

College of Natural Resources

UNIVERSITY OF MINNESOTA ¹⁰⁷

BULLETIN

1994 - 1996

College of
NATURAL RESOURCES

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Introduction

Policies

Bulletin Use—The information in this bulletin and other University bulletins, publications, or announcements is subject to change without notice. University offices can provide current information about possible changes.

This publication is available in alternative formats upon request. Please contact the Office of Admissions, University of Minnesota, 240 Williamson Hall, 231 Pillsbury Dr. S.E., Minneapolis, MN 55455 (612/625-5008).

This bulletin also is available in electronic format on Internet and may be accessed via Gopher.

Equal Opportunity—The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

In adhering to this policy, the University abides by the Minnesota Human Rights Act, Minnesota Statute Ch. 363; by the Federal Civil Rights Act, 42 U.S.C. 2000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; by the Americans With Disabilities Act of 1990; by Executive Order 11246, as amended; by 38 U.S.C. 2012, the Vietnam Era Veterans Readjustment Assistance Act of 1972, as amended; and by other applicable statutes and regulations relating to equality of opportunity.

Inquiries regarding compliance may be directed to Patricia A. Mullen, Director, Office of Equal Opportunity and Affirmative Action, University of Minnesota, 419 Morrill Hall, 100 Church Street S.E., University of Minnesota, Minneapolis, MN 55455 (612/624-9547).

Access to Student Educational Records—In accordance with regents' policy on access to student records, information about a student generally may not be released to a third party without the student's permission.

(Exceptions under the law include state and federal educational and financial aid institutions.) The policy also permits students to review their educational records and to challenge the contents of those records.

Some student information—name, address, electronic (E-mail) address, telephone number, dates of enrollment and enrollment status (full time, part time, not enrolled, withdrawn and date of withdrawal), college and class, major, adviser, academic awards and honors received, and degrees earned—is considered public or directory information. Students may prevent the release of public information only during their terms of enrollment. To do so, they must notify the records office on their campus.

Students have the right to review their educational records. The regents' policy, including a directory of student records, is available for review at 150 Williamson Hall, Minneapolis, and at records offices on other campuses of the University. Questions may be directed to the Office of the Registrar, 150 Williamson Hall (612/625-5333).

Immunization—Students born after 1956 who take more than one University class are required under Minnesota law to submit an Immunization Record form.

The form, which is sent along with the official University admission letter, must be filled out and returned to Boynton Health Service within 45 days of the first term of enrollment in order for students to continue registering for classes at the University. Complete instructions accompany the form.

Extracurricular Events—No extracurricular events requiring student participation may be scheduled from the beginning of study day to the end of finals week. Exceptions to this policy may be granted by the Senate Committee on Educational Policy. The Senate advises all faculty that any exemption granted pursuant to this policy shall be honored and that students who are unable to complete course requirements during finals week shall be provided an alternative and timely opportunity to do so.

Smoke-Free Campus Policy—Smoking is prohibited in all facilities of the University of Minnesota, Twin Cities campus except for designated private residence hall rooms.

Career Opportunities

Some College of Natural Resources (CNR) programs offer excellent employment opportunities. Forest products majors, particularly those pursuing a degree in paper science and engineering, find the job market very strong. Starting salaries for these graduates range from \$38,000 to \$40,000 per year. Urban forestry graduates willing to accept employment in other regions of the United States also enjoy a strong employment outlook.

Forest resources graduates have found an improving job market, partially due to fewer graduates nationwide. Recent budget cutbacks have limited opportunities to some degree, especially with government agencies such as the U. S. Forest Service. Starting salaries for these graduates typically range from \$19,000 to \$26,000 per year. Natural resources and environmental studies is a new curriculum offering. Graduates have experienced relatively good job opportunities. Environmental consulting firms and soil and water conservation

districts are the largest employers of these graduates. Potential employers include federal, state and local government agencies, industry, and nonprofit organizations.

Fisheries and wildlife graduates face a competitive job market. These graduates should (1) be flexible in choosing where to work, (2) maintain above average academic records, (3) gain related work experience before graduation, and (4) earn a master's degree. Starting salaries for fisheries and wildlife graduates typically range from \$18,000 to \$26,000 per year.

CNR offers assistance and advice to students seeking summer jobs and internships in fisheries and wildlife, forestry, forest products industries, outdoor recreation, and the environment, as well as permanent employment after graduation. Job search assistance for all students except forest products majors is provided by the career opportunities coordinator in 135 Natural Resources Administration Building. Students in the forest products paper science and engineering specialization receive assistance in 206 Kaufert Laboratory; all other forest products students, in 240 Kaufert Laboratory. Faculty advise students on job searches, publicize openings, help arrange interviews, and periodically hold information meetings.

Letter from the Dean

Never has there been a more exciting time to be involved in natural resources and environmental sciences. Increasingly we all realize that we have to get much better at managing our resources so as to have environmental, economic, and social health—that one without the others will be meaningless. This is the pursuit of the College of Natural Resources. The educational opportunities you will find described in this bulletin have been developed for students who want to join this quest.

The uses, management, and protection of forest, fish, and wildlife resources are the foci of curricula in forest products, forest resources, recreation resource management, urban forestry, and fisheries and wildlife. The newer program in natural resources and environmental studies is for students with a general interest in how these various resources relate to serving human needs and our ability to deal with our environment. These curricula help students integrate scientific knowledge with the management and communication skills necessary for professional success.

Forests, forest products, recreation resources, fisheries, and wildlife play important roles in the lives of people worldwide, touching on the economic, environmental, social, and cultural well-being of each of us. If you would like to help make the most of these renewable resources and prepare yourself to address the associated environmental issues, I am sure you will find this bulletin presents interesting opportunities.

The College of Natural Resources is recognized nationally for its excellence. We strive to deliver first-rate educational programs aimed at developing professional



leaders and scientific pioneers. The college has been accredited continuously since 1935, when forestry program accreditation was first offered. Graduates have played leadership roles in industry, public agencies, research, and education. Our strength is in the quality of our faculty, students, and staff and in the richness of the University as an educational, scientific, and cultural resource.

A handwritten signature in black ink that reads "Alfred D. Sullivan". The signature is written in a cursive style with a large, prominent "A" and "S".

Alfred D. Sullivan
Dean, College of Natural Resources

General Information



General Information

Mission

CNR's mission is to foster a healthy environment through the discovery and sharing of knowledge about the management, protection, and sustainable use of our natural resources.

Facilities

CNR is based in four buildings on the St. Paul campus: the Natural Resources Administration Building, Green Hall, the Kaufert Laboratory of Forest Products and Wood Science, and Hodson Hall.

The Dean's Office, Office for Student Affairs, Graduate Studies in Forestry Office, Cold Weather Climate Housing Information Center, Forestry Library, and CNR computer laboratory are located in the Natural Resources Administration Building. The Forest Resources Department, Remote Sensing Laboratory, and some Department of Fisheries and Wildlife faculty and graduate student offices are located in Green Hall.

The Forest Products Department is in the Kaufert Laboratory, which has well equipped laboratories for teaching and research in wood products manufacturing, wood chemistry, mechanical testing, biodeterioration, and wood drying. The Department of Fisheries and Wildlife office, library, lecture, laboratory, and faculty facilities are in Hodson Hall. Also on the St. Paul campus, adjacent to college facilities, is the regional headquarters of the North Central Forest Experiment Station of the U.S. Forest Service.

CNR uses several field centers for its programs: The University's *Lake Itasca Forestry and Biological Station* is located in Itasca State Park in north central Minnesota. Minnesota's largest state park embraces 50 square miles of virgin and second-growth forest, bogs, streams, and lakes, including Lake Itasca, the source of the Mississippi River. The station offers housing, dining, library, and laboratory facilities. Fisheries and Wildlife, Forest Resources, and Urban Forestry majors spend a 3½-week summer term at the station studying botany, ecology,

fisheries and wildlife techniques, and forest measurement.

The college's *Cloquet Forestry Center* includes more than 3,700 acres of virgin and second-growth timber in a major forest products manufacturing area of northeastern Minnesota. Forest Resources seniors spend their fall quarter at the center taking 17 credits of field-oriented instruction. Students interact with representatives of local industries and nearby state and federal resource agencies. The center has housing, dining, classroom, laboratory, and library facilities.

The 300-acre *John H. Allison Forest*, about 10 miles from the St. Paul campus, is available for field laboratory work throughout the year.

Other field experiences—such as the industrial forest lands of the southern United States, and the Lake States' forest products mills and factories—are also available to students.

Degrees Offered

Baccalaureate Degrees—The bachelor of science (B.S.) degree is awarded to CNR students who satisfactorily complete 192 required and elective credits in one of five major programs: fisheries and wildlife, forest products, forest resources, recreation resource management, or urban forestry. The B.S. degree is awarded to CNR students who satisfactorily complete 180 required and elective credits in the natural resources and environmental studies program. Curricular requirements are fully explained in the Baccalaureate Programs section of this bulletin. The degree may be earned "with distinction" or "with high distinction."

Graduate Degrees—The master of science (M.S.) and the doctor of philosophy (Ph.D.) in forestry, fisheries, or wildlife conservation, and the master of forestry (M.F.) degrees are offered through the Graduate School in cooperation with CNR. For detailed information, contact the appropriate director of graduate studies, 235 Natural Resources Administration Building

(612/624-2774) for forestry, 200 Hodson Hall (612/624-3600) for fisheries and wildlife, or the *Graduate School Bulletin*. Interested students should apply for admission through the Graduate School, 306 Johnston Hall, 101 Pleasant Street S.E., Minneapolis, MN 55455 (612/625-3014).

Administration

Undergraduate curricula of CNR are organized within three departments: fisheries and wildlife (200 Hodson Hall); forest products (203 Kaufert Laboratory); and forest resources (115C Green Hall), which includes the recreation resource management and urban forestry programs. The college also offers the natural resources and environmental studies curriculum. The chief administrator of each department is the department head.

Each department has a Student Scholastic Standing Committee, composed of faculty members, that is responsible for interpreting and administering college policies and requirements regarding admission, transfer of credit, curricula, academic standards, student credit loads, and other academic matters.

CNR Office for Student Affairs, 135 Natural Resources Administration Building, provides admission, registration, advising, placement, and other assistance to all undergraduates.

Admission

Undergraduates seeking admission to CNR should apply through the Office of Admissions, 240 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-2008). A \$25 nonrefundable application fee is required.

Freshman Admission—High school graduates must submit scores from the Preliminary Scholastic Aptitude Test (PSAT), Scholastic Aptitude Test (SAT), or American College Test (ACT) along with their high school rank percentile (HSR).

The formulas below show how to calculate the ACT or SAT “Aptitude Rating” using a student’s high school rank percentile

and ACT or SAT test scores. If the Aptitude Rating falls at or above the number indicated for the college that a student plans to enter, the student will be admitted automatically, provided the student also has completed the high school preparation requirements below. If the Aptitude Rating falls below the number indicated, the application will be reviewed through the University’s individual review process.

Formula *Minimum Score*

AAR

(ACT Aptitude Rating, for students who have taken the ACT)
 HSR percentile + (2 x ACT composite score) 110

SAR

(SAT Aptitude Rating, for students who have taken the SAT)
 HSR percentile + (SAT verbal ÷ 10 + SAT math ÷ 10) 160

Students seeking admission will be expected to have completed at least the following courses while in high school (grades 9-12):

- 1) **FOUR YEARS OF ENGLISH** with emphasis on writing, including instruction in reading and speaking skills and in literary understanding and appreciation;
- 2) **TWO YEARS OF SOCIAL STUDIES**, including U.S. history;
- 3) **THREE YEARS OF MATHEMATICS**, including one year each of elementary algebra, geometry, and intermediate algebra;
- 4) **THREE YEARS OF SCIENCE**, including one year each of biological and physical science;
- 5) **TWO YEARS OF A SINGLE SECOND LANGUAGE**.

Applicants who attain at least the minimum score and meet course requirements will be admitted routinely. Others will be considered on an individual basis, taking into account factors such as high school performance and educational objectives.

General Information

Transfer Admission—Appropriate credits earned at other accredited colleges and universities or within other units of the University may be applied toward CNR programs. Most students find they must transfer before their junior year to meet residence and upper-level course requirements of CNR.

Credits earned through special examination or Continuing Education and Extension may transfer to CNR.

Adult Special Admission—Students may be admitted, after college approval, as adult specials. Such students are not degree candidates, but complete courses to satisfy individual needs.

Planning to Transfer?

Minnesota's public colleges and universities are working to make transfer easier. You can help if you **PLAN AHEAD, ASK QUESTIONS, and USE PATHWAYS** created by transfer agreements.

Preparing for Transfer

If you are currently enrolled in a college or university:

- Discuss your plans with the campus transfer specialist in the Office for Student Affairs, 135 Natural Resources Administration Building.
- Call or visit your intended transfer college. You should obtain the following materials and information:
 - college catalog
 - transfer brochure
 - information on admissions criteria and on materials required for admission (e.g., portfolio, transcripts, test scores). Note that some majors have limited enrollments or their own special requirements such as a higher grade point average.
 - information on financial aid (how to apply and by what date)
- After you have reviewed these materials, make an appointment to talk with an adviser/counselor in the college or program

you want to enter. Be sure to ask about course transfer and admission criteria.

If you are not currently enrolled in a college or university, you might begin by meeting with a transfer specialist or an admission officer at your intended transfer college to plan the steps you need to take.

Understanding How Transfer of Credit Works

- The receiving college or university decides what credits transfer and whether those credits meet its degree requirements. The accreditation of both your sending and your receiving institution can affect the transfer of the credits you earn.
- Institutions accept credits from courses and programs like those they offer. They look for similarity in course goals, content, and level. "Like" transfers to "like."
- Not everything that transfers will help you graduate. Baccalaureate degree programs usually count credits in three categories: general education, major/minor courses and prerequisites, and electives. The key question is, "Will your credits fulfill requirements of the degree or program you choose?"
- If you change your career goal or major, you might not be able to complete all degree requirements within the usual number of graduation credits.

Applying for Transfer Admission

- Application for admission is always the first step in transferring. Fill out the application as early as you can prior to the deadline. Enclose the application fee.
- Request that official transcripts be sent from every institution you have attended. You might be required to provide a high school transcript or GED test scores as well.
- Recheck to be certain you supplied the college or university with all the necessary paperwork. Most colleges make no decisions until all required documents are in your file.

- If you have heard nothing from your intended college of transfer after one month, call to check on the status of your application.
- After the college notifies you that you have been accepted for admission, your transcribed credits will be evaluated for transfer. A written evaluation should tell you which courses transfer and which do not. How your courses specifically meet degree requirements may not be decided until you arrive for orientation or have chosen a major.
- If you have questions about your evaluation, call the Office of Admissions and ask to speak with a credit evaluator. Ask why judgments were made about specific courses. Many concerns can be cleared up if you understand why decisions were made. If not satisfied, you can appeal. See "Your Rights as a Transfer Student" below.

Your Rights as a Transfer Student

- A clear, understandable statement of an institution's transfer policy.
- A fair credit review and an explanation of why credits were or were not accepted.
- A copy of the formal appeals process.

Usual appeals steps are: 1) Student fills out an appeals form. Supplemental information you provide to reviewers—a syllabus, course description, or reading list—can help. 2) Department or committee will review. 3) Student receives, in writing, the outcome of the appeal. 4) Student can appeal decision to the Office for Student Affairs, 135 Natural Resources Administration Building

- At your request, a review of your eligibility for financial aid or scholarships.

For help with your transfer questions or problems, see your campus transfer specialist.

Financial Aid

Scholarships, grants, loans, and work-study programs available University-wide to eligible

students are administered through the Office of Student Financial Aid, 210 Fraser Hall, 106 Pleasant Street S.E., Minneapolis, MN 55455, or 197 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108 (612/624-1665).

Application forms are available from either of these student financial aid offices and from most Minnesota high school guidance offices. Students should apply as soon after January 1 as possible. The ACT Family Financial Statement is the official need analysis document used in selecting financial aid recipients.

Scholarships and awards available only to CNR students are listed below. These awards are administered by the college's scholarship committees. *Awards may vary each year depending on earnings and availability of funds.* Those available to incoming freshmen and/or transfer students are normally awarded the spring before the academic year of their use. Contact CNR Office for Student Affairs for application information.

CNR Scholarships and Awards

Mary Dwight Akers Loan—Sponsor anonymous. Limited loans as needed and approved by the dean. Up to \$1,000 each.

John H. Allison Scholarship—Sponsored by former members of the Beta Chapter, Tau Phi Delta. For students with special interests in forest economics, forest management, and related areas. One \$500 award annually.

Andersen Corporation Scholarships—Sponsored by Andersen Corporation, Bayport, Minnesota. For forest products juniors and seniors in the marketing and production management specializations on the basis of academic achievement and professional promise. Three \$1,500 awards annually.

Robert C. Bernard Memorial Scholarship—Sponsored by Mrs. Lori Bernard and family and Georgia Pacific Corporation. Established to financially assist a deserving CNR student. One \$1,000 award annually.

R.M. Brown Scholarship—Sponsored by donations to CNR. For a forest resources or

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natural resources and environmental studies senior with a special interest in mensuration or statistics. One \$500 award annually.

Carolind Scholarships—Sponsored by the late Dr. Ralph M. Lindgren. For deserving and outstanding undergraduates. Number per year varies. \$300 to \$400 each.

E.G. Cheyney Memorial Scholarships—Sponsored by the Minnesota Forestry Alumni Association. For juniors or seniors who have demonstrated outstanding ability and improvement in creative writing and speaking skills. One \$300 award annually.

Caleb Dorr Scholarships—Sponsored by the Caleb D. Dorr Fund. For the student in each class with the highest grade point average. Four \$500 awards annually.

Edward A. Everett Memorial Scholarship—Sponsored by the late Edward A. Everett. For upper division forestry students on the basis of financial need, acceptable scholarship, and professional promise. Number per year varies. \$500 each.

Federated Garden Clubs of Minnesota Scholarships—Sponsored by the Federated Garden Clubs of Minnesota. For forestry students on the basis of special interest in urban forestry, academic aptitude, and personal attributes. Number and amount per year varies. Usually \$200 each.

Forest Products Marketing Scholarships—Sponsored by the Forest Industry Fraternity of Minneapolis and St. Paul. For deserving and promising forest products juniors or seniors in the marketing specialization. One or two \$1,000 awards annually.

Thomas W. French Memorial Scholarship—Sponsored by Dr. David and Audrey French. For junior and senior students. Recipient must have strong interest in urban forestry and a high degree of professional promise. One \$1,000 award annually. (Amount may vary each year.)

Robert L. Goudy Memorial Scholarships—Sponsored by Mr. and Mrs. F.X. Corbett, Georgetown, Colorado. For outstanding incoming forest resources

transfer students on the basis of academic ability, vocational promise, extracurricular activities, personality, and financial need. Two \$300 awards annually.

Samuel B. Green Scholarship Medal—Sponsored by the late Mrs. Samuel B. Green in memory of her husband. For the senior with the highest grade point average at the end of fall quarter. One honorary medal annually.

Frank H. Kaufert Scholar—Sponsored by CNR alumni and friends. For students within three quarters of graduation on the basis of academic accomplishments, progress toward degree, and leadership and professional promise. One \$2,500 award annually.

Dayton Kirkham Scholarship—Sponsored by the late Mr. Dayton Kirkham. For entering high school seniors and transfer students on the basis of outstanding academic ability and strong desire to pursue careers in natural resource management. One to two \$750 awards (\$4,500 total for four years) are available to entering first-year students and three \$1,250 awards (\$2,750 total for two years) to transfer students.

Timothy B. Knopp Memorial Scholarship—Sponsored by the Timothy Knopp family and friends for a junior or senior on the basis of demonstrated environmental awareness and interest in the ethics of conservation, and a high degree of professional promise and scholarship. One \$500 award annually.

Ludden Scholarship—Sponsored by the Ludden Trust Fund of the Institute of Agriculture, Forestry, and Home Economics. For undergraduates on the basis of professional commitment, financial need, student organization involvement, and personal attributes. One award of \$900 annually.

Oscar L. Mather Scholarship—Sponsored by the Minnesota Federation of Women's Clubs and Mrs. Oscar L. Mather, Madison Lakes, MN, in memory of her husband. Book awarded to a forestry student displaying outstanding scholarship, leadership, and character.

Ken Merriam Scholarship—Sponsored by Dr. Lawrence Merriam. For a physically handicapped and/or recreation resource management junior or senior. Professional promise emphasized. One \$500 award annually.

William R. Miles Scholarship—Sponsored by the William R. Miles Fund. For a forest resources junior on the basis of professional promise, character and integrity, academic aptitude, and leadership. One or more \$500 awards annually.

C.J. Mulrooney Endowed Memorial Scholarships—Sponsored by WCCO AM and FM Radio and Television. For forest products juniors and seniors with a specialization in marketing or production management. One award of \$2,500 annually.

Natural Resources Alumni Society Scholarship—Sponsored by the Natural Resources Alumni Society. For juniors and seniors on the basis of student involvement in college-related activities, professional promise, leadership, personal attributes, and academic aptitude. Six awards of \$1,000 annually.

Leiton Nelson Scholarship—Sponsored by L.E. Nelson Endowment. For a forest resources or forest products senior demonstrating outstanding academic ability and strong professional promise. One \$1,200 award available alternate years. (Available to qualified graduate student for interim year.)

Charles Lathrop Pack Awards in Forestry—Sponsored by the Charles Lathrop Pack Foundation. For regularly enrolled undergraduates who write the best essays on current forestry or conservation subjects. Three awards annually of \$300, \$200, and \$100.

Paper Science and Engineering Scholarships—Sponsored by manufacturing and supply companies representing the pulp, paper, and allied support industries, and by paper science and engineering alumni. Administered by the University of Minnesota Paper Science and Engineering Council and the Department of Forest Products. For paper science and engineering students on the basis

of academic performance and professional promise. \$600 for freshmen, \$1,200 for sophomores, \$1,800 for juniors, and \$2,400 for seniors—total of \$6,000. Current sponsors include Akrosil, Division of International Paper; Albany International; Appleton Papers, Inc.; BE&K, Inc.; Betz Laboratories, Inc.; Blandin Paper Company; Boise Cascade Corporation; Buckman Laboratories, Inc.; Champion International; Consolidated Papers Foundation, Inc.; Cross Pointe Paper Corp.; Diversey Wyandotte; Englehard Corporation; H.B. Fuller Company Foundation; Henkel Chemical Company; Hennepin Paper Company; Hercules, Inc.; Jefferson Smurfit; Lake States Section, Technical Association of the Pulp and Paper Industry (TAPPI); Lake Superior Paper Industries; 3M Paper Technology Center; Minnesota Forestry Association; Nalco Chemical Company; Nekoosa Packaging; North Central Division, Packaging Corporation of America; Paper Industry Management Association (PIMA); Penford Products Company; Potlatch Foundation for Higher Education; Repap Wisconsin, Inc.; Waldorf Corporation; and alumni and personal contributors.

Kimberley Ann Paulsen Scholarship—Sponsored by the Paulsen family and friends. For undergraduates in the natural resources and environmental studies curriculum on the basis of financial need, environmental awareness, leadership, and academic achievement. One \$500 award annually.

Robert D. Peterson Writing Skill Award—Sponsored by the Robert D. Peterson Award Fund. Open to all sophomores, juniors, and seniors. Recognizes outstanding effort and ability related to communication skills. One \$1,000 award annually.

Pheasants Forever, McLeod County Chapter Scholarship—Sponsored by the McLeod County, Minnesota, Chapter of Pheasants Forever. For seniors in fisheries and wildlife on the basis of academic achievement and professional promise. One \$1,000 award annually.

General Information

A.G. Roan Scholarship—Sponsored by Mrs. A.G. Roan and family. Available to a junior or senior demonstrating a strong conservation ethic. One \$500-\$1,000 award annually.

Henry Schmitz Forest Products Engineering Scholarship—Sponsored by Dr. Stanley J. and Mertie W. Buckman, Memphis, Tennessee. For a forest products junior or senior on the basis of academic achievement and professional promise. One \$1,000 award annually.

Henry Schmitz Student Leadership Awards—Sponsored by Dr. Stanley J. and Mertie W. Buckman, Memphis, Tennessee. For juniors or seniors on the basis of demonstrated leadership and acceptable scholarship. Up to four \$300 awards annually.

Augustus L. Searle Scholarship—Sponsored by Augustus L. Searle. For women in the college with preference given to Minnesota residents. Number per year varies. \$500 each.

J. Donald Smith Award—Sponsored by J. Donald Smith Memorial Fund. Book awarded to a senior in fisheries and wildlife on the basis of academic achievement and professional promise.

K.E. Winsness Scholarship—Sponsored by family and friends of the late Professor Winsness. For a junior or senior in CNR who is pursuing a degree while coping with unusual hardships. One \$500 award annually.

Helen A. Young Memorial Scholarship—Sponsored by John Young, Rochester, Minnesota. To help qualified, competent, and needy students start and complete their forestry education. One \$200 award annually.

Student Activities

Governance—Students may participate in governance activities at the department, college, and campus levels. Within each department, several committees (including curriculum committees) have student representatives. Students also serve on CNR committees and on the college's Student-Faculty Board, which advises the dean on student problems and concerns. Students

also participate in the St. Paul Campus Board of Colleges, which directs student activities and acts as a liaison between the student body and administration, and on the Student Center Board of Governors, which establishes programs, operation policies, and budgets for the St. Paul Student Center.

Clubs—Student clubs in the college include the Environmental Studies Club, Forestry Club, student chapter of the Society of American Foresters, Recreation Resource Management Club, Forest Products Club, Technical Association of the Pulp and Paper Industry (TAPPI), Paper Industry Management Association (PIMA), Fisheries and Wildlife Club (with an affiliated student chapter of the Wildlife Society), and Minnesota Women in Natural Resources Student Organization. Through these clubs, students hold an annual Forester's Day, support a scholarship fund by selling Christmas trees, attend events such as the Midwest Fish and Wildlife Conclave and the Midwestern Foresters Conclave, and produce and market wood identification kits. Xi Sigma Pi Honor Society holds an annual banquet and administers a student speakers bureau.

University Counseling and Consulting Services

University Counseling and Consulting Services (UCCS) offers counseling for academic, career, personal, or relationship concerns. Besides counseling, UCCS features a variety of services. The Career Resource Center and the Learning and Academic Skills Center offer workshops, courses, and materials for career development or academic skills improvement. The Organizational Development Program offers consultation, assessment, team building, conflict mediation, training, and workshops. UCCS's Measurement Services office administers tests; scores exams, surveys, and research instruments for University faculty; and operates the Minnesota Statewide Testing Program for Minnesota elementary and secondary schools. The Testing Center administers admissions, placement, and national tests.

Baccalaureate Programs



Baccalaureate Programs

Six Major Curricula

CNR offers six major curricula leading to the bachelor of science (B.S.) degree: (1) fisheries and wildlife; (2) forest products (with specializations in marketing, production management, paper science and engineering, and wood science); (3) forest resources; (4) natural resources and environmental studies; (5) recreation resource management; and (6) urban forestry. Because the first year of coursework is somewhat similar, students may transfer between curricula at the end of their freshman year with little loss of credit.

Academic Policies

Adviser—Each student, with adviser assistance, is responsible for learning curricular and graduation requirements and developing a course program and timetable to meet them. Freshmen and first-year transfer students in the forest resources, fisheries and wildlife, natural resources and environmental studies, recreation resource management, and urban forestry curricula are assigned an adviser in the CNR Office for Student Affairs. Forest products students are assigned a faculty adviser within that department.

Credit Load—The typical course load for each quarter is 14 to 18 credits, but may vary according to individual ability and circumstances. A credit requires an average of three hours of work per week, including class, laboratory, and preparation time. To carry more than 21 credits, a student must have at least a B average the previous quarter and permission from the department Student Scholastic Standing Committee.

Repeating Courses—Students may repeat a course even if a passing grade was received. The grade received for the course the second time becomes the permanent grade. The original grade and credits are not included in the student's cumulative number of completed credits or grade point average. It is the student's responsibility to report any repeated courses to the CNR Office for Student Affairs.

Auditing—Students who audit a course pay regular tuition and fees, but do not take examinations or earn grades or credits.

Extra Credit—Students may register for one to three extra credits in some courses with the instructor's approval. The extra work is mutually agreed upon and conducted independently of class. Contact the CNR Office for Student Affairs for more information.

Independent Study—With the instructor's approval, students may take regularly offered courses through independent study without attending class. Contact the CNR Office for Student Affairs for more information.

Class Attendance—When students willfully miss class, instructors are under no obligation to help them make up work. However, the following reasons justify absences and makeup requests: (a) illness certified by the Boynton Health Service or another physician; (b) death or serious illness in the immediate family; (c) participation, certified by the Office for Student Affairs (Office of the Registrar—St. Paul, 190 Coffey Hall), in University-approved cocurricular activities; and (d) approval of the absence by the department Student Scholastic Standing Committee, which becomes involved only in emergencies or as an appeal agency.

Class Standing—Students are classified according to the number of credits they have completed: freshmen—45 credits or fewer, sophomores—46 to 90 credits, juniors—91 to 135 credits, seniors—136 credits or more. Freshmen and sophomores are considered lower division; juniors and seniors, upper division.

Registration—The quarterly *Class Schedule* contains general registration information.

Forest resources and forest products juniors and seniors and fisheries and wildlife majors may sign their own course request forms. All other students in the college, regardless of class standing, must have their advisers sign their registration materials.

Students who find it necessary to cancel or add courses after registering for the quarter should contact the CNR Office for Student Affairs for instructions and forms.

Cancel/add requirements		
Week of class	Required to cancel	Required to add
Week 1	--	--
Week 2	--	--
Weeks 3-6	--	Instructor and college scholastic committee approval
Weeks 7-10	College scholastic committee approval	College scholastic committee approval

If a student withdraws from the college at any time, all classes should be officially canceled. Refer to the *Class Schedule* for refund information.

Grading—Two grading options, A-B-C-D-F and S-N, are offered, although use of the S-N option is limited. A grading option is chosen for each course at the time of registration. The following restrictions on the use of the S-N option apply to CNR students:

1. A maximum of 25% of the residence credits presented for the baccalaureate degree may be in courses in which a grade of S was received.
2. All required courses must be taken under the A-F option. Prerequisites for required courses and courses in the major must also be taken A-F unless an exception is made.

University grading policies and letter definitions are explained in the *Class Schedule*.

Honor System—Under an honor system adopted on the St. Paul campus, students accept responsibility for the supervision of student behavior during examinations and pledge not to give or receive aid. A student or faculty member who observes an act of dishonesty may report the incident to the college Honor Case Commission, a committee of the Student-Faculty Board. For more information about how the honor system works, contact the CNR Office for Student Affairs.

Satisfactory Progress—Students in CNR are expected to meet certain minimum academic standards. Students not meeting these standards are subject to probation and suspension by their department Student Scholastic Standing Committee. The following chart details conditions under which these actions will be taken:

Conditions for probation and suspension		
Student status	Probation	Suspension
	Cumulative GPA after first two quarters in college is below	Cumulative GPA after first two quarters in college is below
Freshman	1.90	1.60
Sophomore	2.00	1.90
Upper Division	2.00	1.90
	or any combination of three D and N or F grades in any one quarter	or any combination of three D and N or F grades in three consecutive quarters or two consecutive quarters of probation

The Student Scholastic Standing Committee places a student on probation and informs him or her that repeated low academic performance will lead to a suspension. A suspension lasts two academic quarters, and reinstatement in the program requires a petition to the department Student Scholastic Standing Committee. Students placed on probation or suspension may appeal the action.

The Itasca Session for fisheries and wildlife and forest resources students is not counted as a separate quarter. Itasca grades are included with the fall quarter grades.

Students who are performing poorly academically should contact their adviser as soon as possible to correct the problem. Probation and suspension are rarely waived.

Baccalaureate Programs

To appeal a suspension, the student must obtain a Petition for Reinstatement from the CNR Office for Student Affairs. The petition must be completed and turned in to the chair of the department Student Scholastic Standing Committee, along with any supporting documents. The final decision rests with the department Student Scholastic Standing Committee which will act on the petition and inform the student in writing.

Policy Waivers—Occasionally it may be to the educational advantage of both the student and the department to waive an academic policy or curricular requirement, provided the basic spirit of the regulation is maintained. A student may petition for a departure from normal procedure. If approved by the adviser, the petition is routed to the department Student Scholastic Standing Committee for a final decision. Contact the CNR Office for Student Affairs for more information.

Graduation Requirements

To receive the bachelor of science (B.S.) degree, CNR students must meet the following requirements:

1. Complete a minimum of 192 credits (180 for natural resources and environmental studies), including required and elective courses in the chosen curriculum. No more than 9 credits in physical education may be applied toward the degree. No more than 9 credits in music may be applied as elective credits toward the degree.
2. Achieve a GPA of 2.00 or higher with no more than 5 credits of D in required forest resources, forest products, natural resources and environmental studies or fisheries and wildlife designator courses and 5 credits of D in other required courses.
3. Satisfy liberal education requirements (see below).
4. Satisfy residence and other general University requirements for graduation.

Graduation with Honors—The B.S. degree may be earned “with distinction” or “with

high distinction.” Students who achieve a GPA of at least 3.85 may be recommended to the faculty for graduation with high distinction. The recommendation is made on the basis of scholarship and other evidence of satisfactory achievement in the curriculum. Students who achieve a GPA between 3.35 and 3.85 may be recommended for graduation with distinction.

Transfer students who have completed less than half the credits required for graduation while in residence in CNR are not eligible to graduate with honors.

Quality Credits—The number of free elective credits required for graduation may be decreased by one for every five grade points in excess of those required to reach a GPA of 3.35. Free electives may be chosen without regard to curricular or college requirements. No more than one-twelfth of the total number of credits required for graduation may be gained through quality credits.

Special Examinations for Credit—

Currently enrolled students who believe their knowledge of a subject is equal to that required to complete a particular course may request to take an examination for credit. If the Student Scholastic Standing Committee and the department approve, arrangements can be made with an appropriate instructor to take an examination. Usually no grade is assigned. A \$30 fee is assessed for each examination. Credit by special examination is not granted for language or mathematics courses taken in high school.

College Level Examination Program

(CLEP)—Students may earn credit for the CLEP social science and humanities examinations prepared by the College Entrance Examination Board. CLEP also offers a number of subject examinations for credit. Information may be obtained from the CNR Office for Student Affairs.

Liberal Education Requirements—The University of Minnesota believes that all students, regardless of their area of specialization or vocational goals, should have a broad liberal education. Therefore, in addition to its own curricular requirements,

CNR requires coursework in each of four liberal education categories. The minimum number of credits required in each category and a partial list of courses follow. Note that individual CNR curricula may require more credits in any of the four categories and place restrictions on which courses to complete and when. Students in doubt about the use of specific courses should consult the CNR Office for Student Affairs.

The University of Minnesota is implementing new liberal education requirements fall 1994. Check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768), for changes affecting students with 38 or fewer credits enrolling fall quarter 1994 and later. See page 18 for a general description of the new liberal education requirements.

All CNR students must take Rhet 1101, 1104, 1151, 1222, 3562 (except that recreation resource management majors may substitute 3551 for 3562). Students who pass an English proficiency examination, administered by the Rhetoric Department, may be exempted from Rhet 1101. Students with above average writing skills may also take exemption examinations, administered once each quarter by the Rhetoric Department, for Rhet 3562. Note that advanced composition courses taken at other institutions can be used to satisfy the Rhet 3562 requirement.

CNR accepts CLEP scores at the 75th percentile or higher for exemption from up to 8 credits in category D and, in special cases by petition, in category C.

Computer Competency—Computer skills are necessary for today's student. As a student in CNR, you will use computer applications in your coursework regardless of the major you choose. You will be expected to have basic computer competency in word processing, spreadsheets, database management, and telecommunications. Your level of computer competency will be assessed in the advising process. If you lack needed skills, you will be given advice on which courses you will be required to take in order to learn those skills.

- A. Communication, Language, Symbolic Systems**—26 credits minimum
This category is automatically fulfilled by core curriculum required courses in all CNR majors.
- English and Foreign Language Communication Skills*
Comp 1011, 1012, 1013, 1027
Rhet 1101, 1104, 1151, 1222, 3254, 3266, 3562
Spch 1101, 1102, 3605
 - Logic and Philosophic Analysis*
Clas 1048
Phil 1001, 1005, 5105, 5201
 - Mathematics*
Math—all courses except 1005-1006, 5703
Stat 3011, 3091, 5021
- B. Physical, Biological, and Analytical Sciences**—25 credits minimum
This category is automatically fulfilled by core curriculum required courses in all CNR majors.
- The Physical Universe*
Ast 1011, 1021
BioC 1401, 3031
Chem 1001-1002, 1051-1052
Geo 1001, 1002, 1111
Phys 1041, 1042, 1045, 1046, 1251, 1252, 1253
Soil 1020, 3125
 - The Biological Universe*
Biol 1009, 1103, 1106, 1201
PBio 1009, 1012
Ent 1005
GCB 3022
Phsl 1002
- C. The Individual and Society**—8-22 credits minimum, depending on curriculum (with no more than 6 credits in any one discipline)
The following courses are suggested; students are not limited to this list. See your *Class Schedule* or adviser for additional courses in Category C.
- Analysis of Human Behavior and Institutions*
Afro 1025, 3055, 3061-3062, 3072, 3091
AgEc 1101, 1102
Anth 1102
Econ 1001-1002, 1004-1005, 3001-3002
FR 1201 (except fisheries and wildlife)
FSoS 1001, 1025
Geog 1301, 1401
Pol 1001, 1025, 1026, 1027
Psy 1001, 1004-1005
Rhet 5165
Soc 1001, 3101
Spch 3401
 - Development of Civilization: Historical and Philosophical Studies*
Afro 1015, 1025, 1441
Clas 1001, 1002, 1003, 1004, 1005, 1006, 1042, 3071, 3072, 3073
Fren 3501, 3502
Hist—all courses through 1954
Ital 3501, 3502
Jour 5601
Phil 1002, 3001, 3002, 3003, 3004
Pol 1041
Rhet 1310, 1311, 3375
Span 3501, 3502

Liberal Education Requirements

(effective fall 1994 and later for students enrolling with 38 or fewer credits)

A liberal education introduces you to the modes of inquiry and subject matter of the major branches of knowledge, including the factual information and theoretical or artistic constructs that form their foundations; the "ways of knowing"—the kinds of questions asked and how insight, knowledge, and data are acquired and used; the changes over time of their central ideas or expressive forms; and the interrelationships among them and with human society in general. To these ends, study by all undergraduate students on the Twin Cities campus is guided by a common framework.

The Diversified Core Curriculum

Physical and Biological Sciences. Comprehension of physical and biological principles; understanding of and ability to use the methods of scientific inquiry—the ways in which scientists investigate physical and biological phenomena; and appreciation of the importance of science and the value of a scientific perspective.

Requirement: A minimum of three courses totaling at least 12 credits, including one course with a laboratory or field experience in the physical sciences and one course with a laboratory or field experience in the biological sciences.

History and Social Sciences. Knowledge of how historians and social scientists describe and analyze human experiences and behavior; study of the interrelationships among individuals, institutions, structures, events, and ideas; understanding of the roles individuals play in their historical, cultural, social, economic, and political worlds.

Requirement: A minimum of three courses totaling at least 12 credits, including one course with historical perspective.

Arts and Humanities. Understanding of approaches to the human condition through works of art, literature, and philosophy; knowledge of how artists create and humanistic scholars think; ability to make aesthetic judgments.

Requirement: A minimum of three courses totaling at least 12 credits including courses in two of the following: literature, philosophical perspective, and visual or performing arts.

Mathematical Thinking. Acquisition of mathematical modes of thinking; ability to evaluate arguments, detect fallacious reasoning, and evaluate complex reasoning chains; appreciation of the breadth of applications of mathematics and its foundations.

Requirement: A minimum of one course totaling at least four credits.

The Designated Themes of Liberal Education

The designated themes of liberal education offer a dimension to liberal learning that complements the diversified core curriculum. Each of the themes focuses on an issue of compelling importance to the nation and the world, the understanding of which is informed by many disciplines and interdisciplinary fields of knowledge.

Requirement: A minimum of six courses (or five courses if one includes an approved practicum), including one course in each of the following:

Cultural Diversity. Understanding of the roles gender, ethnicity, and race play in structuring the human experience in and developing the social and cultural fabric of the United States.

International Perspectives. Comprehension of the ways in which you are part of a rapidly changing global environment dominated by the internationalization of most human endeavors.

Environment. Knowledge of the interaction and interdependence of the biophysical systems of the natural environment and human social and cultural systems.

Citizenship and Public Ethics. Reflection on and determination of a clearer sense of your present and future civic relationships and your obligations to the community.

Writing Skills *(effective 1995)*

The ability to communicate effectively is a hallmark of a liberally educated individual and a key to a successful and satisfying life. To encourage refining of writing skills, the liberal education curriculum includes both writing courses and writing across the curriculum.

Requirement: one writing course and four courses certified as writing intensive.

You may satisfy the liberal education requirements with a number of courses and credits different from those of other students because some courses serve multiple goals in the curriculum; e.g., some courses will satisfy a diversified core requirement and a designated theme requirement, and other courses will satisfy the requirements for each of two themes. Thus, you may satisfy the designated theme requirements with a smaller number of courses than is stated in the requirement. Each quarter, the *Class Schedule* will publish the requirements and list all courses that satisfy them.

In addition, the *Class Schedule* will list which of these courses are offered that quarter and which are tentatively scheduled for the subsequent quarters during the academic year.

D. Literature, Humanities, and Fine Arts—8 credits minimum

1. *Literature*
 Engl—all literature courses
 Foreign languages—all literature courses
 Rhet—all literature and humanities courses
2. *The Arts*
 Afro 1301, 3105, 3301
 Arch 1021, 1022, 1023
 ArtH—all courses except 5521, 5950, 5960, 5970, 5990, 5991
 ArtS—all courses except 3530, 3970, 3980, 5530, 5970
 Dsgn 1501, 1521
 Mus—all courses except 1052, 1053, 1340, 1351, 1602, 3970, 3980, 5253, 5330, 5340, 5364, 5365, 5540, 5667, 5950
 Th—all courses except 3412, 3980, 5321, 5540, 5950, 5970

Itasca Session—Forest resources, urban forestry, and fisheries and wildlife majors are required to complete a 3½-week Lake Itasca Forestry and Biological Station summer term between their freshman and sophomore or sophomore and junior years. To attend, students must have completed 40 credits and attained a minimum cumulative GPA of 2.00. Forest resources and urban forestry students must also have completed the following courses with a grade of C or better: Biol 1103, Chem 1001 or 1051, and Math 1008 (students with a C or better in high school trigonometry are exempt from Math 1008). Fisheries and wildlife students must have completed the following courses with a grade of C or better: Biol 1009, 1103, and 1106. The session is also open to students who are not enrolled in CNR.

All transfer students must provide the CNR Office for Student Affairs with transcripts of all coursework and an application by July 15 before the start of the Itasca Session they wish to attend.

Cloquet Session—Students in forest resources are required to complete the Cloquet Forestry Session in the fall of their senior year. To attend, students must have attained a minimum cumulative GPA of 2.00 at the end of the preceding quarter and completed the Itasca Session and FR 1100, 3103, 3300, 5100, 5114, 5200, 5212, 5215, 5232, Soils 1020, and FW 3052.

Special Learning Opportunities

Minnesota-Idaho Student Exchange—

Forest resources students at the University of Minnesota who are pursuing a management or biological sciences emphasis may study timber harvesting in Idaho during their senior year under an exchange agreement with the University of Idaho. Minnesota students return from this study in Idaho to be awarded their baccalaureate degree from the Department of Forest Resources. In turn, Idaho students take coursework in paper science and engineering at the University of Minnesota.

Forest Products Cooperative Education

Program—Students in this program alternate periods of employment in their career fields with periods of academic study. The program leads to a B.S. in forest products, with a specialization in paper science and engineering, production management, marketing, or wood science. Full-time students who have declared a major in forest products and who have a 2.70 GPA may apply.

Students must complete at least two quarters of academic study before their first quarter of work. At the end of each work quarter, students must submit a written report on their work assignments and learning experiences to a faculty member. Successful reports are graded "S" (satisfactory) and 1 credit is awarded for completing a work quarter. Continuation of the program is based on indication of normal progress toward the degree, a 2.50 cumulative GPA, and satisfactory work progress. For more information, contact Dr. James Bowyer, Forest Products Department Head, 209 Kaufert Laboratory (612/624-4292).

Fisheries and Wildlife Field Trip—

Fisheries and wildlife majors are eligible to participate in a field trip during spring break of their senior year. Selection for participation is competitive, based on previous academic performance. Students travel with a faculty member or graduate student(s) to different regions of the United States to observe and discuss ongoing

Baccalaureate Programs

fisheries and wildlife management activities. Local agency personnel provide on-site information. Selected students will register for one credit of FW 5398—Special Problems in Wildlife, either during winter or spring quarters.

Study Abroad—CNR students have many opportunities to study abroad. Study in English is possible at a number of sites. If a University of Minnesota program does not meet a student's needs, many other options are available.

Identifying Study Abroad Opportunities—The *Study Abroad Catalog* describes the broad range of opportunities for University of Minnesota students to study in another country as part of their degree program. Students can learn more about these options through an advising appointment at the International Study and Travel Center (ISTC), 102 Nicholson Hall (612/626-9000). After identifying one or more options of interest, students should see a Global Campus adviser in 104 Nicholson (612/625-3379) for detailed program information and credit and financial aid planning.

Study Abroad Opportunities in Natural Resources—Two types of study abroad that can especially enhance degree work in CNR are field study and integrated classroom study. Minnesota Studies in International Development (MSID) is a field study program offering two-quarter winter/spring grassroots internships in Ecuador, India, Jamaica, Kenya, Morocco, or Senegal, preceded by on-campus preparatory courses in the fall. The Student Project for Amity among Nations (SPAN) consists of summer overseas research on a topic of the student's choosing, preceded by a year's on-campus preparation and followed by project writeup in the fall; the four destinations change from year to year. The University also cosponsors two specialized options for CNR students: a tropical biology/conservation program in Costa Rica and a marine biology program in Denmark.

Integrated classroom study programs permit students to take regular university courses alongside host-country nationals.

The University's student exchanges and consortium memberships provide access to universities in many countries. Conservation and resource management curricula taught in English are available in Australia, Canada, Fiji, Finland, the Netherlands, the Philippines, and the United Kingdom. Students with sufficient language fluency may instead choose to study in Dutch (the Netherlands), Finnish (Finland), French (France), German (Germany), Italian (Italy), Korean (South Korea), Portuguese (Brazil), Spanish (Argentina, Colombia, Spain, Uruguay), Swedish (Finland, Sweden), or Thai (Thailand).

Other Study Abroad Opportunities—CNR students need not necessarily seek credit in their major. Study abroad is encouraged for language acquisition or cultural learning. The resulting credits can often be used as electives. The University and other institutions sponsor a broad range of intensive language and area studies programs. Contact ISTC for more information.

Credit and Financial Aid—Advance planning and CNR endorsement are essential to assure that credit from study abroad fits smoothly into the student's degree program. Students who enroll in a University of Minnesota program will receive procedural information from the sponsoring office on campus. Those who select any other option should make an appointment with a Global Campus adviser (104 Nicholson Hall, 612/625-3379) as early as possible to discuss credit procedures and obtain a Foreign Study Checklist. Through the checklist, the CNR Office for Student Affairs, 135 Natural Resources Administration Building, will record agreements concerning credit. The checklist also helps maintain the student's enrollment status and financial aid eligibility while abroad.

For nearly all study abroad programs, students can arrange to retain their University financial aid eligibility and/or defer past loans. Additional financial aid is available for some programs. Contact ISTC for more information.

Fisheries and Wildlife

This curriculum offers basic education in the biological and physical sciences and related nonscience disciplines to provide the broad background necessary for professional careers in fisheries and wildlife, natural resources, and other biological sciences. The program emphasizes basic principles and quantitative approaches to fisheries and wildlife conservation. Undergraduate-level study will satisfy only minimum requirements for professional employment; graduate-level study will enhance career opportunities. (The master's degree is required for many management, administrative, and research positions. The doctorate may be required for some positions and for college teaching.)

All students take the core curriculum of 167-178 credits, including six credits at the Itasca Session and three credits of a senior project, completed as a group activity with classmates over two quarters. The 14-25 elective credits may be used for concentration in a specific field of interest or spread among different disciplines. Electives are chosen in consultation with the student's adviser.

The curriculum described below applies to students who have accumulated 39 or more credits before fall quarter 1994. Students with 38 or fewer credits should check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768).

Freshman and Sophomore Years—88-91 credits

A. Communication, Language, and Symbolic Systems—29-32 required credits

- Rhet 1101—Writing to Inform and Persuade (4)
- Rhet 1104—Library Research Methods (1)
- Rhet 1151—Writing in Your Major (4)
- Rhet 1222—Public Speaking (4)
- Rhet 3266—Communication, Discussion, in Small Group Decision Making (4)
 - or Spch 3411—Small Group Communications Processes (4)

Choose one of the following groups:

- Math 1251, 1252—One-Variable Differential and Integral Calculus I-II (4,4) and Math 1261—Algebra and Geometry of Euclidean Space (4)
 - or Math 1251, 1252—One-Variable Differential and Integral Calculus I-II (4,4) and Phil 1001—Introduction to Logic (5)
 - or Math 1131—Finite Mathematics (5) and Math 1142—Short Calculus (5) and Phil 1001—Introduction to Logic (5)

B. Physical, Biological, and Analytical Sciences—38 required credits

- Biol 1009—General Biology (5)
- Biol 1103—General Botany (5)
- Biol 1106—General Zoology (5)
- Biol 5041—Ecology (4)
- Chem 1051—Chemical Principles I (4)
- Chem 1052—Chemical Principles II (4)
- FR 1201—Conservation of Natural Resources (3)
- FW 1001—Orientation in Fisheries and Wildlife (1)
- NRES 3010—Ethics and Values in Resource Management (3)
- PBio 3201—Introductory Taxonomy (4)
 - or PBio 1009—Minnesota Plant Life (4)

C. The Individual and Society—13 required credits

- AgEc 1102—Principles of Macroeconomics (4)
- Mgmt 3001—Fundamentals of Management (4)
 - or Mgmt 3002—Psychology in Management (4)
 - or IR 3010—The Individual in the Organization (4)
- Pol 1001—American Government and Politics (5)

D. Literature, Humanities, and Fine Arts—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Junior and Senior Years—79-87 credits

Itasca Session—6 credits

- FR 3106—Important Plants in Fisheries and Wildlife Habitats (1)
- FW 3600—Fisheries and Wildlife Field Techniques (5)

Required Courses—73-81 credits

- BioC 1401—Elementary Biological Chemistry (4)
 - or Chem 3301, 3305—Elementary Organic Chemistry I and Lab (4,2)
- EEB 5608—Ecosystems: Form and Function (3)
 - or EEB 5014 Ecology of Plant Communities (5)
- EEB 5156—Comparative Animal Physiology (5)
 - or AnSci 3301—Systemic Physiology (6)
- EEB 5044—Evolution (4)
- EEB 5601—Limnology (4)
 - or Geo 1601—Oceanography (4)
- EEB 5136—Ichthyology (4)
- FW 5129—Mammalogy (5)
 - or EEB 5134—Introduction to Ornithology (5)
- FW 5601—Assessment and Management of Vertebrate Populations (5)
- FW 5603—Ecology and Management of Fish and Wildlife Habitats (4)
- FW 5604—Fishery and Wildlife Management (4)
- FW 5701, 5702—Senior Project (1,2)
- GCB 3022—Genetics (4)
- Geo 1001—Introduction to Geology (4) and Geo 1021—Introduction to Geology Lab: Geology of Minnesota (1)
- Phys 1041-1042—Introductory Physics (5,5)
 - or Phys 1104 and 1105—General Physics (4,4) and Physics 1107 and 1108—General Physics Laboratory (1,1)
- (For students considering graduate school the 1104/1105 series plus Phys 1106 and 1109 are recommended.)
- Rhet 3562—Writing in Your Profession (4)
- Stat 3011-3012—Statistical Analysis (4,4)
 - or Stat 5021—Statistical Analysis (5)

Baccalaureate Programs

Suggested Electives—12-25 credits

Choose from this list. Unlisted courses may be taken after consultation with your adviser.

EEB 3111—Introduction to Animal Behavior (4)

EEB 5052—Theoretical Population Ecology (4)

FR 5100—Silviculture (4)

FR 5200—Aerial Photo Interpretation (3)

FR 5212—Natural Resources Inventory (4)

FR 5231—Range Management (3)

FR 5240—Natural Resource Policy and Administration (3)

FR 5262—Remote Sensing of Natural Resources (4)

FW 5455—Aquaculture (3)

FW 5459—Fish Physiology (4)

FW 5460—Pollution Impacts on Aquatic Systems (3)

FW 5461—The Behavior of Fishes (2)

FW 5570—Avian Conservation (4)

FW 5620—Geographic Information Systems for Fisheries, Wildlife, and Biological Conservation (4)

NRES 3060—Water Quality in Natural Resource Management (3)

PA 5721—Environmental Policy I (3)

Total Graduation Requirements—192 credits

Required courses listed above (167-178) and electives (14-25 credits).

Fisheries and Wildlife Minor

This minor enables students in the natural resource areas or other fields such as communications and education to develop a secondary concentration in fisheries and wildlife. An overview of fish and wildlife natural history and the general principles applied to managing their populations and habitats is provided. Open to students who have completed the required background courses or their equivalent; the minor is declared once minor core and optional courses are completed.

Required Background Courses—19-20 credits

Biol 1103—General Botany (5)

Biol 1106—General Zoology (5)

Biol 5041—Ecology (4)

FW 1001—Orientation in Fisheries and Wildlife (1)

One vertebrate biology course from the following:

EEB 5114—Vertebrate Biology (4)

FW 5129—Mammalogy (5)

EEB 5134—Introduction to Ornithology (5)

EEB 5834—Field Ornithology (5) (Itasca)

EEB 5136—Ichthyology (4)

Minor Core Courses—14 credits

FW 3052—Introduction to Fisheries and Wildlife (3)

FW 5603—Ecology and Management of Fish and Wildlife Habitats (4)

FW 5604—Fishery and Wildlife Management (4)

Optional Courses—Choose one course

FW 5459—Fish Physiology (4)

FW 5455—Aquaculture (3)

FW 5601—Assessment and Management of Vertebrate Populations (5)

FW 5570—Avian Conservation (4)

Total Graduation Requirements—192 credits

Required courses, including 8 credits in Category D, (167-183 credits), and suggested electives (9-25 credits)

Forest Products

This curriculum is for students interested in careers in the development, production, marketing, and use of the thousands of products that flow from forests—from paper, wood based panels, and furniture to chemicals from wood. Courses emphasize the chemical, physical, and mechanical properties of wood and the newest technologies for converting this raw material into its many final forms.

The curriculum described below applies to students who have accumulated 39 or more credits before fall quarter 1994. Students with 38 or fewer credits should check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768).

Marketing—This specialization is for students interested in the marketing, sales, and distribution of forest products. Technical emphasis is on the physical-mechanical nature of wood-based building materials, including lumber, plywood, fiberboard, particleboard, and newer composite products. In addition, coursework focuses on marketing principles and analysis, management science, computer applications, and economics. Career opportunities include purchasing and selling of all types of forest products at the wholesale and retail levels, technical sales, product promotion, and specialized marketing research.

Freshman and Sophomore Years—81 required credits plus electives

A. *Communication, Language, and Symbolic Systems*—22 required credits

Math 1142—Short Calculus (5)

Rhet 1101—Writing to Inform and Persuade (4)

Rhet 1104—Library Research Methods (1)

Rhet 1151—Writing in Your Major (4)

Rhet 1222—Public Speaking (4)

Stat 3011—Statistical Analysis (4)

B. Physical, Biological, and Analytical Sciences—34
required credits

- Biol 1009—General Biology (5)
 Chem 1001—General Principles of Chemistry (4)
 Chem 1002—Elementary Organic Chemistry (4)
 ForP 1001—Forest Products Orientation (1)
 ForP 1301—Wood as a Raw Material (4)
 ForP 1303—Wood Structure and Identification (2)
 FR 1100—Dendrology (4)
 Phys 1041—Introductory Physics (5)
 Phys 1042—Introductory Physics (5)

C. The Individual And Society—17 required credits

- AgEc 1101—Principles of Microeconomics (4)
 AgEc 1102—Principles of Macroeconomics (4)
 Jour 1001—Introduction to Mass Communication (4)
 Psy 1001—Introduction to Psychology (5)

D. Literature, Humanities, and Fine Arts—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Junior Year—47 required credits

- Acct 1050—Introduction to Financial Reporting (5)
 BME 3260—Professional Sales Education (3)
 CSci 3102—Introduction to PASCAL Programming (4)
 or CSCI 3113—Introduction to Programming in C (4)
 or AgET 3030—Introduction to Problem Solving With Computers (4)
 ForP 3300—Wood Industry Tours (2)
 ForP 3303—Forest Products Marketing (3)
 ForP 3312—Building Materials Estimating (2)
 ForP 5300—Wood-Fluid Relationships (3)
 ForP 5301—Mechanical Properties (3)
 ForP 5303—Wood Deterioration (4)
 ForP 5331—Undergraduate Seminar (2)
 Mgmt 3001—Fundamentals of Management (4)
 Mktg 3000—Principles of Marketing (4)
 Mktg 3010—Buyer Behavior and Marketing Analysis (4)
 Mktg 3020—Marketing Operations Management (4)
 Electives and liberal education requirements

Senior Year—46-47 required credits

- Acct 3001—Introduction to Management Accounting (4)
 BLaw 3058—Introduction to Law, the Law of Contracts and Sales Contracts (4)
 BME 3260—Professional Sales Education (3)
 BFin 3000—Finance Fundamentals (4)
 ForP 3305—Grading Standards and Product Performance (2)
 ForP 5304—Wood Drying and Preservation Processes (4)
 ForP 5307—Wood-Base Panel Technology (4)
 ForP 5308—Wood Machining (3)
 ForP 5355—Mechanics and Structural Design With Wood Products (4)
 ForP 5356—Advanced Forest Products Marketing (3)
 FR 5240—Natural Resource Policy and Administration (3)
 or FR 5250—Role of Renewable Natural Resources in Developing Countries (2)
 Jour 5251—Psychology of Advertising (4)
 Mktg 3030—Sales and Distribution Management (4)
 Rhet 3562—Writing in Your Profession (4)
 Electives and liberal education requirements

Directed Electives—at least two courses

- Acct 5160—Financial Statement Analysis (4)
 Jour 5721—Mass Media and U.S. Society (4)

- LM 3000—Introduction to Logistics (4)
 LM 5020—Advanced Logistics Management (4)
 Mgmt 3002—Psychology in Management (4)
 Mktg 3050—Marketing Communications (4)
 Mktg 3065—Retail Management (4)

Total Graduation Requirements—192 credits.

Required courses listed above (174-175 credits) and electives, including directed electives (17-18 credits).

Production Management—This

specialization is for students interested in production management, product development, and industrial engineering careers in industries that manufacture lumber, plywood, particleboard, furniture, and other wood products. In addition to a strong wood science background, students gain knowledge in industrial engineering, labor management and economics.

Freshman and Sophomore Years—76 credits required, electives, and liberal education requirements in Category D.

A. Communication, Language, and Symbolic Systems—25 required credits

- Math 1251—One-Variable Differential and Integral Calculus I (4)
 Math 1252—One-Variable Differential and Integral Calculus II (4)
 Rhet 1101—Writing to Inform and Persuade (4)
 Rhet 1104—Library Research Methods (1)
 Rhet 1151—Writing in Your Major (4)
 Rhet 1222—Public Speaking (4)
 Stat 3091—Probability and Statistics (4)

B. Physical, Biological, and Analytical Sciences—38 required credits

- BioC 1401—Elementary Biological Chemistry I (4)
 Biol 1009—General Biology (5)
 Chem 1051—General Principles of Chemistry I (4)
 Chem 1052—General Principles of Chemistry II (4)
 ForP 1001—Forest Products Orientation (1)
 ForP 1301—Wood as a Raw Material (4)
 ForP 1303—Wood Structure and Identification (2)
 FR 1100—Dendrology (4)
 Phys 1041—Introductory Physics (5)
 Phys 1042—Introductory Physics (5)

C. The Individual and Society—13 required credits

- AgEc 1101—Principles of Microeconomics (4)
 AgEc 1102—Principles of Macroeconomics (4)
 Psy 1001—Introduction to Psychology (5)

D. Literature, Humanities, and Fine Arts—8 required credits

Suggested courses:

- Rhet 1301—Modern Thought and the Enlightenment (4)
 Rhet 1302—Modern Thought and the Industrial Revolution (4)
 Rhet 1303—Modern Thought and the Impact of Evolution (4)
 Rhet 1310—Humanities: The Land in American Experience (4)

See the Liberal Education Requirements section of this bulletin for additional Category D suggestions.

Baccalaureate Programs

Junior Year—45 required credits

- CSci 3102—Introduction to PASCAL Programming and Problem Solving (4)
or CSci 3113—Introduction to Programming in C (4)
or AgEt 3030—Introduction to Programming (4)
ForP 3300—Wood Industry Tours (2)
ForP 3303—Forest Products Marketing (3)
ForP 3305—Grading Standards and Product Performance (2)
ForP 3361—Introduction to Adhesives (3)
ForP 5300—Wood-Fluid Relationships (3)
ForP 5301—Mechanical Properties of Wood (3)
ForP 5303—Wood Deterioration (3)
ForP 5331—Undergraduate Seminar (2)
ForP 5355—*Mechanics and Structural Design With Wood Products* (4)
IEOR 3000—Introduction to Industrial Engineering Analysis (4)
IEOR 5030—Quality Control and Reliability (4)
IEOR 5040—Introduction to Operations Research (4)
IR 3002—Personnel and Industrial Relations (4)
Electives

Senior Year—42-43 required credits

- ForP 5304—Wood Drying and Preservation Processes (4)
ForP 5305—Pulp and Paper Technology (2)
ForP 5306—Analysis of Production Systems (3)
ForP 5307—Wood-Base Panel Technology (4)
ForP 5308—Wood Machining (3)
FR 5240—Natural Resource Policy and Administration (3)
or FR 5250—Role of Renewable Natural Resources in Developing Countries (2)
IEOR 5010—Introduction to Work Analysis (4)
IEOR 5020—Engineering Cost Accounting (4)
IEOR 5311—Management for Engineers (4)
IEOR 5361—Inventory and Production Control (4)
IR 3007—Collective Bargaining and Modern Labor Relations (4)
Rhet 3562—Writing in Your Profession (4)
Electives

Suggested Electives

- Acct 1050—Introduction to Financial Reporting (5)
ForP 3202—Leadership and Management Skills Development (2)
ForP 5356—Advanced Forest Products Marketing (3)
IEOR 5180—Applied Industrial Engineering (3-5)
IEOR 5221—Industrial Plants (3-5)
IEOR 5321—Industrial Safety (4)
IEOR 5351—Analysis of Production Processes (4)
IR 3010—The Individual and the Organization (4)
LASK 1001—Becoming a Master Student (4)
LM 3000—Introduction to Logistics Management (4)
Mktg 3000—Principles of Marketing (4)
Mktg 3010—Buyer Behavior and Marketing Analysis (4)
Mktg 3090—Marketing Topics: Industrial Marketing (4)
Rhet 3254 Advanced Public Speaking (4)
Rhet 3266—Communication, Discussion in Small Group Decision Making (4)

Total Graduation Requirements—192 credits

Required courses listed above (163-164 credits), electives (20-21 credits), and liberal education requirements in category D (8 credits).

Paper Science and Engineering—This specialization provides in-depth training in mathematics, physics, chemistry, engineering, and wood and fiber science and technology. It also includes specialized pulp and paper and related engineering courses on the technology of the pulping and papermaking processes. Graduates find careers in process engineering, manufacturing operations, technical services, marketing, plant management, and research and development.¹

Detailed plans of study are available from the director of Paper Science and Engineering.

Freshman and Sophomore Years—68 credits required, electives, and liberal education requirements in categories C (8 credits) and D (8 credits).

A. *Communication, Language, and Symbolic Systems*—33 required credits

- CSci 3102—Introduction to PASCAL Programming (4)
or CSci 3113—Introduction to Programming in C (4)
or AgET 3030—Introduction to Problem Solving With Computers (4)
Math 1251—One-Variable Differential and Integral Calculus I (4)
Math 1252—One-Variable Differential and Integral Calculus II (4)
Math 1261—Algebra and Geometry of Euclidean Space (4)
Math 3261—Differential Equations with Linear Algebra (4)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)

B. *Physical, Biological, and Analytical Sciences*—35 required credits

- Chem 1051—Chemical Principles I (4)
Chem 1052—Chemical Principles II (4)
Chem 3301—Elementary Organic Chemistry I (4)
Chem 3302—Elementary Organic Chemistry II (4)
Chem 3305—Elementary Organic Chemistry Laboratory I (2)
Chem 3306—Elementary Organic Chemistry Laboratory II (2)
ForP 1001—Forest Products Orientation (1)
ForP 5331—Undergraduate Seminar (2)
Phys 1251—General Physics I (4)
Phys 1252—General Physics II (4)
Phys 1253—General Physics III (4)

C. *The Individual and Society*—8 required credits

AgEc 1102—Principles of Macroeconomics (4)
See the Liberal Education Requirements section of this bulletin for additional Category C suggestions.

D. *Literature, Humanities, and Fine Arts*—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Junior Year—50 required credits

- CE 3400—Fluid Mechanics (4)
 ForP 1301—Wood as a Raw Material (4)
 ForP 1303—Wood Structure and Identification (2)
 ForP 3300—Wood Industry Tours (2)
 ForP 3301—Industrial Internship (2)
 ForP 5302—Wood Chemistry I (3)
 ForP 5305—Pulp and Paper Technology (2)
 ForP 5306—Analysis of Production Systems (3)
 ForP 5310—Pulp and Paper Process Laboratory (3)
 ForP 5311—Pulp and Paper Process Engineering Calculations I (4)
 ForP 5312—Pulp and Paper Process Engineering Calculations II (4)
 ForP 5315—Paper Engineering Laboratory (2)
 ForP 5353—Wood Chemistry II (3)
 ForP 5361—Adhesion and Adhesives (3)
 ME 3301—Thermodynamics (4)
 Stat 5021—Statistical Analysis (5)
 Electives and liberal education requirements

Senior Year—35-36 required credits

- Chem 5520—Elementary Physical Chemistry (3)
 ForP 5313—Pulp and Paper Process Operations (4)
 ForP 5314—Pulp and Paper Process Operations II: Paper Machine Operations, Finishing and Converting (3)
 ForP 5316—Coated Product Development (2)
 ForP 5318—Pulp and Paper Process Dynamics and Control (3)
 ForP 5320—Biological and Environmental Science of Pulp and Paper (3)
 ForP 5321—Material Science of Paper: Paper and Fiber Physics and Properties (4)
 ForP 5359—Surface and Colloid Chemistry of Papermaking (3)
 FR 5240—Natural Resource Policy and Administration (3)
 or FR 5250—Role of Renewable Natural Resources in Developing Countries (2)
 ME 5342—Heat Transfer (4)
 Rhet 3562—Writing in Your Profession (4)
 Electives and liberal education requirements

Suggested Electives

- CE 5500—Analysis and Design of Water Supply Systems (4)
 CE 5501—Analysis and Design of Wastewater Systems (4)
 Chem 5521—Elementary Physical Chemistry (3)
 ChEn 5001—Computational Methods in Chemical Engineering and Material Science (4)
 ChEn 5101—Principles of Chemical Engineering I (4)
 ChEn 5102—Principles of Chemical Engineering II (4)
 ForP 5300—Wood-Fluid Relations (3)
 ForP 5301—Mechanical Properties (3)
 IEOR 5020—Engineering Cost Accounting, Analysis, and Control (4)
 ME 3201—Mechanical Engineering Systems Analysis (4)
 ME 3303—Applied Thermodynamics (4)
 ME 3701—Basic Measurements Laboratory I (2)
 ME 3702—Basic Measurements Laboratory II (2)
 ME 5283—Industrial Instrumentation and Automatic Control (4)
 Stat 5301—Designing Experiments (5)

Total Graduation Requirements—192 credits
 Required courses listed above (169-170 credits), and electives (22-23 credits).

Wood Science—This specialization is for students who want a broad education in forest products coupled with a strong training in biology, chemistry, math and physics. Completion of this specialization is excellent preparation for technical jobs in the wood products industry or for going on to graduate school.

Freshman and Sophomore Years—94 credits plus electives

A. Communication, Language, and Symbolic Systems—25 required credits

- Math 1251—One-Variable Differential and Integral Calculus I (4)
 Math 1252—One-Variable Differential and Integral Calculus II (4)
 Math 1261—Algebra and Geometry of Euclidean Space (4)
 Math 3251—Vector Differential Calculus (4)
 Rhet 1101—Writing to Inform and Persuade (4)
 Rhet 1104—Library Research Methods (1)
 Rhet 1151—Writing in Your Major (4)

B. Physical, Biological, and Analytical Sciences—53 required credits

- Biol 1009—General Biology (5)
 Biol 1103—General Botany (5)
 Chem 1051—Chemical Principles I (4)
 Chem 1052—Chemical Principles II (4)
 Chem 3301—Elementary Organic Chemistry I (4)
 Chem 3302—Elementary Organic Chemistry II (4)
 Chem 3305—Elementary Organic Chemistry Laboratory I (2)
 Chem 3306—Elementary Organic Chemistry Laboratory II (2)
 ForP 1001—Forest Products Orientation (1)
 ForP 1301—Wood as a Raw Material (4)
 ForP 1303—Wood Structure and Identification (2)
 FR 1100—Dendrology (4)
 Physics 1251—General Physics I (4)
 Physics 1252—General Physics II (4)
 Physics 1253—General Physics III (4)

C. The Individual and Society—8 required credits

- AgEc 1101—Principles of Microeconomics (4)
 AgEc 1102—Principles of Macroeconomics (4)

D. Literature, Humanities, and Fine Arts—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Junior Year—33 required credits

- Chem 3100—Quantitative Analysis Lecture (3)
 Chem 3101—Quantitative Analysis Laboratory (2)
 Chem 5520—Elementary Physical Chemistry (3)
 ForP 3300—Wood Industry Tours (2)
 ForP 5300—Wood-Fluid Relationships (3)
 ForP 5301—Mechanical Properties (3)
 ForP 5302—Wood Chemistry I (3)
 ForP 5303—Wood Deterioration (4)
 ForP 5331—Undergraduate Seminar (2)
 Rhet 1222—Public Speaking (4)
 Stat 3011—Statistical Analysis (4)
 Electives and liberal education requirements

Baccalaureate Programs

Senior Year—35-36 required credits

- CSci 3102—Introduction to PASCAL Programming (4)
or CSci 3113—Introduction to Programming in C (4)
or AgEt 3030—Introduction to Problem Solving with Computers (4)
ForP 5304—Wood Drying and Preservation Processes (4)
ForP 5305—Pulp and Paper Technology (4)
ForP 5306—Analysis of Production Systems (3)
ForP 5307—Wood-Base Panel Technology (4)
ForP 5353—Wood Chemistry II (3)
ForP 5355—Mechanics and Structural Design With Wood Products (4)
ForP 5361—Adhesion and Adhesives (3)
FR 5240—Natural Resource Policy and Administration (3)
or FR 5250—Role of Renewable Natural Resources in Developing Countries (2)
Rhet 3562—Writing in Your Profession (4)
Electives and liberal education requirements

Total Graduation Requirements—192 credits

Required courses listed above (162-163 credits), and electives (29-30 credits).

Forest Resources

This curriculum prepares students to manage forest and related lands for timber, wildlife, recreation, water production, and environmental enhancement. Graduates may become directly involved in land management or play specialized supporting roles in areas such as resource planning, forest protection, and public relations. Still others find employment in related fields such as environmental education and interpretation.

All students take the core curriculum of required courses (including the Itasca and Cloquet Sessions) listed below. In addition, students must complete a minimum of 20 credits in one of the seven areas of emphasis listed below. A student may also submit a proposal for an individual area of emphasis, including an explanation of its professional relevance and the courses to be completed, to the faculty for their review and approval.

The curriculum described below applies to students who have accumulated 39 or more credits before fall quarter 1994. Students with 38 or fewer credits should check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768).

Core Curriculum

Freshman and Sophomore Years—85-94 required credits plus electives

- A. *Communication, Language, and Symbolic Systems*—30-32 required credits
CSci 3102—Introduction to PASCAL Programming (4)
or AgET 3030—Introduction to Problem Solving with Computers (4)
or GC 1571—Introduction to BASIC Programming and Microcomputers (5)¹
Math 1142—Short Calculus (5)
or Math 1251—One-Variable Differential and Integral Calculus I (4)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
Stat 3011—Statistical Analysis (4)
or Stat 5021—Statistical Analysis (5)

¹Students who wish to take FR 5110 should not take GC 1571.

B. Physical, Biological, and Analytical Sciences—33-40 required credits

- Biol 1009—General Biology (5)
or Biol 1201—Evolutionary and Ecological Perspectives (5) and Biol 1202—Molecular and Cellular Perspectives (5)
Biol 1103—General Botany (5)
Chem 1001—General Principles of Chemistry (4)
or Chem 1051—Chemical Principles I (4)
Chem 1002—Elementary Organic Chemistry (4)
or Chem 1052—Chemical Principles II (4)
ForP 1301—Wood as a Raw Material (4)
FR 1001—Forest Resources Orientation (1)
FR 1200—Introduction to Forest Resources (3)
or FR 1201—Conservation of Natural Resources (3)
FR 3300—Elements of Surveying (2)¹
or CE 3100—Introduction to Surveying and Mapping (4)²
Geo 1001—Introduction to Geology (4)
and Geo 1021—Introduction to Geology Lab: Geology of Minnesota (1)
Phys 1001—The Physical World (4)
Phys 1005—Physics Laboratory (1)

¹FR 3300 may be taken as part of the Cloquet Session.

²Students need override from the Civil Engineering Department to register.

C. The Individual and Society—8 required credits (with no more than 6 credits in any discipline.)

- AgEc 1101—Principles of Microeconomics (4)
AgEc 1102—Principles of Macroeconomics (4)
See the Liberal Education Requirements section of this bulletin for additional Category C suggestions.

D. Literature, Humanities, and Fine Arts—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Itasca Session—6 required credits

This summer term is to be taken between the freshman and sophomore or sophomore and junior years.
 FR 3100—Minnesota Plants (2)
 FR 3101—Northern Forest Ecosystems (3)
 FR 3201—Field Forest Measurements (1)

Junior and Senior Years—66 required credits

Soil 1020—The Soil Resource (4)
 FR 1100—Dendrology (4)
 FR 3103—Meteorology and Climatology for Natural Resource Managers (2)
 FR 3104—Forest Ecology (3)
 FR 5100—Silviculture (4)
 FR 5114—Forest Hydrology (4)
 FR 5200—Aerial Photo Interpretation (3)
 FR 5226—Forest Economics and Planning (5)
 FR 5232—Management of Recreational Lands (4)
 FR 5240—Natural Resource Policy and Administration (3)
 FR 5212—Natural Resources Inventory (4)
 FR 5215—Forest Fire Management (2)
 FW 3052—Introduction to Fisheries and Wildlife (3)
 Rhet 3562—Writing in Your Profession (4)

Fall Quarter—Cloquet Session

FR 5101—Field Silviculture (4)
 FR 5102—Forest Wildlife Habitat Management (1)
 FR 5115—Forest Hydrology, Field Applications (2)
 FR 5126—Silviculture: Soil-Site Relationships (2)
 FR 5202—Remote Sensing, Field Applications (2)
 FR 5222—Forest Resources Inventory (2)
 FR 5236—Forest Recreation Planning (1)
 FR 5248—Harvesting and Engineering (3)
 Electives and liberal education requirements

Total Graduation Requirements—192 credits

Required courses listed above (151-160 credits), credits to satisfy area of emphasis, and electives (32-41 credits).

Areas of Emphasis

Forest Hydrology—This interdisciplinary emphasis helps develop skills to solve water resource problems. Students can qualify as hydrologists on the Civil Service register, and with proper selection of electives can also meet the criteria for hydrologists as established by the American Institute of Hydrology. For more information, contact Dr. Kenneth N. Brooks, 235 Natural Resources Administration Building (612/624-2774); or Dr. James A. Perry, 312 Green Hall (612/624-9796).

Required Courses—27 credits

CE 3400—Fluid Mechanics (4)
 CE 5401—Water Resources Engineering (4)
 CE 5405—Hydrology and Hydrologic Design (4)
 FR 5153—Advanced Forest Hydrology (4)
 Math 1251, 1252—One-Variable Differential and Integral Calculus I-II (4,4)
 Math 3261—Differential Equations with Linear Algebra (4)

NRES 5060—Water Quality in Natural Resource Management (3)

Recommended Electives—at least four related courses; the list below is not all-inclusive.

AgEn 5540—Watershed Engineering (4)
 CE 5402—Computational Hydraulics (4)
 CE 5410—Open Channel Hydraulics (4)
 CE 5425—Groundwater Mechanics (4)
 CE 5505—Water Quality Engineering (4)
 CE 5506—Environmental Water Chemistry (4)
 FR 5130—Geographical Information systems in Natural Resources Analysis (2)
 FR 5131—Geographical Information Systems Lab (1)
 FR 5250—Role of Renewable Natural Resources in Developing Countries (2)
 FR 5262—Remote Sensing of Natural Resources (4)
 FR 5264—Quantitative Techniques in Forest Management (3)
 FR 5703—Colloquium in Forest Biology (1-4)
 Geo 5251—Geomorphology (4-5)
 Geo 5601—Limnology (4)
 Geo 5611—Groundwater Geology (5)
 Soil 5232—Soil Physics (5)
 Soil 5310—Soil Chemistry (4)
 Soil 5240—Microclimatology (4)
 Soil 5710—Forest Soils (3-4)

Forest Soils—This emphasis covers forest soil science, land use, management planning, and forest production. Students will qualify as soil scientists on the Civil Service register as well as satisfy requirements for a soil science minor (which can be entered directly on the transcript). For more information, contact Dr. David F. Grigal, 556 Borlaug Hall (612/625-4232); or Dr. Edward Sucoff, 103 Green Hall (612/624-7249).

Required Courses—23-25 credits

Soil 1020—The Soil Resource (4)
 or Soil 3125—Basic Soil Science (4)
 Soil 3416—Soil Fertility (5)
 Soil 5510—Field Study of Soils for Environmental Assessment (4)
 Soil 5710—Forest Soils (3-4)
 Soil 3220—Soil Conservation and Land Use Management (4)
 Soil elective (3-4)

Recommended Electives—at least two courses (including 3 cr in soil science)

Ent 5250—Forest Entomology (4)
 FR 3104—Forest Ecology (4)
 FR 5120—Tree Physiology (3)
 FR 5153—Advanced Forest Hydrology (4)
 FR 5231—Range Management (3)
 FR 5262—Remote Sensing of Natural Resources (4)
 FR 5264—Quantitative Techniques in Forest Management (3)
 Geo 5251—Geomorphology (4-5)
 Geo 5261—Glacial Geology (4-5)
 PlPa 5212—Diseases of Forest and Shade Trees (4)
 Soil 5210—Physical Properties and the Environment (4)

Baccalaureate Programs

- Soil 5240—Microclimatology (4)
Soil 5550—Peatlands: Formation, Classification, and Utilization (3)
Soil 5560—Interpretation of Land Resources (3)
Soil 5610—Soil Biology (4)

Management and Administration—This emphasis is for students interested in administrative careers in public resource agencies or forest industries. Concepts and techniques used to develop policies and programs and to manage people and processes in large organizations are explored, providing a framework for systematic individual development through experience and continuing education. For more information, contact Dr. Paul V. Ellefson, 330B Green Hall (612/624-3735); Dr. Hans M. Gregersen, 301D Green Hall (612/624-6298); or Dr. Dietmar W. Rose, 301H Green Hall (612/624-9711).

Required Courses—12 credits

- Acct 1050—Introduction to Financial Reporting (5)
FR 5241—Natural Resource Management: Political and Administrative Processes (3)
or FR 5264—Quantitative Techniques in Forest Management (3)
Mgmt 3001—Fundamentals of Management (4)

Recommended Electives—at least three courses

- Acct 3001—Introduction to Management Accounting (4)
BFin 3000—Finance Fundamentals (4)
BGS 3002—Business and Society (4)
BLaw 3058—Introduction to Law, the Law of Contracts and Sales Contracts (4)
or PA 5102 Legal Environment of Public Affairs (3)
IDSc 3030—Information Systems and Information Management (4)
IR 3010—Human Relations and Applied Organization Theory (4)
Mgmt 3002—Psychology in Management (4)
PA 5200—Introduction to Planning (3)
Pol 3307—The American Bureaucracy (4)

Industrial Forest Management—This emphasis is for students who wish to gain a more complete understanding of industrial forest management. Planning, decision-making, and project implementation activities are emphasized. For more information, contact Dr. Dietmar W. Rose, 301H Green Hall (612/624-9711).

Required Courses—23-24 credits

- FP 3303—Forest Products Marketing (3)
FP 3300—Wood Industry Tours (2)
or FP 5306—Analysis of Production Systems (3)
FR 5241—Natural Resource Management: Political and Administrative Processes (3)

- FR 5264—Quantitative Techniques in Forest Management (3)

- IEOR 5050—Engineering Economics Analysis (4)
Math 1252—One-Variable Differential and Integral Calculus II (4)

- Math 1261—Algebra and Geometry of Euclidean Space (4)

Recommended Electives

- IDSc 3030—Information Systems and Information Management Systems (4)
IEOR 3000—Introduction to Industrial Engineering Analysis (4)
IEOR 5020—Engineering Cost Accounting, Analysis, and Control (4)
IEOR 5040—Introduction to Operations Research (4)
IEOR 5441—Operations Research II (4)
Stat 5021—Statistical Analysis (5)
Stat 5301—Designing Experiments (5)
Stat 5302—Applied Regression Analysis (5)

Resource Measurements and Information Systems—This emphasis is for students with analytical skills interested in forest measurement and information systems.

Focus is on such subjects as sampling, mathematical modeling, statistics, computer science, remote sensing, and decision support systems. For more information, contact Dr. Thomas E. Burk, 35A Natural Resources Administration Building (612/624-6741); Dr. Alan R. Ek, 115C Green Hall (612/624-3400); or Dr. Marvin A. Bauer, 220B Green Hall (612/624-3703).

Required Courses—21-22 credits

- CSci 3113—Introduction to Programming in C (4)
or CSci 3102—Introduction to PASCAL Programming (4)
or GC 1572—Introduction to Computer Programming (5)
or equivalent course in C or FORTRAN or PASCAL or BASIC programming (4)
Math 1252—One-Variable Differential and Integral Calculus II (4)
Math 1261—Algebra and Geometry of Euclidean Space (4)
Stat 5021—Statistical Analysis (5)

Recommended Electives—at least two courses

- FR 5110—Forestry Applications of Microcomputers (4)
FR 5264—Quantitative Techniques in Forest Management (3)
or IEOR 5040—Introduction to Operations Research (4)
FR 5262—Remote Sensing of Natural Resources (4)
or FR 5130—Geographic Information Systems in Natural Resource Analysis (2) and FR 5131—Geographic Information Lab (1)
FW 5601—Assessment and Management of Vertebrate Populations (5)
Math 3251—Multivariable Differential Calculus (4)
or Math 3261—Differential Equations with Linear Algebra (4)

- Stat 5302—Applied Regression Analysis (5)
 or Stat 5301—Designing Experiments (5)
 or Stat 5201—Sampling Methodology in Finite
 Populations (4)

Forest Harvesting—This emphasis is for students interested in timber harvesting and its impact on other land management considerations. The coursework is interdisciplinary and requires careful preparation for spending the senior year at the University of Idaho earning 14 semester credits (21 quarter credits). Students are trained for careers in logging engineering firms, forest products companies, and government agencies. Typical work includes planning and designing timber sales, supervising logging crews, designing and laying out roads, and managing wood procurement. For more information, contact Dr. Charles R. Blinn, 314 Green Hall (612/624-3788).

Junior Year

- Fall Quarter (Minnesota)*—11-13 credits
 CE 3100—Introduction to Surveying and Mapping (4)¹
 or FR 3300—Elements of Surveying (Cloquet) (2)
 FR 3103—Meteorology and Climatology for Natural
 Resource Managers (2)
 FR 3104—Forest Ecology (4)
 FW 3052—Introduction to Fisheries and Wildlife (3)

- Winter Quarter (Minnesota)*—14 credits
 FR 5100—Silviculture (4)
 FR 5200—Aerial Photo Interpretation (3)
 FR 5240—Natural Resource Policy and
 Administration (3)
 Rhet 3562—Writing in Your Profession (4)

- Spring Quarter (Minnesota)*—16 credits
 FR 5212—Natural Resources Inventory (4)
 or FR 5114—Forest Hydrology (4)
 FR 5215—Forest Fire Management (2)
 FR 5226—Forest Economics and Planning (5)
 FR 5231—Range Management (3)

¹Students need override from the Civil Engineering Department to register.

Senior Year

- Fall Quarter (Cloquet)*—17 credits
Spring Semester (Idaho)—6 or 9 semester credits
 For Pr 431—Production and Cost Control in Timber
 Harvesting (3 sem/4.5 qtr cr; offered alt yrs)
 For Pr 433—Forest Tractor Systems Analysis (3 sem/4.5
 qtr cr)
 For Pr 434—Cable Systems Analysis (3 sem/4.5 qtr cr;
 offered alt yrs)¹
Fall Semester (Idaho)—5 or 8 semester credits
 For Pr 430—Forest Engineering and Harvesting (3 sem/
 4.5 qtr cr)
 For Pr 432—Low Volume Forest Roads (3 sem/4.5 qtr cr)
 For Pr 434—Cable Systems Analysis (3 sem/4.5 qtr cr;
 taught as directed study alt yrs)
 FR 462—Watershed Management (2 sem/3 qtr cr)

Recommended Electives (Idaho)

- Bus 332—Quantitative Methods in Business (3 sem/4.5
 qtr cr; offered fall/spring)
 CE 316—Advanced and Route Surveying (2 sem/3 qtr cr;
 offered spring alt yrs)
 CE 317—Land Surveying (3 sem/4.5 qtr cr; offered
 spring alt yrs)
 CE 386—Engineering Economics (3 sem/4.5 qtr cr;
 offered fall/spring)
 CE 482—Project Management Techniques (1-4 sem/1.5-
 6 qtr cr; offered spring)
 For 470—Introduction to Forest Resources Planning (3
 sem/4.5 qtr cr; offered spring)
 For 476—Forestry Project Evaluation (3 sem/4.5 qtr cr;
 offered fall)
 For 477—Integrated Forest Management Models (3 sem/
 4.5 qtr cr; offered spring)
 For 575—Advanced Forest Management (2 sem/3 qtr cr;
 offered alt yrs)
 For Pr 444—Lumber Manufacturing (3 sem/3 qtr cr;
 offered spring)
 For Pr 477—Forest Products Business Management (3
 sem/4.5 qtr cr; offered spring alt yrs)
 For Pr 522—Advanced Forest Roads (3 sem/4.5 qtr cr;
 offered spring alt yrs)
 For Pr 534—Advanced Techniques of Timber Harvesting
 (3 sem/4.5 qtr cr; offered spring alt yrs)

Recommended Electives (Minnesota)

- FR 5153—Advanced Forest Hydrology (4)
 Soil 5710—Forest Soils (3-4)

¹To be taken only once, during spring semester or as directed study in fall semester.

Silviculture/Forest Biology—This emphasis is for students interested in the biological sciences such as ecology, silviculture, and physiology. It provides background information for careers as forest resource managers and silviculturist specialists. For more information, contact Dr. Glenn Furnier, 101E Green Hall (612/624-3720); Dr. Carl Mohn, 105 Green Hall (612/624-7281); Dr. Klaus Puettmann, 101C Green Hall (612/625-3733); Dr. Peter Reich, 220F Green Hall (612/624-7249); or Dr. Edward Sucoff, 103 Green Hall (612/624-7249).

Required Courses—17 credits

- Ent 5250—Forest Entomology (4)
 FR 5120—Tree Physiology (3)
 FR 5152—Forest Genetics (3)
 PIPa 5212—Diseases of Forest and Shade Trees (4)
 Soil 5710—Forest Soils (3)

Adviser-Approved Electives—a minimum of 12 credits from 3xxx- and/or 5xxx-related courses in biology, forestry, and/or soils approved by the student's adviser. The list below is not all-inclusive. Other courses may be substituted.

Baccalaureate Programs

EEB 5014—Ecology of Plant Communities (5)
EEB 5016—Ecological Plant Geography (5)
FR 3225/5225—Directed Study Experience (1-5)
FR 5110—Forestry Applications of Microcomputers(4)
FR 5130—Geographic Information Systems in Natural Resource Analysis (2) and FR 5131—Geographic Information Lab (1)
FR 5231—Range Management (3)
FR 5262—Remote Sensing of Natural Resources (4)
FR 5703—Colloquium in Natural Resources (1-4)
NRES 3001—Colloquium in Natural Resources and Environmental Studies (1)
Soil 5510—Field Study of Soils for Environmental Assessment (4)
Selected courses in fisheries and wildlife; ecology, evolution, and behavior; plant biology; rhetoric; and soil science.

Forest Resources Minor

This minor helps students in natural resources or related areas to develop a solid understanding of forest resource dynamics, management, and the importance of forest resources in our society. The minor incorporates a fundamental science background plus coursework dealing with the multiple uses and manipulation of forest resources and their assessment and policy implications. Open to students who have completed the required background courses or the equivalent, the minor is awarded once the minor core and optional courses are completed.

Minor Core—15 credits

FR 1100—Dendrology (4)
FR 1200—Introduction to Forest Resources (3)
or FR 1201—Conservation of Natural Resources (3)
or FR 1202—Farm and Small Woodlands Forestry (3)
or FR 1203—Introduction to Minnesota's Natural Resources (3)
FR 3104—Forest Ecology (4)¹
or Biol 5041—Ecology (4)
FR 5100—Silviculture (4)

¹This requirement can also be met by the following courses offered at Itasca: FR 3100—Minnesota Plants (2), FR 3101—Northern Forest Ecosystems (3), FR 3201—Field Forest Measurements (1).

Optional Courses—7 credits, with at least one course from each of these two categories:

Management and Policy

ForP 1301—Wood as a Raw Material (4)
FR 3201—Field Forest Measurements (1)
FR 3250 or 5250—Role of Renewable Natural Resources in Developing Countries (2)
FR 5200—Aerial Photo Interpretation (3)
FR 5212—Natural Resources Inventory (4)
FR 5202—Remote Sensing, Field Applications (2) (Cloquet)

FR 5222—Forest Resources Inventory (2) (Cloquet)
FR 5226—Forest Economics and Planning (5)
FR 5231—Range Management (3)
FR 5232—Management of Recreational Lands (4)
FR 5233—Principles of Outdoor Recreation Planning (3)
FR 5236—Forest Recreation Planning (1) (Cloquet)
FR 5240—Natural Resource Policy and Administration (3)
FR 5241—Natural Resource Management: Political and Administrative Processes (3)
FR 5248—Harvesting and Engineering (3) (Cloquet)
FR 5257—Recreation Land Policy (3)
FR 5259—Analysis of Outdoor Recreation Behavior (3)
FR 5240—Natural Resource Policy and Administration (3)
FR 5264—Quantitative Techniques in Forest Management (3)
FR 5500—Urban Forest Management (3)

Biology

Ent 5250—Forest Entomology (4)
Soil 1020—The Soil Resource (4)
FR 3100—Minnesota Plants (1)
FR 3101—Northern Forest Ecosystems (3)
FR 3103—Meteorology and Climatology for Natural Resource Managers (2)
FR 5101—Field Silviculture (4) (Cloquet)
FR 5114—Forest Hydrology (4)
FR 5115—Forest Hydrology, Field Applications (2) (Cloquet)
FR 5120—Tree Physiology (3)
FR 5126—Silviculture: Soil-Site Relationships (2) (Cloquet)
FR 5152—Forest Genetics (3)
FR 5153—Advanced Forest Hydrology (4)
FR 5215—Forest Fire Management (2)
NRES 5060—Water Quality in Natural Resource Management (3)
PIPa 5212—Diseases of Forest and Shade Trees (4)

Natural Resources and Environmental Studies

The Natural Resources and Environmental Studies curriculum, jointly offered with the College of Agriculture, is for students interested in an interdisciplinary major focusing on the use and management of natural resources and the study of the environment.

Students have considerable flexibility in designing their study program. Programs can be designed to achieve one or more of the following objectives:

- Gain an understanding of the interaction between natural resources and modern society. Learn about the significant social and environmental roles that natural resources can play nationally and internationally.

- Prepare for careers in public and private organizations that are responsible for planning the use and management of natural resources and protection of the environment. Learn about subjects that will prepare you for positions in fields such as environmental assessment, resource inventory, natural resource planning, environmental protection, sustainable development, policy analysis, waste management, and natural resource management.
- Develop appropriate background for graduate study.

All students take the core curriculum of required courses (including two colloquia) listed below. In addition, students must complete a minimum of 24 credits in one of six areas of concentration.

The curriculum described below applies to students who have accumulated 39 or more credits before fall quarter 1994. Students with 38 or fewer credits should check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768).

Core Curriculum

Freshman and Sophomore Years—89-90 required credits plus electives

A. *Communication, Language, and Symbolic Systems*—22 required credits

- Math 1142—Short Calculus (5)
- Rhet 1101—Writing to Inform and Persuade (4)
- Rhet 1104—Library Research Methods (1)
- Rhet 1151—Writing in Your Major (4)
- Rhet 1222—Public Speaking (4)
- Stat 3011—Statistical Analysis (4)

B. *Physical, Biological, and Analytical Sciences*—35-36 required credits

- Biol 1009—General Biology (5)
- Biol 1103—Botany (5)
 - or Biol 1106—Zoology (5)
- Chem 1051, 1052—Chemical Principles I-II (4,4)
 - or Chem 1001—General Principles of Chemistry (4) and Chem 1002—Elementary Organic Chemistry (4)
- FR 1201—Conservation of Natural Resources (3)
- FR 3250—Role of Renewable Natural Resources in Developing Countries (2)
 - or NRES 1040—Natural Resources as Raw Materials (3)
 - or NRES 1010—Issues in the Environment (3)
- Geo 1001—Introduction to Geology (4)
- NRES 1001—Orientation to Natural Resources and Environmental Studies (1)

NRES 3001—Colloquium in Natural Resources and Environmental Studies (1)¹

Phys 1041—Introductory Physics (5)
or Phys 1001, 1005—The Physical World (4,1)

C. *The Individual and Society*—24 credits

Required Courses—16 credits

- AgEc 1101—Principles of Microeconomics (4)
- AgEc 1102—Principles of Macroeconomics (4)
- NRES 3010—Ethics and Values in Resource Management (3)
- Pol 1001—Political Science (5)

Suggested Courses—8 credits

- Anth 5117—Anthropology of Resource Management (4)
- HSci 1711—Technology and Western Civilization (4)
- Pol 3307—The American Bureaucracy (4)
- Soc 1001—Introduction to Sociology (4)

Students must complete two colloquia

D. *Literature, Humanities, and Fine Arts*—8 credits
Suggested courses:

- Hum 1005—Humanities in the Modern World (4)
- Rhet 1301—Modern Thought and the Enlightenment (4)
- Rhet 1302—Modern Thought and the Industrial Revolution (4)
- Rhet 1303—Modern Thought and the Impact of Evolution (4)
- Rhet 1310—Humanities: The Land in American Experience (4)

See the Liberal Education Requirements section of this bulletin for additional Category D suggestions.

Junior and Senior Years—69-77 credits

Required courses (45-53 credits) plus courses in area of concentration (minimum of 24 credits).

- FR 3103—Meteorology and Climatology for Natural Resource Managers (2)
 - or Soil 1425—Introduction to Meteorology (4)
- FR 3104—Forest Ecology (4)
 - or EEB 3001—Introduction to Ecology (4)
- FR 5114—Forest Hydrology (4)
 - or AgEt 5410—Hydrology and Water Quality (5)
 - or NRES 3060/5060—Water Quality in Natural Resources Management (3)
- FR 5240—Natural Resource Policy and Administration (3)
- FR 5226—Forest Economics and Planning (5)
 - or AgEc 3610—Resource Development and Environmental Economics (4)
- FW 3052—Introduction to Fisheries and Wildlife (3)
- NRES 3020/5020—Plant Resource Management and the Environment (4)
 - or FR 5100—Silviculture (4)
- NRES 3050—Experience and Training in a Field Setting (1-4)
 - or NRES 3051—From Tall-Grass Prairies to Boreal Forests Field Session (4)
 - or Itasca Field Session (6)
- NRES 5100—Problem Solving in Natural Resources and Environmental Studies (5)
- NRES 5210—Survey, Measurement, and Modeling Methods for Natural Resources I (4)
- Rhet 3562—Writing in Your Profession (4)
- Soil 1020—The Soil Resource (4)
 - or Soil 3125—Basic Soil Science (4)

Baccalaureate Programs

- Soil 3220—Soil Conservation and Land Management (4)
or Soil 5210—Soil Physical Properties and the Environment (4)
or Soil 5510—Field Study of Soil for Environmental Assessment (4)

Total Graduation Requirements—180 credits
Required courses listed above (134-146), credits in area of concentration (24 credits minimum), and electives (10-22 credits).

Areas of Concentration—24 credits minimum

Resource Assessment—Focus on development of skills for assessing the magnitude and quality of various natural and environmental resources with techniques such as remote sensing, quantitative analysis, and geographic information systems. For more information, contact Dr. Marvin E. Bauer, 220B Green Hall (612/624-3703); Dr. Alan R. Ek, 115C Green Hall (612/624-3400); Dr. Lloyd P. Queen, 220C Green Hall (612/624-9271); or Dr. Thomas E. Burk, 35A Natural Resources Administration Building (612/624-6741).

- AgEc 3040—Economic Development of American Agriculture (4)
AgEc 3610—Resource Development and Environmental Economics (4)
Econ 5611—Resource and Environmental Economics (4)
FR 3104—Forest Ecology (4)
or EEB 3001—Introduction to Ecology (4)
FR 3300—Elements of Surveying (2)
FR 5110—Forestry Applications of Microcomputers (4)
FR 5130—Geographic Information Systems in Natural Resource Analysis (2) and FR 5131—Geographic Information Lab (1)
FR 5200—Aerial Photo Interpretation (3)
FR 5212—Natural Resources Inventory (4)
FR 5231—Range Management (3)
FR 5232—Management of Recreational Lands (4)
FR 5233—Principles of Outdoor Recreational Planning (3)
FR 5241—Natural Resource Management: Political and Administrative Processes (3)
FR 5262—Remote Sensing of Natural Resources (4)
FR 5412—Advanced Remote Sensing (4)
FW 5455—Aquaculture (3)
FW 5460—Pollution Effects on Aquatic Systems (3)
FW 5601—Assessment and Management of Vertebrate Populations (5)
FW 5603—Ecology and Management of Fish and Wildlife Habitats (4)
FW 5604—Fisheries and Wildlife Management (4)
FW 5620—Geographic Information Systems for Fisheries, Wildlife, and Biological Conservation (4)
Geog 5562—Introduction to Geographic Information Systems (4)
NRES 3060/5060—Water Quality in Natural Resource Management (3)

- NRES 5220—Survey, Measurement, and Modeling Methods for Natural Resources II (4)
Soil 5232—Soil Physics (5)
Soil 5550—Formation, Classification, and Utilization (3)

Water Resources—Focus on the management of water resources to achieve desired water quantity and quality. Special emphasis on water movement, storage, and hydrologic and climatologic cycles. (Students should take Math 1251 and 1252 in place of Math 1142.) For more information, contact Dr. Kenneth N. Brooks, 235E Natural Resources Administration Building (612/624-2774); or Dr. James A. Perry, 312 Green Hall (612/624-9796).

- AgEn 5540—Watershed Engineering (4)
AgEn 5550—Water Management Engineering (4)
AgET 5410—Hydrology and Water Quality (5)
CE 3400—Fluid Mechanics (4)
CE 5401—Water Resources Engineering (4)
CE 5505—Water Quality Engineering (4)
CE 5510—Solid and Hazardous Waste Management (4)
CE 5515—Water and Wastewater Microbiology (4)
FR 3104—Forest Ecology (4)
or EEB 3001—Introduction to Ecology (4)
FR 3103—Meteorology and Climatology for Natural Resource Managers (2)
FR 5114—Forest Hydrology (4)
FR 5115—Forest Hydrology, Field Applications (2)
FR 5153—Advanced Forest Hydrology (4)
FW 5460—Pollution Impacts on Aquatic Systems (3)
Geo 5601—Limnology (4)
Geo 5611—Groundwater Geology (4)
Geog 5444—Geography of Water Resources (4)
NRES 3060/5060—Water Quality in Natural Resource Management (3)
PubH 5242—Environmental Health Aspects of Groundwater Systems (2)
Soil 3416—Soil Fertility (5)
Soil 5240—Microclimatology (4)

Resources and Environmental Protection—Focus on understanding major environmental protection issues and their solutions. Topical concerns include solid waste management, global climate change, and protection of plant and animal resources. For more information, contact Dr. Edward I. Sucoff, 103 Green Hall (612/624-7249); Dr. Glenn R. Furnier, 101E Green Hall (612/624-3720); Dr. Dietmar W. Rose, 301H Green Hall (612/624-9711); Dr. Hans M. Gregersen, 301D Green Hall (612/624-6298); Dr. James A. Perry, 312 Green Hall (612/624-9796); Dr. Carl A. Mohn, 105 Green Hall (612/624-7281); Dr. Ira R. Adelman, 200 Hodson Hall (612/624-3600);

Dr. Anne Kapuscinski, 130 Hodson Hall (612/624-2720); or Dr. James R. Kitts, 216 Hodson Hall (612/624-3298).

- AgEc 5600—Land Economics (3)
 Econ 5611—Research and Environmental Economics (4)
 FR 3104—Forest Ecology (4)
 or EEB 3001—Introduction to Ecology (4)
 FR 5130—Geographic Information Systems in Natural Resource Analysis (2) and FR 5131—Geographic Information Lab (1)
 FR 5241—Natural Resource Management: Political and Administrative Processes (3)
 FR 5262—Remote Sensing of Natural Resources (4)
 FW 5460—Pollution Impacts on Aquatic Systems (3)
 FW 5570—Avian Conservation (1-2)
 FW 5603—Ecology and Management of Fish and Wildlife Habitats (4)
 FW 5604—Fisheries and Wildlife Management (4)
 FW 5620—Geographic Information Systems for Fisheries, Wildlife, and Biological Conservation (4)
 Geo 5108—Advanced Environmental Geology (4)
 NRES 3060/5060—Water Quality in Natural Resource Management (3)
 PA 5102—Legal Environment of Public Affairs (3)
 PA 5721—Environmental Policy (3)
 Pol 5523—Politics of the Regulatory Process (4)
 PubH 5181—Air Pollution (3)
 PubH 5242—Environmental Health Aspects of Groundwater Systems (2)
 PubH 5253—Introduction to Hazardous Waste Management (3)
 Soil 3416—Soil Fertility (5)

Environmental Issues and Planning—

Focus on major issues in natural resources and the environment at local, national, and worldwide levels. Emphasis on understanding, analysis, planning, and decision making required to address these problems. For more information, contact Dr. Paul V. Ellefson, 330B Green Hall (612/624-3735); Dr. Howard M. Hoganson, North Central Experiment Station, Grand Rapids, MN 55744 (218/327-4490); Dr. Dietmar W. Rose, 301H Green Hall (612/624-9711); Dr. Francesca J. Cuthbert, 320 Hodson Hall (612/624-1756); Dr. David W. Lime, 301G Green Hall (612/624-2250); Dr. Melvin J. Baughman, 330G Green Hall (612/624-0734); Dr. Anne Kapuscinski, 130 Hodson Hall (612/624-2720); Dr. Dorothy H. Anderson, 301F Green Hall (612/624-2721); or Dr. Peter A. Jordan, 201C Green Hall (612/624-9281).

- AgEc 3040—Economic Development of American Agriculture (4)
 AgEc 3610—Resource Development and Environmental Economics (4)

- AgEc 5650—Economics of Natural Resource Policy (4)
 Anth 5117—Energy Research Use (4)
 FR 3104—Forest Ecology (4)
 or EEB 3001—Introduction to Ecology (4)
 Econ 5611—Resource and Environmental Economics (4)
 FR 5232—Management of Recreation Lands (4)
 FR 5233—Principles of Outdoor Recreational Planning (3)
 FR 5241—Natural Resource Management: Political and Administrative Processes (3)
 FR 5257—Recreation Land Policy (3)
 FW 5460—Pollution Impacts on Aquatic Systems (3)
 FW 5603—Ecology and Management of Fish and Wildlife Habitats (4)
 FW 5604—Fisheries and Wildlife Management (4)
 PA 5001—Politics, Planning, and Decision Making (3)
 PA 5102—Legal Environment of Public Affairs (3)
 PA 5721—Environmental Policy (3)
 Pol 5523—Politics of the Regulatory Process (4)

Soil Resources—Focus on management, interpretation, and inventory of soil resources. Emphasis on preventing soil erosion and reducing land degradation and adverse impacts of erosion on water and air quality. For more information, contact Dr. Edward I. Sucoff, 103 Green Hall (612/624-7249).

- AgEc 5600—Land Economics (3)
 AgET 5410—Hydrology and Water Quality (5)
 Agro 1010—Principles of Agronomy (5)
 or Agro 3020—Growth Development and Culture of Field Crops (5)
 FR 3104—Forest Ecology (4)
 or EEB 3001—Introduction to Ecology (4)
 FR 5200—Aerial Photo Interpretation (3)
 FR 5231—Range Management (3)
 Soil 3220—Soil Conservation and Land Use Management (4)¹
 Soil 3416—Soil Fertility (5)¹
 Soil 5210—Soil Physical Properties and the Environment (4)
 Soil 5240—Microclimatology (3)
 Soil 5510—Field Study of Soils for Environmental Assessment (4)¹
 Soil 5560—Interpretation of Land Resources (3)
 Soil 5710—Forest Soils (3)¹

¹Recommended course. Other courses possible with adviser approval.

Waste Management—Focus on the requirements needed to manage the waste stream. Understanding the processes involved in managing wastes and implementing procedures for municipal solid waste composting, incineration, recycling, and the implications of landfilling solid waste. For more information, contact John V. Bell, 135 Natural Resources Administration Building (612/624-6768).

Baccalaureate Programs

CE 5510—Solid and Hazardous Waste Management (4)
Econ 5611—Resource and Environmental Economics (4)
FW 5460—Pollution Effects on Aquatic Systems (3)
NRES 5600—Principles of Waste Management (4)
PA 5001—Politics, Planning, and Decision Making (3)
PA 5721—Environmental Policy (3)
Pol 5523—Politics of the Regulatory Process (4)
PubH 5242—Environmental Health Aspects of
Groundwater Systems (3)
Soil 5610—Soil Biology (4)

Recreation Resource Management

This curriculum prepares students for careers in the comprehensive planning and management of land and water for recreation, with emphasis on natural nonurban areas; for participation in government resource-oriented recreation programs as well as private planning and consulting; and for graduate work in resource planning and management.

The curriculum described below applies to students who have accumulated 39 or more credits before fall quarter 1994. Students with 38 or fewer credits should check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768).

Freshman and Sophomore Years—95-106 required credits

A. *Communication, Language, and Symbolic Systems*—17-18 required credits

Math 1142—Short Calculus (5)
or Math 1251—One-Variable Differential and Integral Calculus I (4)

Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)

B. *Physical, Biological, and Analytical Sciences*—44-53 required credits

Biol 1009—General Biology (5)
or Biol 1201—Evolutionary and Ecological Perspectives (5) and Biol 1202—Molecular and Cellular Perspectives (5)

Biol 1103—General Botany (5)
Biol 5041—Ecology (4)
Chem 1002—Elementary Organic Chemistry (4)
or Chem 1051—Chemical Principles I (4) and Chem 1052—Chemical Principles II (4)

FR 1001—Forest Resources Orientation (1)
FR 1100—Dendrology (4)
FR 1201—Conservation of Natural Resources (3)
Geo 1001—Introduction to Geology (4) and Geo 1021—Introduction to Geology Lab: Geology of Minnesota (1)

LA 1024—Landscape Theory (4)¹
or LA 1401—The Designed Environment (4)
Phys 1001—The Physical World (4) and Phys 1005—Physics Laboratory (1)
(Students who have completed high school physics with a B or better may be exempt, but must first see their adviser.)

Soils 1020—The Soil Resource (4)
or Soils 3125—Basic Soil Science (4)
Electives and liberal education requirements
¹Offered through CEE only, fall quarter.

C. *The Individual and Society*—26-27 required credits
AgEc 1101—Principles of Microeconomics (4)
AgEc 1102—Principles of Macroeconomics (4)
Geog 1401—Physical Geography (5)
or Geog 1301—Human Geography (5)
Pol 1041—Contemporary Political Ideologies (4)
or Pol 1001—American Government and Politics (5)
Psy 1001—Introduction to Psychology (5)
Soc 1001—Introduction to Sociology (4)
Electives and liberal education requirements

D. *Literature, Humanities, and Fine Arts*—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Junior Year—40-46 required credits
AgEc 3610—Community Resource Development (4)
or AgEc 5620—Regional Economic Analysis (3-4)
FR 5114—Forest Hydrology (4)
FR 5130—Geographic Information Systems in Natural Resource Analysis (2) and FR 5131—Geographic Information Lab (1)
FR 3300—Elements of Surveying (2)
or Geog 3511—Introduction to Cartography (5)
FR 5232—Management of Recreational Lands (4)
FW 3052—Introduction to Fisheries and Wildlife (3)
Rec 3550—Park and Recreation Administration (5)
or Rec 3530—Recreation and Park Areas and Facilities (5)
or Rec 5310—Programming in Outdoor Education (4)
Rhet 3254—Advanced Public Speaking (4)
or Rhet 3266—Communication, Discussion, in Small Group Decision Making (4)
Rhet 3562—Writing in Your Profession (4)
Soc 3801—Sociological Methods I: Descriptive Statistics (5)
or Stat 3011—Statistical Analysis (4)
Soc 3802—Sociological Methods II: Statistical Inference (5)
or Stat 3012—Statistical Analysis (4)
Electives and liberal education requirements

Senior Year—27-28 required credits
EEB 5014—Ecology of Plant Communities (5)
or EEB 5016—Ecological Plant Geography (5)
FR 5200—Aerial Photo Interpretation (3)
Soc 3803—Sociological Research Methods III: Research Methods (5)
or NRES 5210—Survey, Measurement and Modeling Methods for Natural Resources I (4)
FR 5233—Principles of Outdoor Recreation Planning (3)
FR 5259—Analysis of Outdoor Recreation Behavior (3)
or FR 5257—Recreation Land Policy (3)
NRES 5100—Problem Solving in Natural Resources and Environmental Studies (5)

Soc 3401—Social Organization (4)

or Soc 3411—Understanding Formal Organizations (4)

Electives and liberal education requirements

Recommended Electives

AgEc 1250—Principles of Accounting (5)

AgET 3030—Introduction to Problem Solving with Computers (4)

or CSci 3113—Introduction to Programming in C (4)

or GC 1571—Introduction to BASIC Programming and Microcomputers (5)

BLaw 3058—Introduction to Law, the Law of Contracts and Sales Contracts (4)

FR 3100—Minnesota Plants (2) (Itasca)

FR 3101—Northern Forest Ecosystems (3) (Itasca)

FR 3201—Field Forest Measurements (1) (Itasca)

FR 5110—Forestry Applications of Microcomputers (4)

FR 5114—Forest Hydrology (4)

FR 5212—Natural Resources Inventory (4)

FR 5215—Forest Fire Management (2)

FR 5226—Forest Economics and Planning (5)

FR 5231—Range Management (3)

Hort 1021—Woody Plant Materials (5)

or Hort 1022—Herbaceous Plant Materials (5)

Mgmt 3001—Fundamentals of Management (4)

Mgmt 3002—Psychology in Management (4)

PBio 1009—Minnesota Plant Life (4)

PIPa 5212—Diseases of Forest and Shade Trees (4)

Pol 1001—American Government and Politics (5)

Rec 5250—Financing Leisure Services (3)

Rhet 5170—Managerial Communications (4)

Total Graduation Requirements—192 credits

Required courses listed above (162-180 credits), and electives (12-30 credits).

Urban Forestry

Urban forestry involves planning and managing vegetation and associated natural resources in and near urban communities to maximize their benefits to people. Urban forests include all areas along streets and in parks, transportation right-of-ways, private lands, greenbelts, and open spaces. Urban foresters help communities plan and design their urban forests, supervise tree selection and planting, design insect and disease protection programs, and provide related services. City governments are the principal employers, as well as state and federal forestry agencies, forestry consulting firms, tree service firms, nursery firms, and utility companies. Graduates may also be qualified for traditional professional forestry positions, including those in the federal government.

The curriculum described below applies to students who have accumulated 39 or more credits before fall quarter 1994. Students with 38 or fewer credits should check in the CNR Office for Student Affairs, 135 Natural Resources Administration Building (612/624-6768).

Freshman and Sophomore Years—84-86 required credits plus electives

A. *Communication, Language, and Symbolic Systems*—26-28 required credits

GC 1571—Introduction to BASIC Programming and Microcomputers (5)¹

or AgEt 3030—Introduction to Problem Solving with Computers (4)

or CSci 3102—Introduction to PASCAL Programming (4)

Math 1142—Short Calculus (5)

Rhet 1101—Writing to Inform and Persuade (4)

Rhet 1104—Library Research Methods (1)

Rhet 1151—Writing in Your Major (4)

Rhet 1222—Public Speaking (4)

Stat 3011—Statistical Analysis (4)

or Stat 5021—Statistical Analysis (5)

¹Students who wish to take FR 5110 should not take GC 1571. AgEt 3030 is the prereq for FR 5110.

B. *Physical, Biological, and Analytical Sciences*—36 required credits

Biol 1009—General Biology (5)

or Biol 1201—Evolutionary and Ecological Perspectives (5)

Biol 1103—General Botany (5)

Chem 1051, 1052—Chemical Principles I-II (4,4)

or Chem 1001—General Principles of Chemistry (4) and Chem 1002—Elementary Organic Chemistry (4)

FR 1001—Forest Resources Orientation (1)

FR 1200—Introduction to Forest Resources (3)

or FR 1201—Conservation of Natural Resources (3)

Hort 1021—Woody Plant Materials (5)

Phys 1001—The Physical World (4)

Phys 1005—Physics Laboratory (1)

Soils 1020—The Soil Resource (4)

or Soils 3125—Basic Soil Science (4)

C. *The Individual and Society*—8 required credits (no more than 6 credits in any one discipline)

AgEc 1102—Principles of Macroeconomics (4)

See the Liberal Education Requirements section of this bulletin for additional Category C suggestions.

D. *Literature, Humanities and Fine Arts*—8 required credits

See the Liberal Education Requirements section of this bulletin for Category D suggestions.

Itasca Session—6 required credits

This summer term is to be taken between the freshman and sophomore or sophomore and junior years.

FR 3100—Minnesota Plants (2)

FR 3101—Northern Forest Ecosystems (3)

FR 3201—Field Forest Measurements (1)

Baccalaureate Programs

Junior Year—34-35 required credits and recommended electives

- ForP 1301—Wood as a Raw Material (4)
 - FR 1100—Dendrology (4)
 - FR 3104—Forest Ecology (4)
 - FR 5100—Silviculture (4)
 - FR 5120—Tree Physiology (3)
 - FR 5212—Natural Resources Inventory (4)
 - FR 5233—Principles of Outdoor Recreation Planning (3)
or Hort 3030—Landscape Design of Residential and Small Commercial Sites (4)
 - PIPa 5212—Diseases of Forest and Shade Trees (4)
 - Rhet 3562—Writing in Your Profession (4)
- Electives and liberal education requirements

Senior Year—32 required credits and recommended electives

- AgEc 1250—Principles of Accounting (4)
 - Ent 5250—Forest Entomology (4)
 - FR 5200—Aerial Photo Interpretation (3)
 - FR 5226—Forest Economics and Planning (5)
 - FR 5240—Natural Resource Policy and Administration (3)
 - FR 5500—Urban Forest Management (3)
 - Hort 5046—Nursery Management and Production I (4)
 - Hort 5047—Nursery Scheduling and Enterprise Development (2)
 - Hort 5048—Nursery Management and Production II (4)
- Electives and liberal education requirements

Recommended Electives—at least 19 credits

- BLaw 3058—Introduction to Law, the Law of Contracts and Sales Contracts (4)
- Ent 5210—Insect Pest Management (4)
- ForP 1303—Wood Structure and Identification (2)
- FR 1202—Farm and Small Woodlands Forestry (2)
- FR 3103—Meteorology and Climatology for Natural Resource Managers (2)
- FR 3202—Leadership and Management Skills Development (2)
- FR 3300—Elements of Surveying (2)
- FR 5110—Forestry Applications of Microcomputers (3)
- FR 5114—Forest Hydrology (4)
- FR 5152—Forest Genetics (3)
- FR 5232—Management of Recreational Lands (4)
- FR 5241—Natural Resource Management: Political and Administrative Processes (3)
- FW 3052—Introduction to Fisheries and Wildlife (3)
- Hort 1022—Herbaceous Plant Materials (5)
- Hort 1036—Plant Propagation (4)
- Hort 3072—Turf Management (4)
- Hort 5026—Landscape Management (5)
- IR 3010—The Individual in the Organization (4)
or IR 3002—Personnel and Industrial Relations (4)
- LA 1401—The Designed Environment (4)
- Mgmt 3001—Fundamentals of Management (4)
- PA 5231—Strategy and Tactics in Project Planning (4)

Total Graduation Requirements—192 credits

Required courses (150-153 credits), recommended electives (19 credits), and electives (20-23 credits).

Course Descriptions



Course Descriptions

Course Numbering and Symbols—Courses primarily for freshmen and sophomores are numbered 1000 through 1998; for juniors and seniors, 3000 through 3998; for juniors, seniors, and graduate students, 5000 through 5998. Courses numbered 8000 and above are restricted to students registered in the Graduate School.

The following symbols are used throughout the course descriptions:

, The comma, used in prerequisite listings, means "and."

§ Credit will not be granted if credit has been received for the course listed after this symbol.

¶ Concurrent registration is allowed (or required) in the course listed after this symbol.

† All courses preceding this symbol must be completed before credit will be granted for any quarter of the sequence.

Δ Registration Override Permit, completed and signed by the unit offering the course, is required for registration.

Registration Override Permit, completed and signed by the instructor, is required for registration.

When no abbreviated department prefix precedes the course number listed as a prerequisite, that prerequisite is in the same department as the course being described.

Agricultural and Applied Economics (AgEc)

1101. PRINCIPLES OF MICROECONOMICS. (4 cr, §Econ 1002; prereq 1102)
Economics of the firm and household; factor and product price determination; theory of production, consumption, and distribution; supply and demand analysis; equilibrium analysis.

1102. PRINCIPLES OF MACROECONOMICS. (4 cr, §Econ 1001)
Determinants of natural income and employment levels; prices and money; the banking system; monetary and fiscal policy; economic growth and development; role of government in the economy.

Agricultural Engineering Technology (AgET)

3030. INTRODUCTION TO PROBLEM SOLVING WITH COMPUTERS. (4 cr; prereq Math 1031 or equiv; 3 lect hrs, 1 rec hr per wk)
Elementary problem solving using computers. Writing programs in BASIC language. Use of timesharing terminals. Elements of computer hardware and software.

Chemistry (Chem)

1001. GENERAL PRINCIPLES OF CHEMISTRY. (4 cr, §1051-1052, §1008, §1031-1032)
Introduction to chemistry, matter and energy, atoms, molecules, chemical bonding, the mole and chemical calculations, gases, liquids, solids, solutions, chemical reactions, acids, bases and equilibrium.

1002. ELEMENTARY ORGANIC CHEMISTRY. (4 cr, §3301, §3302; prereq 1001 or advanced placement by exam)
Short introduction to organic chemistry with emphasis on biological systems.

1051-1052†. GENERAL PRINCIPLES I-II. (4 cr per qtr, §1001-1002, §1031-1032)
Introduction to chemistry from the standpoint of atomic structure; periodic properties of elements and compounds derivable from structural considerations; laws governing behavior of matter, theories of solutions, acids, bases, and equilibria.

3301. ELEMENTARY ORGANIC CHEMISTRY I. (4 cr, §3331; for non-chem majors; prereq 1005 or 1032 or equiv; 4 lect hrs per wk)
Important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds.

3302. ELEMENTARY ORGANIC CHEMISTRY II. (4 cr; prereq 3301, 3305; 4 lect hrs per wk; if 3305 is taken concurrently, a passing grade is required for 3305 in order to receive cr for 3302)
Continuation of 3301.

3305. ELEMENTARY ORGANIC CHEMISTRY LABORATORY I. (2 cr; prereq 3301 or ¶3301; 1 lab conf, 4 lab hrs per wk)
Techniques used to prepare typical organic substances.

3306. ELEMENTARY ORGANIC CHEMISTRY LABORATORY II. (2 cr; prereq 3302 or ¶3302; 1 lab conf, 4 lab hrs per wk)
Techniques used to prepare typical organic substances.

Fisheries and Wildlife (FW)

1001. ORIENTATION IN FISHERIES AND WILDLIFE. (1 cr; S-N only)
Survey of technical requirements and education of fishery and wildlife technicians and scientists; introduction to fields of work, problems, and career opportunities.

1002. WILDLIFE: ECOLOGY, VALUES, AND HUMAN IMPACT. (3 cr)

Controversial issues involving specific wildlife management principles and techniques. For students without natural science background interested in natural resource topics, especially wildlife issues.

3052. INTRODUCTION TO FISHERIES AND WILDLIFE. (3 cr; prereq 1 ecol course)

Traditional and contemporary approaches to population and biodiversity conversation, natural history and management of important Minnesota game and nongame species, impact of global environmental problems on the Earth's biodiversity.

3600. FISHERIES AND WILDLIFE FIELD TECHNIQUES. (5 cr; prereq 3052, Δ; at Itasca)

Introduction to various field techniques and skills; planning and implementing field projects; data collection and analysis using microcomputers; written reports and a field journal.

5129. MAMMALOLOGY. (5 cr, §EBB 5129; prereq Biol 1106 or 3011 or #)

Recent families and orders of mammals of the world and genera and species of mammals of North America, with emphasis on morphology, evolution, and zoogeographic history.

5278. SPECIAL LECTURES: WILDLIFE. (Cr ar; offered when feasible)

Lectures in special fields of wildlife given by a visiting scholar or regular staff member.

5279. SPECIAL LECTURES: FISHERIES. (Cr ar; offered when feasible)

Lectures in special fields of fisheries given by a visiting scholar or regular staff member.

5393. SPECIAL PROBLEMS: FISHERIES BIOLOGY. (Cr ar; prereq #, Δ)

Individual field, library, and lab research in fisheries biology.

5398. SPECIAL PROBLEMS: WILDLIFE BIOLOGY. (Cr ar; prereq #, Δ)

Individual field, library, and lab research in wildlife biology.

5455. AQUACULTURE. (3 cr; prereq Biol 1009, 1103, 1106 or equiv, Chem 1051-52 or equiv or #; offered alt yrs)

Role of aquaculture in resource management and world food production; institutional and economic considerations; principles of husbandry of aquatic organisms; interactions between fish metabolism and water quality; nutrition and energetics; fish health and genetics.

5459. FISH PHYSIOLOGY. (4 cr; prereq AnSci 3301 or EEB 5136 or EEB 5156 or #)

Relationships between the physiology of fishes, their behavior, and the aquatic environment. Includes examination of ionic and osmotic balance, gas exchange, locomotion, orientation and migration, reproduction, endocrinology, growth, and stress.

5460. POLLUTION IMPACTS ON AQUATIC SYSTEMS. (3 cr; prereq Biol 5041, EEB 5601, Chem 1051-1052, 3301, 3305 or #; offered alt yrs)

Pollution assessment approaches, biological effects, fate and flow of contaminants in aquatic systems and major types of pollutants will be described.

5461. THE BEHAVIOR OF FISHES. (2 cr; prereq EEB 1111 or FW 5459 or #)

Organismal and sub-organismal perspectives of fish behavior. Feeding behavior and optimal foraging theory, learning and intelligence in fish, genetic basis of behavior, neural and endocrine bases of behavior, communication, orientation and navigation, schooling and shoaling, reproduction, and application of an understanding of fish behavior to the harvest, management, and conservation of fishes.

5570. AVIAN CONSERVATION. (4 cr; prereq EEB 5134 or grad standing or #; offered alt yrs)

Current problems in avian conservation and management, with equal emphasis on nongame, wetland, and game birds.

5601. ASSESSMENT AND MANAGEMENT OF VERTEBRATE POPULATIONS. (5 cr; prereq Math 1142 or Math 1251, PubH 5450 or equiv)

Conceptual models of populations, description of population characteristics, and computer-assisted estimation of population parameters for the purpose of management. Competency in microcomputer word processing and spreadsheet data entry required.

5603. ECOLOGY AND MANAGEMENT OF FISH AND WILDLIFE HABITATS. (4 cr; prereq 5601 or grad standing or #)

Ecological analysis of environmental factors as they influence distributions and productivity of terrestrial and aquatic vertebrates. Emphasis on those factors humans do or can influence. Three or four all-afternoon and/or Saturday morning field trips.

5604. FISHERY AND WILDLIFE MANAGEMENT. (4 cr; prereq 5601 or #)

Basic understanding of fisheries and wildlife management with an emphasis on managed species of interest. Introduction to tactics and strategies of fisheries and wildlife management. Understanding of the role of strategic planning in directing and redirecting management actions. Use and efficacy of fisheries and wildlife management tools.

5620. GEOGRAPHIC INFORMATION SYSTEMS FOR FISHERIES, WILDLIFE, AND BIOLOGICAL CONSERVATION. (4 cr; prereq Biol 5041, #)

Hands-on experience with GIS as a tool for understanding, analyzing, and managing ecological systems. ARC/INFO and how to apply it to problems in fisheries, wildlife, and biological conservation.

5701, 5702+. SENIOR PROJECT. (1-2 cr; prereq FW sr or grad or #)

Two-quarter course providing problem-solving training. Management problem identification and analysis design, information and data gathering and analysis, and oral and written problem reporting. Problem selection influenced by guest speakers, resource agency contacts, and group discussions; topic selected is a contemporary fisheries and wildlife management issue.

Course Descriptions

For Graduate Students Only

(For description, see *Graduate School Bulletin*)

8200. SEMINAR

8364. RESEARCH IN FISHERIES BIOLOGY

8377. RESEARCH IN WILDLIFE BIOLOGY

8448. FISHERY SCIENCE

8451. PRODUCTION BIOLOGY OF FISHERY ENVIRONMENTS

8452. CONSERVATION BIOLOGY: GENETIC AND DEMOGRAPHIC ISSUES

8459. STREAM AND RIVER ECOLOGY

8460. FISH HABITATS AND RESTORATION

8576. WILDLIFE MANAGEMENT: LARGE MAMMALS

8579. ECOSYSTEM ANALYSIS AND SIMULATION: A NUMERICAL APPROACH

Forest Products (ForP)

1001. FOREST PRODUCTS ORIENTATION. (1 cr)

Information about curricula offerings, specializations, career options, CLE requirements, financial aid, scholarships, summer employment, and other student-related concerns.

1301. WOOD AS A RAW MATERIAL. (4 cr)

Physical and chemical nature of solid wood and wood fiber as it relates to the requirements of major wood-based industries. World supply and consumption. Weekly demonstration labs dealing with structure and properties of wood and manufacture of solid, particle, and fiber products.

1303. WOOD STRUCTURE AND IDENTIFICATION. (2 cr; prereq 1301 or #)

Features of wood structure vital to identifying wood of various tree species and understanding physical properties of wood. Lecture and lab.

3202. LEADERSHIP AND MANAGEMENT SKILLS DEVELOPMENT. (3 cr)

Discussions and classroom exercises on management, planning, directing, controlling, and organization; group problem-solving, the implications of organizational change, time management, and career planning and development.

3300. WOOD INDUSTRY TOURS. (2 cr; prereq 1301; jr or sr standing or #)

A five-day bus tour of visits to a dozen or more manufacturers representing a broad cross section of the wood-using industry. Scheduled during spring quarter break.

3301. INDUSTRIAL INTERNSHIP. (2 cr; prereq ForP cooperative ed student)

Industrial work assignment in FP cooperative education program. Evaluation based on formal report written by student at end of each quarter of work assignment.

3303. FOREST PRODUCTS MARKETING. (3 cr)

Survey of marketing in the forest products industry, including review of basic marketing concepts and terminology.

3305. GRADING STANDARDS AND PRODUCT PERFORMANCE. (2 cr; prereq 1301, 1303 or #)

History, development, and practical application of hardwood and softwood log and lumber grading methods.

3310. WOOD-FRAME BUILDING SYSTEMS AND MATERIALS. (4 cr; prereq Phys 1001 or equiv)

Light-frame construction methods and material selection with emphasis on wood-based products and components. Basic wood properties and products, cost estimating, building codes, construction practices, heat loss, and residential construction terminology.

3312. BUILDING MATERIALS ESTIMATING. (2 cr)

Modern methods of estimating quantity, grade, and specifications of building materials for light-frame construction.

3325. DIRECTED STUDY EXPERIENCE. (1-5 cr; prereq #, Δ)

Opportunity to pursue experiences not available under independent study or extra credit registration. The student develops, in consultation with the adviser for the project, a prospectus and completes progress reports and a final report on his or her project.

3361. INTRODUCTION TO ADHESIVES. (3 cr; prereq BioC 1301, Phys 1042; offered even yrs)

Scope and use of adhesive applications. Fundamental nature of adhesion; ideal adhesive joint. Adhesive polymers. Fabrication and mechanical properties of adhesively bonded assemblies.

5300. WOOD-FLUID RELATIONSHIPS. (3 cr; prereq 1301)

Moisture in wood and its relationship to density and specific gravity, shrinking and swelling, electrical properties, strength properties, thermoconductivity, sorption isotherms, dimensional stabilization, permeability and diffusion. Lectures only.

5301. MECHANICAL PROPERTIES. (3 cr; prereq 1301 or #)

Basic mechanics and strength of materials as applied to wood products.

5302. WOOD CHEMISTRY I. (3 cr; prereq Chem 3302)

Molecular structure of wood cell wall. Structure, properties, and reactions of monosaccharides and derivatives; oligosaccharides. Structure, properties, and biogenesis of cellulose; cellulose derivatives; comparison with starch.

5303. WOOD DETERIORATION. (4 cr; prereq 1301 or #)

Deterioration of wood and wood products by bacteria, fungi, insects, marine organisms, fire, and weathering; methods of preservation and preservatives used. Lecture and lab.

5304. WOOD DRYING AND PRESERVATION PROCESSES. (4 cr; prereq 5300, 5303)

Materials, equipment, processes, and technical considerations inherent in the industrial drying and/or preservative treatment of wood products. Lectures, lab exercises, plant visits.

5305. PULP AND PAPER TECHNOLOGY. (2 cr; prereq 5300 or #)

Pulping processes, fiber refining and processing, paper manufacturing, fiber and paper properties; paper recycling; water requirements and effluent treatment.

5306. ANALYSIS OF PRODUCTION SYSTEMS.

(3 cr; prereq 1301 or #; 3300 recommended)
Engineering and economic analysis of manufacturing and distribution systems for wood-based products. Material balances, equipment selection, economic analysis, and presentation techniques.

5307. WOOD-BASE PANEL TECHNOLOGY. (4 cr; prereq 5300, 5301 or #)

Design, manufacture, properties, and applications of structural and nonstructural wood-base panels. Adhesives and their application in the panel industry. Lecture and lab.

5308. WOOD MACHINING. (3 cr; prereq 1301, 1303)

Technologies and methods. Development and application of various wood processing systems.

5310. PULP AND PAPER PROCESS LABORATORY.

(3 cr; prereq 5305 or #)
Chemical and mechanical pulping, pulp preparation, secondary fiber, de-inking, wet end additives. Lab problems and exercises supplemented by lectures.

5311. PULP AND PAPER PROCESS CALCULATIONS I. (4 cr; prereq AgET 3030, CE 3400, ChEng 5001, ME 3301)

Physical and chemical process engineering calculations; steady and unsteady state material and energy balances applied to pulping and papermaking processes; flowsheet and system calculations; computer-aided material and energy balances.

5312. PULP AND PAPER PROCESS CALCULATIONS II. (4 cr; prereq 5311 or ChEn 5101, ¶ME 3301)

See 5311.

5313. PULP AND PAPER PROCESS OPERATIONS I. (4 cr; prereq 5305, 5312, 5353, CE 3400, ME 3301, ME 5342 or ChEn 5102 or #)

Application of the principles of momentum, heat, and mass transfer to unit operations in the pulp and paper industry; fluid transport, filtration, sheet formation, sedimentation, drainage, pressing, heat exchange, evaporation, washing, bleaching, humidification and drying, chemical and energy recovery. Computer simulation of multiple-stage systems.

5314. PULP AND PAPER PROCESS OPERATIONS II: PAPER MACHINE OPERATIONS, FINISHING AND CONVERTING. (3 cr; prereq 5305, 5310, 5311, 5312, 5315, 5359, ¶5321, CE 3400, ME 3301, ME 5342 or #)

Theory and practice of the design and operation of paper machines and associated finishing and converting equipment.

5315. PAPER ENGINEERING LABORATORY.

(2 cr; prereq 5305, 5310 or ¶5310, 5312 or #)
Experiments that illustrate and apply the principles of momentum, heat, and mass transfer. Operation and performance optimization of pilot-plant paper machine. Process engineering studies of industrial production systems.

5316. COATED PRODUCT DEVELOPMENT. (2 cr; prereq 5359)

Coating process and products (primarily paper); theory, techniques, and procedures for formulating and applying coatings; properties and uses of coated products.

5318. PULP AND PAPER PROCESS DYNAMICS AND CONTROL. (3 cr; prereq 5305, 5310, 5311, 5312, 5315, ¶5321, CE 3400, ME 3301, ME 5342 or #)

Theory and practice of process control in the pulp and paper industry: sensors, control equipment and algorithms, final control elements; applications to industrial pulp and paper manufacturing, available hardware and software.

5320. BIOLOGICAL AND ENVIRONMENTAL SCIENCE OF PULP AND PAPER. (3 cr; prereq sr or ForP grad standing or #)

Biology and chemistry of the pulp and paper processes as related to their impacts on the environment; treatment of process effluents and discharges; governmental regulations and industry compliance; theory, design and operation of equipment for the treatment or prevention of environmental effects; biochemistry of pulp and paper aquatic systems; advances in biological pulping and papermaking.

5321. MATERIAL SCIENCE OF PAPER (PAPER AND FIBER PHYSICS AND PROPERTIES). (4 cr; prereq 5305, 5310, 5311, 5312, 5315, 5359, CE 3400, ME 3301, ME 5342, ¶Chem 5520 or #)

Advances in understanding the response of fibers subjected to various operations of papermaking processes: mechanisms acting in stock preparation, refining, wet-end operations, web consolidation and drying; analysis of their corresponding influences on fiber, pulp suspension, and paper properties; challenges placed on end products by changing raw materials and requirements, including introduction of recycled pulp in paper products.

5331. UNDERGRADUATE SEMINAR. (2 cr; prereq ForP major; must be taken before sr yr)

Career planning, résumé preparation, discussion of job interviewing, and practice of technical presentation.

5350. WOODY TISSUE MICROTÉCHNIQUE. (2 cr; offered when feasible)

Use of sliding and rotary microtomes, maceration, differential staining, and special techniques in preparing woody tissue for microscopic study. Lab.

5353. WOOD CHEMISTRY II. (3 cr; prereq 5302)

Composition, distribution, and structure of hemicelluloses and their interactions with cellulose. Biosynthesis, structure, and analytical degradation of lignins. Wood delignification. Pulp bleaching chemistry. Lignin biodegradation.

Course Descriptions

5355. MECHANICS AND STRUCTURAL DESIGN WITH WOOD PRODUCTS. (4 cr; prereq 5301)

Mechanical behavior of lumber, plywood, and particleboard as applied to structural considerations in building construction. Lecture and lab.

5356. ADVANCED FOREST PRODUCTS MARKETING. (3 cr; prereq 3303 or #)

Marketing and market analysis, sales, and retail and wholesale distribution of forest products. Lectures and case studies.

5359. SURFACE AND COLLOID CHEMISTRY OF PAPERMAKING. (3 cr; prereq 5361 or #, Chem 3302, ME 3301, ¶Chem 5520)

Principles of surface and colloid chemistry applied to basic problems in pulp and paper manufacturing operations and product uses.

5361. ADHESION AND ADHESIVES. (3 cr; prereq Chem 3302)

Scope and use of adhesive applications. Fundamental nature of adhesion; ideal adhesive joint. Conformations of linear polymers. Statistical thermodynamics and polymer adsorption onto adherent surface. Adhesives in common use. Mechanical properties of adhesive joints.

5401. SENIOR TOPICS. (Cr ar; prereq sr, #, Δ)

Independent study in a field of interest to a forestry major. Planned with adviser.

5405. PAPER IN TODAY'S WORLD. (3 cr, §5305; offered through CEE)

Primarily for elementary and secondary school teachers although other interested students may enroll. Enables teachers to prepare a teaching unit on pulp and paper for use in an elementary, junior high, or senior high school science class. Not open to forest products majors.

5410. UNDERSTANDING WOOD. (2 cr; offered through CEE)

For woodworking professionals and serious craftspersons. Cellular structure of wood, identification of hardwoods and softwoods, interaction of water and wood. No prior technical training in wood properties is needed. Although general experience with woodworking is helpful.

5420. USING PROCESS SIMULATION IN THE PULP AND PAPER INDUSTRY. (2 cr; CEE only)

This hands-on microcomputer two-day workshop provides instruction in solving flowsheet calculation problems relating to pulp and paper process engineering, and demonstrations of the types of problems that can be solved using these techniques. Primarily for practicing engineers in the paper industry. Not open to forest products majors.

For Graduate Students Only

(For description, see *Graduate School Bulletin*)

8300. RESEARCH PROBLEMS

8301. RESEARCH PROBLEMS

8304. ADVANCED TOPICS IN WOOD DRYING

8306. SEMINAR: FOREST PRODUCTS

8307. ADVANCES AND METHODS IN FOREST PRODUCTS PATHOLOGY AND PRESERVATION

8310. MECHANICS OF WOOD AND WOOD COMPOSITES

Forest Resources (FR)

1001. FOREST RESOURCES ORIENTATION. (1 cr)
Information about curricula offerings, areas of emphasis, CLE requirements, and summer job and internship programs.

1100. DENDROLOGY. (4 cr; prereq Biol 1103)

Identification, nomenclature, classification, and distribution of about 200 important forest trees. Preparation and use of keys, systems of natural classification, and field and lab methods of identification.

1200. INTRODUCTION TO FOREST RESOURCES. (3 cr)

Multiple forest resources and their management. History, policy, and current issues in forest resources. Lectures, labs, field trips.

1201. CONSERVATION OF NATURAL RESOURCES. (3 cr)

Development of thought on natural resource conservation in the United States. Renewable resources and their management problems; resource conservation and environmental management related to basic ecological principles.

1202. FARM AND SMALL WOODLANDS

FORESTRY. (3 cr for non-forestry majors, 2 cr for majors [3 cr with paper]; prereq for majors 1100 or ¶1100)

Status and problems of the small woodland owner. Factors influencing tree growth. Cutting practices for and marketing products of small woodlands. Establishing and caring for plantations, shelterbelts, and windbreaks. Field trips.

1203. INTRODUCTION TO MINNESOTA'S NATURAL RESOURCES. (3 cr, §1201; for non-forestry students)

Ecological, social, and economic implications of Minnesota's soil, water, forest, wildlife, and other resources are studied in field exercise and group discussions at nature centers and natural areas. Environmental teaching techniques for the elementary indoor classroom.

3100. MINNESOTA PLANTS. (2 cr; prereq Biol 1103, Δ; at Itasca)

Identification of plants as related to habitat.

3101. NORTHERN FOREST ECOSYSTEMS. (3 cr; prereq Chem 1001 or Chem 1051, Δ; at Itasca)

Field examination of succession, soils, silvical characteristics, tree classification, stand structure, and regeneration ecology.

3102. SOUTHERN FOREST RESOURCE TOUR.

(1 cr; prereq FR jr or sr or #: offered odd yrs)
One-week field tour of selected southern forest industries and public forest management agencies. Walnut production, southern pine silviculture, hardwood use, various mill tours. Discussions, paper.

3103. METEOROLOGY AND CLIMATOLOGY FOR NATURAL RESOURCE MANAGERS.

(2 cr; prereq Phys 1001, Phys 1005 or #)
Fundamentals of meteorology and climatology as applied to wildland resource management.

3104. FOREST ECOLOGY.

(4 cr)
Ecological concepts and principles as a basis for conservation and management of forest ecosystems.

3106. IMPORTANT PLANTS IN FISHERIES AND WILDLIFE HABITATS.

(1 cr; prereq FW 3600 or ¶FW 3600; at Itasca)
Field identification of important plants in fisheries and wildlife habitats.

3107. FOREST ECOLOGY LABORATORY.

(1 cr, §3101; prereq ¶3104)
Forest stands, communities, and ecosystems. Field trips.

3201. FIELD FOREST MEASUREMENTS.

(1 cr; prereq Math 1008, Δ; at Itasca)
Introduction to land survey, tree and stand measurement, and basic forest sampling techniques.

3202. LEADERSHIP AND MANAGEMENT SKILLS DEVELOPMENT.

(3 cr)
Discussions and classroom exercises on management, planning, directing, controlling, and organization; group problem solving, implications of organizational change, time management, and career planning and development.

3225. DIRECTED STUDY EXPERIENCE.

(1-5 cr; prereq fr or soph standing, #, Δ)
Opportunity to pursue experiences not available under independent study or extra credit registration. Student develops, in consultation with the adviser for the project, a prospectus and completes progress reports and a final report on his or her project.

3250. ROLE OF RENEWABLE NATURAL RESOURCES IN DEVELOPING COUNTRIES.

(2 cr)
International perspective on important resource issues, including integration of natural resource, social, and economic considerations. Overviews of issues and case studies.

3300. ELEMENTS OF SURVEYING.

(2 cr; prereq Math 1008 or high school trig, Δ; at Cloquet)
Basic concepts of elementary plane surveying for use in natural resource assessment. Introduction to public land and boundary surveys and geographic information systems. Lectures and labs.

5100. SILVICULTURE.

(4 cr; prereq for FR major, 1100, 3104, Itasca Session; for nonmajor, 3104 or equiv, #)
Introduction to silvics, forest regeneration and site preparation techniques, intermediate silvicultural practices, and silvicultural systems.

5101. FIELD SILVICULTURE.

(4 cr; prereq 5100, Δ; at Cloquet)
Regeneration surveys, plantation inspection, site preparation, and reforestation prescription. Practice in marking for thinning and determining effect on stands. Compartment examination and prescription. Written and oral reports.

5102. FOREST WILDLIFE HABITAT MANAGEMENT.

(1 cr; prereq FW 3052, ¶FW 5100, Δ; at Cloquet)
Forest vegetation management techniques for developing and maintaining wildlife habitat; consideration of vegetation dynamics, habitat requirements, and silvicultural techniques.

5104. FOREST ECOLOGY.

(4 cr; prereq one biol course or #)
Ecological concepts and principles as a basis for conservation and management of forest ecosystems.

5106. SENIOR SILVICULTURE SEMINAR.

(2 cr [3 cr with research paper]; prereq sr, 5100 or #)
Students prepare, present, and critique seminars on silvicultural topics of interest. Guest speakers.

5107. FOREST ECOLOGY LABORATORY.

(1 cr, §5160; prereq ¶5104)
Forest stands, communities, and ecosystems. Field trips.

5108. PHYSIOLOGICAL ECOLOGY: ORGANISMS TO ECOSYSTEMS.

(3 cr; prereq 5103 or 5104 or Biol 5041 or Hort 5041)
Interaction between plants and their environment; mechanisms that affect whole plant, community, and ecosystem processes. Causes and consequences of variation in resource availability and stress in diverse ecosystems. Relationships of resource availability and stress to plant establishment, growth, and survival; links between organismal, community, successional, and ecosystem processes.

5110. FORESTRY APPLICATIONS OF MICROCOMPUTERS.

(4 cr; prereq Stat 3011, AgET 3030 or equiv; offered even yrs)
Use of commercial microcomputer software to solve forestry problems, applications programming, workings of hardware components. Hands-on access to microcomputers, lectures.

5114. FOREST HYDROLOGY.

(4 cr; prereq Itasca Session, 3103, Geo 1001 or #)
Introduction to the hydrologic cycle and hydrologic processes. Effects of forest management activities on water yield, storm flow, and water quality.

5115. FOREST HYDROLOGY, FIELD APPLICATIONS.

(2 cr; prereq 5114, Δ; at Cloquet)
Use of hydrologic instrumentation to measure precipitation, streamflow, infiltration capacity, soil moisture, air temperature, evaporation, and selected water quality constituents. Collection and interpretation of hydrologic information to evaluate forest-use impacts on water quantity and quality.

Course Descriptions

5120. TREE PHYSIOLOGY. (4 cr; prereq Chem 1001 or 1051, 10 cr biol)

Genetic variation in forest trees, underlying causes, use. Tree growth, nutrition, and water relations. Environmental and internal growth regulation. Plant biochemistry and photo-chemistry. Physiology related to silviculturally and ecologically significant phenomena.

5126. SILVICULTURE: SOIL-SITE RELATIONSHIPS. (2 cr; prereq 1020, 5100, Δ; at Cloquet)

Field examination of forest soils and their relationship to site productivity and forest management.

5130. GEOGRAPHIC INFORMATION SYSTEMS IN NATURAL RESOURCE ANALYSIS. (2 cr; prereq sr or grad or #)

Introduction to the application of Geographic Information Systems (GIS) to natural resource and regional planning studies. Theory and technical points; emphasis on applications. Hands-on experience with microcomputer. Case study, including map digitizing, data processing, and generation of map products.

5131. GEOGRAPHIC INFORMATION SYSTEMS LAB. (1 cr; prereq 5130)
Lab for 5130.

5142. TROPICAL FOREST ECOLOGY. (3-4 cr; prereq 1 ecol course 3xxx level or higher)

Ecological principles related to form, function, and development of wet and dry tropical forests at organismal, community, and ecosystem scales. Succession, productivity, biodiversity, sustainability, agro-forestry, and management alternatives. Natural distribution of forest types; causes, consequences, and extent of deforestation.

5146. DYNAMICS OF GLOBAL CHANGE: PLANT ECOLOGY. (3-4 cr; prereq 1 pl ecol or pl phys course 3xxx level or higher)

Implications of global change elements for wild and cultivated vegetation, including forests, grasslands, and agricultural ecosystems. Responses on ecosystem, community, organismal, and physiological scales. Potential climate change, elevated atmospheric concentrations of carbon dioxide, ozone, and other trace gases, acid deposition, and other pollutants.

5152. FOREST GENETICS. (3 cr; prereq Biol 1103, Stat 3011)

Genetic variation of forest-tree species and underlying principles; application of plant breeding principles to forestry.

5153. ADVANCED FOREST HYDROLOGY. (4 cr; prereq 5114 or #)

Current hydrologic problems in the management of forested watersheds. Analytical methods to evaluate effects of vegetation management on the quantity and quality of runoff. Lecture and lab.

5160. PRACTICUM IN FOREST BIOLOGY AND MEASUREMENTS. (3 cr; prereq grad, #; at Itasca)
Plant identification, plant dynamics, land survey, tree measurement.

5200. AERIAL PHOTO INTERPRETATION. (3 cr)
Types, characteristics, procurement, preparation, viewing, and interpretation of color, black-and-white, and color infrared aerial photographs; basic aerial photography; introduction to mapping; applications to resource surveys.

5202. REMOTE SENSING: FIELD APPLICATIONS. (2 cr; prereq 5200, 5212; at Cloquet)
Field applications of remote sensing for inventory, mapping and monitoring forest and natural resources.

5212. NATURAL RESOURCES INVENTORY. (4 cr; prereq Itasca Session, AgET 3030 or equiv computer programming course with FORTRAN or BASIC language, Math 1142 or Math 1251, Stat 3011 or Stat 5021)

Measurement of stand variables, forest products, forest growth and yield. Elementary statistics. Sampling methods for estimating characteristics of natural resources and resource use for management decision making. Lecture and lab.

5215. FOREST FIRE MANAGEMENT. (2 cr; prereq Itasca Session, 1100, 3103, 5100 or #)
Concepts, principles, and techniques of fire control and use in wildland management.

5222. FOREST RESOURCES INVENTORY. (2 cr; prereq 5212; at Cloquet)
Field application of sampling methods for estimating natural resource characteristics for inventory, appraisal, and monitoring.

5225. DIRECTED STUDY EXPERIENCE. (1-5 cr; prereq jr or sr or grad standing, #, Δ)
Opportunity to pursue experiences not available under independent study or extra credit registration. The student develops, in consultation with the adviser for the project, a prospectus and completes progress reports and a final report on his or her project.

5226. FOREST ECONOMICS AND PLANNING. (5 cr; prereq 5212, AgEc 1101 or #)
Conduct and interpretation of economic analysis; forest planning concepts, principles, and techniques of forest regulation.

5231. RANGE MANAGEMENT. (3 cr; prereq Biol 1103 or #)
Important range plants; range livestock; range management methods and improvements; public grazing land administration; relationship of livestock grazing to wildlife, forest, watershed, and recreation management on public and private range lands.

5232. MANAGEMENT OF RECREATIONAL LANDS. (4 cr)
Understanding and applying recreation management tools from a public agency perspective. Management concepts such as ROS, LAC, social monitoring, and public information processes.

5233. PRINCIPLES OF OUTDOOR RECREATION PLANNING. (3 cr; prereq 5232 or #, Stat 3100, Soc 3801 or NRES 5210 or Stat 5021)

Emphasis on planning methodologies. Use tools such as survey instruments and observational techniques for data gathering; analyze information gathered through surveys and observation and data generated by computer mapping techniques; use GIS information in planning recreational uses and understanding trade-offs between choices; select appropriate strategies for public involvement in recreation resource planning.

5236. FOREST RECREATION PLANNING. (1 cr; prereq 5232, Δ; at Cloquet)

Recreation area and site planning, examples and managerial concerns. Fieldwork and presentation.

5240. NATURAL RESOURCE POLICY AND ADMINISTRATION. (3 cr; prereq For jr or sr or #)

Basic concepts of political and administrative processes in developing natural resource policies and programs. Policy processes, agenda setting, political decision rules, strategies for achieving agreement, participants in policy development, public means of implementing policies, and case examples.

5241. NATURAL RESOURCE MANAGEMENT: POLITICAL AND ADMINISTRATIVE PROCESSES. (3 cr; prereq 5240 or #)

Advanced concepts of political and administrative processes important to developing natural resource policies and programs. Issue creation and agenda-setting theories, incremental decision-making styles, role of analysis and analytical information, actions of major policy participants (e.g., courts, legislatures, interest groups, media), program planning, budgeting and staffing, and evaluation of natural resource case studies.

5248. HARVESTING AND ENGINEERING. (3 cr; prereq 3300 or CE 3100, Δ; at Cloquet)

Introduction to harvesting systems, relationship to forest management, and preparation and administration of timber sales. Fundamentals of location, construction, and maintenance of forest roads.

5250. ROLE OF RENEWABLE NATURAL RESOURCES IN DEVELOPING COUNTRIES. (2 cr)

International perspective on important resource issues, including integration of natural resources and social and economic considerations. Overview of issues and case studies. Term paper.

5257. RECREATION LAND POLICY. (3 cr; prereq 5232 or #)

Policy issues affecting the use and management of lands devoted entirely or in part to recreational objectives.

5259. ANALYSIS OF OUTDOOR RECREATION BEHAVIOR. (3 cr; prereq 5232, RRM major or grad or #)

Development of environmental framework for understanding recreation behavior. Contributions of several disciplines, current cultural trends, management implications.

5262. REMOTE SENSING OF NATURAL RESOURCES. (4 cr)

Introduction to remote sensing for natural resource inventories, land-use analyses, and environmental monitoring activities; photographic, thermal, multispectral, and radar sensing procedures; airborne and satellite systems; visual and computer-assisted analysis techniques. Interdisciplinary.

5264. QUANTITATIVE TECHNIQUES IN FOREST MANAGEMENT. (3 cr; prereq 5212, 5226 or #)

Forestry applications of quantitative techniques in allocation and other decision-making problems. Mathematical programming, simulation, and other techniques.

5403. FUNDAMENTALS OF NATURAL RESOURCE EDUCATION. (3 cr; CEE only)

For elementary teachers. Study of soil, water, forest, and wildlife resources of Minnesota and the biological principles and ecological implications of management. Environmental issues created by natural resource manipulation. Development of outdoor teaching skills in environmental education in a metropolitan center.

5412. ADVANCED REMOTE SENSING. (4 cr; prereq 5262 or #)

Working knowledge of quantitative remote sensing. Both theoretical basis and practical aspects, including energy-matter interactions, radiation measurements and sensors, and digital image analysis.

5460. WATER QUALITY: THE INTERNATIONAL DIMENSION. (3 cr; prereq previous college-level coursework in water resources or #)

Water quality management practices and policies in non-U.S. countries. Water quality as one of many natural resources being managed by rapidly changing societies. World literature in natural resources.

5500. URBAN FOREST MANAGEMENT. (3 cr; prereq 5100 or #)

Terminology and principles of urban tree inventory, propagation, and care; management case studies; equipment operation and costs.

5703. COLLOQUIUM IN FOREST BIOLOGY. (1-4 cr; prereq varies with topic, #)

Colloquium on specialized topics in forest biology and silviculture.

5704. COLLOQUIUM IN NATURAL RESOURCES. (1-4 cr; prereq varies with topic, #)

Colloquium on specialized topics in natural resources.

For Graduate Students Only

(For description, see *Graduate School Bulletin*)

8100. RESEARCH PROBLEMS: SILVICULTURE

8101. RESEARCH PROBLEMS: FOREST-TREE PHYSIOLOGY

8102. RESEARCH PROBLEMS: FOREST-TREE GENETICS

8103. RESEARCH PROBLEMS: FOREST HYDROLOGY

Course Descriptions

8104. RESEARCH PROBLEMS: FOREST ECOLOGY

8106. TOPICS IN SILVICULTURE-FOREST SOILS

8107. SEMINAR: FOREST RESOURCES

8112. RESEARCH PROBLEMS: PHYSIOLOGICAL ECOLOGY

8200. RESEARCH PROBLEMS: FOREST MANAGEMENT

8201. RESEARCH PROBLEMS: FOREST ECONOMICS

8202. RESEARCH PROBLEMS: FOREST BIOMETRY

8203. RESEARCH PROBLEMS: FOREST RECREATION

8204. RESEARCH PROBLEMS: FOREST POLICY

8205. RESEARCH PROBLEMS: REMOTE SENSING

8207. ECONOMIC ANALYSIS OF FORESTRY PROJECTS

8211. SEMINAR: NATURAL RESOURCE POLICY ISSUES

8301. TEACHING PRACTICUM

Mathematics (Math)

1031. COLLEGE ALGEBRA AND PROBABILITY.

(4 cr, §1051, §1111, §1151, §1201; prereq 3 yrs high school math, placement exam or GC 0631 with a grade of C or better)

Algebra and analytic geometry explored in greater depth than is usually done in three years of high school mathematics. Additional topics from combinations, permutations, and probability. A suitable prerequisite for 1131 or 1142, but not for 1251.

1131. FINITE MATHEMATICS. (5 cr; prereq 3 yrs high school math incl probability, satisfactory placement exam or grade of C or better in 1031)

Elementary computer programming, financial mathematics, probability, linear algebra, linear programming, Markov chains.

1142. SHORT CALCULUS. (5 cr; for students requiring minimal amount of calculus; prereq 3 yrs high school math, satisfactory placement exam or grade of C or better in 1031 or 1151)

Derivatives, integrals, differential equations, maxima and minima, partial differentiation, applications.

1151. PRECALCULUS II. (4 cr; §1008, §1111, §1201; prereq 3½ yrs high school math, placement exam or 1051 with a grade of C or better)

Second of two courses (see 1051) in algebra, analytic geometry, and trigonometry. Prepares students for the full calculus sequence. Not an acceptable prerequisite for 1131.

1251-1252. ONE-VARIABLE DIFFERENTIAL AND INTEGRAL CALCULUS I-II. (4 cr per course;

§1411H-1421H, §1451H-1452H.; prereq 4 yrs high school math incl trig, satisfactory placement exam or grade of C or better in 1151; grade of C or better in 1251 required for 1252)

Calculus of functions of one variable and related geometry and applications.

1261. THE ALGEBRA AND GEOMETRY OF EUCLIDEAN SPACE. (4 cr, §1241, §1553H, §3142, §3511H; prereq 1251)

Vectors and their operations; matrices and matrix algebra, linear algebraic equations; Gaussian elimination; determinants and their applications; linear transformations; subspaces, quadratic functions, rigid motions, and orthogonal matrices.

3251. MULTIVARIABLE DIFFERENTIAL CALCULUS. (4 cr, §3211, §3311, §3521H, §3552H; prereq 1251, 1261)

Differentiation of parametric curves; partial differentiation and the derivative as local linear approximation; the chain rule; applications to maximum/minimum problems with attention to boundaries and constraints, including Lagrange multipliers; Taylor's Theorem (multivariable) and the second derivative test.

3252. MULTIVARIABLE INTEGRAL CALCULUS.

(4 cr, §for students with [3211, 3331] or [3311, 3331] or 3551H or 3552H; prereq 1252, 3251 or ¶3251) Double and triple integrals; change of variable procedures with emphasis on polar and spherical coordinates; mass and centroid; integration on curves and surfaces; vector fields and the theorems of Green, Gauss, and Stokes.

3261. DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA. (4 cr, §3221, §3321, §3531H, §3551H; prereq 1221 or 1251, 1241 or 1261 or 3142)

First-order equations, linear equations with constant coefficients, and linear systems. Companion topics from linear algebra; general vector spaces, independence, spanning sets, basis, dimension, eigenvalues, and eigenvectors.

3262. INFINITE SEQUENCES AND SERIES WITH METHODS OF APPROXIMATION. (4 cr; prereq ¶3261)

Infinite sequences and series; mathematical induction and its implications for recursively defined sequences; convergence and techniques for evaluation of sequential limits and sums of series; applications of sequences and series to approximations and estimates of error. Required for honors students who have not taken 1552H.

Natural Resources and Environmental Studies (NRES)

1001. ORIENTATION TO NATURAL RESOURCES AND ENVIRONMENTAL STUDIES. (1 cr; S-N only)

Information about NRES major. Discussions with faculty adviser. Employment information. Current topics in NRES. Information about facilities. Discussions with alumni.

1010. ISSUES IN THE ENVIRONMENT. (3 cr)

Interdisciplinary offerings exploring five areas of environmental concern: aspects of environmental design providing maximum compatibility of human beings with their environment, sources of water pollution and their control, disposal and control of solid wastes from agriculture, minimization of pesticide pollution of the environment, and managed use of forest resources to maintain environmental quality. Televised course involving 20 taped lectures and 10 discussion periods.

1040. NATURAL RESOURCES AS RAW MATERIALS. (3 cr)

Role of natural resources as raw materials for industry and economic development. Environmental and economic trade-offs associated with raw material gathering, processing and use. Implications of processing technologies, energy considerations.

3001. COLLOQUIUM IN NATURAL RESOURCES AND ENVIRONMENTAL STUDIES. (1 cr)

Roundtable discussions of current topics in NRES.

3010. ETHICS AND VALUES IN RESOURCE MANAGEMENT. (3 cr)

Formulating a natural resources philosophy based on ethical behavior. Ethical dilemmas inherent in managing natural resources.

3020. PLANT RESOURCE MANAGEMENT AND THE ENVIRONMENT. (4 cr; prereq ¶5020, Biol 1009 or Biol 1201, Biol 1202, soph standing)

Same as 5020. World vegetation management practices, extent. Emphasis on forest management; agriculture and agro-forestry; historical, current, and prospective practices and environmental and societal implications.

3050. EXPERIENCE AND TRAINING IN A FIELD SETTING. (1-4 cr; prereq #)

Students are required to obtain professional experience in a field setting by attending field sessions, completing a Professional Experience Program, or volunteering for various natural resource and/or environmental programs through local state or federal agencies. Approval by instructor required.

3051. FROM TALL-GRASS PRAIRIES TO BOREAL FORESTS. (4 cr)

Two-week field course on ecology of the Upper Midwest and teaching methods of ecological research using experts in ornithology, ichthyology, herpetology, community ecology, ecosystems, ecology, mammalogy, paleoecology, archeology, and limnology. Designing and implementing field experiments.

3060. WATER QUALITY IN NATURAL RESOURCE MANAGEMENT. (3 cr)

Same as 5060. Global and ecological perspective on managing surface and groundwater resources. Water quality concerns.

3100. CONSERVATION OF BIODIVERSITY. (4 cr)

Biological and social principles underlying biodiversity conservation. Management and policy alternatives for maintaining biodiversity.

3201. FIELD ASSESSMENT TECHNIQUES. (1 cr; at Itasca)

Land survey and mapping; measurement and sampling methods for forest vegetation, wildlife, and other resources.

3225. DIRECTED STUDY EXPERIENCE. (1-5 cr; prereq fr or soph standing; #, Δ)

Opportunity to pursue experiences not available under independent or extra credit registration. The student develops, in consultation with the adviser for the project, a prospectus and completes progress reports and a final report on his or her project.

3800. NATURAL RESOURCES INTERPRETATION AND COMMUNICATION. (3 cr)

Environmental education in the context of natural resource agencies.

5001. COLLOQUIUM IN NATURAL RESOURCES AND ENVIRONMENTAL STUDIES. (1 cr)

Key concepts and techniques in restoration; common factors in restoration projects; threats to health of aquatic ecosystems.

5020. PLANT RESOURCE MANAGEMENT AND THE ENVIRONMENT. (4 cr; prereq ¶3020)

Same as NRES 3020. Discussion period; term paper.

5060. WATER QUALITY IN NATURAL RESOURCE MANAGEMENT. (3 cr; prereq 3060)

Same as 3060. Weekly discussion session; integrative paper on a water quality problem.

5100. PROBLEM SOLVING IN NATURAL RESOURCES AND ENVIRONMENTAL STUDIES. (5 cr; prereq sr)

Solving a real-world natural resources and/or environmental problem. Discussions and assignments reflect diverse aspects of the problem. Oral and written presentations. Students participate as a member of a team.

5210. SURVEY, MEASUREMENT, AND MODELING METHODS FOR NATURAL RESOURCES I. (4 cr; prereq Math 1142, Stat 3011, AgEt 3030 or GC 1571 or equiv computer competency)

Introduction to survey design, measurement concepts, and modeling methods useful in studying natural resources and environmental issues. Emphasis on data collection and analysis.

5220. SURVEY, MEASUREMENT, AND MODELING METHODS FOR NATURAL RESOURCES II. (4 cr; prereq 5210 or FR 5212 or equiv; offered alt yrs)

Advanced survey design, measurement concepts, and modeling methods for studying natural resources and environmental problems.

5225. DIRECTED STUDY EXPERIENCE. (1-5 cr; prereq jr or sr or grad standing; #, Δ)

Opportunity to pursue experiences not available under independent study or extra credit registration. The student develops, in consultation with the adviser for the project, a prospectus and completes progress reports and a final report on his or her project.

Course Descriptions

5600. PRINCIPLES OF WASTE MANAGEMENT. (4 cr; prereq Biol 1009 or Biol 1201, Biol 1202 or Chem 1051, Stat 3011 or #)

Understanding the issues, problems, and solutions in remediating the waste stream generated by today's society. Topics include waste stream dynamics, municipal solid waste and yard waste composting, waste to energy incineration operation, ash disposal, recycling, landfill requirements, requirements for direct land disposal, regulatory trends, and case studies.

Physics (Phys)

1001. THE PHYSICAL WORLD. (4 cr, §any other physics courses except 1061)

Conceptual introduction to modern discoveries and theories in physics; discussion of their applications and importance in today's society. Relativity, cosmology, atomic physics, nuclear physics, solid state physics, superconductivity, computers, lasers, quarks, and unification theory. Development of classical background as needed.

1005. PHYSICS LABORATORY. (1 cr; prereq 1001 or ¶1001; S-N only)

Lab experiments offered with 1001.

1041-1042. INTRODUCTORY PHYSICS. (5 cr per qtr, §any other intro physics courses)

Lectures and problem sessions. Mechanics, fluids and gases, heat, waves, electricity and magnetism, light, optical instruments, atoms and spectra, nuclei, radioactivity.

1251-1252-1253-1254. GENERAL PHYSICS. (4 cr per qtr; prereq Math 1251, Math 1221 or ¶1221 for 1252, Math 1241 or ¶1241 for 1253; 3 lect, 1 rec, 2 lab hrs per wk)

Calculus-level course.

1251: Mechanics.

1252: Heat, electricity.

1253: Magnetism, optics.

1254: Twentieth-century physics.

Rhetoric (Rhet)

1101. WRITING TO INFORM AND PERSUADE.

(4 cr, §Comp 1011; prereq ¶1104)

Relationship of fact finding and clear thinking to informative and persuasive writing. Importance of thesis sentence, evidence, coherence, clarity, and correctness. Relatively short (500-750 words) assignments complement instruction in the Library Lab.

1104. LIBRARY RESEARCH METHODS. (1 cr; S-N only; taught by St. Paul campus library staff)

On-site instruction in information retrieval techniques.

Lectures, audiovisual presentations, and problem-solving assignments strengthen skills in using the library.

1151. WRITING IN YOUR MAJOR. (4 cr; prereq 1101, 1104, soph status)

Students investigate and write on subjects related to their majors. Assignments such as literature review, abstract, fact sheet, instructions, and feature article.

1222. PUBLIC SPEAKING. (4 cr; prereq 1101, 1104)

Fundamentals of speechmaking. Emphasis on organizing the speech and projecting it to the audience.

3254. ADVANCED PUBLIC SPEAKING. (4 cr; prereq 1222)

Training for specific speech situations most likely to be encountered professionally. Emphasis on analysis, design, preparation, and delivery of presentations to provide greater flexibility within a variety of speech environments.

3266. COMMUNICATION, DISCUSSION IN SMALL GROUP DECISION MAKING. (4 cr; prereq 1101)

Role of communication techniques in the small group decision-making process. Emphasis on discussion within a variety of decision-making modes such as voluntary groups, business meetings, and conflict groups.

3562. WRITING IN YOUR PROFESSION. (4 cr; prereq 1101, 1104, 1151, jr status)

Projects in professional writing. Relationship between structuring information to meet needs of particular readers and writing effectively. Assignments such as the feasibility report, proposal, memorandum, letter of application, and résumé.

Soil Science (Soil)

1020. THE SOIL RESOURCE. (4 cr; prereq Chem 1001 or Chem 1051)

Introduction to the physical, chemical, and biological aspects of soils. Use of the soil classification system to understand the use of soil survey information for land-use planning. Concepts of soil fertility for understanding plant growth requirements. Introduction to urban soils and their management. Understanding soil's role in environmental planning and conservation decisions.

5710. FOREST SOILS. (3 cr; prereq 1020, FR 5114)

Factors affecting tree growth; estimation, modification, and management effects on site productivity; regeneration.

Statistics (Stat)

3011. STATISTICAL ANALYSIS. (4 cr; prereq college algebra)

3012. STATISTICAL ANALYSIS. (4 cr; prereq 3011)

5021. STATISTICAL ANALYSIS. (5 cr, §3012; prereq college algebra)

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Administration and Faculty

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¹⁰ Associate member from Department of Civil and Mineral Engineering

¹¹ Associate member from Department of Agricultural and Applied Economics

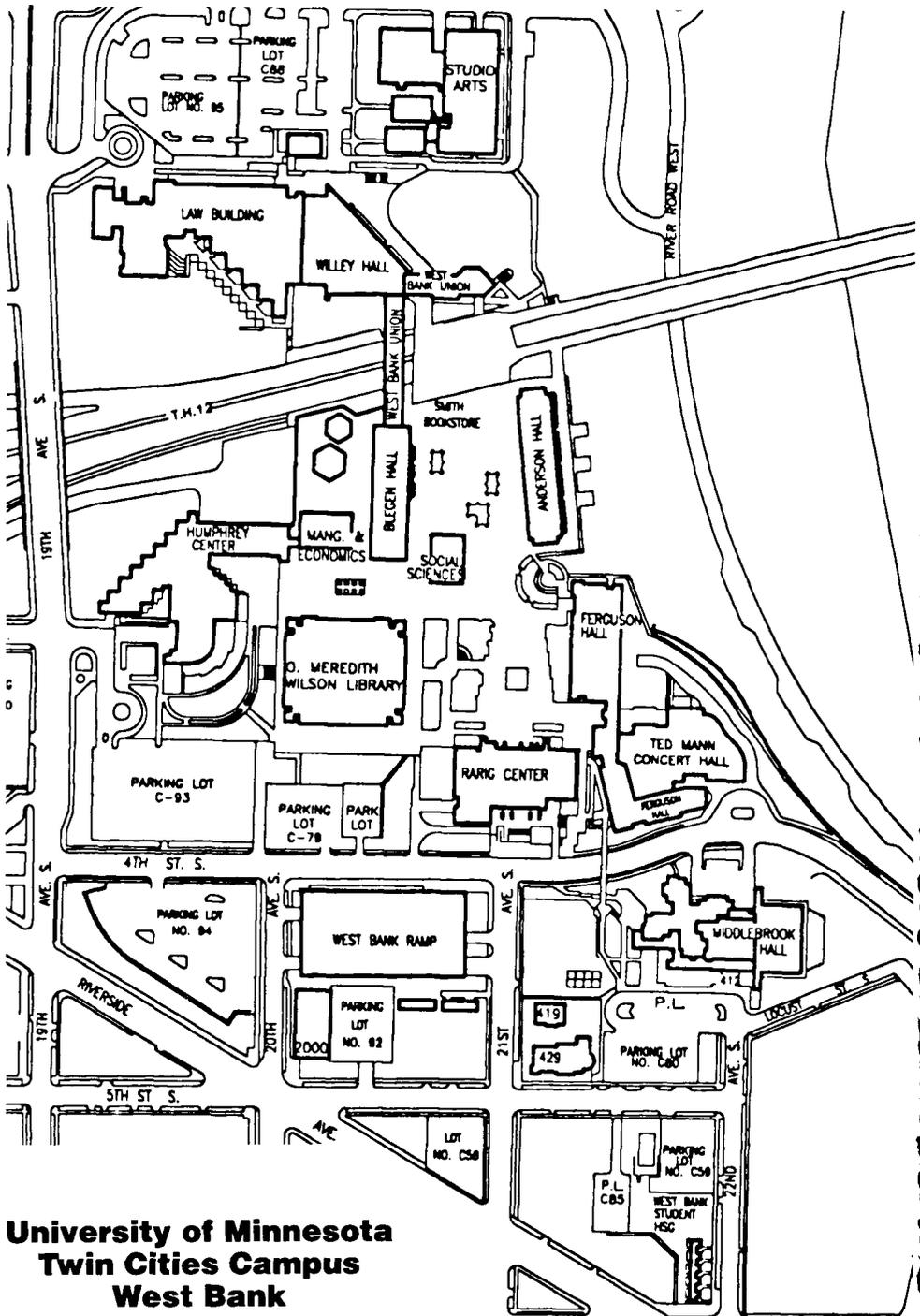
¹² Associate member from Minnesota Extension Service

¹³ Associate member from Department of Fisheries and Wildlife

¹⁴ from USDA Forest Service North Central Forest Experiment Station

¹⁵ from Minnesota Department of Natural Resources

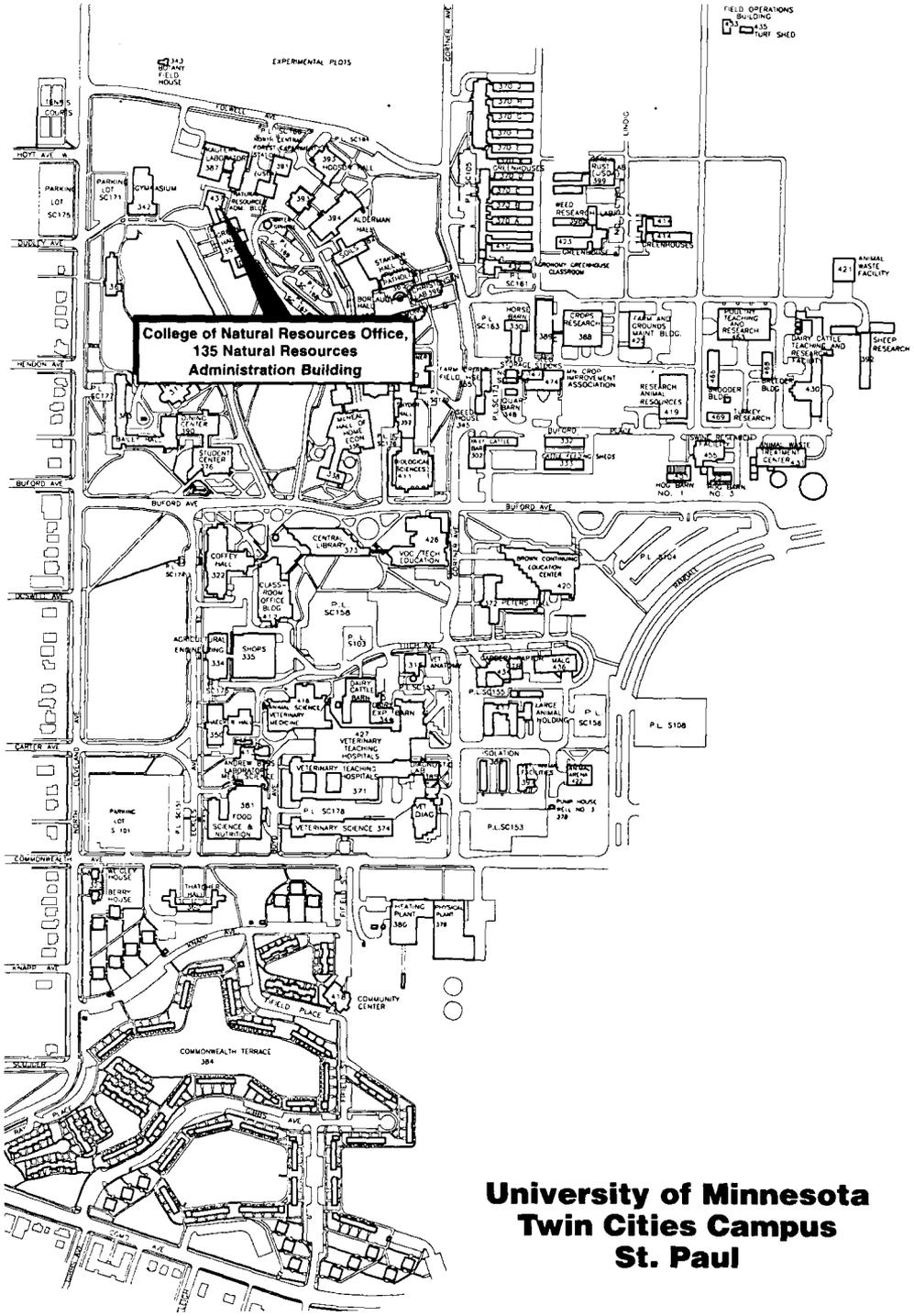
¹⁶ Associate member from the National Biological Survey and National Park Service



**University of Minnesota
Twin Cities Campus
West Bank**



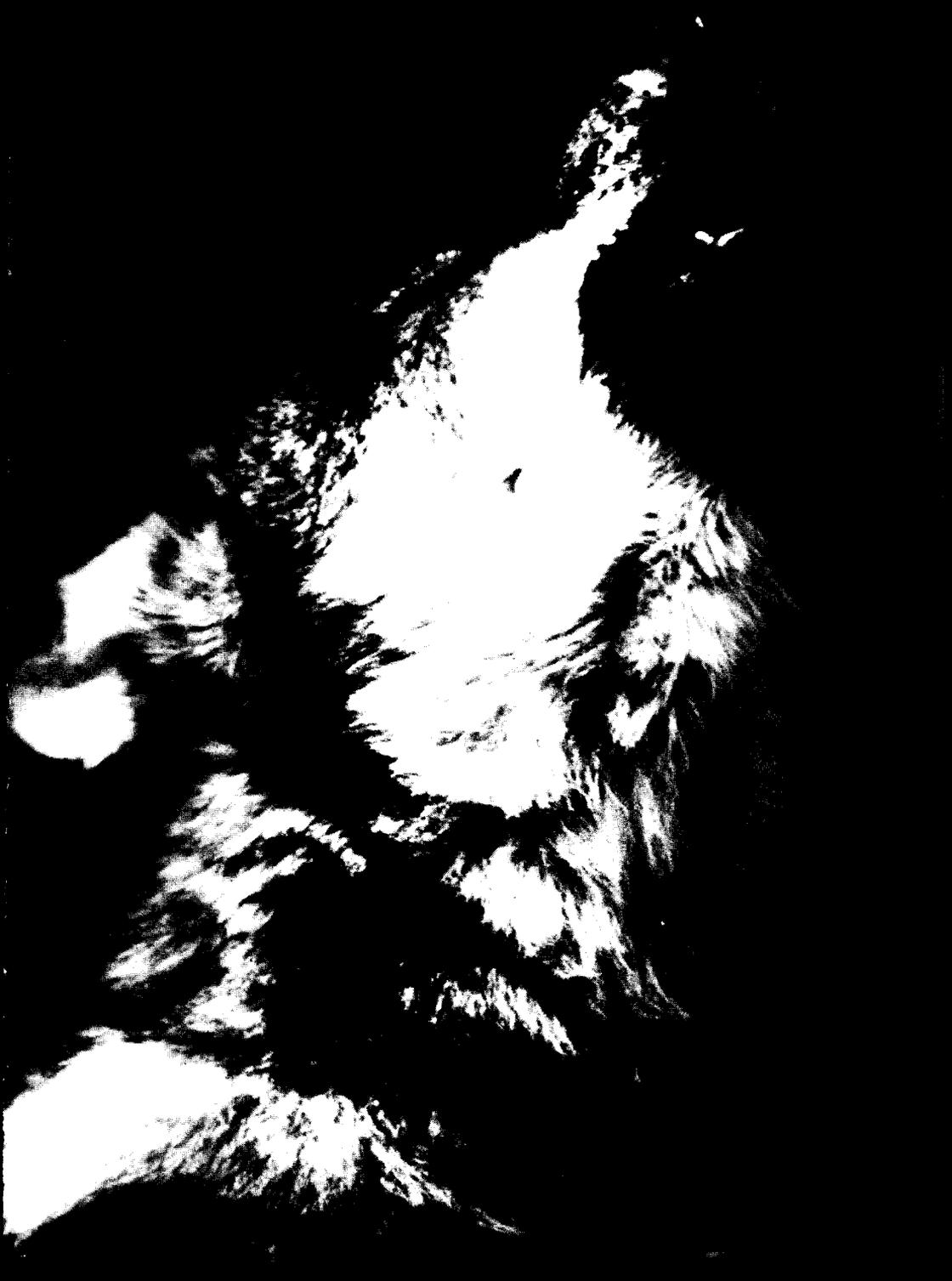
**University of Minnesota
Twin Cities Campus
East Bank**



**College of Natural Resources Office,
135 Natural Resources
Administration Building**

**University of Minnesota
Twin Cities Campus
St. Paul**

I n d e x



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UNIVERSITY OF MINNESOTA

The Title Campus Bulletin

M3
#1

1994 Summer Session



*First Term:
June 14 - July 19*

*Second Term:
July 21 - August 24*

*Special programs
and workshops
beginning June 14*

CO
ION
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UNIVERSITY OF MINNESOTA

Twin Cities Campus

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lis, Minnesota. POSTMASTER: Send address
changes to University of Minnesota, 110
Williamson Hall, 231 Pillsbury Drive S.E.,
Minneapolis, MN 55455-0213.

Summer Session Office
135 Johnston Hall
101 Pleasant Street S.E.
Minneapolis, MN 55455

Office hours
8:00 a.m.- 4:30 p.m.

Access to Student Educational Records

In accordance with regents' policy on access to student records, information about a student generally may not be released to a third party without the student's permission. (Exceptions under the law include state and federal educational and financial aid institutions.) The policy also permits students to review their educational records and to challenge the contents of those records.

Some student information—name, address, electronic (E-mail) address, telephone number, dates of enrollment and enrollment status (full time, part time, not enrolled, withdrawn and date of withdrawal), college and class, major, adviser, academic awards and honors received, and degrees earned—is considered public or directory information. Students may prevent the release of public information only during their terms of enrollment. To do so, they must notify the records office on their campus.

Students have the right to review their educational records. The regents' policy, including a directory of student records, is available for review at 150 Williamson Hall, Minneapolis, and at the records offices on other campuses of the University. Questions may be directed to the Office of the Registrar, 150 Williamson Hall (612/625-5333).

Cover Art: This year's cover art is the work of Brad Norr, a Minneapolis artist.

For Summer Session information and bulletins, please call (612) 624-4000

Equal Opportunity

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

In adhering to this policy, the University abides by the Minnesota Human Rights Act, Minnesota Statute Ch. 363; by the Federal Civil Rights Act, 42 U.S.C. 2000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; by the Americans With Disabilities Act of 1990; by Executive Order 11246, as amended; by 38 U.S.C. 2012, the Vietnam Era Veterans Readjustment Assistance Act of 1972, as amended; and by other applicable statutes and regulations relating to equality of opportunity.

Inquiries regarding compliance may be directed to Patricia A. Mullen, Director, Office of Equal Opportunity and Affirmative Action, University of Minnesota, 419 Morrill Hall, 100 Church Street S.E., University of Minnesota, Minneapolis, MN 55455 (612/624-9547).

Bulletin Use

The contents of this bulletin and other Summer Session bulletins, publications, or announcements are subject to change without notice. The Summer Session office can provide current information about possible changes.

This publication/material is available in alternative formats upon request. Please contact Marchet Reeve, Summer Session, 135 Johnston Hall, 101 Pleasant Street S.E., Minneapolis, MN 55455, (612) 624-4000.

W E L C O M E



Welcome to the 1994 Summer Session

University of Minnesota Twin Cities

Term I — June 14 - July 19

Term II — July 21 - August 24



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Join us for
a great
summer at
the
University
of
Minnesota

No better
time . . .

No better
place!



W E L C O M E

The University of Minnesota-Twin Cities conducts one of the largest and most comprehensive Summer Sessions in the nation.

Each summer, students and visitors from throughout the world take advantage of the University's outstanding curriculum, faculty, and facilities. Regular courses, normally taught during five, seven, or 10-week sessions, are complemented by Evening Extension classes, institutes, workshops and short courses, conferences, speakers, films, outdoor concerts, theatre productions, campus recreational activities, and hundreds of special programs — all of which give the summer campus a vibrancy unlike that found at any other time of year.

The University

of Minnesota

Summer

Session.

Summer Session is becoming increasingly popular. Here's why—

- You can make up credits.
- Summer classes can help you stay on schedule to graduate or even accelerate progress toward your degree. Most students take one or two courses, but a maximum of 10 credits per 5-week term is allowable.
- Fewer courses "close" in the summer, making it easier to enroll in classes that are hard to get into during the fall, winter, or spring quarters.
- By taking fewer classes, you can better focus your attention and have more control over your study time. For many students this translates into better grades.
- Summer classes are usually smaller and less formal, affording more opportunity for interaction.
- Most classes meet only in the morning, leaving afternoons free for study, recreation, or employment.
- If you're a commuter, the traffic near campus is less congested and parking is easier to find.
- The inviting landscape, warm weather, and relaxed change of pace draw students outdoors. Whether you prefer the lively and festive atmosphere of the mall, or quiet places in the shade, you'll find the campus itself to be especially pleasant in the summer.

Truly, there is

no better time

and no better

place.

C A L E N D A R

1994 SUMMER SESSION

Calendar

	Term I (5 weeks)	Term II (5 weeks)	7 week courses	10 week courses
Registration				
Registration begins for academic year students	May 12	May 12	May 12	May 12
Registration begins for summer-only students	May 20	May 20	May 20	May 20
Last day to register without incurring a late fee	First day of class			
Instructor's approval is required to register or add a class after this date	June 16	July 25	June 20	June 20
Instructor's approval plus Scholastic Committee approval is required to register or add a class after this date	June 20	July 27	June 22	June 27
Last day to cancel a class without notation on transcript	June 20	July 27	June 27	June 27
Scholastic Committee approval is required to cancel a class after this date	July 5	August 10	July 13	July 27
Session dates				
Term begins	June 14	July 21	June 14	June 14
Term ends	July 19	August 24	August 3	August 24
Fee payments and refunds				
Billing date	June 17	July 29	June 17	June 17
Payment due date	July 12	August 16	July 12	July 12
Refunds	See schedule in the "Tuition and Fees" section.			
Grading system				
Last day to change your grading system	June 20	July 27	June 27	June 27

JUNE
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30

JULY
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31

AUGUST
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31

Note: The following policies apply for courses that do not fall within the normal summer term dates: **Late registration**—you may register through the first day of class without incurring a late fee or needing instructor approval. **Cancellation**—you may cancel your registration without penalty through the first day of class. If you cancel and are eligible for a full refund, a "W" will not appear on your transcript; a "W" will appear if the refund is less than full (see the refund schedule under "Refunds.") **Grade options**—you may change your grading system through the first week of class; thereafter, it requires the approval of the college. **Billing and fee payment dates**—same as the term in which the course begins.



R E G I S T R A T I O N

WHO MAY REGISTER

The University of Minnesota Summer Session welcomes many types of students—

- **Currently enrolled University of Minnesota students.**
- **Students admitted to the University of Minnesota for fall quarter.**
- **Visiting students from other colleges and universities.**
- **High school students.** High school students must have completed the 10th grade and rank in the top 20 percent of their class.
- **Professionals continuing their education.**
- **Adults of any age seeking cultural and intellectual growth.** Anyone who is at least a high school graduate can enroll in Summer Session.



Admission

You do not need to apply for formal admission in order to take summer classes. Normally, all you need to do is register. If you are interested in admission to an undergraduate degree program, however, you should contact: University of Minnesota, Office of Admissions, 240 Williamson Hall, Minneapolis, MN 55455; telephone 612/625-2008. If interested in the Graduate School, contact: University of Minnesota, Graduate School Admissions, 309 Johnston Hall, Minneapolis, MN 55455; telephone 612/625-3014. If interested in professional degree programs, such as law, you should contact the appropriate school.

Graduate students currently enrolled elsewhere in an accredited U.S. graduate school must apply for transient student status in order to earn graduate credit at the University as a summer-only student. See "Special Instructions for Graduate School Students," later in this section.

Student Classification

For purposes of registration, Summer Session students at the University of Minnesota are classified as **Academic Year students** or as **Summer-only students**. There are some variations in registration procedures depending upon your classification and your college.

- **Academic Year Students.** You are considered to be an academic year student if you have

ever been officially admitted to a degree program on the Twin Cities campus of the University of Minnesota *and* if you registered at least once in the program to which you were admitted. This includes **current students, former students, and graduates** — even if it has been many years since you took your coursework. Students at the University of Minnesota Twin Cities campus with adult special status register as academic year students for registration purposes.

- **Summer-only students.** Summer visitors who have never registered in a degree program to which they have been officially admitted at the University of Minnesota Twin Cities, are considered summer-only students. This includes students newly admitted for fall 1994, high school students (you must have completed the 10th grade and rank in the top 20 percent of your class), students from other colleges/universities, and University of Minnesota Extension students. Students enrolled at other University of Minnesota campuses, excluding the Twin Cities, are also considered summer-only students for registration purposes.

WHEN TO REGISTER

If you are an **academic year student**, you may register for either or both summer terms beginning **May 12**. If you are a **summer-only student** you may register starting **May 20**.

Registration continues through the first day of class. After the first day, a late registration fee is assessed and you may need the instructor's permission to enter the course.

HOW TO REGISTER

PROCEDURES FOR ACADEMIC YEAR STUDENTS

Summer Session registration begins May 12. You may use the registration center in 202 Fraser Hall on the Minneapolis campus or in 130 Coffey Hall on the St. Paul campus. The same registration procedures and registration forms apply to the summer as during the fall, winter, and spring quarters, except there is no alphabetical queue for summer. Although registration is on a first-come, first-served basis, it generally isn't necessary to register on the first or second day of registration unless you are trying for the relatively few high demand courses that fill quickly.

Because fall registration begins May 16, you may, if you wish, register for both summer and fall during your spot in the fall registration queue.

As an academic year student you always register through the college to which you are admitted. You cannot "switch" colleges for the summer or register as a summer-only student through another college without permission of your home college.

PROCEDURES FOR SUMMER-ONLY STUDENTS

Before registering, contact the office of the college offering your summer courses for more information about registering and for program approval (see the college listing in the Directory, inside back cover). If you are newly admitted to the College of Liberal Arts, discuss your summer program with a CLA advisor in B-18 Johnston Hall, 612/624-9585, before registering. If you are a new international student, see "Special Instructions for International Students" later in this section.

Registration for summer-only students is a three step process:

1. Complete a Course Request form and a Request for Summer-only Status form. Use a separate Course Request form for each summer term. These forms are found in the center tear-out section of this bulletin and are also available at the Fraser Hall and Coffey Hall registration centers or from the Summer Session Office.

Your College of Registration. At the University of Minnesota you must register through a particular college. This is your college of registration. Typically, the college of registration is the one offering the course, although you may register for other courses, subject to prerequisite requirements or special restrictions, if any. Registration is possible through the College of Liberal Arts (CLA) for many courses that are not

Important note for visiting summer-only students about transferring credits

Visiting summer-only students who attend other colleges and universities, and who wish to transfer University of Minnesota coursework back to their home institutions, should be aware that the decision to accept transfer credit rests entirely with the home institution. You are advised to check with your home institution *before* registering. Credits offered by the University of Minnesota are *Quarter* credits. As a general rule for transfer purposes, 1 Semester credit = 1.5 Quarter credits; 1 Quarter credit = .67 Semester credit.

offered by CLA, such as architecture, astronomy, biology, chemistry, child psychology, computer science, geology, management (1000-level only), mathematics, physical education (activity courses only), physics, physiology, plant biology, and public health (3001 and 3004 only). If you have questions about which college of registration to choose, call the Academic Advising office in the Counseling Department of Continuing Education and Extension 612/625-2500, or the Summer Session Office at 612/624-3555.

2. Go to the advising office of your college of registration for program approval. *Exception:* You do not need college approval if you register through the Institute of Technology or College of Liberal Arts unless you are a high school student. If you are a high school student, see "Special Instructions for High School Students" later in this section.

R E G I S T R A T I O N

Mail Registration Option For Summer Only Students

Summer-only students who plan to register through the College of Liberal Arts or the College of Education have the option to register by mail. Some exceptions and restrictions apply. You cannot register by mail if you are a high school student who has not yet graduated from high school, or if you want to register for courses that have special registration instructions. In-person registration is recommended if you are a high school student who has graduated and will attend college in the fall, or if you want to register for courses that tend to fill quickly.

If you would normally not qualify to use the mail registration option, but personal circumstances prevent you from coming to the campus to register in person, call the Summer Session Office, 612/624-3555.

Mail registration for the College of Liberal Arts

Mail registration is not available to academic year students in the College of Liberal Arts. Mail registration is not possible for courses that require a Registration Override Permit (courses where # or Δ or college approval appear in the prerequisite statement) or for 8000-level courses. Mail registration requests are processed beginning on May 20, 1994, the first day for summer-only registration. Registration forms must be received in the Summer Session office by June 3, 1994.

Mail registration for the College of Education

Mail registration is available for students registering in the College of Education as previously registered M.Ed., postbaccalaureate, adult special, and summer-only students. Registration in the Graduate School or in 8000-level courses is not possible by mail. Mail-in registrations will be processed beginning May 13 and must be received by the Education Student Affairs Office no later than June 3, 1994.

You must obtain any overrides that are defined in the prerequisite statements of courses (i.e., * college approval, Δ department approval, or # instructor approval) and submit them with your mailed registration.

To register by mail:

1. Fill out the Course Request form, Request for Summer-only Status form, and the Hospitalization Insurance form—entering all information requested according to the example. Please use a separate Course Request form for each term. Incomplete or incorrect registration materials will be returned to you unprocessed. The deadline is June 3. Materials received after June 3 cannot be processed by mail and will be returned so that you may register in person.
2. Mail the completed forms to the address listed on the Course Request form.
3. Do not send payment with your registration materials. You will receive confirmation of your registration in the mail. If you do not receive it by June 9, please call 625-5815 (Education mail registration) or 624-3555 (Liberal Arts mail registration). A bill will be mailed to you AFTER the start of each session. Payment is due by July 12 for courses beginning in Term I and by August 16 for Term II courses.
4. The Student Services Fee is charged to all students registering for three or more credits per term. *A partial exemption from the Health Service Fee is NOT available.* If you have further questions about the Health Service Fee, please contact Boynton Health Service, Room W220, 624-1471.
5. *Important: If you decide not to attend your class, you must officially cancel by submitting a properly approved Course Request form. If you do not cancel, you will be liable for full tuition and fees.*

Registration for summer-only students, continued...

Advising. Each college has an advising office ready to help you if you need it. All summer-only students registering through CLA are served in the CLA Pre-major Advising Office, B18 Johnston Hall, 612/624-9585. You may also receive help from the academic advising office of the Counseling Department, Continuing Education and Extension, located in 314 Nolte Center, 612/625-2500.

3. Beginning May 20, go to a registration center to register. Bring your completed forms. On the Minneapolis campus (East Bank) the registration center is in 202 Fraser Hall. On the St. Paul campus it is in 130 Coffey Hall. You will be given a printout showing your registration and fees. Check it carefully — you are responsible for the accuracy of your registration.

You will not be asked to pay your tuition when you register. You will be mailed a billing statement which contains charges for tuition, special fees (if any), the student services fee if you register for three or more credits, and hospitalization insurance if you have no private coverage.

Special instructions. Special registration instructions apply to some students. See "Special Instructions" at the end of this section.

MORE ABOUT REGISTRATION

Course Numbering System

1000-level courses are introductory courses intended for freshmen, sophomores, juniors, and seniors. 3000-level courses are intended for sophomores, juniors, and seniors. 5000-level courses are intended for juniors, seniors, and graduate students. To prevent inappropriate registrations, sophomores should not register for 5000-level courses, nor freshmen for 3000- or 5000-level courses, without first consulting their college advising office.

Registrations in 8000-level courses are intended for graduate students only. Exceptions must be approved by the department offering the course.

Credit Load

The University considers a full summer load to be 6 credits per 5-week term, although some providers of financial aid may require a different credit load. The maximum credit load (except in the Graduate School) is 10 credits per 5-week term. Registration for more than 10 credits per term requires approval of the Scholastic Committee of your college. Credits from courses of 7-10 weeks that begin in Term One are counted half toward the limit for Term One and half toward the limit for Term Two. This includes the 15 credit intensive language courses. If you are registered in the Graduate School, your maximum credit limit is 11 credits per 5-week term.

Late Registration

You should register no later than the first day of class. After the third day of class you must have instructor permission to register for a course. After the fifth day, approval of your college Scholastic Committee is required. Late fees are also assessed for late registration. If you register after the first day of class a late registration fee of \$10 is charged. If you register after the first week of class the fee is increased to \$20. Refer to the Calendar on p. 3 for exact 1994 dates.

Limited Enrollment

Any course that carries an R before the course number has an enrollment limit.

How to Find Out if a Course is Open or Closed

The Section Status Reports located outside of 101 Fraser Hall, B18 and 16 Johnston, 4 Mechanical Engineering, 170 Anderson Hall, and 130 Coffey Hall can tell you if a course with limited enrollment (R before the course number) is open or closed. If a course is not on the report, it has no limit on enrollment. Section Status Reports are also available on the *Gopher* Internet under the Office of the Registrar menu.

Gaining Admission to a Closed Course

Go first to the department offering the course, where you may be put on a waiting list or be referred to the instructor for permission to

register. Attend the first class meeting. To register your instructor must approve your entrance by signing a Registration Override Permit. Submit this permit at the registration center along with your Course Request form.

Holds

If you have a hold on your record, you may not register until that hold is cleared with the office imposing the hold. A hold may be imposed for financial indebtedness to the University (e.g., unpaid library fines, unpaid tuition or fees, or delinquent health service payments) or for disciplinary or scholastic reasons. For more information, check with your college office or call or visit a Student Relations staff member in the Office of the Registrar, 150 Williamson Hall (625-5333) or 130 Coffey Hall (624-3731). (*Note:* CLA scholastic holds, including advisor approval, probation, and suspension holds, are not enforced for Summer Session registration.)

Registration Override Permits

A Registration Override Permit with appropriate signatures must be submitted with your Course Request form in the following instances:

- If there is a # or Δ or college approval in your course description (i.e., you need the consent of the instructor, department or college), or
- If you do not meet course requirements as described in the course listing, or

R E G I S T R A T I O N

- If the course is closed, and the instructor gives you permission to enter the closed course.

Handwritten notes are not accepted. Obtain Registration Override Permits from the instructor, department, or college.

Required Approvals

Registration for more than 10 credits per term requires approval of the Scholastic Committee of your college of registration (except for 15-credit, intensive-language sequences). Credits for 7- and 10-week courses are counted toward term limits by applying half of the credits to each term.

Independent study, extra credit, directed study, directed research, and directed instruction require the approval of the instructor, department, and college. Obtain a special permission slip for independent and directed study from the department, get approval

of the instructor and department, and bring the form to your college office for approval.

Registrations in 8000-level courses through colleges other than the Graduate School must be approved by the department offering the course.

Changing Your Registration

Use the Course Request form to make all changes in your registration, including additions, cancellations, and changes in grading system. Changes are not official until you have completed this procedure:

1. Check the box indicating cancel/add and note the number of credits you will have after this change. If you are canceling all courses, check the Complete Cancellation box.
2. Obtain instructor, advisor, and/or college office approval if required.
3. Turn in your Course Request

form at a registration center, where you will receive a revised fee statement.

Cancellation of a course after the first week of a 5-week term will result in a W on your record. A 7- or 10-week course may be cancelled without a W on your record through the tenth day of the term. (*Note: if you cancel all courses before or during the first week of the term, a W will not appear on your transcript; however, a notation of your cancellation will appear.*)

You should contact your college office for information about committee requirements and procedures when Scholastic Committee approval is required.

You must pay for every course for which you register unless you officially cancel. Cancellations are effective the day you officially cancel (by taking a completed Course Request form to a registration center), not on the date

Approvals required for cancel/adds. A University-wide policy governs all cancel/adds:

5-week courses	7 & 10-week courses	Required to Cancel	Required to Add
Days 1-3	Week 1	Nothing required	Nothing required
Days 4-5	Week 2	Nothing required	Instructor approval
Weeks 2-3	Weeks 3-6	Nothing required	Approval of Instructor and college Scholastic Committee
Weeks 4-5	Weeks 7-10	Approval of college Scholastic Committee	Approval of Instructor and college Scholastic Committee

you stopped attending class.

Remember: cancellations must be made in person at a registration center; cancellations by mail are not allowed. If you fail to cancel any course for which you have registered but not paid, you will receive billing statements for your tuition and fees, including late payment fees. Unless you make full payment, a hold will be placed on your record.

Note: If you are a summer-only student who registered by mail and cannot get to campus to cancel, call 624-3555.

Tuition charges and refunds for course additions and cancellations. Full tuition is charged on a per-credit basis for all changes in registration that increase your credit load. No additional tuition is charged when any course addition is balanced at the same time by a cancellation equal to the number of credits being added. Refunds are issued on a per-credit basis according to the refund rate that applies to the date of cancellation. A refund schedule is presented in the "Tuition and Fees" section of this Bulletin.

Mandatory Attendance on the First Day of Class

You must attend the first class meeting of every course in which you are registered unless you obtain the instructor's approval for your intended absence before the first meeting. Without this prior approval, you may lose your place

in class to another student. If you wish to remain in a course from which you have been absent the first day without prior approval, contact your instructor as soon as possible. Instructors have the right to deny you admission if the course is full. *You must officially cancel any course to which you are denied admission.*

Auditing Courses

Most colleges permit auditing. As an auditor, you enroll in, pay tuition and fees for, and attend class but do not complete assignments or take examinations. You receive no credit for the course, but it will be placed on your transcript with the symbol V (Visitor) to indicate your special registration status. Although you do not receive credit, the credit value for the course counts in determining the credit total for the student services fee.

Colleges may have additional requirements for you to meet before you register as an auditor. It may be necessary to have approval from your instructor and/or special scholastic committees. **Colleges generally do not allow you to repeat an audited course for credit.** For further information, check with the college offering the course.

To register as an auditor once you have received any necessary approval, write a "V" in the "Grade Option" column of the Course Request form.



Taking Courses Through the Senior Citizen Education Program

If you are 62 or older and a Minnesota resident, you may audit courses free of charge or take courses for credit at \$6 per credit whenever space is available after the first day of class. Under this plan, you will not pay the student services fee, but must pay any required laboratory or materials fees.

Registration for the Senior Citizen Education Program is on the

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second day of class (June 15 for first term and July 22 for second term). Attend the first day of class, however, to see if space is available and to receive information about class procedures. To register, go to 202 Fraser Hall (150 Williamson Hall for those with mobility impairments) or 130 Coffey Hall with your registration forms and identification to verify age and Minnesota residency. Call 625-5333 for more information.

Grading Options and Policies

There are two grading systems at the University of Minnesota Twin Cities campus: *A-B-C-D-F* and *S-N*. The *S* represents satisfactory work based on standards announced by the instructor and may vary from course to course. The *N* stands for no credit and is assigned when minimum course standards are not met (i.e., when the student does not earn an *S*). Ask in your college office about restrictions on the use of *S-N* credits.

A grade of "I" (Incomplete) is assigned when, in the instructor's opinion, there is a reasonable expectation that the student can complete successfully any missed work in the course. An *I* that is not made up by the end of the student's next summer term or quarter becomes either an *F* or *N*, depending on the grading system under which the course was taken.

If either *A-F only* (for *A-B-C-D-F*) or *S-N only* is printed after the prerequisite statement for a course,

you must register for that grading system (leave the grade option column blank on your Course Request form). If no grading system is listed, you may usually register for either *A-F* or *S-N* grading by marking your choice on the Course Request form. Colleges may restrict the use of *S-N* grading because of degree requirements. There may also be a limit on the number of *S-N* credits per term. Check with your college office for complete information.

You may change your designated grading option through the first week of classes for 5-week courses (Monday, June 20 for first term; Wednesday, July 27 for second term) and through the second week of classes for 7- and 10-week courses (Monday, June 27). For short term courses, check with your college office for deadlines. To change your grading option, bring a completed Course Request form to a registration center (202 Fraser or 130 Coffey Hall).

Final Exams

Final exams are scheduled during the regular meeting time of the course, usually on the last day of the course. If you miss the final exam in a course, you will receive a grade of *I* only when there is a reasonable expectation that you can successfully complete the work of the course. Instructors should announce both course requirements and make-up policies on the first day of class.

Make-up exams are given

according to the policies of the college offering the course. Instructors generally provide make-up examinations for students who have acceptable excuses (e.g., verifiable medical difficulties) for missing the final. To avoid any misunderstanding, contact your instructor in advance if you must miss an exam.

Receiving Your Grades

Grades will be mailed to you approximately two or three weeks after the end of each term. Be sure to update your address when you register. If you will be moving or will not be on campus through the summer, you should submit an address change to 150 Williamson Hall or 130 Coffey Hall. Most instructors will accept a self-addressed, stamped postcard which they will return to you with your grade once grades have been assigned. Grades are also available on the Student Access System, on the *Gopher* Information Server (under Office of the Registrar on the University of Minnesota Campus Information menu). The *University Day Coursework and Grades* screen contains all grades submitted to the Office of the Registrar. Grades are posted on your transcript and unofficial record approximately two or three weeks after the end of the term. See "Transcripts" for more information.

Transcripts

Official transcripts are certified and signed by the University

Important for all students:

It bears repeating: Attend the first meeting of class unless you notify the instructor in advance of an unavoidable absence. If you miss the first class meeting you may lose your place to another student.

If you decide not to take your class, you must officially cancel by submitting a properly approved Course Request form. You must pay for every course for which you register unless you officially cancel.

Registrar. There are two types of service for obtaining official transcripts: regular service and rush service. Regular service is available for \$3 a copy and processing takes about two or three workdays. After processing, your copies will be mailed to the places you have specified. Rush service on your official transcript request is available at \$9 a copy. Rush service guarantees your transcript will be issued to you in person or put in the mail on the same day it is requested. You must have a picture ID (student ID card, driver's license, state ID card, or current passport) to receive over-the-counter rush service. Prepaid courier service may also be requested for both regular and rush service. Visit the transcript service (150 Williamson Hall, Minneapolis, or 130 Coffey Hall, St. Paul) for more information, or call 625-5333.

Requests for official transcripts can also be submitted by mail or dropped off at the locations below. Because these requests must be in writing with your original signature, no phone or FAX requests are accepted. Requests should include your full name, your student ID number (Social Security number for summer-only students), name of the University of Minnesota, Twin Cities college through which you registered, dates of enrollment, and complete address(es) to which to send the transcript(s).

Students who take courses in Minneapolis units should send their requests to the Transcript Service, 150 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455. Students who take courses in St. Paul units should send their requests to the Office of the Registrar-St. Paul, 130 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108. If your last registration in Extension was 1989 or earlier, you must request your Extension record at the Transcript Service in Minneapolis. Your request must include a check or money order payable to the University of Minnesota for \$3 or \$9 per transcript or the same amount in transcript vouchers from the Bursar.

You may pick up an *unofficial* copy of your record by presenting a picture ID at the transcript service counter in 150 Williamson Hall or at 130 Coffey Hall. There is no charge for an unofficial copy of your record; there is, however, a



limit of one copy per day.

Students are advised that disciplinary action will be taken if academic records are forged or altered.

SPECIAL INSTRUCTIONS FOR COLLEGE OF LIBERAL ARTS STUDENTS

Advising for visiting summer-only students is available in B18 Johnston Hall between 8 a.m. and 4 p.m., Monday through Friday. Advisors can assist you with your concerns regarding registration, course work, and choosing a major.

Exceptions to registration deadlines must be requested by petition to the CLA Scholastic Committee. Such petitions are not routinely approved. If circumstances prevent you from meeting a deadline, you must contact your college office (B18 Johnston Hall for summer-only

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students) before the deadline.

Honors students should check the honors course listings in 115 Johnston Hall.

Holds. CLA holds, including advisor signature and scholastic holds, are waived for the summer session. Other holds are enforced.

Non-CLA courses. Courses not listed in the CLA Bulletin may not be applicable towards a CLA degree. Consult your college advising office before registering for courses not listed in the CLA Bulletin.

S-N registration. The number of S-N credits that can be applied to a CLA degree is limited. See the CLA Bulletin for details. Courses in departmental majors may be taken S-N only if the department has approved such a policy. Otherwise, S-N registration is allowed in all courses listed in the

CLA Bulletin.

Important for both College of Liberal Arts and College of Education students —

Deadlines for registration and grading system changes. Deadlines and approval requirements for canceling and adding courses, and changing your grading system to or from S-N grading, will be strictly enforced. Be sure to make any adjustments in your registration promptly. All changes must be made at the registration centers in 202 Fraser Hall or 130 Coffey Hall. Deadline dates are shown on page 3. **If you never attend or stop attending classes you must officially cancel even if your fees are unpaid.**

SPECIAL INSTRUCTIONS FOR COLLEGE OF EDUCATION STUDENTS

Students who have previously registered in the College and who have been admitted to a degree or licensure program offered by the College of Education, or have been admitted as an Adult Special in the College, are not required to obtain general registration approvals except for those approvals that are defined in the prerequisite statements of courses (instructor, department, and college approvals that require override permits).

Summer-only students in the College of Education must obtain college approval on their Course Request form from the Education Student Affairs Office (ESAO), 7A

Wulling Hall, before going to a registration center to register (if registering by mail, this is not necessary).

Courses offered by the College of Education are found under numerous departments and designators. Look under "Education" in the Course Schedule for a complete list.

SPECIAL INSTRUCTIONS FOR CARLSON SCHOOL OF MANAGEMENT STUDENTS

Academic year students
Students already enrolled in Carlson School of Management (CSOM) undergraduate degree programs may register for 3000- and 5000-level CSOM courses without an override. See the paragraph on Accounting courses for exceptions.

Students in approved units. If you are a student in an approved, non-CSOM unit with 90 or more credits and your GPA is 2.8 or higher, you may register for all 3000- and 5000-level general management courses (excluding practicum, honors, and special sections). You may register for these courses by going directly to your registration center. Your college office can provide you with a detailed list of general management courses.

Other academic year students. Any non-CSOM student with 90 or more credits and a cumulative GPA of 2.8 or higher may register

for open 3000- and 5000-level CSOM courses by bringing a current transcript to 290 Humphrey Center to receive a Registration Override Permit.

Visiting summer-only students

If you are a visiting summer-only student who wants to register for 3000- or 5000-level courses offered by the CSOM, or if the CSOM is the college from which you will be taking the majority of your summer credits, the CSOM should be your college of registration. Before registering, please fill out the Request for Summer-only Status form and the Course Request form (found in this Bulletin) and bring them to 290 Humphrey Center along with a current copy of your transcript.

Summer-only students with 90 or more credits. You may register for open 3000- and 5000-level CSOM courses if you have completed or have in progress 90 or more quarter credits (60 or more semester credits) and can provide a current transcript that shows a cumulative grade point average of 2.8 or higher. Bring your transcript to 290 Humphrey Center and ask for a Registration Override Permit(s).

Summer-only students with fewer than 90 credits. If you have fewer than 90 quarter credits (60 semester credits), you can register for 1000-level CSOM courses through either the CSOM or the College of Liberal Arts. (If you register through the College of Liberal Arts, you must obtain a

Registration Override Permit in 290 Humphrey Center or B18 Johnston Hall for every 1000-level CSOM course you take.) There are no grade point average requirements for registration in 1000-level courses; you must, however, meet all prerequisite requirements. You may not register for 3000-level CSOM courses.

Accounting Courses

Acct 1050 is available to all students who have completed 40 or more credits. Acct 3001 is available to all CSOM students and students in approved units. Students registering for Acct 3101 must have received either an A or B in Acct 1050 (or Acct 1024 and 1025) or have passed the Acct 3101 pretest. Check with 290 Humphrey Center for details (624-3313).

Other students enrolled in CSOM undergraduate degree programs must complete a closed or restricted class request form in 290 Humphrey Center to obtain permission to register for 3000- and 5000-level accounting courses.

Graduate Courses

CSOM and IR graduate students. Graduate students enrolled in the CSOM or the Industrial Relations program may register for most CSOM graduate courses. MBA courses are restricted to students enrolled in the MBA program.

Non-CSOM graduate students. Non-CSOM graduate students may request approval to register for CSOM graduate courses by

completing a petition for entry form. Approval will be given just prior to the first class meeting based on availability of space. Forms and additional information will be available in 295 Humphrey Center beginning June 1. Approval for IR graduate courses must be obtained from the director of graduate studies in Industrial Relations, 537 Management /Economics.

SPECIAL INSTRUCTIONS FOR GRADUATE SCHOOL STUDENTS

Academic year students who have been admitted to the Graduate School

New Students. If you are registering for the first time in the Graduate School, obtain your registration materials in 309 Johnston Hall.

Active Students. If you have registered in the Graduate School at least once in the last two years, clear any holds you may have, obtain any approval or overrides you may need, and proceed to the registration center with all of your completed registration materials.

Inactive Students. If you have not registered in the Graduate School at least once in the last two years, you must be readmitted before you will be allowed to register. Contact the Graduate School Admissions Office, 306 Johnston Hall (625-8060) *well in advance* of the day on which you wish to register.

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Transient graduate students or visiting summer-only students

If you are currently enrolled in some other accredited U.S. graduate school and wish to earn graduate credit at the University of Minnesota this summer, you may want to apply for transient graduate student status. Your decision will depend in large part on the requirements of your home school. Transient status is necessary if your home school requires that your work appear on a transcript as a graduate school course. In that case, you should register through the Graduate School and will pay Graduate School tuition rates.

Check first with your home institution to see if your proposed registration (both the level of the course and the course content) will be acceptable in your graduate program. If so, then apply for transient status by filling out Graduate School Form 57. To request Form 57, write to the Graduate School, 309 Johnston Hall, University of Minnesota, 101 Pleasant Street S.E., Minneapolis, MN 55455. Be sure to allow at least three weeks for the approval process. No application fee or supporting materials are required. Permission to register as a transient student, if granted, will be for one summer (both terms) or one academic quarter and will not extend beyond that single summer or quarter.

If you decide you do not need

transient status in the Graduate School, you may register for 1000-, 3000-, and 5000-level courses by registering as a summer-only student through the college offering the course.

Maximum Credits. The maximum credit load for each summer term is 11.

Thesis Credits. All students are required to register for thesis credits before receiving a Plan A master's or a professional master of engineering degree (at least 16 credits of 8777 required) or a Ph.D., Ed.D., or D.M.A. degree (at least 36 credits of 8888 required). Doctoral students may not register for thesis credits until the quarter after they have passed their preliminary oral examinations.

Tuition for thesis credits is assessed the same way course credits are assessed, with both resident and nonresident rates. If you have any questions about registering for thesis credits, including which course designator to use, contact your director of graduate studies or the Graduate School, 316 Johnston Hall (625-3490).

Doctoral Residency Requirement. Doctoral students are required to complete a residency requirement of seven quarters full-time registration. Full-time registration during the academic year is defined as seven or more credits per quarter. For more information, contact 316 Johnston Hall (625-3490).

Tuition Benefits for Graduate Assistants. In the summer the tuition waiver structure is more complex than it is in the academic year. Summer 1994 benefits will change slightly from last year. Contact your department payroll officer in late spring to determine what a given appointment will produce in tuition waivers. These benefits are for tuition only and do not cover the student services fee or course fees. **REMEMBER:** Tuition benefits *never* appear automatically on the registration system for the summer terms. You must obtain the proper forms from your work department and stop by the Graduate Assistant Office (GAO), 1313 5th St. S.E., Suite 317, in order to have your summer tuition benefit placed in the Registration and Student Accounts Receivable data bases. If you have a regular percentage appointment, obtain a copy of your Personnel Action Form (PAF) from your department payroll officer. If you have an hourly or miscellaneous percentage appointment, obtain in addition to the PAF a letter from your work department informing the GAO of the number of hours you are expected to work during the summer. If you are registering for Extension Classes, you must have a Tuition Benefit Information form filled out by your work department, have it authorized by the GAO, and submit it to the Extension Classes office in Wesbrook Hall. Instructions specific to dentistry, law, and medicine will be available directly from those schools or the GAO

during last spring quarter. All other general information on tuition benefit eligibility and procedures is available from your work department or the GAO at 627-1075.

You should be aware of an important difference between the summer and the rest of the year. If you hold an assistantship for any number of hours during a fall, winter, or spring quarter, you must have also registered during that quarter. You do not, however, need to register for summer in order to hold an assistantship (*exception*: if you are a new graduate student or if you did not register during the preceding spring quarter, you must register for at least 1 credit during one summer term). Audit (V) registration by itself is not sufficient if summer registration is required of you.

Graduation. Graduate School degrees are awarded monthly. To graduate at the end of any given month you must:

1. Submit your Graduate School Application for Degree form in 150 Williamson Hall or 130 Coffey Hall on or before the first workday of the month.
2. Complete all other requirements by the last workday of the month.

Graduating before the end of the quarter may affect your eligibility for student loans, housing, etc. Check with the appropriate office if you have questions on eligibility.

The Application for Degree form

and detailed graduation instructions are available in 316 Johnston Hall.

SPECIAL INSTRUCTIONS FOR HIGH SCHOOL STUDENTS

Qualified high school students have several summer opportunities at the University of Minnesota.

Special Programs. Some special programs, such as the Summer Honors College, are designed exclusively for high school students. See the "Special Programs" section of this Bulletin.

Regular Summer Session Courses. To qualify for summer-only admission to regular summer session courses, you must have completed the tenth grade and rank in the top 20 percent of your class. You must bring an official copy of your high school transcript, demonstrating a strong academic background and appropriate preparation for the course(s) selected. You are also encouraged to present, whenever possible, a letter of recommendation from a high school teacher or counselor. This letter of recommendation is required if your transcript does not indicate your high school rank. Bring this with you when you come to register.

As a general rule, introductory (1000-level) courses are open to high school students. In



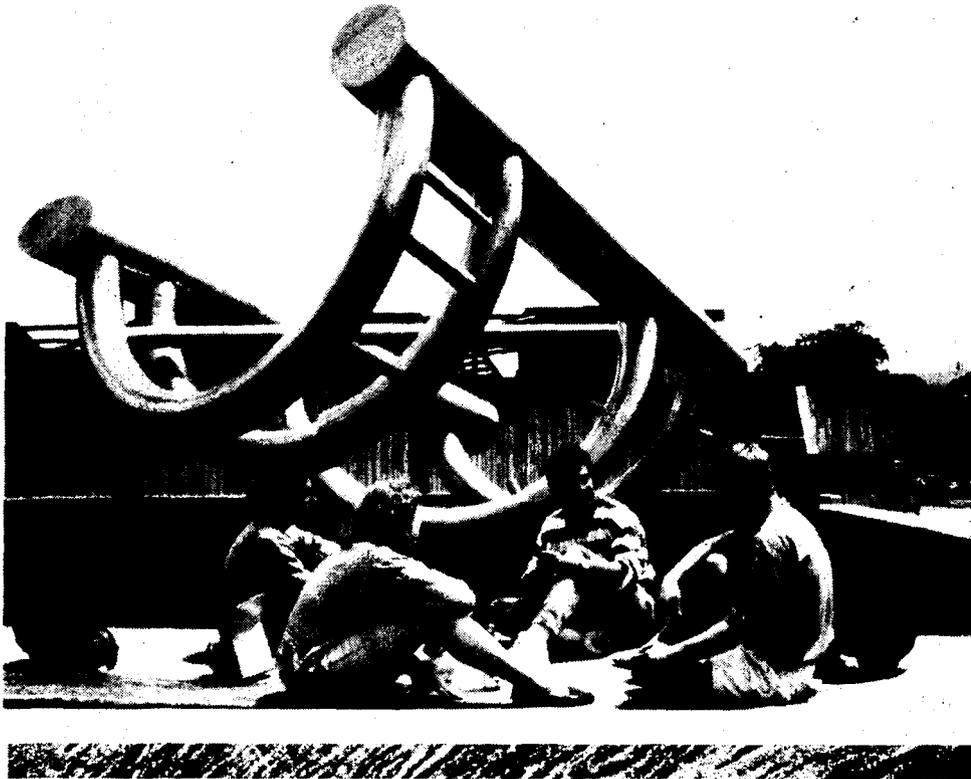
exceptional cases, intermediate (3000-level) or advanced (5000-level) courses might also be taken.

For Registration Approval.

If you want to take 1000-level courses in the Institute of Technology, the College of Biological Sciences, or the College of Liberal Arts, make an appointment with an advisor in the Advanced High School Student Services Office in 201 Westbrook Hall (626-1666).

For 3000-level or 5000-level courses in the College of Biological Sciences or the Institute of Technology, or any course in the Colleges of Agriculture, Home Economics, Natural Resources, or the General College, go to the office of the college offering the course. These college offices are listed on the inside back cover. If you are given college approval, you may then register by following the usual procedure for summer-

R E G I S T R A T I O N



SPECIAL INSTRUCTIONS FOR NEW INTERNATIONAL STUDENTS

If you hold a non-immigrant visa of any type, have been formally admitted to the University of Minnesota, and are registering for the first time, three holds have been placed on your record: AI (visa document check), ME (health clearance), and AZ (English proficiency). International students who are admitted to the University of Minnesota for either Summer Term I or Term II must register for a full course of study during that term. This is necessary in order to (1) maintain your legal immigration status, and (2) validate your admission to the University. Please read the paragraphs below carefully. If you have questions, you may call International Student and Scholar Services at 626-7100.

NOTE: If you are registering for classes but have not been formally admitted to the University of Minnesota, you may register directly as a summer-only student. The following information does not pertain to you.

Document Check and General Information (AI Hold). Go to International Student and Scholar Services, 20 Nicholson Hall. You will be asked to provide evidence of your immigration status. You

must
bring
your
passport

only students.

Post-Secondary Enrollment Options Act (PSEOA)

The state options act which allows high school juniors and seniors to attend college tuition-free is not in effect during the summer. You may want, however, to take a regular summer course or enroll in one of the special programs for high school students in order to discover whether you want to take advantage of the options act next fall. You are responsible for tuition during the summer, although limited financial aid is available for some special programs.

Questions?

High school students who have advising questions related to

summer course choice, transfer of credits, and/or utilization of PSEOA for the upcoming year should talk to an advisor in the Advanced High School Student Services Office. If you are interested in taking University of Minnesota courses during the upcoming fall quarter, contact this office long before the beginning of your high school year so that you can work out the details involved in using college credits toward your high school graduation. Call 612/ 626-1666 for an appointment or write to the Advanced High School Student Services Office at 201 Westbrook Hall, 77 Pleasant St. S.E., Minneapolis, MN 55455.

and visa documents (I-94 form, pages 3-4 of your I-20AB, and/or IAP-66). Sponsored students must also provide documentation of their financial support. If you are a permanent resident, you must present documented evidence of your status.

Health Clearance (ME Hold). If you are not a citizen of the United States and are registering for the first time at the University, you must have a health clearance in order to register. You will be provided with a health clearance form once you have taken a tuberculin skin test or have shown proof that you have been tested within the last year and are free of tuberculosis. You should report to the information desk at Boynton Health Service, 410 Church Street, Minneapolis, several days before you plan to register. You will need to return 48 hours after you have taken the tuberculin test to have the test read and to obtain your health clearance form. Tuberculin tests for international students often indicate that students have been exposed to tuberculosis (positive test) but not necessarily that they have contracted the disease. If your test is positive, you will be allowed to register; however, you will be required to have a chest x-ray and to return for the results.

Mandatory Health/Hospitalization Insurance. All international students must carry hospitalization insurance for themselves and their dependents. Insurance coverage must be continuous from the date of arrival

in the United States through the final date of departure from the United States. This means that international students must show proof of insurance coverage even if they are registered for less than three credits per term or are away from campus for the summer or an academic quarter. See "Health Service and Hospitalization Charges" in the Tuition and Fees section of this Bulletin.

English Proficiency (AZ Hold). If you have not provided enough information about your English proficiency, an AZ hold may be placed on your record. This hold can be removed only by the Minnesota English Center (MEC), 101 Klæber Court. To find out if you have an AZ hold, check with the MEC directly or ask at International Student and Scholar Services during your document check. An AZ hold needs to be removed by the MEC even if English is your native language or you scored 550 or higher on your TOEFL exam. If English is not your first language and you achieved less than 550 on the TOEFL exam, or if the TOEFL exam was waived at the time of your admission, you may be required to take the Minnesota English Language Proficiency test. Register for this test at the MEC office as soon as possible because results are not available for seven to ten days. You will be required to pay a \$25 testing fee for the MELP test. You will be given information about requirements for English classes during your visit to the MEC. You can also call the MEC office, 624-1503, for more information.





T U I T I O N & F E E S

1994 SUMMER SESSION TUITION¹

Be sure to read the section immediately to the right of this rate schedule because some students who are classified as "summer-only" students for purposes of registration, pay "academic year" rates, and vice versa.

All costs are per credit unless otherwise specified.

	Resident	Nonresident
Undergraduate Programs		
Academic year		
lower division students	\$68.50	\$201.50
Academic year		
upper division students	\$74.00	\$218.50
Pharmacy B.S. seniors	\$48.50	\$ 90.50
Visiting summer-only and Adult Special students ²	\$80.50	\$ 80.50
Graduate Programs		
Departmental Masters (Agriculture, Education, Public Health)		
Graduate School	\$100.00	\$200.00
M.B.A. Day	\$174.00	\$348.00
Evening	\$202.00	\$308.00
	\$202.00	\$202.00
Professional Degree Programs		
Dentistry		
per credit	\$ 217.00	\$ 325.00
12 or more credits	\$2,600.00	\$3,900.00
Law (semester rate)	\$ 276.00	\$ 276.00
Medical School		
1-5 credits	\$ 855.00	\$1,710.00
6-10 credits	\$1,710.00	\$3,420.00
11-15 credits	\$2,565.00	\$5,130.00
16 credits or more	\$3,420.00	\$6,840.00
Pharmacy (Pharm.D.)	\$ 122.50	\$ 245.00
Veterinary Medicine		
per credit	\$ 200.00	\$ 300.00
12 credits or more	\$2,400.00	\$3,600.00

¹ This tuition and fee schedule is subject to final approval by the Board of Regents and may change without notice.

² This rate applies only to undergraduate colleges.

The tuition you pay in the Summer Session depends upon your student status and the kind of program you are enrolled in.

You pay the Academic-year Undergraduate rate if any of the following applies to you:

- You have been officially admitted to a degree program at the University of Minnesota at any time in the past and registered at least once in that program;
- You are a new student who has been officially admitted to the University for summer or fall 1994;
- You are a graduate of the University of Minnesota; or
- You are an admitted student at another campus of the University of Minnesota (Duluth, Morris, Crookston).

You pay the Lower Division rate through the summer term in which you register for your 90th credit; the Upper Division rate applies thereafter.

You pay the Summer-only Undergraduate rate if:

- You have never been admitted to a degree program on any campus of the University of Minnesota;
- You were admitted in the past but never registered in that program;
- You have taken courses at the University but only as an evening Extension student or a previous summer-only student and have not been admitted to a degree program;
- You are a high school student who has not been admitted as a first year student to the University of Minnesota;

• You are presently classified as an Adult Special student, or were classified as such during your last attendance at any campus of the University of Minnesota.

You pay the Resident rate if:

- You fall into the Summer-only category as outlined above, or
- You have maintained a permanent home in Minnesota for at least one calendar year for purposes other than obtaining an education, and have been classified as a Minnesota resident by the University of Minnesota, or
- You receive a tuition reciprocity benefit.

Tuition reciprocity

If you now receive tuition reciprocity, and come to the Twin Cities campus for the summer from another University of Minnesota campus or other Minnesota system, you need to notify your home state that you have switched campuses or systems for the summer. If you are a current University of Minnesota student who receives reciprocity, you may continue to receive it for the 1994 Summer Session and following academic year. If you are entering the University of Minnesota for the first time during Summer Session, you need to apply for the reciprocity benefit using the 1993-94 application form for your home state. If you have just been admitted to the University and your first enrollment is for Summer Session, and reciprocity has been granted, you need not reapply for the following academic

year. For information and application forms, check with your home state reciprocity office.

Minnesota Higher Education Coordinating Board 400 Capitol Square Building 550 Cedar Street St. Paul, MN 55101 612/296-3974

State of Wisconsin Higher Education Aids Board P.O. Box 7885 Madison, WI 53707 608/266-2578

South Dakota Board of Regents Reciprocity Program Box 2201 Brookings, SD 57007 605/688-4497

North Dakota Board of Higher Education State Capitol Building 600 E. Boulevard Avenue Bismarck, ND 58505-0154 701/224-2962

You can also obtain application forms and information in 240 Williamson Hall (612/625-6330).

FEES

LATE FEES are assessed for both late registration and late payment.

Late Registration.

No registration will be accepted after June 14 (first term) or July 21 (second term) without payment of the late registration fee as follows:

June 15-20 or July 22-27	\$10
Thereafter	\$20

Exception: If you take a course that begins after June 14 for first term or July 21 for second term, you may register for that course

through the first day it meets without incurring a late registration fee.

Late Payment

A fee of \$20 is charged if your tuition and fees are not paid in full by the due date on your billing statement.

STUDENT SERVICES FEE

If you register for 3 or more credits in a term, you must pay a \$67.39 Student Services Fee for that term in addition to tuition. If you only register for a 3-5 credit course, and that course is six to ten weeks in length, you will be assessed the Student Services Fee for Term I only (but if you want to extend your benefits beyond Term I—to use Boynton Health Service, for example—you must pay the Student Services Fee for Term II as well). The Student Services Fee is generally waived for courses held outside the nine-county metro area (Hennepin, Ramsey, Dakota, Washington, Anoka, Carver, Wright, Scott, and Chisago). If your course is held on another campus of the University, however, you pay the Student Services Fee of that campus.

COURSE FEES¹

All fees are per term unless otherwise indicated. Students taking the following courses will pay course fees as follows:

Architecture

\$20—3081, 3082, 3083, 3091, 3092,

3093, 5111, 5112, 5113, 5121, 5122, 5123, 8251, 8252, 8253, 8254, 8255, 8256, 8777—Design studio fee

Art

Materials fees³

\$5—1101, 1102, 1404, 5190

\$20—1702, 3720

\$25—1701, 3710, 5710, 5970

\$30—3430, 5430, 8360

\$35—1510, 1520, 1530, 1540, 3306, 5360

\$40—3510, 3520, 3530, 3540, 3550, 5510, 5520, 5530, 5540, 5550, 5590



\$45—3830

\$50—1301, 1302, 1811, 1812, 3301,

3302, 3303, 3304, 3305, 3307, 5310,

5320, 5330, 5340, 5350, 5370, 8310,

8320, 8330, 8340, 8350, 8370

\$55—5830

\$60—1802, 3810, 5390

\$66—5890

\$70—5810

\$80—3820, 5821

\$95—5820

\$225—8810

T U I T I O N & F E E S

Arranged (amount adjusted to individual needs of students or particular class project)—3420, 3970, 3980, 5420, 5970, all other 8000-level courses

Composition and Communication
\$245²—0011

Design, Housing, and Apparel
\$8—1641, 1642, 3611, 3643, 5644, 5645, 5646—Materials fee for student courses
\$45—1331, 3331, 5331—Materials and dyes fee

Ecology, Evolution, and Behavior
\$15—5014, 5016, 5132, 5134—

Transportation fee
Forest Products
\$50—ForP 3300—Wood industries tour

General College
\$245²—0401, 0402, 0419, 0611, 0615, 0616, 0617, 0618, 0621, 0623, 0625, 0631, 0641, 0643—
Preparatory mathematics and composition

Itasca Forestry and Biological Station
\$10—Laboratory fee
\$5 per week minimum—Research fee (researchers must also pay the laboratory fee)

Landscape Architecture
\$20—5103, 5105, 5211, 5212, 5213, 8111, 8777—Design studio fee
\$35—5073, 5107

Mathematics
\$273²—1008, 1031, 1051, 1151

Music, Applied
Applied lessons—1 half-hour lesson per week for 2 credits; 2 half-hour lessons or 1 hour lesson per week for 4 credits.
Music majors who have passed the entrance exam: \$0 per 2 credits.
Majors taking extra credits (beyond requirement) or taking lessons on a second instrument: \$45 per 2 credits.
Students taking lessons for minor in music: \$45 per 2 credits.
Non-majors, elective credit: \$115 (0-2 credits).

Natural Resources and Environmental Studies
\$150—3051—Food and lodging fee

Plant Biology
\$20—1009—Transportation fee

Soil Science
\$6—3220—Field course
\$19—3520, 5510—Transportation fee
\$35—5515—Transportation fee

The 1994 summer Student Services Fee supports the following programs:

Africana Student Cultural Center	\$12
Asian American Student Cultural Center	\$08
Association of Gay/Lesbian/Bi	\$07
Boynton Health Service	\$29.35
Child Care Consortium	\$31
Financial Management	\$74
Graffiti	\$87
International Study and Travel Center	\$66
LaRaza Student Cultural Center	\$12
Minnesota Daily	\$1.25
Minnesota International Student Association	\$23
Minneapolis Student Union	\$9.52
Radio K	\$45
Recreational Sports - Building Fund	\$2.50
Recreational Sports - Operations	\$6.98
St. Paul Student Center	\$4.85
Student Advocate Service	\$11
Student Emergency Loan Fund	\$11
Student Ombuds Service	\$21
Summer Cultural Programs	\$3.25
Student Union Expansion	\$3.04
University Student Legal Service	\$2.58
Total	\$207.20

¹ Fees are subject to change without notice

² In lieu of tuition

³ Materials fees—assessed at the time of registration. Arranged fees are collected by the department.

SPECIAL FEES¹

Credit by Special Examination

\$30—Check with your college office for further information.

Deposit Cards

\$40—Chemistry cards

\$5—Art cards

Deposit cards may be purchased from the Bursar. Materials, breakage, or equipment use will be charged against the card; any balance will be refunded at the end of the course.

Diploma, Overseas Mailing

\$5—Optional. For sending a diploma *air mail* to an address outside the United States, Canada, or Mexico.

Diploma Replacement Fee

\$15

Facility Fees

Students registered in the following courses must pay the amount indicated to the appropriate facility operator for the use of the facility and/or equipment:

\$15—PE 1048, 1148

\$18—PE 1034

\$23—PE 1035

\$25—PE 1205

\$60—AnSc 1601

\$75—PE 1057, 1157, 1257

Field Studies Health Service Fee

\$29.35 per summer term—

Required of students on University field studies such as Geology Field School, Lake Itasca Field Station, etc. The fee covers outpatient medical care for emergency illness

at the nearest facility on approval of the person in charge of the group. Eligible charges that are not collectible from a student's insurance carrier will be paid by Boynton Health Service up to a maximum of \$100 per visit.

Graduate and Professional Student Assembly (GAPSA)

\$.51 per term—Assessed to all students in most professional schools and students in the Graduate School.

International Student Aid Fee

\$2 per term required of all students who hold nonimmigrant visas. Nonrefundable.

Itasca Recreation Fee

\$3.40 per term—Assessed to all students registered for courses at the Lake Itasca Forestry and Biological Station.

Minnesota Public Interest Research Group (MPIRG)

\$1.25 (refusable/refundable)—Assessed with the student services fee. MPIRG is a nonprofit, nonpartisan, student-run organization. A statewide advocacy group, MPIRG gives students the opportunity to speak out on public issues and work for social change. The fee supports a professional staff for lobbying, litigation, organizing, and research. You may decline to pay the fee prior to registration by initialing the MPIRG section on the Course Request form or you may obtain a refund at a location and date that will be announced in the student newspaper, *Minnesota Daily*.

Minnesota Student Association (MSA)

\$.45 per term—Assessed to all undergraduates, departmental masters, and students in pharmacy.

Music Practice Rooms

Rooms with upright or grand piano, harp, harpsichord, organ, or percussion as well as rooms with no instrument will be available for rental by the term. Check in 100 Ferguson Hall for rental information and rates.

Recreational Sports Locker Rentals

\$1 per day; \$15 per one or both summer terms for towel and locker at University Recreation Center, Norris Gym, and St. Paul Gym.

¹Fees are subject to change without notice.

REQUIRED CHARGES FOR HEALTH SERVICE AND HOSPITALIZATION INSURANCE

Outpatient care at Boynton Health Service is automatically provided during the term in which you are assessed the student services fee (students taking three credits or more per term). If you are a degree-seeking student you must also have hospitalization insurance. If you are a degree-seeking student and do not have hospitalization insurance, University-sponsored insurance must be purchased at the following cost: per term (5-week coverage)

T U I T I O N & F E E S

\$61; second term plus interim coverage until the beginning of fall quarter (9-week coverage) \$120; both terms plus interim coverage (14-weeks coverage) \$181. See "Health and Medical Services" in the "Services and Resources" section of this Bulletin for more information about health services and hospitalization insurance, including care for which there is a charge.

MAKING PAYMENT

Paying Your Fees

You must pay all tuition and fees in full by the due date on your billing statement. There is no installment payment plan for Summer Session. A \$20 late payment fee is assessed if your tuition and fees are not paid in full by the due date on each billing statement. For all questions about fee payment, call Student Accounts Receivable, 625-8500.

Student Accounts Receivable Billing System for Tuition and Fees

With this billing system, every student will have an account at Student Accounts Receivable and will receive a bill for tuition and fees at the beginning of each term. Each time you register for, cancel, or add courses, your tuition and fees will be charged to your account. This account, unlike individual fee statements, will reflect your total charges for tuition and fees.

You will receive fee statements when you register, but they will

not carry payment due dates. Your tuition due dates will be on your billing statement.

You will be assessed billing charges for the current term if you have a previous balance outstanding. Any payments that you make will always be applied to the oldest charge on your account. It is your responsibility to report any change in address to the University. When you register, verify that the address printed on your course confirmation form is correct. (You may report an address change to Student Accounts Receivable by calling 625-8500.) If you do not receive any billing statement, you must obtain a payment voucher on or before the payment due dates (July 12 for first term and August 16 for second term). Payment vouchers are available at Student Accounts Receivable, 20 Fraser Hall in Minneapolis (Bursar's departmental window, 145 Williamson Hall, for students with mobility impairments) or 107 Coffey Hall in St. Paul. If you want to pay your balance before you receive your billing statement, go to Student Accounts Receivable where a payment voucher will be prepared for you.

When to Pay

The billing statement for first term will be issued on June 17 and will have a due date of July 12; for second term the billing statement will be issued on July 29 and will have a due date of August 16. A \$20 late payment fee is assessed for each bill that is not paid in full by

the due date, including a final summer bill sent on August 29 with a due date of September 13.

Where to Pay

Pay your tuition and fees at the Bursar's Office (145 Williamson Hall on the east bank, 101A Anderson Hall on the west bank in Minneapolis, and 107 Coffey Hall in St. Paul). Your billing statement (or fee statement) and a check or money order may also be dropped in any of the fee deposit boxes on campus: in the Fraser and Coffey Hall registration centers, both concourses in Williamson Hall; Anderson Hall; and Minneapolis Student Union Service Center. Payments are picked up at 8 a.m. and are credited to the previous day. The receipted statement may be picked up after five workdays at 145 Williamson Hall or 107 Coffey Hall. Your receipted statement will be mailed to you if you enclose a self-addressed stamped envelope.

Mailing Your Payment

Your billing statement (or fee statement) and a check or money order may be mailed, using the envelope enclosed with your billing statement, to the Bursar's Office, P.O. Box 88, Minneapolis, MN 55440-0088. Write your student ID number on your check or money order and enclose all copies of your statement. (If you are paying with your fee statement, do not remove the student copy before sending in the

payment but do remove the lower portion—your course confirmation form.) Your mailed payment must be received by the billing statement due date, or you will be billed for additional charges on the following statement. If you want your receipted statement returned to you by mail, you must enclose a self-addressed, stamped envelope. If you do not include this return envelope, you can pick up your receipted copy after five workdays at the Bursar's Office in Minneapolis (145 Williamson Hall).

Collection Procedures and Costs
 Past due accounts may be subject to handling charges and collection procedures. Collection can include court action or referral to outside collection agencies. You are responsible for any and all costs necessary for the collection of any amount not paid when due.

REFUNDS

There are two refund schedules: one for new students (students attending the University for the

first time) and one for continuing students. All refunds for tuition and fees are issued on a per-credit basis according to the refund rate that applies to the effective date of cancellation. Cancellations are effective the day you officially cancel—not on the date you stopped attending classes. If you stop attending class for any reason, cancel immediately by taking a completed Course Request form to a registration center. To receive a refund, you must cancel within the time periods outlined in the boxes below.

REFUND SCHEDULE SUMMER SESSION 1994						
Continuing Students						
100% refund	75% refund	50% refund	No refund after			
day 1	day 2	day 3	3 days			
days 1-2	days 3-4	days 5-6	6 days			
days 1-3	days 4-5	days 6-8	8 days			
1st week*	2nd week	3rd week	3 weeks			
*NOTE: For 6-10 week courses, the first week of class ends on Monday, June 20, 1994.						
New Students						
100% refund	80% refund	70% refund	60% refund	50% refund	40% refund	No refund after
day 1	day 2	day 3	day 4	day 5	day 6	day 6 or last day of class
days 1-2	days 3-4	days 5-6	days 7-8	days 9-10	days 11-12	day 12
days 1-3	days 4-5	days 6-8	days 9-10	days 11-13	days 14-15	day 15
1st week	2nd week	3rd week	4th week	5th week	6th week	6 weeks
*NOTE: For 6-10 week courses, the first week of class ends on Monday, June 20, 1994.						

T U I T I O N & F E E S

In a limited number of circumstances (e.g., active military duty, scholastic drop), retroactive cancellation may be possible. If authorized within one calendar year after the end of the term, you may also be entitled to a tuition refund. Check with the Student Relations staff in 150 Williamson Hall (625-5333) or 130 Coffey Hall for details.

FINANCIAL ASSISTANCE

Financial Aid

Eligibility for summer 1994 financial aid is based on your 1993-94 Free Application for Federal Student Aid (FAFSA). If you have not previously submitted a FAFSA for 1993-94, you must submit one by May 2, 1994, to be eligible for summer aid.

In addition to the FAFSA, you must submit a Summer Financial Aid Application. These applications will be available in 210 Fraser Hall after February 1, 1994. For information on funding or financial aid procedures, visit or write the Office of Student Financial Aid, 210 Fraser Hall, 106 Pleasant Street S.E., Minneapolis, MN 55455 or 197 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108. You may also call (612) 624-1665, or toll free 1-800-400-UOFM.

NOTE: If, for any reason, you do not receive financial aid, you are still responsible for paying your tuition and fees.

Grant Programs

Federal Pell Grant. You will be considered for a Federal Pell Grant if you are an undergraduate admitted to a University of Minnesota degree or certificate program who did not attend one or more quarters of the 1993-94 school year, or who took fewer than 12 credits in one or more quarters in 1993-94. You must register for at least 1 credit during the summer to qualify. Students must turn in their Student Aid Reports (SARs) by June 30, 1994. Completion of the 1993-94 FAFSA is required.

Minnesota State Grant. You may be eligible if you are an undergraduate who did not attend one or more quarters of the 1993-94 school year, or who took less than 15 credits in one or more quarters in 1993-94. You must register for at least 3 credits during the summer to be eligible for a state grant. Completion of the 1993-94 FAFSA is required.

Summer Employment

You are eligible for summer employment by the University if you were registered for at least 6 undergraduate or 3 graduate credits in a degree program during spring quarter and are returning to school in the fall, or are registered for a minimum number of credits during the summer. For more information, contact the Student Employment Center, 120 Fraser Hall, 624-8070.

Summer Loan Programs

If you already received a Federal Stafford Student Loan for 1993-94, you may be eligible for a second summer Stafford loan. Federal SLS, Federal PLUS, SELF, HEAL, Law Access Loan, and Law Loans are also available for summer 1994. All loans require at least half-time registration in a degree or certificate program. Complete information on specific eligibility criteria and other terms of these loans is available in the *Student Loans* brochure included with your financial aid packet. Forms for these loans are available at 210 Fraser Hall and 197 Coffey Hall.

Regent's Scholarships

University staff members employed during the summer session are entitled to the same tuition privileges in the summer as during the academic year. Check with the Human Resources Development Division for limitations.

CAMPUS SERVICES & RESOURCES



College Advising Offices. For help in planning your academic program, choosing a major, and discussing scholastic concerns. All colleges provide these services. Consult the Directory on the inside back cover for addresses and phone numbers of colleges not listed below.

- **College of Liberal Arts**
Academic year students should use their assigned college advising office (for information call 625-2020). Summer-only students may get advising help in B18 Johnston Hall, 624-9585

- **College of Education**
The Education Student Affairs Office provides help with program planning and registration, counseling, admissions, licensure, and placement services. 40 Wulling Hall, 625-6501

BOOKSTORES

Textbooks, trade and reference books, general supplies, computers, campus wear and gifts, cap and gown rental and sales.

East Bank Store, 160 Williamson Hall, 625-6510

West Bank Store, 100 Anderson Hall, 625-3000

St. Paul Store, 7 Student Center, 624-9200

Health Sciences Store, 2-554 Moos Tower, 625-8600

BURSAR'S OFFICE

For paying tuition and fees (no credit cards accepted), cashing refund vouchers and checks (with restrictions on amount and ID/fee statement required plus fee of \$.25 per check), and purchasing deposit cards, student ID authorizations, and transcript vouchers. Three locations:

145 Williamson Hall (East Bank), 625-7535, Monday-Friday 8 a.m.-3:30 p.m.

101a Anderson Hall (West Bank), 625-1383, Monday-Friday 8 a.m.-2:30 p.m.

107 Coffey Hall, St. Paul, 625-8108, Monday-Friday, 8 a.m.-2:30 p.m.

BUS SERVICE

Inter-campus buses. Service (Route 13) between the Minneapolis and St. Paul campuses and between the East and West Banks is available free of charge unless one enters or exits at stops off campus. Complete information about bus service, including park-and-ride lots, is available at the information desk in each student union, the housing office in Comstock Hall, and University Transit Services at 2818 Como Ave. S.E., Minneapolis 55414; or call 625-9000.

Route 52 Commuter and City Bus Service. Semi-express Route 52 Commuter Bus Service, consists of 12 routes directly serving the University's Minneapolis campus from various residential areas of the Twin Cities. Call 625-9000 for information.

It's a
"full service"
campus
in the
summer.

ADVISING

Students with questions about what to study and which courses to take can make use of either the Counseling Department in Continuing Education and Extension, or the college advising offices.

Counseling Department of Continuing Education and Extension (CEE)

Available to all summer students—

- **Counseling-** Professional counseling services in career and educational planning.
 - **Advising-** Academic advising to help students select programs of study, determine prerequisites and academic standing, evaluate transcripts, choose courses, and handle other academic matters.
 - **Financial Aid-** Assistance for students seeking information about grants, scholarships, loans, and work-study for part-time or full-time study.
- 314 Nolte Center, 625-2500

CAMPUS SERVICES & RESOURCES

CHILD CARE

University Child Care Center.
Care for infants and toddlers as well as preschool children. Fees for care are charged on a sliding scale based on family income and age of child. There is a waiting list. 1818 4th Street South, Mpls, 627-4014. Monday-Friday 7:15 a.m. - 5:30 p.m.

COMPUTER SERVICES

Extensive computer facilities, networks and services are available to University students. Call Help Line Information, 625-1555, for a referral to the kind of facility or service you need.

COUNSELING

University Counseling Services.
Available to all students and covering a wide range of concerns including career choice, educational planning, academic and learning skills improvement, interpersonal relationships, women's issues, and personal development. Counseling and testing information is confidential. 109 Eddy Hall, 624-3323
190 Coffey Hall (St. Paul), 625-3115
16 Johnston Hall (disabled students) 624-4037

Crisis Counselor
308-310 Boynton Health Service,
625-8475

Mental Health Clinic
N400 Boynton Health Service,
624-1444

DISABILITY SERVICES

The University will provide reasonable modifications or adjustments to ensure access for students with disabilities. Disability Services (DS) provides direct assistance such as information, referral, support, and academic accommodations (i.e., interpreting, reading, test accommodations, etc.) for enrolled and prospective students, as well as consultation/training/technical assistance with faculty and staff to promote access to programs and facilities. DS will also assist disabled students in obtaining services from other University or community resources. Campus Accessibility Guides are available and address such issues as building accessibility, handicapped parking, curb cuts, elevator locations, and accessible buses. University policy calls for accommodations to be made on an individualized and flexible basis; therefore, it is the responsibility of students to seek assistance and to make their needs known. For more information contact Disability Services, 30 Nicholson Hall, 626-1333. (V/TDD)

ESCORT SERVICE

Campus Escort Service,
8 p.m. - 1 a.m., seven days a week.
624-9255 or 624-WALK

FINANCIAL AID

Student Financial Aid Office
210 Fraser Hall, 624-1665, or toll free 1-800-400-UOFM.

Counseling Dept., Continuing Education and Extension
314 Nolte Center, 625-2500

HEALTH AND MEDICAL SERVICES

Boynton Health Service. All students who take 3 or more credits per summer term are assessed the Student Services Fee. (*Exception:* If you only register for a 3-5 credit course, and that course is seven to ten weeks in length, you will be assessed the Student Services Fee for Term I only. If health coverage is needed during Term II, you should purchase the Extended Coverage Benefits plan for that term.) By paying the Student Services Fee you are eligible to receive most nonhospital medical services at Boynton Health Service on the Minneapolis campus at no cost, and other services at reduced cost. If you pay the Student Services Fee for both terms, you are eligible for benefits until the first day of fall quarter coverage. If you do not pay the Student Services Fee for any given term, you may be eligible to purchase outpatient health coverage—through Boynton's Extended Coverage Benefits plan—for that term at the cashier's window, second floor, Boynton Health Service. The Extended Coverage cost for a single five-week summer term is

\$43; it is \$86 for Term II until the beginning of fall quarter. If you are not required to pay the student services fee or if you do not purchase Extended Coverage, you may still use the Health Service on a fee-for-service basis.

Boynton Health Service is open throughout the summer from 8 a.m.-5 p.m. Monday-Friday. Prepaid medical care at Boynton includes general outpatient services, internal medicine, orthopaedics, chest clinic, women's clinic, eye clinic, and laboratory procedures. Partial fees are charged for certain services, such as routine physical exams, annual dental exams, and some specialty care. Charges for mental health services, x-rays, and minor surgical procedures must be submitted by you to your hospitalization insurance company; your student services fee will cover the costs that your hospitalization insurance does not. Students without hospitalization insurance will be responsible for full payment of these charges. Full fees are charged for prescription medications, eyeglasses and contacts, and most dental care. Boynton general info: 625-8400; medical info: 625-7900.

Emergency care. During the hours that Boynton is closed, medical care for emergencies is available in the emergency department of University Hospital or other area hospitals. The cost for after-hours care in the emergency department is your responsibility. Students covered by private insurance or through a health maintenance

organization (HMO) should use the emergency facility specified by their plan. Students covered by the University-sponsored hospitalization insurance will be charged a \$25 copayment per visit to a PreferredOne Network Emergency Room Service. Students with no hospitalization insurance are responsible for all charges incurred in an emergency room.

Hospitalization insurance. The Board of Regents requires all degree-seeking students taking 3 or more credits per summer term to carry hospitalization insurance. If you already have insurance, fill in the name of your insurance company and your policy number on the Hospitalization Insurance form found on the tear-out insert in this bulletin and bring the form with you when you register. Otherwise you will automatically be charged for University-sponsored hospitalization insurance. International students must carry hospitalization insurance for themselves and their dependents. Insurance coverage must be continuous from the date of arrival in the U.S. through the final date of departure from the U.S.

If you are registered for only one summer term, you can, if you wish, purchase insurance covering both terms and the interim. In fact, even if you do not take any summer courses, you can purchase insurance for the summer as long as you were enrolled in the University-sponsored

hospitalization plan during spring quarter. It is important to maintain insurance coverage through the summer so you are protected in case of a summer accident or illness.

You may purchase University-sponsored hospitalization insurance when you register or at the cashier's window, second floor, Boynton Health Service. Insurance must be purchased before the end of the first week of classes for each term. The *costs for coverage* are:

- for one term (5-week coverage) \$61;
- second term plus interim coverage until the beginning of fall quarter coverage (9-week coverage) \$120;
- both terms plus interim coverage (14-week coverage) \$181.

For an insurance brochure, or specific information concerning benefits or dependent insurance coverage, contact the Student Insurance Office at Boynton W228, 624-0627.

Immunization clearance. State of Minnesota law requires all students born after December 31, 1956, to provide documentation of immunization for measles, mumps, rubella, tetanus, and diphtheria the first time they register for more than one class. This documentation must be entered on a Student Immunization Record Form and must include the month and year each immunization was given. Forms are available at your registration center and at Boynton

CAMPUS SERVICES & RESOURCES

Health Service. Begin now to check your medical or high school immunization records. (The law allows for some exceptions based on documented medical or conscientious exemptions.) All students are legally required to provide information on immunizations or exemptions; students who fail to provide the required information cannot remain enrolled.

Further information. For detailed information about student health coverage, contact the cashier's window, second floor, Boynton Health Service 624-1471 or see Welcome to Boynton Health Service, a brochure available at Boynton. General information and a copy of the brochure may be obtained by calling 625-8400.

Graduate Assistant Health Care Plan. University subsidized comprehensive health insurance through Group Health, Inc., is available to graduate and professional students who meet certain eligibility requirements. The University will pay 50-100 percent of the cost of this coverage, the exact percentage depending on the details of a student's eligibility. Students will be billed for any portion of the premium they owe. To receive this coverage, students must apply for it by the enrollment deadline (June 30 for most students). A student's spouse and children may also be enrolled (at the student's expense) in a separate plan with similar benefits and clinic locations. To apply, or for more information, contact the

Graduate Assistant Insurance Office, W226 Boynton, 625-6936.

HIGH SCHOOL STUDENT SERVICES

Office of Advanced High School Student Services (Continuing Education and Extension Counseling). Advising and assistance for all high school students registered in the Summer Session.
201 Wesbook Hall, 626-1666

HOUSING

Minneapolis campus. Housing is available for 1994 Summer Session students in two residence halls on the Minneapolis campus: Middlebrook and Comstock Halls. Middlebrook is a coeducational, air-conditioned residence on the West Bank. Nearly all rooms are doubles (very limited number of singles). Comstock Hall is a coeducational, air-conditioned residence on the East Bank. Both single and double rooms are available at Comstock.

A seven-day per week (21 meals) food service program is part of the Summer Session contract. Nutritious, well-balanced meals are planned, prepared and served under the supervision of food specialists in dining areas located within the halls. All meals are served on an all-you-can-eat basis (except for some special menu items).



St. Paul campus. A limited number of spaces for Summer Session students are available in Bailey Hall. Bailey accommodations are in air-conditioned double rooms. Bailey summer residents without meal service should apply for commuter meal contracts through the St. Paul Dining Center.

Application for housing. Application forms will be sent upon request. They are contained in an informational brochure that provides detailed information about policies, procedures, and specific halls. The summer housing contract is not available until early April each year. Prior to April, all applicants requesting the contract are placed on a mailing list and the contract is sent when available.

Guest housing. Short-term residence hall accommodations for students taking short courses or visitors with University-related business or activities are available on a limited basis.

Off-campus housing in private residences is maintained by the Division of Off-Campus Housing. During the past several years, over 7,000 rental units have been listed. Listings are available in Comstock Hall East and, during the summer months, in 190 Coffey Hall on the St. Paul campus.

Housing Services Office
Comstock Hall East
210 Delaware St. S.E.
Minneapolis, MN 55455
624-2994

LEGAL AID

Civil Practice Clinic
190 Law, 625-5515

University Student Legal Service
Includes notary service.
160 West Bank Union, 624-1001

LIBRARIES

The University of Minnesota Twin Cities Libraries, with a collection of more than five million cataloged volumes, ranks among the largest in American university library collections. In addition to books and periodicals, the libraries have substantial holdings of archives, audiovisuals, government documents, manuscripts, maps, microforms, scores, and other material. The core collections are located in more than 19 separate locations, directly supporting the curriculum and serving as the foundation for research.

• **Wilson Library, West Bank 624-3321**—Collections in humanities and the social sciences are concentrated in Wilson Library, including American studies, anthropology, area studies, art, business, economics, film, geography, history, language, literature, philosophy, political science, religion, sociology and women's studies. Wilson also houses the Ames Library of South Asia; the East Asian Library; the Middle East Library; Government Publications Library; and Map Library.

• **Walter Library, East Bank 624-3366** Holds collections in education, library science and psychology. Walter also houses the *Science & Engineering Library* which contains collections in chemistry, engineering, geology and physics.

• **St. Paul Central Library, St. Paul 624-2233** Collections in agriculture, applied economics, applied statistics, biotechnology and biological science, design, home economics, housing and apparel, family social sciences, food science and nutrition, rural sociology, textiles, and vocational/technical education.

• **Bio-Medical Library, Diehl Hall 626-5653**—Collections in allied health, dentistry, medicine, mortuary science, nursing, pharmacy and public health.

Related Subject Collections

• **Architecture**—160 Arch Building 624-6383

• **Biochemistry**—406 Biological Sciences Center, St. Paul campus 624-1292

• **Entomology, Fisheries & Wildlife**—375 Hodson Hall, St. Paul campus 624-9288

• **Forestry**—B50 Natural Resources Admin. Bldg., St. Paul campus 624-3222

• **Journalism (Sevareid Library)**—121 Murphy Hall 625-7892

• **Law**—Law Center, West Bank 625-4300

• **Mathematics**—310 Vincent Hall 624-6075

• **Music**—70 Ferguson Hall 624-5890

• **Plant Pathology**—395 Borlaug hall, St. Paul campus 625-9777

• **Veterinary Medicine**—450 Veterinary Science, St. Paul campus 624-4281

Archives and Special Collections

• **Andersen Horticultural Library**—3675 Arboretum Dr., Chanhassen 443-2440

• **Charles Babbage Institute Archives**—102 Walter Library 624-5050

• **James Ford Bell Natural History Library**—462 Wilson Library 624-1528

• **Children's Literature Research Collections (Kerlan)**—109 Walter Library 624-4576

• **Manuscripts Divisions**—826 Berry St., St. Paul 627-4199

• **Social Welfare History Archives**—101 Walter Library 624-6394

CAMPUS SERVICES & RESOURCES

- Special Collections and Rare Books—466 Wilson Library 624-385
- University Archives—10 Walter Library 624-0562
- Wangenstein Historical Collection (medical)—568 Diehl Hall 626-6881

LUMINA

LUMINA (Libraries of the University of Minnesota Integrated Network Access) serves as the major access point for the University Libraries' collections. To connect to LUMINA, call 625-6009. For hardware or software problems, call 626-2272. LUMINA is accessible from any of more than 70 public terminals available throughout the University Libraries; access is also possible from the Academic Computer Services and Systems laboratories located throughout the Twin Cities campus.

Specialized Services

Includes library instruction, computer-literature searching, inter-library borrowing and photocopying. *Circulation* information is available from any library circulation unit. *Library hours* are available by calling 624-4552.

MINORITY STUDENT SERVICES

Martin Luther King Program. Specifically designed to serve the needs of minority students enrolled in CLA. 19 Johnston Hall, 625-2300

Minority and Special Student Affairs, Office for (OMSSA)

Provides minority and special students with a wide range of support services including counseling, tutoring and cultural programs. Room 310, 1901 University Ave. S.E. (Mpls), 625-9556

OMSSA Learning Resource Centers:

- African American
323 Walter Library, 625-1363
- American Indian
125 Fraser Hall, 624-2555
- Asian/Pacific American
306 Walter Library, 624-2317
- Chicano/Latino
332 Walter Library, 625-6013

Project Technology Power.

Assists African-American, Native American, and Chicano/Latino students who are enrolled in the Institute of Technology with counseling, career and educational planning, registration and tutorial services. 339 Walter Library, 626-0219.

MUSEUMS AND GALLERIES

The new **Frederick R. Weisman Art Museum**, anchoring the east end of the Washington Avenue bridge, holds the University's permanent collection (strength: American paintings and graphics). Special exhibitions are held throughout the year. Call 625-9494 for more information and summer hours.

The Bell Museum of Natural History, located at 17th St. and University Ave. S.E., provides exhibits and educational programs for the University community and the public. Special emphasis is on Minnesota wildlife. Includes an excellent bookstore. Summer hours: 9 a.m. - 5 p.m. T-F; 10 a.m. - 5 p.m. Sat.; noon - 5 p.m. Sun. No admission charge for registered University of Minnesota students. Call 624-1852.

Art Galleries. Call for current exhibit information.

- Goldstein Gallery, 241 McNeal Hall, St. Paul Campus, 624-7434, 624-9700.
- Larson Gallery, St. Paul Student Center, 625-0214.
- Coffman Gallery, third floor, Minneapolis Student Union, 625-7666.
- Katherine E. Nash Gallery, lower concourse, Willey Hall, West Bank, 624-7530.

PARKING

Parking is available at various facilities on and near the campus. Hourly rate facilities and meters are a good choice for visitors or anyone needing short term parking. Daily rate facilities (which charge a daily, set fee that you pay when you enter) are the best choice for students needing more than short term parking. For more information—including maps, parking for disabled persons, and economical carpool parking, call Parking Services at 625-6566 or 626-PARK.



RECREATIONAL SPORTS

Indoor and outdoor facilities for swimming, running, weight-lifting, golf, tennis and many other activities through an open recreation program. Fitness programs, such as aerobic dance classes, are also offered — usually at reduced rates for students. For information call:

101 Cooke Hall, 625-6800
104 St. Paul Gymnasium, 625-8283

REGISTRAR

Registration Centers. For turning in registration materials, cancel/add materials, scholarships; obtaining fee statements; processing payroll deductions.

- 202 Fraser Hall, Minneapolis
 - 130 Coffey Hall, St. Paul
- Monday 9 a.m. - 4 p.m.; Tuesday - Friday 8 - 4 (On Mondays, May 23, June 14, and July 21 the registration centers will be open 8 a.m.-5:30; on other Mondays limited service will be available at 150 Williamson Hall until 5:30 p.m.)

Student Services

- 150 Williamson Hall, Minneapolis
- Transcript Service, 624-4115*
Student Relations, 625-5333
ID Cards, 625-9357
- Monday 9 a.m.-5:30 p.m.; Tuesday-Friday 8-4 (May 23, June 14, July 21: 8 a.m.- 5:30 p.m.)
- 130 Coffey Hall, St. Paul
- 624-3731

Monday a.m.-4 p.m.; Tuesday-Friday 8-4 (May 23, June 14, July 21: 8 a.m.-5:30 p.m.)

Transcript Service — For regular service for official transcripts (\$3 charge), rush service for official transcripts (\$9 charge), and for unofficial copies of student records (limit one per day, no charge).

Student Relations — For assistance with individual student record problems, questions; registration services for students with mobility impairments; address changes; certification letters; Veterans certification (190 Coffey Hall in St. Paul); student loan deferments; turning in Application for Degree forms and Application for Change of College or Status forms. For obtaining maps and miscellaneous publications and information.

ID Cards — (Minneapolis only) For obtaining new student ID cards; name changes; lost student ID cards turned in.

Student Access System

You may view your academic record using the new, on-line Student Access System on the Gopher Information Server (under Office of the Registrar on the University of Minnesota Campus Information menu). This system consists of the following screens that retrieve information from the Student Data Base, which is the source of information on your transcript:

- The *Basic Student Record*

Information screen contains information on your address, college, major and advisor, total credits earned, and GPA. Any holds on your record are also displayed, along with addresses for clearance of those holds.

- The *University Day Coursework and Grades* screen contains information on your day school registrations on a quarter by quarter basis.
- The *CEE and Transfer Coursework and Grades* screen contains information on your registrations through Continuing Education and Extension and on work transferred to the University from other institutions.

To use the system, you will need to enter your student ID number or social security number, and enter your birthdate as your password. You can then change your password using the *Password Change* screen.

STUDENT ACCOUNTS RECEIVABLE

For obtaining refunds and fee payment verifications, receiving assistance with student billing problems or questions. **NOTE:** a picture ID is required for service.

20 Fraser Hall, Monday-Friday, 8 a.m.-3:30 p.m., 625-8500
107 Coffey Hall, St. Paul, Monday-Friday, 8 a.m.-2 p.m., 625-8102





CAMPUS SERVICES & RESOURCES

STUDENT UNIONS

All Twin Cities campus students, through payment of the student services fee, become members of the University of Minnesota Student Union providing intellectual, cultural, social and recreational services, programs and activities for the University community. Three union buildings—two on the Minneapolis campus and one in St. Paul—provide students with a place to relax, meet with friends, enjoy a snack, buy supplies, or study.

Minneapolis Student Unions. Minneapolis Student Unions provide a variety of public lounges and event/meeting rooms in Coffman Memorial Union and West Bank Union. In Coffman Memorial Union you will find many convenient services and products: an Information Desk, a Service Center providing postal services and sale of MTC passes and entertainment discount tickets; a newstand; ATM services; *Copies on Campus*; several cafeteria and fast food counters; *Golden Razor*; and *Federal Credit Union*.

Additionally, you will find student organization offices, the *Gopher Game Room*, and an arts/crafts workshop, *The Studio*. At the West Bank Union, the Skyway Service Center sells convenience store items and the administrative office provides campus information. A full schedule of summer concerts and films is offered in both buildings.

• *Coffman Memorial Union (East Bank)*; Information Desk: first floor, 625-4177

• *West Bank Union*, Office: 130 WBU Skyway, 624-5200

St. Paul Student Center. The St. Paul Student Center strives to provide a comfortable "home while on campus" atmosphere. The Center contains lounges, meeting rooms, the Larson Art Gallery, bowling, billiards, pingpong and a ballroom. Recreational, cultural, and educational programs are offered throughout the summer. The information booth sells snacks, candy, MTC bus passes and movie and entertainment discount tickets. Other features include: the *Terrace Cafe*, serving breakfast, lunch and snacks with indoor and outdoor seating; ATM and check cashing services; the St. Paul Bookstore; the *Outdoor Store*, which sells and rents outdoor gear, canoes, tents and camping equipment; and *Copies on Campus* offering copies and self-service word processing. Minneapolis students are cordially invited to take Intercampus Bus 13 direct to the St. Paul Student Center, where they will find a friendly place to spend their summer hours. Call 625-7200 for hours and information.

SUMMER SESSION OFFICE

For general information, help or referral on all summer session concerns.

135 Johnston Hall, 624-4000

SPECIAL PROGRAMS



Make your summer special!

SUMMER STUDY ABROAD

THE GLOBAL CAMPUS

Institute of International Studies and Programs

The most frequently chosen study abroad programs are those offered by the Global Campus. Each program abroad is offered in collaboration with an academic department, faculty and foreign institutions in order to combine academic study with a cross-cultural learning experience in a foreign environment.

The Global Campus study abroad programs vary in length, focus and discipline and include traditional intensive and integrated language programs, academic field study and theme programs for non-language majors. For more information go to the Global Campus office, 106-BA Nicholson Hall, or call 612/626-3379.

Art in China

Courses in Chinese painting and woodblock printing are offered at the Zhejiang Academy of Fine Arts in scenic Hangzhou, south China. You will take frequent excursions off campus to observe Chinese natural and cultural landscapes. Mid-June to late July. Earn 6 credits. Information on graduate credit is available. Cost: \$2,900 covers tuition, fees, room and meals, excursions and four-day tours of Beijing and Guilin.

Airfare, independent travel, and personal expenditures are extra. Eligibility: one year of professional or university-related art experience. Application deadline: March 1. Application fee: \$40.

Chinese in Tianjin

First through third year Chinese classes and elective courses in history, literature, and fine arts, taught in English. Located at Nankai University in Tianjin, China. Earn up to 16 credits. Mid-June to mid-August. Cost: \$2,995 covers tuition, housing in the foreign student dormitory, meals, fees, four-day tour of Beijing and excursions. Airfare, personal expenditures, and independent travel are extra. Eligibility: program language level will be determined by previous course work in Chinese or the equivalent Chinese proficiency level. Application deadline: March 1. Application fee: \$40.

International Program in Toledo, Spain

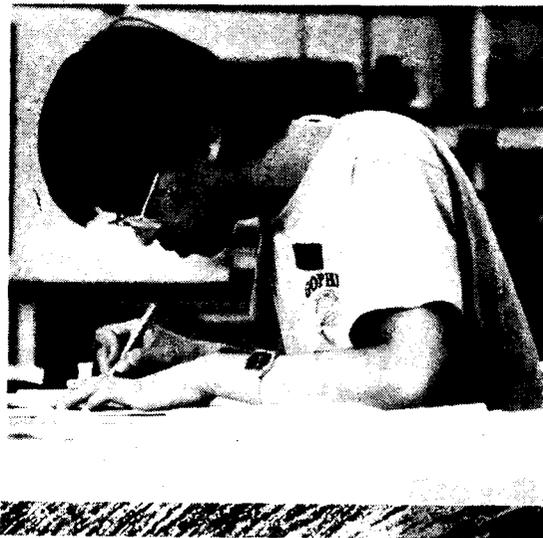
A theme program offering courses in anthropology and archaeology, art history, culture, economics, geography, history, interdisciplinary studies, linguistics, literature, political science and Spanish language. 9-14 credits. Located at San Juan de la Penitencia, Toledo, Spain. June 15 to July 27. Cost: \$2,990 covers tuition, fees, room and board, one-day excursions and medical insurance. Personal expenditures

and airfare are extra. Eligibility: the Summer Session requires one year of college-level Spanish or the equivalent. Application deadline: April 15. Application fee \$40.

Summer Program for Teachers of Spanish

A language/theme program with courses specifically designed for Spanish teachers of grades K-12, foreign language education, ESL, bilingual education, as well as college language instructors and graduate students. May fulfill graduate level credits for recertification. The program's common theme of contemporary Spanish society and culture is divided into four areas of study: culture and society, language development, language and culture: classroom applications and independent research. 9 - 13-1/2 quarter credits (6-9 semester credits). July 3 - August 5. Cost: \$4000 covers tuition, fees, room

Join people
from all over
the world on
campus this
summer.



SPECIAL PROGRAMS

STUDY ABROAD

and board in Madrid, medical insurance and excursions (the cost to recipients of the King Juan Carlos Fellowship is \$2400). Personal expenditures, airfare, and Sunday meals are extra. Eligibility: placement in Language Development and Independent Research courses is dependent on participant's intermediate Spanish proficiency level according to ACTFL guidelines. Application deadline: April 1. Application fee \$50.

Spanish in Venezuela

Beginning to advance language, literature and culture coursework, plus the experience of living with a family in Merida in the heart of the Andes. Two summer sessions are available: May to June and June to August. Eligibility: 2.5 GPA. Application fee: \$40. Contact Global Campus for more information.

Anthropology in Belize

This five-week field school will introduce you to archaeological fieldwork, including excavation, survey, recording procedures, and laboratory analysis in Cerros, an unpopulated peninsula in Belize, Central America. Accommodations will be in thatched casitas at a small lodge about two miles from the site. Earn 5-8 credits. Early July to early August. Application deadline: March 15. For information on eligibility, registration and fees, contact: Professor Debra Walker, Department of Anthropology, 215 Ford Hall, 625-7347.

Interior Design in Europe

The design of interiors, architecture and decorative arts in relation to the culture in which it occurs. Site visits to London, Paris, Luxembourg/Trier, and Florence. Led by Denise Guerin, associate professor of interior design. Earn 8 credits. June 15 - July 4. Cost: \$3,500 covers tuition, lodging, and continental breakfasts, Eurail Youth Flexipass, all ground transportation and entrance fees, special seminars and four group dinners. Airfare, personal expenditures, and independent travel are extra. Eligibility: contact Professor Guerin, Department of Design, Housing, and Apparel. Application deadline: March 14. Application fee: \$40.

Archaeological Fieldwork in Greece

Field Study. The following courses are offered: ArtH 5120 and Clas 5120: Field Research in Archaeology. Strongly recommended to prepare for this program is the Practicum in Field Techniques (CICv 3340 or Clas 5340) offered spring term on campus. 4-8 credits. Located in Western Peloponnesos; Kyparissia, Messene and Pylos, Greece. Mid-June to late August, three-four weeks at each site. Cost: \$750 covers up to 6 credits, study abroad, housing, meals and fees. Airfare and all personal expenditures are extra. Eligibility: preference given to students registered in spring quarter practicum. Application deadline: To insure full consideration, applications must be received by

February 15. Contact: Department of Classical and Near Eastern Studies, 625-5353.

SPAN (Student Project for Amity Among Nations)

College of Liberal Arts

SPAN is a consortium of 19 Minnesota colleges and universities that send students to countries around the globe each summer to undertake individual research. Students apply a full year in advance and begin their preparation during the academic year prior to their summer project. Twelve credits are awarded at the completion of the research project. For information about the 1995 program, come to the SPAN office in 107 Nicholson Hall or call 626-1083. During the summer of 1994 students will study in Australia, Ireland, Mexico, and Pakistan.

SUMMER LANGUAGE INSTRUCTION

College of Liberal Arts

Instruction in 14 languages will be offered this summer. Ten-week "intensive" courses enable you to take the equivalent of one year of language (15 credits) in one summer.

AMERICAN INDIAN (Amln)

Term I

3024 Intermediate Ojibwe

S P E C I A L P R O G R A M S

LANGUAGE INSTRUCTION

CHINESE (Chn)

Term I
1011-1012-1013 Beginning Modern Chinese (10-week intensive)

DUTCH (Dich)

Term I
1101-1102-1103 Beginning Dutch (10-week intensive)

FRENCH (Fren)

Term I
1101 Beginning French
1102 Beginning French
1103 Beginning French
1101-1102-1103 Beginning French (10-week intensive)

1104 Intermediate French
1105 Intermediate French
1104-1105-1106 Intermediate French (10-week intensive)
3015 French Composition and Conversation

Term II
1102 Beginning French
1103 Beginning French
1105 Intermediate French
3016 Advanced French Composition and Conversation

GERMAN (Ger)

Term I
1101 Beginning German
1103 Beginning German
1101-1102-1103 Beginning German (10-week intensive)

1104 Intermediate German
1106 Intermediate German
3011 Conversation and Composition

Term II
1102 Beginning German
1104 Intermediate German
1105 Intermediate German
3012 Conversation and Composition

GREEK (Grk)

Term I
3001 Beginning Classical Greek: Accelerated

HEBREW (Hebr)

Term I
1101-1102-1103 Beginning Hebrew (10-week intensive)

ITALIAN (Ital)

Term I
1104 Intermediate Italian
1101-1102-1103 Beginning Italian (10-week intensive)
Term II
1105 Intermediate Italian

JAPANESE (Jpn)

Term I
1011-1102-1103 Beginning Japanese (10-week intensive)

LATIN (Lat)

Term I
3001 Beginning Latin (5-week intensive)

NORWEGIAN (Nor)

Term I
1101-1102-1103 Beginning Norwegian (10-week intensive)

PORTUGUESE (Port)

Term I
1001-1102-1103 Beginning Portuguese (10-week intensive)

RUSSIAN (Russ)

Term I
1101-1102-1103 Beginning Russian (10-week intensive)
1104-1105-1106 Intermediate Russian (10-week intensive)

SPANISH (Span)

Term I
1101 Beginning Spanish
1102 Beginning Spanish
1103 Beginning Spanish
1101-1102-1103 Beginning Spanish
1104 Intermediate Spanish
1105 Intermediate Spanish
1106 Intermediate Spanish
1104-1105-1106 Intermediate Spanish (10-week intensive)

Term II

1102 Beginning Spanish
1103 Beginning Spanish
1104 Intermediate Spanish
1105 Intermediate Spanish
1106 Intermediate Spanish

ULPAN HEBREW LANGUAGE COURSE

College of Liberal Arts

June 14 - August 24

The Ulpán is a unique approach to teaching Hebrew. Developed in Israel at a time when a large adult immigrant population needed to acquire a working knowledge of Hebrew rapidly, the Ulpán was designed to create teaching techniques and instructional materials. The practical goal was to enable adults of widely differing educational experiences and abilities, as well as diverse linguistic backgrounds, to quickly make a linguistic and cultural adjustment to a new environment.

The Ulpán Hebrew language course offered this summer will extend over both terms and run June 14 through August 24. It will provide intensive study of the language as well as learning experiences in Israeli culture. The program is designed for individuals who have not previously studied Hebrew. You will spend 15 hours per week in class during the 10 weeks. In addition to normal class sessions, special learning activities that involve natural and spontaneous use of Hebrew will include games and sports activities, Israeli folk dancing and singing, meeting with delegates of Israeli students from Rishon le'Tzion, and sessions with Israeli artists, musicians, and other professionals. Register for Hebr 1101-1102-1103.

For further information, write Classical and Near Eastern Studies, 330 Folwell Hall, University of Minnesota, 9 Pleasant St. S.E., Minneapolis, MN 55455, or call 625-5353.

"Summer in the City" 1994

General College

Experience short courses (two-three weeks) that combine the richness of a teaching college with first-hand knowledge of the Twin cities. **Open to all students.**

General Arts (GC 1311). June 14 - July 1. Del Adamson. Art in the Twin Cities. Visit galleries, museums, theatres, Minneapolis Sculpture Garden, and other places where art is found.

Cultural Anthropology (GC 1285). June 14 - July 1. Fred Johnson. This course will focus on Twin City area cultural groups based on ethnicity, class, and deviance.

Violence in the Family (GC 1728). June 14 - July 1. Sander Latts. Through lectures and visits to several social agencies, this course will focus on the various forms of violence found in the family.

Nature Study (GC 1133). July 5 - 19. Jay Hatch. Visit Pig's Eye Heron Rookery, Minnesota River Valley Wildlife Refuge, Cedar Creek Natural History Area, Wolsfeld Woods, and many other Twin Cities natural history areas where you will learn how to observe and identify trees, wild flowers, insects, birds, and other wildlife.



Notable Guest Professors

Want a course with a different perspective? Consider these...

AmSt 3252 - American Popular Culture, 1960 to 1945. Term II. Noted Italian scholar, Professor Giuhana Muscio, who is currently on the faculty of the Film Studies and Journalism Department of the University of Padua and was a visiting professor last summer at UCLA, will teach about our popular culture from a non-American vantage point. Expect to be confronted with an imaginative, original interpretation that compares American pop culture with Europe and Italy.

Pol 3477 - Middle Eastern Government and Politics. Term II. Taught by Professor Kemal Kirisci from Bogazici University in Istanbul, Turkey (this is an English speaking university where all courses are taught in English). Here is a wonderful opportunity to learn about this critical region of the world from the perspective of someone who lives virtually on the bridge between east and west.

Summer Entertainment on Campus

MUSIC

Big bands, jazz, upbeat classics — all kinds of music and entertainment events — make the **Summer at Northrop Festival** a campus highlight each year. Events run from mid-June through August. Most are free and performed outdoors on the Northrop Plaza during the noon hour so you can enjoy them during lunch. This lively festival is presented by the Summer Session office.

Watch for schedules of the Summer at Northrop events. Calendars are available during the first week's events on the Northrop Mall or may be picked up in June at the Northrop Ticket Office, 105 Northrop Auditorium.

In addition to free events, the Summer at Northrop Festival occasionally presents special concerts and performances by renowned artists. Call the Northrop Ticket Office at 624-2345 for more information.

THEATRE

This summer, while the University Theatre's Mississippi River paddleboat, the Minnesota Centennial Showboat, undergoes renovation, the theatre will produce a play in Rarig Center featuring "The Showboat Players." Audiences will enjoy entertainment in the spirit of the Showboat. Call 625-4001 for regular ticket information and reservations. A limited quantity of free tickets are available to students registered in Summer Session. Call 624-3555 for information about complimentary tickets.

STUDENT UNION PROGRAMS

The Minneapolis Student Unions and the St. Paul Student Center offer a wide variety of free recreational and cultural entertainment throughout the summer — films, music, speakers and special events.

For more information about Coffman programs call 625-4177; for West Bank programs call 624-5200; for St. Paul programs call 625-7200.

FILM

Outstanding films from around the world are shown on campus by the University Film Society. Nightly plus weekend matinees. For information call 627-4430.

Enjoy!



SPECIAL PROGRAMS

LAKE ITASCA FORESTRY AND BIOLOGICAL STATION

LAKE ITASCA FORESTRY AND BIOLOGICAL STATION

Opportunities for Summer Research and Field Study

The University of Minnesota's Lake Itasca Forestry and Biological Station is situated on Lake Itasca in Itasca State Park—just a mile from the headwaters of the Mississippi River and about 20 miles north of Park Rapids in northwestern Minnesota. Located in an ecological area of national renown, it is also one of the nation's oldest and largest field stations.

Facilities include comfortable cabins, a large assembly/dining hall, reference library, 12 labs in six academic buildings, and varied research, classroom and study areas. Much of the instruction takes place in the field; many varied habitats are within walking distance of the station. Boats and canoes are available for classes and personal use. The setting lends itself to establishing good, long lasting friendships.

ITASCA BIOLOGY SESSION

College of Biological Science

Term I — June 14 - July 19

Term II — July 21 - August 24

Undergraduate students will benefit from study of biological systems in this unique ecological laboratory where species and processes are observed in their natural setting. The exposure to the variety of habitats and ecosystems available at Itasca, the opportunity to take courses and to study under the direction of senior faculty of the University of Minnesota and visiting faculty from other universities, and the opportunity to interact with undergraduate peers and with graduate students and researchers adds to the learning experience.

Graduate students at all stages of study find in the Itasca field biology station a unique and protected environment able to provide the basic materials for study and research. The variety of courses available in both terms allows the student to choose an entire summer of intensive work in a particular field of interest or to select a course from one of the two terms of summer study. Graduate students who elect to devote themselves to research problems will find well-equipped and maintained laboratories.

Teachers and professional biologists can pursue advanced study or can use summer field study as a time for professional renewal and enhancement. Short courses allow for flexibility and in-depth study of a specialized topic at Itasca.

Independent investigators may pursue research in various fields of terrestrial and freshwater biology during any season. To initiate research projects and to use the excellent laboratories, an application must be made to the Resident Biologist.

The program

You may register for 3-10 credits per term. Most courses meet two days a week from 8 a.m. - 5 p.m. For complete descriptions of the courses listed below, look in the department listings under Biology (Biol), Ecology, Evolution, and Behavior (EEB), Neuroscience (NSc), and Plant Biology (PBio).

Term I

Biol 1806 - General Zoology
Biol 3811 - Intro. to Animal Behavior
Biol 5816 - Field Biology Photography
Biol 5850 - Special Topics in Biology
Sec. 1: Aquatic Ecology
Biol 5890 - Research Problems at Itasca
EEB 5834 - Field Ornithology
EEB 5839 - Field Studies in Mammalogy
NSc 5100 - Introductory Neurobiology Laboratory at Itasca
PBio 5801 - Plains and Boreal Flora

Term II

Biol 3812 - Plant Biology
Biol 5841 - Ecology
Biol 5850 - Special Topics in Biology
Sec. 2: Behavior/Telemetry

Sec. 3: Measurements of Plant Environments

Biol 5890 - Research Problems at Itasca

EEB 5817 - Vertebrate Ecology

EEB 5852 - Ecological Genetics

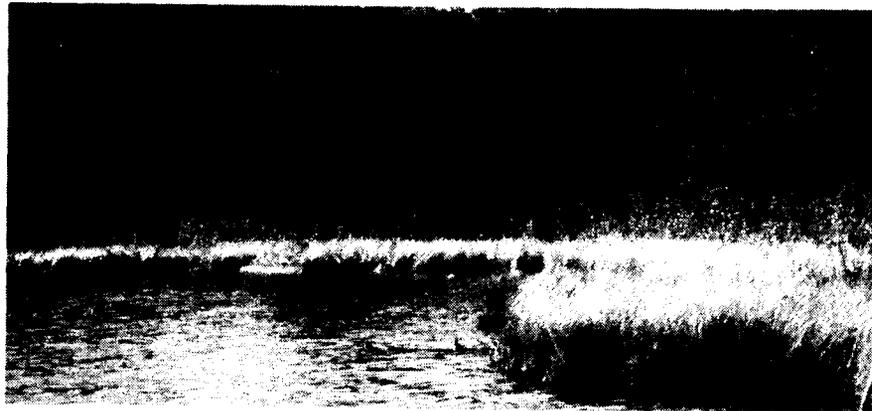
NSc 5550 - Itasca Cell and

Molecular Neurobiology Laboratory

Itasca Biology requires special registration forms. For instructions and complete information about the program, accommodations, costs, etc. contact the Summer Session office,

135 Johnston Hall, Minneapolis, MN 55455; 612/624-3555, or the Itasca Biology Program office, 303 Ecology Building, 1987 Upper Buford Circle, St. Paul, MN 55108; 612/624-6743.

For more information about Itasca neuroscience, contact the Neuroscience Program office, 295 A5 Vet/Med, 1988 Fitch Ave., St. Paul, MN 55108; 612/625-1715.



ITASCA FORESTRY SESSION

College of Natural Resources

August 24 - September 17

The program

With an emphasis on field study, 80 percent of your time will be spent in the forests and on the waters of Itasca Park and surrounding areas. Depending upon your interests, major and academic status, you may select one of three program options: Forestry, Fisheries and Wildlife, or a Graduate Student Practicum.

For complete descriptions of the courses listed below, look under the department listings for Fisheries and Wildlife (FW) and Forest Resources (FR).

- **Forest Resources.** Open to all qualified students and required of students in the Forest Resources, Urban Forestry and Renewable Resource Science curricula. Students enrolled in the Natural Resources and Environmental Studies major may use this session to satisfy the NRES 3050 requirement.

FR 3100 - Minnesota Plants

FR 3101 - Northern Forest Ecosystems

FR 3106 - Important Plants in Fisheries and Wildlife Habitats

FR 3201 - Field Forest Measurement

FR 5160 - Practicum in Forest Biology and Measurements

- **Fisheries and Wildlife.**

Required of Fisheries and Wildlife majors.

FW 3600 - Fisheries and Wildlife Field Techniques

- **Graduate Student Practicum.**

Graduate students may enroll in undergraduate courses. They may alternatively enroll in FR 5160 - Practicum in Forest Biology and Measurements.

Itasca Forestry requires special registration forms. For instructions and complete information about the program, accommodations, costs, etc. contact the Itasca Forestry Program office, 135 Natural Resources Administration, 2003 Upper Buford Circle, St. Paul, MN 55108; 612/624-6768.

NEW AT ITASCA—

Biol 3025 - Recombinant DNA Laboratory. This new program at Itasca, June 12 - July 1, offers a small group of undergraduate students an unparalleled opportunity to intensively study basic recombinant DNA techniques. The laboratory emphasizes methods for growing, isolating, and purifying recombinant DNAs and cloning vectors. A special application is required. For more information contact Linda Daghestani at 625-2275.

SPECIAL PROGRAMS

FIELD ECOLOGY

College of Natural Resources

August 20 - September 14

NRES 3051 - From Tall Grass Prairies to Boreal Forests

In this three week traveling field course you will be introduced to both pure and applied aspects of the ecology of the three major biomes of the region: prairies, boreal forests, and eastern deciduous forests. You will also execute, analyze, and present ecological research in group and individual projects. Field locations include Voyageurs National Park, Itasca State Park, Porcupine Mountains State Park, and the Cedar Creek Natural History Area. Experts from several fields will assist in teaching the course. This 4 credit course satisfies requirements for NRES 3050 and 1 credit of NRES 3001 Colloquia. Instructor: Michael Walters, Department of Forest Resources, is a forest ecologist whose research interests include forest succession and old growth forests in the lake states and disturbance ecology in the Amazon Basin. Course fee \$150 for meals and lodging at the various sites. *For more information contact Marni Lucas, 135 Natural Resources Administration, 2003 Upper Buford Circle, St. Paul, MN 55108; 612/624-6768.*

FIELD GEOLOGY

Institute of Technology

June 13 - July 22

Fieldwork in geologic mapping (Geo 5111) will be conducted in the Sawatch Mountains near Gunnison, Colorado. The course is restricted to geology, geophysics or geo-engineering majors who have satisfactorily completed Geo 5201. A major paper is required after completion of field work. Instructor's permission is required for registration.

INTERNSHIPS

Career experts agree that students should obtain work-related experience before graduating. Want a summer internship for academic credit, but don't know how to go about it? A new course, ID 3211 "Internship: Interdisciplinary Perspectives on Work," enables you to **earn credit, work at an internship in a business, government, or non-profit setting, and study issues related to work and careers.** Most internships offer some compensation. A separate application is required by **May 15** at the Office for Special Learning Opportunities (OSLO), 220 Johnston Hall, 624-7577.

SUMMER EXTENSION PROGRAMS

University Education and Extension

Evening Extension Classes. Many evening classes, originating in the standard curricula of most academic departments, are offered during the same dates as Summer Session. Also offered are several special and noncredit programs. Watch for the Summer Evening Extension Classes bulletin, available in April. For more information contact Extension Classes, 101 Westbrook Hall, 77 Pleasant St. S.E., Minneapolis, MN 55455; or call 612/625-3333.

Independent Study. When you cannot attend classes on campus, you can select from more than 450 correspondence or media-assisted courses. For more information contact Independent Study, 45 Westbrook Hall, 77 Pleasant St. S.E., Minneapolis, MN 55455; or call 612/624-0000.

Noncredit programs for professionals. Noncredit educational programs for a wide variety of professional groups—conferences, symposia, short courses—are offered throughout the summer by the department of Professional Development and Conference Services (PDCS), which plans and conducts such programs in collaboration with the academic units of the University. For more information contact PDCS, 131 Nolte Center, 315 Pillsbury Drive S.E., Minneapolis, MN 55455; or call 612/625-6616.

SPECIAL PROGRAMS

HIGH SCHOOL STUDENTS

PROGRAMS FOR HIGH SCHOOL STUDENTS

Each summer, the University of Minnesota presents opportunities for high school students who want to explore challenging subjects within a college setting. What is best about these summer programs? The answers are as diverse as the students who attend. Former participants said they liked just about everything: the intellectual stimulation of the courses; the fun of living in a residence hall and experiencing college life; meeting new friends; and getting to know their professors.



SUMMER HONORS COLLEGE

Twin Cities Campus
College of Liberal Arts

June 15 - July 1

Summer Honors College offers high ability high school students a chance to briefly experience the intellectual, cultural, and social environment of a university campus.

You live in a residence hall and study with some of the finest University faculty, selecting two of the many specially designed 2 credit courses. Sample course titles for this year include: "Practical Problem Solving through Fantasy", "What is a Number?", "Quarks and Quasars-20th Century Physics", "The United States in the 1950s", and "Images of Asian Americans in Print and Film." The program includes visits to local entertainment and cultural attractions. Cost: \$535

Eligibility: You must have completed your sophomore or junior year of high school and rank in the upper 20 percent of your class.

For more information and to register, contact Carol Ann Dickinson, Summer Session, 135 Johnston Hall, University of Minnesota, Minneapolis, MN 55455; 612/624-9898.

HIGH SCHOOL SUMMER SCIENCE RESEARCH PROGRAM

Twin Cities Campus
College of Biological Sciences

June 13 - August 5

In this program you will work in the laboratory of a faculty mentor on a research project (you may select the project of your choice in advance). You will write a scientific research paper and present your results at the

Research Symposium at the end of the summer. Areas to be researched include: ecology, microbiology, genetics, cell biology, plant biology, biochemistry, soil science, food science, horticulture, plant pathology, entomology, veterinary medicine, environmental science, forestry, and fish and wildlife biology. This program is for commuters only. *Estimated cost: your transportation.*

Eligibility: you must be between your junior and senior year and have high academic achievement, interest in research, completion of a course in biology, chemistry and algebra 2, and recommendation of a science teacher. -Scholarships: each student will receive a stipend of \$1200. Application deadline is March 11, 1994.

For more information and to apply, contact Bill Ganzlin, College

SPECIAL PROGRAMS

HIGH SCHOOL STUDENTS



of Biological Sciences, University of Minnesota, 223 Snyder Hall, 1475 Gortner Ave., St. Paul, MN 55108; 612/624-9717.

SUMMER SCHOLARS PROGRAM

Morris Campus

July 10 - July 22

The Summer Scholars Program at University of Minnesota, Morris, is designed to offer scholastically talented high school students an intellectually challenging and socially rewarding college-level experience. You join with students from throughout the Upper Midwest for two weeks on the UMM campus to engage in stimulating dialogue, get a taste of campus life and to earn college credits. You select one of two interdisciplinary courses. "Human Reproduction and Biotechnology: Tinkering with Nature" focuses on the biological, philosophical, and historic issues associated with genetic alteration.

The other course, "Growing Up American," examines through literature, history, and film the experience of growing up in twentieth century America. *Cost: \$325.*

Eligibility: You must have just completed your junior year and rank in the upper 20 percent of your class. In addition, "Human Reproduction" requires one year of high school biology; "Growing Up American" requires two years of high school English and one year of US history.

For more information and to register, contact the Office of Continuing Education and Summer Session, 231 Community Services Building, University of Minnesota-Morris, Morris, MN 56267; 612/589-6450.

Other Special Programs

In addition to those cited above, the University sponsors a large number of other special programs for pre-college students. Call the Summer Session office at 612/624-3555 and ask to receive our 1994 booklet which describes these various programs.

Regular Courses

In the Summer Session, introductory, 1000-level courses are generally open to high school students who have completed the 10th grade and rank in the top 20 percent of their class. For more information about registering for regular college courses, see "Special Instructions for High School Students" in the Registration section of this bulletin.

ITASCA FIELD BIOLOGY ENRICHMENT PROGRAM

Lake Itasca Forestry and Biological Station

College of Biological Sciences

June 15 - 30

The Itasca Field Biology Enrichment Program is a residential program held at the University of Minnesota's Forestry and Biological Station in Itasca State Park. You live in on-site cabins during the two-week program. The goal of the program is to introduce you to a wide range of experience in the field of biology in general, and more specifically, to involve you in the methods of science. You will gain the kind of "hands-on" experiences with plants and animals in a field setting that is possible only at an outstanding facility such as the Itasca Station. Examples of field study include mammalogy, animal behavior, forest ecology, aquatic biology, plant biology and biophotography. *Cost: \$565.*

Eligibility: You must have completed grades 10, 11 or 12, including a high school biology course, have an interest in science, and have a "B" average in the most currently recorded school term. Application deadline is May 13.

For more information and to apply, contact Bill Ganzlin, College of Biological Sciences, 223 Snyder Hall, St. Paul, MN 55108; 612/624-9717.

SPECIAL PROGRAMS

COURSES AND WORKSHOPS FOR TEACHERS

SPECIAL PROGRAMS, COURSES AND WORKSHOPS FOR TEACHERS

In addition to its regular courses, the University of Minnesota Summer Session is pleased to offer a wide variety of special short courses, institutes, and workshops designed specifically for the professional continuing education needs of teachers and administrators, pre-school through grade 12.

SUMMER INSTITUTE FOR TEACHERS

*College of Liberal Arts and Summer
Session*

The ever-changing world and classroom create the impetus for us to come together and explore emerging issues, important changes, and new ideas that you can bring back to your classroom. In 1994, we will offer many familiar courses from past years but have also added some exciting new ones. Each course is designed to be timely, informative and stimulating. Most are interdisciplinary and all are in a convenient one or two week format. You will learn, plan, design curriculum, and share ideas with other teachers from throughout the state and with faculty from the University.

For registration materials, costs and additional information about each course of the Summer Institute for Teachers, please contact the Summer Session office, 612/624-9898.

Enrollment in all courses is limited. Early registration is advised.

ENJOY CHILDREN'S LITERATURE

*Second Annual Summer
Symposium
June 16 - 17*

Children's Literature in the Classroom: Asian and Asian American Authors. *Symposium: June 16, 8:30-4:00. For an optional 1 credit, participate in the Symposium plus a workshop June 17 from 9 a.m.-12 noon.*

Come for the Symposium on the first day and enjoy a stimulating slate of speakers, including Marie G. Lee, author of *Finding My Voice* and *If It Hadn't Been for Yon Jun*, and Ed Young, well known Asian author and illustrator. Or come for a day and a half, spending your second day researching Asian and Asian American children's books in the University Library's renowned Kerlan Collection of Children's Literature. Either way, this is a wonderful opportunity to hear authors, illustrators and

publishers as well as local Asian American community leaders discussing books and the experiences that inspired them.

This symposium is offered for anyone who enjoys, reads, or teaches children's literature.

You may register for the Thursday symposium only without credit (CEUs available) OR register for the Symposium plus the 1 credit workshop (AmSt 5920, Sec. 5). For more information call 624-9898.

Sponsored cooperatively by the American Studies department of the College of Liberal Arts, the Kerlan Collection of Children's Literature, Summer Session, and the department of Professional Development and Conference Services, Continuing Education and Extension.

EXPLORE DIVERSITY June 20 - July 1

Explore diversity issues by taking one of the following six special courses. While primary attention will be on content, you will also look at ways to incorporate these new ideas and materials into your classroom.

Afro 5598 - Black Arts Renaissance: African-American Art and Culture in the 1960s and 70s 4 credits. 9:30 a.m.-noon. John Wright, department of Afro-American and African Studies and department of English.

SPECIAL PROGRAMS

COURSES AND WORKSHOPS FOR TEACHERS

The postwar 1920s was the decade of the "New Negro" and the Jazz Age's "Harlem Renaissance," or first Black Renaissance. Four decades and a World War later—in the wake of the Civil Rights movement of the 50s and Black Power struggles of the 60s and early 70s—a self-proclaimed "New Breed" generation of black artists and intellectuals orchestrated an energetic new Black Arts Movement and an explosion of urban black popular culture. You will study Broadway shows and independent black film and theatre; African inspired painting and sculpture, modernist jazz with strongly cultivated Afro-Asian references, nationalistic politico-religious groups and orators like Malcolm X and Stokely Carmichael; rhythm and Blues and "soul music" and poets and novels and much more. Target audience: secondary teachers of literature, humanities, and history.

Hist 5381 Sec. 5 - Feminism's Second Wave 4 credits. 9:30-noon.
Sara Evans, department of History.

The "second wave" of feminism emerged in the late 1960s out of the civil rights and student movements of that era (the first wave was the movement for

woman suffrage, 1848-1920. It waxed and waned through the 1970s and 1980s, affecting many aspects of American culture ranging from words we use to assumptions about work, family, and sexuality. It also raised a number of highly controversial issues that remain unresolved.

This course will explore the contours of that social movement in the 1970s and 1980s, as well as its origins in the 1960s.

Target audience: all teachers.

Eng 5920 - Intercultural Studies in Literature and Film 4 credits. 9:00 a.m.-noon. *Charles Sugnet, department of English.*

This course involves you in conversation about how best to present film as well as literature from world cultures. You will study novels and film, produced in the United States and abroad, that relate to American minority culture. Examples might be works such as: *Things Fall Apart* (African) by Chinua Achebe; *Sula* (African American) by Toni Morrison; *Love Medicine* (American Indian) by Louise Erdrich; *Annie John* (Caribbean) by Jamaica Kincaid; *The Middle Man and Other Stories* ("new" American immigrants—

India, Iran, Korea) by Bharati Mukherjee; *Perfumed Nightmare* (Philippines, film) by Kidlat Tahimik or *Xalu* (Senegal, film) by Ousmane Sembene. Target audience: secondary teachers of English and humanities.

AmIn 5960 - The Flowering Tree: Traditional and Contemporary American Indian Literature and Culture 4 credits. 9:30 a.m.-noon. *Carol Miller, departments of American Studies and American Indian Studies.*

This course integrates the cultural and aesthetic qualities of texts such as *Black Elk Speaks*, *Night Flying Woman* by Ignatia Broker, *Ojibway Ceremonies* by Basil Johnston, *The Way to Rainy Mountain* by Scott Momaday, *Storyteller* by Leslie Silko, and *Tracks* by Louise Erdrich to illustrate the reflowering and connectedness of traditional Native expression within contemporary American Indian literature. These works also serve as models for discussion of the opportunities and challenges multicultural curricula engender in the classroom, especially in terms of diverse, and often problematic, student response. Target audience: all teachers.

MINNESOTA HISTORY WORKSHOP

College of Liberal Arts, The Humphrey Forum, and the Minnesota Historical Society

July 25-August 5

This long-running annual summer workshop is a two-week, 5-credit course for elementary and secondary teachers and graduate students. This year's topic focuses on Biography. See p. 46 for a full description.

AmSt 5920 - (Dis)abling Images in Literature, Film, and the Media

4 credits. 9:30 a.m.-noon. Terry Collins, General College, and Susan Kroeger, Office for Students with Disabilities. Marj Schneider, Consultant

Why did Tiny Tim have a mobility impairment? Why did Quasimodo, the "Hunchback of Notre Dame," have a disfiguring birth defect? Why did Dr. Strangelove use a wheelchair and have a neurologically uncontrolled arm? Why was the Joker in Batman disfigured? Why is Captain Hook's prosthesis so "evil"? In this course you will look seriously at how "disability" has been viewed culturally in the past, and how images in our literature and film arts have reflected and compounded bigotry against people with disabilities. You'll also work with recent materials which point to changes in self-definition among people with disabilities and, perhaps, in popular consciousness. Target audience: all teachers.

WoSt 5100 Sec. 5 - Issues for Adolescents: Sexual Identity 4 credits. June 28-July 12, 8:15-11:45 a.m.. John Yoakum, Youth and Aids Project and Jacquelyn Zita, department of Women's Studies

An exploration of adolescent sexual orientation from the perspective of individual identity. You will study the impact of the school and community, and institutional responses toward gay, lesbian, and bisexual youth.

Interventions, roles, and curricular issues in the school and helping professions. Target audience: all teachers

WoSt 5100 Sec. 6 - Bag Lunch Seminar 1 credit. June 28-July 8, 12 noon-1:30 p.m. Jacquelyn Zita, department of Women's Studies. To take this seminar you must be registered concurrently in WoSt 5100, above.

A screening of videos relevant to lesbian/gay adolescents, including history, politics, and community issues. A short discussion will follow each viewing.

EXPAND THE CLASSROOM

Leave the confines of your classroom behind and investigate other resources for learning.

Biol 5960 Sec 5 - Teaching and Learning with Museums 4 credits, June 20 - July 1, 9:30 a.m.-noon. Kevin Williams, Bell Museum of Natural History.

Three elements fundamental to all museums are: understanding (critical thinking), communication, and perspective. You strive for these same three elements in your classroom. In this course you will have the opportunity to gain experience in the processes of museums and discuss with other teachers how museums and their methods can be used by you, no matter what subject you are teaching. You will gain an



understanding of the variety of museums and other informal educational resources available in the Twin Cities area. You will learn how to use these resources to support the development of classroom activities and improve the usefulness of field trips. Some specific topics you will cover include: storytelling, creating and using collections, researching and creating exhibits, and using demonstration and theatre. Target audience: all teachers.

Geog 5900 Sec. 6 - Summer City Institute I 4 credits. June 27-July 11, 9:30 a.m.-noon. Judith Martin, department of Geography and director, Urban Studies.

This course tackles some especially challenging urban issues and

SPECIAL PROGRAMS

COURSES AND WORKSHOPS FOR TEACHERS

makes fairly extensive use of fieldwork, site visits, and guest speakers. Among the topics that might be addressed: the political and economic evolution of our urban landscapes; the challenges and opportunities offered by increased diversity in cities; the aesthetic and economic role of arts and culture in cities; the challenges of urban environmental issues; and the dilemmas which cities face in addressing such problems as poverty and housing needs. Efforts will be made to tailor the

Dust off a family album. Browse through its photographs. Read the letters and diaries written by people well-known or forgotten. Piece together the events and ideas that were part of the lives and shaped the world in which they lived. Then tell their story to others. Biography is a wonderful adventure in history and politics, literature, intellect and imagination. Minnesota's past is filled with individuals whose lives are evidence of events that have influenced the way we understand our world.

archaeology. Held in Little Falls near an on-going archaeological site, you will gain hands-on experience examining this culturally rich area of Minnesota while developing ways to introduce archaeological concepts into your existing curriculum units. Target audience: all teachers.

ENVISION CHANGE

EngW 5210 - Writing for Teaching: Inspiring Writing and Creative Thinking in the Classroom 4 credits. June 28 - July 2, 9:30 a.m.-12 noon. Chris Anson, department of composition and communication.

Have you considered just how powerful a tool writing can be? Do you use writing as a learning activity in your classroom? Are you and/or your students afraid of writing? This course will introduce you to a whole series of activities focusing on writing. Whether you are a beginning, casual or serious writer you will have the chance to experiment with the craft. You will learn to apply new ideas by trying them first. The goal will be for you to USE writing to think about teaching, and along the way to think about how you can use writing IN your own teaching. Target audience: all teachers.

The Minnesota History Workshop will offer two weeks of biographies this summer—reading, researching, and writing them. Classroom teachers, authors, and scholars will spend time talking with us about the art and science of biography. We'll talk about how biography may be used to teach reading, writing, history, and literature. You will spend time in the archives, manuscripts, and collections of history, uncovering the life of a Minnesotan you find fascinating. Target audience: elementary teachers 3-6, English, history, humanities teachers 7-12.

InAr 5100 Sec. 5 - Archaeology in the Classroom: A Workshop for Teachers 1 credit. June 21 - 24. Little Falls, MN. Offered in cooperation with the Institute for Minnesota Archaeology.

This workshop gives you the opportunity to gain a broad, general background in the field of

course to the particular interests of participants. You will work on a project which addresses one urban issue in depth. Target audience: all teachers.

Hist 5381 - Minnesota History Workshop: Uncovering Lives: Reading, Writing, and Teaching Biography 5 credits. July 25-August 5, 8:30-4:00. Steven Sandell, Director, Humphrey Forum. Offered in cooperation with the Humphrey Institute and the Minnesota Historical Society

17th Annual

CHILDREN'S LITERATURE SUMMER FORUM

University Libraries

Watch for details of this Summer Session tradition, organized by the Kerlan Collection/Children's Literature Research Collection. A series of ten public presentations by renowned authors, illustrators, and teachers of children's books. Most presentations are held on Thursdays 2:15-3:15 p.m. in 109 Walter Library (air conditioned!). For more information call 624-4576.



IntR 5900 Sec. 5 - Questions of Justice: Teaching for and About the Human Rights of Children 4 credits. June 27 - July 1, 8:30 a.m.-4 p.m. (with break for lunch). Walter Enloe, International Relations Program, Institute for International Studies and Programs, and David Shiman, University of Vermont.

A course providing opportunities for teachers to explore the relationships between human rights issues and education. This year's focus is on the human rights of children, which will be approached from local and global perspectives. You will examine instructional materials, models and methods; and develop lessons focusing on a particular issue. Target audience: all teachers interested in incorporating human rights issues into their curriculum.

FOREIGN LANGUAGE IMMERSION PROGRAM FOR TEACHERS

For the first time, teachers of Spanish, French, and German can come together in the summer and expand their knowledge of the

culture, taught in the language of the culture, while comparing their own classroom and cultural experiences with other teachers. As an option during the afternoon, teachers from all three sections can meet in a class led by Professor Diane Tedick. Discussions will surround the issues involved in teaching a foreign language while also teaching about the culture and history of the native speakers.

Area 5920 Sec. 1 - Constructing France: Symbols, Popular Culture and Media 4 credits, June 14 - July 19, 10 a.m.- 12 noon, MTWTh. Professors Chateau and Cherif.

Area 5920 Sec. 2 - German Unification: Historical, Sociological and Cultural Approaches 4 credits, June 14 - July 19, 10 a.m.-12 noon, MTWTh. Professors Savelsberg, Prowe and Weiss.

Area 5930 Sec. 1 - Social Movements in Latin America: Historical, Anthropological and Political Approaches 4 credits, June 14 - July 19, 10 a.m.-12 noon, MTWTh. Professors Gonzalez, Skewes, Sikkink.

For more information about the above three courses, including prerequisites and application information, contact Rene Aravena, Institute for

International Studies, University of Minnesota, 214 Social Science Building (west bank), 267 19th Ave. S., Minneapolis, MN 55455; 612/624-9007.

SeEd 5191 Sec. 5 - Workshop in the Teaching of Second Languages and Cultures: Exploring Issues of Second Language Pedagogy 4 credits, June 14 - July 19, 1-3 p.m. MTHTh. Professor Diane Tedick.

Participants will explore approaches for incorporating authentic materials, current technology, cultural content, contemporary politics, history, etc. into second language classrooms. The first part of the session will involve discussion of curricular planning, instructional techniques and approaches, and assessment procedures for inservice and preservice teachers of French, German, and Spanish. The second part of the afternoon session will involve separate sessions for participants representing each of the target languages and to be facilitated by mentor teachers, who will share strategies and techniques and help the participants in preparing lessons that meet the intended goals of the course.

Surfing the Internet

We have the pleasure this year of bringing you an exciting noncredit introduction to the Internet. Any teacher enrolled in the Summer Institute for Teachers during the period June 14 - July 1 may take this course designed and offered to introduce you to this exciting, intriguing and confusing global network. Professor Marvin Marshak will lead several sessions. You will receive more information when you register. Everyone will have the opportunity for hand-on-practice

SPECIAL PROGRAMS

COURSES AND WORKSHOPS FOR TEACHERS

AEROSPACE FOR TEACHERS

Institute of Technology

Two Introductory Workshops Offered in cooperation with the National Aeronautics and Space Administration (Lewis Center), Civil Air Patrol Liaison Personnel (U.S. Air Force), Minnesota Department of Aeronautics, and Department of Aerospace Engineering and Mechanics of the University of Minnesota, these workshops are designed to provide information about aviation and the space sciences that can be used to create exciting new courses or put spark into existing classroom programs.

AEM 5001 - Introductory Workshop for Elementary and Secondary Teachers. June 20 - July 1. The introductory workshop will be repeated July 18-29 if the first section fills.

AEM 5002 - Advanced Aerospace Workshop. July 5 - 15. An advanced aerospace workshop for secondary math and science school teachers, building upon AEM 5001.

Complete course descriptions are found in the departmental listings under Aerospace Engineering and Mechanics (AEM).

Workshop registration. You must be an in-service teacher (any field) to enroll in the introductory workshop and an in-service math, science, or aerospace teacher to

enroll in the advanced workshop. Enrollment is limited to 30 per course. To register, you must obtain a registration information packet by calling 625-8000 or writing to the Department of Aerospace Engineering and Mechanics, University of Minnesota, 107 Akerman Hall, 110 Union Street S.E., Minneapolis, MN 55455. You must also obtain a Registration Override Permit from the Department of Aerospace Engineering and Mechanics. This permit grants you a place in the course. To receive the permit, your request must be accompanied by written verification of your current in-service teaching status on school district letterhead. If approved, you will be issued a dated permit. You then register in the usual manner. If you do not register by the designated expiration date on the Override Permit, you will lose your place in the course.

Practicing administrators/counselors or non-in-service teachers can send in a written request to the Aerospace Workshop instructor for course enrollment consideration (c/o Department of Aerospace Engineering and Mechanics, address above). Such requests should state your purpose for taking the course.

SYMPOSIUM FOR SCHOOL BAND DIRECTORS

College of Liberal Arts

The Summer Session is pleased to announce a new program which we expect will become a popular feature for years to come. It will be led by Craig Kirchoff, our new director of University Bands, who has wide national experience as a clinician for school bands and band directors.

August 7 - 12

Mus 5950 - Special Topics in Music: The Art of Wind Band Teaching. 2 credits or noncredit. This week long symposium is dedicated to the continuing education of the school band conductor/educator in all grade levels, elementary through high school. You will concentrate your efforts in three areas: (1) personal musical growth; (2) expansion of your pedagogical base at every level of instrumental music education; (3) strategies for developing and refining your skills as ensemble conductors. Craig Kirchoff, director of University Bands, and numerous other faculty and guest clinicians will lead the symposium. Taught in Ferguson Hall, the University's new music building. Optional housing is available in Middlebrook Hall, which is adjacent to Ferguson. Special conference fee: \$175; optional for meals, housing, and parking: \$155. Tuition extra for those who wish credit (see tuition schedule on p. 18). For complete information contact Carolyn Wavrin, University of Minnesota, School of Music, 100 Ferguson Hall, 2106 Fourth St. S., Minneapolis, MN 55455; 624-2008.

S P E C I A L P R O G R A M S

EDUCATION SHORT COURSES AND WORKSHOPS

EDUCATION SHORT COURSES AND WORKSHOPS

College of Education

*See departmental listings
for full descriptions.*

ADULT AND TEACHER EDUCATION (AdEd)

5204. Reading in Work Settings. June 17, 18, 24, 25, July 8, 9.

R.5103. Family Literacy. July 25-Aug. 4.

AGRICULTURAL EDUCATION (AgEd)

5032. High School Curriculum in Agriculture. June 27-30, July 5-8.

R.5042. Agricultural Mechanics. August 2-5.

R.5043. Farm Management: Business Records for the High School Student: Decision and Dollars. July 26-29, August 2-5.

ART EDUCATION (ArEd)

R.5001. Art Media Techniques: Sec 1, Computer Use in the Art Class. June 14-29. Sec 2, Art Education and Instructional Planning. June 20-July 1.

R.5308. Theory and Practice of Teaching Art in Elementary Schools. June 30-July 19.

8306. Seminar: Art Education. July 5-19.

5389. Application of Aesthetic Theory in Education. July 21-August 10.

BUSINESS AND MARKETING EDUCATION (BME)

R.5353. Curriculum Construction in Business and Marketing Education. July 5-15.

R.5370. Special Topics in Instruction: Using Microcomputer Applications Software to Teach Business Content. June 20-July 1.

R.5261. Sales Training. August 15-19.

CURRICULUM AND INSTRUCTIONAL SYSTEMS (CISy)

R.5600. Introduction to Curriculum Systems. June 30-July 19.

R.5801. Curriculum and Instructional Systems Workshops: Sec 1, Peer Coaching. June 14-29.

R.5100. Workshop.

Sec 1, Using Local and Wide Area Networks in the Classroom. July 21-August 5.

Sec 2, Microsoft Works for Teachers. August 8, 9, 10, 11.

Sec 3, Explicit Instruction vs. Coaching: Exploring the Teacher's Role.

August 1, 3, 5, 8.

R.5600. Introduction to Curriculum Systems. July 21-August 5.

EDUCATIONAL POLICY AND ADMINISTRATION (EdPA)

5128. Workshop: Educational Administration.

Sec 1, Quality and Renewal in the Learning Organization. June 20-30.

Sec 2, Outcome Based Education. June 27-July 8.

Sec 3, Designing and Administering the Multicultural School. June 29, 30, July 5, 6, 8, 11, 13, 15, 18, 19.

8248. Seminar: Metropolitan School Governance. June 27-July 1.

5128. Workshop: Educational Administration.

Sec 1, Cross-Cultural Perspectives on Leadership. August 12-14.

Sec 2, Facilitating School Change. July 25-August 6.

Sec 3, Critical Issues in International Education and Educational Exchanges.

EDUCATIONAL PSYCHOLOGY (EPsy)

R.5114. Psychology of Student Learning. June 15-July 11.

R.5200. Special Topics: SAS for Data Management, Data Analysis, and Report Writing. June 17-July 8.

R.5400. Workshop: Counseling Psychology.

Sec 1, Counseling and Therapy Interventions with Men. June 20-24.

Sec 2, Stress, Coping, and Well-Being. July 5-19.

5601. Education of Exceptional Children. June 14-July 15.

R.5607. Collaboration for Inclusive School Communities. June 20-24.

5608. Parent and Professional Planning for Handicapped Students. July 6-19.

5609. Family-Professional Planning for Persons with Severe Handicaps. July 6-19.

R.5612. Education of Learning-Disabled Children. June 14-29.

5620. Introduction to Mental Retardation. June 14-July 15.

5641. Models of Service Delivery to Students with Hearing Impairments. July 6-12.

5646. Reading and Instructional Practices with Hearing-Impaired Students. July 13-19.

R.5656. Educational Needs of Students with Emotional Disturbances or Behavioral Disorders. June 14-28.

R.5657. Educational Interventions for Students with Emotional Disturbances or Behavioral Disorders. June 30-July 15.

SPECIAL PROGRAMS

EDUCATION SHORT COURSES AND WORKSHOPS



5702. Workshops: Special Education. Sec 1, Improving ASL for Classroom Communication. June 20-24.

5710. Contemporary Services for Persons with Developmental Disabilities.

June 27-July 13.

5900. Independent Study.

R.Sec 1. Building Socially Desirable Values, Attitudes and Behaviors: A Course for Teachers, Social Workers, and Parents. June 15, 20, and 23.

R.Sec 2. Measuring Outcomes in Education. June 16-July 1.

R.5115. Psychology of Adult Education. July 25-August 19.

R.5220. Educational Measurement in the Classroom. July 25-29.

5647. Aural and Speech Programming for Children with Hearing Impairment.

July 21-27.

ELEMENTARY EDUCATION (Elem)

R.5101. Workshop.

Sec 1, Authentic Assessment in the Classroom. July 5, 7, 12, 14.

Sec 2, Current Development in English Education: Writing to Learn Across the Curriculum. July 15, 18, 19.

Sec 3, The Language of Advertising. July 5, 7, 12, 14.

Sec 4, Maps and Mapping in the Elementary School. July 6, 8, 11.

Sec 5, Exploring Minnesota in the Elementary School. July 6, 8, 11, 13.

Sec 6, Curriculum Integration for Elementary Teachers. July 5, 7, 12, 14.

R.5107. Diagnosis and Treatment of Learning Difficulties. June 30-July 19.

R.5145. Classroom Management. June 14-29.

5300. Literature for the Elementary School. June 14-July 6.

R.5316. Teaching and Supervision of

English in the Elementary Schools. June 14-29.

R.5318. Creative Writing For and By Children. June 14-29.

5319. Teaching Second Languages and Cultures in Elementary Schools. June 14-29.

R.5338. Teaching Reading in the Intermediate Grades. June 14-29.

5339. Workshop.

Sec 1, Helping Children with Reading Problems in Primary Grade Classrooms.

July 15, 18, 19.

R.5350. Elementary School Science: Materials and Resources. July 5-19.

R.5361. Teaching Social Studies in the Elementary School. June 14-29.

R.5376. Current Trends in Early Childhood Education. June 14-29.

R.5101. Workshop.

Sec 1, Explicit Instruction vs Coaching: Exploring the Teacher's Role. August 1, 3, 5, 8.

Sec 2, Multicultural Education: Structure and Communication. August 1, 3, 5, 8.

Sec 3, Performance Assessment in Math and Science. July 22, 25, 27, 29.

Sec 4, Using Local and Wide Area Networks in the Classroom. July 21-August 5.

R.5107. Diagnosis and Treatment of Learning Difficulties. July 21-August 5.

R.5227. Teaching About the Newspaper in the Classroom. July 21-August 5.

R.5334. Reading Difficulties. July 21-August 5.

5339. Workshop.

Sec 1, Reading Activities Textbooks Don't Include. July 21, 26, 28.

Sec 2, Storytelling. July 21, 26, 28.

Sec 3, Issues: Whole Language. July 22, 25, 27, 29.

R.5347. Workshop: Curriculum Implementation in Elementary School Science-Field Biology for Elementary Science Teachers. August 3, and 14, 15, 19.

HOME ECONOMICS EDUCATION (HEEd)

R.5320. Adult Education in Home Economics. June 20-July 1.

R.5404. Introduction to Early Childhood Family Education Program. June 14.

R.5406. Special Topics in Parent and Family Education.

Sec 1, School-Family Linkages. June 15-17.

Sec 2, Home Visits as an Educational Strategy. June 15-17.

Sec 3, Effective Parent Education for Diverse Populations. June 20, 21, 29, 30, July 1.

Sec 4, Education for Family Communication. July 5-15.

R.5407. Family Life Education. July 5-15.

R.5103. Family Literacy. July 25-August 24.

R.5405. Child Development and Parent Education. July 25-August 5.

5406. Special Topics in Parent and Family Education: Literacy. July 25-29, August 1-5.

R.5409. Group Methods for Parent and Family Education. August 8-12.

R.5510. History, Philosophy, and Professional Practice. August 1-19.

INDUSTRIAL EDUCATION (Ind)

5306. Implementing Curricular Change in Technology Education. June 17 and hrs ar.

R.5330. Industrial Course Construction. June 14 and ar.

KINESIOLOGY (Kin)

- R.3001. Lifetime Fitness and Health. June 14-July 6.
- R.3132. Motor Development. June 14-27.
5100. Teaching Physical Education for the Handicapped. June 28-July 12.
5111. Sport Facilities. June 14-28.
5136. Psychology of Coaching. June 28-July 12.
- R.5151. Curriculum. June 14-July 1.
- R.5375. Competitive Sport for Children and Youth. June 28-July 12.
- R.5141. Nutrition for Exercise and Physical Performance. July 21-August 3.
- R.5460. Foundations of Sport Management. July 21-August 5.
- R.5540. Technology in Sport and Physical Education. July 21-August 5.
- R.5720. Topics in Kinesiology. Sec 1, Integrating Sport Sciences into the Curriculum: Math/Science. July 21-August 4. Sec 2, Organization and Management of Physical Education and Sport. July 21-August 5.
- R.5740. Workshop: Coaching of Individual, Dual, or Team Sports: Soccer. July 21-August 3.

MATHEMATICS EDUCATION (MthE)

- R.5153. Geometry in the Intermediate Grades. June 14-June 30.
- R.5155. Rational Number Concepts and Proportionality. July 11-14.
- R.5355. Mathematics for Slow-Learning Children. June 14-July 8.
- R.5102. Workshop; Mathematics Education: Performance Assessment in Math and Science. July 22, 25, 27, 29.

MUSIC EDUCATION (MuEd)

5606. Movement-Based Methods for Music Education. July 21-August 10.
- R.5667. Computer-Based Music Instruction. July 21-August 3.
5750. Workshop: Music Education: Multicultural Music for Teachers. July 21-August 3.

RECREATION, PARK, AND LEISURE STUDIES (Rec)

5460. Foundations of Sport Management. July 21-August 5.

SECONDARY EDUCATION (SeEd)

- R.5186. Alternatives in Second Language Education. July 5-19.
- R.5191. Workshop: Teaching of Second Languages and Cultures: Exploring Diversity in Second Language Textbooks. June 14-July 19.
- R.5344. Teaching Reading in Content Areas. June 14-29.
- R.5350. Current Developments in English Education. Sec 1, Writing to Learn Across the Curriculum. July 15, 18, 19. Sec 2, The Language of Advertising. July 5, 7, 12, 14.
- R.5390. Current Developments in Secondary School Science Teaching. June 15-19.
- R.5394. Workshop: Science Education: Foundations of Science Education — Demonstration Techniques in Secondary Physical Sciences. June 30-July 19.
- R.5191. Workshop: Teaching of Second Languages and Cultures: Multicultural Education. July 21-August 5.
- R.5227. Teaching About the Newspaper in the Classroom. July 25-August 24.

- R.5349. Workshop: Secondary Reading Instruction: Reading Activities Textbooks Don't Include. July 21, 26, 28.

- R.5394. Workshop: Science Education: Foundations of Science Education — Performance Assessment in Math and Science. July 22, 25, 27, 29.

VOCATIONAL EDUCATION (VoEd)

- R.5100. Special Topics in Instruction. Sec 1, Effective Management of Diversity in Educational Work Settings. June 14-24.
5101. Special Topics in Curriculum. Sec 1, Teaching About Economic Issues Related to Public Policy. June 20-24.
5400. Education for Work. July 5-13.
- R.5760. Organization Development in Industry and Business. June 20-July 1.
- R.5795. HRD Approach to Quality Improvement. July 5-15.
- R.5761. Team Building in Business and Industry. June 17, 18, 24, 25, July 8, 9.
- R.5900. Using Vocational Education Research. July 5-15.
5101. Special Topics in Curriculum. Sec 1, Improving School to Work Transition. August 12-24. Sec 2, Integration of Vocational and Academic Education. August 24-24.
5300. Philosophy and Practice of Vocational Education. August 1-11.
5330. Coordination Techniques in Cooperative Education. August 1-11.
- R.5750. Training in Industry and Business. July 25-August 5.
- R.5762. Management of Conflict. July 23, 30; August 6, 13.



C O U R S E S C H E D U L E



Symbols — The following symbols are used throughout the course descriptions in place of page footnotes:

! Work for this course will extend past the end of the term. A grade of "K" will be assigned to indicate the course is still in progress.

† All courses preceding this symbol must be completed before credit will be granted for any quarter of the sequence.

§ Credit will not be granted if credit has already been received for the course listed after this symbol.

¶ Concurrent registration is required (or allowed) in the course listed after this symbol.

Registration Override Permit, completed and signed by the instructor, is required for registration.

Δ Registration Override Permit, completed and signed by the department offering the course, is required for registration.

* A special fee is charged. See section on Course Fees.

** Courses in which graduate students may prepare Plan B projects.

R The letter R preceding a course number indicates a course with limited enrollment.

Check the Section Status Report (posted outside of 101 Fraser Hall, B18 and 16 Johnston Hall, 4 Mechanical Engineering, 170 Anderson Hall, and 130 Coffey Hall) to see if space is available in your limited enrollment courses.

Following each course title are parenthetical statements; the first indicates the call number of the course, and the second specifies credits, class limits, prerequisites, hours and days of the week the

class meets, location of the class, and course instructor.

Call Number — This six-digit number follows the title or section number for each course. You must use the course numbers and these specific call numbers when you fill out your Course Request form.

Prerequisites — Entrance into certain courses requires completion of (or concurrent enrollment in) other specified courses, or possession of particular qualifications or class standing.

Class standing is determined by the number of credits completed. The following breakdown may vary slightly by college: freshman, 0-45 credits; sophomore, 46-90 credits; junior, 91-135 credits; senior, 136 or more credits. Check with your college office for further information.

For questions regarding prerequisites, call the department in which the course is offered.

Hours and Days — The starting and ending times for classes are indicated in 24-hour clock time. To convert from the 24-hour clock to standard p.m. time, subtract 1200 (for example, 1615 minus 1200 = 4:15 p.m.)

Classes generally meet for 60 minutes, beginning and ending at the following times: 0800-0900; 0915-1015; 1030-1130; 1145-1245; 1300-1400; 1415-1515; 1530-1630. Days of the week are abbreviated M, T, W, Th, F.

Missing Information — When hours, days, or places of meeting are not listed, consult the instructor or department offering the course.

Cancellation or Changes in Courses — As a matter of policy, Summer Session does not cancel courses for any reason, although unexpected circumstances sometime make cancellation necessary. If a course in which you have enrolled must be canceled, you will be notified and given the opportunity to transfer into another course without penalty. If you do not wish to enroll in another course, you will receive a full refund for the course that was canceled. The University reserves the right to cancel, postpone, reschedule, limit enrollment, split or combine courses, and to change instructors and/or locations of courses.

Changes made after the printing of this bulletin are published in the school newspaper *Minnesota Daily*. Lists of changes are also available in the Summer Session office, 135 Johnston Hall.

A

Accounting (Acct)

645 Management/Economics. 624-6506
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of courses on page 12.

SPECIAL TERM: SEVEN-WEEK COURSES JUNE 14- AUGUST 1

R.1050. Introduction to Financial Reporting. (5 cr; each section limited to 50 students; \$8050; prereq 40 cr; A-F only)
Basic concepts of measurement and valuation underlying development of financial reports for external users. Financial statement preparation, analysis of alternative valuation approaches, and interpretation of financial statement information.
Sec 1, (289291) 0800-0930 MTWTh, BlegH 240
Sec 2, (189812) 1200-1330 MTWTh, BlegH 240

R.3001. Introduction to Management Accounting (987849) (4 cr; limited to 50 students; prereq 1050; A-F only; 1000-1145 MWTh; BlegH 240)
Overview of management accounting as main information collection and analysis technology in organizations. Analysis of cost-volume-profit relationships, budgeting and analysis of variances from budgeted performance, and decentralized organizational design.

R.3101. Intermediate Financial Reporting. (189292) (4 cr; limited to 25 students; prereq grade of B- or better in 1024/1025 or 1050; A-F only; 1800-2030 MW; BlegH 125)
Relationships between economic events and their representation in financial statements aimed at external users. Income determination, asset valuation, and capitalization of corporations.

R.5102. Advanced Financial Reporting I. (4 cr; limited to 30 students; prereq 3101 or 5101; mgmt or grad mgmt students only; A-F only; 1800-2030 MW; BlegH 220)
Relationship between complex events such as defined benefit pension plans, leases, and intercorporate investments, and reflection of these events in financial statements. Introduction to business combinations, consolidated reporting.
Sec 1, (989293)
Sec 2, (389623) MBA only

R.5125. Auditing Principles and Procedures. (4 cr; limited to 25 students; prereq 3101 or 5101; accounting majors only; A-F only;

1730-2000 TTh; BlegH 240)
Auditor's role and function. Includes audit standards, ethics, procedures, legal responsibilities.
Sec 1, (285273)
Sec 2, (989620) MBA only

R.5135. Income Tax Accounting. (4 cr; limited to 25 students; prereq 1025 or 1050; A-F only; 1730-2000 MW; BlegH 240) Jacobs
Introduction to principles of federal income taxation of various taxpaying entities.
Sec 1, (185274)
Sec 2, (789621) MBA only

R.5180. Advanced Financial Reporting II. (4 cr; limited to 30 students; prereq 5102; mgmt or MBA students only; A-F only; 1730-2000 MW; BlegH 230) Tranter
Consolidated financial reporting with a particular focus on international business organizations. Introduction to reporting issues in government and not-for-profit entities.
Sec 1, (188943)
Sec 2, (589622) MBA only

SPECIAL TERM: TEN-WEEK COURSE JUNE 14- AUGUST 24

R.5160. Financial Statement Analysis. (4 cr; limited to 25 students; prereq 1050 or MBA 8030; A-F only; 1730-2100 Th; BlegH 415)
Interpretation and analysis of financial statements and schedules for investors and other users.
Sec 1, (789554)
Sec 2, (289615) (MBA student only)

Adult and Teacher Education (AdEd)

325 Vocational/Technical Education, 624-3010
(Vocational and Technical Education)
College of Education

FIRST TERM

5204. Reading in Work Settings—June 17, 18, 24, 25; July 8, 9. (391615) (3 cr; 1700-2000 F, 0900-1500 S; VoTech R380; \$VoEd 5204) Park
Overview of concepts involved in reading instruction into vocational training programs and work settings; diagnosis and methods of assessing needs of vocational students and workers on a job; techniques for building needs into training programs.

5205. Field Experience in Adult Education. (4-8 cr [max 8 cr]; prereq #: A-F only)
Sec 23, (089236) Williams
Sec 25, (889237) Park

R.5401. Adult Learning and Development Through the Life Span. (689238) (3 cr; limited to 25 students; 1030-1245 TTh, VoTech 220; A-F only) Williams.

Physiological, social, and cultural bases of adult behavior; motivation, socialization, personality change as applied to education of adults.

R5411. Strategies for Teaching Adults. (591614) (3 cr; 1600-1830 MW, VoTech 220; limited to 25 students) Williams.
Identification, classification, and analysis of techniques used in teaching adult.

8302. Problems: Adult Education. (1-9 cr; prereq #)
Individual research in area of adult education.
Sec 23, (489239) Williams
Sec 25, (889240) Park

SECOND TERM

R.5103. Family Literacy—July 25-August 5. (191616) (3 cr; limited to 25 students; 1300-1600 MTWThF, VoEd R385; \$HEEd 5406; prereq practicing adult educator or #) Park
This course is designed for adult educators who are currently involved in or who have interest in family literacy programs. Family literacy programs are designed for parents who want to learn to improve the literacy skill of their children and who may also need improvement in their own educational skills.

5205. Field Experience in Adult Education. (789814) (4-8 cr [max 8 cr]; prereq #: A-F only) Park
See First Term.

8302. Problems: Adult Education. (589815) (1-9 cr; prereq #) Park
See First Term.

Adult Psychiatry (AdPy)

A-614 Mayo. 626-6015
Medical School

FIRST TERM

5109. Externship in Clinical Psychiatry—Duluth Hospital. (187002) (9 cr; prereq regis med) Olson

5110. Contemporary Hospital Psychiatry—St. Luke's Hospital, Duluth. (087003) (9 cr; prereq regis med) Cowan

5500. Psychiatry Externship. (787013) (9 cr; prereq regis med) Eckert

5512. Medical-Surgical Psychiatry: Consultation-Liaison. (690437) (9 cr; prereq 3rd or 4th yr med stu) Popkin

5514. Substance Abuse and Associated Psychiatric Disorders. (189700) (9 cr; prereq regis med) Halikas

5515. Neuropsychology, University Hospitals. (587028) (9 cr; prereq regis med) Meier

5516. St. Mary's Extended Care Center, Alcoholic Treatment Unit. (587031) (4.5-9 cr; prereq regis med) Hiers

5518. Community Psychiatry—Braham, MN. (887035) (9 cr; prereq regis med) Walton

5530. Independent Study. (487037) (Up to 9 cr per period; prereq Δ; hrs ar) Mackenzie
Completion of individual projects or study courses in psychiatry or basic sciences.

5602. Clinical Psychopharmacology Seminar. (287038) (1 cr; prereq regis med) Abuzzahab

5924. Practical Psychotherapy, Crisis Intervention and Emergency Management. (490438) (3 cr; prereq #) Mitchell

SECOND TERM

5109. Externship in Clinical Psychiatry: Duluth Hospital. (189647) (9 cr; prereq regis med) Olson

5110. Contemporary Hospital Psychiatry—St. Luke's Hospital, Duluth. (090029) (9 cr; prereq regis med) Cowan

5500. Psychiatry Externship. (186951) (9 cr; prereq regis med) Eckert

5512. Medical-Surgical Psychiatry: Consultation-Liaison. (090435) (9 cr; prereq 3rd or 4th yr regis med stu) Popkin

5514. Substance Abuse and Associated Psychiatric Disorders. (189678) (9 cr; prereq regis med) Halikas

5515. Neuropsychology: University Hospitals. (390030) (9 cr; prereq regis med) Meier

5516. St. Mary's Extended Care Center, Alcoholic Treatment Unit. (190031) (4.5-9 cr; prereq regis med) Hiers

5518. Community Psychiatry—Braham, MN. (090032) (9 cr; prereq regis med) Walton

5530. Independent Study. (488477) See First Term.

5602. Clinical Psychopharmacology Seminar. (890033) (1 cr; prereq regis med) Abuzzahab

5924. Practical Psychotherapy, Crisis Intervention and Emergency Management. (890436) (3 cr; prereq #) Mitchell

COURSE DESCRIPTIONS

Aerospace Engineering and Mechanics (AEM)

107 Akerman Hall. 625-8000
Institute of Technology

FIRST TERM

R.1015. Statics. (4 cr; each rec limited to 30 students; prereq Phys 1251 or equiv, Math 1261 or equiv; IT student; A-F only; lect 0800-1015 MWF; AkerH 313)
Vector algebra. Principles of statics. Application of equations of equilibrium to simple structures and machines; Statically determinate beams. Cables. Nature and influence of friction.
Rec 1, (085056) 0915-1015 TTh, AkerH 313
Rec 2, (189185) 0915-1015 TTh, AkerH 317

R.3036. Dynamics. (4 cr; limited to 33 students; prereq 1015, ¶ Math 3261 or equiv; IT student; A-F only; lect 1030-1245 MWF; Arch 10)
Review of particle dynamics. Mechanical systems and the rigid-body model. Equilibrium. Kinematics and dynamics of plane systems. Technical applications.
Rec 1, (885057) 1030-1130 TTh, Arch 10

R.5001. Workshop: Elementary and Secondary Teachers—June 20-July 1 or July 18-July 29 (The second session of this workshop will be opened only after the first session is filled and if there is substantial interest in the workshop.) (4 cr; each section limited to 30 students; prereq educ major; in-service teacher [documentation required], and Δ Kaldahl, Aerospace Engineering and Mechanics faculty. Lectures, film reviews, construction, and demonstration of classroom aids, involvement with the NASA spacemobile, flight experience, and field trips cover such topics as satellites and probes, model rocketry including a launch, astronaut in space, principles of flight, conventional aircraft, space age education tools. Visits to local aerospace facility and to major aerospace installation in the country subject to availability of airlift. Prerequisites will be enforced. Special registration procedures apply (see Restrictions, p. 31).
Sec 1, (086045) 1300-1745 MTWThF; MechE 108 (June 20-July 1)
Sec 2, (191527) 1300-1745 MTWThF; MechE 108 (July 18-29)

R.5002. Advanced Aerospace Workshop—July 5-15. (991528) (4 cr; limited to 30 students; prereq educ major; in-service secondary teacher in math, science or aerospace [documentation required], or 5001, or #, Δ. 1300-1745 MTWThF; MechE 108) Kaldahl, Vano, Aerospace Engineering and Mechanics faculty. Advanced workshop for secondary math and science teachers. Uses contemporary NASA design projects

to provide new teaching tools to stimulate student interest in physics and math. Prerequisites will be enforced. Special registration procedures apply (see Restrictions, p. 31).

8777. Thesis Credits: Masters. (488558) (1-16 cr [max 11 cr per summer term])

8800. Selected Topics in Mechanics and Materials. (886046) (1-4 cr per qtr; prereq Δ)
Topics of current interest.

8810. Selected Topics in Fluid Mechanics. (290179) (1-4 cr per qtr; prereq Δ)
Topics of current interest.

8880. Plan B Project. (187601) (1-4 cr per qtr [max 4 cr]; prereq grad aerospace engineering or mechanics maj, Δ)

8888. Thesis Credits: Doctoral. (888718) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

5800. Problems in Mechanics and Materials. (185131)
(1-4 cr per qtr; prereq Δ)
Topics of current interest. Individual projects.

5810. Problems in Fluid Mechanics. (985132) (1-4 cr per qtr; prereq Δ)

5838. Summer Engineering Employment. (186304) (1-4 cr per qtr; prereq completion of 3rd yr, Δ)

5840. Industrial Assignment. (686047) (2 cr; prereq regis in engineering intern program; Δ)
Engineering intern industrial laboratory. A formal technical report, covering the work during the industrial assignment, is required.

5841. Industrial Assignment. (486048) (2 cr; prereq regis in engineering intern program; Δ)

5842. Industrial Assignment. (286049) (2 cr; prereq regis in engineering intern program; Δ)

5843. Industrial Assignment. (186893) (2 cr; prereq regis in engineering intern program; Δ)

SECOND TERM

R.3016. Deformable Body Mechanics. (4 cr; each rec limited to 30 students; prereq 1015, ¶ Math 3261 or equiv; IT student; A-F only; lect 1030-1245 MWF; Arch 10)
Principles of statics; equilibrium conditions. Uniaxial loading and deformation. Stress and strain at a point. Material behavior; linear elasticity. Torsion. Bending of beams of symmetrical section.

Rec 1, (685058) 1030-1130 TTh, Arch 10
Rec 2, (088944) 1030-1130 TTh, Arch 60

R.3200. Introduction to Engineering Fluid Mechanics. (4 cr; limited to 30 students; prereq IT student, 1015, Math 3261 or equiv; A-F only; lect 0915-1130 MWF; AkerH 313)
Abrahamson

The flow of viscous incompressible fluids; fluid statics, Bernoulli flow, momentum conservation, laminar and turbulent pipe flow, laminar and turbulent boundary layers.
Rec 1, 0915-1015 TTh, AkerH 313
Lab 1, (491525) 1300-1700 M, AkerH 30
Lab 2, (291526) 1300-1700 W, AkerH 30

8777. Thesis Credits: Masters. (888640) (1-16 cr [max 11 cr per summer term])

8800. Selected Topics in Mechanics and Materials. (588485) (1-4 cr; prereq Δ)
See First Term.

8810. Selected Topics in Fluid Mechanics. (686565) (1-4 cr per qtr; prereq Δ)
See First Term.

8880. Plan B Project. (387600) (1-4 cr per qtr [max 4 cr]; prereq grad aerospace engineering and mechanics maj, Δ)

8888. Thesis Credits: Doctoral. (988774) (1-36 cr [max 11 cr per summer term])

Afro-American Studies (Afro)

808 Social Sciences Tower.
624-9847
(Afro-American and African Studies)
College of Liberal Arts

FIRST TERM

R.1021. Introduction to African Studies. (691703) (4 cr; limited to 40 students; 0905-0955 MTWThF; BlegH 205) Coifman
Diverse elements of African studies curriculum, content, and methodology. Historical perspective and present trends.

R.3514. African-Arabic Literature in Translation. (392084) (4 cr; limited to 35; 1330-1530 TTh; BlegH 245)
AshShareef
African literature in Arabic from different countries. Genres represented: novel, short story, poetry, and drama. Emphasis on 20th century. Texts discussed in cultural and historical context. Theoretical and critical essays. Major writers. All readings in English.

R.3654. African Cinema. (891702) (4 cr; limited to 25 students; 1010-1215

MW, 1010-1100 TTh; BlegH 210)
Pike
Examination of films by African filmmakers. Aesthetic, theoretical, and sociopolitical issues explored through class screenings and critical readings. Emphasis on films from sub-Saharan Africa.

3970. Directed Studies. (285046) (1-15 cr per term; prereq #, Δ, CLA approval)

3991-3992-3993. Senior Project in African and Afro-American Studies. (389136, 189137, 089138) (2 cr per qtr; prereq completed CLA advanced composition requirement, permission of undergrad adviser; A-F only)
Continuous registration three-quarter course for writing of senior paper under the guidance of a faculty supervisor.

5598. Summer Institute for Teachers: Black Arts Renaissance: African-American Art and Culture in the 1960s and 70s—June 20-July 1. (xxxxxx) (4 cr; 0930-1200 MTWThF; SocSci 815) Wright
See Summer Institute for Teachers, page 41.

5970. Directed Studies. (185007) (1-6 cr per term; prereq #, Δ, CLA approval; qualified sr and grad students may register with # for work on tutorial basis)

SECOND TERM

R.3011. Islam in Africa. (192085) (4 cr; limited to 35 students; 1330-1530 TTh; BlegH 245) AshShareef
Ideological, doctrinal, and ritual aspects of Islam in continental Africa. Various religious brotherhoods and Sufi orders from different African countries in the 20th century: the *Ansar*, the *Khatmiyya*, the Muslim Brothers, the *Qadiriyya*, the Republican Brothers, the *Sanusiyya*, the *Tijaniyya*. All readings in English.

R.3910. Topics in Afro-American/African Studies. (190622) (4 cr; limited to 25 students; 1300-1500 TTh; BlegH 205) Harris
Explores the social and political issues of African-Americans in the 1960s.

3970. Directed Studies. (789652) (1-15 cr; prereq #, college approval)

3991-3992-3993. Senior Project in African and Afro-American Studies. (190619, 490620, 290621) (2 cr; prereq completed CLA advanced composition requirement, permission of undergraduate adviser; A-F only)
Continuous registration three-quarter course for writing of senior paper under the guidance of a faculty supervisor.

5970. Directed Studies. (989651) (1-6 cr; prereq #, college approval; qualified senior and graduate students may register with # for work on tutorial basis).

Agricultural and Applied Economics (AgEc)

231 Classroom/Office Building,
St. Paul. 625-1222
College of Agriculture

FIRST TERM

3990. Independent Study in Agricultural and Applied Economics. (190370) (cr ar; prereq #) Staff
Independent study and supervised reading and research on subjects and problems not covered in regularly offered courses.

5990. Special Topics and Independent Study in Agricultural and Applied Economics (287850)(Cr ar; prereq #) Staff
Independent study, supervised reading, or research on agricultural economics problems not covered in regularly offered courses.

8110. Master's Paper: Plan B Project. (390951) (1-9 cr [max 9 cr]; prereq #; S-N only)

8200. Advanced Topics in Agricultural and Applied Economics. (185243) (1-9 cr; [may be repeated for cr]; hrs ar) Staff
Special problems for individual work by qualified students.

8777. Thesis Credits: Masters. (288559) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688719) (1-36 cr [max 11 cr per summer term])

SECOND TERM

3990. Independent Study in Agricultural and Applied Economics. (890369) (cr ar; prereq #) Staff
Independent study and supervised reading and research on subjects and problems not covered in regularly offered courses.

5990. Special Topics and Independent Study in Agricultural and Applied Economics. (187851) (cr ar; prereq #) Staff
See First Term.

8110. Master's Paper: Plan B Project. (190952) (1-9 cr [max 9 cr]; prereq #; S-N only)

8200. Advanced Topics in Agricultural and Applied Economics. (987852) (1-9 cr; [may be repeated for cr]; hrs ar) Staff
See First Term.

8777. Thesis Credits: Masters. (288643) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788775) (1-36 cr [max 11 cr per summer term])

Agricultural Education (AgEd)

320 Vocational/Technical Building,
St. Paul. 624-3010
(Vocational and Technical Education)
College of Education

FIRST TERM

R.3001. Experiential Learning: Production Agriculture. (188269) (1-14 cr [max 14 cr]; no more than 20 cr of 3001, 3002 combined; limited to 8 students; prereq #; hrs ar; S-N only)
Experiential learning in a production of agriculture business; planned, organized, monitored, and evaluated based on pre-experience diagnosis of learning prerequisite to higher-level courses in technical agriculture.

R.3002. Experiential Learning: Agricultural Business. (588938) (1-14 cr [max 14 cr]; no more than 20 cr of 3001, 3002 combined; limited to 8 students; prereq #; hrs ar; S-N only)
Experiential learning in an agricultural non-farm business. Planned, organized, monitored, and evaluated based on a pre-experience diagnosis of learning required to meet competency expectations for those employed in agricultural businesses.

5027. Practicum: Extension Experiences. (691149) (2-9 cr [max 9 cr]; \$HEEd 5027) Norenberg
Observation of and participation in activities of Extension Service staff at county and state levels; familiarization with staff, program planning and development, and educational and administrative functions.

5032. High School Curriculum in Agriculture—June 27-30, July 5-8 and hrs ar. (091536) (3 cr; 10 cr educ) 1300-1600 MTWThF and hrs ar; VoTech R385) Peterson
Philosophy, organization, and administration of instruction in agriculture departments in secondary schools.

5090. Independent Study. (192023) (1-3 cr; prereq sr; hrs ar; A-F only) Norenberg, Peterson, Leske, Persons
Topics may be chosen to permit study of areas within education or to supplement areas of inquiry not provided in the regular course structure.

5095. Integrating Paper: Master of Education. (092024) (3 cr; prereq MEd student in agricultural education; hrs ar; A-F only) Norenberg, Peterson, Leske, Persons
Preparation of a paper dealing with learning in agricultural education applied to professional responsibilities.

8001. Research in Agricultural Education (892025) (Cr ar; prereq 15 cr in education) Norenberg, Peterson, Leske, Persons
Selecting problems, preparing bibliographies, analyzing and

interpreting data, and preparing manuscripts.

8091. Field Problems. (692026) (Norenberg, Peterson, Leske, Persons) (3 cr; hrs ar)
Making investigations, gathering data, and formulating plans regarding agricultural education.

8777. Thesis Credits: Masters. (688560) (1-16 cr [max 11 cr per summer term])

SECOND TERM

R.3001. Experiential Learning: Production Agriculture. (488270) (1-14 cr [max 14 cr]; no more than 20 cr of 3001, 3002 combined; limited to 8 students; prereq #; hrs ar; S-N only)
See First Term.

R.3002. Experiential Learning: Agricultural Business. (388939) (1-14 cr [max 14 cr]; no more than 20 cr of 3001, 3002 combined; limited to 8 students; prereq #; hrs ar; S-N only)
See First Term.

5027. Practicum: Extension Experiences. (091150) (2-9 cr [max 9 cr]; \$HEEd 5027) Norenberg
Observation of and participation in activities of Extension Service staff at county and state levels; familiarization with staff, program planning and development, and educational and administrative functions.

R.5042. Agricultural Mechanics—July 26-29, August 2-5 (891537) (1-3 cr [max 12 cr]; limited to 20 students; 0900-1200 TWThF and hrs ar; VoTech 110) Eighth
Technical and managerial information, techniques, and materials. Designed to facilitate participant's instructional planning, resource development, and instruction. Topic to be identified with each offering. This offering for 3 credits.

R.5043. Farm Management: Business Records for the High School Student: Decision and Dollars—July 26-29, August 2-5 (691538) (1-3 cr [max 12 cr]; limited to 20 students; 1300-1600 TWThF and hrs ar; VoTech 220) Persons
Based upon the work of national task force for improving record keeping and analysis skills, this course will introduce teachers to generally accepted accounting practices used in farm and non-farm business.

5090. Independent Study. (492027) (1-3 cr; prereq sr; hrs ar) Norenberg, Peterson, Leske, Persons
See First Term.

5095. Integrating Paper: Master of Education. (292028) (3 cr; prereq MEd student in agricultural education; hrs ar; A-F only) Norenberg, Peterson, Leske, Persons
See First Term.

8001. Research in Agricultural Education. (492030) (Cr ar; prereq 15 cr in education) Norenberg, Peterson, Leske, Persons
See First Term.

8091. Field Problems. (192029) (3 cr; hrs ar) Norenberg, Peterson, Leske, Persons
See First Term.

8777. Thesis Credits: Masters. (788646) (1-16 cr [max 11 cr per summer term])

Agricultural Engineering (AgEn)

213 Agricultural Engineering,
St. Paul. 625-7733
Institute of Technology

FIRST TERM

8777. Thesis Credits: Masters. (488561) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088720) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERM: 10-WEEK COURSE

5050. Intern Reports. (688185) (2 cr; prereq IT student, #) Chaplin
Student exposure to engineering practice through an intern program. Engineering reports on work assignments are reviewed by faculty and coordinated with industry advisers.

SECOND TERM

8777. Thesis Credits: Masters. (188649) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388777) (1-36 cr [max 11 cr per summer term])

Agronomy and Plant Genetics (Agro)

411 Borlaug Hall, St. Paul.
625-7773
College of Agriculture

FIRST TERM

1020. Special Problems. (985244) (1-3 cr; prereq 5 cr agronomy, #) Smith, Cardwell
In-depth research or studies in agronomy. Intended for those who wish to pursue aspects of agronomy in greater depth than that offered in other courses or who wish to investigate areas not presently offered. Tutorial instruction under staff guidance.



COURSE DESCRIPTIONS

5001. Problems in Agronomy for Advanced Students. (785245) (1-5 cr; prereq 20 cr agronomy, #) Smith, Cardwell
In-depth research or studies in agronomy. Intended for advanced students who wish to pursue aspects of agronomy in greater depth than that offered in other courses or who wish to investigate areas not presently offered. Independent study and research under staff guidance.

8010.* Research in Agronomy. (585246) (Cr ar; prereq #) Staff
Problems in physiology and production of crop plants.

8330. Research in Plant Genetics. (385247) (Cr ar) Staff

8340. Directed Studies for Thesis Research. (090371) (Cr ar)
For doctoral students who have not yet taken preliminary oral exam. Planning and implementation of thesis research for the quarter.

8777. Thesis Credits: Masters. (288562) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888721) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

5310. Orientation to Field Crop Breeding. (788940) (1 cr; prereq 5020 or #; 0800-1000 F; BorH 306; S-N only) Stuthman
Field study of plant breeding programs and techniques.

8320. Orientation to Agronomy and Soils Field Research Techniques. (585313) (1 cr; S-N only; \$Soils 8320; prereq 5040 or #; 0800-1000 M; BorH 306) Cardwell
Field survey and discussion of research techniques in crop physiology, crop and soil management, and weed science programs in agronomy and soils.

SECOND TERM

1020. Special Problems. (186117) (1-3 cr; prereq 5 cr agronomy, #) Smith, Cardwell
See First Term.

5001. Problems in Agronomy for Advanced Students. (986118) (1-5 cr; prereq 20 cr agronomy, #) Smith, Cardwell
See First Term.

8010. Research in Agronomy. (786119) (Cr ar; prereq #) Staff
See First Term.

8330. Research in Plant Genetics. (585098) (Cr ar) Staff

8340. Directed Studies for Thesis Research. (890372) (Cr ar)
See First Term.

8777. Thesis Credits: Masters. (388651) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188778) (1-36 cr [max 11 cr per summer term])

American Indian Studies (Amln)

102 Scott Hall. 624-1338
College of Liberal Arts

FIRST TERM

3024. Intermediate Ojibwe. (090533) (5 cr; prereq 1023; 1300-1515 MTWThF; ScottH 4) Oakgrove

R.3036 Dakota Culture and History. (891991) (4 cr; limited to 20 students; 1015-1115 MTWTh; ScottH 4) Schommer
The processes of maintenance and change in Dakota culture.

3211. American Indian Philosophies. (691992) (4 cr; limited to 40 students; 1300-1530 MT; NichH 201)
Comparative studies of American Indian philosophies, tribal world views, and sources of ecological consciousness.

5960. Summer Institute for Teachers: The Flowering Tree: Traditional and Contemporary American Indian Literature and Culture—June 20-July 1. (092086) (4 cr) Miller
See Summer Institute for Teachers, page 41.

SECOND TERM

R.3026. Ojibwe Culture and History. (390531) (4 cr; limited to 20 students; 1415-1515 MTWTh; ScottH 4) Oakgrove
The processes of maintenance and change in Ojibwe culture.

American Studies (AmSt)

104 Scott Hall. 624-4190
College of Liberal Arts

FIRST TERM

R.1001. American Cultures. (189817) (4 cr; limited to 40 students; 0915-1015 MTWThF; BlegH 125) Staff
Interdisciplinary study examining class, gender, public policy, and social issues by comparing the cultures and artistic expression of at least three of the following groups: European American, African American, American Indian, Asian American, and Chicano and Latino. 1001: to mid-19th century.

R.3113. American Cultural Diversity. (188277) (4 cr; limited to 40 students; 1030-1130 MTWThF; BlegH 250)
Patterns of American cultural expression, values, and lifestyles analyzed within the context of the dominant "normative" pattern of American life.

3970. Directed Studies. (188201) (1-15 cr; prereq #, Δ, CLA approval) Staff

5920. Summer Institute for Teachers: Sec 5, Children's Literature in the Classroom: Asian and Asian American Writers—June 16 and 17. (790087) (1 cr; 1300-1630 June 16, and 0900-1300 June 17; West Bank Union Auditorium, Kerlan Collection) Karen Nelson Hoyle
See Summer Institute for Teachers, page 41.
Sec 6, (Dis)abling Images in Literature, Film, and the Media—June 20-July 1. (090970) (4 cr; 0930-1200 MTWThF; BlegH 140) Miller
See Summer Institute for Teachers, page 41.

8777. Thesis Credits: Masters. (188563) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688722) (1-36 cr [max 11 cr per summer term])

8970. Readings in American Civilization. (585523) (Cr and hrs ar) Staff

SECOND TERM

R.1003. American Cultures. (789294) (4 cr; limited to 40 students; 0915-1015 MTWThF; BlegH 110) Staff
Interdisciplinary study examining class, gender, public policy, and social issues by comparing the cultures and artistic expression of at least three of the following groups: European American, African American, American Indian, Asian American, and Chicano and Latino. 1003: 1920's to present.

R.3111. Creative Americans and Their Worlds: 1920s to the present. (589295) (4 cr; limited to 40 students; 1145-1345 TTh; BlegH 120)
The cultural life of Americans through study of works and lives of selected artists in several media, including painting, literature, architecture, music, and drama.

3252. American Popular Culture: 1900-1945. (491704) (4 cr per qtr; limited to 20 students; 1300-1515 TTh; BlegH 135) Muscio

3970. Directed Studies. (486468) (1-15 cr; prereq #, Δ, CLA approval) Staff

5920. Topics in American Studies. (291705) (2-6 cr per qtr [12 cr max]; limited to 20 students; 1300-1515 TTh; BlegH 135; prereq #) Muscio
American popular culture, 1900-1945. Meets with 3252.

8777. Thesis Credits: Masters. (088653) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088779) (1-36 cr [max 11 cr per summer term])

8970. Readings in American Civilization. (286472) (ar cr) Staff

Ancient Near Eastern Studies (ANE)

330 Folwell Hall, 625-5353
(Classical and Near Eastern Studies)
College of Liberal Arts
(See also Hebrew; Jewish Studies; Religious Studies)

SECOND TERM

R.1001. The Bible: Narrative Texts. (590088) (4 cr, limited to 20 students; \$3001; \$ReIS 3201; 0900-1130 MW; FolH 306) Paradise
Survey of literary and historical narrative texts from: Pentateuch, Joshua, Judges, Samuel, and Kings. Reading of extensive selections from Bible and secondary materials on literary background of texts. Meets with 3001, ReIS 3201.

R.3001. The Bible: Narrative Texts. (390089) (4 cr, limited to 20 students; \$1001, \$ReIS 3201; 0900-1130 MW; FolH 306) Paradise
Meets with 1001 and ReIS 3201, but requires additional work for advanced undergraduate and graduate credit.

Anesthesiology (Anes)

B515 Mayo. 624-9990
Medical School

FIRST TERM

8777. Thesis Credits: Masters. (988564) (1-16 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

Elective Courses

5186. Clinical Practice in Anesthesia. (188076) (15 cr; prereq CRNA, regis B.S. in nurs anes, 5086, #) Palahniuk, staff

5286. Directed Study, Anesthesia Topics/Project: Clinical. (485157) (Cr ar; prereq CRNA, regis B.S. in nurs anes, #)

5386. Education in Nurse Anesthesia. (488074) (1 cr; prereq CRNA, regis B.S. in nurs anes, #) Palahniuk, staff

SECOND TERM

8777. Thesis Credits: Masters.
(888654) (1-16 cr [max 11 cr per summer term])

Animal Physiology (AnPh)

495 An Sci/VM, St. Paul
624-7455
College of Agriculture

FIRST TERM

8777. Thesis Credits: Masters.
(788565) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(488723) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters.
(488656) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(188781) (1-36 cr [max 11 cr per summer term])

Animal Science (AnSc)

120 Peters Hall, St. Paul.
624-2722
College of Agriculture

FIRST TERM

3306. Artificial Insemination Techniques Laboratory. (188255) (1 cr; prereq # 3305 rec; S-N only; off-campus) Crabo
Practical insemination exercises in cows. Review of the physiology of the bovine estrus cycle and semen handling.

5710. Special Problems. (185248) (Cr ar; prereq #) Staff
Research in an area of animal science under the supervision of a staff member. Written report required.

5715. Tutorial. (986894) (Cr ar; prereq #)
Informally structured course to encourage study in depth of a specific discipline in animal science. Pertinent readings, centered on fundamental propositions, suggested; preparation of written essays of high quality required. Tutorials available in cryobiology, cytogenetics, genetics, meats, nutrition, and physiology.

8750. Concepts and Developments in Meat Science and Technology. (085249) (1 cr [may be repeated once for cr]; prereq #) Staff

Review and evaluation of pertinent scientific literature.

8777. Thesis Credits: Masters.
(088930) (1-16 cr [max 11 cr per summer term])

8810.* Research in Animal Science. (385250) (Cr and hrs ar; prereq #) Staff
Research including experimental studies in the disciplines associated with animal production and research, with emphasis on interdisciplinary studies embracing environmental and managerial considerations.

8820.* Research in Animal Genetics. (185251) (Cr and hrs ar; prereq #) Staff
Research in quantitative genetics, cytogenetics, and other areas related to animal breeding.

8830.* Research in Animal Physiology. (085252) (Cr and hrs ar; prereq #) Staff
Individual research under faculty direction. Topics to be determined by consultation: may be a specialized aspect of a thesis problem or an individual problem of mutual interest to graduate student and adviser.

8840.* Research in Animal Nutrition. (885253) (Cr and hrs ar; prereq #) Staff
Research in selected areas of animal nutrition. Topics and species studied determined by consultation.

8850.* Research in Muscle Chemistry and Physiology. (685254) (Cr and hrs ar; prereq #) Staff
Individual, original research, under staff direction, on selected problems involving the chemical, biochemical, and physiological aspects of muscle and meat technology. Topic may be a specialized aspect of a thesis problem or an individual problem of mutual interest to graduate student and adviser.

8888. Thesis Credits: Doctoral.
(888931) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5710. Special Problems. (186120) (Cr ar; prereq #) Staff
See First Term.

5715. Tutorial. (985051) (Cr ar; prereq #)
See First Term.

8750. Concepts and Developments in Meat Science and Technology. (986121) (1 cr [may be repeated once for cr]; prereq #) Staff
See First Term.

8777. Thesis Credits: Masters.
(688932) (1-16 cr [max 11 cr per summer term])

8810.* Research in Animal Science. (786122) (Cr and hrs ar; prereq #) Staff
See First Term.

8820.* Research in Animal Genetics. (586123) (Cr and hrs ar; prereq #) Staff
See First Term.

8830.* Research in Animal Physiology. (386124) (Cr and hrs ar; prereq #) Staff
See First Term.

8840.* Research in Animal Nutrition. (186125) (Cr and hrs ar; prereq #) Staff
See First Term.

8850.* Research in Muscle Chemistry and Physiology. (086126) (Cr and hrs ar; prereq #) Staff
See First Term.

8888. Thesis Credits: Doctoral.
(488933) (1-36 cr [max 11 cr per summer term]) Staff

Anthropology (Anth)

215 Ford Hall. 625-3400
College of Liberal Arts

FIRST TERM

1101. Human Origins. (591581) (5 cr; 1030-1130 MTWThF; FordH 285) Arnold
World prehistory as investigated by anthropologists; methods and concepts used by anthropologists in studying of prehistoric human biological and cultural development.

1102. Introduction to Social and Cultural Anthropology. (787853) (5 cr, \$5102; 0915-1015 MTWThF; FordH 115) Lipset
Varieties and range of human behavior as revealed through comparative study of cultures in all parts of the world.

3111. Introduction to Archaeology. (391582) (5 cr; 1145-1245 MTWThF; FordH 115) Gibbon
Introduction to the fundamentals of archaeological field and laboratory analysis.

3211. Native Peoples of North America. (191583) (4 cr; 1030-1130 MTWThF; FordH 115) Dunnigan
Aboriginal cultures of native North America. Effects of culture contact.

3303. Women: Anthropological Perspectives. (091584) (4 cr; prereq 1102; WoSt 1101, WoSt 1102 recommended; 0915-1015 MTWThF; FordH 285) Barlow
A cross-cultural, comparative study of women and gender. Theoretical and methodological approaches in anthropology to the study of gender.

3970. Directed Studies. (185525) (Cr and hrs ar; prereq #, Δ, p) Staff

5141. Culture and Personality. (490469) (4 cr; prereq 1102 or 5102 or # [waived for majors in public health, nursing, psychology, sociology, and social work]; 1145-

1245 MTWThF; FordH 285) Ingham
Role of culture in formation of personality. Individual adjustments to demands of culture. Psychological approach to culture.

5970. Directed Readings. (587854) (2-4 cr; prereq #, Δ, CLA approval)
Qualified students may register for work on tutorial basis.

8211. Advanced Field Techniques in Archaeology. (387855) (3 cr; hrs ar) Staff

8777. Thesis Credits: Masters.
(388567) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(188725) (1-36 cr [max 11 cr per summer term])

8950. Directed Studies. (085526) (Cr and hrs ar; prereq #) Staff

SECOND TERM

1102. Introduction to Social and Cultural Anthropology. (087857) (5 cr, \$5102; 0915-1015 MTWThF; FordH 115) Gerlach
See First Term.

3131. Religion and Culture. (690471) (4 cr; prereq 1102 or #; 0915-1015 MTWThF; FordH 285) Penn
Anthropological perspectives on religion. Religion in relation to social order and individual life cycle. Religion and cultural change.

3201. Approaches in Cultural Anthropology. (891585) (4 cr; prereq 1102 or #; 1030-1130 MTWThF; FordH 285) Raheja
Humanistic and scientific conceptions of culture. Interpretation and explanation. Theoretical foundations of current anthropological thought.

3970. Directed Studies. (186478) (Cr and hrs ar; prereq #, Δ, college approval) Staff

5970. Directed Readings. (887858) (2-4 cr; prereq #, Δ, CLA approval)
See First Term.

8777. Thesis Credits: Masters.
(988659) (1-16 cr [max 11 cr per summer term])

8810. Topics: Writing Research Proposals. (691586) (2 cr; prereq Anthropology graduate student; 1230-1400 TTh; FordH 235) Raheja
Formulation of research programs, relation between theory and particular research strategies, writing techniques.

8888. Thesis Credits: Doctoral.
(888783) (1-36 cr [max 11 cr per summer term])

8950. Directed Studies. (086479) (Cr and hrs ar; prereq #) Staff



COURSE DESCRIPTIONS

Architecture (Arch)

110 Architecture. 624-7866
College of Architecture and Landscape
Architecture

FIRST TERM

1301. Introduction to Architectural Drawing. (591547) (4 cr; limited to 20 students; no prereq; \$1010; A/F only; 1230-1645 TTh; Arch 60)
A beginning drawing course that emphasizes visualization and drawing of form and space in the physical environment. Exploration of basic elements of form using design drawing systems and conventions. Development of skills in visual literacy and expression through drawing.

R.3062. Building Systems. (190062) (4 cr; limited to 20 students, prereq Arch major, 3061; 0800-1000 MW, 0915-1200 F; Arch 55) Weeks
Building systems, subsystems, and components; principles of structural theory; materials and methods used in building; new and developing technologies.

R.3411. History of Architecture to 1750. (391548) (4 cr; limited to 30 students; no prereq; \$LA 3411 or Arch 1021; A/F only; 0915-1130 MWF; Arch 25) Satkowski
History of architecture and city planning from antiquity to 1750, as illustrated by major monuments from Western and non-Western cultures.

3970. Directed Study. (085218) (Cr ar; prereq 3081 or Δ)

5970. Directed Study. (291199) (Cr ar; prereq #)

8777. Thesis Credits: Masters. (188568) (1-16 cr [max 4 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

5283. Architecture Studio III: Site, Context and Form. (991545) (6 cr; limited to 25 students; prereq 5282, Architecture major or #; A/F only; 1300-1700 MWF; Arch 220) Mulfinger/Albertsson
Development of architectural form and space within the context of a specific site and building program. Exploration of materials and structure systems within the context of increasingly complex design projects. Lecture, design projects and critiques.

SECOND TERM

3412. History of Architecture since 1750. (691961) (4 cr; limited to 30 students; no prereq; \$LA 3412 or Arch 1023; A/F only; 0915-1130 MWF; Arch 25) Satkowski
A history of the major monuments, concepts, and theories of urbanism and architecture since 1750.

5970. Directed Study. (285130) (Cr ar; prereq #)

8777. Thesis Credits: Masters. (988662) (1-16 cr [max 4 cr per summer term])

Art Education (ArEd)

125 Peik Hall. 625-6372
(Curriculum and Instruction)
College of Education

FIRST TERM

R.5001. Art Media Techniques: Sec 1, Computer Use in the Art Class—June 14-29. (090631) (1-12 cr; [max 12 cr]; limited to 20 students; 1230-1530 MTWThF; PeikH 355; A-F only) Freedman-Norberg
Lectures, demonstrations, discussion, critique sessions exploring and learning various techniques and processes in creativity; handling specific media. Learning experiences using computer graphics technology. Focuses on: computer graphics in teaching art and design; social and aesthetic implications of computer graphics technology; and the development of skills using computer hardware and software to produce graphics. This 3 credit offering is for Art Education post-baccalaureate students only.

Sec 2, Art Education and Instructional Planning—June 20-July 1. (391680) (4 cr; limited to 40 students; 1300-1615 MTWThF; PeikH 40) DiBlasio
Lectures, demonstrations, discussions, critique sessions exploring and learning various techniques and processes in creativity; handling specific media. Each offering focuses on a single topic. Encountering works of art and examining curricular issues related to discipline-based art education; developing instructional plans for multicultural visual arts curricula.

R.5308. Theory and Practice of Teaching Art in Elementary Schools—June 30-July 19. (890632) (4 cr; limited to 30 students; 1300-1630 MTWThF; PeikH 40; A-F only)
Study of art concepts, skills, and processes appropriate for elementary school; methods of art instruction, and children's production of and responses to art. This offering is for Elementary post-baccalaureate students only.

5600. INTERNSHIP. (588275) (3-9 cr; prereq #; hrs ar; A-F only) DiBlasio
Professional assignment for degree candidates under joint supervision of departments and cooperating agency.

5605. Practicum. (388276) (3-9 cr; prereq #; A-F only) DiBlasio
Independent project under direction; gathering data, developing proposals, experimenting with evaluating innovative practices.

5900. Professional Problems. (3 cr; prereq MEd student, #; hrs ar; A-F only)

Independent study for MEd candidates integrating learning from art education, art, and education. Sec 21, (890629) DiBlasio
Sec 22, (690633) Freedman-Norberg

8306. Seminar: Art Education—July 5-19. (191681) (3 cr; Ar time; grad students only) DiBlasio
Reports, evaluation of problems, recent literature.

8900. Problems: Art Education. (Cr ar; prereq #; hrs ar) Independent projects under staff guidance; may include advanced studio practice or technical problems requiring experimental or library research. Sec 21, (190630) DiBlasio
Sec 22, (490634) Freedman-Norberg

SECOND TERM

5389. Applications of Aesthetic Theory in Education—July 21-August 10. (689241) (3 cr; 0800-1015 MTWThF; PeikH 40; A-F only) DiBlasio
Contemporary theories of art, psychological and philosophical foundations. Open to teachers, supervisors, and administrators concerned with art in general education at all levels.

5600. INTERNSHIP. (290635) (3-9 cr; prereq #; hrs ar; A-F only) DiBlasio
See First Term.

5605. Practicum. (190636) (3-9 cr; prereq #; A-F only; hrs ar) DiBlasio
See First Term.

5900. Professional Problems. (790638) (3 cr; prereq MEd student, #; hrs ar; A-F only) DiBlasio
See First Term.

8900. Problems: Art Education. (590639) (Cr ar; prereq #; hrs ar) DiBlasio
See First Term.

Art History (ArH)

108a Jones Hall. 624-4500
College of Liberal Arts

FIRST TERM

R.3008. History of Ancient Art. (491539) (4 cr; limited to 50 students; 1315-1430 MTWTh; Jones H 207B) Staff
Architecture, sculpture, and painting of selected early cultures; stress on influences contributing to the development of Western art.

R.3011. History of Renaissance and Baroque Art. (786797) (4 cr; limited to 65 students; 1015-1130 MTWTh; JonesH 207B) Canedy
The major monuments in architecture, sculpture, and painting from the early 14th century through the baroque period.

R.3585. Afro-American Art. (491993) (4 cr; limited to 65 students; 0845-1000 MTWTh; Jones H 207B) Griebel
History of Afro-American Art from the 18th century through the present day.

R.3595. American Folk Art in the 20th Century. (192071) (4 cr; limited to 65 students; 1145-1300 MTWTh; Jones H 207B) Griebel
Examines the function of folk art in an era of mass communication, mass consumption and mass transportation. By placing the folk object within the context of its making and use, we evaluate how and why such objects retain their importance for the maker and within the community. Emphasis is on material culture as a way to understand folk communities, our own and others.

3970. Directed Studies. (187629) (1-5 cr; prereq #, Δ, college approval) Staff
Guided individual reading or study.

3971. Major Project. (687859) (1 cr; prereq art history major, #) Staff
Completion of a research paper begun in a 5000-level project course.

5970. Directed Readings. (785066) (1-5 cr; prereq sr, #, Δ, CLA approval) Staff
Guided individual reading or study.

8888. Thesis Credits: Doctoral. (988726) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.3009. History of Medieval Art. (691541) (4 cr; limited to 65 students; 0845-1000 MTWTh; Jones H 207B) Steyaert
Medieval architecture, painting, and sculpture from early Christian through Gothic periods.

R.3012. History of 19th, 20th Century Art. (491542) (4 cr; limited to 65 students; 1015-1130 MTWTh; JonesH 207B) Staff

R.3013 Introduction to East Asian Art. (291543) (\$EAS 3013; 4 cr; limited to 50 students; 1145-1300 MTWTh; Jones 207B) Poor
Major themes of East Asian art. The arts of China and Japan (not all-inclusive).

3970. Directed Studies. (187582) (1-5 cr; prereq #, Δ, college approval) Staff
See First Term.

3971. Major Project. (087860) (1 cr; prereq art history major, #) Staff
See First Term.

5970. Directed Readings. (386480) (1-5 cr; prereq sr, #, Δ, CLA approval) Staff
See First Term.

8888. Thesis Credits: Doctoral. (688784) (1-36 cr [max 11 cr per summer term])

Art (Arts)

208 Art Building, 625-8096
College of Liberal Arts

Art Department policy requires that all students must have written permission from the instructor to register for a class after the first class meeting.

Materials fees are assessed at the time of registration for most Art courses. The fee covers part of the cost of expendable materials, models, breakage, and special facilities. For fee amounts, see page 19.

FIRST TERM

R.1101. Drawing I. (4 cr; each section limited to 20 students)
Introduction to studio work; exploration of contemporary and traditional methods. Work from nature, various drawing mediums.
Sec 1, (885527) 0800-1015 MTWThF, ArtB 140, Cowette
Sec 2, (487863) 0800-1015 MTWThF, ArtB 150, Gray
Sec 3, (287864) 1030-1245 MTWThF, ArtB 140, Cowette

R.1301. Sculpture. (789702) (4 cr; limited to 20 students; 0800-1015 MTWThF; ArtB 65) Lucey
Study of structure with emphasis on form and space. Direct construction in metal.

R.1302. Sculpture. (787495) (4 cr; limited to 20 students; 1030-1245 MTWThF; ArtB 50) Lucey
Study of structure with emphasis on form and space. Clay, plaster, wood. Mold making and casting.

R.1520. Printmaking: Lithography. (690373) (4 cr per term [8 cr max]; limited to 20 students; 0800-1015 MTWThF; ArtB 170) Krepps
Planographic printing processes from stones and metal plates. Image making, processing, printing, and presentation in creative context.

R.1540. Printmaking: Screen. (490374) (4 cr per term [8 cr max]; limited to 8 students; 1030-1245 MTWThF; ArtB 170) Bethke
Traditional and contemporary screen printing media. Paper stencil, tusche and glue, cut stencil, and photo stencil techniques, and their aesthetic applications. Meets with 3540 and 5540.

R.1701. Photo Medium. (4 cr; each section limited to 20 students)
Contemporary and historical use of photography. Use of camera, film development, and enlarging. The creative process.
Sec 1, (387936) 0800-1015 MTWThF, ArtB 120, Rossi
Sec 2, (987494) 1030-1245 MTWThF, ArtB 120, Rossi

R.1812. Ceramics: Wheel Throwing. (786184) (4 cr; limited to 20 students; 1030-1245 MTWThF; ArtB 10) Hoard
Introduction to wheel throwing

techniques for individual creative expression.

R.3110. Drawing. (491587) (4 cr per term [12 cr max]; limited to 12 students; prereq 1102, 1401; 1030-1245 MTWThF, ArtB 150) Gray
From model, still life, and nature; individual creative expression in various mediums. Meets with 5110.

R.3130. Watercolor. (290375) (4 cr per term [12 cr max]; limited to 12 students; prereq 1101, 1102, 1401, 1404; 1030-1245 MTWThF; ArtB 141)
Transparent watercolor, gouache, casein, tempera. Figure, still life, landscape, abstract design. Meets with 5130.

R.3430. Paper: Pulp to Plastic Expression. (389220) (4 cr per term [12 cr max]; limited to 10 students; prereq 1401, 1xxx level Studio Arts course; 1030-1245 MTWThF; ArtB 35) Krepps
Creative and traditional approaches in papermaking. The role of paper in the total expression of an art work and the relationship of materials and preparation that lends uniqueness to handmade papers. Papermaking as a creative involvement in both two- and three-dimensional applications. Meets with 5430.

R.3540. Printmaking: Screen. (689708) (4 cr per term [12 cr max]; limited to 7 students; prereq 1401, 4 cr of 1540 or #; 1030-1245 MTWThF; ArtB 170) Bethke
Screen printing techniques, emphasis on color and image development. Meets with 5540.

3970. Directed Study. (1-5 cr per term [8 cr max]; prereq 24 cr in studio arts and #, Δ, college approval)
Sec 2, (589703) Bethke
Sec 4, (085011) Cowette
Sec 6, (191589) Gray
Sec 9, (986801) Hoard
Sec 11, (186187) Krepps
Sec 13, (791594) Lucey
Sec 20, (190183) Rossi
Sec 21, (490200)

3980. Directed Instruction. (1-5 cr per term [8 cr max]; prereq #, Δ, college approval)
Students assist in teaching a course they have completed.
Sec 2, (389704) Bethke
Sec 4, (885012) Cowette
Sec 6, (491590) Gray
Sec 9, (586803) Hoard
Sec 11, (086188) Krepps
Sec 13, (591595) Lucey
Sec 20, (990184) Rossi
Sec 21, (590379)

R.5110. Drawing. (291588) (4 cr per term [16 cr max]; limited to 8 students; prereq 12 cr of 3110 or #; 1030-1245 MTWThF, ArtB 150) Gray
Drawing in all mediums from life. Meets with 3110.

R.5130. Watercolor. (990380) (4 cr per term [16 cr max]; limited to 8 students; prereq 12 cr of 3130 or #;

1030-1245 MTWThF; ArtB 141)
Advanced watercolor techniques, aesthetic directions. Individual concepts and development of sensibilities. Meets with 3130. May not be taken for graduate credit.

5190. Advanced Entry: Drawing and Painting. (4 cr per term [16 cr max]; prereq #, Δ)
Sec 4, (686193) Cowette
Sec 6, (291591) Gray

5390. Advanced Entry: Sculpture. (4 cr per term [16 cr max]; prereq #, Δ)
Sec 13, (189705) Lucey

R.5430. Paper: Pulp to Plastic Expression. (189221) (4 cr per term [16 cr max]; limited to 4 students; prereq 12 cr of 3430 or #; 1030-1245 MTWThF; ArtB 35) Krepps
See 3430. Meets with 3430.

R.5540. Printmaking: Screen. (489709) (4 cr per term [16 cr max]; limited to 5 students; prereq 12 cr of 3540 or #; 1030-1245 MTWThF; ArtB 170) Bethke
Screen processes and combined techniques. Meets with 1540 and 3540.

5590. Advanced Entry: Printmaking. (4 cr per term [16 cr max]; prereq #, Δ)
Sec 2, (889710) Bethke
Sec 11, (886192) Krepps

5790. Advanced Entry: Photography. (192032) (4 cr per term [16 cr max]; prereq #, Δ)
Sec 20, Rossi

5890. Advanced Entry: Ceramics/Glass. (992033) (4 cr per term [16 cr max]; prereq #, Δ) Hoard

5970. Directed Study. (1-5 cr per term [12 cr max]; prereq 24 cr in studio arts and #, Δ, CLA approval)
Sec 2, (689711) Bethke
Sec 4, (685013) Cowette
Sec 6, (191592) Gray
Sec 9, (386804) Hoard
Sec 11, (886189) Krepps
Sec 13, (391596) Lucey
Sec 20, (790185) Rossi
Sec 21, (391226)

8110. Drawing. (4 cr per term [12 cr max])
Sec 4, (786895) Cowette
Sec 6, (991593) Gray

8120. Painting. (4 cr per term [24 cr max])
Sec 4, (586896) Cowette

8510. Printmaking. (4 cr per term [36 cr max])
Sec 2, (489712) Bethke
Sec 11, (890405) Krepps

8810. Ceramics. (386897) (4 cr per term [24 cr max]) Hoard

SECOND TERM

R.1101. Drawing I. (187937) (4 cr; limited to 20 students; 0800-1015

MTWThF; ArtB 160) Roode
See First Term.

R.1102. Drawing II. (186481) (4 cr; limited to 20 students; prereq 1101; 0800-1015 MTWThF; ArtB 141)
Feinberg
Work from life and nature; color and pictorial structure.

R.1301. Sculpture. (091603) (4 cr; limited to 20 students; 0800-1015 MTWThF; ArtB 65)
Study of structure with emphasis on form and space. Direct construction in metal.

R.1404. Color. (386186) (4 cr; limited to 20 students; §1104; prereq 1101; 1030-1245 MTWThF; ArtB 141)
Feinberg
Color and its visual implications.

R.1701. Photo Medium. (4 cr; each section limited to 20 students)
See First Term.
Sec 1, (391601), 0800-1015 MTWThF, ArtB 120
Sec 2, (191602), 1030-1245 MTWThF, ArtB 120

R.1811. Ceramics: Handbuilding. (585070) (4 cr; limited to 20 students; 1030-1245 MTWThF; ArtB 10) Lane
Introduction to hand-building techniques in clay for individual creative expression.

R.3120. Painting. (386494) (4 cr per term [12 cr max]; limited to 12 students; prereq 1101, 1102, 1401, 1404, 3105, 4 cr of 3110 or §3110; 1030-1245 MTWThF; ArtB 151)
Roode
Media and problems in painting. Individual projects. Meets with 5120.

3970. Directed Study. (1-5 cr per term [8 cr max]; prereq 24 cr in studio arts and #; Δ, college approval)
Sec 5, (587496) Feinberg
Sec 12, (186190) Lane
Sec 18, (191597) Roode
Sec 21, (490388)

3980. Directed Instruction. (1-5 cr per term [8 cr max]; prereq #, Δ, college approval)
See First Term.
Sec 5, (387497) Feinberg
Sec 12, (086191) Lane
Sec 18, (091598) Roode
Sec 21, (490391)

R.5120. Painting. (886502) (4 cr per term [16 cr max]; limited to 8 students; prereq 12 cr of 3120 or #; 1030-1245 MTWThF; ArtB 151)
Roode
Various media. Individual problems. Meets with 3120.

5190. Advanced Entry: Drawing/Painting. (4 cr [max 16 cr]; prereq #, Δ)
Sec 5, (786251) Feinberg
Sec 18, (891599) Roode

5890. Advanced Entry: Ceramics/Glass. (792034) (4 cr per term [max 16 cr]; prereq #, Δ) Lane



COURSE DESCRIPTIONS

5970. Directed Studies. (1-5 cr per term [max 12 cr]; prereq 24 cr in studio arts and #, Δ, CLA approval) Sec 5, (187498) Feinberg Sec 12, (586185) Lane Sec 18, (591600) Roode

8110. Drawing. (4 cr per term [max 12 cr]) Sec 5, (186898) Feinberg Sec 18, (891604) Roode

8120. Painting. (4 cr per term [max 24 cr]) Sec 5, (086899) Feinberg Sec 18, (691605) Roode

8810. Ceramics. (592035) (4 cr per term [max 24 cr]) Lane

Astronomy (Ast)

356 Physics. 624-0211
Institute of Technology

FIRST TERM

R.1011. Descriptive Astronomy. (386091) (4 cr; limited to 153 students; 0915-1115 MWF; Phys 166) Survey of the sun, moon, planets, and stars; description of the galaxy and universe to which the sun belongs.

R.1015. Descriptive Astronomy Laboratories. (1 cr, \$1025H; prereq high school algebra...high school trigonometry recom; each section limited to 25 students; 4 lab hrs per wk; minimum one night observation required) Sec 1, (988273) 1300-1500 MW, Phys 450 Sec 2, (788274) 0915-1115 TTh, Phys 450

8777. Thesis Credits: Masters. (088569) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788727) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.1011. Descriptive Astronomy. (386589) (4 cr; limited to 153 students; 0915-1115 MWF; Phys 166) See First Term.

R1015. Descriptive Astronomy Laboratories. (1 cr, \$1025H; prereq high school algebra...high school trigonometry recom; each section limited to 25 students; 4 lab hrs per wk; minimum one night observation required) Sec 1, (288271) 1300-1500 MW, Phys 450 Sec 2, (188272) 0915-1115 TTh, Phys 450

8777. Thesis Credits: Masters. (588664) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288786) (1-36 cr [max 11 cr per summer term])

B

Biochemistry (BioC)

140 Gortner Laboratory, St. Paul. 624-7755

College of Biological Sciences

FIRST TERM

R.3021. Biochemistry. (191485) (4 cr; \$Biol 5001; prereq Biol 1009, 8 cr organic chem; limited to 150 students; 0815-0945 MTWThF; BorH 335) Staff An introduction to our fundamentals of biochemistry is presented, including the structure and function of protein, nucleic acids, lipids and carbohydrates; metabolism and regulation of matabolism; quantitative treatments of chemical equilibrium; enzyme catalysis, and bioenergetics; and the chemical basis of genetic information flow.

5950. Special Topics. (188062) (1-5 cr; prereq #, Δ)

5970. Directed Studies. (788050) (Cr ar; prereq #, Δ) Staff

5990. Directed Research. (588051) (Cr ar; prereq #, Δ) Staff Laboratory or field investigation of selected areas of research.

8290. Current Research Techniques. (685268) (1-3 cr; prereq grad major in biochemistry; S-N only) Graduate faculty

Research projects in biochemistry carried out in the research laboratory of an individual staff member. Will satisfy all or part of the laboratory requirements for the Ph.D. degree.

8777. Thesis Credits: Masters. (388570) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388729) (1-36 cr [max 11 cr per summer term])

8990. Graduate Research. (485269) (2-5 cr; prereq #) Graduate faculty Research problems in various fields in biochemistry represented by staff interest.

SECOND TERM

5950. Special Topics. (988063) (1-5 cr; prereq #, Δ)

5970. Directed Studies. (388052) (Cr ar; prereq #, Δ) Staff

5990. Directed Research. (188053) (Cr ar; prereq #, Δ) Staff See First Term.

8290. Current Research Techniques. (586137) (1-3 cr; prereq grad major in biochemistry; S-N only) Graduate faculty See First Term.

8777. Thesis Credits: Masters. (188666) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988788) (1-36 cr [max 11 cr per summer term])

8990. Graduate Research. (386138) (2-5 cr; prereq #) Graduate faculty See First Term.

Biochemistry, Medical (MdBc)

4-225 Millard Hall. 625-6100
Medical School

Elective Courses

FIRST TERM

5053. Problems in Biochemistry. (686372) (1-10 cr; may be taken one or both terms; prereq 5100 or 5753; hrs ar; biochem grad students must register S-N) Staff Special work arranged with qualified students.

8290. Current Research Techniques. (486373) (1-3 cr; prereq grad major in biochemistry, #; S-N only) Staff

8300. Research. (286374) (Cr and hrs ar) Staff

SECOND TERM

5053. Problems in Biochemistry. (187039) (1-10 cr; may be taken one or both terms; prereq 5100 or 5753; hrs ar; biochem grad students must register S-N) Staff See First Term.

8290. Current Research Techniques. (487040) (1-3 cr; prereq grad major in biochemistry, #; S-N only) Staff

8300. Research. (287041) (Cr and hrs ar) Staff

Biology (Biol)

223 Snyder Hall. 624-9717
College of Biological Sciences
(See also special section on Itasca Biology Program.)

FIRST TERM

R.1103. General Botany (789537) (5 cr, \$3012; limited to 20 students; prereq 1009; students who plan to major in biology in CLA or any bioscience major in CBS should take 3012; lect 1300-1400 MTWThF, BioSci 70; lab 0915-1245 TTh; BioSci 176) Koukkari

Levels of organization of plants, plant functions, plant growth and development, plant reproduction.

R.1106. General Zoology (191995) (5 cr; \$1806; limited to 25 students; prereq 1009; lect 0930-1050 MTWTh, BorH 365; lab 1200-1400 MTWTh; BioSci 182) Barnwell Survey of animal phyla; structure, function, behavior, adaptation, and evolutionary relationships.

R.1806. General Zoology—June 14-July 19. (490908) (5 cr; limited to 20 students; prereq general biology; 0800-1700 MTh; offered at Itasca) Megard Survey of animal phyla; structure, functions, behavior, adaptation, and evolutionary relationships.

R.3011. Animal Biology. (5 cr, \$1106; each section limited to 20 students; prereq 1009, Chem 1005; lect 1210-1330 MTWTh; ClaOff B35) Comparison of ways different phyla have solved similar physiological problems. Laboratory includes survey of major animal groups and physiological experiments. Meets with 3111. Lab 1, (188952) 1000-1200 MTWTh, BioSci 107 Lab 2, (988953) 1000-1200 MTWTh, BioSci 245 Lab 3, (391498) 1400-1600 MTWTh, BioSci 107

R.3012. Plant Biology. (385331) (5 cr, \$1103, 3812; limited to 36 students; prereq 1009, Chem 1005; lect 0915-1030 MTWTh, BioSci 70; lab 1045-1230 MTWTh; BioSci 151) Charvat Plant diversity and evolution; structure and function of the plant cell and of the whole organism; growth and development of plants.

3111. Animal Biology. (788954) (4 cr, \$3011; prereq 1009, 1106, Chem 1005; 1210-1330 MTWTh; ClaOff B35) Lectures covering the comparative physiology of various animal groups; coordination, movement, support, excretion, reproduction. Meets with 3011.

5003. Genetics. (088085) (4 cr, \$GCB 3022, \$GCB 5022; prereq 5001; 1125-1245 MTWThF; ClaOff B25) Introduction to the nature of genetic information, its transmission from parents to offspring, its expression in cells and organisms, and its course in populations.

R.5041. Ecology. (4 cr; each section limited to 18 students; \$5841; prereq Math 1142 or 1211, Biol 1103 or 1106, or 3011 or 3012; A-F only; lect 0800-1000 MTThF; Ecology 150A) Staff Growth, structure and evolution of populations. Pairwise biotic interactions between species and their effect on the diversity and structure of natural communities. Nutrient dynamics, function, productivity, and temporal stability of ecosystems.

Rec 1, (186201) 1030-1230 TTh,
Ecology 150A
Rec 2, (986202) 1330-1530 TTh,
Ecology 150A

**R.5816. Field Biology Photography—
June 14-July 19.** (985390) (5 cr;
limited to 20 students; A-F only;
prereq course in beginning biology; Δ;
0800-1700 WS; taught at Itasca)
Rubbelke

Field photography techniques for
documentation of insects, vertebrates,
aquatic organisms, and habitats of the
Itasca area. Emphasis on general
photographic principles and applied
advanced techniques using flash,
reversed lenses, and infra-red
photoelectric tripping devices. On-site
processing of color slides and black
and white films. No previous
processing experience required.
Students will be charged for darkroom
supplies, which usually run to \$75.00.

**R.5825. Recombinant DNA
Laboratory—June 12-July 1.** (991996)
(4 cr; limited to 12 students; prereq
\$5125, \$MicB 5125, \$MicB 5425,
application necessary, Δ; 0930-1600
MTWThF; offered at Itasca) Hackett &
Phillips
Introduction to basic recombinant
DNA techniques. The course
emphasizes methods for growing,
isolating and purifying recombinant
DNAs and cloning vectors.

R.5850. Special Topics in Biology.
(prereq Δ; limited to 20 students; A-F
only; taught at Itasca)
**Sec 1, (986264) Aquatic Ecology,
June 14-July 19.** (5 cr; prereq 15 cr
biology, 5 cr chemistry; 0800-1700
MTh) Whiteside
Biological, chemical and physical
aspects of lakes. Includes extensive
laboratory and field analysis of the
ecological relationships between
aquatic organisms and their
environment.

**5890. Research Problems at Itasca in
Ecology and Behavioral Biology; or
Fisheries and Wildlife; or Plant
Pathology; or Zoology.** (485272) (See
Itasca Biology Program) (Cr ar; prereq
#, Δ) Staff
Undergraduate and graduate students
develop a short-term research project
in most of the departments offering
courses at Itasca during Term I and
Term II.

**5960. Summer Institute for Teachers:
Teaching and Learning with
Museums—June 20-July 1.** (xxxxxx) (4
cr;
See Summer Institute for Teachers,
page 41.

**FIRST AND SECOND TERMS:
TEN-WEEK COURSES**
(Register once in Term I)

**R. 1201. Evolutionary and Ecological
Perspectives.** (5 cr; \$Biol 1008; each
section limited to 20 students; Lect
0800-0915 TTh; Moost 2-650) Decker
An introductory biology course with

emphasis on general evolutionary and
ecological principles. Scientific
inquiry, history of evolutionary
thought, variation, heredity,
evolutionary mechanisms, origin and
evolutionary history of life including
evolution of humans, population
biology, ecology of communities and
ecosystems, behavioral ecology. (No
prereq).

Lab Sec. 1, (991495) 0930-1230 T,
KoltH S187
Lab Sec. 2, (791496) 1300-1600 T,
KoltH S187
Lab Sec. 3, (591497) 0930-1230 Th,
KoltH S187

SECOND TERM

**R.3812. Plant Biology—July 21-
August 24.** (689417) (5 cr; limited to
20 students; \$1103, \$3012; prereq
1009, Chem 1005; 0800-1700 TF;
Special offerings of the core Plant
Biology course taught at Itasca)
Biesboer,
Plant diversity and evolution; structure
and function of the plant cell and of
the whole organism; growth and
development of plants. This course
satisfies the plant biology require-
ments for University of Minnesota
majors.

R.5004. Cell Biology. (588955) (3 cr;
prereq 5001; 1030-1130 MTWThF;
ClaOff B25)
Structured functions of membranes,
organelles, and other macromolecular
aggregates found in plant, animal, and
bacterial cells. Cell form and
movement, intercellular communi-
cation, transport, and secretion.

R.5841. Ecology—July 21-August 24.
(988418) (5 cr; limited to 20 students;
\$5041; prereq Math 1142 or 1211,
Biol 1103 or 1106 or 3011 or 3012, Δ;
A-F only; 0800-1700 MTh; Special
offering of the core ecology course,
taught at Itasca) Siniff and Staff
Growth, structure and evolution of
populations. Pairwise biotic
interactions between species and their
effect on the diversity and structure of
natural communities. Nutrient
dynamics, function, productivity, and
temporal stability of ecosystems.

5850. Special Topics in Biology.
(Taught at Itasca) See First Term.
**Sec 2, Behavior/Telemetry, July 23-
August 10,** (790901), 0800-1700
WSa, 3 cr, Siniff, Tester and Staff
Use of radio-telemetry to study animal
behavior, especially movements and
the use of space. Basic features of
radiotransmission, transmitters, and
receivers relevant to biotelemetry; safe
and humane methods for capture and
immobilization of animals for radio-
tagging; techniques for attachment of
transmitters, locating radio-tagged
animals; use of maps and positioning
systems; processing data from radio-
fixes; telemetry for further behavioral
and physiological information.

**5890. Research Problems at Itasca in
Ecology and Behavioral Biology; or**

**Fisheries and Wildlife; or Plant
Pathology; or Zoology.** (185332) (See
page 40) (Cr ar; prereq #, Δ) Staff

5950. Special Topics in Biology.
(391193) (2 cr; 0900-1045 TWTh;
BioSci 260) Sedler

**Biomedical Engineer-
ing (BME)**

Box 107 UMHC. 626—3446
Laboratory Medicine and Pathology
Medical School & Institute of
Technology

FIRST TERM

**8002. Internship in Biomedical
Engineering.** (689174) (3 cr; prereq
biomed engineering grad stu or Δ; S-N
only)

8770. Plan B Project. (589555) (4 cr;
no cr toward PhD; prereq #; A-F only)

8777. Thesis Credits: Masters.
(988855) (1-16 cr [max 11 cr per
summer term])

8888. Thesis Credits: Doctoral.
(588941) (1-36 cr [max 11 cr per
summer term])

8970. Independent Study. (389556)
(1-4 cr; prereq #; A-F only)

8990. Directed Research. (691457)
(1-4 cr; prereq #; A-F only)

SECOND TERM

**8002. Internship in Biomedical
Engineering.** (489175) (3 cr; prereq
biomed engineering grad stu or Δ; S-N
only)

8770. Plan B Project. (189557) (4 cr;
no cr toward PhD; prereq #; A-F only)

8777. Thesis Credits: Masters.
(388942) (1-16 cr [max 11 cr per
summer term])

8888. Thesis Credits: Doctoral.
(788856) (1-36 cr [max 11 cr per
summer term])

8970. Independent Study. (089558)
(1-4 cr; prereq #; A-F only)

8990. Directed Research. (491458)
(1-4 cr; prereq #; A-F only)

**Biomedical Science
(BMSc)**

FIRST TERM

8888. Thesis Credits: Doctoral.
(390402) (1-36 cr [max 11 cr per
summer term])

8990. Research: Biomedical Science.
(290134) (cr ar; prereq student
enrolled in MD/PhD program)

SECOND TERM

8888. Thesis Credits: Doctoral.
(590401) (1-36 cr [max 11 cr per
summer term])

8990. Research: Biomedical Science.
(190135) (cr ar; prereq student
enrolled in MD/PhD)

**Biophysical Sciences
(BPhy)**

V372 VFW Cancer Research Center.
625-8440
Medical School

FIRST TERM

8223. Research. (689207) (Cr ar) Staff

8777. Thesis Credits: Masters.
(888573) (1-16 cr [max 11 cr per
summer term])

8888. Thesis Credits: Doctoral.
(588731) (1-36 cr [max 11 cr per
summer term])

SECOND TERM

8223. Research. (489208) (Cr ar) Staff

8777. Thesis Credits: Masters.
(888671) (1-16 cr [max 11 cr per
summer term])

8888. Thesis Credits: Doctoral.
(388794) (1-36 cr [max 11 cr per
summer term])



COURSE DESCRIPTIONS

Business Administration (BA)

290 Hubert H. Humphrey Center.
624-3313
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on page 12.

FIRST TERM

R.3998. Independent Study. (985275) (Cr ar [may be repeated for cr]; limited to 10 students; prereq p) Staff Student-initiated project and/or independent course of study. Forms and instructions available in 290 HHHctr.

8888. Thesis Credits: Doctoral. (588728) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.3998. Independent Study. (386141) (Cr ar [may be repeated for cr]; limited to 10 students; prereq p) Staff See First Term.

8888. Thesis Credits: Doctoral. (188787) (1-36 cr [max 11 cr per summer term])

Business, Government, and Society (BGS)

837 Management/Economics. 624-5232
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on page 12.

FIRST TERM

R.3004. International Business. (089818) (4 cr; limited to 45 students; 0915-1130 TTh; BlegH 435) World business with emphasis on the global economy, international concepts, global business strategies, multinational corporations and technology, personnel and operations in the host nations. Resource (including energy) questions in their global contexts: quantities, demands, distribution of resources.

Business Law (BLaw)

645 Management/Economics. 624-6506
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on pages 12.

FIRST TERM

R.3058. Introduction to Law, The Law of Contracts and Sales Contracts. (785276) (4 cr, \$8158; limited to 40 students; prereq Econ 1002; 0800-0945 MTW; BlegH 420; A-F only) Andrews Study of the origin of law, its place in and effect upon society; the history and development of law; the system of courts; and legal procedure. An extensive study of the law of contracts as the basic law affecting business transactions; law affecting the sales of goods contracts.

Business and Marketing Education (BME)

425 Vocational/Technical Education Building, St. Paul.
624-3004
(Vocational and Technical Education) College of Education

FIRST TERM

R.5262. Customer Service Training (590642) (3 cr; limited to 25 students; 1730-2030 MW; VoTech 220) Overview of customer service strategies used by successful organizations and training practices used to develop customer-oriented personnel.

R.5353. Curriculum Construction in Business and Marketing Education—July 5-15. (685318) (4 cr; limited to 25 students; 0800-1205 MTWThF; VoTech R285; A-F only) Stone Content identification, program organization, preparation of instructional objectives, guidelines for selection and development of instructional materials.

R.5359. Occupational Experience. (087499) (1-18 cr; limited to 25 students; S-N only; 1800-2000 T, June 14, and hrs ar; VoTech 420C) Weisensel Observation and employment experiences in business offices or marketing businesses; weekly seminars on application to teaching and guidance of high school and post-high school students. Each 1-credit offering requires 85 hours of work.

R.5370. Special Topics in Instruction: Using Microcomputer Applications Software to Teach Business Content—June 20-July 1 (791529) (3 cr; limited to 20 students; 0830-1200 MTWThF; VoTech 230) Lambrecht Using word processing, spreadsheet,

database, and graphics software to support instruction in business and marketing content areas. Familiarity in using this software by course participants is assumed. Advanced features of the software will be examined as these features support the use of application to engage students in learning subject matter content.

5600. Field-Based Projects in Business and Marketing Education. (791997) (1-12 cr [max 12 cr]; hrs ar; A-F only) Stone, Lambrecht, McLean Individual or group work on curricular, instructional, developmental, or evaluation problems and projects applicable to local school or business situations.

5900. Directed Study in Business and Marketing Education (591998) (1-6 cr [max 6 cr]; S-N optional; prereq Δ; hrs ar) Stone, Lambrecht, McLean Opportunity for individual learning experiences not covered by regular courses.

8777. Thesis Credits: Masters. (188571) (1-16 cr [max 11 cr per summer term])

8900. Problems: Business and Marketing Education. (391999) (1-9 cr [max 9 cr]; prereq #; hrs ar) Stone, Lambrecht, McLean Individual research.

SECOND TERM

R.5253. Supervisory Training. (189719) (3 cr; limited to 25 students; prereq VoEd 5340 or equiv; 1730-2030 MW; VoTech R285; A-F only) Problems, practices, programs, issues, and methodologies related to preparing trainers of supervisors in business, office, and marketing occupations.

R.5261. Sales Training—August 15-19. (290652) (3 cr; limited to 25 students; 0800-1500 MTWThF; VoTech 220; A-F only) Introduction to strategies and techniques useful in developing effective sales people.

R.5310. Introduction to Microcomputer Applications in Business and Marketing Education. (190653) (3 cr; limited to 25 students; 1600-1830 TTh; VoTech 230; A-F only) Instructional uses of microcomputers; representative business and marketing education applications, including word processing, databases, spreadsheets, and graphics.

5600. Field-Based Projects in Business and Marketing Education. (990654) (1-12 cr [max 12 cr]; prereq #; hrs ar; A-F only) Stone See First Term.

5900. Directed Study in Business and Marketing Education. (790655) (1-6 cr [max 6 cr]; S-N optional; prereq Δ; hrs ar) Stone See First Term.

8777. Thesis Credits: Masters. (888668) (1-16 cr [max 11 cr per summer term])

8900. Problems: Business and Marketing Education. (590656) (1-9 cr [max 9 cr]; hrs ar) Stone See First Term.

C

Cell Biology and Neuroanatomy (CBN)

4-135 Jackson Hall. 624-1123
Medical School

FIRST TERM

3970. Special Problems. (785391) (2 cr; prereq #) Staff Guided individual reading or study.

8156. Advanced Anatomy. (485398) (1-6 cr; prereq #) Staff Individual problems in gross anatomy, embryology, histology, or neuroanatomy.

8200. Research. (490116) (1-10 cr; prereq #) Staff Research directed by faculty in Cell Biology and Neuroanatomy.

8777. Thesis Credits: Masters. (488575) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388732) (1-36 cr [max 11 cr per summer term])

SPECIAL TERMS: THREE-, SIX-, OR TEN-WEEK COURSES

(Register once in Term I)

5304. Head, Neck Anatomy for Medical/Dental Residents. (590883) (5 cr; prereq participation in a residency in the Medical School or School of Dentistry) Robertson and staff

5500. General Gross Anatomy. (585392) (ar cr; prereq Phase D medical student or #) Robertson

5501. The Extremities. (385393) (ar cr; prereq Phase D medical student or #) Robertson

5502. Head and Neck. (185394) (ar cr; prereq Phase D medical student or #) Robertson

5508. The Thorax. (085395) (ar cr; prereq Phase D medical student or #) Robertson

5509. The Abdomen. (885396) (ar cr;

prereq Phase D medical student or #)
Robertson

5510. Perineum, Genital-Urinary System and Pelvis. (685397) (ar cr; prereq Phase D medical student or #) Robertson

SECOND TERM

3970. Special Problems. (285399) (2 cr; prereq #) Staff
See First Term.

8156. Advanced Anatomy. (085400) (1-6 cr; prereq #) Staff
See First Term.

8200. Research. (290117) (1-10 cr; prereq #) Staff
See First Term.

8777. Thesis Credits: Masters. (488673) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088796) (1-36 cr [max 11 cr per summer term])

Cell and Developmental Biology (CDB)

250 Biological Sciences.
624-3003
(Genetics and Cell Biology)
College of Biological Sciences

FIRST TERM

8777. Thesis Credits: Masters. (288576) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088734) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (988676) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688798) (1-36 cr [max 11 cr per summer term])

Center for Interfacial Engineering (CIE)

144 Shepherd Laboratories. 626-2230

TEN-WEEK COURSE:

Register once in Term I.

5102. Techniques, Language, and Concepts. (191222) (1-3 cr; prereq research appointment or #; ar, ar) Evans

Individualized learning experience that consists of modules focusing on development of interpersonal, teamwork, and communication skills and on understanding academic and industrial research cultures.

Chemical Engineering (ChEn)

151 Amundson Hall. 625-1313
(Chemical Engineering and Materials Science)
Institute of Technology

FIRST TERM

5902, 5903, 5904, 5905. Special Topics. (686050) (486051) (286052) (186053) (Cr ar)

8777. Thesis Credits: Masters. (188594) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288741) (1-36 cr [max 11 cr per summer term])

8901-8902-8903. Research in Chemical Engineering. (986054) (786055) (586056) (Cr ar)

SECOND TERM

5902, 5903, 5904, 5905. Special Topics. (486566) (286567) (186568) (986569) (Cr ar)

8777. Thesis Credits: Masters. (088684) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288805) (1-36 cr [max 11 cr per summer term])

8901-8902-8903. Research in Chemical Engineering. (286570) (186571) (986572) (Cr ar)

Chemical Physics (ChPh)

139 Smith Hall. 624-6000
Institute of Technology

FIRST TERM

8777. Thesis Credits: Masters. (988600) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588745) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (288688) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588809) (1-36 cr [max 11 cr per summer term])

Chemistry (Chem)

139 Smith Hall. 624-6000
Institute of Technology

A \$40 deposit card, available at the Bursar's Office, Williamson Hall, is necessary for all lab courses.

FIRST TERM

Placement exam is required of all University of Minnesota students to be placed into either Chem 1001 or Chem 1051. Exam recommended for summer-only students for advisory purposes. Call the General Chemistry Office at (612) 624-0026 for available testing dates.

R.1001. General Principles of Chemistry. (4 crs; Limited to 60 students; each recitation section limited to 20 students; \$1003,1008. For students not passing the chemistry placement exam; prereq high school chemistry or equiv., 2 yrs. high school mathematics required [4 yrs recommended], high school physics recommended.

Introduction to chemistry, matter and energy, atoms, molecules, chemical bonding, the mole and chemical calculations, gases, liquids, solids, solutions, chemical reactions, acids, bases and equilibrium.
Lect 0800-0930 MTWTh, SciCB 325
Sec 1, (590544) Rec 1145-1245 MW, Smith 121
Lab 1300-1600 MWF* SmithH 249
Sec 2, (390545) Rec 1145-1245 MW, KoltH S135
Lab 1300-1600 MWF* SmithH 249
Sec 3, (090547) Rec 1145-1245 MW, KoltH S137
Lab 1300-1600 MWF* SmithH 249
*Fridays are make-up labs only; all sections may attend.

R.1051. Chemical Principles I. (4 crs; limited to 100 students; each recitation section limited to 20 students; primarily for stu majoring in sci or eng; prereq 1001 or passing chemistry placement examination. 1051 is prereq for 1052.)

Atomic theory, periodic properties of elements, chemical thermodynamics, development of the use of structural concepts, geometry of molecules, bonding theory, behavior of the gaseous and liquid states, solid state and materials chemistry, dynamics, equilibrium, behavior of solutions, acids and bases, descriptive chemistry of elements and compounds.
Lect 0800-0930 MTWTh, SciCB 375;
Sec 1, (690552) Rec 1145-1245 MW, FordH 40
Lab 1300-1600 MWF* SmithH 110
Sec 2, (290554) Rec 1145-1245 MW, FordH 170
Lab 1300-1600 MWF* SmithH 110
Sec 3, (190555) Rec 1145-1245 MW, FordH 175
Lab 1300-1600 MWF* SmithH 110
Sec 4, (990556) Rec 1145-1245 MW, SmithH 231
Lab 1300-1600 MWF* SmithH 110
Sec 5, (790557) Rec 1145-1245 MW, SmithH 331

Lab 1300-1600 MWF* SmithH 110
*Fridays are make-up labs only; all sections may attend.

R.1052. Chemical Principles II. (4 crs; limited to 60 students; each recitation section limited to 20 students; prereq 1051) See 1051.

Lect 0800-0930 MTWTh, SciCB 175;
Sec 1, (590561) Rec 1145-1245 MW, AmundH 124
Lab 1300-1600 MWF* SmithH 210
Sec 2, (390562) Rec 1145-1245 MW, AmundH 158
Lab 1300-1600 MWF* SmithH 210
Sec 3, (190563) Rec 1145-1245 MW, AmundH 120
Lab 1300-1600 MWF* SmithH 210
*Fridays are make-up labs only; all sections may attend.

R.3301. Elementary Organic Chemistry I. (786038) (4 cr; limited to 200 students; prereq 1052 or equiv; 0800-1015 TWThF; SmithH 100) Important classes of organic compounds, both aliphatic and aromatic, and heterocyclic compounds.

R.3303. Elementary Organic Chemistry III. (486194) (4 cr; limited to 30 students; prereq 3302, 3306 or ¶3306; 0800-1015 MTWTh; SmithH 111)

Basic principles of organic chemistry, with emphasis on a survey of organic reaction mechanisms, intended to coordinate the knowledge which has been acquired in the preceding two quarters of organic chemistry.

R. 3305. Elementary Organic Chemistry Laboratory I. (2 cr; prereq 3301 or ¶3301; lect 1030-1130 T, SmithH 100)

See 3301.
Sec 1, Lab (986040) 1145-1600 TW; limited to 80; SmithH 349
Sec 2, Lab (891117) 1145-1600 ThF; limited to 64; SmithH 349

3970. Directed Study. (586042) (Cr ar; prereq #)
On- or off-campus learning experiences, individually arranged between a student and faculty member, in areas not covered by regular courses.

R.5126. Modern Analytical Chemistry. (4 cr; limited to 40 students; each lab section limited to 20 students; primarily for chemical engineering majors; prereq 3302 and 3306 or Δ)
Lect 0800-0850 MTWThF; SmithH 331
Sec 1, Lab (191818) 0905-1205 MW; KoltH 297
Sec 2, Lab (991819) 0905-1205 TTh; KoltH 297
Strategies and techniques for solving modern analytical problems. The use of modern instruments in analysis.

R.5520. Elementary Physical Chemistry. (786041) (3 cr; limited to 50 students; prereq 1 yr college chemistry, Phys 1253 or ¶Phys 1253, Math 3251 or equiv; 0800-1015 MWF; SmithH 231)



COURSE DESCRIPTIONS

Brief general survey. Chemical thermodynamics.

5970. Directed Study. (089642) (cr ar; prereq any 5xxx Chem course, #)

8777. Thesis Credits: Masters. (688591) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488740) (1-36 cr [max 11 cr per summer term])

R.8990. Research in Chemistry. (785505) (Cr ar; prereq chem grad stu or Δ; S-N only)

SECOND TERM

Placement exam is required of all University of Minnesota students to be placed into either Chem 1001 or Chem 1051. Exam recommended for summer-only students for advisory purposes. Call the General Chemistry Office at (612) 624-0026 for available testing dates.

R.1002. General Principles of Chemistry. (4 cr; limited to 100 students; each recitation section limited to 20 students; \$1003, \$1008. For students not passing the chemistry placement exam; prereq high school chemistry or equiv., 2 yrs high school mathematics required [4 yrs recommended], high school physics recommended).

See First Term
Lect 0800-0930 MTWTh, SciCB 175
Sec 1, (292093) Rec 1145-1245 MW; FordH 120
Lab 1300-1600 MWF*; SmithH 249
Sec 2, (192094) Rec 1145-1245 MW; AmundH 104
Lab 1300-1600 MWF*; SmithH 249
Sec 3, (992095) Rec 1145-1245 MW; Phys 157
Lab 1300-1600 MWF*; SmithH 249
*Fridays are make-up labs only; all sections may attend.

R.1051. Chemical Principles I. (4 crs; limited to 40 students; each recitation section limited to 20 students; primarily for stu majoring in sci or eng; prereq 1001 or passing chemistry placement examination. 1051 is prereq for 1052.)
See First Term.

Lect 0800-0930 MTWTh, SciCB 375
Sec 1, (390576) Rec 1145-1245 MW, FordH 130
Lab 1300-1600 MWF* SmithH 110
Sec 2, (590575) Rec 1145-1245 MW, ApH 103
Lab 1300-1600 MWF* SmithH 110
*Fridays are make-up labs only; all sections may attend.

R.1052. Chemical Principles II. (4 crs; limited to 100 students; each recitation section limited to 20 students; prereq 1051)
See 1051 First Term.
Lect 0800-0930 MTWTh, SciCB 325
Sec 1, (890582) Rec 1145-1245 MW, SmithH 121
Lab 1300-1600 MWF* SmithH 210

Sec 2, (690583) Rec 1145-1245 MW SmithH 231
Lab 1300-1600 MWF* SmithH 210
Sec 3, (490584) Rec 1145-1245 MW, SmithH 331
Lab 1300-1600 MWF* SmithH 210
Sec 4, (290585) Rec 1145-1245 MW, KoltH 5135
Lab 1300-1600 MWF* SmithH 210
Sec 5, (190586) Rec 1145-1245 MW, KoltH 5132
Lab 1300-1600 MWF* SmithH 210
*Fridays are make-up labs only; all sections may attend.

R.3100. Quantitative Analysis Lecture. (291820) (3 cr; limited to 60 students; 3100-3101†; for non-chemistry majors; prereq 1052; 0800-0855 MTWThF; SmithH 231)
Modern quantitative methods of analysis.

R.3101. Quantitative Analysis Laboratory. (191821) (2 cr; limited to 32 students; 3100-3101†; for non-chemistry majors; prereq 3100 or ¶ 3100; 0900-1200 MTWTh; SmithH 310)
Modern quantitative methods of analysis including elementary physicochemical procedures.

R.3302. Elementary Organic Chemistry II. (986748) (4 cr; limited to 200 students; prereq 3301, 3305 or ¶ 3305; if 3305 taken concurrently, a passing grade required for 3305 to receive cr for 3302; 0800-1015 TWThF; SmithH 100)
See 3301 First Term.

R.3306. Elementary Organic Chemistry Laboratory II. (2 cr; prereq 3302 or ¶ 3302, 3305; lect 1030-1130 T, SmithH 100)
See 3301 First Term.
Sec 1, Lab (386754) 1145-1600 TW; limited to 64; Smith H 349
Sec 2, Lab (691118) 1145-1600 ThF; limited to 64; Smith H 349

3970. Directed Studies. (686758) (Cr ar; prereq #)
See First Term.

R.5521. Elementary Physical Chemistry. (886760) (3 cr; limited to 50 students; prereq 5520; 0800-1015 MWF; SmithH 331)
Kinetics, bonding, and structure.

5970. Directed Study in Chemistry. (889643) (cr ar; prereq any 5xxx Chem course, #)

8777. Thesis Credits: Masters. (388682) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488804) (1-36 cr [max 11 cr per summer term])

8990. Research in Chemistry. (685514) (Cr ar; prereq chem grad stu or Δ; S-N only)

Chicano Studies (Chic)

102 Scott Hall. 624-6309
College of Liberal Arts

FIRST TERM

R.3106. Introduction to Chicano Studies: Mexico and the United States. (389492) (4 cr; limited to 20 students; 0915-1130 MW; BlegH 350)
Rojas
Convergence of Spanish-Mexican and Anglo American societies in the Spanish borderlands. Literary, social, cultural and historical perspectives—1821 to 1960.

3970. Directed Studies. (385037) (Cr ar; prereq #, Δ, college approval)
Guided individual reading or study.

5970. Directed Studies. (385183) (Cr ar; prereq #, Δ, CLA approval)
Guided individual reading or study.

SECOND TERM

R. 3213. Chicano Music and Art. (191706) (4 cr; limited to 20 students; 0915-1130 MW; BlegH 255) Rojas
The musical and artistic experiences of Chicanos.

3970. Directed Studies. (185184) (Cr ar; prereq #, Δ, college approval)
Guided individual reading or study.

5970. Directed Studies. (185220) (Cr ar; prereq #, Δ, CLA approval)
Guided individual reading or study.

Child and Adolescent Psychiatry (CAPy)

D-697 Mayo. 626-6577
Medical School

SPECIAL TERM: JUNE—SEPTEMBER

5203. Child and Adolescent Psychiatry for Psychology Interns. (787058) (1-5 cr; prereq #) Hoberman
Experience in assessment and therapeutic interventions with children, adolescents, and families in an outpatient child and adolescent psychiatric setting.

5204. Diagnostic Methods in Child and Adolescent Psychiatry. (587059) (1 cr; prereq med student, #) Garfinkel

5603. Inpatient Clinical Child Psychiatry for Primary Care Physicians. (787061) (Cr and hrs ar; prereq med student, #) Myers
Supervised diagnostic and therapeutic experiences in an inpatient, multidisciplinary child psychiatry unit with emphasis on groups and milieu therapies.

5608. Introduction to Family Therapy: Theory and Practice.

(587062) (3 cr; prereq MD and/or #, basic psychopath course, current supervised involvement in treatment of cases) Miner

8100. Readings in Child, Adolescent and Family Psychiatry. (187064) (1 cr; prereq MD, #) Moore, Leffert

8120. Therapeutic Methods in Child and Adolescent Psychiatry. (887066) (1 cr; prereq MD, #) Moore, Leffert

8200. Outpatient Clinical Child and Adolescent Psychiatry. (687067) (3 cr; prereq MD, #) Bernstein

8228. Research in Child and Adolescent Psychiatry. (487071) (1 cr; hrs ar) August
Research design, methodology, and current research projects are reviewed with faculty members and guests.

8248. Residential Child and Adolescent Treatment. (090953) (3 cr; prereq MD, #) Jensen

8253. Child and Adolescent Community Psychiatry. (890954) (2 cr; prereq MD, #) Jensen

Child Psychology (CPsy)

106 Child Development.
624-1891
College of Education

FIRST TERM

1301. Introductory Child Psychology. (185291) (4 cr, \$3309, \$5301; prereq 5 cr introductory psychology; 0915-1130 MWF; ChDev 216) Mooney-McLoone
Introduction to science of child behavior; review of theories and research. Meets with 3309.

3309. Introductory Child Psychology for the Social Sciences. (086806) (4 cr, \$1301, \$5301; prereq Psy 1001; 0915-1130 MWF; ChDev 216) Mooney-McLoone
Science of child behavior; review of theory and research; designed for majors in psychology, sociology, and related disciplines; not suggested for CPsy majors. Meets with 1301.

3343. Introduction to Cognitive Development. (189820) (4 cr; prereq 1301 or #: 0915-1035 MTWThF; NichH 209) Deak
Development of cognitive processes; research, methodology, and contrasting theoretical perspectives. Introduction to research and theory in developmental psychology.

3980. Directed Instruction. (985292) (1-4 cr [max 4 cr]; prereq #: S-N only) Weinberg
Undergraduates serve as teaching assistants in courses they have successfully completed for credit.

5315. Introduction to Mental Retardation—June 14-July 15. (991822) (4 cr; SEPsy 5620; prereq 1301 or equiv; 1030-1200 MTWThF; BuH 123) Turnure
Psychological and educational problems related to the mentally retarded.

5329. Genetics, Ethology, and Development. (889819) (4 cr; prereq 1301 or equiv; 0915-1055 MTWTh; ChDev 105) Charlesworth
Survey of evolutionary theory, behavioral genetics applied to understanding of development of human behavior; formation of species-adaptive behavior and individual differences in infancy, childhood, and adolescence.

5334. Children and Youth in Society. (791823) (4 cr; prereq 4 cr child psych; 1050-1210 MTWThF; NichH 209) Susman
Child development principles relative to social policy decision making; application of theories and findings to such issues as media influences, mainstreaming, day care, child abuse, effects of peers.

5343. Cognitive Development. (589300) (4 cr; prereq 3343, 3308 or Psy 1005; 1055-1235 MTWTh; ChDev 218) Bauer
Development of cognitive processes; discussion of relevant theory, research literature, and methodology.

5970. Directed Study. (785293) (Cr ar; prereq #) Weinberg
Independent reading.

5990. Directed Research. (585294) (Cr ar; prereq #) Weinberg
Individual empirical investigation.

8777. Thesis Credits: Masters. (488608) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988757) (1-36 cr [max 11 cr per summer term])

8970. Independent Study. (385295) (Cr ar) Weinberg
Independent reading.

8990. Research Problems. (185296) (Cr ar) Weinberg
Individual empirical investigation.

SECOND TERM

R.3308. Research Methods in Child Psychology. (089821) (4 cr; limited to 25; prereq 1301, Psy 1001; 0915-1035 MTWThF; ChDev 105) Wegesin
Techniques used in the study of child development; emphasis on collection, organization, and analysis of data.

3980. Directed Instruction. (186148) (1-4 cr [max 4 cr]; S-N only; prereq #) Weinberg
See First Term.

5302. Infancy. (889822) (4 cr, \$3302; prereq 1301 or #; 1055-1215

MTWThF; ChDev 218) Yonas
Perceptual, motor, emotional, social, and cognitive development during the first two years of life; the developing infant in her or his social and physical environment.

5303. Adolescent Psychology. (189672) (4 cr; \$3303; prereq 5 cr introductory psychology; 1055-1215 MTWThF; ChDev 216) Williams
Physical, cognitive, and social development during adolescence.

5331. Processes of Social Development—July 21-August 17. (591824) (4 cr; \$3331; prereq 1301 or equiv; 0830-1045 TWTh; ChDev 216) Collins
Processes of individual change from infancy through adolescence and development of capacities for and influences of social relations; research, methodology, and theoretical perspectives. Topics include: biological bases of social behavior; relationships, impact of schooling and mass media, gender roles, achievement motivation, prosocial behavior, and regulation of antisocial behavior.

5336. Development and Interpersonal Relations. (489418) (4 cr, \$5339; prereq 1301 or equiv, 3308 or Psy 1005, 3331 or 5331; 0915-1035 MTWThF; ChDev 218) Teo
Processes and functions of interactions with parents and peers; analysis of theory and research on developmental changes and influences.

5970. Directed Study. (186151) (Cr ar; prereq #) Weinberg
See First Term.

5990. Directed Research. (786153) (Cr ar; prereq #) Weinberg
See First Term.

8777. Thesis Credits: Masters. (388696) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088815) (1-36 cr [max 11 cr per summer term])

8970. Independent Study. (586154) (Cr ar) Weinberg
See First Term.

8990. Research Problems. (386155) (Cr ar) Weinberg
See First Term.

Chinese (Chn)

(East Asian Languages and Literatures)
College of Liberal Arts

FIRST TERM

3163. 20th Century Chinese Literature in English. (191549) (4 cr; 1145-1245 MTWThF; FolH 214) Staff
Main trends in Chinese literature from May 4th period (ca. 1919) to present. Knowledge of Chinese not required.

3970. Directed Studies. (887861) (1-15 cr; prereq #, Δ, college approval) Staff

5970. Directed Studies. (885110) (1-4 cr; prereq #, Δ, CLA approval) Staff

8777. Thesis Credits: Masters. (388598) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988743) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. *Students must enroll for all three courses and may not enroll in other summer courses.* Prospective students should talk to an adviser before registering for intensive language courses.

1011-1012-1013. Intensive Beginning Modern Chinese. (15 qtr credit for both terms, 10 hours with principal instructor, 10 hours with drillmaster; limited to 28 students; 0800-1220 MTWThF; KoltH S138)
R1011, Sec 5, (386835) June 14-July 7, 5 cr; Wang
R1012, Sec 5, (186836) July 8-Aug. 1, 5 cr; Staff
R1013, Sec 5, (086837) August 2-24, 5 cr; Staff

SECOND TERM

3970. Directed Studies. (587532) (1-15 cr; prereq #, Δ, college approval) Staff

5970. Directed Studies. (387533) (1-4 cr; prereq #, Δ, CLA approval) Staff

8777. Thesis Credits: Masters. (688686) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988807) (1-36 cr [max 11 cr per summer term])

Civil Engineering (CE)

122 Civil and Mineral Engineering. 625-5522 (Civil and Mineral Engineering) Institute of Technology

FIRST TERM

8097. Civil Engineering Research. (988483) (4 cr; prereq #)

8777. Thesis Credits: Masters. (688588) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288738) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8097. Civil Engineering Research. (788484) (4 cr; prereq #)

8777. Thesis Credits: Masters. (788680) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088801) (1-36 cr [max 11 cr per summer term])

Classical Civilization (CICv)

300 Folwell Hall. 625-7565
College of Liberal Arts

FIRST TERM

3990. Directed Research. (190880) (4 cr; prereq #, Δ, college approval)

SECOND TERM

3990. Directed Research. (288500) (4 cr; prereq #, Δ, college approval)

Classics (Clas)

330 Folwell Hall. 625-5353 (Classical and Near Eastern Studies) College of Liberal Arts

FIRST TERM

1045. Basic Program in Technical Terminology and Word Study. (486972) (3 cr; independent and optional assistance labs ar; 1530-1700 TW; FolH 240)
Study of prefixes, suffixes, and high frequency roots from Greek and Latin through computer-assisted instruction; principles of word compounding; methods and techniques of work analysis. Meets with 1048, 1141, 3046.

1048. Greek and Latin Terminology in the Medical and Biological Sciences. (286973) (2 cr, \$1141; prereq 1045 or ¶ 1045; independent and optional assistance labs ar; 1530-1700 TW; FolH 240)
Study of roots and terms basic to the medical and biological sciences in English contexts. Meets with 1045, 1141, 3046.

1141. Greek and Latin Terminology for Nursing. (187534) (3 cr, \$1048; independent and optional assistance labs ar; 1530-1700 TW; FolH 240)
Greek and Latin prefixes, suffixes, and roots basic to the vocabulary of nursing through computer-assisted instruction. Meets with 1045, 1048, 3046.

R.3008. History of Ancient Art. (092072) (4 cr; limited to 15 students; \$ArH 3008; 1315-1430 MTWTh; Jones H 207B) Staff
Architecture, sculpture, and painting



COURSE DESCRIPTIONS

of selected early cultures; stress on influences contributing to the development of Western art. Meets with ANTH 3008.

3046. Advanced Etymology: Vocabulary of the Sciences and Humanities. (087535) (2 cr; prereq 1045 or ¶ 1045; independent and optional assistance labs ar; 1530-1700 TW; FolH 240)
Latin and Greek roots that have English derivatives; regularities of linguistic change (Grimm's law), principles of etymology, and lessons on specialized terminology in various fields, computer-assisted instruction. Meets with 1045, 1048, 1141.

8777. Thesis Credits: Masters. (588602) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688753) (1-36 cr [max 11 cr per summer term])
Knowledge of Greek or Latin is not required.

SECOND TERM

R.1042. Greek and Roman Mythology. (990539) (4 cr; limited to 100 students; 1145-1245 MTWThF; FolH 306) Hershbell
The heroes, gods, and goddesses of ancient Greece and Rome. The stories of the myths and the stories behind the myths.

1045. Basic Program in Technical Terminology and Word Study. (886838) (3 cr; independent and optional assistance labs ar; 1530-1700 TW, FolH 240)
See First Term. Meets with 1048, 1141, 3046.

1048. Greek and Latin Terminology in the Medical and Biological Sciences. (686839) (2 cr; §1141; prereq 1045 or ¶ 1045; independent and optional assistance labs ar; 1530-1700 TW, FolH 240)
See First Term. Meets with 1045, 1141, 3046.

1141. Greek and Latin Terminology for Nursing. (086840) (3 cr, §1048; independent and optional assistance labs ar; 1530-1700 TW, FolH 240)
See First Term. Meets with 1045, 1048, 3046.

3046. Advanced Etymology: Vocabulary of the Sciences and Humanities. (886841) (2 cr; prereq 1045 or ¶ 1045; independent and optional assistance labs ar; 1530-1700 TW, FolH 240)
See First Term. Meets with 1045, 1048, 1141.

8777. Thesis Credits: Masters. (288691) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788811) (1-36 cr [max 11 cr per summer term])

Clinical and Population Sciences (CAPS)

225 Veterinary Hospital, St. Paul. 625-7755
College of Veterinary Medicine

FIRST TERM

5680. Problems in Veterinary Epidemiology and Public Health. (689448) (Cr ar; prereq 5650 or equiv or #) Diesch, Pullen, R. Robinson, others
Individual study arranged with faculty member.

5951. Directed Studies. (489449) (1-5 cr; prereq #, Δ)
Independent, directed study in veterinary science in areas arranged by the student and a faculty member.

8194.* Problems in Diagnostic Virology, Serology, and Immunology. (689451) (Cr ar; prereq grad student or #) Ames, Molitor
Laboratory techniques of diagnostic virology, serology, and immunology. Research techniques of fluorescent antibody; determination of classes of immunoglobulins and immunostimulation of lymphocytes.

8195.* Preventive Veterinary Medicine. (489452) (Cr ar) Diesch, others
Application of the principles and practice of preventive veterinary medicine in food-animal production at the herd, state, national, or international levels.

8199. Problems in Economics of Animal Health. (289453) (1-3 cr) Olson, others
Impact of animal disease on animal productivity and the return to investment in animal health by producers or the society studied using disease problems of current interest as subjects. Questions involving human health problems may be studied.

8290. Advanced Veterinary Medicine. (189454) (Cr ar; prereq 5162, SACS 5172, #) V. Larson, Hardy, others
Discussions of the diseases of organs or systems in animals from the following etiologic group: prenatal, metabolic, toxic infectious, physical influences.

8291. Advanced Diagnosis and Therapeutics of Animal Diseases. (989455) (Cr ar; prereq 5162, SACS 5172, #) Osborne, McKeever, Ogburn, Olson, others
Detailed examination, discussions, and treatment of cases of animal diseases.

8292. Seminar: Veterinary Medicine. (789456) (Cr ar; prereq #) Osborne, others

8293. Medical Conference. (589457) (Cr ar; prereq 5162, SACS 5172, #) Osborne, others
Medical, surgical, or obstetrical cases

supported by anatomic, bacteriologic, pathologic, physiologic, pharmacologic, and radiologic evaluations whenever applicable.

8299. Research in Veterinary Medicine. (389458) (Cr ar)
Research problems relating to any aspect of internal medicine or to the various systems in animals.

8390. Seminar: Veterinary Medicine. (189459) (Cr ar; prereq DVM degree or equiv) Wallace

8392. Advanced Large Animal Surgery. (589460) (Cr ar; prereq DVM degree or equiv, #) Kobluk, Trent
Surgery of various systems in large animals with preoperative and postoperative evaluation and treatment.

8393. Problems in Large Animal Orthopedics. (389461) (3 cr; prereq 5365, #) Kobluk, Trent

8397. Large Animal Anesthesia. (189462) (Cr ar; prereq SACS 5380, #) Raffe
Special problems associated with anesthesia of large animals.

8590. Advanced Diagnostic Methods in Reproductive Diseases. (089463) (Cr ar; prereq 5570 or #)
Discussion and laboratory practices of methods for determination of fertility status of female and male animals.

8594. Special Problems in Animal Reproduction. (889464) (Cr ar; prereq 5570, #) Staff
Detailed discussion and laboratory study of specific reproductive disorders.

8595. Seminar: Veterinary Obstetrics. (689465) (1 cr; prereq #) Seguin

8790. Problems in Veterinary Clinical Pharmacology and Therapeutics. (489466) (3 cr; prereq grad student or #)
Examination of clinical cases and experimental animals: dealing with pharmacotherapeutics of various drugs used for food producing and companion animals.

8791. Seminar in Clinical Pharmacology and Therapeutics. (289467) (2 cr; prereq grad student or #)
Examination of current literature and case material.

FIRST AND SECOND TERMS: TEN WEEK COURSE.

5011. Veterinary Public Health (VPH) Clinic Rotation. (190152) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Preparation for health and socially responsible role in veterinary community medicine (rural and/or urban); preparation for federal accreditation and ; introduction to public practice veterinarians.

5015. Advanced Veterinary Public Health (VPB) Clinic Rotation. (591662) (4 cr; prereq regis vet med 3rd or 4th yr grad or # or IV Track Designator)

The objectives are: 1) to prepare the student for his/her health and socially responsible role in veterinary community medicine (rural and/or urban); 2) to prepare the student for federal accreditation; and 3) to introduce the students to public practice veterinarians.

5091. Preceptorship. (690163) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Participation in a practice setting involving large, mixed, small equine, specialty practice, or other fields of veterinary medicine as approved by the Director of the Preceptorship Program.

5111. Large Animal Medicine. (290148) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Medical diseases of horses, cattle, and small ruminants. History taking, clinical diagnosis, and patient management.

5115. Advanced Large Animal Medicine. (391663) (4 cr; prereq regis vet med 3rd or 4th yr grad or # or IV Track Designator)
This rotation will provide exposure to medical diseases of horses, cattle, and small ruminants. History taking, clinical diagnosis and patient management will be emphasized.

5211. Large Animal Surgery. (190149) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Diagnostic and therapeutic management of lameness and surgical diseases of the large animal species (equine, bovine, small ruminants) in a hospital setting.

5215. Advanced Large Animal Surgery. (191664) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
The large animal surgery clinical rotation provides student exposure to the diagnostic and therapeutic management of lameness and surgical diseases of the large animal species (equine, bovine, small ruminants) in a hospital setting.

5221. Equine Lameness. (490164) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Two-week course involving clinical, didactic, and laboratory learning.

5225. Advanced Equine Lameness. (091665) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
This is a two-week course involving clinical, didactic, and laboratory learning.

5231. Equine Podiatry. (290165) (4-24 crs; prereq 3rd or 4th yr vet med



COURSE DESCRIPTIONS

student; S-N only)
Concepts of equine podiatry.

5235. Advanced Equine Podiatry. (891666) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)

This course's objectives are to thoroughly prepare the student in the concepts of equine podiatry.

5511. Equine Theriogenology (490150) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Clinical training in equine theriogenology.

5531. Dairy Palpation. (190166) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Development of the technical skills for palpating the reproductive tract of cows rectally.

5535. Advanced Dairy Palpation. (491301) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
The primary focus of the dairy theriogenology palpation rotation will be to develop the technical skills of palpating the reproductive tract of cow per rectum.

5591. General Theriology. (391291) (4-24 cr; prereq #)
Comparative theriogenology training program based on clinical case load in Veterinary Teaching Hospitals and theriogenology field herds. Comparative teaching labs (e.g., semen evaluation). Students focus on species of interest (bovine, equine, small animal) depending on season and case load.

5595. Advanced General Theriology. (691667) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
Students would participate in a comparative theriogenology training program based on the clinical case load in the Veterinary Teaching Hospital and the theriogenology field herd. Comparative teaching laboratories would be offered (e.g. semen evaluation, etc.). Students would be allowed to focus their experience in those species of interest (bovine, equine, small animal) depending on season and case load.

5631. Swine Nutrition. (191074) (4-24 cr; prereq 3rd or 4th yr vet med or DVM or grad)
Nutrition and feeding of pigs.

5635. Advanced Swine Nutrition. (491668) (4 cr; prereq grad or # or IV Track)
This rotation will focus on the nutrition and feeding management of pigs.

5695. Advanced Epidemiology and Biostatistics. (691670) (4 cr; prereq IV track or grad or #)
Strengths and limitations of statistical methodologies used in veterinary medicine and epidemiology. Design

of a feasible research program given constraints of funding, time, and facilities. Preparation of a detailed research proposal suitable for submission for competitive funding.

5821. Mastitis, Milking Machines and Milk Quality. (990167) (4-24 crs; prereq regis 3rd or 4th yr vet med or grad stu or #; S-N only)
Evaluation of herd mastitis problems, recommendations for solutions.

5825. Advanced Mastitis Milking Machines and Milk Quality. (491671) (4 cr; prereq grad or # or IV track)
This rotation is designed to provide the tools to allow the student to be competent to evaluate herd mastitis problems and provide rationally based recommendations for solutions.

5831. Ruminant Nutrition. (790168) (4-24 crs; prereq regis 3rd or 4th yr vet med or grad stu or #; S-N only)
Nutrient requirements for ruminants, nutrient content of feed stuffs (primarily forages), energy utilization, nutritional disorders, formulation of adequate rations, and techniques for analyzing rations.

5835. Advanced Ruminant Nutrition. (291672) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
This course is strongly recommended for students interested in dairy and suggested for students with a strong beef interest. Topics to be covered include: nutrient requirements for ruminants, nutrient content of feed stuffs (primarily forages), energy utilization, protein and nonprotein nitrogen utilization, nutritional disorders, formulation of adequate rations, and techniques for analyzing rations.

5841. Applied Dairy Nutrition. (590169) (4-24 crs; prereq 5831, regis 3rd or 4th yr vet med or grad stu or #; S-N only)
Providing nutritional advice, counseling, and/or assessment to a dairy farm.

5845. Advanced Dairy Nutrition. (191673) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
This course is designed to cover principles, techniques, goals and objectives of providing nutritional advice and/or assessment to a dairy farm.

5851. Dairy Record Analysis, Epidemiology and Nutrition. (990170) (4-24 crs; prereq regis 3rd or 4th yr vet med or grad stu or #; S-N only)
The evaluation of a dairy herd as a whole, using biological and economic records.

5855. Advanced Dairy Record Analysis, Epidemiology, and Economics. (991674) (4 cr; prereq IV track or grad or #)
Evaluation of a dairy herd using biological and economic records.

5911. Advanced Building Design and Total Herd Evaluation. (290151) (4-24 crs; prereq regis 3rd or 4th yr vet med or grad stu or #; S-N only)
Advanced housing ventilation, equipment, and building design principles utilizing the epidemiologic approach to promoting animal health. Integration of total animal health care, environmental control, and herd management into herd veterinary services.

5915. Advanced Building Design and Total Herd Evaluation. (791675) (4 cr; prereq regis vet med 3rd or 4th yr or grad or #)
The first week of this course will emphasize advanced housing, ventilation, equipment, and building design principles utilizing the epidemiologic approach to promoting animal health. The herd evaluation section will focus on the integration of total animal health care, environmental control, and herd management into herd veterinary services.

5941. Small Ruminant Health and Production. (991075) (4-24 cr; prereq 3rd or 4th yr vet med)
Sheep and goat production, medicine and health management.

5945. Advanced Small Ruminant Health and Production. (591676) (4 cr; prereq regis vet med 3rd or 4th yr or grad or # or IV Track Designator)
The Small Ruminant and Production Rotation addresses the need of the senior veterinary student and the practitioner to acquire working knowledge with the practical aspects of sheep and goat production, medicine and health management.

SECOND TERM

5680. Problems in Veterinary Epidemiology and Public Health. (189468) (Cr ar; prereq 5650 or equiv or #) Diesch, Pullen, R Robinson, others
See First Term.

5951. Directed Studies. (989469) (1-5 cr; prereq #, Δ)
See First Term.

8194.* Problems in Diagnostic Virology, Serology, and Immunology. (189471) (Cr ar; prereq grad student or #) Ames, Molitor
See First Term.

8195.* Preventive Veterinary Medicine. (989472) (Cr ar; Diesch, others
See First Term.

8199. Problems in Economics of Animal Health. (789473) (1-3 cr) Olson, others
See First Term.

8290. Advanced Veterinary Medicine. (589474) (Cr ar; prereq 5162, SACS 5172, #) Hardy, others
See First Term.

8291. Advanced Diagnosis and Therapeutics of Animal Diseases. (389475) (Cr ar; prereq 5162, SACS 5172, #)
Osborne, McKeever, Ogburn, Olson, others
See First Term.

8292. Seminar: Veterinary Medicine. (189476) (Cr ar; prereq #) Osborne, others

8293. Medical Conference. (089477) (Cr ar; prereq 5162, SACS 5172, #)
Osborne, others
See First Term.

8299. Research in Veterinary Medicine. (889478) (Cr ar)
See First Term.

8390. Seminar: Veterinary Surgery. (689479) (Cr ar; prereq DVM degree or equiv)
Wallace

8392. Advanced Large Animal Surgery. (089480) (Cr ar; prereq DVM degree or equiv, #) Kobluk, Trent
See First Term.

8393. Problems in Large Animal Orthopedics. (889481) (3 cr; prereq 5365, #) Kobluk, Trent

8397. Large Animal Anesthesia. (689482) (Cr ar; prereq SACS 5380, #) Raffe
See First Term.

8590. Advanced Diagnostic Methods in Reproductive Diseases. (489483) (Cr ar; prereq 5570 or #) Staff
See First Term.

8594. Special Problems in Animal Reproduction. (289484) (Cr ar; prereq 5570, #)
See First Term.

8595. Seminar: Veterinary Obstetrics. (189485) (1 cr; prereq #) S. Johnston

8790. Problems in Veterinary Clinical Pharmacology and Therapeutics. (989486) (3 cr; prereq grad student or #)
See First Term.

8791. Seminar in Clinical Pharmacology and Therapeutics. (789487) (2 cr; prereq grad student or #)
See First Term.



COURSE DESCRIPTIONS

Clinical Laboratory Science (CLS)

D-242 Mayo. 625-9171
(Laboratory Medicine and Pathology)
Medical School

FIRST TERM

5180. Advanced Chemistry. (385328)
(1-5 cr; prereq #) Yasmineh

8236. Research on Clinical Laboratory Problems. (585327) (1-10 cr) Hallgren

8777. Thesis Credits: Masters. (088605) (1-16 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN WEEK COURSE

5768. Advanced Hematology. (185329) (Cr ar; prereq #) Brunning

SECOND TERM

5180. Advanced Chemistry. (785326)
(1-5 cr; Prereq #) Yasmineh

8236. Research on Clinical Laboratory Problems. (985325) (1-10 cr) Hallgren

8777. Thesis Credits: Masters. (588695) (1-16 cr [max 11 cr per summer term])

Cognitive Science (CgSc)

205 Elliott Hall 625-9367
College of Liberal Arts

FIRST TERM

8360. Seminar: Topics in Cognitive Science (091035) (1 cr [max 4 cr]; prereq CgSc minor or #; S-N only; EltH 204)

Communication Disorders (CDIs)

115 Shevlin Hall. 624-3322
College of Liberal Arts

FIRST TERM

R.3100. Clinical and Research Observation (2 cr; each section limited to 2 students; prereq Δ; S-N only)
Supervised observation of clinical procedures such as evaluation and treatment of persons with communication disorders, or of research relating to normal and disordered communication.
Sec 1, (485529) 0800-1200 W, MoosT 6296, Staff
Sec 2, (286195) 1230-1600 Th, MoosT 6296, Staff

R.5302. Anatomy and Physiology of the Speech and Hearing Mechanisms.

(791613) (4 cr; 0800-1200 TW; FolH 340) Liss
Gross anatomy, physiology, and function of structures related to phonation, articulation, and audition.

5611. Augmentative Systems of Communication—June 16, 17, 20-22, 27-30. (190546) (3 cr; 1300-1600 MTWThF: SmithH 231) Reichle
Equipment and instructional procedures used to establish communication board and signing skills in severely handicapped populations.

5970. Directed Studies. (885530) (Cr ar [may be repeated for cr]; prereq #, Δ, CLA approval) Staff
Directed readings and preparation of reports on selected subjects.

8520. Clinical Education in Speech-Language Pathology. (685531) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8521. Clinical Education in Speech-Language Pathology. (787867) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8720. Clinical Education in Audiology. (485532) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8721. Clinical Education in Audiology. (587868) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8777. Thesis Credits: Masters. (088586) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688736) (1-36 cr [max 11 cr per summer term])

8990. Research. (285533) (Cr ar [may be repeated for cr]) Staff
Open to graduate students engaged in research.

SECOND TERM

5970. Directed Studies. (686520) (Cr ar [may be repeated for cr]; prereq #, Δ, CLA approval) Staff
See First Term.

8520. Clinical Education in Speech-Language Pathology. (286522) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8521. Clinical Education in Speech-Language Pathology. (187865) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8720. Clinical Education in Audiology. (186523) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8721. Clinical Education in Audiology. (987866) (1-6 cr [may be repeated for cr]; prereq Communication Disorders grad stu) Staff

8777. Thesis Credits: Masters. (388679) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188800) (1-36 cr [max 11 cr per summer term])

8990. Research. (786525) (Cr ar [may be repeated for cr]) Staff
See First Term.

Comparative Literature (CLit)

350 Folwell Hall. 624-8099
College of Liberal Arts
(See also Cultural Studies and Comparative Literature.)

FIRST TERM

8888. Thesis Credits: Doctoral. (288755) (1-36 cr [max 11 cr per summer term])

8970. Directed Reading. (987642) (1-4 cr; prereq grad student in comparative lit, Δ)

SECOND TERM

8888. Thesis Credits: Doctoral. (388813) (1-36 cr [max 11 cr per summer term])

8970. Directed Reading. (485515) (1-4 cr; prereq grad student in comparative lit, Δ)

Comparative Studies in Discourse and Society (CSDS)

350 Folwell Hall. 624-8099
(See also Cultural Studies and Comparative Literature.)
College of Liberal Arts

FIRST TERM

8888. Thesis Credits: Doctoral. (788761) (1-36 cr [max 11 cr per summer term])

8970. Directed Studies. (790915) (2 cr; prereq grad student or #)

SECOND TERM

8888. Thesis Credits: Doctoral. (688817) (1-36 cr [max 11 cr per summer term])

8970. Directed Studies. (590916) (2 cr; prereq grad student or #)

Composition and Communication (Comp)

306 Lind Hall. 625-2888
College of Liberal Arts
(See also Rhetoric)

FIRST TERM

R.1011. Writing Practice I. (5 cr; each section limited to 25 students)
Guided practice in solving writers' problems: defining purpose, organizing and developing content, analyzing audience, drafting the whole essay and its parts, and revising and editing to master fundamentals of expository structure and style.
Workshops on basic skills, syntactic fluency, and editing.
Sec 1, (387919) 0800-1000 MWF, LindH 340
Sec 2, (787920) 0915-1115 MWF, JonesH 11

R.3011. Writing About Literature. (186196) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, jr.; 1030-1210 MWF, LindH 217)
Primary focus on presenting the active reading of literary works (poems, plays, fiction) in literary commentary and criticism, primarily for academic audiences. Use of secondary sources, and attention to various theoretical and critical approaches.

R.3012. Writing in the Humanities. (188322) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, jr.; 0915-1055 MWF, LindH 302)
Writing on topics where historical and multicultural perspectives are brought together in the context of these disciplines. Assignments involve integrating primary texts with critical commentary. Frequent practice in presenting primary materials through paraphrase and summary.

R.3013. Writing for the Arts. (986197) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, jr.; 1115-1245 MWF, LindH 302)

Writing in the roles of artist, member of the audience, and critic to balance subjective responses and academic analysis. Emphasis on the importance of writing to create and maintain the arts communities through grants, reviews, and formal criticism.

R.3014. Writing in the Social Sciences. (4 cr; each section limited to 20 students; prereq fulfillment of Writing Practice requirement, jr.)
Emphasizes writing as a way to communicate knowledge about individual and collective human behavior. Multidisciplinary perspectives on common social issues, description and analysis of quantitative data. Assignments may include the literature review, research proposal, case study, and theoretical

argument.
 Sec 1, (786198) 0800-0940 MWF, LindH 315
 Sec 2, (485479) 0915-1055 MWF, Arch 60
 Sec 3, (288237) 1030-1210 MWF, LindH 315
 Sec 4, (788470) 1115-1245 MWF, LindH 325

R.3015. Writing About Science. (389380) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, jr; 1030-1210 MWF; LindH 320)
 Presentation of problems in science and mathematics in clear expository prose. Writing for expert and non-expert audiences. Emphasis on integrating theoretical explanations and empirical evidence.

R.3022. Critical Reading and Writing for Management. (889061) (4 cr; limited to 20 students; prereq 1011 or equiv, Mgmt or Pre-Mgmt stu with more than 60 cr; 0915-1055 MWF; FordH 40)
 Strategies and conventions for writing in management and related fields. Improvement of communication skills through the incorporation of narrative, descriptive, analytical, and persuasive techniques into writing on current business topics, with an emphasis on critical reading, thinking, and writing. Strategies for communicating among varied audiences in business settings.

R.3027. Advanced Expository Writing. (4 cr; each section limited to 20 students; prereq fulfillment of Writing Practice requirement, jr.)
 Designed for already competent writers, this course focuses on the production of polished writing within and beyond the university setting. Teaches effective argumentation through critical reading and awareness of context and audience.
 Sec 1, (687537) 0915-1055 MWF, JonesH 10
 Sec 2, (687618) 1030-1210 MWF, LindH 340

R.3031. Technical Writing for Engineers. (4 cr; each section limited to 20 students; prereq fulfillment of Writing Practice requirement, jr., IT stu)
 Presenting technical information accurately and clearly with attention to the rhetorical and organizational contexts of the writing. Analysis of writing situations, style and form of technical reports, and collaborative written and spoken presentations.
 Sec 1, (587921) 0800-0940 MWF, LindH 320
 Sec 2, (585022) 0915-1055 MWF, LindH 203

R.3032. Preprofessional Writing for Business. (586798) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, School of Mgmt or BIS stu, jr; 1115-1245 MWF, LindH 203)
 Writing for the wide variety of situations and audiences found in business. Form and style of business

writing in collaborative and individual assignments. Assignments and practical examples tied as much as possible to students' major fields.

R.3033. Writing for the Health Sciences. (288402) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice req, Health Science or Pre-Health Science major with more than 60 credits; 0915-1055 MWF; MechE 221)
 Addresses the writing needs of students from the diverse fields of the Health Sciences. Primary emphasis on practicing and achieving verbal clarity in a variety of situations ranging from precise description of a clinical procedure to balanced discussion of ethical contexts.

SECOND TERM

R.1011. Writing Practice I. (889416) (5 cr; limited to 25 students; 0915-1115 MWF, LindH 302)
 See First Term.

R.3013. Writing for the Arts. (990637) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, jr.; 1115-1245 MWF, LindH 340)
 See First Term.

R.3014. Writing in the Social Sciences. (4 cr; each section limited to 20 students; prereq fulfillment of Writing Practice requirement, jr)
 See First Term.

Sec 1, (189381) 0800-0940 MWF, LindH 340
 Sec 2, (189803) 0915-1055 MWF, LindH 325
 Sec 3, (089804) 1030-1210 MWF, LindH 229

R.3022. Critical Reading and Writing for Management. (889805) (4 cr; limited to 20 students; prereq 1011 or equiv, Mgmt or Pre-Mgmt stu with more than 60 cr; 1030-1210 MWF; LindH 320)
 See First Term.

R.3027. Advanced Expository Writing. (4 cr; each section limited to 20 students; prereq fulfillment of Writing Practice requirement, jr)
 See First Term.
 Sec 1, (386799) 0915-1055 MWF, LindH 203
 Sec 2, (586199) 1030-1210 MWF, AmundH 120

R.3031. Technical Writing for Engineers. (4 cr; each section limited to 20 students; prereq fulfillment of Writing Practice requirement, jr, IT stu)
 See First Term.
 Sec 1, (387922) 0800-0940 MWF, LindH 320
 Sec 2, (687635) 0915-1055 MWF, Arch 30

R.3032. Preprofessional Writing for Business. (187923) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, School of Mgmt

or BIS stu, jr; 1115-1245 MWF; LindH 325)
 See First Term.

R.3033. Writing for the Health Sciences. (089382) (4 cr; limited to 20 students; prereq fulfillment of Writing Practice requirement, Health Science or Pre-Health Science majors with more than 60 credits; 0915-1055 MWF, LindH 303)
 See First Term.

Computer Science (CSci)

4-192 Electrical Engineering & Computer Science Building.
 625-4002
 Institute of Technology

FIRST TERM

R.3102. Introduction to Pascal Programming. (990492) (4 cr; limited to 65 students; prereq non CSci major, Math 1111 or 1201 or equiv. or #; informal lab; lec 0915-1030 M, 0915-1115 WF, EE/CSci 3115, rec 1030-1130 M, EE/CSci 3115)
 Pascal computer language, applications, programming techniques. Designed to bring students to advanced level competence in Pascal programming. Integral nonscheduled laboratory.

R.3113. Introduction to Programming in C. (689725) (4 cr; limited to 65 students; prereq 3101 or 3102 or any programming experience and precalculus or #; 0915-1115 WF, 0915-1015 T; ME 212)
 Intensive introduction to syntax and semantics of the C language, with introduction to UNIX tools for implementing C programs. Students will write programs, use debugging aids, and build library.

R.3311. Discrete Structures of Computer Science. (391551) (4 cr; limited to 60 students; prereq 1 qtr calculus or #; lec 1300-1500 TTh, 1300-1400 F, rec 1400-1500 F; EE/CSci 3125)
 Mathematical techniques and structures needed in Computer Science. Topics include formal logic, elementary combinatorics, induction, recurrences, relations and graphs.

R.3316. The Structure of Computer Programming I. (189722) (4 cr; limited to 60 students; prereq 1 qtr. calculus or #; §3106; lec 1030-1230 TW, 1030-1130 Th, AmundH 240; rec 1130-1230 Th, AmundH 240)
 Different programming paradigms as a formal way of expressing computer algorithms and data. Procedures, recursion and iteration as algorithmic development techniques. Use of abstractions and modularity. Scheme language used for illustration of ideas and lab problems.

R.3321. Algorithms and Data Structures I. (590494) (4 cr; limited to 60 students; prereq 3311, 3316 or #; §3105, §3121; lec 1030-1230 TW, 1030-1130 Th, AmundH B75, rec 1130-1230 Th, EE/CSci 3125)
 Fundamental data structures with some of the rudimentary computer algorithms. Implementation of data structures and their operations as abstract data types. Study of C++ with emphasis on implementation of data types and control structures.

R.5106. Structure of High Level Languages. (986183) (4 cr; limited to 60 students; prereq 3322, 5102, or #; 1300-1500 TTh, 1300-1400 F; EE/CSci 3115)
 Formal definition of the syntax and semantics of programming languages; semantics both by means of interpreters and by using the axiomatic approach. Concepts underlying programming languages and their realizations in a selected group of languages. Program description at compile time and execution time.

R.5301. Numerical Computation. (485059) (4 cr; limited to 60 students; prereq Math 3261 or #...a knowledge of Pascal or FORTRAN is assumed; 1030-1230 TTh, 1030-1130 F; Phys 210)
 Floating point arithmetic and rounding errors. Iterative methods. Numerical solution of nonlinear equations. Newton's method. Direct methods for linear systems of equations. Gauss elimination. Factorization methods. Interpolation and approximation. Numerical integration and differentiation. Introduction to numerical solution of ordinary differential equations.

8777. Thesis Credits: Masters. (688610) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588759) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.3101. An Introduction to Computer Applications for Scientists and Engineers. (690499) (4 cr; limited to 60 students; prereq 1 quarter calculus; lec 0915-1015 M, 0915-1115 WF, EE/CSci 3111, rec 1030-1130 M, EE/CSci 3111)
 Algorithm development and the principles of computer programming using the Fortran language, emphasizing numerical methods for science and engineering applications. Integral open laboratory.

R.3121. Survey of Data Structures and Algorithms. (489726) (4 cr; limited to 60 students; prereq 3102 or 3113 or #; §3321; 1030-1230 TTh, EE/CSci 3111, 1030-1130 F; EE/CSci 3115)
 Fundamental structures of computer science, including induction,



COURSE DESCRIPTIONS

mathematical analysis of computational complexity, and the definition and implementation of selected data structures along with their fundamental operations. Implementation of data structures in computer programs.

R.3317. The Structure of Computer Programming II. (189728) (4 cr; limited to 60 students; prereq 3316; lec 1300-1500 TTh, 1300-1400 M, EE/CSci 3111; rec 1415-1515 M, EE/CSci 3111)

Advanced programming paradigms. Object-oriented programming, logic programming, and pattern matching. Generic operators, local variables, and objects as ways of encapsulating different conceptual parts of a program. Scheme language is used for illustration of ideas and lab problems.

R.3322. Algorithms and Data Structures II. (190501) (4 cr; limited to 55 students; prereq 3321; §5121; lec 0915-1015 M, 0915-1115 TTh, EE/CSci 3115, rec 1030-1130 M, EE/CSci 3125)

Fundamental paradigms for algorithm design with the supporting data structures. Complexity correctness analysis, and lower bound theory. Implementation of selected algorithms and data structures using C++ language. Meets with 5121.

R.5121. Algorithms and Data Structures II. (890503) (4 cr; limited to 15 students; prereq non CSci majors only, 3321, §3322; lec 0915-1015 M, 0915-1115 TTh, EE/CSci 3115, rec 1030-1130 M, EE/CSci 3125) See 3322. Meets with 3322.

8777. Thesis Credits: Masters. (188697) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888816) (1-36 cr [max 11 cr per summer term])

Control Science and Dynamical Systems (CSDy)

109 Vincent Hall. 625-8883 (School of Mathematics) Institute of Technology

FIRST TERM

8888. Thesis Credits: Doctoral. (588762) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8888. Thesis Credits: Doctoral. (488818) (1-36 cr [max 11 cr per summer term])

Cultural Studies and Comparative Literature (CSCL)

350 Folwell Hall. 624-8099 College of Liberal Arts (see also Humanities)

FIRST TERM

R.1301. Discourse and Society. (290750) (4 cr; §Hum 1301; limited to 45 students; 0800-1015 TTh; FolH 419) Jha

General introduction to modes of expression (e.g. verbal, visual, musical) through representative works. Analysis of discourse in relation to social structures, examining its role in creating and contesting social borders, replicating cultures, and attaching differential privilege to various practices.

R.3115. Cinema and Ideology. (591628) (4 cr; §Clit 3215, Hum 3755; limited to 30 students; 1030-1245 TTh; FolH 419) Mowitz

Study of the major aspects of film as discourse with special attention to the complex relations it maintains with the ideological and political contexts in which it appears. Specific films will be used to study cinema as institution, film as current product, and artistic ideologies in politics.

R.3910. Topics in Cultural Studies and Comparative Literature: Nietzsche and Poststructuralism. (490746) (4 cr; limited to 20 students; prereq jr or sr or #; 1300-1545 TTh; FolH 419) Canning

Discussion of problems in criticism and interpretation based on student reading and writing projects. Group meetings and individual consultation. Meets with 5910.

3970. Directed Studies. (590754) (cr ar; prereq #) Guided individual reading or study.

R.3979. Issues in Cultural Pluralism. (190748) (4 cr; §Clit 3979; limited to 35 students; 1145-1245 MTWThF; FolH 138) Sarles

Critical, comparative basis for studying minority cultures in America: fabric, dynamics, strengths, tensions; how they differ, yet form a distinct culture.

5910. Topics in Cultural Studies and Comparative Literature: Nietzsche and Poststructuralism. (990881) (4 cr; limited to 10 students; prereq jr or sr or grad stu, #; 1300-1545 TTh; FolH 419) Canning

See 3910. Meets with 3910.

5970. Directed Studies. (790882) (cr ar; prereq jr or sr or grad student, #) Guided individual reading or study.

SECOND TERM

R.1303. Knowledge, Persuasion, Power. (290764) (4 cr; limited to 30

students; §Hum 1301; 1030-1245 TTh; FolH 134) Jha
Inquiry into the ways certain bodies of discourse come to cohere, to exercise persuasive power, and to be regarded as authoritative, while others are marginalized, ignored, or denigrated. Interrelations of center and periphery, hegemony and counterhegemony, canon and apocrypha.

R.1921. Introduction to Film Study. (391629) (4 cr; limited to 30 students; §ArH 1921, §Clit 1921; 1030-1245 MW; FolH 234) Mowitz

Fundamentals of film language and the major theories of film presented through detailed analysis of several films.

R.3175. Comedy: Text and Theory. (390769) (4 cr; limited to 70 students; §Hum 3701; 1030-1245 MW; FolH 134) Thomas

Interdisciplinary study of comedy and comic theory through time and across world cultures in philosophy, psychology, literature, drama, film, folk tale, play, and social convention.

3970. Directed Studies. (790770) (cr ar; prereq #) See First Term.

5970. Directed Studies. (590771) (cr ar; prereq jr or sr or grad student, #)

Curriculum and Instructional Systems (CISy)

125 Peik Hall. 625-6372 (Curriculum and Instruction) College of Education

FIRST TERM

R.5006. Introduction to Instructional Computer Programming. (691717) (3 cr; limited to 25 students; prereq 5003 or #; 0750-1020 MW; PeikH 355) Hooper

Introduction to designing computer based instructional programs through programming. Students need not have a mathematical or science background.

5100. Workshop: Authentic Assessment in the Classroom—July 5,7,12,14. (090662) (2 cr; limited to 30 students; Meets with Elem 5101 (1); 1300-1730 TTh; PeikH 25) Examining models for authentic assessment; developing performance/portfolio assessment for outcome-based education.

R.5206. Microcomputer Uses in Elementary Classrooms. (285337) (3 cr; §Elem 5140; limited to 5 students; 0750-1020 TTh; PeikH 355; A-F only) Stochl

Uses of microcomputers to enhance instruction; applications in language arts, mathematics, science, social studies; evaluation of available programs. Meets with Elem 5140.

R.5208. Computer-Based Tools for Teachers. (388956) (3 cr; prereq 5003 or 5206, or #; limited to 25 students; 0800-1100 TTh; EdHAn 62; S-N optional) Hooper The use of microcomputers for instructional material generation, record keeping, and classroom management tasks in K-12 classrooms.

5509. Directed Individual Study. (1-6 [max 6 cr]; prereq #; A-F only) Review of literature in research and theory related to issues in curricular instructional systems. Sec 23, (489824) Anderson Sec 24, (188957) Hooper

R.5600. Introduction to Curriculum Systems—June 30-July 19. (187856) (3 cr; limited to 30 students; 1300-1515 MTWThF; PeikH 46; A-F only) Kimpston

Principles of curriculum design, forces influencing goals and curriculum planning, curricular trends and issues, traditional and emergent curricular designs, current proposals for change, and a model for curriculum planning.

R.5801. Curriculum and Instructional Systems Workshops:

Sec 1, Peer Coaching—June 14-29. (xxxxxx) (1-3 cr [max 9 cr]; limited to 30 students; 0800-1015 MTWThF; PeikH 25; A-F only) Anderson Concepts and skills of peer coaching. Establishing the peer coaching relationship, planning for and making classroom observations, and providing feedback. Various forms of peer coaching and their rationale. Skills for helping colleagues become more reflective about their own teaching. This offering for 3 credits.

5902. MEd Core Course on Instruction. (292000) (3 cr; 1030-1230 MWF; PeikH 225) Anderson Identifying goals, selecting instructional strategies, and developing assessment procedures for contemporary K-12 classrooms. Incorporates issues related to multicultural education and reflective teaching.

R.8103. Research Methods in Curriculum and Instruction. (491718) (3 cr; limited to 35 students; prereq PhD student or #; 1030-1230 MWF; PeikH 315; A-F only) Orton

An introduction to and comparison of traditional and alternative research methods in education, including the theoretical assumptions of which the methods are based, appropriate related research questions, and a survey of research procedures.

8501. Problems: Curriculum and Instructional Systems. (289825) (Cr ar; prereq #) Hooper Individual empirical investigation.

8700. Curriculum and Instructional Systems Field Experience. (3-6 cr [max 6 cr]; prereq #; hrs ar) Internship experience in an educational setting; planning, implementing, and supervising curriculum or instructional change.

Sec 23, (689823) Anderson
Sec 24, (088958) Hooper

SECOND TERM

R.5100. Workshop.

Special topics courses in the design, development, implementation and evaluation of curricular and instructional systems.

Sec 1, Using Local and Wide Area Networks in the Classroom—July 21-August 5. (291719) (3 cr; limited to 25 students; 1030-1245 MTWThF; concurrent with Elem 5101(5); PeikH 355) Lambrecht
Examination of local area networks for classroom instruction; examination of national networks, such as Gopher and Internet, for professional development and instructional use. Actual in-class use of networks will focus on instructional issues and classroom management, not technical installation or maintenance. Previous experience in using computers is desirable.

Sec 2, Microsoft Works for Teachers—August 8, 9, 10, 11. (691720) (1 cr; limited to 25 students; 1030-1245 MTWTh, PeikH 355) Lambrecht
Introduction to the word processing, spreadsheet, and database capabilities of Microsoft Works, an integrated software application. Attention will be given to the materials development and records management uses for teachers. Some prior experience with computer is recommended.

Sec 3, Explicit Instruction vs. Coaching: Exploring the Teacher's Role—August 1, 3, 5, 8. (491721) (1 cr; 1030-1245; PeikH 375 MWF; meets with Elem 5101(1)) Orton
This course will explore the promises and pitfalls of instruction that departs from the traditional model of teaching to specific objectives.

R.5370. America's Schools in the 20th Century—July 21-August 24. (691765) (3 cr; limited to 40 students; prereq educ or grad student or #; \$EdPA 5370; 1030-1230 MWF; PeikH 155; A-F only) Gardner
Analysis and interpretation of events and issues that shaped America's schools in the 20th century; emphasis also on the current proposals for the reform of education and their antecedents.

R.5600. Introduction to Curriculum Systems—July 21-August 5. (888461) (3 cr; limited to 30 students; 1300-1515 MTWThF; PeikH 46; A-F only) See First Term.

R.8100. Curriculum and Instruction Core: Critical Examination of Curricular Contexts—July 21-August 24. (188084) (3 cr; prereq PhD student or #; limited to 25 students; 1030-1300 TTh; PeikH 155; A-F only) Gardner
Theoretical principles and major empirical findings in the core discipline of generic curriculum decision making; relationships among

curricular processes, instructional design variables, and interactive teaching behavior.

D

Dance (Dnce)

1056 Norris Hall. 624-5060
(Theatre Arts and Dance)
College of Liberal Arts

FIRST TERM

R.1007. Fundamentals of Jazz I (491461) (1 cr; limited to 15 students; 1510-1640 MTWTh; NorrisH M151)
Basic skills of jazz dance.

R.1070. Beginning Jazz I (291462) (1 cr; limited to 15 students; 1510-1640 MTWTh; NorrisH M153A)
Basic jazz techniques and stylistic range of jazz dance and its origins.

R.1077. Beginning Tap I (191463) (1 cr; limited to 15 students; 1645-1745 MTWTh; NorrisH M153B)
The basics of tap; working on fundamental syncopation and various rhythms.

R.3070. Intermediate Jazz I
Sec 1, (991464) (1 cr; limited to 15 students; 1615-1745 MTWTh; NorrisH 67)
Various styles of jazz dance at the intermediate level.

R.3077. Intermediate Tap I (791465) (1 cr; limited to 15 students; 1645-1745 MTWTh; PeikG G65) Chvala
Basic skills of tap dance; working on syncopation, clarity of movement, and tone and texture.

R.3330. Topics in Dance Theory
Sec 1, Beginning/Intermediate Modern Technique (691460) (2 cr; limited to 15 students; prereq 1030 or equiv; 1145-1315 MTWTh; NorrisH M153A) Cheng
Continuing skills begun in beginning level of moving with spatial clarity, musicality and dynamic quality. Additional work on turnout and placement.
Sec 2, Advanced Tap (591466) (1 cr; limited to 15 students; prereq 3077 or equiv; 1510-1610 MTWTh, PeikG G65) Chvala
Increasing complexity on syncopation and dynamics.

Dental Hygiene (DH)

9-436 Moos Tower, 625-9121
School of Dentistry

FIRST TERM

R.3501. Advanced Dental Hygiene Clinical Experience I. (090404) (1-6 cr; limited to 7 students; prereq 3195; S-N only)
Advanced clinical dental hygiene experience to prepare the student for private practice employment, continued education, and/or other career opportunities.

SECOND TERM

R.3502. Advanced Dental Hygiene Clinical Experience II. (190403) (1-6 cr; limited to 7 students; S/N only) See 3501.

Dentistry (Dent)

15-209 Moos Tower. 625-9982
School of Dentistry

FIRST TERM

5006. Fixed Prosthodontics I. (091259) (1 cr)
Treatment planning for abutments, retainers, and pontics used in Fixed Prosthodontics.

5009. Fixed Prosthodontics: Independent Study. (189731) (Cr and hrs ar)

5055. Health Ecology: Independent Study. (989732) (Cr and hrs ar)

5070. Health Ecology elective. (086336) (Cr ar)
Allows highly motivated students to undertake study and receive academic credit for activities in special-interest areas.

5150. Operative Dentistry I. (091293) (2 cr)
Lectures on the nomenclature of operative dentistry, cavity design and classification, composition of materials, instrumentation, and the fundamental basis of the techniques employed.

5155. Operative Dentistry Laboratory. (089169) (3 cr; 5154-5155+; prereq 5154; A-F only)
Techniques and principles of cavity preparation, manipulation of restorative materials, and instrumentation.

5158. Operative Dentistry: Independent Study. (789733) (Cr and hrs ar)

5183. Patient Management IV. (589734) (1 cr; prereq 5182; S-N only)
Educational setting (clinic) for integration, application, and development of skills taught in

Physical Evaluation I and II and Patient Management II.

5250. Oral Pathology: Independent Study. (389735) (Cr and hrs ar)

5320. Oral and Maxillofacial Surgery: Independent Study. (189736) (Cr and hrs ar)

5335. Oral and Maxillofacial Surgery Clinic Elective Rotation. (089737) (Cr and hrs ar) Development of examination, diagnosis, treatment planning, and clinical skills in oral and maxillofacial surgery.

5385. Orthodontics: Independent Study. (889738) (Cr and hrs ar)

5420. Pediatric Dentistry: Independent Study. (689739) (Cr and hrs ar)

5460. Periodontology: Independent Study. (089740) (Cr and hrs ar)

5553. Removable Prosthetics: Independent Study. (889741) (Cr and hrs ar)

5602. Biomaterials: Independent Study. (689742) (Cr and hrs ar)

5630. Endodontics: Independent Study. (489743) (Cr and hrs ar)

5654. Oral Anatomy: Independent Study. (289744) (Cr and hrs ar)

5680. Oral Biology: Independent Study. (189204) (Ar cr)

5755. Occlusion: Independent Study. (189745) (Cr and hrs ar; S-N only)

5777. Oral Radiology III. (991190) (1 cr)
Interpretation of intraoral and extraoral roentgenograms.

5785. Oral Radiology: Independent Study. (989746) (Cr and hrs ar)

5807. Treatment Planning: Independent Study. (789747) (Cr and hrs ar)

5900. Dental Clinic—June 20-29. (490018) (Cr ar; 0900-1200 MTWThF, 1315-1600 MTWThF; MoosT 8327, 9327)

5901. Dental Clinic Elective—June 20-September 6. (690972) (Cr and hrs ar; S-N only)

5990. Field Experience: Administration in a Multidisciplinary Health Center. (089205) (2 cr)
Administration and management concerns related to the development of a dental service in a multidisciplinary care facility for older adults. Field placement and precepts at the Amherst H. Wilder Senior Health Clinic and affiliated residences.

8129. Topics and Problems in Dental Education. (290408) (ar cr; prereq #)
Independent study for advanced work in student learning, instructional

COURSE DESCRIPTIONS

development, curriculum planning, student testing and evaluation, and academic administration, where these areas and their interfaces are applied directly to professional dental education. Applying and extending concepts learned in 8126, 8127.

8441. Seminars in TMJ and Craniofacial Pain. (788212) (1 cr; A-F only)
Advanced topics on theories and application of recently developed techniques of data collection, diagnostic strategies, and management for TMJ and craniofacial pain problems.

8442. Advanced Clinical TMJ and Craniofacial Pain. (589233) (1-4 cr; A-F only)
Interdisciplinary study of patients with TMJ and craniofacial pain using techniques of assessment currently being researched; background and clinical knowledge of the patient synthesized with current literature on management. Management program is developed, discussed with faculty, and implemented; effects of treatment and compliance are reviewed at each follow-up appointment.

8443. Current Literature in TMJ and Craniofacial Pain. (588213) (1 cr; prereq #: A-F only)
Review of current literature in TMJ and craniofacial pain and how it relates to past literature, theories on pain, and philosophies on management.

8777. Thesis Credits: Masters. (788615) (1-16 cr [max 11 cr per summer term])

FIRST AND SECOND TERM: TEN-WEEK COURSES

(Register once in Term I)

5500. Evaluation in Operative Dentistry. (390125) (1 cr; prereq Δ; S-N only)

5945. Geriatric Hospital Dentistry. (889173) (Cr ar)
Rotations at the University of Minnesota Hospital Dental Clinic and/or the Minneapolis Veterans Administration Medical Center Dental Clinic. Management of elderly patients in acute care settings. Dental management of patients compromised by medical therapies such as radiation treatment or chemotherapy, as well as patients with acute illness.

5950. Advanced General dentistry Seminar I. (785469) (Cr ar; S-N only)
Clinical seminars with an emphasis on treatment planning, case presentation, techniques and materials, comprehensive oral health care and maintenance, and issues in practice management. Correlated with concurrent clinical experiences.

5955. Advanced General Dentistry Clinical administration I. (289226) (Cr ar; S-N only)

Field experience in community dental clinic practice and administration.

5960. Advanced General Dentistry Clinic I. (189227) (Cr ar; S-N only)
Comprehensive oral health care delivered in a variety of settings, with emphasis on complex restorative care, coordinating care with dental and medical specialists, special needs patients, and advanced techniques.

5964. Advanced General Dentistry Clinic V. (989228) (Cr ar; S-N only)
Comprehensive oral health care delivered in a variety of settings, with emphasis on complex restorative care, coordinating care with dental and medical specialists, special needs patients, and advanced techniques.

5970. General Practice Seminar I. (685156) (Cr ar; S-N only)
A sequence of lectures, discussions, and seminars on topics, related to current dental practice. Correlated with clinical experiences.

5974. General Practice Clinical Administration I. (789229) (Cr ar; S-N only)
Field experience in hospital dental clinic administration for residents.

5980. General Practice Clinic I. (189230) (Cr ar; S-N only)
A series of planned experiences in the clinical disciplines of dentistry. Emphasis on patient care.

5984. General Practice Clinic V. (989231) (Cr ar; S-N only)
A series of planned experiences in the clinical disciplines of dentistry. Emphasis on patient care.

5989. Advanced Clinical Geriatric Dentistry. (789232) (Cr ar)
Practical clinical experience in examination, diagnosis, treatment planning, and treatment of older adult patients in the dental clinic at the Amherst H. Wilder Senior Health Center.

SECOND TERM

5009. Fixed Prosthodontics: Independent Study. (589748) (Cr and hrs ar)

5055. Health Ecology: Independent Study. (389749) (Cr and hrs ar)

5070. Health Ecology elective. (987012) (Cr ar)
See First Term.

5150. Operative Dentistry I. (391467) (2 cr)
See First Term.

5158. Operative Dentistry: Independent Study. (789750) (Cr and hrs ar)

5250. Oral Pathology: Independent Study. (589751) (Cr and hrs ar)

5320. Oral and Maxillofacial Surgery: Independent Study. (389752) (Cr and hrs ar)

5385. Orthodontics: Independent Study. (189753) (Cr and hrs ar)

5401. Pediatric Dentistry I. (391260) (1 cr)
Development of the dentition; restorative dentistry and pulpal therapy in the primary and permanent dentition; principles of preventive dentistry.

5420. Pediatric Dentistry: Independent Study. (089754) (Cr and hrs ar)

5460. Periodontology: Independent Study. (185050) (Cr and hrs ar)

5553. Removable Prosthetics: Independent Study. (889755) (Cr and hrs ar)

5602. Biomaterials: Independent Study. (985048) (Cr and hrs ar)

5630. Endodontics: Independent Study. (689756) (Cr and hrs ar)

5654. Oral Anatomy: Independent Study. (489757) (Cr and hrs ar)

5680. Oral Biology: Independent Study. (289758) (Cr and hrs ar)

5755. Occlusion: Independent Study. (189759) (Cr and hrs ar; S-N only)

5775. Oral Radiology I. (891294) (2 cr)
Films, roentgenograms, cassettes, and grids used in dentistry.

5785. Oral Radiology: Independent Study. (489760) (Cr and hrs ar)

5807. Treatment Planning: Independent Study. (289761) (Cr and hrs ar)

5900. Dental Clinic. (689255) (Cr ar)

5945. Geriatric Hospital Dentistry. (189762) (Cr ar)

See First and Second Term: Ten-Week Courses.

5950. Advanced General Dentistry Seminar I. (790221) (ar cr; S-N only)
See First and Second Term: Ten-Week Courses.

5960. Advanced General Dentistry Clinic I. (590222) (ar cr; S-N only)
See First and Second Term: Ten-Week Courses.

5970. General Practice Seminar I. (590219) (ar cr; S-N only)
See First and Second Term: Ten-Week Courses.

5980. General Practice Clinic I. (990220) ar cr; S-N only)
See First and Second Term: Ten-Week Courses.

5989. Advanced General Geriatric Dentistry. (289257) (Cr ar)
See First and Second Term: Ten-Week Courses.

5990. Field Experience: Administration in a Multidisciplinary Health Center. (889206) (2 cr)
See First Term.

8129. Topics and Problems in Dental Education. (190409) (ar cr; prereq #)
See First Term.

8441. Seminars in TMJ and Craniofacial Pain. (688218) (1 cr; prereq #: A-F only)
See First Term.

8442. Advanced Clinical TMJ and Craniofacial Pain. (189258) (1-4 cr; prereq #: A-F only)
See First Term.

8443. Current Literature in TMJ and Craniofacial Pain. (488219) (1 cr; prereq #: A-F only)
See First Term.

8777. Thesis Credits: Masters. (388701) (1-16 cr [max 11 cr per summer term])



UNIVERSITY OF MINNESOTA

SUMMER SESSION REGISTRATION INSTRUCTIONS

Summer Session 1994 dates:

Term I: June 14- July 19

Term II: July 21 - August 24

In-person registration begins:

Thursday, May 12, 1994

Academic year students - Bring *Course Request form* and *Student Hospitalization Insurance form* to your registration center.

Friday, May 20, 1994

Summer-only students - Bring *Course Request form*, *Request for Summer-only Status form* and the *Student Hospitalization Insurance form* to the registration center.

Important: Current and previously enrolled University of Minnesota students must register in their last Twin Cities college of enrollment unless they have been admitted to another Twin Cities, University of Minnesota college.

Mail-in registration:

Available to: Summer-only students in the *College of Liberal Arts*.

Summer-only students, Adult Specials and M.Ed. students in the *College of Education*.

Mail registration is not open to academic-year students or summer-only students registering for courses through colleges other than Liberal Arts and Education.

To register by mail, first see all instructions and restrictions in the registration section of the bulletin. Then fill out the *Course Request form*, *Request for Summer-only Status form* and *Student Hospitalization Insurance form* completely, and be sure to mail your registration by June 1, 1994. Mail registrations are processed on May 20 for the College of Liberal Arts and May 12 for the College of Education in the order in which they are received.

Registration Forms:

See instructions for completing the *Course Request form* on the next page. Call 624-3555 for questions on any of the registration forms.

Registration Centers:

Fraser Hall, room 202, East Bank by Northrop Auditorium

Coffey Hall, room 130, St Paul campus, across from Student Center

See inside page for registration center locations.

Important phone numbers:

See back inside cover of bulletin for University offices (student, departmental and college).

Directions to campus and parking locations:

See detailed maps and directions after the course listing in the bulletin.

ID number or Social Security number

UNIVERSITY OF MINNESOTA

Name (last, first, middle)

COURSE REQUEST

College of enrollment, Student mailing address, Telephone number, Major, City, State, Zip Code

Term and year [] Fall [] Winter [] Spring [] Summer session I [] Summer session II 19__

[] Registration: number of credits [] Cancel/add: number of credits after change [] Complete cancellation

Note: Fill in VARIABLE CREDITS only if credits are listed as "ar cr" in the Class Schedule. Fill in GRADE OPTION if mandatory grading is not listed in the Class Schedule. To change grade option or variable credits, list course as both cancellation and addition.

Table with columns: COURSE(S)--First choice (original registration), COURSE(S)--Second choice (or additions), CANCELLATIONS. Sub-columns include CALL NUMBER, GRADE OPTION, VARIABLE CREDITS, DESIGNATOR, COURSE NUMBER, AND SECTION.

MPIRG (optional) Minnesota Public Interest Research Group is described in the Class Schedule. The MPIRG fee is \$2.50 per quarter (or \$1.25 per summer term) for those who pay the student services fee. Payment is refundable through MPIRG. If you choose NOT to pay, Initial here ->

REQUIRED APPROVAL (if needed)

SIGNATURES ON THIS FORM WILL NOT BE ACCEPTED IN PLACE OF OVERRIDE PERMITS.

ID number or Social Security number

UNIVERSITY OF MINNESOTA

Name (last, first, middle)

COURSE REQUEST

College of enrollment, Student mailing address, Telephone number, Major, City, State, Zip Code

Term and year [] Fall [] Winter [] Spring [] Summer session I [] Summer session II 19__

[] Registration: number of credits [] Cancel/add: number of credits after change [] Complete cancellation

Note: Fill in VARIABLE CREDITS only if credits are listed as "ar cr" in the Class Schedule. Fill in GRADE OPTION if mandatory grading is not listed in the Class Schedule. To change grade option or variable credits, list course as both cancellation and addition.

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REQUIRED APPROVAL (if needed)

SIGNATURES ON THIS FORM WILL NOT BE ACCEPTED IN PLACE OF OVERRIDE PERMITS.

COMPLETING YOUR COURSE REQUEST FORM

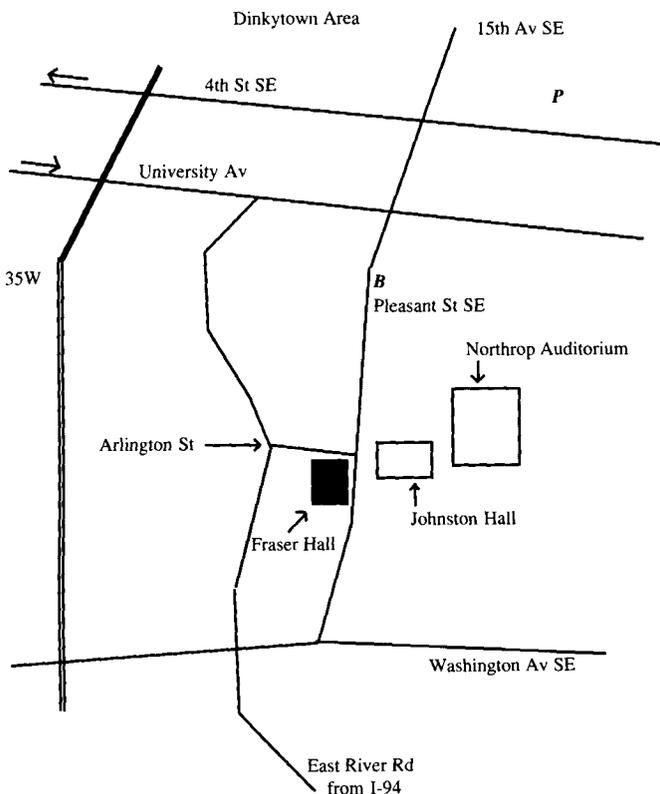
① ID number or Social Security number: <div style="font-size: 24pt; font-weight: bold; margin-left: 20px;">3145461</div>	UNIVERSITY OF MINNESOTA COURSE REQUEST	
Name (last, first, middle): <div style="font-size: 24pt; font-weight: bold; margin-left: 20px;">JONES, LAURA K.</div>		
② College of enrollment LIBERAL ARTS	Student mailing address ④ 313 ATLANTIC AVE. N	Telephone number (612) 489-7491
③ Major HISTORY	City ST. PAUL	State MN
⑤ Term and year <input type="checkbox"/> Fall <input type="checkbox"/> Winter <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer Session I <input type="checkbox"/> Summer Session II 1994		Zip Code 55117
⑥ <input checked="" type="checkbox"/> Registration: Number of credits: 4 <input type="checkbox"/> Cancel/Add: Number of credits after change <input type="checkbox"/> Complete Cancel		
Note: Fill in VARIABLE CREDITS only if credits are listed as "ar cr" in the Class Schedule. Fill in GRADE OPTION if mandatory grading is not listed in the Class Schedule. To change grade option or variable credits, list course as both cancellation and addition.		
COURSE(S)-First Choice (original registration)		COURSE(S) - Second choice (or additions)
CALL NUMBER (A)	GRADE OPTION (B)	VARIABLE CREDITS (C)
DESIGNATOR, CRSE NUMBER, SECTION (D)	CALL NUMBER (E)	GRADE OPTION (F)
VARIABLE CREDITS (G)	DESIGNATOR, CRSE NUMBER, SECTION (H)	CALL NUMBER (I)
DESIGNATOR, CRSE NUMBER, SECTION (J)	CALL NUMBER (K)	DESIGNATOR, CRSE NUMBER, SECTION (L)
CALL NUMBER 886922	GRADE OPTION (M)	VARIABLE CREDITS (N)
DESIGNATOR, CRSE NUMBER, SECTION HIST 1002	CALL NUMBER 690860	GRADE OPTION (O)
VARIABLE CREDITS (P)	DESIGNATOR, CRSE NUMBER, SECTION HIST 3422	CALL NUMBER (Q)
CANCELLATIONS		DESIGNATOR, CRSE NUMBER, SECTION (R)
CALL NUMBER (S)		DESIGNATOR, CRSE NUMBER, SECTION (T)
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STUDENT HOSPITALIZATION INSURANCE

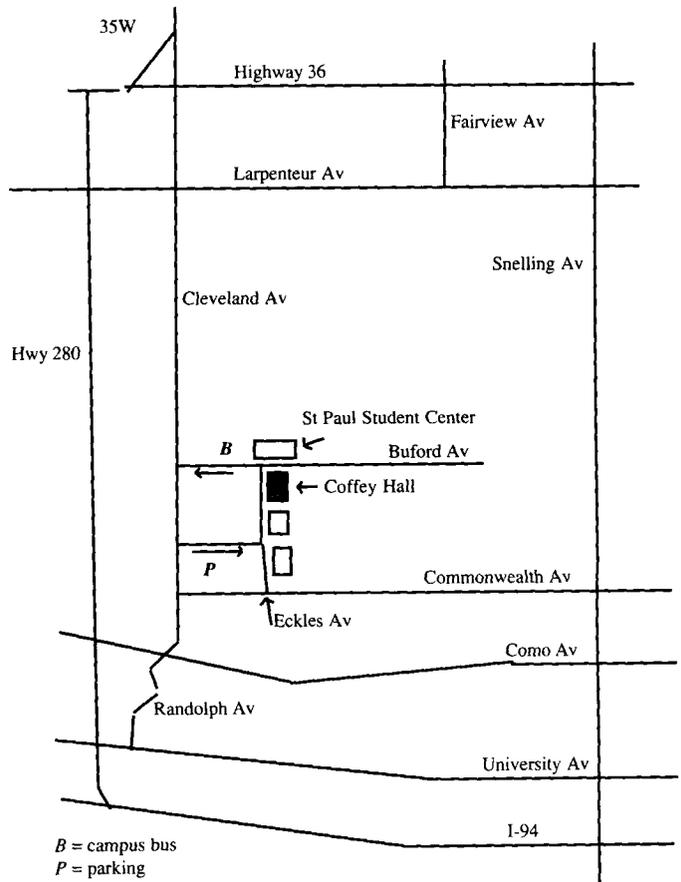
Student name (last, first, middle initial)	Student ID number
<input type="checkbox"/> Summer term I <input type="checkbox"/> Summer term II	
<p>If you are taking 3 or more credits, you will automatically be charged for University-sponsored hospitalization insurance unless you check the first box below, fill in the name of your insurance company and policy number, and sign the bottom of this form. If you do not provide complete information, you will be charged for insurance when you register. You may receive a full refund by returning to the Registration Center with complete insurance information by the end of the first week of classes. (NOTE: If you are taking 3 or more credits and do not have hospitalization insurance, you do not have to fill out this card.)</p>	
<input type="checkbox"/> I am adequately covered by the hospitalization insurance indicated below.	
Name of insurance company or HMO	Policy number
<input type="checkbox"/> I have applied for and am enrolled in the Graduate Assistant Health-Care Plan.	
Student signature	Date

A291-otr 4/92

REGISTRATION CENTER LOCATION
Minneapolis campus, Fraser Hall, rm 202



REGISTRATION CENTER LOCATION
St. Paul campus, Coffey Hall, rm 130



B = campus bus
P = parking

REQUEST FOR SUMMER-ONLY STATUS

U of M student ID number (if any)	Social Security number	Date of birth (mm/dd/yy)
Student name (last, first, middle)	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female	
Current address (street, city, state, Zip Code)	Telephone number	
Permanent address if different from above (street, city, state, Zip Code)	Telephone number	
To which college are you submitting your request? (e.g., CLA, IT, Education, etc.)	Summer term/year <input type="checkbox"/> I <input type="checkbox"/> II 19__	

STUDENT STATUS. Check all that apply:

I have never attended the University of Minnesota.

*I am now in day school at the University. Campus/college: _____ Major: _____

I have applied or been admitted to the University. Campus/college: _____ Term/yr: _____

*I was previously enrolled in a day school degree program at the University. Campus/college: _____
Year: _____ Name (if different): _____

I have taken day classes only as an adult special or a summer-only student. I have taken only extension/evening classes at the University.

I am a high school student. High school: _____ Year: _____

I am now enrolled in a degree program at another college/university. College/university: _____
Major: _____

I am a college graduate. College: _____ Degree: _____ Major: _____

Current work experience. Employer: _____
Type of work: _____ Dates of employment: _____

***Important--current and previously enrolled University students:** You must register in your last Twin Cities college of enrollment unless you have been admitted to another Twin Cities college of the University.

REQUEST FOR CONFIDENTIAL INFORMATION

The University requests confidential information to update your student record. This information is used for reporting and research purposes and will help the University provide student data to University community and government agencies. Any submitted information is kept confidential in accordance with Regents' policy and state and federal law. Supplying this information is voluntary; refusal to provide it will not affect your status at the University.

Predominant ethnic background

Black (Afro-American, non-Hispanic origin): a person having origins in any of the black racial groups of Africa (excluding persons of Spanish, Portuguese, Latin American, or other Hispanic origin).

American Indian or Alaskan Native: a person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition.

Asian or Pacific Islander: a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, Japan, Korea, India, the Phillipine Islands, and Samoa.

International student (foreign student): a nonresident alien (i.e., a person who is not a citizen of the United States and who is in this country on a temporary basis and does not have the right to remain indefinitely). **Note:** A resident alien, a noncitizen who has been lawfully admitted for permanent residence and holds an alien registration receipt card (form 1-551/155), is to be reported in the appropriate ethnic categories along with U.S. citizens.

Chicano: a person of Mexican-American origin who prefers to be known as Chicano rather than Hispanic.

Other Hispanic: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race.

White, non-Hispanic: a person having origins in any of the original peoples of Europe, North Africa, or the Middle East (excluding persons of Spanish or Portuguese origin).

for college use only			for records office use only	
<input type="checkbox"/> approved for summer-only registration			initials	date
college code:	date:	college approval stamp:		

If registering in the College of Liberal Arts, mail to:

Summer Session
135 Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

If registering in the College of Education, mail to:

Education Student Affairs Office
40 Wulling Hall
University of Minnesota
86 Pleasant Street S.E.
Minneapolis, MN 55455

Dermatology (Derm)

4240 Phillips-Wangensteen Building.
625-8625
Medical School

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

5184. Special Course in Dermatology. (786377) (Cr ar) Meighan

8225. Clinical Dermatology. (386379) (Cr ar) Lynch, Dahl, Meighan, others

8226. Clinical Seminar. (786380) (Cr ar; 1300-1630 WF; PWB 4-272) Lynch, Dahl, others
Conference twice weekly on diagnosis and treatment of skin conditions.

8227. Histology of the Skin. (586381) (Cr ar; 1530-1630 WF; PWB 4-272) Orkin, others
Includes histopathology, histochemistry, and fluorescence microscopy.

8228. Research: Dermatology and Related Basic Sciences. (386382) (Cr ar) Dahl, Hordinsky

8229. Electron Microscopy in Dermatology. (186383) (Cr ar) Zelickson, others

8230. Functional Biology of the Skin. (086384) (Cr ar) Dahl, Lynch

8231. Clinics in Dermatology for Non-Dermatologists. (886385) (Cr ar) Lynch

8232. Seminar: Dermatology Histopathology and Mycology. (686386) (Cr ar) Rest

SECOND TERM

5182. Preceptorship in Dermatology. (288481) (Cr ar; prereq regis med stu)

Design (Dsgn)

See Design, Housing, and Apparel (DHA)

Design, Housing, and Apparel (DHA)

240 McNeal Hall, St. Paul. 624-9700
College of Home Economics

FIRST TERM

1323. Design Process: Drawing I. (891490) (4 cr; \$1523, prereq Appl Dsgn, Pre-Appl Dsgn, AScD, Pre AScD, Cos Dsgn, Dsgn Comm, Pre-Dsgn Comm, Hsg, Int Dsgn, Pre-Int Dsgn, Ret Mdse, Pre-Ret Mdse, or TexC student; 0830-1030 MTWThF; McNH 258)

Problem solving in drawing with application of design elements and principles. Assignments done both in and out of design studio.

3203. Field Experience in Apparel Sciences and Design. (192001) (1-3 cr; \$3003; S-N only; prereq soph; HE 1003, #)
Planned work experience relating activity in business, industry, or government to the student's area of study. Written consent of faculty supervisor before registration is required.

5103. Field Study: National/International. (390917) (1-15 cr [max 15]; prereq #)
Faculty directed field study in a national or international setting.

5170. Special Topics in Design, Housing, and Apparel.
Sec 1, Visual Research Methods in Design Communication. (690440) (4 cr; 0830-1030 MTWTh, McNH 216) Martinson
The course will investigate various methods of visual research including systematic image collection and analysis, cognitive mapping, categorization of visual images, the use and design of visual morphologies, visual appraisal, and methods of notation.

Sec. 2, Cultural Reflections of the Interior Environment. (491489) (3 cr; 1000-1200 MWF, McNH 197) Erickson
Discussion and examination of selected historic and contemporary interiors in relation to cultural influences such as privacy, comfort, and social status.

Sec. 3, Nonstore Retailing. (491492) (4 cr; 0830-1100 MWF; McNH 376) Johnson
Survey of nonstore retailing including direct marketing, direct selling, and home shopping emphasizing their history, operation, impact, and opportunities. Includes field trips.

5203. Field Experience in Apparel Sciences and Design. (992002) (1-4 cr; \$5003; prereq completion of at least one-half of professional sequence and plan to be submitted and approved in advance by advisor and employer; #)
Supervised work experience relating activity in business, industry, or government to the student's area of study. Written consent of faculty supervisor before registration is required. Integrative paper required.

R.5234. Clothing for Special Needs. (291493) (4 cr; limited to 20 students; prereq 5231 or 5541, TexC 3216 or 3621; 0830-1200 TTh; McNH 205, 216) LaBat
Experimental design concepts as they relate to special market segments, i.e., physical limitations, safety protection, energy consumption, with emphasis on the integration of human needs, fabric character, and the garment structure.

R.5303. Field Experience in Design Communication. (792003) (1-4 cr; limited to 20 students; \$3584; prereq completion of at least one-half of professional sequence and plan to be submitted and approved in advance by advisor and employer, #; S-N only)
Supervised work experience relating activity in business, industry, or government to the student's area of study. Integrative paper is required. Written consent of faculty supervisor required before registration.

5403. Internship in Housing. (592004) (3 cr; prereq 3470 or 3870, completion of half of professional sequence, #; S-N only) Franklin
International, intercultural, or other directed work in a community that offers a variety of housing experiences.

5480. Directed Study in Housing. (392005) (1-4 cr [max 8]; \$5888; prereq #) Goetz
Independent study in housing.

8280. Directed Study in Apparel Sciences and Design. (192006) (1-4 cr; prereq #; A-F only)
Independent study under tutorial guidance.

8290. Readings in Apparel Sciences and Design. (092007) (1-3 cr; prereq #; A-F only)
Independent study and review of books and periodicals useful for individual programs, but not available in the course offerings.

8480. Directed Study in Housing. (892008) (1-4 cr [max 8]; prereq #; A-F only) Goetz
Independent study in housing.

8777. Thesis Credits: Masters. (088619) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188764) (1-36 cr [max 11 cr per summer term])

TEN-WEEK TERM (Register once in Term I)

3221. Pattern Development in Apparel Design. (691491) (5 cr; \$3604; prereq 1602 or 3211, 3217 or 3662; 0830-1100 MWF; McNH 205)
Principles of pattern development, drafting, and draping for apparel design.

SECOND TERM

1101. Introduction to the Designed Environment. (091486) (3 cr; 0900-1050 MWF; McNH 33) Guerin
Analysis of the interaction between people and the designed environment, both at the micro and macro levels.

1328. Design Process: Color I. (891487) (4 cr; \$1528; prereq Appl Dsgn, Pre-Appl Dsgn, AScD, Pre-AScD, Cos Dsgn, Dsgn Comm, Pre-Dsgn Comm, Hsg, Int Dsgn, Pre-Int

Dsgn, Ret Mdse, Pre-Ret Mdse, or TexC student; 0830-1030 MTWThF, McNH 262)
Color concepts and their applications to design.

3203. Field Experience in Apparel Sciences and Design. (692009) (1-3 cr; \$3003; S-N only; prereq soph, HE 1003, #)
Planned work experience relating activity in business, industry, or government to the student's area of study. Written consent of faculty supervisor before registration is required.

5103. Field Study: National/International. (190918) (1-15 cr [max 15]; prereq #)
See First Term.

5203. Field Experience in Apparel Sciences and Design. (092010) (1-4 cr; \$5003; prereq completion of at least one-half of professional sequence and plan to be submitted and approved in advance by advisor and employer; #)
Supervised work experience relating activity in business, industry, or government to the student's area of study. Written consent of faculty supervisor before registration is required. Integrative paper required.

R.5303. Field Experience in Design Communication. (992016) (1-4 cr; limited to 20 students; \$3584; prereq completion of at least one-half of professional sequence and plan to be submitted and approved in advance by advisor and employer, #; S-N only)
See First Term.

5403. Internship in Housing. (892011) (3 cr; prereq 3470 or 3870, completion of half of professional sequence, #; S-N only) Franklin
See First Term.

5480. Directed Study in Housing. (692012) (1-4 cr [max 4]; prereq #) Goetz
See First Term.

R.8170. Special Topics in DHA: Literature of Design. (691488) (3 cr; limited to 15 and #; 1200-1400 MWF; McNH 376 and add 2 hr per week ar) Guerin
The course will investigate the literature of the design discipline. Various design issues will be explored including, but not limited to, visual thinking, design process and method, and human behavior as affected by design. The theory and research findings supporting these issues will be a major component of the course. Additionally, students will investigate a topic related to their specific design area, i.e., graphic design, interior design, or costume design. Students will complete critical literature reviews and identify research issues for further development.

8280. Directed Study in Apparel Sciences and Design. (492013) (1-4 cr; prereq #; A-F only)

COURSE DESCRIPTIONS

Independent study under tutorial guidance.

8290. Readings in Apparel Sciences and Design. (292014) (1-3 cr; prereq #; A-F only)

Independent study and review of books and periodicals useful for individual programs, but not available in the course offerings.

8480. Directed Study in Housing. (192015) (1-4 cr; [max 8]; prereq #; A-F only) Goetz
See First Term.

8777. Thesis Credits: Masters. (088703) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888847) (1-36 cr [max 11 cr per summer term])

Dutch (Dtch)

231 Folwell Hall. 625-2080
College of Liberal Arts

FIRST AND SECOND TERM: TEN-WEEK COURSE (Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll in all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses.

R.1101-1102-1103. Beginning Dutch. (15 cr for both terms; \$1110; limited to 20 students; 0915-1245 MTWThF; FolH 240) VanderSanden and Bos
Structure, listening and reading comprehension, writing, speaking.
R.1101, Sec 5, (689806) June 14-July 7, 5 cr
R.1102, Sec 5, (489807) July 8-August 1, 5 cr
R.1103, Sec 5, (289808) August 2-24, 5 cr

E

East Asian Studies (EAS)

Area Studies Programs. 624-8543
(East Asian Studies)
College of Liberal Arts

FIRST TERM

3468. People's Republic of China: The Communist Revolution, 1900 to

Present. (088278) (4 cr, SHist 3468, Hist 5468; 0915-1015 MTWThF; HHHctr 30) Farmer
Introduction of Marxism to China, rise of Communist Party, and development of rural guerilla movement. Career of Mao Tse-tung and developments in People's Republic; the Great Leap, Cultural Revolution, Gang of Four. Meets with Hist 3468 and Hist 5468.

SECOND TERM

3013. Introduction to East Asian Art. (991707) (4 cr; \$ArH 3013; 1145-1300 MTWTh; JonesH 207B) Poor
Major themes of the arts of China and Japan (not all-inclusive).

3474. Rise of Modern Japan: 1853-1914. (390657) (4 cr; \$ Hist 3474, 1030-1145 MTWTh; BlegH 105) Marshall
The Meiji Revolution from Commodore Perry to eve of World War I: origins of constitutional monarchy, industrial economy, Western influence, and modern cultural change. Meets with Hist 3474.

Ecology, Evolution, and Behavior (EEB)

109 Zoology. 625-4466
College of Biological Science (See also Itasca Biology Program in Special Program section.)

FIRST TERM

R.3001. Introduction to Ecology. (4 cr; each rec limited to 20 students; open to jrs and above but not biology majors; lect 0915-1015 MWF; McNH 33)
Basic concepts in ecology dealing with organization, development, and functioning of ecosystems; population growth and regulation. Human impact on such systems.
Rec 1, (389122) 0800-0900 TTh, McNH 197
Rec 2, (189123) 0915-1015 TTh, McNH 197

R.3811. Introduction to Animal Behavior—June 14-July 19. (191499) (5 cr; limited to 20 students; \$AnSci 3111; prereq course in beginning biology; A-F only; 0800-1700 WS; taught at Itasca) Phillips
Survey of the biological study of animal behavior including questions of causation, development, function and evolution; emphasizes the evolution of adaptive behavior, especially social behavior, in the natural environment.

R.5834. Field Ornithology—June 14-July 19. (089124) (5 cr; limited to 15 students; prereq course in general biology including study of zoology, Δ; 0800-1700 MTh; offered at Itasca) Kaufmann
Emphasis on the breeding season, biology, and behavioral ecology of

birds in the Itasca Park region. Field birds to a variety of habitats to learn bird identification and to observe and practice techniques for conducting field studies. Laboratory sessions investigate family distinctions and species identification. Individual field projects. Classes often begin at 5:00 a.m. with a break during the day.

R.5839. Field Studies in Mammalogy—June 14-July 19. (690910) (5 cr; limited to 20 students, prereq college level course in biology which includes study of animals, or instructor permission, department permission; A/F only; 0800-1700 TF; taught at Itasca) Christian
A field course emphasizing techniques in study of small mammals. Lectures and field projects will emphasize identification distributions, community interactions, ecophysiology and population ecology.

5970. Directed Studies. (889125) (Cr ar; prereq #, Δ) Staff

5990. Directed Research. (689126) (Cr ar; prereq #, Δ) Staff
Laboratory or field investigation of selected areas of research.

8391. Advanced Work in Ecology and Behavioral Biology. (489127) (Cr ar; prereq #) Staff

8777. Thesis Credits: Masters. (289128) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (189129) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.5817. Vertebrate Ecology—July 21-August 24. (489130) (5 cr; limited to 15 students; prereq course in ecology, Δ; 0800-1700 TF; offered at Itasca) Tester
Field studies on vertebrate populations and their relationships to local environments; habitat analysis and ecological research methods. Students working individually or in teams investigate behavioral and ecological aspects of selected vertebrates. Research-oriented course supplemented with lectures and field trips.

R. 5852. Ecological Genetics—July 21-August 24. (490911) (5 cr; limited to 15 students; prereq college level course in general biology or genetics or instructor permission; A/F only; 0800-1700 MTh, taught at Itasca) Staff
Introduction to basic population and quantitative genetics; variation in natural populations; electrophoretic analysis of field samples; reconstructing phylogeny; genetic studies of population structure, and introduction to mitochondrial DNA analysis.

5970. Directed Studies. (289131) (Cr ar; prereq #, Δ) Staff

5990. Directed Research. (189132)

(Cr ar; prereq #, Δ) Staff See First Term.

8391. Advanced Work in Ecology and Behavioral Biology. (989133) (Cr ar; prereq #) Staff

8777. Thesis Credits: Masters. (789134) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (589135) (1-36 cr [max 11 cr per summer term])

Economics (Econ)

1035 Management/Economics Building. 625-6353
College of Liberal Arts
(See also Public Affairs.)

FIRST TERM

R.1101. Principles of Microeconomics. (4 cr; \$1104; each section limited to 30 students; prereq plane geometry and intermediate algebra at GC 0623 and GC 0631 level)

Demand and supply; competition and monopoly; the distribution of income.
Sec 1, (888279) 0800-0900 MTWThF, BlegH 115
Sec 2, (188280) 0915-1015 MTWThF, BlegH 115
Sec 3, (088281) 1030-1130 MTWThF, BlegH 225
Sec 4, (888282) 1145-1245 MTWThF, BlegH 225
Sec 5, (688283) 1300-1400 MTWThF, BlegH 115

R.1102. Principles of Macroeconomics. (4 cr, \$1105; each section limited to 30 students; prereq 1101 or equiv, plane geometry and intermediate algebra at GC 0623 and GC 0631 level)

National income; money and banking; business cycles; international trade.
Sec 1, (488284) 0915-1015 MTWThF, BlegH 135
Sec 2, (288285) 1030-1130 MTWThF, BlegH 205

R.3101. Microeconomic Theory. (185534) (4 cr; \$3105; limited to 35 students; prereq 1101, 1102 or equiv, 1 qtr calculus; 1030-1130 MTWThF; BlegH 230)

Behavior of households, firms, and industries under competitive and monopolistic conditions; factors influencing production, price, and advertising decisions.

R.3102. Macroeconomic Theory. (985535) (4 cr; limited to 35 students; prereq 3101 or equiv; 1145-1245 MTWThF; BlegH 205)

Determinants of national income, employment, and price level; aggregate consumption, investment, and government demand; the money market; the labor market.

R.3103. Welfare Economics. (788095) (4 cr; limited to 35 students; prereq

3101 or equiv; 1030-1130 MTWThF; BlegH 420)

Economic efficiency and the conditions necessary to sustain it. Conflicts between efficiency and income distribution goals. How market structure and public policies increase or decrease efficiency.

R.3601. Industrial Organization and Anti-Trust Policy. (988287) (4 cr; \$5631; limited to 15 students; not open to economics majors; prereq 1101, 1102 or equiv; 0800-0900 MTWThF; BlegH 145)

Economic aspects of antitrust and related policies. Relations between market structure and economic efficiency and welfare. Economic origins of monopoly and other restraints on competition. Purposes and effects of antitrust and related legislation. Meets with 5631.

R.3701. Money and Banking.

(085123) (4 cr, \$5701, \$5721; limited to 50 students; prereq 1101, 1102 or equiv; not open to economics majors; 1145-1245 MTWThF, BlegH 230) Historical development, present characteristics, and economic role of financial institutions. Commercial banking, the Federal Reserve system, and monetary policy.

R.3751. Financial Economics I.

(785424) (4 cr; limited to 35 students; prereq 3101 or 3105 or equiv, 1 qtr statistics, 1 qtr calculus; 1030-1130 MTWThF; BlegH 150) Financial decisions of firms and investors. Determination of interest rates and asset prices. The role of risk and uncertainty. Emphasis on economic models rather than the details of financial institutions.

3951. Major Project Seminar.

(189302) (2 cr; prereq 3101, 3102, 3103 or equiv)

3970. Directed Studies. (785536) (Cr ar; prereq #, Δ, college approval)

Guided individual reading or study in areas not available in regular course offerings.

R.5301. Economic Development.

(585537) (4 cr, \$5331; limited to 25 students; prereq 1101, 1102 or equiv; not open to economics majors; 1145-1245 MTWThF; BlegH 145)

Economic growth in low income countries. Theory of aggregate and per capita income growth. Population growth, productivity increases, and capital formation. Allocation of resources between consumption and investment and among sectors. International assistance and trade. Meets with 5331.

R.5331. Economic Development.

(385538) (4 cr, \$5301; limited to 25 students; prereq 3101, 3102 or equiv; 1145-1245 MTWThF; BlegH 145) See 5301. Meets with 5301.

R.5401. International Economics.

(185539) (4 cr, \$5431, \$5432; limited to 40 students; not open to economics majors; prereq 1101, 1102 or equiv;

1030-1130 MTWThF; BlegH 125)

Explanations of trade patterns. Commercial policy and international capital movements. Balancing international receipts and payments, the role of exchange rates, international monetary reform.

R.5431. International Trade. (289940)

(4 cr; \$5401 limited to 35 students; prereq 3101, 3102, 3103 or equiv; 0915-1015 MTWThF; BlegH 225) Explanations of trade patterns. Commercial policy and international capital movements.

R.5631. Industrial Organization and Anti-Trust Policy. (788288) (4 cr,

\$3601; limited to 35 students; prereq 3101, 3103 or equiv; 0800-0900 MTWThF; BlegH 145) See 3601. Meets with 3601.

R.5731. Macro Economic Policy.

(291722) (4 cr; limited to 35 students; prereq 3101, 3102 or equiv; 0915-1015 MTWThF; BlegH 145) Evaluation of policy alternatives. Rational Expectations. Rules versus discretion. Control of inflation. Natural rate of unemployment. Targets and Instruments.

R.5831. Cost-Benefit Analysis.

(386852) (4 cr; limited to 35 students; prereq 3101, 3103 or equiv; 0800-0900 MTWThF; BlegH 155) Principles for evaluation of benefits and costs of public projects or programs. Definition and measurement of benefits and costs. Rate of return and rate of discount. Treatment of market imperfections, risk, and uncertainty.

5970. Directed Studies. (385541) (Cr ar; prereq #, Δ, CLA approval) Staff

Guided individual reading or study in areas not available in regular course offerings.

8777. Thesis Credits: Masters.

(888623) (1-16 cr [max 11 cr per summer term]) Staff

8888. Thesis Credits: Doctoral.

(088765) (1-36 cr [max 11 cr per summer term]) Staff

8990. Individual Research. (185542)

(Cr ar) Staff

SECOND TERM

R.1101. Principles of Microeconomics. (4 cr; \$1104; each

section limited to 30 students; prereq plane geometry and intermediate algebra at GC 0623 and GC 0631 level) See First Term.

Sec 1, (588289) 0915-1015 MTWThF, BlegH 145

Sec 2, (988290) 1030-1130 MTWThF, BlegH 140

Sec 3, (788291) 1145-1245 MTWThF, BlegH 140

R.1102. Principles of Macroeconomics. (4 cr; \$1105; each

section limited to 30 students; prereq 1101 or equiv, plane geometry and intermediate algebra at GC 0623 and GC 0631 level)

See First Term.
Sec 1, (588292) 0800-0900 MTWThF, BlegH 140
Sec 2, (388293) 0915-1015 MTWThF, BlegH 140
Sec 3, (188294) 1030-1130 MTWThF, BlegH 125
Sec 4, (088295) 1145-1245 MTWThF, BlegH 135

R.3101. Microeconomic Theory. (4 cr;

\$3105; limited to 35 students; prereq 1101, 1102 or equiv, 1 qtr calc) See First Term. See Special Term for Section 2.
Sec 1, (386530) 0915-1015 MTWThF, BlegH 135

R.3102. Macroeconomic Theory.

(886533) (4 cr; limited to 35 students; prereq 3101 or equiv; 1145-1245 MTWThF; BlegH 205) See First Term.

R.3103. Welfare Economics. (486535)

(4 cr; limited to 35 students; prereq 3101 or equiv; 0915-1015 MTWThF; BlegH 115) See First Term.

R.3701. Money and Banking.

(286536) (4 cr, \$5701, \$5721; limited to 50 students; prereq 1101, 1102 or equiv; not open to economics majors; 0915-1015 MTWThF; BlegH 230) See First Term.

R.3751. Financial Economics I.

(889304) (4 cr; limited to 35 students; prereq 3101 or 3105 or equiv, 1 qtr statistics, 1 qtr. calculus; 1030-1130 MTWThF; BlegH 215) See First Term.

R.3801. Elements of Public Finance.

(186853) (4 cr, \$5821; limited to 15 students; prereq 1101, 1102 or equiv; not open to Economics majors; 0915-1015 MTWThF; BlegH 435) Tax and expenditure policies, primarily at federal level. Impact of tax structure on the distribution of income. Evaluation of public programs. Optimal mix of public and private sector output. Meets with 5821.

3951. Major Project Seminar.

(089303) (2 cr; prereq 3101, 3102, 3103 or equiv)

3970. Directed Studies. (186537) (Cr ar; prereq #, Δ, college approval) Staff

See First Term.

R.5307. Comparative Economic

Systems. (287539) (4 cr, \$5337; limited to 25 students; prereq 1101, 1102 or equiv; not open to Economics majors; 1030-1130 MTWThF; BlegH 230)

Functions of economic systems; market economy, liberal socialism, centrally planned economy. American and Soviet economies. Meets with 5337.

R.5337. Comparative Economic

Systems. (687540) (4 cr, \$5307; limited to 25 students; prereq 3101, 3102 or equiv; 1030-1130 MTWThF; BlegH 230) See 5307. Meets with 5307.

R.5401. International Economics.

(487538) (4 cr, \$5431 \$5432; limited to 40 students; not open to economics majors; prereq 1101, 1102 or equiv; 1145-1245 MTWThF; BlegH 110) See First Term.

R.5432. International Finance.

(989942) (4 cr; limited to 35 students; prereq 3101, 3102, 3103 or equiv; 5431 or equiv recommended; 1030-1130 MTWThF; BlegH 420) Balancing international receipts and payments; the role of exchange rates; international monetary reform.

R.5821. Elements of Public Finance.

(086854) (4 cr, \$3801; limited to 35 students; prereq 3101, 3103 or equiv; 0915-1015 MTWThF; BlegH 435) See 3801. Meets with 3801.

5970. Directed Studies. (786539) (Cr ar; prereq #, Δ, CLA approval) Staff

See First Term.

8777. Thesis Credits: Masters.

(988709) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.

(888850) (1-36 cr [max 11 cr per summer term])

8990. Individual Research. (186540)

(Cr ar) Staff

SPECIAL TERM: AUGUST 16-SEPTEMBER 16

R.3101. Microeconomic Theory.

Sec 2, (192054) (4 cr, \$3105; limited to 45 students; prereq 1101, 1102 or equiv, 1 qtr calculus, Humphrey Institute Students only; 0915-1015 MTWThF; HHHCtr 30) Kudrle Microeconomics with a public policy emphasis. For incoming graduate students in public affairs. Course is a prerequisite to the school's core sequence in policy and analysis.

Education (Educ)

Education courses may be found under the following departments and course designations: Adult and Teacher Education (AdEd), Agricultural Education (AgEd), Art Education (ArEd), Business and Marketing Education (BME), Child Psychology (CPs), Curriculum and Instructional Systems (CISy), Educational Policy and Administration (EdPA), Educational Psychology (EPs), Elementary Education (Elem), Home Economics Education (HEEd), Industrial Education (Ind), Science (Sci), Mathematics Education (MEd), Physical Education (PE), Recreation, Park and Leisure Studies (Rec), Secondary Education (SecEd), and Vocational Education (VoEd).

Previously registered students (and admitted to a degree or licensure program offered by the College of Education, or admitted as an Adult Special in the College) are no longer required to obtain general registration approvals except for those approvals that are defined in the prerequisite statements of courses (instructor, department and college approvals that require override permits).

Summer-only students in the College of Education must obtain college approval on their Course Request form from the Education Student Affairs Office (ESAO), 7A Welling Hall.

FIRST TERM

8888. Thesis Credits: Doctoral. (1-36 cr [max 11 cr per summer term])
 Sec 1, (489242) Higher Education
 Sec 2, (289243) Curriculum and Instruction
 Sec 3, (189244) Vocational Education
 Sec 4, (989245) Recreation, Park, and Leisure Studies
 Sec 5, (789246) Social and Philosophical Foundations of Education

SECOND TERM

8888. Thesis Credits: Doctoral. (1-36 cr [max 11 cr per summer term])
 Sec 1, (589247) Higher Education
 Sec 2, (389248) Curriculum and Instruction
 Sec 3, (189249) Vocational Education
 Sec 4, (589250) Recreation, Park, and Leisure Studies
 Sec 5, (389251) Social and Philosophical Foundations of Education

Educational Administration (EdAd)

275 Peik Hall. 624-1006
 (Educational Policy and Administration)
 College of Education
 (See also Educational Policy and Administration.)

FIRST TERM

8777. Thesis Credits: Masters. (488625) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688767) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (288710) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688851) (1-36 cr [max 11 cr per summer term])

Educational Policy and Administration (EdPA)

275 Peik Hall. 624-1006
 College of Education

FIRST TERM

R.5090. School and Society. (3 cr, each section limited to 45 students; prereq sr or post-BA in education or CLA music ed major or Δ; A-F only)
 Readings in social science and philosophy integrating views of the role of the school in a changing American society.
 Sec 1, (589314) 0800-0900 MTWThF, PeikH 28, Harkins
 Sec 2, (890162) 1030-1130 MTWThF; NichH 109; Lewis

5099. Directed Study. (Cr and hrs ar [max 9 cr]; prereq #; S-N optional)
 Individual or group work on topics or problems in social and philosophical foundations of education.
 Sec 21, (389315) Harkins
 Sec 22, (189316) Louis
 Sec 23, (089317) Turner
 Sec 24, (989634) King
 Sec 29, (291834) Lewis

5128. Workshop: Educational Administration. (1-6 cr; S-N optional)
 Laboratory approach provides opportunities for experienced administrators to concentrate on common administrative and supervisory problems. See Special Programs section.
Sec 1, Quality and Renewal in the Learning Organization—June 20-30. (889318) (3 cr; 0915-1200 MTWThF; Arch 45) Harkins

Sec 2, Outcome Based Education—June 27-July 8. (191835) (3 cr; 0830-1130 MTWThF; FordH 55) King
Sec 3, Designing and Administering the Multicultural School—June 29,30, July 5,6,8,11,13,15,18,19. (292076) (3 cr; 0900-1130 MTWThF; Andersen Contemporary School, 2727 10th Avenue South, Minneapolis) Shin

5201. Formal Organizations in Education. (385314) (3 cr; 0915-1130 TTh; ChDev 216) Anderson
 Classical and current theories of organizational behavior and administration. Special topics include leadership and control, communication, conflict, the effects of educational environments, organizational design and change, and organizational effectiveness.

5202. Politics of Education. (989827) (3 cr; 0915-1200 MW; NichH 216; S-N optional) Staff
 Social science findings, concepts, and methods used to consider the political context of educational administration; emphasis on creation of public school policy by local and state governments; role of administrators.

5204. Financing Elementary and Secondary Schools. (089320) (3 cr; 0915-1200 MW; PeikH 46; S-N optional) Mueller
 Value assumptions and educational finance policy, economic factors, sources and characteristics of educational revenue, state and local distribution systems, federal support, urban/rural variations, institutional financing alternatives.

5214. School Management Information Systems. (391839) (3 cr; 0915-1200 MW; JonesH 4; S-N optional) Hendrix
 Basic techniques required to generate, maintain, and make accessible the computer-based management information system in education.

5222. Introduction to Policy Research. (3 cr; only grad students may take S-N, all other A-F)
 Critical examination of the political, philosophical, environmental and methodological issues that accompany policy research in education; particular consideration will be given to the determinants of the applicability of quantitative and qualitative methods.
 Sec 1, (890663) 0915-1130 TTh; PeikH 46; Hendrix, Mueller

5245. Ethics, Morality and Values in Education. (591841) (3 cr; 1430-1630 MWF; PeikH 33; S-N optional) Orton
 Introductory graduate level course on the subject matter of ethics, morality and values in education. Application to key issues of professional practice.

5250. American Higher Education. (489323) (4 cr; 1300-1530 TTh; PeikH 48; S-N optional) Anderson
 American higher and postsecondary education in historical and contemporary perspective; special emphasis on

the societal and political demands on the higher education system and consequent changes in its various forms and functions.

5272. Problems: Educational Administration. (1-3 cr per term, hrs ar \$8272; S-N optional)
 For superintendents and principals qualified to make intensive studies of a school system.
 Sec 22, (490665) Hendrix
 Sec 25, (290666) Mazzoni
 Sec 26, (190667) Mueller
 Sec 27, (391842) Nickerson
 Sec 31, (990668) Ammentorp
 Sec 32, (790669) Turner
 Sec 33, (190670) Louis
 Sec 34, (990671) King
 Sec 35, (191843) Lewis

5281. Economic Analysis in Educational Evaluation. (091844) (3 cr; 1300-1545 MW; PeikH 25; S-N only) Lewis
 Use and application of cost-effectiveness, cost-benefit, cost-utility, and cost-feasibility in the evaluation of educational problems and programs.

8228. Problems: Higher Education. (Cr and hrs ar; prereq #)
 Selected topics on college programs, instruction, organization, and administration.
 Sec 21, (289324) Ammentorp
 Sec 22, (189325) Louis
 Sec 23, (989326) Turner
 Sec 24, (789828) Anderson
 Sec 25, (891845) Lewis

8229. Seminar: Higher Education. (1-4 cr; prereq #)
 Intensive study of selected topics.
Sec 1, New Directions for the University—June 14-24. (592018) (3 cr; 0915-1215 MTWThF; HHHCr 60) Heydinger

8248. Seminar: Metropolitan School Governance—June 27-July 1. (190921) (3 cr; prereq 5202 or EdAd 5202 or SPFE 5202; 0900-1500 MTWThF; off campus) Nathan, Sundin
 Impact of metropolitanization on policy issues confronting public schools in core cities; strategies proposed for restructuring education governance emphasizing Twin Cities metropolitan area.

8261. Problems: History and Philosophy of Education. (Cr and hrs ar; prereq #)
 For graduate students interested in research and original work in these areas.
 Sec 21, (589328) Harkins
 Sec 22, (389329) Louis
 Sec 23, (789330) Turner
 Sec 24, (589829) King
 Sec 26, (691846) Lewis

8271. Problems: Secondary School Administration. (491847) (Cr and hrs ar; prereq #) Nickerson

8273. Field Study. (0-10 cr, hrs ar; prereq #)
 Required for specialist in education certificate. The 10 credits will be

based on a written report covering an approved field study. Students may register for the general planning and organization of their study without credit.

- Sec 22, (790672) Hendrix
- Sec 25, (989830) Mazzoni
- Sec 26, (189333) Mueller
- Sec 27, (291848) Nickerson
- Sec 31, (089334) Ammentorp
- Sec 32, (889335) Turner
- Sec 33, (689336) Louis
- Sec 34, (489337) King
- Sec 35, (191849) Lewis

8888. Thesis Credits: Doctoral. (591967) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.5090. School and Society. (3 cr; each section limited to 45 students; prereq sr or post-BA in education or CLA music ed major or Δ; A-F only) See First Term
 Sec 1, (289338) 0800-0900 MTWThF, PeikH 225, Harkins
 Sec 2, (390674) 1300-1400 MTWThF, PeikH 28, Lange

5099. Directed Study. (Cr and hrs ar, [max 9 cr] prereq #; S-N optional) See First Term.
 Sec 21, (189834) Harkins
 Sec 22, (789831) Louis
 Sec 27, (291851) Mestenhauer
 Sec 28, (791854) Paige

R.5103. Supervision and Administration of Special Education. (192077) (3 cr; §Epsy 5660; prereq #; 0915-1145 MW; PeikH) Weatherman
 Procedures in establishing and improving educational programs for exceptional children.

5128. Workshop: Educational Administration.
 See First Term.
Sec 1, Cross-Cultural Perspectives on Leadership—August 12-14. (189339) (2 cr; August 12 1400-2100, August 13 0900-2100, August 14 0900-1600; HHHCtr 30) Mestenhauer, Paige
Sec 2, Facilitating School Change—July 25-August 5. (591855) 3 cr; 0915-1145 MTWThF; PeikH 225; Wahlstrom
Sec 3, Critical Issues in International Education and Educational Exchanges. (792017) (4 cr; 0915-1230 TTh; Peik H 315) Mestenhauer

R.5130. Leadership Development Seminar. (489340) (3 cr; limited to 25 students; prereq advanced application, p; S-N optional. Advance application required by July 15, 1994.
 Sec. 1, (489340) 1030-1530 MTWThF; BioSci 70 St. Paul; Nickerson

R.5139. Laboratory in Decision Making. (289341) (3 cr; limited to 25 students; prereq advanced application, p; S-N optional. Advance application required by July 15, 1994.
 Sec 1, (289341) 1030-1530 MTWThF; BioSci 70 St. Paul; Nickerson

5212. School Budgeting. (189342) (3 cr; 1300-1530 MW; PeikH 25; S/N optional) Sederberg
 Concepts and skills involved in preparing financial budgets for public schools; competency in translating educational programs into budgetary systems, anticipating revenue receipts, planning expenditures, and techniques for preparing a balanced budget.

5213. Financial Resource Management. (989343) (3 cr; 1300-1530 TTh; PeikH 25 c; S/N optional) Sederberg
 Concepts and skills involved in the management of financial resources in public schools; performance exercises related to public school accounting systems, purchasing, the controller function, and reporting and interpreting school financial data.

5272. Problems: Educational Administration. (1-3 cr per qtr, \$8272; hrs ar)
 See First Term.
 Sec 27, (890677) Nickerson
 Sec 28, (690678) Sederberg
 Sec 30, (992078) Weatherman
 Sec 31, (490679) Ammentorp
 Sec 33, (890680) Louis
 Sec 35, (690681) Wahlstrom
 Sec 36, (191091) Mestenhauer
 Sec 37, (391856) Paige

8228. Problems: Higher Education. (Cr and hrs ar; prereq #)
 See First Term.
 Sec 21, (490862) Ammentorp
 Sec 22, (590673) Louis

8261. Problems: History and Philosophy of Education. (Cr and hrs ar; prereq #)
 See First Term.
 Sec 21, (089835) Harkins
 Sec 22, (589832) Louis
 Sec 27, (191852) Mestenhauer
 Sec 28, (991853) Paige

8271. Problems: Secondary School Administration. (189347) (Cr and hrs ar; prereq #) Nickerson

8273. Field Study. (0-10 cr, hrs ar; prereq #)
 See First Term.
 Sec 27, (189350) Nickerson
 Sec 28, (089351) Sederberg
 Sec 30, (792079) Weatherman
 Sec 31, (290683) Ammentorp
 Sec 33, (889836) Louis
 Sec 35, (389833) Wahlstrom
 Sec 36, (891103) Mestenhauer
 Sec 37, (891859) Paige

8605. Problems: International Education Research. (191860) (3-6 cr; prereq 5605 or AdEd 5605 or Educ 5605) Mestenhauer
 Examination of comparative research studies focusing on major educational issues worldwide with emphasis on development education.

8888. Thesis Credits: Doctoral. (091861) (1-36 cr [max 11 cr per summer term])

Educational Psychology (EPsy)

204 Burton Hall. 624-3543
 College of Education

FIRST TERM

R.5114. Psychology of Student Learning—June 15-July 11. (186800) (3 cr; limited to 50 students; 1500-1730 MWF; FolH 104; A-F only) vandenBroek
 Survey of psychological methods and principles; models of the learner; topics in development, creativity, intelligence, and motivation; implications for teaching and curriculum design in preschool, elementary, and secondary education; professional training with children and adolescents as clients.

R.5119. Learning and Cognitive Foundations of Education. (4 cr; each lab limited to 25 students; prereq education student, or CLA music ed maj or p, course in psychology recommended; lect 0800-0920 MTTh, Phys 150; A-F only) Bart
 Principles of development, learning, cognition, individual differences, classroom management, instructional delivery, and related topics; their applicability to instruction and the organization of curricular materials.
 Lab 1, (489838) 0800-0920 WF, Phys 150
 Lab 2, (289839) 0800-0920 WF, Phys 143

R.5135. Workshop in Human Relations. (786802) (6 cr; limited to 50 students; 0800-1300 June 14 and 0800-1300 MTWThF July 5-15; Arch 40; S-N only) LeCount
 Experientially based course including simulation activities, curriculum writing, and supervised practice in basic human relations skills, emphasizing individual, cultural, and ethnic differences and their implications for educational practice.

R.5139. Interpersonal and Personality Effects on Learning. (4 cr; each section limited to 50 students; prereq senior or post BA in education or CLA music education major or , at least one course in psychology; A-F only) Major theories and research on schooling as it relates to human relations, small groups, face to face relations, and individual personality and social development.
 Sec 1, (689840) 1030-1230 MTWTh, SciCB 375, Rest
 Sec 2, (489841) 1030-1230 MTWTh, SciCB 325

R.5151. Structuring Learning: Social Psychological Approaches. (485353) (3 cr; limited to 30 students; July 5-19; 1300-1600 MTWTh; BuH 125, and hrs ar off campus; A-F only)
 How to use cooperation, competition, and individualization to affect learning climate, and cognitive and affective outcomes of instruction.

R.5200. Special Topics: SAS for Data Management, Data Analysis, and Report Writing—June 16-July 8. (291879) (3 cr; limited to 25 students; 0800-0930 MTWThF; PeikH 225 S-N only) Davenport

This is a data analysis course which cuts across disciplines. It will teach students how to use the SAS statistical package to perform data management, data analysis, and report writing. This course should be of interest to data analysts in academic and commercial settings and students who wish more practice in applying statistical procedures. Students will be responsible for completing a short computer run for each class and a final project.

R.5229. Classroom Assessment Methods. (289842) (2 cr; limited to 100 students; prereq concurrent student participation in practice teaching or some similar field experience is strongly suggested; 1300-1500 TTh; Phys 131; A-F only) Terwilliger
 Concepts and techniques necessary for effective diagnosis of learning problems and assessment of educational outcomes. Primary emphasis is given to constructing teacher-made assessment devices which are efficient, technically sound, and directly relevant to classroom decision-making.

R.5240. Principles and Methods of Evaluation. (492058) (3 cr; limited to 30 students; 1230-1530 MWF; ChDev 216; S-N optional) J. King
 Introductory course in program evaluation; theory; practical examples; purpose, roles, program descriptions, and evaluation strategies.

R.5260. Introductory Statistical Methods. (186805) (4 cr; limited to 40 students; 0800-0900 MTWThF; WullH 130; ChDev 216; S-N optional) Terwilliger
 Techniques for organizing and presenting data; descriptive indices of central tendency, variability, and bivariate correlation/regression; procedures for making inferences concerning means and proportions.

R.5400. Workshop: Counseling Psychology. (1-6 cr [max 12 cr])
 For all counselors, teachers, and administrators; aspects of intervention theory in relation to psychological principles; counseling, career development, assessment, psychological education and consultation.
Sec 1, Counseling and Therapy Interventions with Men—June 20-24. (186223) (3 cr; limited to 30 students; 0800-1630 MTWThF; BuH 125; A-F only) Skovholt
 Emphasis will be on broad themes in male socialization and psychology along with counseling interventions and counseling methods in working with men.
Sec 2, Stress, Coping, and Well-Being—July 5-19. (590950) (3 cr; 1000-1230 MTWThF; BuH 125; A/F only) Romano

COURSE DESCRIPTIONS

Theories, research, and applications of stress, coping, and well-being. Applications to educational and counseling agency populations.

5601. Education of Exceptional Children—June 14-July 15. (886807) (4 cr; 0800-0930 MTWThF; ChDev 218; A-F only) Introduction to field of special education for classroom teachers and other school personnel.

R.5607. Collaboration for Inclusive School Communities—June 20-24. (990699) (3 cr; limited to 50 students; 0800-1600 MTWThF; BuH 120) York Rationale for, implications of, and strategies for including students with unique needs (e.g., disabilities) in general education classroom settings. The importance of creating a sense of community among students and adults in today's heterogeneous classrooms and school is emphasized.

5608. Parent and Professional Planning for Handicapped Students—July 6-19. (791868) (3 cr; 1300-1530 MTWThF; BuH 120; A-F only) Study and demonstration of constructive approaches to cooperative planning and implementation of education programs by parents, teachers, and others involved with children who have special needs.

5609. Family-Professional Planning for Persons with Severe Handicaps—July 6-19. (591869) (3 cr; 1300-1530 MTWThF; BuH 123; A-F only) Marchel, Richards Interdisciplinary course examining the needs of families who have children with severe handicaps; emphasis on life cycle needs, service issues, programs of support from infancy through adult year, services from different agencies, disciplines, professional requirements, and responsibilities in serving families.

R.5612. Education of Learning-Disabled Children—June 14-29. (489354) (3 cr; limited to 30 students; 1030-1230 MTWThF; FolH 306; A-F only) Espin Analysis of considerations in design and conduct of services for learning-disabled children; approaches to education of such children.

5620. Introduction to Mental Retardation—June 14-July 15. (991870) (4 cr; SCPsy 5315; prereq 5601 or PsyS 5101 or #; 1030-1200 MTWThF; BuH 123; A-F only) Turnure Issues relating to educational practices; community planning; educational philosophy, administration and organization, and programming.

5641. Models of Service Delivery to Students with Hearing Impairments—July 6-12. (791871) (3 cr; limited to 30 students; 0800-1300 MTWThF; MN State Academy for the Deaf; A-F only) Rose Programmatic and systems of support for infants, children, and youth with hearing impairments; educational

delivery system models, curriculum and material adaptation, and consultation skills.

5646. Reading and Instructional Practices with Hearing-Impaired Students—July 13-19. (591872) (4 cr; limited to 30 students; 0800-1500 MTWThF; MN State Academy for the Deaf; A-F only) McAnally Focuses on the knowledge and skills required to assess, plan, and implement instruction for individuals with hearing impairments. Emphasis is placed on the theoretical and pragmatic issues in the acquisition of reading and writing skills, curricular adaptations, and effective instructional approaches used with hearing-impaired learners.

R.5656. Educational Needs of Students with Emotional Disturbances or Behavioral Disorders—June 14-28. (888962) (3 cr; limited to 40 students; students must also register for 5657; 0800-1015 MTWThF; BuH 123; A-F only) Wood Preparation for specialists: educational characteristics, educational interventions, teaching of social behavior, legal and ethical issues.

R.5657. Educational Interventions for Students with Emotional Disturbances or Behavioral Disorders—June 30-July 15. (688963) (3 cr; limited to 40 students; prereq 5656; students must also register for 5656; 0800-1015 MTWThF; BuH 123 A-F only) Wood Preparation for specialists: assessment and planning procedures, interagency cooperation, career preparation and transition for EBD students.

R.5701. Practicum: Special Education. (Cr and hrs ar; prereq #; S-N only) Supervised experience in teaching or related work in schools or other agencies serving exceptional children. Sec 1, (686808), 8 cr, Wilderson; off campus, limited to 20 students Sec 2, (588244), 8 cr, off-campus, limited to 20 students Sec 11, (390092), 8 cr Sec 12, (190093), 8 cr Sec 23, (989844), 8cr, Rose; off-campus

5703. Practicum Experience: Special Education. (Cr and hrs ar; prereq #; off-campus; A-F only) Supervised experience in teaching or related work in schools or other agencies serving exceptional children. Sec 1, (488964) off campus Sec 2, (189356) off campus

5710. Contemporary Services for Persons with Developmental Disabilities—June 27-July 13. (989357) (3 cr; 0800-1015 MTWThF; BuH 120) Survey course focusing on the characteristics and service needs of persons with developmental disabilities using interdisciplinary approaches. Changing concepts, models of services, issues relating to promoting independence, productivity, and integration into communities.

5900. Independent Study. (Cr and hrs ar [max 12 cr]; prereq # for secs 21-54; A-F only)

R.Sec 1. Building Socially Desirable Values, Attitudes and Behaviors: A Course for Teachers, Social Workers, and Parents—June 15, 20, and 23. (490973) (2 cr; limited to 40 students; 0900-1600; BioSci 12; S-N only) Samuels

Most current techniques used to build moral values and modify human behavior were developed a half century ago using rats and pigeons to test the techniques. Because of wide variability in environmental social settings and inborn individual differences among humans, these techniques work in only a small percentage of cases. In this course we will learn new approaches for motivating and creating the conditions that lead to positive and desirable behavior and attitudes of the type which lead to personal growth and success. We will also examine the strengths and weaknesses of the more traditional approaches used to mold and modify behavior.

R.Sec 2. Measuring Outcomes in Education—June 16-July 1. (691880) (2 cr; limited to 25 students; 1500-1700 MTWThF; BuH 125; S-N only) Davenport

This course will provide a forum for thoughtful deliberation on assessment issues pertaining to outcome-based education. The major emphasis of the course will be on performance assessment. The goals will be to (1) provide training so that teachers will be better prepared to use alternative assessment techniques and (2) provide information so that teachers (and others) are better able to evaluate the worth of these popular measurement strategies.

Sec 21, (288190) psychological foundations, MacEachern
Sec 27, (789845) special education, Rose
Sec 29, (886810) special education, Wood
Sec 30, (686811) special education, Knowlton
Sec 34, (791885) counseling, Romano
Sec 35, (588180) special education
Sec 41, (391873) special education, Turnure
Sec 42, (188966) counseling, Skovholt
Sec 43, (789358) special education, Wilderson
Sec 44, (589359) special education, York
Sec 45, (989360) special education, Espin
Sec 46, (589846) psychological foundations, Bart
Sec 48, (189848) psychological foundations, Terwilliger
Sec 49, (089849) special education, Hupp
Sec 51, (690695) psychological foundations, Davenport
Sec 52, (491881) psychological foundations, vandenBroek
Sec 53, (292059) psychological foundations, Samuels
Sec 54, (191874) special education, Rynders

8260. Statistical Methods. (486812) (3 cr; prereq 5260 PsyF 5110 or Psy 3801 or equiv; 0745-0900 MTWThF; AndH 230) MacEachern Foundations of statistical theory; practice in applying theories in solution of educational and psychological problems.

8262. Statistical Methods. (286813) (3 cr; prereq 8261; 0915-1015 MTWThF; AndH 230) MacEachern Foundations of statistical theory; practice in applying theories in solving of educational and psychological problems.

8279. Problems: Statistics for Students in Education and Psychology. (Cr and hrs ar) Recent developments in statistical science; applications to educational and psychological problems. Sec 22, (186814) MacEachern Sec 23, (290697) Davenport Sec 24, (291882) Terwilliger

8777. Thesis Credits: Masters. (588535) (1-16 cr [max 11 cr per summer term])

8832. Clinical Practice in School Psychology. (691037) (1-5 cr; prereq 8810 or PsyS 8310) Casey Supervised diagnosis and treatment of children referred to psychoeducational settings; training in broad range of approaches to problems of adjustment in school-age children, their families, schools, and community settings.

8888. Thesis Credits: Doctoral. (388536) (1-36 cr [max 11 cr per summer term])

8900. Research Problems. (Cr and hrs ar; prereq #)
Sec 24, (786816) psychological foundations, Maruyama
Sec 27, (586817) psychological foundations, MacEachern
Sec 33, (189851) special education, Rose
Sec 35, (091875) special education, Turnure
Sec 36, (585389) special education, Wood
Sec 37, (391887) counseling, Romano
Sec 41, (388181) special education
Sec 42, (788968) special education, Knowlton
Sec 46, (588969) counseling, Skovholt
Sec 47, (789148) school psychology
Sec 48, (789361) special education, Wilderson
Sec 49, (589362) special education, York
Sec 50, (389363) special education, Espin
Sec 51, (089352) psychological foundations, Bart
Sec 52, (889853) psychological foundations, Terwilliger
Sec 53, (191883) psychological foundations, vandenBroek
Sec 54, (891876) special education, Hupp
Sec 55, (691877) special education, Rynders
Sec 56, (991884) psychological foundations, Samuels

8910. Directed Study. (692060) (cr ar; School Psych major only)

SECOND TERM

R.5115. Psychology of Adult Education—July 25-August 19. (492061) (4 cr; limited to 30 students; 1015-1330 MWF; A-F only; BuH 125) R. Tennyson
Survey of psychological methods and principles in human learning; models of adult learner, topics in motivation, creativity, achievement, intelligence; implications for teaching and curriculum design in higher education, continuing education, and professional training.

R.5119. Learning and Cognitive Foundations of Education. (4 cr; each lab limited to 25 students; prereq education student, or CLA music ed maj or p; one prior course in psychology recommended; lect 0800-0920 MTTh; Phys 150; A-F only) Bart
See First Term.
Lab 1 (789859) 0800-0920 WF, Phys 150
Lab 2 (189860) 0800-0920 WF, Phys 143

R.5139. Interpersonal and Personality Effects on Learning. (4 cr; each section limited to 50 students; prereq senior or Post BA in education or CLA music education major or p; at least one course in psychology; A-F only) See First Term.
Sec 1, (789862) 1030-1230 MTWTh, Phys 150, Rest
Sec 2, (589863) 1030-1230 MTWTh, Phys 131, LeCount

R.5220. Educational Measurement in the Classroom—July 25-29. (686226) (4 cr; limited to 25 students; 0800-1200 MTWThF, 1300-1500 MTWThF, Fairview Community Center, 1910 W County Rd B, Roseville, MN; S-N only) Terwilliger
Principles and methods for construction, evaluation, and improvement of classroom measures; techniques for describing results statistically; use of measurement in evaluating instruction and student performance; assignment of grades.

R.5229. Classroom Assessment Methods. (389864) (2 cr; limited to 100 students; prereq concurrent student participation in practice teaching or some similar field experience is strongly suggested; 1330-1530 TTh; BuH 125; A-F only) Davenport
See First Term.

R.5260. Introductory Statistical Methods. (386818) (4 cr; limited to 40 students; 0800-0900 MTWThF, BuH 120) Davenport
See First Term.

R.5615. Educational Interventions for Learning Disabilities. (888959) (3 cr; limited to 30 students; prereq 5612;

1030-1130 MTWThF; BuH 120; A-F only)
Planning, implementing, evaluating academic programs for students with disabilities in written and spoken language, quantitative concepts, and cognitive skills required for learning.

5647. Aural and Speech Programming for Children with Hearing Impairment—July 21-27. (191891) (4 cr; limited to 30 students; prereq #: 0800-1500 MTWThF; MN State Academy for the Deaf; A-F only) Rose
Fundamentals of the speech and hearing mechanisms; survey of instructional practices, technology-based assistive devices to develop auditory and speech skills. Strategies to adapt to the classroom acoustic environment.

5700. Assessment and Decision Making in Special Education. (091892) (3 cr; 0915-1015 MTWThF; BuH 120; A-F only)
For teachers and other educational personnel. Identifying needs of handicapped students; planning, monitoring, evaluating instructional programs; practice in use of standardized devices and development of clinical measures for handicapped students.

5900. Independent Study. (Cr and hrs ar [max 12 cr]; prereq #: A-F only)
Sec 21, (188191) psychological foundations, MacEachern
Sec 27, (292062) special education, Rose
Sec 40, (188358) special education
Sec 50, (689868) psychological foundations, Terwilliger
Sec 51, (489869) psychological foundations, Davenport
Sec 52, (889870) psychological foundations, Tennyson,
Sec 54, (190711) special education, Wilderson
Sec 55, (091889) psychological foundations, Bart

R. 8129. Research Problems: Learning and Cognition. (Cr ar; prereq #)
Formulation of research designs.
Sec 1, (185355) Tennyson

8261. Statistical Methods. (186819) (3 cr; prereq 8260; 0745-0900 MTWThF; AndH 230) MacEachern
Foundations of statistical theory;

practice in applying theories in solution of educational and psychological problems.

8263. Design and Analysis of Experiments. (586820) (3 cr; prereq 8262 or PsyF 8112 or #: 0915-1015 MTWThF; AndH 230) MacEachern
Functional approach to principles of efficient design in experiments and other types of observational programs; improved sampling techniques; methods of analyzing observational results.

8279. Problems: Statistics for Students in Education and Psychology. (Cr and hrs ar)
See First Term.
Sec 22, (289369), MacEachern
Sec 23, (689370), Davenport

8777. Thesis Credits: Masters. (988824) (1-16 cr [max 11 cr per summer term])

8832. Clinical Practice in School Psychology. (491055) (1-5 cr; prereq 8810 or PsyS 8310) Casey
Supervised diagnosis and treatment of children referred to psychoeducational settings; training in broad range of approaches to problems of adjustment in school-age children, their families, schools, and community settings.

8888. Thesis Credits: Doctoral. (788825) (1-36 cr [max 11 cr per summer term])

8900. Research Problems. (Cr and hrs ar; prereq #)
Sec 22, (285354) psychological foundations, Tennyson
Sec 23, (386821) psychological foundations, Davison
Sec 24, (186822) psychological foundations, MacEachern
Sec 25, (689871) psychological foundations, Terwilliger
Sec 33, (792065) special education, Rose
Sec 40, (088359) special education
Sec 45, (489368) psychological foundations, Davenport
Sec 54, (090712) special education, Wilderson
Sec 55, (391890) psychological foundations, Bart
Sec 56, (192063) school psychology

8910. Directed Study. (992064) (cr ar; school psych major only)

Electrical Engineering (EE)

4178 Electrical Engineering/Computer Science. 625-3300
Institute of Technology

FIRST TERM

R.1400. Circuits Laboratory. (687876) (1 cr; limited to 12 students; prereq IT student, 3009 or ¶ 3009; 1300-1515 MW, EE/CSci 3160) Laboratory to accompany EE 3009 and 3060.

R.3009. Linear Circuits I. (487877) (4 cr; limited to 90 students; prereq IT student; Math 3261, Phys 1253; 0800-1015 MTWThF; EE/CSci 3210; A-F only)
Physical principles underlying the modeling of circuit elements. Two- and three-terminal resistive elements, Kirchhoff's laws. Simple resistive circuits. Linearity in circuits. First-order circuits. Circuits in sinusoidal steady state.

5470 Directed Study. (885060) (Cr and hrs ar; prereq Δ)

8450. Special Investigations. (685061) (1-4 cr; prereq #: hrs ar)

8460. Plan B. Project. (485062) (4 cr; prereq #: A-F only)

8777. Thesis Credits: Masters. (188627) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288769) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES
(Register once in Term I)

R.3005. Electronic Circuits and Systems. (290490) (4 cr; limited to 50 students; not for EE majors; prereq 3009; 0800-0900 MTWF; EE/CSci 3125) Holte

R.3006. Circuits and Electronics Laboratory I. (1 cr; each section limited to 14 students; no EE majors; prereq IT student, 3003 or ¶ 3003) Lab 1, (991559) 1030-1245 M, EE/CSci 3160
Lab 2, (291560) 0800-1015 Th EE/CSci 3160

R.3012. System Design. (686064) (4 cr; limited to 50 students; prereq upper division EE major, 3011; 1145-1245 MTWF; EE/CSci 3230; A-F only) Continuous, discrete-time systems. Feedback: stability, applications.

R.3062. Analog and Digital Electronics. (187548) (4 cr; limited to 65 students; prereq upper division EE, CSci, or ME major, 3061, 3351, 3401 or ¶ 3401; lect 0915-1015 MTWF; EE/CSci 3230; rec 0915-1015 Th, EE/CSci 3115, 1st 5 weeks; EE/CSci 3111, 2nd 5 weeks)



COURSE DESCRIPTIONS

Stability and feedback amplifiers, operational amplifier structures, implementation of digital circuits with bipolar and field effect transistors; application to inverters, gates, flip-flops, logic arrays, and storage elements

R.3111. Electromagnetic Waves. (087549) (4 cr; limited to 50 students; prereq 3110, upper division EE major; 1030-1130 MTWTF; EE/CSci 3230) Time-varying electromagnetic fields. Propagation of electromagnetic waves. Metallic and optical waveguides.

R.3351. Introduction to Logic Design. (4 cr; each section limited to 12 students; prereq soph standing in IT; lect 1145-1245 MWThF; EE/CSci 3210) Boolean algebra and logic gates. Combination logic: simplification and design examples. Sequential logic and design of synchronous, sequential logic systems. Integral laboratory. Lab 1, (989763) 1030-1245 T, EE/CSci 2178
Lab 2, (187879) 1300-1515 W, EE/CSci 2178
Lab 3, (487880) 1300-1515 Th, EE/CSci 2178

R.3402. Junior Electrical Engineering Laboratory. (2 cr; each section limited to 12 students; prereq 3401, 3062 or ¶3062; A-F only)
Lab 1, (986071) 1300-1745 M, EE/CSci 3146
Lab 2, (786072) 1300-1745 T, EE/CSci 3146
Lab 3, (586073) 0800-1245 Th, EE/CSci 3146

3476. Industrial Assignment I. (486065) (2 cr; prereq regis in co-op program) Industrial work assignment in engineering co-op program. Grade based on formal written report covering the quarter's work assignment, but deferred until completion of EE 5478, Industrial Assignment III.

3477. Industrial Assignment II. (286066) (2 cr; prereq 3476) See 3476.

R.5002. Digital Signal Processing. (387550) (3 cr; limited to 65 students; prereq upper division elec engr maj or grad IT major, 3012 or #: 0800-0900 MWF; EE/CSci 3115) General concepts of signal processing; discrete-time systems and digital filters.

R.5003. Digital Signal Processing Laboratory. (1 cr; each section limited to 12 students; prereq upper division EE maj, 3402 or ¶3402, 5002, or #: A-F only)
Lab 1, (188319) 0800-1015 T, EE/CSci 2170
Lab 2, (488320) 1030-1245 T, EE/CSci 2170

R.5450. Senior Design Project. (2 cr; each section limited to 5 students; prereq EE senior, 3012, 3062, 3110,

3351, 3352, 3402) Team participation in formulation and solving of open-ended design problems. Oral and written presentations. Sec 1, (985339) 0915-1245 Th, EE/CSci 3230
Sec 2, (285340) 0915-1245 Th, EE/CSci 3230
Sec 3, (388097) 0915-1245 Th, EE/CSci 3230
Sec 4, (291557) 0915-1245 Th, EE/CSci 3230
Sec 5, (191558) 0915-1245 Th, EE/CSci 3230

5478. Industrial Assignment III. (186067) (2 cr; prereq 3477, regis in co-op program; A-F only) Industrial work assignment in engineering co-op program. Grade based on formal written report covering the quarter's work assignment.

5479. Industrial Assignment IV. (986068) (2 cr; prereq 5478) See 5478.

SECOND TERM

R.1400. Circuits Laboratory. (187551) (1 cr; limited to 12 students; prereq IT student, 3009 or ¶3009; 1300-1515 MW; EE/CSci 3160)

R.3010. Linear Circuits II. (787884) (4 cr; limited to 75 students; prereq IT student, at least C grade in 3009; 0800-1015 MTWThF; EE/CSci 3210; A-F only) Energy and power in AC circuits. Transformers. Laplace transform techniques of circuit analysis. Frequency response. Two ports.

5470. Directed Study. (785164) (Cr and hrs ar; prereq Δ)

8450. Special Investigations. (685173) (1-4 cr; prereq #: hrs ar)

8460. Plan B Project. (087552) (4 cr; prereq #: A-F only)

8777. Thesis Credits: Masters. (788713) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488852) (1-36 cr [max 11 cr per summer term])

Elementary Education (Elem)

125 Peik Hall. 625-6372 (Curriculum and Instruction) College of Education

FIRST TERM

R.3300. Children's Literature. (085333) (3 cr; limited to 35 students; 0800-1000 MWF, PeikH 165; A-F only)

Materials for children's reading in the elementary school program.

3604. Student Teaching in the Nursery School. (085297) (3-6 cr; prereq approval of major adviser and director of student tchg; hrs ar; S-N only) Murphy

R.5100. Elementary School Curriculum. (3 cr; prereq 3101; limited to 35 students each section; A-F only) Buggie

Selection and organization of subject matter for courses; methods, problems, and findings of research by subjects.

Sec 1, (885298) June 14-29; 1030-1245 MTWThF; PeikH 28

R. 5101. Workshop.

Leadership in procedures; operational processes; major considerations in planning and organizing; interpersonal relationships, and evaluation of improvement programs.

Sec 1, Authentic Assessment in the Classroom—July 5, 7, 12, 14.

(990962) (2 cr; 1300-1730 TTh; meets with CISy 5101(1); PeikH 25) Examining models for authentic assessment; developing performance/portfolio assessment for outcome-based education.

Sec 2, Current Development in English Education: Writing to Learn Across the Curriculum—July 15, 18, 19. (991738) (1 cr; limited to 50 students; 1300-1600 MTF; prereq elem tchg exper; meets with SeEd 5350(1); PeikH 31) Strot

Survey of different techniques for using writing to foster learning in different subject matter areas; strategies for developing assignments, integrating reading and writing, using writing to foster discussion, and evaluating students' writing.

Sec 3, The Language of Advertising—July 5, 7, 12, 14. (791739) (1 cr; limited to 50 students; 1030-1245 TTh; prereq elem tchg exper, #; meets with SeEd 5350(2); PeikH 31) Slater

Analysis of advertising (print and non-print media) as persuasive communication with an emphasis on creating visual literacy and analytical writing instructional materials for language arts classes.

Sec 4, Maps and Mapping in the Elementary School—July 6, 8, 11. (191740) (1 cr; limited to 50 students; 1300-1600 MWF; prereq elem tchg exper, #; PeikH 155) Buggie

Using maps and mapping skills to incorporate varied learning styles.

Sec 5, Exploring Minnesota in the Elementary School—July 6, 8, 11, 13.

(991741) (1 cr; limited to 50 students; 0800-1015 MWF; prereq elem tchg exper, #; PeikH 315) Buggie
Current materials and methods will be used to focus on Minnesota as a thematic unit.

Sec 6, Curriculum Integration for Elementary Teachers—July 5, 7, 12, 14. (791742) (1 cr; limited to 50 students; 1030-1245 TTh; prereq elem tchg exper, #; PeikH 225) Buggie
Organizing curricular content through thematic concepts: connecting structure and themes from literature, science, mathematics, social studies and the arts.

R.5107. Diagnosis and Treatment of Learning Difficulties—June 30-July 19. (885334) (3 cr; limited to 35 students; 0800-1015 MTWThF; PeikH 155; A-F only)
Diagnosis of pupil difficulty; development and prevention; tests as aids to teaching; following up a testing program; socioemotional problems associated with learning difficulties.

R.5140. Microcomputer Uses in Elementary Classrooms. (687862) (3 cr; limited to 25 students; SCISy 5206; 0750-1020 TTh; PeikH 355; A-F only) Stochl
Use of microcomputers to enhance instruction; applications in language arts, mathematics, science, social studies; evaluation of available programs. Meets with CISy 5206.

R.5145. Classroom Management—June 14-29. (788971) (3 cr; limited to 40 students; SSeEd 5145; prereq tchg or admin exper or #: 1300-1515 MTWThF; PeikH 315; A-F only) Hansen.

For teachers, administrators, and support staff working in elementary school programs; focus on management of student behavior, or instruction as it relates to student behavior, and of teaching organizational tasks in the classroom.

5300. Literature for the Elementary School—June 14-July 6. (685299) (3 cr; limited to 35 students; 1030-1200 MTWThF; PeikH 155; A-F only) Monson
Evaluative survey of books for children; research related to children's reading interests; selection of literature.

R.5316. Teaching and Supervision of English in the Elementary Schools—June 14-29. (591743) (3 cr; limited to 35 students; prereq 3316 or elem tchg exper, #; 0800-1015 MTWThF; Peik 31) Pbinney
Improvement of instruction, study of trends in english education.

R.5318. Creative Writing For and By Children—June 14-29. (3 cr [max 6 cr]; each section limited to 35 students; prereq 3300 or 3316 or elem tchg exper or #: S-N only)
Language arts in the elementary school for experienced teachers, supervisors, graduate students, and college instructors; emphasis on

creative aspects of writing of children's literature and the children's own writing. Authors and illustrators of children's books will be involved in these 3-credit offerings. Sections will meet jointly for several sessions.
Sec 1, (385300) 1300-1515 MTWThF, FolH 306, Monson
Sec 2, (188093) 1300-1515 MTWThF, FolH 318, Taylor

5319. Teaching Second Languages and Cultures in Elementary Schools—June 14-29. (086823) (3 cr; 1145-1515 MTWThF; PeikH 215; A-F only) Jorstad
 Methods and materials; development of oral and written communication; consideration of alternatives in program format; preparation of materials; global awareness and cross-cultural experience; assessment of children's language; children's literature, games, songs; development of units and lessons.

R.5331. Teaching and Supervision of Reading in the Elementary School. (590687) (3 cr; limited to 35 students; prereq 9cr in educ; 0915-1130 MTWThF; PeikH 215; A-F only) Watts
 Objectives, materials, and teaching procedures; current practices and curricula; class and individual projects.

R.5335. Clinical Diagnosis of Reading Difficulties. (289274) (3 cr; limited to 15 students; prereq 5334; 1030-1130 MTWThF; PeikH 25 and off campus location to be announced; A-F only) Taylor, Smith
 Relationship to psychological factors and remedial correction. Concurrent registration in 5336 required.

R.5336. Clinical Practice in Remedial Teaching. (885107) (3 cr; limited to 15 students; prereq 5334 or 5107 and #; 1145-1245 MTWThF; PeikH 25 and off campus location to be announced; A-F only) Smith
 Remedial tutoring of individual children who have difficulty in school learning. Students will be informed of where class will meet upon registration. Concurrent registration in 5335 required.

R.5338. Teaching Reading in the Intermediate Grades—June 14-29. (391744) (3 cr; limited to 35 students; Prereq 3331 or elem tchg exper, #; 1030-1245 MTWThF; Peik 33) Watts
 For teachers and specialists interested in problems of teaching reading beyond the decoding stage; emphasis on comprehension strategies, basic study skills, reading in the content areas, and using literature in the reading program.

5339. Workshop.
 Analysis of new instructional materials, techniques, recent trends, and innovations in elementary reading instruction.
Sec 1, Helping Children with Reading Problems in Primary Grade

Classrooms—July 15,18,19. (191737) (1 cr; prereq elem tchg exper, #; 0830-1130 MTF; Peik 28) Taylor, Ilnot
 Focus on strategies for the classroom teacher to use to provide supplemental instruction for struggling readers. Topics will include the early intervention in reading program in first and second grade classrooms, guided writing, cross-age tutoring, and fluency building in second and third grade classrooms.

R.5350. Elementary School Science: Materials and Resources—July 5-19. (191745) (3 cr; limited to 35 students; 0800-1015 MTWThF; Peik 365) Finley
 Experiences in the use of educational materials and media common to the teaching of modern elementary school science.

R.5361. Teaching Social Studies in the Elementary School—June 14-29. (189275) (3 cr; prereq 3101 or equiv; limited to 30 students; 1030-1245 MTWThF; PeikH 48; A-F only)
 Content and organization of social studies programs; programs of understanding, improving the learning situation, and effective use of materials.

R.5376. Current Trends in Early Childhood Education—June 14-29. (588972) (3 cr; limited to 40 students; prereq tchg experience in kindergarten or primary school or #; 1530-1745 MTWThF; PeikH 315; A-F only) Hansen
 Continuing needs of children in our changing culture; current practices and recent research.

5602. Practicum: Improvement of Teaching. (3 cr; prereq MEd student in elem education; hrs ar; S-N only)
 Sec 23, (185301) Stochl
 Sec 25, (085302) Monson
 Sec 27, (885303) Taylor
 Sec 28, (989276) Finley
 Sec 29, (789277) Graves
 Sec 31, (388973) Hansen
 Sec 32, (089947) Phinney
 Sec 33, (190689) Watts

8916. Problems: Teaching English. (Cr and hrs ar; prereq #)
 Sec 22, (685335) Monson
 Sec 23, (889948) Phinney

8931. Problems: Teaching Reading. (Cr and hrs ar; prereq 5331 or SeEd 5344 and #)
 Sec 21, (190684) Taylor
 Sec 22, (590690) Watts

8976. Problems: Teaching Kindergarten. (188974) (3 cr; prereq #; hrs ar) Hansen

8991. Problems: Improvement of Instruction. (Cr and hrs ar; prereq #)
 Sec 23, (485305) Stochl
 Sec 25, (285306) Monson
 Sec 27, (185307) Taylor
 Sec 28, (589278) Finley
 Sec 29, (491735) Graves
 Sec 31, (088975) Hansen
 Sec 32, (689949) Phinney
 Sec 33, (890775) Watts

SECOND TERM

R.5101. Workshop.
 Leadership in procedures; operational processes; major considerations in planning and organizing; interpersonal relationships, and evaluation of improvement programs.

Sec 1, Explicit Instruction vs Coaching: Exploring the Teacher's Role—August 1,3,5,8. (391758) (1 cr; 1030-1245; Peik 375; meets with CIsy 5100-3) Orton

This course will explore the promises and pitfalls of instruction that departs from the traditional model of teaching to specific objectives.

Sec 2, Multicultural Education: Structure and Communication—August 1,3,5,8. (191762) (1 cr; limited to 50 students; prereq elem tchg exper, #; 0800-1015; Peik 46) Narvaez

The course will focus on classroom structures and communication styles that facilitate the teaching of diverse students. Students will analyze and develop methods for their own classrooms.

Sec 3, Performance Assessment in Math and Science—July 22,25,27,29. (091763) (1 cr; limited to 50 students; prereq elem tchg exper, #; 1030-1245 MWF; Peik 365; meets with SeEd5394 (1), MthE 5102 (1))

This course will focus on performance assessment in elementary and secondary science. Topics will include the use of portfolios, holistic scoring, performance tasks, writing in mathematics and science, observations, check lists, and interviews.

Sec 4, Using Local and Wide Area Networks in the Classroom—July 21-August 5. (891764) (3 cr; limited to 25 students; 1030-1245 MTWThF; Peik 355; concurrent with CIsy 5100(1)) Lambrecht
 Examination of local area networks for classroom instruction, such as Internet and Gopher, for professional development and instructional use. Actual in-class use of networks will focus on instructional issues and classroom management, not technical installation or maintenance. Previous experience in using computers is desirable.

R.5107. Diagnosis and Treatment of Learning Difficulties—July 21-August 5. (686324) (3 cr; limited to 35 students; 0800-1015 MTWThF; PeikH 215; A-F only) Park
 See First Term.

R.5227. Teaching About the Newspaper in the Classroom—July 21-August 5. (089950) (1-3 cr [max 4 cr]; \$SeEd 5227; limited to 15 students; 0915-1245 MTWThF; Peik 31; A-F only) Avery
 The institution of the newspaper; articulation of a series of articles of useful instructional strategies, curriculum development techniques, and teaching materials. This 3-credit offering meets with SeEd 5227.

R.5334. Reading Difficulties—July 21-August 5. (486325) (3 cr; limited to 40

students; prereq 5331 or SeEd 5344; 0800-1015 MTWThF; PeikH 28; A-F only) Manning
 Causes, prevention, and correction; remedial practices useful to the classroom teacher, school counselor, and reading specialist.

5339. Workshop
 Analysis of new instructional materials, techniques, recent trends, and innovations in elementary reading instruction.

Sec 1, Reading Activities Textbooks Don't Include—July 21,26,28. (191759) (1 cr; limited to 50 students; prereq elem tchg exper, #; 1300-1600 TTh; Peik 48; meets with SeEd 5349(1)) Pearl

Fostering student success in reading and learning from subject matter materials. Practical, teacher-tested strategies for middle and secondary school students.

Sec 2, Storytelling—July 21,26,28. (591760) (1 cr; limited to 50 students; prereq elem tchg exper, #; 1300-1600 TTh; Peik 33) Gilbertson

This course will focus on storytelling techniques and on source materials for storytellers. These include folk literature and other genres of literature as well as personal recollection and family history.

Sec 3, Issues: Whole Language—July 22,25,27,29. (391761) (1 cr; limited to 50 students; prereq elem tchg exper, #; 1030-1245 MWF; Peik 33)

This course will focus on issues of applying an integrated, literature-rich curriculum in elementary classrooms. The theoretical underpinnings of this philosophy of teaching and learning will also be addressed.

R.5347. Workshop: Curriculum Implementation in Elementary School Science-Field Biology for Elementary Science Teachers—August 3, and 14,15,19. (290778) (1-3 cr [max 12 cr]; limited to 25 students; prereq elem tchg exper; August 3 Woodlake Nature Center, August 14,15,19 Itasca State Park; Itasca State Park Biological Station; A-F only)
 Concept foundations, goals, and teaching and evaluation procedures. Using the natural environment in teaching through development of teaching procedures, ideas exchanged, materials design and adaptation, and awareness of material sources using an interdisciplinary approach. Prior application must be made by June 15 to Field Biology Workshop Department of Curriculum and Instruction, 125 Peik Hall, 159 Pillsbury Drive SE, Minneapolis, MN 55455-0208. Attention: Naaz Babvani. Students pay for travel, food and lodging at the park. Arrangements are finalized at first session on campus. This offering for 3 credits.

5602. Practicum: Improvement of Teaching. (3 cr; prereq MEd student in elem education; hrs ar; S-N only)
 Sec 26, (188473) Manning

8931. Problems: Teaching Reading. (690776) (Cr and hrs ar; prereq 5331



COURSE DESCRIPTIONS

Endodontics (Endo)

8-166 Moos Tower. 624-9900
School of Dentistry

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)

5299. Advanced Clinical Endodontics. (789585) (Cr ar; A-F only)

5303. Advanced Clinical Endodontics. (886337) (Cr ar; A-F only)
Diagnosis and treatment of clinical cases. Students assigned complex cases and explore new and unique techniques.

5309. Advanced Endodontic Emergency. (589586) (1 cr; S-N only)

5313. Advanced Endodontic Emergency. (686338) (1 cr; S-N only)
Each student is responsible for all emergencies in the Endodontic Clinic during an assigned 1-week period (8 hours a day).

5329. Review of Cases. (389587) (1 cr; S-N only)

5333. Review of Cases. (486339) (1 cr; S-N only)
Students present cases from the previous quarter for review by endodontic faculty and graduate students.

5500. Evaluation in Endodontics. (190126) (1 cr; S-N only)

8004. Research in Endodontics. (886340) (1 cr)
Organized literature review in areas of specific interest to student, selection of this project, and completion of research and thesis.

8313. Seminar: Endodontics. (686341) (2 cr; A-F only)
Organized literature review in areas of interest to student, selection of a project, and completion of research and a thesis.

English as a Second Language (ESL)

102 Klaeber Court. 624-1503
(Linguistics) College of Liberal Arts

FIRST TERM

8777. Thesis Credits: Masters. (088538) (1-16 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (588826) (1-16 cr [max 11 cr per summer term])

English Language and Literature (Engl)

207 Lind Hall. 625-3363
College of Liberal Arts

FIRST TERM

R.1005. Introduction to Literature. (4 cr; each section limited to 38 students) Staff

Understanding and enjoying literature. Readings of novels, short stories, poems, and plays.

Sec 1, (785343) 0915-1015 MTWThF; LindH 305.

Sec 2, (791630) 1300-1400 MTWThF; LindH 217.

Sec 3, (591631) 1030-1300 TTh; LindH 203.

R.1016. Introduction to American Literature. (xxxxxx) (4 cr; limited to 18 students; 0800-1030 TTh; LindH 302)
Critical discussion and of writing about selected works of American literature. Typical authors: Poe, Hawthorne, Whitman, Dickinson, Twain, Frost, Fitzgerald, Hurston.

R.1591. Literature of American Minorities. (989312) (4 cr; limited to 38 students; 1145-1245 MTWThF; LindH 305) Staff
Representative works by Afro-American, American Indian, Asian American, and Chicano/Chicana writers. Examination of relevant social factors.

R.1671. The Short Story. (189809) (4 cr; limited to 38 students; 0800-0940 MWF; LindH 215) Staff
Introduction to short stories, with some emphasis on the history and diversity of the form. Typical authors: Poe, Chekhov, Lawrence, Joyce, Kafka, Porter, Welty, Faulkner.

R.3008. Techniques of Literary Study. (189017) (4 cr; limited to 30 students; 1145-1415 TTh; LindH 302) Anderson
Training and practice in the analysis of various literary forms, with a special emphasis on poetry. Use of the argument, evidence, and documentation in literary papers; introduction to major developments in contemporary criticism.

R.3118. The Romantic Age. (391632) (4 cr; limited to 38 students; 1030-1300 MW; LindH 229) Luke
Major and representative works of the romantic period (1798-1832). Typical authors: Blake, Wordsworth, Coleridge, Byron, Shelley, Keats.

R.3241. Shakespeare. (085543) (4 cr; \$3243; limited to 30 students; 0915-1145 TTh; LindH 217)
Plays from Shakespeare's early and middle periods. All sections will read *A Midsummer Night's Dream*, *Hamlet*, a history play, and three or four other plays.

R.3455. American Short Story. (989018) (4 cr; limited to 38 students; 1300-1530 MW; EE/CSci 2260) Furia
Typical authors: Irving, Poe,

Hawthorne, Twain, Crane, Cather, Faulkner, Welty, Bellow.

R.3851. The English Language. (789019) (4 cr; \$5851; limited to 38 students; 1030-1130 MTWThF; LindH 305) MacLeish

The English language: its structure (phonetics, phonology, morphology, syntax, semantics) and use (pragmatics, dialect variation, and first language acquisition).

R.3960. Junior-Senior Seminar. (4 cr per qtr; limited to 15 students; prereq English major, jr or sr; Comp 3011 or Comp 3012 or Comp 3013, Δ)

Sec 1, The Poetry of Witness.

(890789) 0915-1145

MW, LindH 303, Browne
Using Carolyn Forché's anthology AGAINST FORGETTING: THE POETRY OF WITNESS and Czesław Miłosz's THE WITNESS OF POETRY as our main texts, we'll explore some of the ways in which the number of twentieth-century writers, and discuss the validity of the often-invoked distinction between political and personal poetry. Authors include Anna Akhmatova, W.H. Auden, Robert Bly, Ernesto Cardenal, Nazim Hikmet, Linda Hogan, Denise Levertov. Students may do either poems or criticism for their final project.

3961. Senior Paper. (191003) (1 cr; prereq Engl maj, sr, 3960 or ¶ 3960 or 3960H or ¶ 3960H or 3931-3932 or ¶ 3931-3932 or EngW 3960 or ¶ EngW 3960, Δ; S-N only)

3963H. Honors Thesis. (186845) (4 cr; prereq honors candidacy in English and consent of English honors adviser)

3970. Directed Studies. (987611) (1-15 cr per term; prereq #, Δ, college approval)
Guided individual reading or study.

3980. Directed Instruction. (486843) (Cr ar; prereq #, Δ, college approval)

R.5152. 19th Century English Novel. (789313) (4 cr; limited to 38 students; 1145-1325 MWF; CivMinE 213)
Hirsch
Novels by such authors as Scott, Dickens, the Brontës, Thackeray, Eliot, Hardy.

R.5414. Contemporary American Literature. (190790) (4 cr; limited to 38 students; 0915-1055 MWF, AmundH 120) Solotaroff
A study of the important authors, intellectual currents, movements, conventions, genres, and themes since 1940.

5920. Summer Institute for Teachers: Intercultural Studies in Literature and Film—June 20-July 1. (892087) (4 cr) Sugnet
See Summer Institute for Teachers, page 41.

5970. Directed Studies. (591094) (1-4 cr; prereq #, Δ, CLA approval)

8888. Thesis Credits: Doctoral. (688770) (1-36 cr [max 11 cr per summer term])

8970. Independent Reading. (787612) (1-15 cr; prereq #, Δ)

SECOND TERM

R.1005. Introduction to Literature. (4 cr; each section limited to 38 students) Staff

See First Term.

Sec 1, (585344) 0800-0900 MTWThF; LindH 302.

Sec 2, (091634) 1145-1415 MW; AmundH 124.

R.1016. Introduction to American Literature. (891635) (4 cr; limited to 38 students; 0915-1055 MWF; AmundH 240) Staff

Critical discussion of and writing about selected works of American literature. Typical authors: Poe, Hawthorne, Whitman, Dickinson, Twain, Frost, Fitzgerald, Hurston.

R.1591. Literature of American Minorities. (691636) (4 cr; limited to 38 students; 1300-1400 MTWThF; LindH 203) Rabinowitz
See First Term.

R.3008. Techniques of Literary Study. (290795) (4 cr; limited to 30 students; 1030-1300 WF; LindH 217) Ross
See First Term.

R.3242. Shakespeare. (190796) (4 cr; \$3243; limited to 30 students; 0915-1145 TTh; AmundH 120) Geffen
Plays from the middle and late periods. All sections read *King Lear*, *Macbeth*, *The Tempest*, and two or three others.

R.3671. The Novel. (790798) (4 crs; limited to 38 students; 0915-1145 MW; AmundH 156) Weinsheimer
The novel as a literary form. Readings of selected works of fiction from the 18th century to the present.

R.3851. The English Language. (288321) (4 cr; limited to 38 students; \$5851; 1030-1300 TTh; LindH 217) Escure
See First Term.

R.3960. Junior-Senior Seminar. (4 cr per qtr; limited to 15 students; prereq English major, jr or sr; Comp 3011, 3012 or 3013; Δ)

Sec 1, American Literacy and Cultural Diversity. (690924) (0915-1145 TTh, AmundH 156) Anson

This course links academic study with service learning through a unique arrangement with local community service agencies. In it, students study a range of perspectives on the nature, acquisition, and present state of literacy in the U.S. with special focus on issues of culturally diverse and disadvantaged members of our society. Topics include the development of literacy as a function of culture; the nature of dialect

communities and the relationship of dialects to American schooling; bilingualism and language policy (especially educational) in the U.S.; language, gender, and the educational process; and the politics of language relative to the institution of education. In addition to the wide-ranging coursework, participants are required to tutor young children at a local community service agency in the Twin Cities.

3961. Senior Paper. (289016) (1 cr; prereq Engl maj, sr, 3960 or ¶ 3960 or 3960H or ¶ 3960H or EngW 3960 or ¶ EngW 3960, Δ; S-N only)

3963H. Honors Thesis. (986846) (4 cr; prereq honors candidacy in English and consent of English honors adviser)

3970. Directed Studies. (587613) (1-15 cr per term; prereq #, Δ, college approval)
Guided individual reading or study.

3980. Directed Instruction. (286844) (Cr ar; prereq #, Δ, college approval)

R.5940. Figures in English and North American Literature: Poe-Melville. (491637) (4 cr; limited to 38 students; 1145-1415 MW, AmundH 158) Roth

5970. Directed Studies. (391095) (1-4 cr; prereq #, Δ, CLA approval)

8888. Thesis Credits: Doctoral. (288853) (1-36 cr [max 11 cr per summer term])

8970. Independent Reading. (387614) (1-15 cr; prereq #, Δ)

English: Creative & Professional Writing (EngW)

207 Lind Hall, 625-3363
College of Liberal Arts

FIRST TERM

5210. Summer Institute for Teachers: Writing for Teaching: Inspiring Writing and Creative Thinking in the Classroom—June 27-July 8. (892056) (4 cr; 0930-1200 MTWThF; Arch 30) Anson
See Summer Institute for Teachers, page 41.

SECOND TERM

R.3102. Intermediate Fiction Writing. (191723) (4 cr; limited to 15 students; prereq EngW 1102 or equiv; 0830-1020 MWF; LindH 215) Staff
For students with experience in writing fiction. Exercises, experiments, assigned readings, and discussion of students' work.

Entomology (Ent)

219 Hodson Hall, St. Paul. 624-3278
College of Agriculture

FIRST TERM

5910. Special Problems in Entomology. (988080) (Cr ar; prereq #) Staff
Individual field, laboratory, or library studies in various areas of entomology.

5920. Special Lectures in Entomology: Aquatic Insects—June 14-July 19. (990489) (3 cr; \$5360; limited to 20 students; prereq introductory biology; offered at Itasca; 0800-1700 WS; taught at Itasca) Holzenthal
Taxonomy and natural history of aquatic insects of the Lake Itasca area, including their importance in aquatic ecology, water resource management, recreation, and conservation. Morning lectures are followed by afternoon field trips to standing and running water habitats in Lake Itasca State Park. Emphasis is on field methods and family level identification. An insect collection is required.

8500.* Research in Entomology. (485255) (Cr ar; prereq #; S-N only) Staff

8777. Thesis Credits: Masters. (188630) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488771) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5910. Special Problems in Entomology. (788081) (Cr ar; prereq #) Staff
See First Term.

8500.* Research in Entomology. (886127) (Cr ar; prereq #; S-N only) Staff

8777. Thesis Credits: Masters. (388715) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188854) (1-36 cr [max 11 cr per summer term])

F

Family Practice and Community Health (FPCH)

6-240 Phillips-Wangenstein Building.
624-2622
Medical School

SPECIAL TERM: JULY 1-SEPTEMBER 26

Required Courses

8201. Clinical Family Medicine. (486387) (Cr ar; hrs ar) Ciriacy, staff

8207. Seminar: Common Diseases Seen in Family Medicine. (986393) (1 cr; hrs ar) Ciriacy, staff

8208. Family Medical Conferences. (286388) (1 cr; hrs ar) Ciriacy, staff

8209. Family Medicine X-Ray Conference. (786394) (1 cr; hrs ar) Ciriacy, staff

8210. Family Medicine Grand Rounds. (186389) (0-1 cr; hrs ar) Asp, staff

8212. Clinical Psychiatry Rounds. (486390) (1 cr; prereq 1st yr resident in family practice; hrs ar) Kelly, staff

Elective Courses

5955. Directed Study. (285421) (1-15 cr; prereq #; hrs ar) Coleman

5960. Basic Research Methods: Seminar and Practicum. (887875) (4 cr; hrs ar) Kelly, staff

5967. Introduction to Health Data Systems. (087602) (ar cr; prereq completion of first yr residency in family practice and community health or #) Staff

5968. Computers in Theory and Practice. (185341) (Cr ar) Gepner

8205. Medical Records Systems. (985342) (2 cr; hrs ar) Ciriacy, Kelly

8223. Introduction to Gerontology, Geriatric Medicine. (887617) (2 cr; prereq 2nd yr FPCH resident or #; 1300-1630 Th; 0830-1600 F; Ebenezer Society) Keenan

8253. Research Problems. (586395) (Cr ar; hrs ar) Kelly, staff

Family Social Science (FSoS)

290 McNeal Hall. 625-1900
College of Human Ecology

FIRST TERM

3600. Family Issues Across the Lifespan. (091505) (5 cr; prereq Psy 1001, Soc 1001; 0845-1200 TTh; McNH 33) Detzner
Major family theories serve as frameworks to analyze selected problems confronting families throughout the lifespan.

5206. Undergraduate Research. (491508) (3-6 cr per qtr [max 15 cr]; prereq 5205 or #) AR Opportunities for Family Social Science major to work with faculty on research projects that may include research planning, proposal writing, literature reviews, data collection, data coding and/or cleaning, data analyses and research reporting.

5218. Family Financial Management. (891506) (4 cr; prereq 3260 or equiv; 1300-1530 TTh; McNH 198) Rettig
Analysis of family financial management principles. Financial planning of savings; investments; credit; mortgages; taxation; life, disability, health, property insurance; public, private pensions; and estate planning.

5230. Independent Study in Family Social Science. (685304) (1-5 cr [max 16 cr]) Staff

5240. Special Topics: Intergenerational Relations in African American Families. (691507) (4 cr; 0915-1145 MW; McNH 198) Goodman
Intergenerational parenting issues and variations in family structure in African American families across socioeconomic levels.

8222. Internship in Teaching College Level Family Courses II. (289629) (2 cr; prereq 8221)

8223. Internship in Teaching College Level Family Courses III. (689630) (2 cr; prereq 8222)

8230. Directed Study in Family Social Science. (489371) (1-7 cr; prereq #) Staff

8270. Practicum: Family Research. (190443) (1-5 crs; prereq #jarr
Supervised family research.

8777. Thesis Credits: Masters. (988595) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588597) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERM: TEN-WEEK COURSE

(Register once in Term I)



COURSE DESCRIPTIONS

5249. Fieldwork: Directed Community Work Experience. (688297) (5-15 cr; prereq 5231, human relationships maj, #; 0930-1100 T; McNH 375; S-N only) Goodman

8553. Internship in Marital and Family Therapy III. (489161) (7 cr; 8551-8552-8553+; prereq 8552, #; A-F only)
Participation in actual marital and family therapy clinical practice in approved community setting with on-site supervision (one to one) plus on-campus supervision (group setting with fellow interns).

SECOND TERM

R.1001. Introduction to Dynamics of Family Relationships. (290926) (4 cr; limited to 50 students; 0900-1130 MW; McNH 197)
General exploration of partner selection, interaction in committed relationships, parenting, gender roles, and the impact of social issues on family relationships.

1025. Parenthood. (190927) (4 cr; 1300-1530 TTh; McNH 197)
Examination of differing concepts of family roles-father, mother, son, daughter, sister, brother. Their implications for parent-child and sibling interaction. Effects of parenthood on husband-wife relations.

3260. Family Resource Management. (991500) (4 cr; prereq AgEc 1101, Psy 1001, Soc 1001...Anth 1002, Pol 1001 rec; 0900-1130 MW; McNH 198) Rettig
Development of a theoretical systems framework to analyze behavior in families with emphasis on managerial aspects of behavior; goal setting, planning, and implementing resources.

5200. Family Systems. (791501) (5 cr; prereq Psy 1001, Soc 1001; 1300-1615 TTh; McNH 33) Olson
Advanced survey of current developments in family social science emphasizing families as complex systems of interpersonal relationships that also interact with larger social systems.

5202. Family Psychology: The Study of Close Relationship Processes. (591502) (4 cr; prereq Psy 1001, introductory sociology or #; 1300-1530 MW; McNH 198) Boss
Family Psychology is the study of processes of interaction and communication that take place in families of choice and other close relationships. Research and theory is multidisciplinary and taken from psychology, sociology, family therapy. Marriage, divorce, friendship, partnerships, being single will be considered as we discuss theories of attraction, love, intimacy and sexuality. Issues of fairness, altruism, equity, power, violence and communication will be presented as central to relationship formation and

dissolution within diverse social contexts.

5206. Undergraduate Research. (191504) (3-6 cr per qtr [max 15]; prereq 5205 or #) Opportunities for Family Social Science majors to work with faculty on research projects that may include research planning, proposal writing, literature reviews, data collection, data coding and/or cleaning, data analyses and research reporting.

5230. Independent Study in Family Social Science. (686436) (1-5 cr [max 16 cr]) Staff

5500. Racial and Ethnic Diversity in Families. (192080) (4 cr; prereq 5200 or #, 0915-1145 MW; McNH 198) Goodman, Meyer
Overview of family issues of various American racial and ethnic populations. Study of research and case studies; individual projects to develop and enrich understanding of cultural diversity.

8222. Internship in Teaching College Level Family Courses II. (489631) (2 cr; prereq 8221)

8223. Internship in Teaching College Level Family Courses III. (289632) (2 cr; prereq 8222)

8230. Directed Study in Family Social Science. (289372) (1-7 cr; prereq #) Staff

8270. Practicum: Family Research. (790445) (1-5 crs; prereq #) arr
Supervised family research

8777. Thesis Credits: Masters. (488835) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288836) (1-36 cr [max 11 cr per summer term])

Finance (BFin)

735 Management/Economics Building.
624-2888
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on page xxx.

FIRST TERM

R.3000. Finance Fundamentals. (585277) (4 cr, \$MBA 8040; limited to 50 students; prereq Acct 1050 or Acct 1025; 0915-1045 MTWTh; BlegH 215; A-F only)
Comprehensive, analytical introduction to the principal concepts in finance. The general business environment, valuation theory, financial management decisions concerning uses and sources of funds (capital budgeting), survey the nation's financial markets.

R.3200. Financial Markets and Interest Rates. (385278) (4 cr; limited to 40 students; prereq 3000 or #; 1430-1630 TWF; BlegH 205)
Survey of financial markets in developed economies. Emphasis on fixed-income markets. The term structure of interest rates. The inflation rate and interest rates. Exchange rates and interest rates. Introduction to interest rate futures.

FIRST AND SECOND TERM: TEN-WEEK COURSE

(Register once in Term I)

R.8150. Theory of Finance. (189907) (4 cr; limited to 20 students; prereq MBA 8040 or #, grad mgmt/IR student or Grad Sch Mgmt approval; 1730-2100 M; BlegH 415; A-F only)
Rigorous introduction to modern theory of finance. Discussion of, inter alia, capital budgeting, capital structure, dividend policy, asset pricing, application of option pricing to corporate finance and efficiency of financial markets.

R.8200. Financial Markets and Interest Rates. (788369) (4 cr; limited to 20 students; prereq MBA 8040 or #, grad mgmt student or Grad Sch Mgmt approval; 1730-2100 W; BlegH 415)
Survey of financial markets of modern economies and introduction to theory of how interest rates in the various markets are related. Discussion of, inter alia, interest rate term structure, relationship between interest rate and exchange rate, inflation and interest rates, and use of financial futures.

SECOND TERM

R.3000. Finance Fundamentals. (186142) (4 cr, \$MBA 8040; limited to 50 students; prereq Acct 1050 or Acct 1025, 0915-1045 MTWTh; BlegH 220; A-F only)
See First Term.

Fisheries and Wildlife (FW)

200 Hodson Hall, St. Paul. 624-3600
College of Natural Resources
(See also Itasca Biology Program, and Itasca Forestry Session)

FIRST TERM

5393. Special Problems in Fisheries Biology. (285256) (Cr ar; prereq #) Staff
Individual field, library, and laboratory research in various lines of fisheries biology.

5398. Special Problems in Wildlife Biology. (185257) (Cr ar; prereq #) Staff
Individual field, library, and laboratory research in various areas of wildlife biology.

8364.* Research in Fisheries Biology.

(985258) (Cr ar; prereq fisheries grad; S-N only) Staff

8377.* Research in Wildlife Biology. (785259) (Cr ar; prereq wildlife grad; S-N only) Staff

8777. Thesis Credits: Masters. (188599) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788601) (1-36 cr [max 11 cr per summer term])

SECOND TERM

3600. Fisheries and Wildlife Techniques-August 24-September 17. (188098) (5 cr; prereq 3052, Δ; offered at Itasca; A-F only)
Introduction to field techniques and skills; planning and implementing field projects; data collection and analysis using microcomputers; written reports and field journal. (Additional \$10 lab fee.)

5393. Special Problems in Fisheries Biology. (686128) (Cr ar; prereq #) Staff
See First Term.

5398. Special Problems in Wildlife Biology. (486129) (Cr ar; prereq #) Staff
See First Term.

8364.* Research in Fisheries Biology. (886130) (Cr ar; prereq fisheries grad; S-N only) Staff

8377.* Research in Wildlife Biology. (686131) (Cr ar; prereq wildlife grad; S-N only) Staff

8777. Thesis Credits: Masters. (188837) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988838) (1-36 cr [max 11 cr per summer term])

Fluid Mechanics (FIME)

125 Mechanical Engineering. 625-0705
Institute of Technology

FIRST TERM

8777. Thesis Credits: Masters. (188580) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788582) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (088829) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388830) (1-36 cr [max 11 cr per summer term])

Food Science and Nutrition (FScN)

225 Food Science and Nutrition, St. Paul. 624-1290
Colleges of Agriculture and Human Ecology

FIRST TERM

R.1612. Principles of Nutrition. (4 cr; limited to 120 students; prereq HS Chem and Biol; 0800-1000 MTW; FScN 15) Hanson
Fundamental concepts: human nutritional requirements, function of nutrients, nature of deficiencies. Vegetarianism, weight loss, fad diets, activity, obesity, cancer, heart disease, food processing safety, world food problems.
Rec 1. (990928) 0800-0940 Th, FScN 15.
Rec 2. (790929) 0800-0940 Th, FScN 23.
Rec 3. (190930) 1000-1140 Th, FScN 15.
Rec 4. (990931) 1000-1140 Th, FScN 23.

5111. Independent Study in Food Science and Nutrition. (185260) (1-5 cr [may be repeated for cr]; prereq Δ; hrs ar) Staff
Individual laboratory or library research in some area related to food science or nutrition.

8401. Independent Study: Food Science. (985261) (1-5 cr; prereq Δ; hrs ar) Staff
Independent study and written reports.

8621. Independent Study: Nutrition. (785262) (1-9 cr; prereq #; hrs ar) Staff
Independent study and written reports.

8777. Thesis Credits: Masters. (888590) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288593) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5111. Independent Study in Food Science and Nutrition. (486132) (1-5 cr [may be repeated for cr]; prereq Δ; hrs ar) Staff
See First Term.

8401. Independent Study: Food Science. (286133) (1-5 cr; prereq Δ; hrs ar) Staff
See First Term.

8621. Independent Study: Nutrition. (186134) (1-9 cr; prereq #; hrs ar) Staff
See First Term.

8777. Thesis Credits: Masters. (888833) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688834) (1-36 cr [max 11 cr per summer term])

Foreign Studies Management (FSMg)

290 Hubert H. Humphrey Center. 624-3313
Carlson School of Management

FIRST TERM

3460. Institute of European Studies Program in Vienna, Austria. (888300) (1-54 cr; prereq Δ)

3490. Institute of European Studies Program at the University of Singapore. (888301) (1-45 cr; prereq Δ)

3590. Institute of European Studies International Business Management Program in Dijon. (389797) (1-24 cr; prereq Δ)

3620. Council on International Educational Exchange Japanese Business and Society Program. (389539) (1-24 cr; prereq Δ)

3680. Council on International Educational Exchange Business and Society Program in Seville, Spain. (789540) (1-26 cr; prereq Δ)

3820. Denmark's International Business Studies Program in Copenhagen. (688302) (1-36 cr; prereq Δ)

Foreign Study (FoSt)

260 Social Sciences | 624-4525
College of Liberal Arts

FIRST TERM

0010. Study Abroad. (287606) (prereq Δ; S-N only) This no-credit registration allows students to maintain their status at the University while studying abroad.

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)

3000. Study Abroad. (189798) (1-15 cr; prereq Δ) Temporary registration used by students who are studying abroad for post-return transfer credit or credit by exam and who are eligible for student financial aid or loan deferments.

3060. CIEE Summer Business and Society Program in Moscow. (190975) (1-12 cr)
Eight-week summer program in

Moscow, Russia, under auspices of Council on International Educational Exchange. Program includes courses on Russian business, society, and language taught in English by Russian faculty, combined with visits to Russian companies.

3270. CIC Australian Internship Program. (990976) (1-24 cr)
Eight to twelve-week full-time internship with accompanying seminar beginning in June. Internships available in government, business, and non-profit settings.

3280. CIC Summer Program in Guanajuato, Mexico. (89799) (1-15 cr; prereq Δ)
Seven-week summer language and area studies program in Guanajuato, Mexico, sponsored by the Committee on Institutional Cooperation. Instruction entirely in Spanish by University of Guanajuato faculty. Advanced Spanish, Mexican and Latin American studies courses in history, civilization/culture, literature. Two years of college Spanish or equivalent required.

3290. CIC Summer French Program in Quebec. (789800) (1-10 cr; prereq Δ)
Six-week intensive summer French language program at Laval University, Quebec City, Canada. Language courses at any of seven levels, supplemented at upper levels by Quebec studies courses taught in French. One year college French or equivalent required.

3420. IES Program in London. (288304) (1-54 cr; prereq Δ)
Six-week summer program at the Institute of European Studies in London. Students choose two courses from the following: London Life in British Literature, Introduction to Comparative Law, and History of London.

3430. IES Program in Nantes, France. (589801) (1-54 cr; prereq Δ)
Six-week summer program entirely in French at the Institute of European Studies in Nantes. Students choose two courses from the following: Advanced French, Modern France, and French 19th and 20th Century Art. Two years college French or equivalent required.

3440. IES Program in Paris. (188305) (1-54 cr; prereq Δ)
Six-week summer program at the Institute of European Studies in Paris. Two tracks based on language-level are available. The first track requires one year of college French, and offers Intermediate French and an area studies course taught in English. The second track requires two years of college French, and offers Advanced French, Business French, and area studies courses taught in French.

3450. IES Program in Madrid. (988306) (1-54 cr; prereq Δ)
Six-week summer program at the

Institute of European Studies in Madrid. Two tracks based on language-level are available. The first track requires one year of Spanish, and offers Intermediate Spanish and an area studies course taught in English. The second track requires two years of Spanish, and offers Advanced Spanish and area studies courses taught in Spanish.

3460. IES Program in Vienna. (788307) (1-54 cr; prereq Δ)
Six-week summer program at the Institute of European Studies in Vienna. Beginning German is offered; intermediate and/or advanced German courses are available pending enrollment. Area studies courses in art history, music history, and Eastern European studies are offered in English.

3730. CIEE Tropical Biology Program in Costa Rica. (389802) (1-10 cr; prereq Δ)
Nine-week summer program in tropical biology, under the auspices of the Council on International Educational Exchange. Based at the Monteverde Institute, located in a cloud forest in northwestern Costa Rica. Courses in tropical biology (taught in English), Spanish language instruction, and a field research project.

3820. Denmark's International Study Program. (389234) (1-54 cr; prereq Δ)
Summer program offering two curricula in Copenhagen, Denmark. The first is a ten-week program in architecture and design. The second is a six-week program entitled "Europe in Transition," which offers interdisciplinary courses in East-West studies. Both curricula offer Danish language courses.

SECOND TERM

0010. Study Abroad. (187607) (prereq Δ; S-N only) See First Term.

Foreign Study SPAN (FSSP)

107 Nicholson Hall. 626-1083
College of Liberal Arts

FIRST TERM

5960. Preparatory Seminar for SPAN Overseas Research. (6 cr; prereq approval before Nov 1993 by a faculty selection committee; A-F only)
Intensive study of culture and society to be visited, intercultural communication training, and development of the research project. Usually meets on Saturdays. Credit for 5960 not granted until completion of 5970.
Sec 1 (088202) Australia, Grochowski
Sec 2 (689563) Ireland, Anderson
Sec 3 (489564) Mexico, Furnier & Rose
Sec 4 (289565) Pakistan, Nichols



COURSE DESCRIPTIONS

SECOND TERM

5970. Preparatory Seminar for SPAN Overseas Research. (6 cr; prereq satisfactory completion of first term; A-F only)

Summer directed field study in Australia, Ireland, Mexico, or Pakistan under the guidance of a SPAN faculty adviser accompanying each country group. Each student writes a comprehensive research paper upon return.

Sec 1 (188179) Australia, Grochowski-
Sec 2 (189566) Ireland, Anderson
Sec 3 (989567) Mexico, Furnier & Rose

Sec 4 (789568) Pakistan, Nichols

Forest Products (ForP)

203 Kaufert Laboratory, St. Paul. 624-9219

College of Natural Resources

FIRST TERM

8300.* Research Problems. (886421) (Cr ar) Staff

8301.* Research Problems. (886422) (Cr ar) Staff

8302.* Research Problems. (486423) (Cr ar) Staff

FIRST AND SECOND TERM: TEN-WEEK COURSES

(Register once in Term I)

3301. Industrial Internship. (086904) (2 cr; prereq FP cooperative education student; A-F only) Evaluation based on formal report written by student at end of each quarter of work assignment.

5401. Senior Topics. (286942) (prereq sr, #) (Cr ar)

SECOND TERM

8300.* Research Problems. (386396) (Cr ar) Staff

8301.* Research Problems. (186397) (Cr ar) Staff

8302.* Research Problems. (086398) (Cr ar) Staff

Forest Resources (FR)

115 Green Hall, St. Paul. 624-3400
College of Natural Resources (See also Itasca Forestry Session).

FIRST TERM

3225. Directed Study Experience. (886256) (1-5 cr; prereq #)

5225. Directed Study Experience. (389590) (1-5 cr; prereq #)

8100.* Research Problems. : Silviculture. (286424) (Cr ar) Puettmann, Nichols

8101.* Research Problems. : Forest-Tree Physiology. (186425) (Cr ar) Sucoff, Reich

8102.* Problems: Forest-Tree Genetics. (986426) (Cr ar) Mohn, Furnier, Li

8103.* Research Problems. : Forest Hydrology. (786427) (Cr ar) Brooks, Perry

8104.* Research Problems. : Forest Ecology. (590933) (1-18 cr; A-F only) Reich, Grigal, Sucoff

8105. Advanced Field Silviculture. (086434) (3 cr; prereq 5101, #; offered at Cloquet Forestry Center) Staff
Selected current silvicultural problems and research. Plant-soil relationships with particular reference to forest soils. Methods of forest soil investigations in the field and in the laboratory.

8112. Research Problems. : Physiological Ecology. (790980) (cr ar) Reich, Sucoff

8200.* Research Problems. : Forest Management. (586428) (Cr ar) Rose, Blinn, Hoganson

8201.* Research Problems. : Forest Economics. (386429) (Cr ar) Ellefson, Gregersen, Rose, Blinn

8202.* Research Problems. : Forest Biometry. (786430) (Cr ar) Ek, Burk

8203.* Research Problems. : Forest Recreation. (586431) (Cr ar) Anderson, Lime

8204.* Research Problems. : Forest Policy. (386432) (Cr ar) Ellefson, Gregersen, Baughman

8205.* Research Problems. : Remote Sensing. (186433) (Cr ar) Bauer, Queen

SECOND TERM

3225. Directed Study Experience. (187641) (1-5 cr)

5225. Directed Study Experience. (189591) (1-5 cr)

8100.* Research Problems. : Silviculture. (886399) (Cr ar) Puettmann, Nichols

8101.* Research Problems. : Forest-Tree Physiology. (586400) (Cr ar) Sucoff

8102.* Research Problems. : Forest-Tree Genetics. (386401) (Cr ar) Mohn, Furnier

8103.* Research Problems. : Forest Hydrology. (186402) (Cr ar) Brooks, Perry

8104.* Research Problems. : Forest Ecology. (390934) (cr ar) Reich, Grigal, Sucoff

8112. Research Problems. : Physiological Ecology. (590981) (cr ar) Reich, Sucoff

8200.* Research Problems. : Forest Management. (086403) (Cr ar) Rose, Blinn, Hoganson

8201.* Research Problems. : Forest Economics. (886404) (Cr ar) Ellefson, Gregersen, Rose, Blinn

8202.* Research Problems. : Forest Biometry. (686405) (Cr ar) Ek, Burk

8203.* Research Problems. : Forest Recreation. (486406) (Cr ar) Anderson, Lime

8204.* Research Problems. : Forest Policy. (286407) (Cr ar) Ellefson, Gregersen, Baughman

8205.* Research Problems. : Remote Sensing. (186408) (Cr ar) Bauer, Queen

SPECIAL TERM OFFERED AT LAKE ITASCA FORESTRY AND BIOLOGICAL STATION-AUGUST 25-SEPTEMBER 18

R.3100. Minnesota Plants. (2 cr; each section limited to 15 students; prereq Biol 1103, Δ; offered at Itasca) Identification of forest plants as related to habitat.

Sec 1, (986409) Staff

Sec 2, (286410) Staff

Sec 3, (186411) Staff

Sec 4, (986412) Staff

R.3101. Northern Forest Ecosystems. (3 cr; each section limited to 15 students; prereq Chem 1001 or 1051, Δ; offered at Itasca) Field examination of succession, silvical characteristics, tree classification, stand structure, and regeneration ecology.

Sec 1, (786413) Sucoff, staff

Sec 2, (586414) Sucoff, staff

Sec 3, (386415) Sucoff, staff

Sec 4, (186416) Sucoff, staff

R.3106. Important Plants in Fisheries and Wildlife Habitats. (1 cr; each section limited to 16 students; prereq FW 3600 or #; offered at Itasca; A-F only) Field identification and discussion of important plants and their relationship to fish and wildlife species.

Sec 1, (989147) (August 25-September 17) Splett

Sec 2, (189784) (August 25-September 17) Staff

R.3201. Field Forest Measurement. (1 cr; each section limited to 15 students; prereq Math 1008, Δ; offered at Itasca) Introduction to land survey, tree and stand measurement, and basic forest sampling techniques.

Sec 1, (086417) Burk

Sec 2, (886418) Burk

Sec 3, (686419) Burk

Sec 4, (086420) Burk

R.5160. Practicum in Forest Biology and Measurements. (786900) (3 cr; limited to 15 students; prereq graduate student; offered at Itasca) Sucoff, Burk
Plant identification, plant dynamics, tree measurement.

Forestry (Fors)

235 Natural Resources Administration Building
St. Paul. 624-2774
College of Natural Resources

FIRST TERM

8777. Thesis Credits: Masters. (588857) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388858) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (188859) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588860) (1-36 cr [max 11 cr per summer term])

French (Fren)

260 Folwell Hall. 624-4308
(French and Italian)
College of Liberal Arts

For language immersion course for teachers, see Summer Institute for Teachers, or call 626-7741

FIRST TERM

R.1101. Beginning French. (885544) (5 cr; limited to 20 students; 0915-1130 MTWThF, KoltH S137)

R.1102. Beginning French. (685545) (5 cr; limited to 20 students; prereq 1101 or equiv; degree credit granted)

only according to Entrance Standard; 0800-1015 MTWThF; FolH 148)

R.1103. Beginning French. (485546) (5 cr; limited to 20 students; prereq 1102 or Entrance Standard proficiency test; 0800-1015 MTWThF; AmundH 156)

R.1104. Intermediate French. (285547) (5 cr; limited to 20 students; prereq 1103 or 3 yrs high school French; 1030-1245 MTWThF; FolH 148)

R.1105. Intermediate French. (791076) (5 cr; limited to 20 students; prereq 1104; 1030-1245 MTWThF; AkerH 313)

R.3015. French Composition and Communication. (185548) (4 cr; limited to 18 students; prereq 1106; 0915-1115 MWF; AkerH 309)
Robinson
Emphasis on writing, development of communication skills. Based on a consolidation of grammar.

R.3101. Introduction to French Literary Texts: Poetry. (189843) (4 cr; limited to 25 students; prereq 3016 or equiv; 0800-1000 MWF; AmundH 162) Sivert
Approaches to literary analysis and techniques examined through critical reading. Aims beyond, but focuses on, poetry.

R.3290 Topics in French Literature. (191950) (4 cr; limited to 25 students; prereq 3101, 3103; 1015-1215 MWF; AmundH 162) Waldauer
Selected texts. Taught in French.

3970. Directed Readings. (985549) (1-5 cr; prereq undergrad, #, Δ, college approval)

5710. The French Language: Yesterday, Today, and Tomorrow. (190935) (5 cr; limited to 20 students; prereq 3016; 0915-1215 MWF; JonesH 2) Wieland
Designed primarily for teachers of French who would like to further develop their knowledge of the French language and its development, and improve their own linguistic proficiency.

8777. Thesis Credits: Masters. (188585) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888587) (1-36 cr [max 11 cr per summer term])

8970. Directed Readings. (285550) (1-5 cr; hrs ar) Staff

8990. Ph.D. Topics. (791949) (1-7 cr)

**FIRST AND SECOND TERMS:
TEN-WEEK COURSE**

(Register once in Term I)
A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's

sequence in language. Students must enroll for all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses. To register you must obtain override forms in 260 Folwell Hall.

R.1101-1102-1103. Beginning French. (15 cr for both terms; limited to 20 students; 0915-1245 MTWThF; KolH S140)
R.1101, Sec 5, (185551) June 14-July 7, 5 cr
R.1102, Sec 5, (985552) July 8-August 2, 5 cr
R.1103, Sec 5, (785553) August 3-24, 5 cr

R.1104-1105-1106. Intermediate French. (15 cr for both terms; limited to 20 students; 0915-1245 MTWThF; FolH 104)
R.1104, (789389) Sec 5, June 14-July 7, 5 cr
R.1105, (189390) Sec 5, July 8-August 2, 5 cr
R.1106, (989391) Sec 5, August 3-24, 5 cr

SECOND TERM

R.1102. Beginning French. (386544) (5 cr; limited to 20 students; prereq 1101 or equiv; degree credit granted only according to Entrance Standard; 0915-1130 MTWThF; AmundH 104)

R.1103. Beginning French. (186545) (5 cr; limited to 20 students; prereq 1102 or Entrance Standard proficiency test; 0800-1015 MTWThF; FolH 138)

R.1106. Intermediate French. (291056) (5 cr; limited to 20 students; prereq 1105; 1030-1245 MTWThF; AmundH 309)

R.3014. French Phonetics. (791952) (4 cr; limited to 18 students; prereq 1106; 1015-1215 MWF; FordH 50) Barnes
Theoretical description and practical application of French phonetics, including corrective work.

R.3016. Advanced French Composition and Communication. (086546) (4 cr; limited to 18 students; prereq 3015 or #; 0800-1000 MWF; FolH 208)

R.3602. Literature in English Translation. (390559) (4 crs [does not count toward French major]; limited to 60 students; 0915-1115 MWF; JonesH 2) Akehurst
Representative works from the 19th and 20th centuries; movements, genres, themes. Taught in English.

3970. Directed Readings. (886547) (1-5 cr; prereq undergrad, #, Δ, college approval) Staff

8777. Thesis Credits: Masters.

(188831) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088832) (1-36 cr [max 11 cr per summer term])

8970. Directed Readings. (686548) (1-5 cr; hrs ar) Staff

8990. Ph.D. Topics. (991951) (1-7 cr)

**French and Italian
(Frlt)**

260 Folwell Hall. 624-4308
(French and Italian)
College of Liberal Arts

SECOND TERM

R.3608. New Wave Cinemas. (090063) (4 cr; limited to 60 students; does not count toward French major; knowledge of French and Italian helpful but not necessary; 1145-1400 MWF; FolH 208)
Film work of directors recasting classical traditions of Europe and America. Filmic theories of the Western, B-genre; political cinema; Godard, Resnais, Rivette, Pasolini, Antonioni, Bertolucci. Course varies in structure.

G

General College (GC)
109 Appleby. 625-6663

The General College summer program offerings enable students to refine and further develop their study skills; to strengthen their academic record; and to prepare for transfer to degree programs. Courses are offered in mathematics, science, the social sciences, literature, speech, and writing. Students interested in planning a Summer Program are encouraged to call 625-3339 to make an academic planning appointment.

FIRST TERM

1086. Higher Education Survival Seminar. (190188) (1 cr; Upward Bound Students ONLY; 1300-1430 MTWThF; CläOffB B26) Macias-Howard
Designed to increase student academic achievement at the University. Emphasis on academic coping skills (e.g., study behavior, test-taking, time management, communication skills) and career exploration. Personal issues that may interfere with student progress discussed. Information about University/community resources presented.

R.1132. Biological Science: The Human Body. (488317) (5 cr; limited to 35 students; 0800-1015 MTWThF; ApH 303) Jensen
Problems of physical, mental, and social health related to anatomy, physiology, and needs of the human organism. In studying the heart, for example, instructor shows what it is, how it works, its importance to overall functioning of the body, what can go wrong with it, and what is known about keeping it on the job. Films, televised dissections, and demonstrations supplement lectures.

1132x. Biological Science: The Human Body. (91826) (1 cr; June 14-July 1; prereq Upward Bound Students only; 1015-1100 TWTh; ApH 309; July 5-19 1015-1100 TWTh; ApH 127)

R.1281. Psychology in Modern Society. (091827) (5 cr; limited to 36 students; 0830-1100 TTh; ApH 128) Brothen
This course satisfies the introductory psychology requirement for degree programs such as management, education, and agricultural marketing and serves as the prerequisite for advanced courses in psychology. It consists of a survey of the field of psychology and introduces students to the major theories, concepts, and methods of the discipline. Students will work with the instructor in class two days each week to increase understanding of reading assignments and do experiments that help them learn how psychologists study computer labs to do exercises that give them feedback on their learning progress. Electronic mail communication with the instructor will be facilitated.

R.1421. Writing Laboratory: Basic Writing. (887584) (4 cr; limited to 18 students; 1030-1245 MTWThF; ApH 227) Sirc
Students write on various topics in response to reading and discussion. Personal help with writing problems. Emphasis on clear and effective written expression. Requires use of microcomputer; uses IBM PC.

R.1422. Writing Laboratory: Communicating in Society. (391825) (4 cr; prereq 1421; limited to 18 students; 1030-1245 MTWThF; ApH 219)
Primarily through expository writing, but also through reading and discussion, students analyze how people communicate in society: how they perceive events and ideas, how they think and write about them. Extensive writing practice. Requires use of microcomputer.

R.1481 Creativity: Art Laboratory—Experiences in the Media. (891828) (3 cr; limited to 18 students; 0800-0955 MTWTh; ApH 219) Gates
Creativity: Art Laboratory—Computer Art. This is an introductory course in which students learn to use the computer as an instrument for creating

COURSE DESCRIPTIONS

art. One class session per week is devoted to drawing practice and art instruction in the art laboratory; the remaining class periods are devoted to creating art on computers in the Mac Lab. Assignments include homework, quizzes, learning exercises and creative projects.

FIRST TERM: SHORT COURSES

Summer in the City

R.1133. Nature Study—July 5-19. (691829) (4 cr; limited to 25 students; 0800-1200 MTWThF; ApH 309) General natural history for students with little or no prior training in biology. Common Minnesota plants and animals examined in the field from the viewpoint of the informed amateur naturalist. Natural habitat association; field observation and identification techniques.

R.1285. Cultural Anthropology—June 14-July 1. (589068) (4 cr; limited to 25 students; 0855-1200 MTWThF; ApH 103) F. Johnson Human culture viewed as integrated system of learned and shared knowledge that guides behavior of all members of given society. Attempt to develop generalizations about influence of culture on human behavior by analyzing and comparing ways of life in wide range of cultures. Power of culture to shape personality and power of individuals to alter cultures.

R.1311. Art: General Arts—June 14-July 1. (389069) (4 cr; limited to 25 students; \$3311; 0900-1200 MTWThF; ApH 302; frequent off-campus field trips and gallery visits, \$25.00 additional fee for transportation) Adamson Examines representative works of art from genres of painting, sculpture, architecture, literature, and music to discover how and why art is created. Intensive two-week sections takes advantage of the rich art resources of the Twin Cities. Visits to the major museums, the Minneapolis Sculpture Garden, galleries, architectural sites, and other institutions.

R.1728. Special Topics: Family Life: Violence in the Family—June 14-July 1. (491878) (4 cr; limited to 30 students; 0830-1200 MTWThF; ApH 102, additional fee for transportation) Through visitation of several social agencies and the courts, this course will focus on the various forms of violence found in the family—physical and sexual abuse of children, spousal battering, and elder abuse. Attention will be given to factors which bring about or inhibit family violence, and to what can be done to reduce violence in the family.

FIRST AND SECOND TERM: SEVEN-WEEK COURSES

R.0625. Intermediate Algebra, Part I—June 20-August 5. (188403) (No cr; limited to 30 students; prereq GC math level D or 0621 with grade of C or better or 0617; 0830-1015 MTWThF; ApH 11) Johnson, A. For students with adequate background in elementary algebra. Sets, real numbers, linear equations, linear inequalities, absolute value equations and inequalities, exponents, polynomials, systems of equations, word problems, rational expressions, roots and radicals, complex numbers.

R.0631. Intermediate Algebra, Part II—June 20-August 5. (988404) (No cr; limited to 30 students; prereq GC math level E or 0625 or 1445; 0830-1015 MTWThF; ApH 117) Giese Basic knowledge of linear equations and inequalities, exponents, factoring, rational expressions, roots, radicals, complex numbers, and graphing assumed. Topics include quadratic equations, matrix solutions to systems of equations, general inequalities, conic sections, functions, logarithmic and exponential functions. Introduction to sequences, series, and binomial theorem.

SECOND TERM

R.1298 Social Responsibility: Ethics in Practice. (691832) (3 cr; limited to 20 students; 1000-1200 TWTh; ApH 226) St. John Students will identify philosophies and principles related to ethics: become aware of their own personal code of ethics; develop an understanding of common ethical dilemmas; such as environmentalism and discrimination, that cut across many subsets of society; and analyze ethical problems and recommend solutions in accordance with socially responsible actions.

R.1398 The Science of Music. (491833) (4 cr; 1374 recommended, limited to 30 students; 0915-1130 MTWThF; ApH 302) Fung This course examines music as a science. Course content includes the physical properties of music perception, and ways of manipulating musical sound. This course also helps students broaden the view of music being an art as well as a science. No pre-requisite is required.

Genetics (Gene)

250 Biological Sciences, St. Paul. 624-3003 (Genetics and Cell Biology) College of Biological Sciences

FIRST TERM

8777. Thesis Credits: Masters. (388603) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188604) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (788839) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188840) (1-36 cr [max 11 cr per summer term])

Genetics and Cell Biology (GCB)

250 Biological Sciences, St. Paul. 624-3003 College of Biological Sciences

FIRST TERM

5970. Directed Studies. (187887) (Cr ar; prereq #, Δ) Staff Individual study on selected topics or problems with emphasis on selected readings and use of scientific literature.

5990. Directed Research. (087888) (Cr ar; prereq #, Δ) Staff Laboratory or field investigation of selected areas of research.

8970. Directed Studies. (885270) (Cr ar; prereq #) Staff

8990. Research. (685271) (Cr ar; prereq #; S-N only) Staff

SECOND TERM

3022. Genetics. (989780) (4 cr, SBiol 5003; not intended for biology majors; prereq Biol 1009; 1000-1120 MTWThF; ClaOff B35) Mechanisms of heredity, their implications for biological populations, and applications to practical problems.

5970. Directed Studies. (887889) (Cr ar; prereq #, Δ) Staff See First Term.

5990. Directed Research. (187890) (Cr ar; prereq #, Δ) Staff See First Term.

8970. Directed Studies. (186139) (Cr ar; prereq #) Staff

8990. Research. (586140) (Cr ar; prereq #; S-N only) Staff

Geo-Engineering (GeoE)

122 Civil and Mineral Engineering Building. 625-5522 (Civil and Mineral Engineering) Institute of Technology

FIRST TERM

5660. Special Geo-Engineering Problems. (988239) (2 cr; prereq IT sr or #; A-F only) Literature survey, research work, or design study in geo-engineering problems.

8777. Thesis Credits: Masters. (288609) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488611) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5660. Special Geo-Engineering Problems. (189213) (2 cr; prereq IT sr or #; A-F only)

8612. Geo-Engineering Research Problems. (789215) (1 cr; prereq #; A-F only)

8777. Thesis Credits: Masters. (588843) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388844) (1-36 cr [max 11 cr per summer term])

Geography (Geog)

414 Social Sciences. 625-6080 College of Liberal Arts

FIRST TERM

1301. Human Geography. (392022) (5 cr; 0915-1100 MWF; BlegH 330) Miller Geography of population and principal ways of life; capacity of earth for future population. Rec 1, 0915-1100 TTh; BlegH 445.

3381. Population in an Interacting World. (991805) (4 cr; 1145-1245 MTWThF; BlegH 415) Characteristics of human populations that relate to the nature of places and regions. Differential growth of populations, with consideration of spatial variations in fertility, mortality, and migration. Regional variations in relationship of population and material welfare.

3511. Introduction to Cartography. (591807) (5 cr; prereq 5 cr in geography or #; 1030-1230 MTTh; BlegH 220) McMaster Principles of map design, compilation, specification, and drafting. Map symbols. History of cartography. Projections—analysis of construction,

properties, and uses.
Rec 1, 1030-1230 W; BlegH 455.

3940. Directed Field Study. (487619)
(2-4 cr; prereq #: A-F only) Staff
Guided individual field study.

3970. Directed Readings. (085557) (1-15 cr per qtr; prereq #, Δ, college approval) Staff

R.5900. Summer Institute for Teachers: Summer City Institute—June 27-July 11. (xxxxxx) (4 cr; 0930-1200 MTWThF; BlegH 335) Martin
See Summer Institute for Teachers, page 41.

8777. Thesis Credits: Masters. (288612) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188613) (1-36 cr [max 11 cr per summer term])

8970. Directed Readings. (885558) (1-5 cr) Staff

SECOND TERM

1401. Introduction to Physical Geography. (391808) (5 cr; 0915-1100 MTWThF; BlegH 415).
Distribution of patterns of climate, relief, vegetation, and soils; regional differences in problems of physical development.

3940. Directed Field Study. (887620)
(2-4 cr; prereq #: A-F only) Staff
See First Term.

3970. Directed Readings. (486549) (1-15 cr per qtr; prereq #, Δ, college approval) Staff

5562. Introduction to Geographic Information Systems. (591810) (4 cr; prereq jr or sr geography major or grad or landscape architecture major or #; 1030-1230 MTTh; BlegH 210) McMaster
Basic concepts of geographic information systems structure. Theory and applications for geographic research, location and resource analysis, and regional planning. Location principles, data structure, variable attributes.
Rec 1, 1030-1230 W; BlegH 455.

R.5701. Field Research—July 20-August 8. (391811) (4 cr; limited to 8 students; prereq 12 cr in geography, #) Leitner, Miller
Planning the European Metropolis. Exploration of selected cities and metropolitan regions in the circum-Baltic region, chosen from among Oslo, Stockholm, Helsinki, St. Petersburg, Riga, Danzig, Berlin, and Copenhagen. Emphasis will be placed on planning issues, including housing, downtown development, infrastructure provision, and the new problems associated with European integration, both within the EEC and occasioned by the changes in the former

COMECON countries. Open to (first priority) graduate students and seniors completing Plan A, Plan B, or Senior Project work (and satisfying the field requirement); other graduate students and undergraduates on a space available basis. Students registering for this course must have taken Geography 5505/6 or PA 5605/6 within the past three years. Permission of instructors, Professors Helga Leitner and Roger Miller, is required.

8777. Thesis Credits: Masters. (188845) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088846) (1-36 cr [max 11 cr per summer term])

8970. Directed Readings. (886550) (1-5 cr) Staff

Geology and Geophysics (Geo)

106 Pillsbury, 624-1333
Institute of Technology

FIRST TERM

R.1001. The Dynamic Earth: An Introduction to Geology. (685321) (4 cr; limited to 90 students; 0915-1015 MTWThF; PillsH 110)
A nonmathematical survey of the Earth; its internal and external structure; earthquakes and volcanoes, glaciers; mountain building and destruction, continent formation, seafloor spreading; resources for our future. Meets with 5051 lecture.

R.1021. Introduction to Geology Lab: Geology of Minnesota. (1 cr; each lab limited to 25 students; prereq 1001 or ¶ 1001 or #; a 2 hr lab) Staff
Ten laboratory exercises based on the geology of Minnesota. Introduction to the bedrock, glacial history, topography, mineral resources, and environmental geology of the state through the use of appropriate minerals, rocks, topographic and geologic maps. Meets with 5051 labs.
Lab 1, (485322) 1030-1245 MW, FordH 185
Lab 2, (285323) 1300-1515 MW, FordH 185

3990. Problems in Geology and Geophysics. (987592) (1-6 cr; prereq #, Δ)
Research or problem selected on the basis of individual interests and background.

R.5051. Physical Geology for Teachers. (4 cr, \$1001, \$1111; each section limited to 4 students; only for students holding degrees in education; prereq 1 term college chemistry or physics; lect 0915-1015 MTWThF; seminar 1145-1245 TTh; PillsH 110) Scientific methods and nature of the

Earth. Main features of the physical world and of the processes that have formed them. Meets with 1001 lecture, 1021 labs.
Lab 1, (185105) 1030-1245 MW, FordH 185
Lab 2, (085106) 1300-1515 MW, FordH 185

R.5111. Field Geology—June 13-July 22. (5-9 cr; section 1 limited to 40 students, section 2 limited to 20 students; limited to students majoring in geology, geophysics, or geoengineering; prereq 5201, #) Staff
Geologic mapping on topographic maps and aerial photos, field identification of igneous, sedimentary, and metamorphic rocks, measurement of stratigraphic sections, study of structural and geomorphic features. Major report required after completion of field work.
Sec 1, (787593) (9 cr)
Sec 2, (786847) (5 cr; prereq grad student; ar)

8777. Thesis Credits: Masters. (888606) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688607) (1-36 cr [max 11 cr per summer term])

SECOND TERM

3990. Problems in Geology and Geophysics. (086322) (1-6 cr; prereq #, Δ)
See First Term.

8777. Thesis Credits: Masters. (988841) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788842) (1-36 cr [max 11 cr per summer term])

German (Ger)

231 Folwell Hall, 625-2080
College of Liberal Arts

For language immersion course for teachers, see Summer Institute for Teachers, page 41, or call 626-7741.

FIRST TERM

R.1101. Beginning German. (685559) (5 cr; limited to 20 students; \$1000 or 1110; 0800-1015 MTWThF; AmundH 104)
Listening and reading comprehension, writing, speaking.

R.1103. Beginning German. (691944) (5 cr; limited to 23 students; prereq 1102 or equivalent credit of 1110; 0915-1130 MTWThF; FolH 214)
See 1101.

R.1104. Intermediate German. (185064) (5 cr; limited to 25 students; prereq 1103 or completion of 1110 or

Entrance Standard proficiency test; 0915-1130 MTWThF; NichH 207)
See 1101.

R.1106. Intermediate German. (685352) (5 cr; limited to 25 students; prereq 1105; 0915-1130 MTWThF; CivMinE 212)
See 1101.

R.3011. Conversation and Composition. (286858) (4 cr; limited to 15 students; prereq 1106 and the graduation proficiency test; 0800-1000 MTWThF; CivMinE 214) Teraoka
Spoken German; composition; development of vocabulary; grammar review.

R.3104. Reading and Analysis of Prose. (189400) (4 cr; limited to 20 students; prereq 1106 or the graduation proficiency test; 1145-1300 MTWTh; AmundH 104) Parente
Reading fluency; appreciation of literary values through literary interpretation and familiarization with critical terminology.

R.3501. Contemporary Germany: The Federal Republic. (491945) (4 cr; limited to 20 students; prereq 1106 or the graduation proficiency test; 0915-1015 MTWThF; FolH 426) Weiss
Culture of the Federal Republic of Germany and its evolution since 1949. Lectures and readings in English and German.

8777. Thesis Credits: Masters. (988614) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588616) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll in all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses.

R.1101-1102-1103. Beginning German. (15 cr for both terms \$1000, \$1110; limited to 20 students; 0915-1245 MTWThF; FolH 334)
Listening and reading comprehension, writing, speaking.

R.1101, Sec 5, (085560) June 14-July 7, 5 cr
R.1102, Sec 5, (885561) July 8-August 1, 5 cr
R.1103, Sec 5, (685562) August 2-24, 5 cr

SECOND TERM

R.1102. Beginning German. (686551) (5 cr, \$1110; limited to 23 students;



COURSE DESCRIPTIONS

prereq 1101 or 1000 or first 5 cr of 1110; 0800-1015 MTWThF, Arch 60)
See 1101 First Term.

R.1104. Intermediate German. (191947) (5 cr; limited to 25 students; prereq 1103 or completion of 1110 or Entrance Standard proficiency test; 0915-1130 MTWThF; FolH 426)
See 1101 First Term.

R.1105. Intermediate German. (988094) (5 cr; limited to 25 students; prereq 1104; 0915-1130 MTWThF; NichH 109)
See 1101 First Term.

R.3011. Conversation and Composition. (991948) (4 cr; limited to 15 students; prereq 1106 or the graduation proficiency test; 0815-1015 MTWTh; FolH 246) Duroche Spoken German; composition; development of vocabulary; grammar review.

R.3105. Reading and Analysis of Drama and Poetry. (988323) (4 cr; limited to 20 students; prereq 1106 or graduation proficiency test; 1030-1200 MTWTh; KoltH S137) McCormick Reading fluency; appreciation of literary values through literary interpretation and familiarization with critical terminology.

8777. Thesis Credits: Masters. (688848) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488849) (1-36 cr [max 11 cr per summer term])

Germanic Philology (GPh)

304 Walter Library, 626-0805
(Center for Medieval Studies)

FIRST TERM

8777. Thesis Credits: Masters. (388617) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188618) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (388861) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188862) (1-36 cr [max 11 cr per summer term])

Greek (Grk)

330 Folwell Hall, 625-5353
(Classical and Near Eastern Studies)
College of Liberal Arts

FIRST TERM

3001. Beginning Classical Greek: Accelerated. (191561) (10 cr; 0915-1245 MTWThF; FolH 246) Erickson Grammar, syntax, composition and reading.

8777. Thesis Credits: Masters. (188621) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088622) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (088863) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888864) (1-36 cr [max 11 cr per summer term])

H

Health Informatics (HInf)

Box 511 Mayo, 625-8440
(Laboratory Medicine and Pathology)
Medical School

FIRST TERM

R.5446. Biocomputing Consulting Seminar. (388214) (3 cr; prereq HInf major, 5432, PubH 5452 or #; limited to 10 students)
Overview of new computer and communications hardware and software for health science applications. Group work on client projects illustrates roles and responsibilities involved in analyzing requirements of health science clients, specifying and designing computer and data-base interfaces, and coordinating system life cycle process.

R.5470. Topics in Health Informatics. (188215) (cr ar; prereq #; limited to 10 students)
Selected readings and/or projects.

R.8449. Advanced Readings in Health Informatics. (088216) (1-3 cr; prereq 5432, PubH 5434, #; limited to 10 students) Staff
Discussion of methodology and results.

R.8450. Research in Health Informatics. (888217) (cr ar; prereq #; limited to 10 students) Staff

8777. Thesis Credits: Masters. (788629) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988631) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.5446. Biocomputing Consulting Seminar. (888220) (3 cr; prereq HInf major, 5432, PubH 5454 or #; limited to 10 students)
See First term.

R.5470. Topics in Health Informatics. (688221) (cr ar; prereq #; limited to 10 students)
See First term.

R.8449. Advanced Readings in Health Informatics. (488222) (1-3 cr; prereq 5432, PubH 5434, #; limited to 10 students) Staff
See First term.

R.8450. Research in Health Informatics. (288223) (cr ar; prereq #; limited to 10 students) Staff
See First term.

8777. Thesis Credits: Masters. (488866) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288867) (1-36 cr [max 11 cr per summer term])

Health Science Units (HSU)

W64 Centennial Hall, 624-7102
Health Sciences

FIRST TERM

5210. Terminology of the Health Sciences. (788078) (2cr, SSAHP 5210) McKennell
Programmed learning course covering current and traditional usage; language of health care delivery. Call 612/624-2442 for more information.

SECOND TERM

5210. Terminology of the Health Sciences. (588079) (2 cr, SSAHP 5210) McKennell
Programmed learning course covering current and traditional usage; language of health care delivery. Call 612/624-2442 for more information.

Hebrew (Hebr)

330 Folwell Hall, 625-5353
(Classical and Near Eastern Studies)
College of Liberal Arts
(See also Jewish Studies; Ancient Near Eastern)

FIRST TERM

3980. Directed Instruction. (785438) (1-5 cr; prereq #, Δ; college approval)
Observation and discussion of language classes. Gradually increased participation of student in preparation and presentation of instructional materials to an elementary class. Evaluation of materials; teaching techniques. Seminars on problems of language teaching.

5970. Directed Readings. (485658) (Cr ar; for advanced students wishing to work on special problems; prereq 3013, #, Δ, CLA approval)

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll in all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses.

R.1101-1102-1103. Beginning Hebrew (Ulpan). (15 cr for both terms; each section limited to 25 students; 0915-1245 MTWThF; FolH 312) Shendar (First 5 weeks) (Second 5 weeks)

Specially designed summer program combining language study with learning experiences in culture and group activities that stimulate active use of the language. Introduction to speaking, reading, and listening comprehension of modern Hebrew. May serve as a basis for biblical study. See page 35.
Sec 5, (686257) June 14-July 7, 5 cr
Sec 5, (486258) July 8-August 1, 5 cr
Sec 5, (286259) August 2-24, 5 cr

SECOND TERM

3980. Directed Instruction. (585439) (1-5 cr; prereq #, Δ; college approval)
See First Term.

5970. Directed Readings. (086563) (Cr ar; for advanced students wishing to work on special problems; prereq 3013, #, Δ, CLA approval)

History (Hist)

614 Social Sciences. 624-2800
College of Liberal Arts

FIRST TERM

1002. Introduction to Modern European History Since the Middle Ages. (786833) (4 cr, \$1002H, \$3002; not open to jrs, srs; 1030-1130 MTWThF; BlegH 115) Thayer
Revolution, liberalism, and nationalism to 1870. Meets with 1002H and 3002.

1002H. Honors Course: Introduction to Modern European History Since the Middle Ages. (586252) (4 cr, \$1002, \$3002; not open to jrs, srs; prereq #: 1030-1130 MTWThF; BlegH 415) Thayer
See 1002. Meets with 1002 and 3002.

1052. Ancient Civilization. (491783) (4 cr; 0915-1145 TTh; BlegH 245) Kelly.
History and civilization of the ancient world, 500 to 146 B.C. Meets with 3052.

1302. American History. (792082) (4cr; 1030-1130 MTWThF; BlegH 135) Spear
Modern America from 1880 to the Present.

3002. Introduction to Modern European History Since the Middle Ages. (586834) (4 cr, \$1002, \$1002H; 1030-1130 MTWThF; BlegH 115) Thayer
See 1002. Meets with 1002 and 1002H.

3052. Ancient Civilization. (291784) (4 cr.; 0915-1145 TTh BlegH 245) Kelly
See 1052. Meets with 1052.

3401. Survey of Latin American History: Colonial Period to 1800. (191785) (4 cr; meets with LAS 3401; 0915-1100 MTW; BlegH 155) Schwartz
The Pre-Hispanic and colonial period to 1800 with emphasis on social, cultural and economic aspects.

3431. History of Africa to 1800. (991786) (4cr; meets with Afro 3431; 0915-1015 MTWThF; BlegH 260) Staff
Socio-economic, political and cultural development in pre-colonial Africa; emphasis on the slave trade, Islamic revolution and European commercial penetration.

3468. People's Republic of China: The Communist Revolution, 1900 to Present. (488303) (4 cr, \$5468, \$EAS 3468; 0915-1015 MTWThF; HHHCTr 30) Farmer
Introduction of Marxism to China, rise of Communist Party, and development of a rural guerilla movement. The career of Mao Tse-tung and developments in the People's Republic. The Great Leap, Cultural Revolution, Gang of Four. Meets with Hist 5468 and EAS 3468.

3505. Survey of the Middle East. (989374) (4 cr; 1000-1230 TTh; BlegH 105) Tesdell
Lands and peoples of the Middle East, historical evolution of Middle East civilizations and societies, status of Middle East countries in world affairs. Meets with MELC 3505.

3637. Russian History from Peter the Great to the Present. (189574) (4 cr; \$5133; 1030-1130 MTWThF; HHHCTr 30) Stravrou
A survey of Russian history since Peter the Great.

3822. U.S. In the 20th Century: 1932-1960. (791787) (4 cr; 0915-1130 MW; BlegH 245) Berman
The Great Depression and the New Deal; the challenge of fascism and the coming of World War II; the origins of the Cold War; the great red scare; the politics and culture of the Eisenhower era; the origins of civil rights movement.

3883. History of American Foreign Relations. (490729) (4 cr; 1030-1130 MTWThF; AndH 330) Staff
American foreign relations during the Cold War, 1941 to present.

3970. Directed Studies. (485563) (1-15 cr; prereq #, Δ, college approval)
Guided individual reading or study. Open to qualified students for 1 or more quarters.

3990. Directed Research. (285564) (1-15 cr; prereq #, Δ, college approval)
Qualified students, with consent of instructor, work on a tutorial basis.

5468. People's Republic of China: The Communist Revolution, 1900 to Present. (088992) (4 cr, \$3468, \$EAS 3468; 0915-1015 MTWThF; HHHCTr 30) Farmer
See 3468. Meets with 3468 and EAS 3468.

5857. Summer Institute for Teachers: Feminism's Second Wave—June 20-July 1. (092055) (4 cr; 0930-1200 MTWThF; RarigC 616) Evans
See Summer Institute for Teachers, page 41.

5872. Intellectual History of U.S. In 19TH, 20TH Centuries. (591788) (4 cr; 1145-1245 MTWThF; BlegH 115) Noble
Writings of current scholars of American culture that express paradigmatic conflicts in the study of ideas and values.

5970. Directed Studies. (185565) (1-15 cr; prereq #, Δ, CLA approval)
Qualified senior and graduate students may register for work on tutorial basis. Guided individual reading or study.

5990. Directed Research. (985566) (1-15 cr; prereq #, Δ, CLA approval)
Qualified senior and graduate students may register for work on tutorial basis.

8777. Thesis Credits: Masters. (588633) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188635) (1-36 cr [max 11 cr per summer term])

SECOND TERM

1001. Introduction to Modern European History Since the Middle Ages. (088099) (4 cr, \$1001H, \$3001; not open to jrs, srs; 0915-1015 MTWThF; BlegH 350) Staff
Western European civilization to 1715. Meets with 1001H and 3001.

1001H. Honors Course: Introduction to Modern European History Since the Middle Ages. (988208) (4 cr, \$1001, \$3001; not open to jrs, srs; prereq #: 0915-1015 MTWThF; BlegH 350) Staff
See 1001. Meets with 1001 and 3001.

1053. Ancient Civilization. (391789) (4 cr; 0915-1015 MTWThF; BlegH 205) Evans, J.
History and Civilization of the ancient world, 146 B.C. to A.D. 337.

1101. Introduction to Medieval history. (791790) (4 cr; 0915-1015 MTWThF; BlegH 155) Bachrach
Europe from the decline of Rome to the early Renaissance politics, institutions, society, economy and culture of the Middle Ages. Meets with 3101.

1301. American History. (592083) (4 cr; 1030-1130 MTWThF; BlegH 235) Staff
Colonial, early national period from the Revolution through Civil War and Reconstruction.

3001. Introduction to Modern European History Since the Middle Ages. (788100) (4 cr, \$1001, 1001H; 0915-1015 MTWThF; BlegH 350) Staff
See 1001. Meets with 1001, 1001H.

3053. Ancient Civilization. (591791) (4 cr; 0915-1015 MTWThF; BlegH 205) Evans, J.
See 1053. Meets with 1053.

3101. Introduction to Medieval history. (191799) (4 cr; 0915-1015 MTWThF; BlegH 155) Bachrach
See 1101. Meets with 1101.

3245. History of Eastern Europe; 19TH and 20TH Centuries. (391792) (4 cr; 1030-1130 MTWThF; BlegH 115) Rudolph
Poland, Czechoslovakia, Hungary, Rumania and Yugoslavia. Nationalism and formation of national states; fascism and World War II; Jews in Eastern Europe; communist takeovers; society in communist Eastern Europe today.

3402. Survey of Latin American History. (191793) (4 cr; 1145-1245 MTWThF; BlegH 250) Staff
Development of new nations from

independence to the emergence of dependent economies. Meets with LAS 3402.

3422. The World and the West. (291789) (4 cr; 0800-0900 MTWThF; BlegH 205) Kopf
Modern world of Renaissance, nationalism, modernization, and countermodernization, 1850 to present.

3432. History of Africa: 1800 to Present. (091794) (4 cr; 0915-1015 MTWThF; BlegH 250) Staff
Colonial rule, the forced restructuring and underdevelopment of African economies, African resistance, nationalism and the problems of independence.

3474. Rise of Modern Japan: 1853-1914. (990749) (4 cr; 1030-1145 MTWTh; BlegH 105) Marshall.
The Meiji Revolution from Commodore Perry to eve of World War I: origins of constitutional monarchy, industrial economy, Western influence, and modern cultural change. Meets with EAS 3474.

3621. Renaissance Italy: 1200-1530. (990752) (4 cr; 0800-0900 MTWThF; BlegH 350) Tracy.
Politics and culture in the city-states from Dante to Machiavelli.

3723. Europe since World War II. (891795) (4 cr; 0915-1130 TW, 0915-1015 Th; BlegH 245) Munholland
Reconstruction of European politics and society; emergence of Cold War in Europe; decolonization; economic cooperation and development; East-West relations.

3821. U.S. In the 20TH Century: 1890-1917. (691796) (4 cr; 0915-1015 MTWThF; BlegH 105) Staff
The closing of the agricultural frontier and the growth of industrialism, the corporation and the city; populism and progressevism; the end of isolation and the growth of overseas empire; prohibition and women's suffrage.

3845. American Economic History, 1870 to the Present. (491797) (4 cr; 0800-0900 MTWThF; BlegH 115) Green
Farm problems in the 19th Century. Rise of big business and finance capitalism, government policies and modern society.

3970. Directed Studies. (386558) (1-15 cr; prereq #, Δ, college approval)
See First Term.

3990. Directed Research. (186559) (1-15 cr; prereq #, Δ, college approval)
See First Term.

R.5381. Summer Institute for Teachers Minnesota History Workshop: Uncovering Lives: Reading, Writing, and Teaching Biography—July 25-August 5. (585425) (5 cr;



COURSE DESCRIPTIONS

See Summer Institute for Teachers, page 41.

5970. Directed Studies. (prereq #, Δ, CLA approval)
Sec 1, (185069) (1-15 cr)
See First Term.
Sec 2, (385426) (1-15 cr; for students who are repeating Hist 5381, Minnesota History Workshop, July 25-August 5)

5990. Directed Research. (586560) (1-15 cr; prereq #, Δ, CLA approval)
See First Term.

8777. Thesis Credits: Masters. (188868) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988869) (1-36 cr [max 11 cr per summer term])

History of Medicine (HMed)

510 Diehl Hall, 624-4416
Medical School

FIRST TERM

8777. Thesis Credits: Masters. (088636) (1-16 CR [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888637) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (288870) (1-16 CR [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188871) (1-36 cr [max 11 cr per summer term])

History of Science and Technology (HSci)

342 Physics, 624-7069
College of Liberal Arts

FIRST TERM

8777. Thesis Credits: Masters. (991447) (1-16 cr)

8888. Thesis Credits: Doctoral. (188644) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (090211) (1-16 cr)

8888. Thesis Credits: Doctoral. (588874) (1-36 cr [max 11 cr per summer term])

Home Economics Education (HEEd)

325 Vocational/Technical Building,
St. Paul, 624-3010
(Vocational and Technical Education)
College of Education

FIRST TERM

R.5320. Adult Education in Home Economics—June 20-July 1. (886208) (3 cr; limited to 25 students; 0900-1200 MTWThF; VoTech R380; A-F only) Ernst
Planning a community program; teaching procedures; special problems.

R.5404. Introduction to Early Childhood Family Education Program—June 14. (588308) (1 cr; limited to 40 students; 0800-1700 T; VoTech R380; A-F only) Cooke
Concept and philosophy of such programs as a basis for program implementation.

R.5406. Special Topics in Parent and Family Education
Study of issues and current literature focused on emerging topics relevant to parent and family education.

Sec 1, (189252) School-Family Linkages—June 15-17. (limited to 25 students; 1300-1630 WThF; VoTech R380) Rossmann

Focuses on how family and school collaboratively support a student's educational outcomes. Teachers, outreach workers and administrators in Early Childhood Family Education programs, K-12 schools, and parent education programs will benefit from this workshop on developing relationships between home and school. This offering for 1 credit.

Sec 2, Home Visits as an Educational Strategy—June 15-17. (690714) (limited to 25 students; 0900-1130 WThF; VoTech R380) Seim

History, theory, and practice of home visits as a strategy to educate about family life in the home setting. The content is important for parent educators, early childhood educators, elementary and secondary teachers, nutrition educators, and other family educators. This offering for 1 credit.

Sec 3, Effective Parent Education for Diverse Populations—June 20, 21, 29, 30, July 1. (490715) (1300-1630 MTWThF; VoTech R380) Lovrien

Roles and responsibilities of European-American, middle class parent educators in relation to families from a variety of backgrounds will be examined. Students will critique standard assumptions and practices and will develop practical program strategies for more effective education. There will be several guest teachers in this course. This offering for 2 credits.

Sec 4, Education for Family Communication—July 5-15. (691510) (3 cr; 1300-1600 MTWThF; VoTech R380) Millis

This focus is on preparing educators to develop programs which help family

members to improve their communication. Concepts about family communication, decision making and conflict management will be reviewed and applied to diverse groups in an educational setting.

R.5407. Family Life Education—July 5-15. (286116) (1-4 cr [max 12 cr]; limited to 25 students; 0900-1200 MTWThF; VoTech R380; A-F only) Rossman

Objectives, content, curriculum development, methods, materials, and evaluation approaches for teaching diverse groups of youth and adults family life concepts including current research in communication, relationships, sexuality, self-esteem, and decision making. This offering for 3 credits.

5900. Independent Study: Family Education. (1-3 cr [max 12 cr]; prereq #; hrs ar; A-F only)
Independent study under tutorial guidance.
Sec 22, (888086) Rossmann

8777. Thesis Credits: Masters. (688624) (1-16 cr [max 11 cr per summer term])

8900. Problems: Home Economics Education. (1-9 cr; prereq 8300, #; hrs ar)

Independent study of current educational problems.
Sec 22, (488088) Rossmann

SECOND TERM

R.5405. Child Development and Parent Education—July 25-August 5. (388312) (1-4 cr [max 12 cr]; limited to 25 students; 0830-1200 MTWThF; VoTech R380; A-F only) McClelland, Kos

Objectives, content, curriculum organization, teaching methods, materials, and evaluation approaches for teaching youth and adults about social, cultural, psychological, economic, and technical aspects of child development, parenting, and parent-child interaction. This offering for 4 credits.

5406. Special Topics in Parent and Family Education: Family Literacy—July 25-29, August 1-5. (291509) (3 cr; limited to 25 students; 1300-1600 MTWThF; VoTech R385; AdEd 5103; prereq practicing adult educator or #) Park

This course is designed for adult educators who are currently in or who interest in family literacy programs. Family literacy programs are designed for parents who want to learn to improve the literacy skill of their children and who may also need improvement in their own educational skills.

R.5409. Group Methods for Parent and Family Education—August 8-12. (890713) (2 cr; limited to 25 students; 1230-1615 MTWThF; VoTech R380; A-F only) Bowman

Methods and theories applied to development of skills for leading parent and family education groups.

R.5510. History, Philosophy, and Professional Practice—August 1-19. (188988) (3 cr; limited to 20 students; prereq Post BA student in HEEd or #; 1300-1545 MWF; VoTech R380; A-F only) Thomas
Critical analysis of home economics and the teaching of home economics; identification of practical problems encountered by families; development of a personal orientation towards becoming a home economics teacher.

5900. Independent Study: Family. (1-3 cr [max 12 cr]; prereq #; hrs ar; A-F only)
See First Term.
Sec 24, (488186) Thomas

8777. Thesis Credits: Masters. (688865) (1-16 cr [max 11 cr per summer term])

8900. Problems: Home Economics Education. (1-9 cr; prereq 8300, #; hrs ar)
See First Term.
Sec 24, (188188) Thomas

Honors Seminar (HSem)

115 Johnston Hall, 624-5522
(Honors Program)
College of Liberal Arts

FIRST TERM

R.3010. Conformity, Enmity, and Heroism in Politics. (189235) (4 cr; limited to 15 students; prereq jr or sr, reg CLA Honors div; 1030-1230 MWF; BlegH 105) John L. Sullivan
Analysis of the role of conformity and obedience, as well as heroism and altruism, in politics.

Horticultural Science (Hort)

305 Alderman Hall, St. Paul, 624-4242
College of Agriculture

FIRST TERM

3097. Horticultural Practicum. (686937) (4 cr; prereq upper division horticulture emphasis or sequence, Δ) Approved field, laboratory, or greenhouse experiences in application of horticultural information and practices.

5000. Professional Experience Program. (489192) (4 cr; prereq #; free elective for Hort undergrads, not for grad; Extension regis only; S-N only)
Professional experience in horticulture firms or government agencies through supervised practical work evaluation

of reports, and consultations with faculty advisers and employers.

5091. Directed Studies. (686940) (2-6 cr; prereq 8 cr upper division hort course, Δ)

Opportunities for in-depth exploration of concepts, technology, materials, or programs in specific area to expand professional competency and self-confidence. Planning, organizing, implementing, and evaluating knowledge obtained from formal education and experience.

8051. Advanced Problems in Horticultural Crop Breeding. (785178) (3-9 cr; prereq Δ)

8052. Advanced Problems in Physiology of Horticultural Crops. (187596) (3-9 cr; prereq Δ)

8090. Graduate Horticultural Research. (390982) (1-18 cr; prereq Δ) Directed Studies in Horticulture.

8777. Thesis Credits: Masters. (688638) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688641) (1-36 cr [max 11 cr per summer term])

SECOND TERM

3097. Horticultural Practicum. (386950) (4 cr; prereq upper division horticulture emphasis or sequence, Δ) See First Term.

5091. Directed Studies. (186948) (2-6 cr; prereq 8 cr upper division hort course, Δ) See First Term.

8007. Extension Horticultural Practicum. (085221) (1-5 cr, max 6 cr; prereq 12 grad cr)

8051. Advanced Problems in Horticultural Crop Breeding. (585179) (3-9 cr; prereq Δ)

8052. Advanced Problems in Physiology of Horticultural Crops. (087597) (3-9 cr; prereq Δ)

8090. Graduate Horticultural Research. (190983) (1-18 cr, prereq Δ) Directed studies in Horticulture.

8777. Thesis Credits: Masters. (988872) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788873) (1-36 cr [max 11 cr per summer term])

Housing (Hsg)

See Design, Housing, and Apparel (DHA) page 77.

Humanities (Hum)

355 Ford Hall. 625-6563
College of Liberal Arts

FIRST TERM

R.1003. Humanities in the Modern World III. (690941) (4 cr, \$Rhet 1303; 0800-1020 TTh; FordH 50) Tapp
Impact of science, especially evolution theory, on religious and humanistic thought; roots of existentialism; disorientation in modern culture; impressionism. Integrative study of works by creative figures such as Kierkegaard, Darwin, Nietzsche, Chekhov, Joyce, Mann, Manet, Monet, Renoir, Degas, Wagner, Debussy, Mahler.

R.1005. Humanities in the Modern World V. (191639) (4 cr; \$3005;1030-1300 MW; FordH 155) Klinger
The Western world 1945-1970. Existentialism, "the absurd"; searches for identity, commitment; religious trends; influence of oriental spiritual traditions. Integrative study of works by such creative figures as Camus, Sartre, Ionesco, Bultmann, Watts, Pollock, Warhol, Beauvoir, Cage, LeCorbusier, Fellini.

1115. European Heritage: Middle Ages. (491640) (4 cr; 0930-1200TTh; SmithH 231) Hopkins
sixth to 14th centuries: growth of Christendom: monasticism; feudalism and courtly love; rise of towns and universities. Art and architecture: Byzantine, Romanesque, and Gothic. Music: Gregorian chant, minstrelsy, liturgical drama. Literature: epic, romance, Dante. Islam. Scholastic philosophy: Abelard, Aquinas.

3003. Humanities in the Modern West III. (291641) (4 cr; \$1003, Rhet 1303; 0800-1020 TTh; FordH 50) Tapp
Meets with 1003. Additional work for upper level credit.

3005. Humanities in the Modern West V. (191642) (4 cr; \$1005; 1030-1300 MW; FordH 155) Klinger
Meets with 1005. Additional work for upper level credit.

3115. European Heritage: Middle Ages. (991643) (4 cr; 0930-1200 TTh; SmithH 231) Hopkins
Meets with 1115. Additional work for upper level credit.

3910. Topics in the Humanities: Existential Thought in Modern Literature and Philosophy. (791644) (4 cr; \$5910; 1100-1200 MTWThF; FolH 50) Taraba
Selected works of Kierkegaard, Nietzsche, Kafka and Camus explored in depth.

5910. Topics in the Humanities: Existential Thought in Modern Literature and Philosophy. (591645) (4 cr; \$3910, 1100-1200 MTWThF; FolH 50) Taraba
Meets with 3910. Additional work for graduate credit.

SECOND TERM

1111. European Heritage: Greece. (391646) (4 cr; 0800-0900 MTWThF; FolH 104) Hershbell
Greek civilization; literacy and artistic works that have influenced modern Western culture. Epic and lyric poetry, drama, architecture, sculpture, philosophy, religion: Homer, Hesiod, Aeschylus, Sophocles, Euripedes, Aristophanes, Plato, Aristotle.

3111. European Heritage: Greece (191647) (4 cr; \$1111, Rhet 3321; 0800-0900 MTWThF; FolH 104) Hershbell
Meets with 1111. Additional work for upper level credit.

3910. Topics in the Humanities: The Folktale. (091648) (4 cr; 1030-1300 MW; FolH 344) Liberman
History and composition of folk tales, mainly European. Focus on animal tales and fairy tales. Literary, anthropological and psychological significance of tales.

5910. Topics in the Humanities: The Folktale. (891649) (4 cr; 1030-1300 MW; FolH 344) Liberman
Meets with 3910. Additional work for graduate credit.



Industrial Education (Ind)

425 Vocational/Technical Building, St. Paul 624-3004
(Vocational and Technical Education)
College of Education

FIRST TERM

3200. Technical Development: Advanced. (889268) (1-6 cr; max 33 cr; prereq Ind 1000, 1001, #; hrs ar; A-F only) Pucel
Individualized advanced technical development in areas of construction, graphic communication, manufacturing, power and energy, and transportation.

5000. Occupational Experience. (689269) (1-5 cr, max 15 cr; prereq #; hrs ar; A-F only) Pucel
Structured and supervised employment in industry. Credits allowed will be derived from a ratio of 100 clock hours of supervised work experience to each credit given to the student.

5200. Technical Development: Specialized. (089270) (1-9 cr, max 24 cr; prereq #; hrs ar; A-F only) Pucel
Integration of specialized technical instruction in advanced and emerging areas into courses in industrial education.

5306. Implementing Curricular Change in Technology Education—June 17 and hrs ar. (491511) (3 cr; 0900-1200; VoTech R280) Lewis
Current practices in teaching technology. Observation of innovative facilities. Industrial visits. Curriculum sharing. Development of course units in technology education. Review of basic curricular concepts related to technology education.

R.5330. Industrial Course Construction—June 14 and ar. (185338) (3 cr; limited to 22 students; prereq education or grad student; 0915-1215 - VoTech 135, 1330-1630- VoTech 230 ; (addnl hrs ar) A-F only) Pucel
Principles and techniques; experience in planning, organizing, and building a teaching guide. (Students who will be doing their work outside the 9 county metro area must obtain a letter from 210 VoTech Bldg in order to waive the student services fee for this course.)

5900. School-Based Project in Industrial Education. (392036) (1-6 cr [max 12 cr]; prereq 5305, 5325, MEEd students only; hrs ar; S-N optional) Lewis, Pucel
Independent or team project designed to study, improve, evaluate, or

COURSE DESCRIPTIONS

develop curriculum or instructional materials to improve quality of instruction.

5901. Independent Study. (192037) (1-6 cr; prereq Δ; hrs ar; A-F only) Lewis, Pucel
Independent inquiry into topics to permit in-depth study of areas in education or supplementation of areas not covered in regular course structure.

8777. Thesis Credits: Masters. (188652) (1-16 cr [max 11 cr per summer term])

8900. Research Problems. (092038) (3-6-9 cr per qtr; prereq approval of candidacy; hrs ar) Lewis, Pucel
Individual conferences.

8901. Research Problems. (892039) (3-6-9 cr per qtr; prereq approval of candidacy; hrs ar) Lewis, Pucel
Individual conferences.

SECOND TERM

5000. Occupational Experience. (990718) (1-5 cr [max 15 cr]; prereq #; hrs ar; A-F only) Pucel
See First Term.

5306. Industrial Education Workshop. (190720) (3 cr; prereq teaching experience, #; A-F only) Pucel

5900. School-Based Project in Industrial Education. (192040) (1-6 cr [max 12 cr]; S-N optional; prereq 5305, 5325, MEd students only; hrs ar) Lewis, Pucel
See First Term.

5901. Independent Study. (092041) (1-6 cr; prereq Δ; hrs ar; A-F only) Lewis, Pucel
See First Term.

8777. Thesis Credits: Masters. (088877) (1-16 cr [max 11 cr per summer term])

8900. Research Problems. (892042) (3-6-9 cr per qtr; prereq approval of candidacy; hrs ar) Lewis, Pucel
See First Term.

8901. Research Problems. (692043) (3-6-9 cr per qtr; prereq approval of candidacy; hrs ar) Lewis, Pucel
See First Term.

Industrial Engineering/Operations Research (IEOR)

125 Mechanical Engineering. 625-0705
(Mechanical Engineering)
Institute of Technology

FIRST TERM

R.5040. Introduction to Operations Research. (186070) (4 cr; limited to 30

students; prereq Math 1241; IT or grad ... IEOR.3000 recommended; 1145-1345 MWThF; MechE 102)
Linear programming, algebra and geometry of linear models, simplex method, sensitivity testing, and duality; network models, network algorithms, and dynamic models.

R.5221. Facilities Planning. (591533) (4 cr; limited to 30 students; prereq IT or grad student, 5010, 5020, 5040; 0800-1000 MWThF; MechE 102) Irani
Facilities planning process, relationship to product design, process planning and market requirements, facility location, financial analysis of facility plans, systematic layout planning, computerized layout planning, mathematical modeling, material handling, warehousing.

R.8410. Industrial Engineering Research. (886161) (3-5 cr; limited to 10 students; hrs ar; prereq #)

R.8411. Industrial Engineering Research. (686162) (3-5 cr; limited to 10 students; hrs ar; prereq 8410)

R.8412. Industrial Engineering Research. (486163) (3-5 cr; limited to 10 students; hrs ar; prereq 8411)

8777. Thesis Credits: Masters. (588647) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588650) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

R.5180. Applied Industrial Engineering. (786069) (3-5 cr [1-2 cr term paper option]; limited to 20 students; prereq [3000, 5010, 5020, 5030 and 5040], Δ)
Industrial engineering surveys and programs. Case problems, studies in local plants.

R.5198H. Industrial Engineering Upper Division Honor Thesis I. (990475) (limited to 5 students)

R.5199H. Industrial Engineering Upper Division Honor Thesis II. (790476) (limited to 5 students)

SECOND TERM

R.5050. Engineering Economic Analysis. (185346) (4 cr; limited to 30 students; prereq IT student or grad, 3000 or #; 1400-1640 MWF; EE/CSci 2260)
Fundamental principles and techniques of economic analysis of engineering projects including economic measures of effectiveness, time value of money, cost estimation, depreciation, taxes, breakeven, replacement and investment analysis.

R.5550. Design and Analysis of Experiments I. (391534) (4 cr; prereq IT or grad student, ME 3900; 1100-1300 MWThF; MechE 102) Dooley
Theory of variation, scientific method, independent and paired t-tests, analysis of variance, diagnostic checks, model building, gull and fractional designs, Taguchi designs, response surface methodology.

R.8410. Industrial Engineering Research. (286164) (3-5 cr; limited to 10 students; hrs ar; prereq #)

R.8411. Industrial Engineering Research. (186165) (3-5 cr; limited to 10 students; hrs ar; prereq 8410)

R.8412. Industrial Engineering Research. (986166) (3-5 cr; limited to 10 students; hrs ar; prereq 8411)

8777. Thesis Credits: Masters. (388875) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188876) (1-36 cr [max 11 cr per summer term])

Industrial Relations (IR)

537 Management/Economics Building. 624-2500
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on page 12.

FIRST TERM

R.8003. Staffing, Training, and Development. (488978) (4 cr; limited to 15 students; prereq 8002 or # and IR grad student or Δ; 1730-2100 MW; HHH 15; IR grad maj must reg A-F)
Introduction to staffing processes (recruitment, selection, promotion, demotion, transfer, dismissal, layoff, retirement) and training development theory and techniques as mechanisms for influencing individual and organizational outcomes, such as performance, satisfaction, and climate.

R.8005. Compensation and Reward Theory and Programs. (390805) (4 cr; limited to 15 students; prereq 8002 or # and IR grad student or Δ; 1730-2100 TTh; HHH 15; IR grad maj must reg A-F)
Introduction to compensation and reward programs in employing organizations. Concepts, models, and theories of organizational and employee behavior in the design and implementation of pay programs. Job evaluation, salary surveys, pay structures, salary increase programs, variable compensation, benefit programs, executive compensation, skill-based pay, and laws and regulations.

R.8013. Staffing and Selection: Strategic and Operational Concerns. (691779) (4 cr; prereq 8003 or #; IR grad major or Δ; 1730-2100 TTh; BlegH 260; IR major must register A-F)
Examines theory and practice related to staffing decisions (recruitment, selection, promotion, demotion, transfer, dismissal, layoff, retirement) in organizations. Considers the legal environment in which staffing decisions are made. Examines staffing from both strategic and operational perspectives.

8777. Thesis Credits: Masters. (589569) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688655) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.3002. Personnel and Industrial Relations. (086143) (4 cr; limited to 45 students; prereq 90 cr completed or in progress, Econ 1101, 1102, Psy 1001; 0800-0945 MTWTh; BlegH 120; A-F only)

An introduction to the human resource management function in organizations. The labor market, recruitment, selection, training, compensation, and labor relations. The changing nature of the world of work, emerging legal issues, discrimination in pay and employment, comparable worth, work performance and its assessment, and the effects of technological change on jobs and employment. Lecture presentations, discussion, case studies, and simulation exercises.

R.8004. Design and Management of Organizations for a Changing World. (090807) (4 cr; limited to 15 students; prereq 8002 or # and IR grad student or Δ; 1730-2100 MW; HHH 15; IR grad major must register A-F)
Introduction to micro through macro organizational issues at the individual, dyadic, group, organizational, and environmental levels, and their implications for organizational design, control, coordination, and development.

R.8006. Introduction to Labor Market Analysis. (891781) (4 cr; limited to 15 students; prereq 8002 or # and IR grad student or Δ; 1730-2100 TTh; HHH 15; IR grad maj must reg A-F)
Labor supply and demand analysis, and its international dimensions; determination of wages, employment and unemployment; accumulation of human capital and investment in education and training; government regulation in the areas of discrimination and workplace safety; role of unions in wage determination.

R.8023. Employee Training: Creating a Learning Organization. (888976) (4 cr; limited to 15 students; prereq 8003 or # and IR grad student or Δ; 1730-

2100 MW; HHHctr 60; IR grad major must register A-F)
Theory, research, and practice related to the design and implementation of employee training programs. Includes instructional design, training techniques, transfer of training, and program evaluation and costing. Covers the role of employees, unions, and firm policies and practices in the training process.

8777. Thesis Credits: Masters. (888878) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688879) (1-36 cr [max 11 cr per summer term])

Information and Decision Sciences (IDSc)

395 Humphrey Center. 624-8030
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on pages 12.

FIRST TERM

8990. Readings in Information and Decision Sciences. (588986) (Cr ar; prereq PhD student and #; A-F only)

8995. Graduate Research in Information and Decision Sciences. (388987) (Cr. ar; prereq PhD student and #; A-F only)

FIRST AND SECOND TERMS: 10-WEEK COURSES (Register once in Term I)

R.1010. Fundamentals of Information Development and Use. (4 cr; SMSci 1010; prereq 30 cr; Math 1111 or ¶ Math1111; limited to 45 students; Lect 0900-1015 MW; BlegH 130; Rec 1, (691801) 0800-0900 Th; BlegH 330; A-F only)
Understanding of the organization as an information generator and the manager as an information processor. Topics include: meeting the information needs of managers; sources of data and data gathering methods for population and process studies; descriptive data analysis; graphical presentation of data; multivariate data organization; probability; discrete and continuous probability distributions; analysis of process data including time series methods and statistical process control.

R.8101. MIS: The Management of Information Technology in Organizations. (988984) (4 cr; limited to 15 students; prereq MBA 8025 or #; 1730-2100 Th; HHHctr 20; A-F only)
The role of information in organizations. Strategic uses of information

technology. Planning and evaluation of information systems. The politics of information and information systems. Roles and perspectives of top management, functional management, and MIS management.

SECOND TERM

8990. Readings in Information and Decision Sciences. (688980) (Cr ar; prereq PhD student and #; A-F only)

8995. Graduate Research in Information and Decision Sciences. (488981) (Cr ar; prereq PhD student and #; A-F only)

Interdepartmental Study (ID)

220 Johnston Hall. 624-7577
College of Liberal Arts

FIRST TERM

3970. Directed Studies. (785567) (1-15 cr; prereq consult with Office for Special Learning Opportunities, JohH 220, p)
Individual projects, readings, and research in areas that cross departmental lines.

FIRST AND SECOND TERM: 10-WEEK COURSE:

3211. Internship: Perspectives on Work. (592102) (6 cr; prereq Δ; application required by May 15; contact OSLO adviser in 220 Johnston Hall, 624-7577, for information on available internships)
Combines practical experience in an internship in business, government, or non-profit sector with reflection upon work. Topics include organizational structure and culture, decision-making, work as a cultural phenomenon, history of the concepts of work and career, relationship of work to the broader demands of citizenship.

SECOND TERM

3970. Directed Studies. (885124) (1-15 cr; prereq consult with Office for Special Learning Opportunities, JohH 220, p)
See First Term.

Interdisciplinary Medicine (InMd)

Box 33 UMHC. 625-3622
Medical School

Contact college office for information regarding summer courses.

Interdisciplinary Archeological Studies (InAr)

215 Ford Hall. 625-3400
College of Liberal Arts

FIRST TERM

5100. Summer Institute for Teachers: Archaeology in the Classroom: A Workshop for Teachers—June 20-23. (592066) (1 cr;)
See Summer Institute for Teachers, page 41.

8777. Thesis Credits: Masters. (392067) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (192068) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (092069) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (392070) (1-36 cr [max 11 cr per summer term])

International Relations (IntR)

214 Social Sciences. 624-9007
College of Liberal Arts

FIRST TERM

R.3900. Topics in International Relations: Environment, Ideology, Science and Politics. (491802) (4 cr; limited to 40 students; prereq. 12 cr in social sciences; 0915-1130 TTh; HHHctr 20) Chateau, Jerome

3960. Field Studies/Internship in International Relations. (886824) (1-8 cr [8 cr max for international relations majors]; prereq Δ) Staff
Internship with government/community/international organization or field study in international relations. Activities must have an international focus.

3970. Directed Studies. (385152) (1-15 cr; prereq #, Δ, college approval) Staff
Guided individual reading or study.

R.3981. Major Project Seminar. (890095) (4 cr; limited to 15 students; prereq non-honors, IntR major, sr, or #; 0915-1130 MW; HHHctr 20; A-F only) Brauer

3990H. Honors Course: Supervised Research Paper. (085347) (1-5 cr; †3990H; prereq sr honors candidate in international relations, Δ)

5900. Summer Institute for Teachers: Questions of Justice: Human Rights for Children—June 27-July 1. (692088) (4 cr)
See Summer Institute for Teachers, page 41.

SECOND TERM

R.3900. Topics in International Relations: Europe After the Cold War: Building a New System. (291803) (4 cr; limited to 40 students; prereq 12 cr in social sciences; 0915-1130 MW; BlegH 150) Erb, Scott

3960. Field Studies/Internship in International Relations. (885348) (1-8 cr [8 cr max for international relations majors]; prereq Δ) Staff
See First Term.

3970. Directed Studies. (685349) (1-15 cr; prereq #, Δ, college approval) Staff
See First Term.

3990H. Honors Course: Supervised Research Paper. (085350) (1-5 cr; prereq sr honors candidate in international relations, Δ)

Italian (Ital)

260 Folwell Hall. 624-4308
(French and Italian)
College of Liberal Arts

FIRST TERM

R.1104. Intermediate Italian. (489273) (5 cr; limited to 20 students; prereq 1103; 1030-1245 MTWThF; FordH 60)
Consolidation of basic structures and development of oral fluency through readings and discussions.

3970. Directed Readings. (185010) (1-5 cr; prereq undergrad, #, Δ, college approval) Staff
Guided individual reading or study.

8777. Thesis Credits: Masters. (288657) (1-16 cr [max 11 cr per summer term])

8970. Directed Readings. (691250) (1-5 cr)

FIRST AND SECOND TERMS: TEN-WEEK COURSE (Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll for all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses. To register you must obtain override forms in 260 Folwell Hall.

R.1101-1102-1103. Beginning Italian. (15 cr for both terms; each section



COURSE DESCRIPTIONS

limited to 20 students; 0915-1245 MTWThF; sec 5, KolH 5136)
A course with speaking objectives based on an audio/lingual approach. Students learn to understand and express fundamental structures of the language. Includes audiovisual aids.
R.1101, Sec 5, (585554) June 14-July 7, 5 cr
R.1102, Sec 5, (385555) July 8-August 2, 5 cr
R.1103, Sec 5, (185556) August 3-24, 5 cr

SECOND TERM

R.1105. Intermediate Italian. (689272) (5 cr; limited to 20 students; prereq 1104; 1030-1245 MTWThF; FolH 138)
Literary and cultural readings, leading to introductory knowledge of Italian literature and civilization.

3970. Directed Readings. (991609) (1-5 cr; prereq undergrad, #, Δ, college approval) Staff
Guided individual reading or study.

8777. Thesis Credits: Masters. (888881) (1-16 cr [max 11 cr per summer term])

8970. Directed Readings. (691281) (1-5 cr)

Japanese (Jpn)
East Asian Languages and Literatures
College of Liberal Arts

FIRST TERM

3970. Directed Studies. (185136) (1-15 cr; prereq #, Δ, college approval) Staff

5970. Directed Studies in Japanese. (585215) (1-15 cr; prereq #, Δ, CLA approval) Staff

8777. Thesis Credits: Masters. (788663) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388665) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll for all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for these courses.

R.1011-1012-1013. Beginning Japanese. (15 credits for both terms; limited to 20 students per recitation section; daily lecture, recitation and labs with English and Japanese speaking instructors; 0800-1220 MTWThF; Arch 15)
R.1011, Sec 5, (689000) June 14-July 7, 5 cr, Staff
R.1012, Sec 5, (289002) July 8-August 1, 5 cr, Staff
R.1013, Sec 5, (989004) August 2-24, 5 cr, Staff

R.3021-3022-3023. Intermediate Japanese. (15 credits for both terms; limited to 20 students per recitation section; daily lecture, recitation and labs with English and Japanese speaking instructor; 0800-1220 MTWThF; AmundH 116)
R.3021, Sec 5 (590589) June 14-July 7, 5 cr, Staff
R.3022, Sec 5 (990590) July 8-August 1, 5 cr, Staff
R.3023, Sec 5 (790591) August 2-24, 5 cr, Staff

SECOND TERM

3970. Directed Studies. (085154) (1-15 cr; prereq #, Δ, college approval) Staff

5970. Directed Studies in Japanese. (885236) (1-15 cr; prereq #, Δ, CLA approval) Staff

8777. Thesis Credits: Masters. (788887) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088894) (1-36 cr [max 11 cr per summer term])

Jewish Studies (JwSt)

330 Folwell Hall. 625-5353
College of Liberal Arts
(Classical and Near Eastern Studies)
(See also Ancient Near Eastern; Hebrew; Religious Studies)

FIRST TERM

1034. Introduction to Judaism. (191566) (4 cr, \$3034, \$ReIS 1034, \$ReIS 3034; 0900-1130 MW; FolH 208) Zahavy
Concepts, movements, and institutions in the development of classical Judaism, as manifested in the literature and festivals of the Jewish people from Second Commonwealth times to the present. Meets with 3034 and ReIS 1034 and 3034.

3034. Introduction to Judaism. (091567) (4 cr, \$1034, \$ReIS 1034, \$ReIS 3034; 0900-1130 MW; FolH 208) Zahavy
Additional written assignments and reading. See 1034. Meets with 1034 and ReIS 1034 and 3034.

R.3521. Holocaust. (691569) (4 cr; limited to 15 students; 1820-2050 TTh; FolH 208) Feinstein

5970. Directed Readings. (891568) (1-12 cr [max 12 cr]; prereq #, Δ, CLA approval)
Guided individual reading or study.

Journalism and Mass Communication (Jour)

111 Murphy Hall. 625-9824
College of Liberal Arts

Preregistration is required for courses marked with a delta(Δ): Jour 3101 and 5990. Students must meet all prerequisites. Further info about preregistration is available from the Undergraduate Studies Center, 15 Murphy Hall, 612/625-0120. For 5XXX-level courses, inquire about graduate credit at the time of registration, or by calling 612/625-4054.

FIRST TERM

R.3101. Reporting. (291512) (4 cr; limited to 16 students; prereq jour maj status, 3004, pass 40 wpm keyboarding test with 6 or fewer errors, Δ; 0915-1215 MTWTh; MurH 212; A-F only).
Fact gathering and journalistic writing. Problems in judgment and handling of news and news features.

R.3614. History of Mass Communication Technology. (191513) (4 cr; limited to 72 students; jour majors must have course approved on program plan; pre-jour majors should not enroll; 1030-1130 MTWThF; MurH 308; A-F only) Fang
How people have used the tools of communication, from earliest times to the present. The impact of new technologies on society. The road to the information superhighway.

3970. Projects in Journalism. (785133) (1-4 cr per term [max 8 cr]; prereq jour major or minor status, 3004, #, Δ; college approval A-F only) Staff
Independent study; projects.

3980. Directed Instruction. (690096) (1-2 cr [2 cr max]; prereq jour major status, adviser approval; one professional course for prof. majors; one adviser approved course for mass comm majors; Δ; S-N only) Staff
Internship at the graduate or undergraduate level supervised by the student's academic sponsor and by the communications medium at which the student is working.

R.5611. Development of American Broadcasting. (190460) (4 cr; limited to 72 students; jour majors must have course approved on program plan; pre-jour majors should not enroll in

course; 0915-1015 MTWThF; MurH 308; A-F only) Fang
Historical and economic development of radio and television in the United States; government regulation, industry self-regulation, forms of social control; issues in contemporary broadcasting; the journalist as broadcaster.

R.5721. Mass Media and U. S. Society. (991514) (4 cr; limited to 32 students; prereq 16 crs in social science depts; jour majors must have course approved on program plan; pre-jour majors should not enroll in course; 1030-1300 TTh; MurH 311; A-F only) Ward
Economic, political, and social determinants of character and content of mass communications in America. Impact, structure, functioning of mass media. Problems, prospects, and criticism. Professionalism, technology, reform.

5970. Advanced Projects in Journalism. (585568) (1-4 cr per term [max 8 cr]; prereq jour major or minor status, 3004, B avg, #, Δcollege approval A-F only) Staff
Independent study; projects.

5970H. Honors Course: Advanced Projects in Journalism. (189163) (1-4 cr per term [max 8 cr]; prereq jour major or minor status, 3004, B avg, regis honors div, #, Δcollege approval A-F only) Staff
Independent study; project

R.5990 Special Topics. (4 cr; each section limited to 16 students; jour majors must have course approved on program plan; pre-jour majors should not enroll in course; 0900-1200 MWF; MurH 20/212/315; A-F only) Johnson, Schwartz
Sec 1, Covering Urban Life: Reporting. (791515) (prereq Jour 3101 or Jour 8990 or equivalent or #, Δ) Johnson

Departing from crisis-orientated conceptions of news, this course helps students construct news features dealing with the everyday lives of city residents. In their stories, students explore conditions leading to social problems before they occur. Final projects will be publishable.

Sec 2, Covering Urban Life: Photojournalism. (591516) (prereq Jour 3301 or equivalent, #, Δ) Schwartz

Departing from crisis-orientated conceptions of news, this course helps students construct news features dealing with the everyday lives of city residents. In their photo-stories, students explore conditions leading to social problems—before they occur. Final projects will be publishable.

8777. Thesis Credits: Masters. (288660) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188661) (1-36 cr [max 11 cr per summer term])

8970. Advanced Projects in Mass Communication. (385569) (1-4 cr [max 8 cr]; prereq grad major or minor in mass comm, #, Δ; A-F only) Staff
Individual research.

SECOND TERM

R.1001. Introduction to Mass Communication. (391517) (4 cr; limited to 180 students; 0915-1015 MTWThF; MurH 105; A-F only)
Nature, functions, and responsibilities of communication media and agencies from professional point of view. News, opinion, entertainment, and persuasion functions; current trends. Specialized communication; aspects of advertising.

R.3008. Mass Communication Processes and Structure. (191518) (4 cr; limited to 72 students; jour majors must have course approved on program plan; pre-jour majors should not enroll in course; 0915-1015 MTWThF; MurH 308; A-F only)
Analysis of a variety of communication theories and major structural aspects of mass communication systems as they affect mass communication processes.

R.3101. Reporting. (789280) (4 cr; limited to 16 students; prereq jour maj status, 3004; pass 40 wpm keyboarding test with 6 or fewer errors; Δ; 0915-1215 MTWTh; MurH 212; A-F only)
Fact gathering and journalistic writing. Problems in judgment and handling of news and news features.

R.3201. Principles of Advertising. (990461) (4 cr; limited to 180 students; jour majors must have course approved on program plan; pre-jour majors should not enroll in course; 1030-1130 MTWThF; MurH 105; A-F only)
Theory, principles, and functions of advertising; its roles in economic, social, and marketing structure. Newspapers, magazines, radio, and television as advertising media.

R.3741. Racial Minorities and the Mass Media. (091519) (4 cr; limited to 72 students; jour majors must have course approved on program plan; pre-jour majors should not enroll in course; 1030-1215 MTTh; MurH 308; A-F only) Doyle
An examination of racial minority groups in the United States as producers, subjects and consumers of mass media. Special attention is given to 20th Century developments, including the media reform movement that started with the campaign against "Birth of a Nation," 1915.

3970. Projects in Journalism. (585134) (1-4 cr per term [max 8 cr]; prereq jour major or minor status 3004, #, Δ college approval A-F only) Staff
See First Term.

3980. Directed Instruction. (890114) (1-2 cr [2 cr max]; prereq jour major status, adviser approval; one professional course for prof. majors; one adviser approved course for mass comm majors; Δ; S-N only) Staff
See First Term.

5970. Advanced Projects in Journalism. (386561) (1-4 cr per term [max 8 cr]; prereq jour major or minor status, 3004, B avg, #, Δ, college approval; A-F only) Staff
See First Term.

5970H. Honors Course: Advanced Projects in Journalism. (288495) (1-4 cr per term [max 8 cr]; prereq jour major or minor status, 3004, B avg, regis honors div, #, Δ, college approval; A-F only) Staff
See First Term.

8777. Thesis Credits: Masters. (488883) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288884) (1-36 cr [max 11 cr per summer term])

8970. Advanced Projects in Mass Communication. (186562) (1-4 cr [max 8 cr]; prereq grad major or minor in mass comm, #, Δ; A-F only) Staff
See First Term.

K

Kinesiology (Kin)

224 Cooke Hall, 625-1007
(School of Kinesiology and Leisure Studies)
College of Education

Courses are offered at the undergraduate and graduate levels for progress in Kinesiology and for Physical Education Licensure (PEL). Courses which apply to State of Minnesota licensure in physical education teaching, adapted physical education, and/or athletic coaching are designated as Physical Education Licensure.

Courses applicable toward requirements in various programs that are offered this summer include the following:

1. Kinesiology-3110, 3111, 3115, 3625, 5141, 5371, 5460, 5720, 5860, 5980, 5981, 5983, 8777, 8888, 8981.
2. Adapted Physical Education Licensure-5120, 5720.
3. State of Minnesota Coaching Licensure-3110, 3111, 3115, 3143, 5740.
4. Post Baccalaureate Teaching Licensure-5521, 5522, 5720. Elementary School Majors-Kin 3327 is offered to accommodate elementary education majors and classroom teachers.

FIRST TERM

3001. Lifetime Fitness and Health—June 14-July 6. (592021) (4 cr; 1300-1500 MTWThF; NichH 109; A-F only) Halvorson
An overview of personal health, nutrition, weight control, stress management, and regular fitness habits that provide a base of action and knowledge for surviving the rigors of school and for living a longer and healthier life.

3110. Human Anatomy. (289419) (3 cr; 0800-0900 MTWThF; CookeH 214; A-F only; Physical Education Licensure) Serfass
Emphasizes bones, nerves, and muscles and their significance in physical education.

3132. Motor Development—June 14-27. (491573) (3 cr; 1300-1530; CookeH 400; A-F only) Burton
Physical growth and development at all ages of childhood and adolescence; relationship of physical growth and psychomotor skill acquisition to cognitive and affective factors.

R.3327. Teaching Physical Education in the Elementary School. (689420) (3 cr; prereq elem education major; limited to 35 students; 0800-0900 MTWThF; NorrisH 3, M 151; A-F only; Physical Education Licensure) Lindow
Overview of the elementary school physical education program; primarily a laboratory course, with participation in representative physical education activities for children; opportunities for observation of children, microteaching, skill analysis, and group discussion.

3900. Directed Study. (1-12 cr [max 12 cr]; prereq Δ; A-F only)
Self-directed study preceded by classroom study and possession of basic competence.
Sec 21, (990797) Serfass
Sec 23, (590799) Burton
Sec 24, (290800) Wiese-Bjornstal
Sec 25, (790803) Wade

5100. Teaching Physical Education for the Handicapped—June 28-July 12. (291574) (3 cr; prereq #; 1300-1530 MTWThF; CookeH 400; A-F only; Physical Education Licensure) Burton.
Introduction to the role of physical education in the education of the handicapped individual, emphasizing understanding, principles of organization, administration, curriculum, supervision, and evaluation.

5111. Sport Facilities—June 14-28. (991576) (3 cr; 0800-1015 MTWThF; CookeH 215; A-F only) Anderson
Planning of areas and facilities for physical education and athletics, with emphasis on current trends and problems in the field.

5136. Psychology of Coaching—June 28-July 12. (191575) (3 cr; 0915-1145 MTWThF; CookeH 400; A-F only; Physical Education Licensure) Wiese-Bjornstal
Physiological aspects of coaching at all age and skill levels, including leadership and communication skills, motivation, and mental skills training for performance enhancement.

R. 5151. Curriculum—June 14-July 1. (590804) (3 cr; limited to 30 students; 1300-1515 MTWThF; CookeH 214) Bayless
For students without previous experience in curriculum; objectives, content, organization, evaluation, and trends.

R. 5375. Competitive Sport for Children and Youth—June 28-July 12. (190801) (3 cr; limited to 30 students; 1300-1500 MTWThF; CookeH 215) Wiese-Bjornstal
Cognitive, behavioral, and biological factors having important implications for competitive sport participants from early childhood through high school.

5521. Pedagogy I: Elementary Physical Education I. (489595) (6 cr; prereq stu in Post BA teacher preparation prog; 0915-1115 MTWThF; NorrisH 3, M151; A-F only; Physical Education Licensure) Lindow
The planning, structuring, communicating, class management, and evaluating role of the contemporary K-middle school physical educator in diverse settings.

5860. Legal Aspects of Sport and Physical Activity. (189941) (4 cr; SRec 5860 prereq Kin 3143 or Rec 3550 or Rec 5460; 0915-1115 MWF; CookeH 206) Schultz
A survey of a variety of legal considerations in sport and physical activity programs in schools, colleges, and the private sector. Contracts, legal liability, and civil rights involving sports participants, coaches, and administrators. Meets with Rec 5860.

5981. Problems. (Cr and hrs ar; prereq MEd candidate, #; A-F only)
Focus on teaching of physical education.
Sec 21, (189423) Serfass
Sec 23, (989424) Burton
Sec 24, (289937) Wiese-Bjornstal
Sec 25, (789425) Wade
Sec 26, (091570) Leon

5983. Readings: Kinesiology. (Cr ar [max 9 cr]; prereq education or graduate student; A-F only)
Sec 21, (589426) Serfass
Sec 23, (389427) Burton
Sec 24, (189938) Wiese-Bjornstal
Sec 25, (189428) Wade
Sec 26, (891571) Leon

8777. Thesis Credits: Masters. (589488) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (389489) (1-36 cr [max 11 cr per summer term])

COURSE DESCRIPTIONS

8981. Research Problems. (Cr and hrs ar; prereq 8980 or #; S-N only) Individual problems.
 Sec 21, (089429) Serfass
 Sec 23, (389430) Burton
 Sec 24, (989939) Wiese-Bjornstal
 Sec 25, (189431) Wade
 Sec 26, (691572) Leon

SECOND TERM

3111. Mechanics of Movement—July 21-August 17. (089432) (3 cr; prereq CBN 1027, 0800-0915 MTWThF; NorrisH 3; A-F only; Physical Education Licensure) Kernozek Structure of the body; principles and mechanics of bodily movements.

R.3115. Physiological Application to Sports—July 21-August 17. (889433) (3 cr, limited to 40 students; prereq Phl 3051 or #; 0930-1045 MTWThF; CookeH 214; A-F only; Physical Education Licensure) Halvorson, Northius Muscular contraction for strength development programs; contributions of training programs to endurance, speed, and skill acquisition; influence of training on the cardiovascular system, fatigue, and recovery; early season training, pre-game meals, and ergogenic aids in athletics.

3143. Organization and Management of Sport—July 21-August 11. (689434) (3 cr; prereq 2 cr coaching course; 0915-1045 MTWThF; CookeH 215; A-F only; Physical Education Licensure) Pickert Principles, policies, and procedures involved in the coaching of interscholastic sports.

3625. Supervised Practical Experience. (790817) (1-12 cr [max 12 cr]; prereq Δ; S-N only) Stoner. On-the-job experience under a specialist in the practical area of study.

3900. Directed Study. (1-12 cr [max 12 cr]; prereq p, A-F only). Self-directed study preceded by classroom study and possession of basic competence.
 Sec 21, (490813) Serfass
 Sec 22, (590818) Hancock
 Sec 23, (390819) Kane
 Sec 24, (790820) Krotee
 Sec 25, (590821) Stoner
 Sec 26, (390822) Wade

R.5141. Nutrition for Exercise and Physical Performance—July 21-August 3. (489435) (3 cr; SHEEd 5412; limited to 30 students; prereq 3115 or FScn 1612 or equiv; 1300-1530 MTWThF; CookeH 214) Serfass Application of basic nutritional principles to active populations, current issues related to dietary modifications for the possible improvement of physical performance, and strategies for educating clientele about nutrition and physical performance.

R.5460. Foundations of Sport Management—July 21-August 5. (289436) (3 cr; SREC 5460; limited to 30 students; prereq Recreation or Kin/PE major or #; 0915-1130 MTWThF; CookeH 206; A-F only) Kane Introduction to the fundamental principles of sport management and fitness. Meets with Rec 5460.

5522. Pedagogy II: Secondary Physical Education—July 21-August 19. (289596) (6 cr; prereq stu in post BA prog; 0915-1130 MTWThF; CookeH 325, Fieldhouse; A-F only; Physical Education Licensure) Spletzer The planning, structure, communicating, class management, and evaluating role of the contemporary middle school -12th grade physical educator in diverse settings.

R.5540. Technology in Sport and Physical Education—July 21-August 5. (791580) (3 cr; Kinesiology student; limited to 20 students; 1300-1600 MTWThF; CookeH 215; A-F only) Stoner Explore computer and video technology applications in sport and physical education including materials development and evaluation of equipment, software, and new applications.

R.5720. Topics in Kinesiology. (1-12 cr [max 12 cr]; each section limited to 30 students; prereq #; A-F only)
Sec 1, Integrating Sport Science into the Curriculum: Math/Science—July 21-August 4. (189437) (3 cr; 1300-1515 MTWThF; NorrisH 3) Hancock Concepts in sport and exercise science to develop curriculum credentials which can be used in cross disciplinary fashion by physical education, math and science teachers. Focus on the development of in-class projects and the application of technology.

Sec 2, Organization and Management of Physical Education and Sport—July 21-August 5. (589944) (4 cr; 0800-1000 MTWThF, CookeH 400) Krotee This course is designated for physical education teachers, coaches and community sports administrators and will focus on the theories and practice of physical education and sport management within the interscholastic, intercollegiate and community sport domains. The planning process, decision making, cooperative management of shared systems and structures, organizational motivation and TQM will be viewed in depth.

R. 5740. Workshop: Coaching of Individual, Dual, or Team Sports: Soccer—July 21-August 3. (190823) (1-12 cr [max 12 cr]; limited to 30 students; 1015-1245 MTWThF; CookeH 400; A-F only; Physical Education Licensure) Krotee This offering for 3 credits.

5980. Research Methodology—July 21-August 17. (989438) (3 cr; prereq education or grad student; 1300-1415 MTWThF; CookeH 206; A-F only) Kane

Methods and design for research in health, physical education, and recreation.

5981. Problems. (Cr and hrs ar; prereq MEd candidate, #; A-F only) See First Term.
 Sec 21, (890937) Serfass
 Sec 22, (789439) Hancock
 Sec 23, (189440) Kane
 Sec 24, (989441) Krotee
 Sec 25, (090824) Stoner
 Sec 26, (690826) Wade
 Sec 27, (791577) Leon

5983. Readings: Kinesiology. (Cr ar [max 9 cr]; prereq education or graduate student; A-F only) See First Term.
 Sec 21, (690938) Serfass
 Sec 22, (789442) Hancock
 Sec 23, (589443) Kane
 Sec 24, (389444) Krotee
 Sec 25, (890825) Stoner
 Sec 26, (490827) Wade
 Sec 27, (591578) Leon

8777. Thesis Credits: Masters. (789490) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (589491) (1-36 cr [max 11 cr per summer term])

8981. Research Problems. (Cr and hrs ar; prereq 8980 or #; S-N only) See First Term.
 Sec 21, (490939) Serfass
 Sec 22, (189445) Hancock
 Sec 23, (089446) Kane
 Sec 24, (889447) Krotee
 Sec 25, (290828) Stoner
 Sec 26, (190829) Wade
 Sec 27, (391579) Leon

Laboratory Medicine and Pathology (LaMP)
 3-155 Jackson Hall. 625-1488
 (Laboratory Medicine and Pathology) Medical School

Courses for Medical and Undergraduate Students

SPECIAL TERMS: THREE- OR SIX-WEEK COURSES

5125. Chronobiology. (486440) (Cr ar; prereq 3rd or 4th yr medical student, #) Halberg

5141. Problems in Experimental Pathology. (286441) (Cr ar; prereq 3rd or 4th yr medical student, #) Staff

5152. Anatomic Pathology in a Hospital Setting. (786525) (Cr ar; prereq 3rd or 4th yr medical student) Posalaky

5158. Cardiac Pathology (United Hospital) (386446) (Cr ar; prereq 3rd or 4th yr medical student, #) Titus, Edwards

5192. Laboratory Medicine for Primary Care (Virginia). (886449) (Cr ar; prereq 4th yr medical student, #) Knabe

5193. Clinical Pathology Externship (Hibbing Hospital). (186450) (Cr ar; prereq #) Eilers

5194. Computer Applications in Medicine. (887844) (Cr ar; prereq #) Ellis

5195. Computer Applications in Medical Research. (687845) (Cr ar; prereq #) Ellis

5203. Clinical Blood Bank Immunology (Minneapolis War Memorial Blood Bank). (086451) (Cr ar; prereq #) Polesky

5210. Surgical Pathology for Post-MDs (288108) (1-10 cr; prereq regis med fellow spec, #; S-N only)

5211. Autopsies for Post-MDs. (188109) (1-10 cr; prereq regis med fellow spec, #; S-N only)

5212. Advanced Neuropathology for Post-MDs. (488110) (1-5 cr; prereq regis med fellow spec, #) Sung

5213. Laboratory Medicine for Post MDs. (288111) (1-10 cr; prereq regis med fellow spec, #; S-N only)

SPECIAL TERMS: SIX-WEEK COURSES

5113. Surgical Pathology: University Hospitals. (486437) (ar cr; prereq 3rd or 4th yr medical student) Snaver

5114. Surgical Pathology (Hennepin County Medical Center). (286438) (ar cr; prereq 3rd or 4th yr medical student) Anderson

5115. Surgical Pathology (Veterans Administration Hospital). (186439) (ar cr; prereq 3rd or 4th yr medical student) Ewing

5119. Forensic Pathology-Medical Examiners Office, Hennepin County Medical Center. (088488) (ar cr; prereq 3rd or 4th yr medical student) Peterson

The function of a medical examiner's office in determining the cause and manner of types of death.

5150. Anatomic Pathology in a Hospital Setting (University Hospitals). (186442) (ar cr; prereq 3rd or 4th year medical student) Burke

5151. Anatomic Pathology in a Hospital Setting (Hennepin County Medical Center). (986443) (ar cr; prereq 3rd or 4th yr medical student) Anderson, Strom

5153. Anatomic Pathology in a Hospital Setting (St. Paul-Ramsey Medical Center). (586445) (ar cr; prereq 3rd or 4th yr medical student) Posalaky

5181. Laboratory and Clinical Hematology. (186447) (9 cr; prereq #) Brunning

5184. Immunohematology in Blood Banking. (086448) (ar cr; prereq #) McCullough

5186. Laboratory Medicine in a Community Hospital. (485045) (9 cr; prereq 4th yr medical student, #) Bandt

Landscape Architecture (LA)

125 Architecture. 625-6860
College of Architecture and Landscape Architecture

FIRST TERM

5140. Interdisciplinary Studies in Landscape Architecture. (885401) (2-6 cr [max 18 cr]; prereq #; A-F only) Staff

8500. Landscape Architecture Research Project. (489581) (1-6 cr; prereq 8283 or #; A-F only) Nassauer

8777. Thesis Credits: Masters. (088667) (1-16 cr [max 11 cr per summer term])

SECOND TERM

5140. Interdisciplinary Studies in Landscape Architecture. (286830) (2-6 cr [max 18 cr]; prereq #; A-F only) Staff

8500. Landscape Architecture Research Project. (389582) (1-6 cr; prereq 8283 or #; A-F only) Nassauer

8777. Thesis Credits: Masters. (888895) (1-16 cr [max 11 cr per summer term])

Latin American Studies (LAS)

232a Social Science. 626-8181
(Area Studies Programs)
College of Liberal Arts

FIRST TERM

3401. Survey of Latin American History: Colonial Period to 1800. (751708) (4 cr; § Hist 3401; 0915-1100 MTW; BlegH 155) Schwartz
The pre-Hispanic and colonial period to 1800, with emphasis on social, cultural, and economic aspects. Meets with Hist 3401

SECOND TERM

3402. Survey of Latin American History: 1800-1929. (591709) (4 cr; §Hist 3403; 1145-1245 MTWThF; BlegH 250) Staff
Development of new nations from independence to the emergence of dependent economies. Meets with Hist 3402

Latin (Lat)

331 Folwell Hall. 625-5353
(Classical and Near Eastern Studies)
College of Liberal Arts

FIRST TERM

3001. Beginning Latin: Intensive. (685528) (10 cr, §1101-1102; 0915-1245 MTWThF; FolH 234) Sheets
Grammar, syntax, composition, and reading.

8777. Thesis Credits: Masters. (088670) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688672) (1-36 cr [max 11 cr per summer term])

SECOND TERM

3002. Latin Readings. (885351) (5 cr, §1103; continuation of 3001 for 3rd quarter of beg Latin; 1030-1130 MTWThF; FolH 142) Erickson
Reading of selected Latin authors, development of reading proficiency.

8777. Thesis Credits: Masters. (188899) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688901) (1-36 cr [max 11 cr per summer term])

Law School (Law)

285 Law. 625-1000

Law School Calendar

May 31— First day of summer session classes
July 30— Last day of summer session classes
July 30-August 2— Final Examination Period for summer session

Admission and Registration
Students must have completed one year at an approved law school and submit a letter of good standing from a dean of an approved law school. The tuition is \$276.00 credit*. Students not currently enrolled in the University of Minnesota Law School must submit a nonrefundable application fee. Last day to register without a late fee is May 27, 1994. Information is available in the college office, 290

Law Building, 229 19th Avenue South, University of Minnesota, Minneapolis, MN 55455 or call 612/625-5005
*Tuition is subject to change.

SPECIAL TERM: EIGHT WEEK COURSES, May 31-July 30

5051. Business Associations. (591970) (4 cr; Prereq p; 0930-1100 MTWTh, Law 40) Matheson

5109. Creditors' Remedies/Secured Transactions. (990119) (4 cr; prereq Δ; 0745-0915 MTWTh; Law 50, 65) Nickles

Attachment, garnishment execution, supplementary proceedings, creditors' bills, judicial sales, fraudulent conveyance, and exemptions, all matters of almost daily concern to practicing lawyers. Legal problems of personal property security in retail installment buying and in financing commercial business.

5600. Professional Responsibilities. (787609) (2 cr; prereq p; 0830-0915 MTWTh; Law 40, 55) Cound
Lawyer's responsibilities to clients, the profession, the administration of justice and society; content and role of formal standards of professional ethics.

5604. Family Law. (890940) (4 cr; 1115-1230 MTWTh; Law 50, 65) Younger

A study of the law governing de jure and de facto families including marriage, divorce, and relations of family members to one another and to the state. Tax component will also be taught.

5618. Trial Practice. (3 cr; prereq Δ) Sed 1, 9290120) 1730-2030 M, Law 1709, Simon
Sec 2, (591080) 1730-1930 TTh, Law 180, Hopfman

This course focuses on the development of trial skills. Each week students prepare for and perform trial skills exercises in class and also in small groups; their small-group performances are videotaped. Students review and critique their videotapes using critique forms and study guides that direct them toward specific areas of their performance that they should be trying to develop and improve. All students perform a complete part of a trial. Students will try three trials over the course of the semester. There is no final, day long trial.

Linguistics (Ling)

Institute of Linguistics and Asian and Slavic Languages and Literatures
142 Klaeber Court. 624-3331
College of Liberal Arts

FIRST TERM

3001. Introduction to Linguistics. (785570) (5 cr, §5001; 1300-1515 MWF, 1300-1400 TTh; FolH 234)

Survey of phonetics, phonology, morphology, syntax, semantics, and historical-comparative linguistics; language learning and the psychology of language; linguistic universals; language in society. Meets with 5001.

3970. Directed Studies. (486941) (1-5 cr; prereq linguistics major, #, Δ, college approval)
Guided individual reading or study.

5001. Introduction to Linguistics. (585571) (5 cr, §3001; prereq grad standing or #; 1300-1515 MWF, 1300-1400 TTh; FolH 234)
See 3001. Meets with 3001.

5731. A Contrastive Approach to Modern English. (188112) (4 cr; prereq 3001 or 5001 or #; does not fulfill degree requirements for majors in Ling or ESL; 1530-1745 MWF; FolH 138)

Linguistic structures of standard English and contrastive analysis of these structures with those of another language. Implications for learning English as a second language.

5970. Directed Studies. (988113) (1-5 cr; prereq Ling or ESL major, #, Δ, CLA approval)

8777. Thesis Credits: Masters. (288674) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188675) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5732. A Contrastive Approach to Modern English. (788114) (4 cr; prereq 5731; does not fulfill degree requirements for majors in Ling or ESL; 1300-1515 MWF; FolH 234)
See 5731, First Term.

5970. Directed Studies. (588115) (1-5 cr; prereq Ling or ESL major, #, Δ, CLA approval)

8777. Thesis Credits: Masters. (188904) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988905) (1-36 cr [max 11 cr per summer term])

COURSE DESCRIPTIONS

M

Management (Mgmt)

837 Management/Economics Building.
624-5232
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on pages 12.

FIRST TERM

R.3001. Fundamentals of Management. (585280) (4 cr, \$8001; limited to 45 students; 0915-1130 MW, BlegH 435; A-F only)
Concepts, theory, research, and operational problems. The principal functional areas of management. Factors and relationships necessary to achieve organizational objectives: establishment of goals, policies, procedures; the planning process; control systems; organizational structure and behavior; leadership.

8990. Readings in Management Theory and Administration. (385281) (Cr ar; prereq 2nd yr grad stu; requisite introductory courses; consent of adviser and #, Grad Sch Mgmt approval) Staff
Readings involve intensive research into a particular subject and normally require preparation of a major term paper.

8995. Graduate Research in Management Theory and Administration. (185282) (Cr ar; prereq 2nd yr. grad student, requisite intro. courses, advisor consent, #, Grad Sch Mgmt approval) Staff
Special research projects on a specific problem completed in cooperation with a business firm.

FIRST AND SECOND TERMS: TEN-WEEK COURSE (Register once in Term I)

R.8006. Psychology in Management. (289159) (4 cr; limited to 20 students; \$3002; prereq grad mgmt student or Grad Sch Mgmt approval; 1730-2100 T; BlegH 435)
Concepts, theories, and empirical research relevant to diagnosis, prediction, and control of human behavior in complex organizations. Models and techniques for analyzing group processes, leadership styles, and organizational structure, change, and environment. Students prepare papers based on their own research or on secondary analysis of existing literature.

SECOND TERM

R.3001. Fundamentals of Management. (686145) (4 cr, \$8001; limited to 45 students; 0915-1130 MW; BlegH 330; A-F only)
See First Term.

R.3004. Business Policy: Strategy Formulation and Implementation. (389900) (5 cr; limited to 35 students; prereq sr and completion of business core or equiv of final core course; 1030-1245 MTW; BlegH 435; A-F only)
Identifying and analyzing problems, establishing corporate or divisional goals, and designing realistic programs of action. Usually the viewpoint of the general line manager (department, division, or executive level) is taken. Case analysis and discussion, small group work, and occasional presentations made to the class.

8990. Readings in Management Theory and Administration. (486146) (Cr ar; prereq 2nd yr. grad student, requisite intro. courses, advisor consent, #, Grad Sch Mgmt approval) Staff
See First Term.

8995. Research in Management Theory and Administration. (286147) (Cr ar; prereq 2nd yr. grad student, requisite intro. courses, advisor consent, #, Grad Sch Mgmt approval) Staff
See First Term.

Marketing (Mktg)

1235 Management/Economics Building. 624-5055
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on pages 12.

FIRST TERM

R.3000. Principles of Marketing. (085283) (4 cr; limited to 35 students; prereq Econ 1101 or equiv; 0915-1115 MWF; BlegH 340; A-F only)
Basic policy and strategy issues in marketing and the environmental factors that affect these issues. Legal, behavioral, ethical, competitive, economic, and technological factors as they affect product, pricing, promotion, and marketing channel decisions.

R.3010. Buyer Behavior and Marketing Analysis. (889903) (4 cr; limited to 35 students; prereq 3000 and OMS 1020 or equiv; 1030-1130 MWF; BlegH 130)
Identifying and applying secondary and primary data to solve marketing problems. Emphasis on consumer and organizational buyer behavior. Topics include survey and experimental research techniques, market segmentation, data analysis, behavior concepts and processes, consumer and organizational decision-making models, and managerial applications of these models.

8990. Readings in Marketing. (885284) (Cr ar; prereq MBA core courses, or MBA 8045 and Δ...and consent of adviser, #, and Grad Sch Mgmt approval)
Readings useful to the student's program and objectives that are not available in regular course offerings.

8995. Graduate Research in Marketing. (685285) (Cr ar; prereq MBA core courses, or MBA 8045, Δ, consent of adviser, #, Grad Sch Mgmt approval)
Individual research on an approved topic that is appropriate to the student's program and objectives.

FIRST AND SECOND TERMS: TEN-WEEK COURSE (Register once in Term I)

R.8078. Marketing Communications. (288318) (4 cr; limited to 15 students; prereq either MBA core courses, or MBA 8045, grad Mgmt student or

Grad School Mgmt approval; 1730-2100 T; BlegH 425)
The communication function as a facet of marketing strategy; integrating advertising, public relations, sales promotion, and other elements into the communications mix; design and evaluation of marketing communications; selection of media; advertiser-agency relationships.

SECOND TERM

R.3020. Marketing Operations Management. (986149) (4 cr; limited to 35 students; prereq 3010; 0915-1115 MWF; BlegH 340)
Development of marketing plans, primarily for manufacturing organizations. Analytical methods for developing and appraising marketing programs, factors important in shaping marketing plans. Planning for selling, communication, distribution, pricing, product development, and marketing research activities.

8990. Readings in Marketing. (286150) (Cr ar; prereq MBA core courses, or MBA 8045, Δ consent of adviser, #, Grad Sch Mgmt approval)
See First Term.

8995. Graduate Research in Marketing. (986152) (Cr ar; prereq MBA core courses or MBA 8045, Δ consent of adviser, #, Grad Sch Mgmt approval)
See First Term.

Master of Business Administration (MBA)

295 Hubert H. Humphrey Center.
624-0006
Carlson School of Management

FIRST TERM

R.5100. Management Topics-June 14-July 19. (488401) (Cr ar; limited to 20 students; prereq #) Lyon, France

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

R.8005. Computer Access and Programming for Business Analysis. (485286) (1 cr; MBA students only; limited to 55 students; 1300-1500 M, BlegH 425; S-N only)
Computer access and use information necessary for MBA courses. Covers introduction to computer terminology and computing at Minnesota, plus programming in BASIC.

R.8015. Human Resources Management. (285287) (4 cr; MBA students only; limited to 55 students; 1000-1145 TTh; BlegH 425)
A systematic approach to major phases of human resource management in organizations including knowledge bases and theories; problems; constraints; opportunities; program controls, evaluations and



costs; and results of effective and efficient human resource management. Emphasis is that of the generalist, not that of specialist personnel or industrial relations professionals.

R.8020. Business Statistics: Data Sources, Presentation, and Analysis. (888394) (4 cr; MBA students only; limited to 30 students; 1730-2100 W; BlegH 425; A-F only)

A managerial view of the Statistical Problem Solving process and the most frequently encountered statistical methods; descriptive statistics for summarizing data; analysis of survey data; regression analysis; material covered using statistical software and computer-stored data sets.

R.8025. Decision Sciences and Information Systems. (185288) (4 cr; MBA students only; limited to 55 students; 1000-1145 MW; BlegH 425; A-F only)

Systems analysis, probability, and decision analysis applied to managerial problems under conditions of uncertainty. Formulation and interpretation of mathematical models. Role of information systems in decision making. Principles of implementation of decision science models and information system.

R.8030. Financial Accounting. (588325) (4 cr; MBA students only; limited to 15 students; 1730-2100 T; BlegH 140; A-F only)

Understanding, interpreting, and analyzing financial statements of business enterprises.

R.8035. Managerial Accounting. (388326) (4 cr; MBA students only; limited to 55 students; 0800-0945 MW; BlegH 425; A-F only)

Use of accounting data in management decisions; accounting systems to generate accounting data, including study of planning and control; transfer pricing, performance evaluation, cost behavior, cost allocation, and standard costs.

R.8040. Financial Management. (985289) (4 cr; MBA students only; limited to 55 students; 1300-1445 TTh; BlegH 425; A-F only)

Hess Analytical introduction to the theory and practice of finance. Applies the basic financial concepts of risk, return, and valuation to the decisions that a person in a small business or a corporate financial officer must make about the sources and uses of funds during times of changing financial markets.

R.8045. Marketing Management. (489046) (4 cr; MBA students only; limited to 20 students; 1730-2100 Th; BlegH 425; A-F only)

Managing the marketing function; marketing planning, strategy, and management concepts. Identification of marketing problems and opportunities; construction, evaluation, and management of a marketing plan.

R.8050. Operations Management. (285290) (4 cr; MBA students only or #; limited to 55 students; 1300-1600 W; BlegH 425; A-F only)

The operations function in different types of organizations and its relationship to business decision. Topics include: operations strategy, process management, JIT, scheduling, inventory control, and quality improvement.

Materials Science (Mats)

151 Amundson Hall. 625-1313 (Chemical Engineering and Materials Science) Institute of Technology

FIRST TERM

R.3400. Mechanical Properties of Materials. (386057) (4 cr; prereq 2nd-year IT student; limited to 150 students; 0800-0955 MWF; AmundH B75) Sivertsen

Structure and properties of metals, alloys, and polymers; heat treatment; alloy selection and metal processing.

5481, 5482, 5483. Special Problems in Physical Metallurgy and Materials Science. (186058) (086059) (386060) (Cr ar; prereq sr)

8480, 8481, 8482. Selected Topics in Materials Science and Engineering. (186061) (086062) (886063) (Cr ar)

8777. Thesis Credits: Masters. (588681) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188683) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5481, 5482, 5483. Special Problems in Physical Metallurgy and Materials Science. (786573) (586574) (386575) (Cr ar; prereq sr)

8480, 8481, 8482. Selected Topics in Materials Science and Engineering. (186576) (086577) (886578) (Cr ar)

8777. Thesis Credits: Masters. (388908) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188909) (1-36 cr [max 11 cr per summer term])

Mathematics (Math)

127 Vincent Hall. 625-7575 Institute of Technology (See also General College)

FIRST TERM

R.1005. Introduction to Elementary Mathematics (686078) (4 cr; limited to 30 students; prereq pre-elem educ stu, 1111 or equiv; May not be applied toward any CLA degree; 1145-1245 MTTh, 1030-1245 WF; VinH 209) Harper

For pre-elementary education students. Elementary computer programming (BASIC), progressions, financial mathematics, counting problems, and other selected topics.

R.1008. Trigonometry. (486079) (4 cr, \$1201; limited to 30 students; prereq plane geometry, 2 yrs high school algebra or 1111, grade of C or better in GC 0631; 0915-1015 MWF, 0915-1130 TTh; VinH 209)

Analytic trigonometry, identities, equations, and properties of trigonometry functions; right and oblique triangles.

R.1031. College Algebra and Probability. (4 cr; \$1051, \$1151, \$1111, \$1201; each section limited to 35 students; prereq 3 yrs high school math, placement exam or GC 0631 with C or better)

Algebra and analytic geometry explored in greater depth than is usually done in three years of high school mathematics. Additional topics from combinations, permutations, and probability. A suitable prerequisite for 1131 or 1142, but not for 1251. Sec 1, (591919) 0800-1015 MTWTh, 0915-1015 F, VinH 1
Sec 2, (991920) 1030-1245 MTWTh, 1030-1130 F, VinH 1

R.1051 Precalculus I. (791921) (4 cr; \$1031, \$1111, \$1201, \$1008, \$1151; limited to 35 students; prereq 3 years high school math, placement exam or GC 0631 with C or better; 0800-1015 MTWTh, 0915-1015 F, VinH 313)

Algebra, analytic geometry, and trigonometry beyond the usual coverage found in a three year high school mathematics program. First of two courses (see 1151). Prepares students for the full calculus sequence. Not an acceptable prerequisite for 1131.

R.1111. College Algebra And Analytic Geometry. (886080) (5 cr, \$1201; limited to 30 students; prereq plane geometry, 2 yrs high school algebra or plane geometry, grade of C or better in GC 0631; may be used to replace 1031; 0915-1130 MTWThF; KoltH \$139)

Functions and graphs, quadratic equations, progressions, inequalities, complex numbers, theory of equations, permutations and combinations, probability, systems of equations, determinants, graphing of linear and quadratic equations, conics in standard position, logarithms.

R.1131. Finite Mathematics. (486082) (5 cr; limited to 40 students; prereq 3 1/2 yrs high school math or grade of C or better in 1111 or 1181, pre-bus or soc and behav sci students; 1030-1245 MTWThF; VinH 6)

For students in pre-business administration and the social and behavioral sciences. Elementary computer programming, financial math, probability, linear algebra, linear programming, Markov chains.

R.1142. Short Calculus (5 cr, \$1211, \$1411H; each section limited to 30 students; prereq 3 1/2 yrs of high school math or grade of C or better in 1111 or 1181 or 1201)

For students requiring a minimal amount of calculus. Derivatives, integrals, differential equations, maxima and minima, partial differentiation, applications. Sec 1, (286083) 0800-1015 MTWThF, VinH 364
Sec 2, (186084) 1030-1245 MTWThF, VinH 364

R.1201. Precalculus. (986085) (5 cr, \$1008, \$1111; limited to 30 students; prereq 4 yrs high school math including trigonometry; may be used to replace 1151; 1030-1245 MTWThF; VinH 113)

For students who need a quick review of high school higher algebra and trigonometry before taking a calculus sequence. Inequalities, analytical geometry, complex numbers, binomial theorem, mathematical induction, functions and graphs, and trigonometric, exponential, and logarithmic functions.

R.1211. Calculus I. (786086) (5 cr, \$1142, \$1411H; limited to 40 students; prereq 4 yrs high school math including trigonometry . . . or grade of C or better in 1201 or 1008, 1111 or equiv may be used to replace 1251; 0915-1130 MTWThF; SciCB 125)

Analytic geometry and calculus of functions of one variable, applications.

R.1221. Calculus II. (586087) (5 cr, \$1421H; prereq grade of C or better in 1211; may be used to replace 1252; limited to 40 students; 1030-1245 MTWThF; VinH 2)
See 1211.



COURSE DESCRIPTIONS

R.1251. One-Variable Differential and Integral Calculus I. (4 cr; §1451H, 1211, 1411H; each section limited to 30 students; prereq 4 yrs high school math including trig, or C grade or better in 1201 or 1008, 1111, or equiv)
Calculus of functions of one-variable and related geometry and applications.
Sec 1, (690003) 0800-1015 MTWTh, 0915-1015 F, VinH 20
Sec 2, (091925) 1030-1245 MTWTh, 1030-1130 F, VinH 314

R.1252. One-Variable Differential and Integral Calculus II. (4 cr; §1452H, §1221, §1421H; each section limited to 35 students; prereq C grade or better in 1251)
See 1251.
Sec 1, (490004) 0800-1015 MTWTh, 0915-1015 F, VinH 16
Sec 2, (891926) 1030-1245 MTWTh, 1030-1130 F, VinH 313

R.1261. The Algebra and Geometry of Euclidean Space. (4 cr; §1241, §1553H, §3142, 3551H; each section limited to 30 students; prereq 1251 or 1211)
Vectors and their operations, matrices and matrix algebra, linear algebraic equations, Gaussian elimination, determinants and their applications, linear transformations, subspaces, quadratic functions, rigid motions, and orthogonal matrices.
Sec 1, (590074) 0800-1015 MTWTh, 0915-1015 F, VinH 301
Sec 2, (591922) 1030-1245 MTWTh, 1030-1130 F, VinH 301

R.3251. Multivariable Differential Calculus. (4 cr; §3211, §3311, §3521H, §3552H; each section limited to 30 students)
Sec 1, (590477) 0800-1015 MTWTh, 0915-1015 F, VinH 2
Sec 2, (391923) 1030-1245 MTWTh, 1030-1130 F, VinH 20
Differentiation of parametric curves. Partial differentiation and the derivation as a local linear approximation. The chain rule. Applications to max-min problems with attention to boundaries and constraints and including Lagrange multipliers. Taylor's theorem (multivariable) and the second derivative test.

R.3252. Multivariable Integral Calculus. (191924) (4 cr; § 3311/3331, § 3521H, § 3552H; limited to 50 students; prereq 3251 or § 3251 or equiv; 1030-1245 MTWTh, 1030-1130 F, SciCB 175)
Double and triple integrals; change of variable procedures, with emphasis on polar and spherical coordinates; mass and centroid; integration on curves and surfaces; vector fields and the theorems of Green, Gauss, and Stokes.

R.3262. Infinite Sequences and Series with Methods of Approximation. (991917) (4 cr; limited to 35 students; prereq 3261 or § 3261; 0800-1015 MTWThF, VinH 113)
Infinite sequences and series;

mathematical induction and its implications for recursively defined sequences; convergence and techniques for evaluation of sequential limits and sums of series; applications of sequences and series to approximations and estimates of error. Required for mathematics honors students who have not taken Math 1552H.

R.3321. Differential Equations and General Vector Spaces (389394) (5 cr; limited to 40 students; §3066, §3212, §3213, §3221, §3513H; prereq grade of C or better in 1241; may be used to replace 3261; 1030-1245 MTWThF; VinH 16)
Vector spaces, especially vector spaces of functions; linear transformations and eigenvalues; first order differential equations; linear differential equations and linear differential systems. It is recommended that multivariable calculus should be taken before this course.

R.5081. Fundamentals of Topics in Analysis. (791918) (4 cr; limited to 30 students; prereq § 3531H or 3211 or equiv; not intended for math majors or minors; 0915-1015 MWF; 0915-1130 TTh; VinH 206; A-F only)
Designed primarily for prospective secondary teachers. Topics in analysis to develop analytic abilities and to broaden perspective on and enhance interest in mathematics. May include real number system, theory of sets, continuous functions, and properties of limits.

R.5242. Linear Algebra with Applications. (186089) (4 cr; §5232-5233, §5247, §5284; limited to 40 students; prereq [1261, 3261] or 3142 or equiv or #; 0915-1015 MWF, 0915-1130 TTh; VinH 211)
Systems of linear equations, finite dimensional linear spaces, bases, linear transformations, matrices, determinants, eigenvalues, reduction to canonical forms, quadratic and bilinear forms, applications.

R.5245. Introduction to Modern Algebra I. (290005) (4 cr; §5282; limited to 30 students; prereq three 32xx math courses or equiv or #; limited to 40 students; 0915-1015 MWF, 0915-1130 TTh; VinH 207)
Algebra at a more concrete level than 5282-5283; 5284. Group theory, including normal subgroups, homomorphism; automorphism, theories of Langrange and Cayley. Ring theory including ideals, integral domains, Euclidean rings, polynomial rings and fields. Abstract approach to vector spaces, and their linear transformations, their structure.

R.5457. Methods of Applied Mathematics (586090) (4 cr; limited to 35 students; prereq [3252, 3261] or equiv ... 3262 rec; 0915-1015 MWF, 0915-1130 TTh; VinH 311)
Modern analytic tools used in applications of mathematics; emphasis on technique. Linear algebra, ordinary and partial differential equations, calculus of variations, Fourier series,

complex variables, optimization, numerical methods.

R.5567. Fourier Series and Boundary Value Problems. (987902) (4 cr, §5571; limited to 30 students; prereq 3261 or equiv or # ... 3262 rec; 1145-1245 MTTh, 1030-1245 WF; VinH 207)
Partial differential equations of theoretical physics. Fourier Series, orthogonal systems, Sturm-Liouville systems, solution of boundary value problems by separation of variables, applications.

R.5606. Advanced Calculus: A Rigorous Approach. (388343) (4 cr; limited to 35 students; §5612; prereq 3252 or equiv, § 3262; 1145-1245 MTTh, 1030-1245 WF; VinH 211)
Basic analysis course at a more concrete level than 5612-5613-5614. Foundations of analysis: completeness of the line, limits, convergence, continuity, integration. Series of functions. Analysis is on the line and in Euclidean space. Other topics of the instructor's choice.

R.5900. Tutorial Course in Advanced Mathematics (588230) (Cr ar; limited to 10 students; prereq #)

8777. Thesis Credits: Masters. (788677) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588678) (1-36 cr [max 11 cr per summer term])

8990. Reading and Research. (186943) (Cr ar)

SECOND TERM

R.1008. Trigonometry. (686579) (4 cr, §1201; limited to 30 students; prereq plane geometry, 2 yrs high school algebra or § 1111, grade of C or better in GC 0631; 0915-1015 MWF, 0915-1130 TTh, VinH 364)
See First Term.

R.1031. College Algebra and Probability. (691927) (4 cr; §1051, §1151, §1111, §1201; limited to 35 students; prereq 3 yrs high school math, placement exam or GC 0631 with C or better; 0800-1015 MTWTh, 0915-1015 F, VinH 1.
See First Term.

R.1111. College Algebra and Analytic Geometry. (086580) (5 cr, §1201; limited to 30 students; prereq plane geometry, 2 yrs high school algebra or plane geometry, grade of C or better in GC 0631; may be used to replace 1031; 1030-1245 MTWThF, VinH 6)
See First Term.

R.1142. Short Calculus (5 cr, §1211, §1411H; each section limited to 30 students; prereq 31/2 yrs high school math or grade of C or better in 1111 or 1181 or 1201)
See First Term.
Sec 1, (686582) 0800-1015 MTWThF,

VinH 209
Sec 2, (486583) 1030-1245 MTWThF, VinH 209

R.1151. Precalculus II. (491928) (4 cr; §1111, §1201, §1008; prereq 3 1/2 years high school math, placement exam or 1051 grade of C or better; 1030-1245 MTWTh, 1030-1130F, VinH 206)
Second of two courses (see 1051) in algebra, analytic geometry, and trigonometry. Prepares students for full calculus sequence. Not an acceptable prerequisite for 1131.

R.1211. Calculus I (186585) (5 cr, §1142, §1411H; limited to 40 students; prereq 4 yrs high school math including trigonometry or grade of C or better in 1201 or [1008 and 1111] or equiv; may be used to replace 1251; 1030-1245 MTWThF; LindH 305)
See First Term.

R.1221. Calculus II. (986586) (5 cr, §1421H; prereq grade of C or better in 1211; limited to 40 students; may be used to replace 1252; 0915-1130 MTWThF; AmundH B75)
See 1211 First Term.

R.1251. One-Variable Differential and Integral Calculus I. (190006) (4 cr; §1451H, §1211, §1411H; limited to 30 students; prereq 4 yrs high schol math incl trig, or C grade or better in 1201 or 1008, 1111, or equiv; 0800-1015 MTWTh, 0915-1015 F; KoltH S139)
See First Term.

R.1252. One-Variable Differential and Integral Calculus II. (4 cr; §1452H, §1221, §1421H; each section limited to 40 students; prereq C grade or better in 1251)
See 1251 First Term.
Sec 1, (990007) 0800-1015 MTWTh, 0915-1015 F, VinH 301
Sec 2, (291929) 1030-1245 MTWTh, 1030-1130 F, VinH 301

R.1261. The Algebra and Geometry of Euclidean Space. (4 cr; §1241, §1553H, §3142, §3551H; each section limited to 30 students; prereq 1251 or 1211)
See First Term.
Sec 1, (390075) 0800-1015 MTWTh, 0915-1015 F, VinH 16
Sec 2, (691930) 1030-1245 MTWTh, 1030-1130 F, VinH 16

R.3251. Multivariable Differential Calculus. (491931) (4 cr; §3211, §3311, §3311, §3521H, §3552H; limited to 30 students; 0915-1130 MTWTh, 0915-1015 F, VinH 2)
See First Term

R.3252. Multivariable Integral Calculus. (4 cr; §3311/3331 or §3211/3331, §3521H, §3552H; each section limited to 30 students; prereq 3251 or § 3251 or equiv)
See First Term.
Sec 1, (190479) 0800-1015 MTWTh, 0915-1015 F, KoltH S137

Sec 2, (291283) 1030-1245 MTWTh,
1030-1130 F, Kolth 5139

R.3321. Differential Equations and General Vector Spaces. (5 cr; each section limited to 35 students; \$3066, \$3212, \$3213, \$3221, \$3253H; prereq grade of C or better in 1241; may be used to replace 3261)
See First Term.
Sec 1, (889397) 0800-1015 MTWThF, VinH 20
Sec 2, (689398) 1030-1245 MTWThF, VinH 20

R.5243. Linear Algebra with Applications. (786587) (4 cr; limited to 30 students; prereq 5242; 0915-1015 MWF, 0915-1130 TTh; VinH 207)
See 5242 First Term.

R.5246. Introduction to Modern Algebra II. (790008) (4 cr; \$5283; limited to 35 students; prereq 5245; 0915-1015 MWF; 0915-1130 TTh; VinH 313)
See 5245 First Term.

R.5458. Methods of Applied Mathematics. (586588) (4 cr; limited to 35 students; prereq 5457; 0915-1015 MWF, 0915-1130 TTh; VinH 311)
See 5457 First Term.

R.5607. Advanced Calculus: A Rigorous Approach. (588342) (4 cr; \$5613; limited to 35 students; prereq 5606; 1145-1245 MTTh, 1030-1245 WF; VinH 207)
See 5606 First Term.

R.5679. Probability. (485076) (4 cr, \$5681 \$Stat 5131; limited to 35 students; prereq 3252 or equiv; 1145-1245 MTTh, 1030-1245 WF; VinH 211)
Elementary principles of probability, total and compound probability, expectation, repeated trials, and topics from the following: Stirling's formula, the probability integral, geometrical probability, probability of causes, Bayes' theorem, errors of observation, principle of least squares.

R.5900. Tutorial Course in Advanced Mathematics (388231) (Cr ar; limited to 10 students; prereq #)

8777. Thesis Credits: Masters. (788906) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588907) (1-36 cr [max 11 cr per summer term])

8990. Reading and Research (887648) (Cr ar)

Mathematics Education (MthE)
125 Peik Hall. 625-6372
(Curriculum and Instruction)
College of Education

FIRST TERM

R.5030. Teaching Mathematics: Geometric Structures. (391968) (3 cr; limited to 35 students; \$5083; prereq 5020, 5620, math ed stu or #, & 5630, does not apply to MEd or grad prog; 0815-1000 MWF; PeikH 385; A/F only) Jackson
Pedagogy, content, and instructional strategies for teaching geometry. Content and issues relevant to the technology appropriate for geometry.

R.5101. Workshop: Elementary School Mathematics. (391694) (3 cr; [max 12 cr] limited to 30 students; not open to math education majors; 0750-1020 MW; PeikH 375; A/F only) Stochl
Modern trends, methods, and materials used to convey mathematical ideas.

R.5153. Geometry in the Intermediate Grades—June 14-June 30. (191695) (2 cr; limited to 30 students; prereq educ or grad student or #; 1030-1300 TTh; PeikH 375; A/F only) Post
Instructional approaches and physical materials related to teaching informal and intuitive geometric concepts in the intermediate and middle school grades. Fundamental concepts of measurement and geometric relationships in one, two, and three dimensions; measurement systems; estimation; geometric figures and their properties; transformations and symmetry; congruence and similarity.

R.5155. Rational Number Concepts and Proportionality—July 11-14. (091696) (1 cr; limited to 30 students; prereq educ or grad student or #; educ or grad stud; 1030-1300 MTWTh; PeikH 375; A/F only) Post
Relationships between the role of rational number concepts and the development of proportional reasoning skills. Psychological, instructional, and pedagogical issues concerned with the development of these conceptual areas.

R.5311. Teaching and Supervision of Mathematics in the Elementary School—June 14-July 19. (691698) (3 cr; limited to 35 students; prereq Elem 3391 or #; educ or grad stud; A/F only; 0750-1020 TTh; PeikH 375) Jackson
Present practices and trends in methods, evaluation, and diagnosis; objectives, psychology, and philosophy related to improvement of instruction. Meets with 5312.

R.5312. Teaching and Supervision of Mathematics in the Secondary School—June 14-July 19. (491699) (3 cr; limited to 35 students; prereq mathematics teaching experience or #; educ or grad stud; A/F only; 0750-1020 TTh; PeikH 375) Jackson
Methods, materials, and curriculum development; principles of learning; review of research; preparation and evaluation of tests, units, and materials of instruction. Meets with 5311.

R.5355. Mathematics for Slow-Learning Children—June 14-July 8. (891697) (3 cr; limited to 30 students; prereq 5311 or Elem 3391 or #; 1030-1300 MWF; PeikH 375; A/F only) Post
Units of instruction emphasizing mathematical concepts essential for vocational competence; experimental materials and methods designed to improve performance of low achievers.

5680. Practicum in Mathematics Education. (3-9 cr [max 9 cr]; prereq #; A-F only)
Supervised experience in teaching or related work in school.
Sec 21, (389931) Stochl
Sec 23, (189932) Post

5980. Directed Studies. (3-9 cr [max 9 cr]; prereq #; A-F only)
Survey of recent literature; design and preparation of reports on special problems.
Sec 21, (385071) Stochl
Sec 23, (185072) Post

8680. Internship: Mathematics Education. (Cr ar)
Participation in supervision, instruction, curriculum development, or research to gain inservice experience in a leadership role; includes a seminar; related project; required for the specialist certificate in mathematics education.
Sec 21, (590785) Stochl
Sec 23, (390786) Post

8980. Problems: Mathematics Education. (Cr ar; prereq 8500 or 8570)
Sec 21, (785309) Stochl
Sec 23, (185310) Post

SECOND TERM

R.5102. Workshop: Mathematics Education: Performance Assessment in Math and Science—July 22,25,27,29. (191700) (1 cr; limited to 50 students; prereq educ or grad stud; 1030-1245 MWF; PeikH 365; A/F only)
Performance assessment in elementary and secondary science. Topics include use of portfolios, holistic scoring, performance tasks, writing in mathematics and science, observations, check lists, and interviews. Meets with SeEd 5394, Elem 5101.

5680. Practicum in Mathematics Education. (687893) (3-9 cr [max 9 cr]; prereq #; A-F only) Jackson

5980. Directed Studies. (487894) (3-9 cr [max 9 cr]; prereq #; A-F only) Jackson

8680. Internship: Mathematics Education. (287895) (Cr ar) Jackson

8980. Problems: Mathematics Education. (187896) (Cr ar; prereq 8500 or 8570) Jackson

Mechanical Engineering (ME)

125 Mechanical Engineering. 625-0705
(Mechanical Engineering)
Institute of Technology

FIRST TERM

R.3201. Mechanical Engineering Systems Analysis (386074) (4 cr, \$AEM 3401; limited to 45 students; prereq AEM 3036, mech engr or aerosp engr maj; 1300-1500 TWThF; MechE 212)
Determination of response of engineering systems utilizing transfer function representation. Analogies between engineering systems based upon transfer function equivalence.

R.3301. Thermodynamics. (086076) (4 cr; limited to 50 students; prereq IT or ForP stu, Chem 1014 or Chem 1052 or Phys 1252, Math 3261 or equiv; 1030-1230 MTWThF; MechE 212)
Properties, equations of state, processes, and cycles for various thermodynamic systems. Development of first and second laws of thermodynamics, correlating heat, work, and mass transfer. Equilibrium irreversibility and mixtures.

R.3702. Basic Measurements Laboratory II. (2 cr; each section limited to 16 students; prereq mech engr upper div, 3701; lect 0915-1015 MW; MechE 212)
Treatment of experimental data, analysis and study of experimental systems via the computer. Static and dynamic characteristics of measurement systems. Fundamental principles of measurement and calibration. Measurement of temperature, pressure, vacuum, humidity, density, viscosity, heating values, speed, power, force, stress-strain, and radioactivity.
Lab 1, (787898) 1030-1230 MW, MechE 370
Lab 2, (587899) 1415-1615 TTh, MechE 370

R.8770. Mechanical Engineering Research (485174) (Cr and hrs ar; limited to 10 students; prereq Δ)

R.8771. Mechanical Engineering Research. (687585) (Cr and hrs ar; limited to 10 students; prereq 8770, Δ)

R.8772. Mechanical Engineering Research. (285175) (Cr and hrs ar; limited to 10 students; prereq 8771, Δ)

8777. Thesis Credits: Masters. (888685) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488687) (1-36 cr [max 11 cr per summer term])

COURSE DESCRIPTIONS

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

R.3741. Industrial Assignment. (186075) (2 cr per qtr; limited to 90 students; prereq regis in intern program) Marple
Industrial work assignment in engineering intern program. Evaluation based on formal written report accomplished by student covering the work assignment.

R.3742. Industrial Assignment. (287900) (2 cr; limited to 90 students; prereq 3741) Marple
See 3741.

R.3743. Industrial Assignment. (885155) (2 cr; limited to 90 students; prereq 3742) Marple
See 3741.

R.5190. Advanced Engineering Problems (886077) (2-4 cr; limited to 20 students; open to upper division students; prereq submission of approved deptl permission form)
Special investigations in various fields of mechanical engineering and related areas including an independent study project.

R.5198H. Mechanical Engineering Upper Division Honor Thesis I (590480) (4 cr; limited to 5 students)

R.5199H. Mechanical Engineering Upper Division Honor Thesis II (189633) (4 cr; limited to 2 students)

R.5460. Internal Combustion Engines. (189378) (4 cr; limited to 30 students; prereq IT student or grad, 3301; 1030-1130 TWThF; MechE 321) Murphy
Principles of power production, fuel consumption, and emissions of gasoline and diesel engines; fuel-air cycle analysis, combustion flames, knock phenomena, air flow and volumetric efficiency, mixture requirements, ignition requirements and performance.

R.5741. Industrial Assignment and Design Project. (285063) (4 cr; limited to 80 students; 5741-5742+; prereq 3742) Marple
Solution of system design problems that require the development of criteria, the evaluation of alternatives, and generation of a preliminary design. Final report emphasizes design communication and describes the design decision process, analysis, and final recommendations.

R.5742. Industrial Assignment and Design Project. (187901) (4 cr; limited to 80 students; 5741-5742+; prereq 5741) Marple
See 5741.

SECOND TERM

R.3205. Engineering Systems Design. (188327) (4 cr; limited to 45 students; prereq mech engr upper div, AEM

3016; 1100-1300 TWThF; MechE 212)
Application of fundamental concepts to the design of typical mechanical components. Engineering approach to the analysis and synthesis of machines and systems. Specification of materials in engineering design. Optimum design criteria.

R.3303. Applied Thermodynamics. (786766) (4 cr, §3305; limited to 30 students; prereq ME or aerosp upper div, 3301 or equiv; 1310-1510 MTWThF; MechE 212)
Application of laws of thermodynamics to chemically reacting systems and engineering systems. Vapor cycles, gas engine cycles, propulsion systems, refrigeration, and air-water vapor mixtures.

R.5260. Engineering Materials and Processing (4 cr; each section limited to 12 students; prereq mech engr upper div, 3020, Phys 1253, Chem 1052, AEM 3016, MatS 3400, safety glasses required; lect 0915-1050 MWF; MechE 212)
Introduction to materials and processing including physical and metallurgical properties, consolidation. Material processing including machining, welding, and deformation processes.
Lab 1, (186769) 1100-1255 MW, MechE 72
Lab 2, (586770) 0800-0955 TTh, MechE 72
Lab 3, (585232) 1030-1225 TTh, MechE 72
Lab 4, (288240) 1415-1610 TTh, MechE 72

R.5342. Heat Transfer. (086773) (4 cr; limited to 50 students; prereq IT upper div or grad or ForP stu, 3301 and CE 3400 or AEM 3200; 1310-1510 MTWThF; Arch 10)
Steady and unsteady conduction of heat. Convection heat transfer in boundary layer and duct flows; forced and free convection; condensation and boiling; heat exchangers. Heat transfer by thermal radiation; radiative properties of black bodies and real surfaces.

R.8770. Mechanical Engineering Research. (185212) (Cr and hrs ar; limited to 10 students; prereq Δ)

R.8771. Mechanical Engineering Research. (985213) (Cr and hrs ar; limited to 10 students; prereq 8770, Δ)

R.8772. Mechanical Engineering Research. (785214) (Cr and hrs ar; limited to 10 students; prereq 8771, Δ)

8777. Thesis Credits: Masters. (588910) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388911) (1-36 cr [max 11 cr per summer term])

Medical Technology (MedT)

15-170 Phillips-Wangensteen Building. 625-9490
Medical School

FIRST TERM

5082. Applied Clinical Chemistry. (688333) (4 cr; prereq 5113; S-N only)
Application of basic methods and techniques in chemistry in the clinical laboratory.

5084. Applied Clinical Virology. (988337) (1 cr; prereq 5100, 5102; S-N only)
Application of basic methods and techniques in the virology laboratory.

5085. Applied Clinical Hematology. (488334) (4 cr; prereq 5077, 5078, 5765, or CLS 5765; S-N only)
Application of basic methods and techniques in hematology in the clinical laboratory, morphology of blood cells, application of techniques in hemostasis.

5086. Applied Clinical Immunohematology. (288335) (4 cr; prereq 5064, 5065; S-N only)
Application of basic methods and techniques in serology and immunology in the clinical laboratory. Blood grouping and compatibility testing for transfusions.

5088. Applied Diagnostic Microbiology. (188336) (4 cr; prereq 5100, 5102; S-N only)
Identification of bacteria by macroscopic and microscopic techniques. Correlation with clinical cases. Identification of parasites and fungi.

5089. Speciality Rotation. (991450) (1 cr; prereq completion of med tech preclin prof crses, 5064, 5065, 5078, 5100, 5102, 5113, 5765; S-N only)
One-week clinical rotation in a specialty laboratory such as immunophenotyping, cytogenetics, pulmonary function, molecular diagnostics, surgical pathology, EKG, advanced virology or advanced coagulation

5090. Special Laboratory Methods. (886452) (2 cr; prereq #)
Special assignment on an individual basis in a special area of experience within the clinical laboratory; field experience.

5120. Seminar. (786301) (1-3 cr)

SECOND TERM

5082. Applied Clinical Chemistry. (088328) (4 cr; prereq 5113; S-N only)
See First Term.

5084. Applied Clinical Virology. (888332) (1 cr; prereq 5100, 5102; S-N only)
See First Term.

5085. Applied Clinical Hematology. (888329) (4 cr; prereq 5077, 5078, 5765; CLS 5765; S-N only)
See First Term.

5086. Applied Clinical Immunohematology. (188330) (4 cr; prereq 5064, 5065; S-N only)
See First Term.

5088. Applied Diagnostic Microbiology. (088331) (4 cr; prereq 5100, 5102; S-N only)
See First Term.

5089. Speciality Rotation. (791451) (1 cr; prereq completion of med tech preclin prof crses, 5064, 5065, 5078, 5100, 5102, 5113, 5765; S-N only)
See First Term.

5090. Special Laboratory Methods. (187042) (2 cr; prereq #)
See First Term.

5120. Seminar. (589281) (1-3 cr)

Medicinal Chemistry (MedC)

8-101 Health Sciences Unit F. 624-9919
College of Pharmacy

FIRST TERM

8777. Thesis Credits: Masters. (187042) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488690) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (188912) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088913) (1-36 cr [max 11 cr per summer term])

Medicinal Chemistry, Undergraduate (MChm)

Pharmacy Student Affairs Office, 5-110 Health Sciences Unit F. 624-9490
College of Pharmacy

FIRST TERM

5970. Directed Studies. (688994) (1-5 cr; prereq #)

5999. Special Problems. (488995) (Cr ar; prereq #)

SECOND TERM

5970. Directed Studies. (288996) (1-5 cr; prereq #)

5999. Special Problems. (188997) (Cr ar; prereq #)

Medicine (Med)

14-110A Phillips-Wangenstein Building. 625-9975
Medical School

Elective Courses for Graduate Students

8201. Clinical Medicine. (086482) (Cr and hrs ar) Ferris, staff

8202. Clinical Conference. (886483) (1 cr; hrs ar) Ferris, staff

8203. Clinical Radiology Conference. (686484) (1 cr; hrs ar) Ferris, staff

8204. Pathology Conference. (486566) (1 cr; hrs ar) Ferris, staff

SECOND TERM

8201. Clinical Medicine. (890887) (Cr and hrs ar) Ferris, staff

8202. Clinical Conference. (690888) (1 cr; hrs ar) Ferris, staff

8203. Clinical Radiology Conference. (490889) (1 cr; hrs ar) Ferris, staff

8204. Pathology Conference. (288139) (1 cr; hrs ar) Ferris, staff

Medieval Studies (MeSt)

304 Walter Library. 626-0805
College of Liberal Arts

FIRST TERM

3970. Directed Studies. (189140) (1-5 cr; prereq #)
Guided individual reading or study in some area of medieval studies.

5970. Directed Studies. (089141) (1-5 cr; prereq #)
Qualified senior and graduate students may register for work on a tutorial basis; guided individual reading or study.

SECOND TERM

3970. Directed Studies. (988998) (1-5 cr; prereq #)
See First Term.

5970. Directed Studies. (888489) (1-5 cr; prereq #)
See First Term.

Microbial Engineering (MicE)

240 Gortner Laboratory.
624-6774
College of Biological Sciences

FIRST TERM

8777. Thesis Credits: Masters. (788694) (1-16 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (488916) (1-16 cr [max 11 cr per summer term])

Microbiology (MicB)

1460 Mayo. 624-6190
Medical School

FIRST TERM

5970. Directed Studies. (787903) (Cr ar; prereq #, Δ) Rogers, staff

5990. Directed Research. (587904) (Cr ar; prereq #, Δ) Rogers, staff

8777. Thesis Credits: Masters. (188692) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988693) (1-36 cr [max 11 cr per summer term])

8990. Research in Microbiology. (086501) (Cr and hrs ar; prereq microbiol grad stu or #) Schlievert, staff
Graduate students with the requisite preliminary training may elect research project outside their thesis work.

SECOND TERM

5970. Directed Studies. (387905) (Cr ar; prereq #, Δ) Rogers, staff

5990. Directed Research. (187906) (Cr ar; prereq #, Δ) Rogers, staff

8777. Thesis Credits: Masters. (888914) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688915) (1-36 cr [max 11 cr per summer term])

8990. Research in Microbiology. (987043) (Cr and hrs ar; prereq microbiol grad stu or #) Schlievert, staff
See First Term.

Middle Eastern Languages and Cultures (MELC)

Institute of Linguistics and Asian and Slavic Languages and Literatures (South Asian and Middle Eastern Languages and Culture)
192 Klaeber Court
College of Liberal Arts

FIRST TERM

3505. Survey: The Middle East. (291302) (4 cr; \$5505, Hist 3505, §MidE 3505, §MidE 5505; 1000-1230 TTh; BlegH 105) Tesdell
Cultural, religious, and scholarly achievements of Middle Eastern peoples from pre-Islamic times to the present. Meets with 5505, Hist 3505.

5505. Survey: The Middle East. (290814) (4 cr; \$3505, Hist 3505, §MidE 3505, §MidE 5505; 1000-1230 TTh; BlegH 105) Tesdell
See 3505.

SECOND TERM

3036. The Religion of Islam. (990816) (4 cr; §MELC 5036, RelS 3036, RelS 5036; 1000-1230 TTh; FolH 234) Farah
Evolution of Islam in historical context; institutions that made for diversity and continuity; traditions, law and observances of the faith; sectarian movements; philosophical and theological trends; modern developments: reformist, revolutionary, and militant.

Military Science (Mil)

108 Armory. 624-7300

FIRST TERM

3970. Directed Studies. (685206) (1-3 cr; prereq #, Δ; hrs ar; A-F only)

SECOND TERM

3970. Directed Studies. (187493) (1-3 cr; prereq #, Δ; hrs ar; A-F only)

Mortuary Science (Mort)

A275 Mayo. 624-6464

FIRST TERM

3080. Funeral Service Practicum. (287122) (8 cr; prereq have completed all requirements for graduation with the exception of 3080, Δ; S-N only) Kroshus, Mathews, Stroud

Practical experience in a funeral home as assigned by the program.

3090. Independent Study. (185422) (1-3 cr; prereq regis in mortuary science) Staff

SECOND TERM

3080. Funeral Service Practicum. (786203) (7 cr; prereq have completed all requirements for graduation with the exception of 3080, Δ; S-N only) Kroshus, Mathews, Stroud
See First Term.

3090. Independent Study. (985423) (1-3 cr; prereq regis in mortuary science) Staff

Museum Studies (MSt)

10 Church Street S.E. 624-6380

FIRST TERM

8016. Internship. (490410) (1-6 cr; prereq 8010, permission of Director of Graduate Studies in Museum Studies) Murdock

SECOND TERM

8016. Internship. (690213) (1-6 cr; prereq 8010, permission of Director of Graduate Studies in Museum Studies) Murdock

Music (Mus)

100 Ferguson Hall. 624-5740
(School of Music)
College of Liberal Arts

FIRST TERM

R.1001. Fundamentals of Music. (189283) (4 cr; limited to 126 students; \$1003, 1004; prereq non-music majors; 1300-1515 MTTh; FergH 225) Anderson
Investigation of music notation and fundamental concepts underlying musical structure. Intervals, clefs, chords, scales, cadences, harmonic analysis, rhythm and meter. Emphasis on active participation: playing the piano, singing, clapping rhythms, aural perception. Weekly laboratory assignments in vocal and piano performance.

R.1051. Piano Class for Non-Music Majors. (2 cr; each section limited to 16 students)
For non-music majors with little or no keyboard background. Functional skills such as reading, harmonizing, playing by ear, and improvising; basic technique and elementary repertoire. Sec 1 (089284) 0915-1115 TTh, FergH 259
Sec 2 (589538) 1300-1500 TTh, FergH 259

COURSE DESCRIPTIONS

1440. Ensemble. (191687) (1 cr; prereq #: ar, FergH 216) O'Reilly Performance of chamber music of major and minor composers; sonatas, trios, quartets, quintets, or her forms. Combinations of vocal and instrumental chamber ensemble materials.

R.3021. Introduction to Music (191690) (5cr; limited to 60 students; \$3021; prereq non-music majors; 1300-1515 MWF; FergH 105) Grayson Music in the repertory of our culture-forms and styles from 17th to 20th centuries. Aural analyses, relationships of large units of musical form.

3440. Ensemble. (991688) (1 cr; prereq #: ar, FergH 216) O'Reilly Performance of chamber music of major and minor composers; sonatas, trios, quartets, quintets, or her forms. Combinations of vocal and instrumental chamber ensemble materials.

3970. Directed Studies. (385572) (1-15 cr; prereq #: Δ, college approval; hrs ar; Staff Independent research and study under faculty guidance. Subjects selected according to strengths and interests of individual students.

3995. Major Project. (890145) (2 cr; prereq sr, #: Δ; A-F only)

5330. Concerto Grosso Ensemble. (989858) (1 cr; prereq #: arr; A-F only) Kim Study and performance of string orchestra and small chamber orchestra literature.

5375. Vocal Pedagogy I. (989861) (4 cr; prereq upper div voice major or #: 1300-1515 MTTh; FergH 90; A/F only) Ware Basics of vocal production; anatomy and physiology of the vocal mechanism. Overview of teaching the child, adolescent, and maturing/aging voice; methods and techniques for both individual and group voice instruction. Observation and participation in class voice as assistant to instructor.

5384. Choral Conducting. (291686) (4 cr; prereq #: must register concurrently with 5490; 0915-1015 MTWThF; FergH 90) Lancaster Choral conducting—hand techniques, sound control, articulation, breath control, intonation.

5399. Performance in Conducting. (389184) (4 cr; prereq 5388 or 5385, #: hrs ar) Lancaster Preparation and conducting, with documentation of an ensemble program.

5440. Ensemble. (791689) (1 cr; prereq #: ar, FergH 216) O'Reilly Performance of chamber music of major and minor composers; sonatas, trios, quartets, quintets, or her forms.

Combinations of vocal and instrumental chamber ensemble materials.

5490. Chamber Singers. (586204) (1 cr; prereq audition; 1030-1130 MTWThF; FergH 90) Lancaster Mixed chorus of 16 to 20 voices. Performances each term.

5532. Analysis of 20th-Century Music. (190426) (3 cr; prereq 3532; 1145-1400 TTh; FergH 149; A-F only) Cherlin Introduction to analysis of 20th-century music.

5644. Studies in 20th-Century American Music. (991691) (4 cr; prereq 3606, 5532 or #: 1415-1630 MTTh; FergH 107; A/F only) Hepokoski Competing concepts of musical style and purpose in 20th-century America; some stylistic and cultural bases of both "art" and "popular" music and their often uneasy interrelationships. Areas covered typically include Ives, Copland, Carter, 1920s jazz, Broadway and popular song.

5804. Folk and Traditional Music: Cross-Cultural Survey. (591693) (4 cr; 1145-1400 MTTh; FergH 107) Kagan Music of the peoples of the world in topical and geographic format. Comparative study of musical styles, behavior, and concepts in varied societies and cultures. Field recordings and filmed performances.

R.5950. Topics in Music
Sec 1. Text and Language—A Singer's Tools for Interpretation—June 14-17, 20. (190121) (2 cr; prereq #: limited to 12 students; 1730-2000 MTWThF; FergH 225) Maurice Understanding the text; using language effectively in communicating the meaning of the text; and discovering how the musical setting defines the interpretation of the text. Vocal performance will be required.

5970. Directed Studies. (486308) (1-5 cr; prereq #: Δ, CLA approval; A-F only)

8777. Thesis Credits: Masters. (088698) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888699) (1-36 cr [max 11 cr per summer term])

8990.* Special Problems. (185573) (2-12 cr; prereq Δ; hrs ar; Staff

8999. Recital Credits: Doctoral. (189857) (6 cr [max 12 cr per quarter]; prereq DMA student; S-N only) Registration for these credits coincides with the performance of a DMA recital, during the matriculation for the degree, for a total of 30 credits.

SECOND TERM

R.1001. Fundamentals of Music

(389282) (4 cr; limited to 35 students; \$1003, 1004; prereq non-music majors; 1300-1515 MTTh, FergH 105) Damschroder See First Term.

3970. Directed Studies. (789182) (1-15 cr; prereq #: Δ, college approval, hrs ar) Staff

3995. Major Project. (589183) (2 cr; prereq sr, #: Δ; A-F only)

5533. Music Since 1945—July 21-August 3. (492089) (4 cr; prereq #: 0915-1145 and 1300-1530 MTWThF; FergH 123) Lubet Procedures and techniques of music composed since 1945.

5950. Special Topics in Music: The Art of Wind Band Teaching. (892090) (please call 624-2008 for information) Kirchhoff Symposium concentrating on personal musical growth of public school music educator; expansion of pedagogical base for music educator; strategies for developing and refining skills as ensemble conductor.

5970. Directed Studies. (088183) (1-5 cr; prereq #: Δ, CLA approval; A-F only)

8777. Thesis Credits: Masters. (288917) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188918) (1-36 cr [max 11 cr per summer term])

8990.* Special Problems (888184) (2-12 cr; prereq Δ; hrs ar; Staff

8999. Recital Credits: Doctoral. (189865) (6 cr [max 12 cr per quarter]; prereq DMA student; S-N only) See First Term.

Music Education (MuEd)

100 Ferguson Hall, 624-0191 College of Liberal Arts

FIRST TERM

R.3011. Teaching Music in the Elementary School (785312) (4 cr; prereq educ major; limited to 30 students; 0915-1015 MTWThF; FergH 107; A-F only) Borg For non-music majors; methods and materials in teaching singing, rhythm, music reading, creativity, classroom instruments, fundamentals, appreciation in K-6.

5112. Research in Music Education: Techniques. (990430) (3 cr; 0800-0915 MTWTh; FergH 157) Haack Methods and techniques employed in investigating and reporting music education problems; review of significant research.

5217. Historical Foundations of Music Education. (891683) (3 cr; prereq #: 0915-1130 TTh; FergH 151; A/F only) Furman

Analysis and interpretation of important elements in modern music teaching derived from the past.

R.5666. Microcomputers in the Music Classroom—June 14-24. (590432) (3 cr; limited to 12 students; 0915-1130 MTWThF; AndH 250; A-F only) Schultz Using the microcomputer to enhance instruction in music; materials for theory, ear training, composition, electronic music; developing a database for music libraries, instrument inventories, budgets.

5831. Music for Exceptional Children. (390433) (3 cr; prereq #: 0915-1130 MW; FergH 151; A-F only) Furman Trends; methods and materials for functional program of singing, playing, rhythm, listening, and creative activities for mentally and physically handicapped and gifted pupils.

R.5970. Independent Study. (1-4 cr; prereq music education/therapy or graduate student, #: Δ; hrs ar; FergH 100)

An independent study project organized by the student with the appropriate instructor.
Sec 21, (589149) Borg
Sec 22, (285516) Schultz
Sec 23, (187579) Furman
Sec 24, (188370) Haack
Sec 25, (890100) McCoy

R.8990. Research Problems (1-12 cr; prereq knowledge of elem statistics; hrs ar; FergH 100)
Sec 21, (185517) Borg
Sec 22, (985518) Schultz
Sec 23, (587580) Furman
Sec 24, (888371) Haack
Sec 25, (690101) McCoy

SECOND TERM

5606. Movement-Based Methods for Music Education—July 21-August 10. (490987) (3 cr prereq music or music ed major or #: 0800-1000 MTWThF; FergH 99) McCoy Participation in movement activities; study of Dalcroze philosophy and techniques; applications of movement to music education; examination of relevant research.

R.5667. Computer-Based Music Instruction—July 21-August 3. (290988) (3 cr; limited to 12 students; 1030-1245 MTWThF; Arch 250; A-F only) Schultz

5750. Workshop: Music Education: Multicultural Music for Teachers—July 21-Aug 3. (989164) (3 cr [max 12 cr]; 1300-1515 MTWThF; FergH 107; A/F only) Haack A workshop for all subject area teachers to explore the education potentials of using music from other cultures as well as American



COURSE DESCRIPTIONS

APPLIED MUSIC (MusA) COURSES

NOTE: Call numbers for courses in applied music will be posted outside 100 Ferguson Hall and must be listed on your course request form. Do not call the music office for these numbers.

Instrument	Elective	Principal	Major	Secondary Required	Secondary Elective	Principal Beyond Requirement	Major Beyond Requirement	Minor	Transfer Student
Fee	\$115	///	///	///	\$45	\$45	\$45	\$45	///
Baritone	1118, 3118, 5118	1218, 3218, 8218	1318, 3318, 8318	1418, 3418, 8418	1518, 3518, 8518	1618, 3618, 8618	1718, 3718, 8718	3818	1918
Bassoon	1114, 3114, 5114	1214, 3214, 8214	1314, 3314, 8314	1414, 3414, 8414	1514, 3514, 8514	1614, 3614, 8614	1714, 3714, 8714	3814	1914
Cello	1107, 3107, 5107	2107, 3107, 8107	1307, 3307, 8307	1407, 3407, 8407	1507, 3507, 8507	1607, 3607, 8607	1707, 3707, 8707	3807	1907
Clarinet	1112, 3112, 5112	1212, 3212, 8212	1312, 3312, 8312	1412, 3412, 8412	1512, 3512, 8512	1612, 3612, 8612	1712, 3712, 8712	3812	1912
Double Bass	1108, 3108, 5108	1208, 3208, 8208	1308, 3308, 8308	1408, 3408, 8408	1508, 3508, 8508	1608, 3608, 8608	1708, 3708, 8708	3808	1908
Flute	1109, 3109, 5109	1209, 3209, 8209	1309, 3309, 8309	1409, 3409, 8409	1509, 3509, 8509	1609, 3609, 8609	1709, 3709, 8709	3809	1909
French Horn	1115, 3115, 5115	1215, 3215, 8215	1315, 3315, 8315	1415, 3415, 8415	1515, 3515, 8515	1615, 3615, 8615	1715, 3715, 8715	3815	1915
Guitar	1123, 3123, 5123	1223, 3223, 8223	1323, 3323, 8323	1423, 3423, 8423	1523, 3523, 8523	1623, 3623, 8623	1723, 3723, 8723	3823	1923
Harp	1122, 3122, 5122	1222, 3222, 8222	1322, 3322, 8322	1422, 3422, 8422	1522, 3522, 8522	1622, 3622, 8622	1722, 3722, 8722	3822	1922
Harpicord	1102, 3102, 5102	1202, 3202, 8202	1302, 3302, 8302	1402, 3402, 8402	1502, 3502, 8502	1602, 3602, 8602	1702, 3702, 8702	3802	1902
Oboe	1111, 3111, 5111	1211, 3211, 8211	1311, 3311, 8311	1411, 3411, 8411	1511, 3511, 8511	1611, 3611, 8611	1711, 3711, 8711	3811	1911
Organ	1103, 3103, 5103	1203, 3203, 8203	1303, 3303, 8303	1403, 3403, 8403	1503, 3503, 8503	1603, 3603, 8603	1703, 3703, 8703	3803	1903
Percussion	1121, 3121, 5121	1221, 3221, 8221	1321, 3321, 8321	1421, 3421, 8421	1521, 3521, 8521	1621, 3621, 8621	1721, 3721, 8721	3821	1921
Piano	1101, 3101, 5101	1201, 3201, 8201	1301, 3301, 8301	1401, 3401, 8401	1501, 3501, 8501	1601, 3601, 8601	1701, 3701, 8701	3801	1901
Saxophone	1113, 3113, 5113	1213, 3213, 8213	1313, 3313, 8313	1413, 3413, 8413	1513, 3513, 8513	1613, 3613, 8613	1713, 3713, 8713	3813	1913
Trombone	1117, 3117, 5117	1217, 3217, 8217	1317, 3317, 8317	1417, 3417, 8417	1517, 3517, 8517	1617, 3617, 8617	1717, 3717, 8717	3817	1917
Tuba	1119, 3119, 5119	1219, 3219, 8219	1319, 3319, 8319	1419, 3419, 8419	1519, 3519, 8519	1619, 3619, 8619	1719, 3719, 8719	3819	1919
Viola	1106, 3106, 5106	1206, 3206, 8206	1306, 3306, 8306	1406, 3406, 8406	1506, 3506, 8506	1606, 3606, 8606	1706, 3706, 8706	3806	1906
Violin	1105, 3105, 5105	1205, 3205, 8205	1305, 3305, 8305	1405, 3405, 8405	1505, 3505, 8505	1605, 3605, 8605	1705, 3705, 8705	3805	1905
Voice	1104, 3104, 5104	1204, 3204, 8204	1304, 3304, 8304	1404, 3404, 8404	1504, 3504, 8504	1604, 3604, 8604	1704, 3704, 8704	3804	1904

Courses in applied music are classified according to nine modes: elective (with or without credit), principal, major, secondary required, secondary elective, principal beyond requirement, major beyond requirement, minor, and transfer student, as well as 3 levels: 1000-, 3000-, and 8000- level (graduate level). You may not register for a course in applied music for credit until you pass the required applied entrance exam. The examining committee will determine the mode(s) for which you may register. You should consult the School of Music, 100 Ferguson Hall, regarding the mode and level appropriate for your degree program. Studio class is required for all undergraduates registering at the x2xx, x3xx, x6xx, x7xx, or 19xx levels. Specific times for these classes will be available from the applied instructor.

Fees for non-music majors are based on individual lessons: \$115 for 0-2 credits. Music and music education majors at the x2xx, x3xx, or x4xx level are exempt from payment of these fees, as are M.M. and D.M.A. students taking courses at the 83xx level. Majors at the x5xx, x6xx, or x7xx level pay \$45 for 2 credits. Music fees are course fees: they are applied in addition to tuition.

COURSE DESCRIPTIONS

subcultures, across the curriculum; understanding music as an expression of socio-cultural values; cross-cultural uses and functions of music; materials development for personal use in the classroom.

5970. Independent Study. (1-4 cr; prereq music education/therapy or graduate student #, Δ; hrs ar; FergH 100)

See First Term.

Sec 21, (989150) Borg
Sec 22, (789151) Schultz
Sec 23, (589152) Furman
Sec 24, (389153) Haack
Sec 25, (490102) McCoy

8990. Research Problems (1-12 cr; prereq knowledge of elem statistics; hrs ar)

Sec 21, (788372) Borg
Sec 22, (588373) Schultz
Sec 23, (388374) Furman
Sec 24, (188375) Haack
Sec 25, (290103) McCoy

N

Natural Resources and Environmental Studies (NRES)

439 Borlaug Hall, St. Paul. 625-1244
115 Green Hall, St. Paul, 624-3400
College of Agriculture
College of Natural Resources

FIRST TERM

3050. Experience and Training in a Field Setting (089186) (1-4 cr; prereq #; A-F only) Soil Science and Forest Resources staff.

Students are required to obtain professional experience in a field setting.

3225. Directed Study Experience (989570) (1-5 cr; prereq fr or soph, #, college approval) Soil Science and Forest Resources staff.

The student develops, in consultation with the advisor for the project, a prospectus, and completes progress reports and a final report on her or his project.

5225. Directed Study Experience (789571) (1-5 cr; prereq jr or sr or grad stu, #, college approval)
See 3225.

SECOND TERM

3050. Experience and Training in a Field Setting. (889187) (1-4 cr; prereq #; A-F only)
See First Term.

3051. From Tall-Grass Prairies to Boreal Forests—August 20-September 14. (392019) (4 cr; prereq Biol 1009 or equiv; offered at various field sites; estimated course fee of \$150) Walters

Introduction to the ecology of the Upper Midwest region and to teach the methods of ecological research. Students will become familiar with the flora, fauna and ecological associations of the three major biomes of this region; maple-basswood forest, boreal forest and tall-grass prairie. Students will gain experience in ecological research by designing and executing field experiments.

3225. Directed Study Experience (589572) (1-5 cr; prereq fr or soph, #, college approval)
See First Term.

5225. Directed Study Experience (389573) (1-5 cr; prereq jr or sr or grad stu, #, college approval)
See First Term.

Neurology (Neur)

12-100 Phillips-Wangensteen Building. 625-9900
Medical School

FIRST TERM

5599. Subinternship in Clinical Neurology. (190104) (Cr ar; prereq 5510, course director recommendation, med stu; S-N only) Rottenberg

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

5122. Pediatric Neurology: Health Care Psychology Interns. (587627) (Cr and hrs ar; prereq #) Shapiro

8200. Clinical Neurology. (786508) (Cr ar) Price, staff

8201. Clinical Pediatric Neurology. (586509) (Cr ar) Swaiman, staff

8202. Research in Neurology. (986510) (Cr ar) Price, staff

8203. Applied Electroencephalography. (786511) (Cr ar) Torres

8204. Applied Electromyography. (586512) (Cr ar) Parry

8205. Applied Neuropathology. (386513) (Cr ar) Sung

8236. Research in Neuropathology. (186514) (Cr ar) Sung

8705. Neurological-Neurosurgical Conference (086515) (1 cr, \$Rad 0124) Staff

8777. Thesis Credits: Masters. (588700) (1-16 cr [max 11 cr per summer term])

SECOND TERM

5599. Supinternship in Clinical Neurology. (990105) (Cr ar; prereq 5510, Course Director recommendation, med stu; S-N only) Rottenberg

8777. Thesis Credits: Masters. (988919) (1-16 cr [max 11 cr per summer term])

Neuroscience (NSc)

295 AS/VM Building. 625-1715
Graduate School

FIRST TERM

R.5100. Introductory Neurobiology Laboratory at Itasca—June 14-July 1. (788999) (3 cr; limited to 12 students; prereq Summer Undergraduate Research Programs in Life Science Disciplines or #; hrs ar; taught at Lake Itasca Forestry and Biological Station; A-F only) Poppele, others
Designed for biological or physical sciences undergraduate students with an interest in the neurosciences. Provides an introduction to concepts in cellular neurosciences in a laboratory environment. Emphasis on understanding the basis of membrane properties, including ionic and molecular mechanisms of resting potentials, action potentials, and synaptic potentials. Students will work with state-of-the-art equipment and contemporary techniques to examine the experimental evidence for these concepts. This is a 3-week, full-time, intensive course. (Financial aid will be available. See page 38.)

8888. Thesis Credits: Doctoral. (188702) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.5550. Itasca Cell and Molecular Neurobiology Laboratory—July 25-August 26. (385510) (6 cr; limited to 12 students; prereq enrolled in neurosci grad prog or consent of neurosci prog; hrs ar; taught at Itasca; S-N only) Poppele, others
Intensive laboratory course introducing cellular and molecular research techniques and topics in contemporary neuroscience. Electrophysiological studies of neuronal properties, neuropharmacological assays of transmitter action, and immunohistochemical identification of transmitters. Concepts and techniques studied in the context of a number of preparations including the neuromuscular junction, in vitro invertebrate

nervous system, the hippocampal slice, the nervous system of the gut. Course is designed for entering or 1st year graduate students in the neurosciences or closely related fields.

8888. Thesis Credits: Doctoral. (288920) (1-36 cr [max 11 cr per summer term])

Neurosurgery (NSu)

B-590 Mayo. 624-6666
Medical School

FIRST TERM

8777. Thesis Credits: Masters. (888704) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488706) (1-36 cr [max 11 cr per summer term])

SPECIAL TERMS: THREE- AND SIX-WEEK COURSES

Elective Courses for Undergraduate Students

5531. Advanced Neuropsychological Seminar. (486924) (2 cr; hr ar; prereq psych fellow spec or #) Robiner

5532. Clerkship in Neuropsychological Assessment. (286925) (1-4 cr; hr ar; prereq psych fellow spec or #) Robiner

5533. Case Conference in Neuropsychology. (186926) (1 cr; hr ar; prereq psych fellow spec or #; S-N only) Robiner

5534. Introduction to Neuropsychological Assessment. (986927) (3 cr; hr ar; prereq psych fellow spec or #; S-N only) Robiner

5535. Case Conference in Clinical Psychology. (786928) (1-2 cr; hr ar; prereq psych fellow spec) Robiner

5536. Seminar in Clinical Psychology. (586929) (1-2 cr; prereq psych fellow spec) Robiner

5537. Psychology Internship. (986930) (4-8 cr; prereq psych fellow spec) Robiner

5550. Neurophysiological Literature Seminar. (586526) (1 cr; prereq Medical School course in physiology, #; hrs ar) Ebner
Study of selected papers covering several topics in neurophysiology. Correlations between neurological and neurosurgical problems and basic concepts in neurophysiology emphasized.

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

Required Courses for Graduate Students

8305. Neurosurgical Diagnosis. (386527) (4 cr; MTWThF; Mayo B524) Heros, Erickson, Maxwell, Haines, Hall, Rengachary
Neurosurgical fellow assists in instruction of clinical clerks and interns, studies problems in diagnosis at University and affiliated hospitals.

8308. Neurosurgical Problems and Management. (186528) (4 cr; MTWThF; Mayo B401) Heros, Erickson, Maxwell, Haines, Hall, Rengachary

Neurosurgical fellow acts as house surgeon at University and affiliated hospitals.

8311. Operative Neurosurgery. (086529) (4 cr; MTWThF; Mayo B401) Heros, Erickson, Maxwell, Haines, Hall, Rengachary
Neurosurgical fellow acts as first assistant for operations at University and affiliated hospitals, and later may be permitted to operate.

8316. Neurological Research. (186531) (6 cr; MTWThF; Diehl F109-110 and G134-144) Ebner
Problems in experimental or clinical surgery.

8318. Neurological Conference (086532) (1 cr; 1325-1415 F; Mayo C231-Todd Amph) Heros, Erickson, Maxwell, Haines, Hall, Rengachary
A review of X-ray films and case histories on neurosurgical service.

8320. Neurosurgical Conference. (686534) (2 cr; 0800-1100 Sa) Heros, Ebner, Erickson, Maxwell, Haines, Hall, Rengachary
In-depth review of selected topics in basic and clinical neurosurgery.

8322. Neurosurgery-Ophthalmology Seminar Part I. (786542) (1 cr; 0800-0850 T; offered Su and W; Sta 51, Mayo B524) Staff
Review and discussion of topics.

8323. Neurosurgery-Ophthalmology Seminar Part II. (986541) (1 cr; prereq 8322; T; offered F and Sa) Staff
Advanced review and discussion of topics.

8330. Neurosurgery Literature Seminar. (986538) (2 cr; 1st and 2nd Th evenings) Heros, Seljeskog, Ebner, Erickson, Maxwell, Haines, Hall, Rengachary
Review and discussion of current literature relating to neurosurgery and the neurosciences.

SECOND TERM

8777. Thesis Credits: Masters. (188921) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988922) (1-36 cr [max 11 cr per summer term])

Norwegian (Nor)

205 Folwell Hall. 625-9887
(Scandinavian Languages and Literature)
College of Liberal Arts

FIRST AND SECOND TERMS: TEN-WEEK COURSE (Register once in Term I)

R. 1101-1102-1103. Beginning Norwegian. (15 cr for both terms; limited to 20 students; 0900-1245 MTWTh; FolH 134 thru July 20; KoltH 5134, July 21-Aug 3) Lybeck, K. & R. R.1101, Sec 5, (891554) June 14-July 8, 5 cr
R.1102, Sec 5, (691555) July 9-August 3, 5 cr
R.1103, Sec 5, (491556) August 4-24, 5 cr

Nursing (Nurs)

6-101 Health Sciences Unit F. 624-9600

FIRST TERM

5240. Core Concepts in Critical Care (189020) (6 cr; prereq 5140, 5141, 5142; 1030-1515 MTh, 1030-1245 TW + 3 additional hrs per week ar; MoosT 2620) Bliss, Stenberg
Provides core knowledge underlying nursing of critically ill children or adults, including technological life support.

5450. Introduction to Community Health. (388164) (3 cr; prereq nursing student or Δ; 0800-1015 MWTh; MoosT 2620) Lia-Hoagberg
Study of those concepts and theories that provide a foundation for community health.

5620. Independent Study in Nursing Topics (289646) (1-9 cr; prereq #) Staff
Learning experiences planned to meet individual student needs, beyond required credits.

5799. Self-Directed Study as a Means of Accomplishing Nursing Electives. (187123) (Cr ar; prereq #) Staff
Opportunity for students to engage in learning experiences not provided for in established nursing elective courses.

R.5820. Decision Making in Health Care. (789375) (3 cr; limited to 15 students; prereq grad stu in health related major; 0915-1245 W, 1300-1630 W; HSUnitF) Corcoran-Perry

Comparison of selected conceptual models of decision making. Development of plans for assessing, evaluating, teaching, or assisting others (health professionals, patients, families) in making decisions about health care.

5942. Nursing Care of the Elderly I (890890) (4 cr; prereq grad nursing students; assessment of the elderly course; ar) Snyder/Camillo
Managing the health care of the elderly; testing nursing interventions for maintaining and restoring health; particular attention will be focused on persons whose presenting concerns are primarily in the physiological realm.

8001. Special Educational Experiences in Nursing (prereq #)
Various learning experiences planned to meet individual needs.
Sec 1, (087194) ar, staff, ar cr

R.8009. Special Topics. (Cr ar; section 2 and 3 limited to 5 students;prereq #) Staff
Sec 1, (687196) arr, ar, cr
Sec 2, (990136) ar, 2 cr, Rossi, (NMW)
Sec 3, (191468) ar. 2 cr, Rossi, (NMW)

8011. Moral and Ethical Positions in Nursing. (992047) (3 cr; prereq nursing grad student or #; ITV UMD to Twin Cities, dates and times to be determined) Block
Influence of moral and ethical positions on behavior and decision making in nursing. Emphasis on bases for positions taken, such as selected moral and ethical theory, rights and responsibilities and conflict.

8777. Thesis Credits: Masters. (288707) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188708) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

5609. Special Educational Experiences in Nursing. (292045) (3 cr; prereq #; 1300-1630 T, ar; ITV to UMD) Lia-Hoagberg
Planned to meet individual needs.

5963. Nursing Leadership for a Changing World. (191115) (3 cr; prereq Graduate Student in Nursing or Nursing Graduate Student or #; 1530-1900 W; ar; ITV to Moorhead) Josten
Knowledge of visioning, change, organizational culture, power, negotiation, team building, forecasting, and personal growth is analyzed to strengthen leadership skills for the future. Focus includes evaluation of concepts within a variety of nursing leadership roles (educator, manager, clinical specialist, consultant).

5964. Public Health Nursing Leadership Practicum. (691135) (4 cr; prereq 8010, 5960, 8040, 5963 or #, #; ar; ITV to Moorhead; S/N only) Josten
Focuses on the development of knowledge and skills of a specific leadership role within the field of public health nursing. The course

facilitates the examination of leadership and role theory within the enactment of a leadership role.

8001. Special Educational Experiences in Nursing (prereq Δ)
See Term I.
Sec 2, (192046) ar, Rossi, 2 cr.

R.8014. Research in Nursing. (788341) (3 cr; prereq inferential statistics; limited to 25 students; 1645-2030 W; HSUnitF 4150/4176)
Research processes and methodologies appropriate to nursing. Analysis of research reports.

8021. Community Health Nursing in Long-Term Care. (091469) (3 cr; limited to 16 students; prereq 8010, Nursing Graduate Student or #; 1530-1900 T; HSUnit F) Bull

R.8030. Nursing Intervention Models. (8 cr; prereq 8012, 8011 or ¶ 8011, #) Sec 1, (989021) 1300-1745 T, HSUnitF Psych cln ar)
Sec 2, (492044) Combination Twin Cities Campus and ITV to MSU—June 16, 22, 23, 29, 1300-1745; June 30, 0800-1745; July 7, 14, 21, 28, 1300-1745, plus cln ar; Vellenga
Developing, providing and evaluating nursing intervention with a specified client population.

8050. Problems in Nursing (1-9 cr; prereq #; S-N only)
Individual study of a problem.
Sec 1, (487202) ar, Alaniz
Sec 2, (086210) ar, Bearinger
Sec 3, (886211) ar, Bliss
Sec 4, (686212) ar, Bull
Sec 5, (486213) ar, Burns
Sec 6, (286214) ar, Corcoran-Perry
Sec 7, (186215) ar, Crisham
Sec 8, (986216) ar, DeHart
Sec 9, (786217) ar, Donaldson
Sec 10, (586218) ar, Duckett
Sec 11, (386219) ar, Edwardson
Sec 12, (786220) ar, Egan
Sec 13, (185369) ar, Feldman
Sec 14, (485370) ar, Gross
Sec 15, (285371) ar, Gustafson
Sec 16, (185372) ar, Hansen
Sec 17, (985373) ar, Josten
Sec 18, (785374) ar, Krichbaum
Sec 19, (585375) ar, Leonard
Sec 20, (385376) ar, Lewis
Sec 21, (185377) ar, Lia-Hoagberg
Sec 22, (085378) ar, Lindquist
Sec 23, (885379) ar, Newman
Sec 24, (789022) ar, Ostwald
Sec 25, (589376) ar, Pederson
Sec 26, (289775) ar, Post-White
Sec 27, (790106) ar, Ryden
Sec 28, (590463) ar, Sime
Sec 29, (390464) ar, Snyder
Sec 30, (190465) ar, Sodergren
Sec 31, (890467) ar, Tomlinson
Sec 32, (690468) ar,

8051. Special Topics in Nursing Research. (090466) (1-9 cr) Staff
Seminar and/or individual study in nursing research.

8060. Advanced Clinical Nursing. (586316) (3-9 cr; prereq #) Staff

COURSE DESCRIPTIONS

8111. Moral and Ethical Development in Nursing Science. (788162) (4 cr; prereq 8011 or equivalent, nurs grad stu or #; 0915-1400 Th; HSUnitF) Crisham
Study of the interactions among research and theory in moral judgment and behavior, applied ethics, and nursing.

8315. Nurse-Midwifery Management: Intrapartal and Postpartal. (588163) (9 cr; prereq 8314; 0915-1400 W, 1530-1745 W; HSUnitF; cli ar) Rossi, staff
Theory and clinical experience in management and care of the laboring woman/couple through the six-week restorative period. Early care of the newborn is an integrated component.

8509. Special Topics: Nursing Education. (386317) (Cr ar; prereq #) Staff

8609. Special Topics: Nursing Supervision. (prereq #)
Sec 1, (186318) cr ar, Staff

SECOND TERM

5241. Practicum: Critically Ill Infants, Children, or Adults. (7 cr; Lect 0800-1245 M, Owre 2210, Rec 1010-1205 M, HSUnitF 4150, 4151, 4153, 4155, 4176; prereq 5240)
Provides experience in caring for critically ill children or adults under supervision of a preceptor.
Clinical 1, (089995) Bliss
Clinical 2, (889996) Fairbanks
Clinical 3, (689997) ar
Clinical 4, (489998) ar
Clinical 5, (289999) ar
Clinical 6, (190000) ar
Clinical 7, (090001) ar
Clinical 8, (890002) ar

5609. Special Educational Experiences in Nursing. (591130) (3 cr; prereq #; 0800-1745 W, HSUnitF ar) Camillo
Planned to meet individual needs.

5620. Independent Study in Nursing Topics. (489774) (cr ar; prereq #) Staff
See First Term.

5799. Self-Directed Study as a Means of Accomplishing Nursing Electives. (889383) (Cr ar; prereq #) Staff
See First Term.

8001. Special Educational Experiences in Nursing. (987317) (Cr ar; prereq #) Staff
See First Term.

8009. Special Topics. (587319) (Cr ar; prereq #) Staff

8051. Special Topics in Nursing Research. (687568) (1-9 cr) Staff
Seminar and/or individual study in nursing research.

8060. Advanced Clinical Nursing (587465) (3-9 cr; prereq #) Staff

8509. Special Topics: Nursing Education. (387466) (Cr ar; prereq #) Staff

8609. Special Topics in Nursing Supervision. (187467) (Cr ar; prereq #) Staff

8777. Thesis Credits: Masters. (788923) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588924) (1-36 cr [max 11 cr per summer term])

Nutrition (Nutr)

225 Food Science and Nutrition, St. Paul. 624-1290
(Food Science and Nutrition)
Colleges of Agriculture and Human Ecology

FIRST TERM

8777. Thesis Credits: Masters. (188711) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988712) (1-36 cr [max 11 cr per summer term])

8990. Graduate Research. (388066) (2-5 cr; prereq #)

SECOND TERM

8777. Thesis Credits: Masters. (388925) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188926) (1-36 cr [max 11 cr per summer term])

8990. Graduate Research. (788064) (2-5 cr; prereq #)

O

Obstetrics and Gynecology (Obst)

12-207 Moos Tower. 626-3503
Medical School

SPECIAL TERMS: JUNE 14- JULY 19 AND JULY 21- AUGUST 24

Elective Courses for Undergraduate Students

5500. Externship in Obstetrics and Gynecology: Primary Health Care of Women. (486552) (Cr ar; prereq regis med) Twiggs, staff

Six-week experience in clinical obstetrics and gynecology spent in hospitals: Hennepin County Medical Center, North Memorial, St. Mary's, Fairview, St. Paul-Ramsey, University, Duluth, and St. John's. Students may express hospital preference, but final assignments will be made by course coordinator. This is the core clinical course in obstetrics and gynecology for Years Three and Four students. All students meet at University Hospital Tuesday, Wednesday, and Thursday the first week and each Wednesday afternoon thereafter for didactic presentations.

5520. Obstetrics and Gynecology Externship in Clinical Practice.

(286553) (4.5 cr; prereq regis med), Twiggs, staff
Practical community experience in obstetrics and gynecology under preceptorship of one or more practicing members of clinical staff. Both office and hospital practice included. The student must obtain a letter from the desired community proctor stating the rotation is acceptable, and this must be received in the coordinator's office and approved prior to beginning the rotation.

5540. Advanced Externship in Obstetrics and Gynecology.

(186554) (Cr ar; prereq 5500) Twiggs
Full-time clinical experience as acting intern on obstetrical and gynecological service at Hennepin County Medical Center, St. Paul-Ramsey Medical Center, University Hospitals, and Waconia Clinic. Rotations in general obstetrics and gynecology (HCMC), high risk obstetrics (HCMC, UMH), gynecologic endocrinology and infertility (UMH), or gynecologic-oncology (UMH) are available.

5560. Research in Reproduction.

(986555) (Cr ar; prereq 5500) Twiggs, staff
Topics selected for each student or chosen by the student.

5575. Gynecological Pathology and Diagnostic Cytology.

(786556) (9 cr; prereq 5500) Okagaki, Brooker
Review of daily gynecological histopathology material of surgical and clinical cases from the Ob-Gyn Service. Includes diagnostic cytology of Pap smears encountered in actual practice.

5590. Preceptorship in Obstetrics and Gynecology.

(586557) (9 cr; prereq 5500) Twiggs
Full-time preceptorship in clinical obstetrics and gynecology, offered by AHEC. Similar to 5520.

Courses for Graduate Students

8201. Advanced Obstetrics and Gynecology I. (286648) (cr ar; required for first year fellows.)
Includes services in the University of Minnesota-affiliated hospitals (University, and Hennepin County

Medical Center) with ample experience in diagnosis, care, and treatment (operative and nonoperative) of patients.

8205. Advanced Obstetrics and Gynecology II.

(186649) (cr ar; required for second year fellows) Twiggs
Similar to 8201 but more advanced, both in clinical and research aspects of the subjects; adapted to increased training and experience of fellows.

8209. Advanced Obstetrics and Gynecology III.

(486650) (cr ar; required for third year fellows) Twiggs
Similar to 8205 but more advanced.

8213. Advanced Obstetrics and Gynecology IV.

(086658) (cr ar; prereq 8212)

8222. Gynecological Oncology.

(686663) (Cr ar; prereq 8221) Twiggs, staff

8223. Gynecological Oncology.

(286665) (Cr ar; prereq 8222) Twiggs, staff

8224. Gynecological Endocrinology-I.

(986667) (Cr ar; prereq 8223) Twiggs, staff

8225. Gynecological Endocrinology-II.

(986670) (Cr ar; prereq 8224) Twiggs, staff

8230. Research in Reproduction.

(286679) (Cr ar; prereq 8229) Twiggs, staff

8777. Thesis Credits: Masters.

(088717) (1-16 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters.

(688929) (1-16 cr [max 11 cr per summer term])

Operations and Management Sciences (OMS)

332 Management/Economics Building. 624-7010
Carlson School of Management

Refer to registration instructions for undergraduate Carlson School of Management courses on pages 12..

FIRST TERM

R.3000. Introduction to Operations Management. (689028) (4 cr; limited to 30 students; 1300-1430 MTWTh; BlegH 415; A-F only)

Concepts and principles related to the management of operations functions, including operations strategy, process design, just-in-time, forecasting inventory management, principles of scheduling, and quality improvement. Examples from service industries,

nonprofit organizations, and manufacturing stressing the relationships between operations and the environment from a managerial perspective.

8990. Readings in Operations and Management Science. (489029) (Cr ar; prereq #, grad SMgmt approval; A-F only)

8995. Graduate Research in Operations and Management Science. (889030) (Cr ar; prereq #, grad SMgmt approval; A-F only)

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

R.1020. Data Analysis and Statistical Inference for Managers. (889027) (4 cr; \$MSCI 1020, DSCI 1050, prereq IDSc 1010, Math 1111, Math 1131 recommended; limited to 45 students; Lec 0900-1015 TTh, BlegH 130; Lab 1100-1200 Th, BlegH 130; A-F only) Introduction to probabilistic and statistical techniques for decision making, including data analysis, sampling, estimation, and hypothesis testing and regression. Using computer software and computer-stored data in statistical analysis. Introduction to modeling and linear programming.

R.8051. Management of Service Operations. (191812) (4 cr; prereq MBA 8050 or OMS 3000 or #; limited to 17 students; A/F only; 1730-2100 M; BlegH 425)

Decision making for production of services and the improvement of productivity and quality in service firms. Specific topics include: measurement of service output, defining customer contact, classification of services, designing service delivery systems, capacity management in service firms, automation of services, and quality improvement of services. Lecture and case studies are used.

SECOND TERM

R.3000. Introduction to Operations Management. (689031) (4 cr; limited to 30 students; 1300-1430 MTWTh; BlegH 125; A-F only) See First Term.

8990. Readings in Operations and Management Science. (489032) (Cr ar; prereq #, grad SMgmt approval; A-F only)

8995. Graduate Research in Operations and Management Science. (289033) (Cr ar; prereq #, grad SMgmt approval; A-F only) See First Term.

Ophthalmology (Oph)

9th floor, Phillips-Wangenstein Building, 625-4400 Medical School

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

5100. Introduction to Anatomy, Histology, and Embryology. (486681) (1 cr; prereq physician or vet med student; 0715-0830 Th; PWB 9335) Cameron

8101. Clinical Ophthalmology. (186683) (8 cr; 0800-1700 MTWThF; PWB 9100) Krachmer, staff

8106. Strabismus Management. (188224) (1 cr; prereq grad physician or grad in veterinary science; 0730-0830 M; PWB 9339) Summers

8131. Practical Ocular Surgery. (986684) (3 cr; 0800-1200 MTWThF) Krachmer, staff

8142. Ophthalmic Pathology Laboratory. (586686) (2 cr; 1330-1530 M; PWB 9335) Cameron, staff

8152. Ophthalmology Laboratory. (386687) (15 cr) Krachmer, staff

8155. Special Topics in Ophthalmology. (086689) (1-3 cr; prereq #) Staff

Oral and Maxillofacial Surgery (OSur)

7-174 Moos Tower, 624-7133 School of Dentistry

FIRST TERM

5257. Ambulatory General Anesthesia. (986345) (1 cr) A clinical rotation involving experience in outpatient management utilizing intravenous sedation and general anesthesia.

5270. Oral and Maxillofacial Radiology Review. (189261) (1 cr) Weekly review and discussion of radiographs taken at University Hospitals relating to oral surgery procedures.

5275. Oral Pathology Review. (587546) (1 cr) Evaluation and microscopic interpretation of diagnostic tissue from oral and peri-oral areas. Other diagnostic information such as clinical appearance, history, and radiologic films is utilized. Course is based on individual participation in a seminar format.

5276. Medicine for the Oral Surgeon. (989262) (2 cr; prereq participation in oral surgery residency program) Rotation at Mt. Sinai Hospital on medical service under direction of University's Internal Medicine department. Rotation involves workup and admission, and daily management of patients on medical service.

5280. Advanced Oral and Maxillofacial Surgery for Postgraduate Dental Fellows. (089575) (1 cr; S-N only)

Basic principles of dental alveolar surgery and the introduction of advanced concepts and principles of oral and maxillofacial surgery for the general dentist. Instruction is provided in differential diagnosis of odontogenic infections, case and risk assessment, drug therapy in contemporary practice. Topics include preprosthetic surgery procedures, biopsy, surgical extraction of erupted and impacted teeth, root recovery, the management of intraoperative and postoperative complications, orthognathic and TMJ surgery, implants, and facial trauma.

8250. Advanced Oral and Maxillofacial Surgery. (786346) (cr ar) Assigned clinics in University Hospitals, Veterans Administration Medical Center, Hennepin County Medical Center, and School of Dentistry.

8251. Seminar: Oral and Maxillofacial Surgery. (289260) (1 cr) Topics in oral and maxillofacial surgery.

8252. Research in Oral and Maxillofacial Surgery. (586347) (Cr ar) Research in fields related to oral and maxillofacial surgery.

8253. Problems in Oral and Maxillofacial Surgery. (386348) (cr ar) Current literature review.

8255. General Surgery. (186349) (cr ar) Clinical rotation on the general surgical service at Fairview Hospital, Minneapolis. Includes seminars, clinics, and operating room experience.

8258. Anesthesia II Seminar. (586350) (1 cr) Outpatient general anesthesia topics and related subjects.

8280. Oral and Maxillofacial Surgery Clinical Pathology Conference. (789263) (1 cr) Evaluation and discussion of clinical, radiographic, and microscopic aspects of oral and perioral diseases and neoplasms. Individual participation in seminar format.

FIRST AND SECOND TERM: TEN-WEEK COURSE

(Register once in Term I)

5500. Evaluation in Oral and Maxillofacial Surgery. (090127) (1 cr; S-N only)

SECOND TERM

5257. Ambulatory General Anesthesia. (087017) (1 cr) See First Term.

5270. Oral and Maxillofacial Radiology Review. (389265) (1 cr) See First Term.

5275. Oral Pathology Review. (387547) (1 cr) See First Term.

5276. Medicine for the Oral Surgeon. (189266) (2 cr; prereq participation in an oral surgery residency program) See First Term.

5277. Physical Diagnosis for Oral and Maxillofacial Surgery Residents. (790414) (1 cr; prereq participation in oral and maxillofacial surgery residency program) Six-week didactic course coupled with evaluation of patients at University Hospital under direction of Department of Medicine and its faculty.

5280. Advanced Oral and Maxillofacial Surgery for Postgraduate Dental Fellows. (889576) (1 cr; S-N only) See First Term.

8250. Advanced Oral and Maxillofacial Surgery. (887018) (cr ar) See First Term.

8251. Seminar: Oral and Maxillofacial Surgery. (589264) (1 cr) See First Term.

8252. Research in Oral and Maxillofacial Surgery. (687019) (Cr ar) See First Term.

8253. Problems in Oral and Maxillofacial Surgery. (087020) (cr ar) See First Term.

8255. General Surgery. (887021) (ar cr) See First Term.

8258. Anesthesia II Seminar. (687022) (1 cr) See First Term.

8280. Oral and Maxillofacial Surgery Clinical Pathology Conference. (089267) (1 cr) See First Term.

Oral Biology (OBio)

17-252 Moos Tower, 624-9123 School of Dentistry

FIRST TERM

8001. Research in Oral Biology. (486342) (Cr ar)

8002. Tutorial in Oral Biology. (286343) (Cr ar [may be repeated for cr]; 2 hrs per wk=1 cr)

8024. Topics in Oral Biology. (888993) (1-3 cr [may be repeated for cr]; prereq #)

8777. Thesis Credits: Masters. (588714) (1-16 cr [max 11 cr per summer term])



COURSE DESCRIPTIONS

8888. Thesis Credits: Doctoral.
(188716) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8001. Research in Oral Biology.
(587014) (Cr ar)

8002. Tutorial in Oral Biology.
(387015) (Cr ar [may be repeated for cr]; 2 hrs per wk=1 cr)

8777. Thesis Credits: Masters.
(088927) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(888928) (1-36 cr [max 11 cr per summer term])

Oral Pathology (OPat)

16-116 Moos Tower. 624-2463
School of Dentistry

FIRST TERM

5017. Oral Pathology Clinic. (189034)
(Cr ar)
Resident participates in management of Oral Pathology Clinic patients at the School of Dentistry and serves as oral pathology consultant with designated staff in school's screening facilities.

8001. Research in Oral Pathology.
(286262) (cr ar)

8004. Histopathology. (186344) (2 cr)
Weekly presentation of various pathologic cases in which methods of diagnosis are stressed. Clinical or radiographic aspects utilized. Covers the spectrum of oral and paraoral pathology.

8006. Current Literature Review.
(989035) (1 cr)
Seminars on a variety of research problems, topics, and areas of special interest between graduate students and oral pathology faculty. Students expected to determine both subjects for discussion and nature of discussions.

8011. Surgical Oral Pathology.
(189154) (Cr ar)
Residents and graduate students participate as staff assistants in diagnosis of oral diseases. Histopathologic, frozen section, clinical, cytologic, cytogenetic, microbiologic, hematologic, radiologic, and other diagnostic means are utilized.

SECOND TERM

5017. Oral Pathology Clinic. (688493)
(Cr ar)
See First Term.

8001. Research in Oral Pathology.
(186263) (cr ar)

8004. Histopathology. (187016) (2 cr)
See First Term.

8006. Current Literature Review.
(789036) (1 cr)
See First Term.

8011. Surgical Oral Pathology.
(089155) (Cr ar)
See First Term.

Oral Radiology (ORad)

7-158 Moos Tower, 625-8418
School of Dentistry

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

5500. Evaluation in Diagnostic/Surgical Sciences. (890128) (1 cr; S-N only)

Orthodontics (Otho)

6-320 Moos Tower. 625-5110
School of Dentistry

FIRST TERM

Required Courses for Graduate Students

5004. Clinical Orthodontics. (386351)
(Cr ar)
Students are assigned patients for the complete management of orthodontic and orthodontically related occlusal problems under direct staff supervision. Credits from this course may not be used for degree programs.

8001. Research in Orthodontics.
(988211) (Cr ar)

8203. Growth and Development.
(186352) (Cr ar)
Head growth, development, osteology and myology. Includes both normal and abnormal morphology and function; cephalometric methods.

8207. Orthodontic Diagnosis and Treatment Planning. (086353) (Cr ar)
Etiology, treatment, and prognosis of clinical orthodontic patients.

8211. Orthodontic Seminar. (886354)
(Cr ar)
Review of current literature and discussion of current research and its implications.

8219. Topics in Orthodontics.
(686355) (Cr ar)
Studies in special topics for advanced students.

SECOND TERM

5004. Clinical Orthodontics. (487023)
(Cr ar)
See First Term.

8001. Research in Orthodontics.
(288268) (Cr ar)

8203. Growth and Development.
(287024) (Cr ar)
See First Term.

8207. Orthodontic Diagnosis and Treatment Planning. (187025) (Cr ar)
See First Term.

8211. Orthodontic Seminar. (987026)
(Cr ar)
See First Term.

8219. Topics in Orthodontics.
(787027) (Cr ar)
See First Term.

Orthopaedic Surgery (OrSu)

Variety Club Heart & Research Center
Rm. 350. 625-1177
Medical School

FIRST TERM

8777. Thesis Credits: Masters.
(788503) (1-16 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register Once in Term I)

Required Courses for Graduate Students

8401. Orthopaedic Conference.
(186710) (3 cr) Thompson, House, Premer, Robinson, Craig, Ogilvie
Review of X-ray films and case histories of patients on the orthopaedic inpatient or outpatient service.

8403. Fractures. (488396) (5 cr)
Gustilo
Orthopaedic fellow acts as house surgeon on the fracture service at Hennepin County Medical Center.

8405. Orthopaedic Diagnosis.
(286715) (3 cr) Thompson, House, Robinson, Craig, Ogilvie, Arendt
Orthopaedic fellow assists in instruction of medical students and interns and studies problems in diagnosis in the Outpatient Department and in University Hospital.

8407. Pediatric Orthopaedics.
(986717) (5 cr) Staff
Orthopaedic fellow acts as house surgeon at Gillette Children's Hospital.

8408. Orthopaedic Problems and Management. (786718) (5 cr)
Thompson, House, Premer, Robinson, Craig, Ogilvie, Arendt
Orthopaedic fellow acts as house surgeon at University and Veterans hospitals.

8409. Orthopaedic Problems and Management. (786721) (5 cr) Aamoth
Orthopaedic fellow acts as house surgeon on the orthopaedic service at Fairview Hospital.

8410. Orthopaedic Pathology.
(386723) (2 cr) Thompson, House, Premer, Robinson, Craig, Ogilvie, Arendt
Seminar for systematic review of pathology of ossified tissues and soft tissues of the extremities.

8411. Orthopaedic Operative Surgery. (686727) (5 cr) Thompson, House, Premer, Robinson, Craig, Ogilvie, Arendt
Orthopaedic fellow acts as first assistant at operations at University and affiliated hospitals and later may be permitted to operate.

8412. Orthopaedic Anatomy.
(486731) (2 cr) House
Orthopaedic fellow dissects upper and lower extremities and aids in instruction of medical students in anatomy of the extremities.

8416. Orthopaedic Research.
(186733) (5 cr) Thompson, House, Robinson, Craig, Ogilvie, Arendt
Problems in experimental or clinical surgery, University Hospital.

SECOND TERM

8777. Thesis Credits: Masters.
(388584) (1-16 cr [max 11 cr per summer term])

Otolaryngology (Otol)

8-240 Phillips-Wangensteen Building.
625-3200
Medical School

SPECIAL TERMS: THREE-, SIX-, AND TWELVE-WEEK COURSES

5970. Directed Studies. (185315) (Cr ar; prereq #)

8250. Advanced Biochemistry of the Auditory System. (589037) (2 cr; prereq MdBc 5100, MdBc 5101 or equiv or #) Juhn

FIRST TERM

8777. Thesis Credits: Masters.
(588504) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(388505) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (488589) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488592) (1-36 cr [max 11 cr per summer term])

P

Pathobiology (Path)

D-242 Mayo. 625-9171
(Laboratory Medicine and Pathology)
Medical School

FIRST TERM

8888. Thesis Credits: Doctoral. (188506) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

Courses for Graduate Program

5141. Problems in Experimental and Clinical Chronobiology. (686761) (Cr ar;)

8201. Research. (486762) (Cr ar; Staff Students with the necessary preliminary training may elect research either as a major or minor in pathobiology.)

SECOND TERM

8888. Thesis Credits: Doctoral. (788596) (1-36 cr [max 11 cr per summer term])

Pediatric Dentistry (Pedo)

6-150 Moos Tower. 624-2161
School of Dentistry

FIRST TERM

5414. Advanced Clinical Pedodontics. (486356) (Cr ar;)
Assignment of patients for treatment of difficult or unusual pedodontic problems under direct faculty supervision.

8001. Research. (286357) (Cr ar)

8290. Hospital Pedodontics I. (186358) (Cr ar; S-N only)
Diagnosis and treatment of difficult and unusual problems in children with various handicapping conditions in

the Children's Physical Medicine and Rehabilitation Center under direct faculty supervision. Includes pre-op and post-op discussion of faculty-supervised general anesthetic cases, and seminar discussion of operating room techniques and procedures, pharmaceutical adjuncts for dental procedures.

8291. Hospital Pedodontics II. (986359) (Cr ar; S-N only)
Diagnosis and treatment of pedodontic problems under direct faculty supervision at Hennepin County Medical Center. Includes participation on a rotation basis in seminars in pediatrics and anesthesia conducted by staff. Pre-op and post-op seminar discussion and evaluation of treatment plans.

8292. Pedodontic Literature. (988192) (2 cr)
In-depth literature review and seminar discussion of specific pedodontic topics.

8294. Pedodontic Diagnosis and Treatment Planning. (286360) (Cr ar)
Systematic approach to diagnosis and treatment planning for various pedodontic problems.

SECOND TERM

5414. Advanced Clinical Pedodontics. (387029) (Cr ar)
See First Term.

8001. Research. (787030) (Cr ar)

8290. Hospital Pedodontics I. (387032) (Cr ar; S-N only)
See First Term.

8291. Hospital Pedodontics II. (187033) (Cr ar; S-N only)
See First Term.

8293. Advanced Pedodontics Techniques. (087034) (Cr ar)
Description and exercises in advanced pedodontic skills and techniques.

8295. Independent Pedodontic Study. (687036) (Cr ar)
Review of pertinent literature and preparation of a position paper on an assigned topic.

8298. Interdisciplinary Care of the Cleft Palate Patient. (186909) (1 cr; S-N only)
Comprehensive surgical, dental, speech and hearing evaluation and management of patients with cleft lip and palate.

Periodontics (Pero)

7-368 Moos Tower. 625-2418
School of Dentistry

FIRST TERM

8250. Supporting Structures of the Teeth. (188210) (Cr ar)

Gingival tissues, cementum, periodontal ligament, and alveolar bone discussed from a histological, physiological, and pathological point of view.

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

5222. Dentistry and Systematic Health Care. (890193) (1 cr; prereq grad stu in dentistry; S/N only)
Seminar designed to improve the dentist's knowledge about treating medically compromised patients. Subjects covered include cardiac murmurs, coagulation, diabetes mellitus, organ transplants, hypertension, radiation and chemotherapy for oncology patients, and control of transmittable diseases.

5500. Evaluation in Periodontology. (690129) (1 cr; prereq p; S-N only)

8000. Advanced Clinical Periodontology. (186361) (Cr ar)
Clinical training in examination, diagnosis, treatment planning, and various phases of prevention and treatment of periodontal disease.

8200. Lectures. (986362) (Cr ar)
Clinical cases are discussed from a diagnostic, treatment planning, and therapeutic viewpoint.

8300. Seminar: Periodontology. (786363) (Cr ar)
Discussion of assigned weekly literature reviews. Preparation of assigned formal literature reviews.

SECOND TERM

5222. Dentistry and Systematic Health Care. (390206) (1 cr; prereq graduate students in dentistry; S/N only)
See First Term.

Pharmaceutics (Phm)

9-177 Health Sciences Unit F. 624-5151
College of Pharmacy

FIRST TERM

8200. Research Problems. (285032) (cr ar;)

8777. Thesis Credits: Masters. (888511) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688512) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8200. Research Problems. (790137) (cr ar;)

8777. Thesis Credits: Masters.

(488639) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488642) (1-36 cr [max 11 cr per summer term])

Pharmaceutics, Undergraduate (Phmc)

Pharmacy Student Affairs Office,
5-110 Health Sciences Unit F. 624-9490
College of Pharmacy

FIRST TERM

5970. Directed Studies. (986913) (1-5 cr; prereq #)

5999. Special Problems. (786914) (Cr and hrs ar; prereq #)

SECOND TERM

5970. Directed Studies. (586915) (1-5 cr; prereq #)

5999. Special Problems (386916) (Cr and hrs ar; prereq #)

Pharmacology (Phcl)

3-249 Millard Hall. 625-9997
Medical School

FIRST TERM

5109. Problems in Pharmacology. (086787) (Cr and hrs ar; prereq grad or upper div stu or #) Loh, staff

8203. Research in Pharmacology. (589779) (Cr and hrs ar; prereq #; A/F only) Loh, staff

8777. Thesis Credits: Masters. (088507) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888508) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5109. Problems in Pharmacology. (887052) (Cr and hrs ar; prereq grad or upper div stu or #) Loh, staff

8203. Research in Pharmacology. (789778) (Cr and hrs ar; prereq #; A/F only) Loh, staff

8777. Thesis Credits: Masters. (288626) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988628) (1-36 cr [max 11 cr per summer term])

COURSE DESCRIPTIONS

Pharmacy Practice (Phar)

Pharmacy Student Affairs Office,
5-110 Health Sciences Unit F. 624-
9490
College of Pharmacy

FIRST TERM

5210. Terminology of the Health Sciences. (490097) (2 cr, \$HSU 5210) McKennell

A modern programmed learning course with the most current usage and traditional components; the language of health care delivery. For information go to room 5120 HSUnitF before the first day of class.

5290. Specialty Clerkships. (585036) (1-16 cr)

Practice experience with specialized populations.

5291. Specialty Externship. (389038) (1-12 cr)

Advanced or specialty drug distribution or pharmacy management experience conducted at participating practice sites.

5970. Directed Studies. (285029) (1-5 cr; prereq #)

5999. Special Problems. (685030) (Cr ar; prereq #)

SPECIAL TERM: JUNE 20-

August 14

(Register once in Term I)

5550. Pharmacy Practice Clerkship: Acute Care. (886919) (4-8 cr; prereq Pharm.D. IV student; A/F only)

5551. Pharmacy Practice Clerkship: Clinical Pharmacokinetics. (186920) (4 cr; prereq Pharm.D. IV student; A/F only)

5552. Pharmacy Practice Clerkship: Pediatrics. (086921) (4 cr; prereq Pharm.D. IV student; A-F only)

5553. Pharmacy Practice Clerkship: Clinical Elective I. (886922) (4-8 cr; prereq Pharm.D. IV student; A-F only)

5554. Pharmacy Practice Clerkship: Clinical Elective I. (686923) (4-8 cr; prereq Pharm.D. IV student; A-F only)

5555. Pharmacy Practice Clerkship: Clinical Elective II. (988158) (4-8 cr; prereq Pharm.D. IV student; A-F only)

5556. Pharmacy Practice Clerkship: Clinical Elective III. (788159) (4-8 cr; prereq Pharm.D. IV student; A-F only)

5557. Pharmacy Practice Clerkship: Special Elective II. (188160) (4-8 cr; prereq Pharm.D. IV student; A-F only)

5558. Pharmacy Practice Clerkship: Special Elective III. (988161) (4-8 cr; prereq Pharm.D. IV student; A-F only)

5391. Pharm.D Community Externship-June 20-August 14. (186917) (4-8 cr; prereq Pharm.D. III student; A-F only)

5393. Pharm.D Hospital Externship-June 20-August 14. (086918) (4-8 cr; prereq Pharm.D. III student; A-F only)

SECOND TERM

5210. Terminology of the Health Sciences. (290098) (2 cr, \$HSU 5210) McKennell
See First Term.

5290. Specialty Clerkships. (785035) (1-16 cr)
See First Term.

5291. Specialty Externship. (389041) (1-12 cr)
See First Term.

5970. Directed Studies. (685027) (1-5 cr; prereq #)

5999. Special Problems. (485028) (Cr ar; prereq #)

Philosophy (Phil)

355 Ford Hall. 625-6563
College of Liberal Arts

FIRST TERM

1001. Introduction to Logic. (285659) (5 cr; 1030-1130 MTWThF; FordH 120) Lewis
Application of formal techniques for evaluating arguments.

1002. Introduction to Philosophy. (188344) (5 cr; 1030-1210 TWTh; BlegH 110) Peterson
Problems, principal methods, and schools of philosophy; historical and contemporary views.

1003. Introduction to Ethics. (091942) (5 cr; 0915-1055 TWTh; FordH 175) Waters
Problems that arise when human beings attempt to think systematically about conduct and value.

3001. General History of Western Philosophy. (489886) (5 cr; 1030-1210 MWF; AmundH 156) Dahl
Greek philosophy, pre-socratics, Socrates, Plato, Aristotle.

3105. Introduction to the Theory of Knowledge. (891943) (4 cr; prereq 1001 or #:0915-1055 TWTh; FordH 170) Root
Theories and problems concerning evidence, belief, and knowledge.

3970. Directed Studies. (685660) (1-5 cr; prereq #, Δ, college approval) staff

5970. Directed Studies and Research. (285662) (1-5 cr; prereq #, Δ, CLA approval) staff

5990. Directed Studies and Research. (689188) (4 cr; prereq #, Δ, CLA approval)

8777. Thesis Credits: Masters. (688509) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088510) (1-36 cr [max 11 cr per summer term])

8970. Directed Study and Research. (785665) (1-4 cr; prereq passed written prelim exam for the PhD in philosophy) staff

SECOND TERM

1001. Introduction to Logic. (186599) (5 cr; 0915-1015 MTWThF; FordH 70) Hanson
See First Term.

1002. Introduction to Philosophy. (191941) (5 cr; 0915-1055 TWTh; FordH 175) Mason
Problems, principal methods, and schools of philosophy; historical and contemporary views.

3003. General History of Western Philosophy. (190482) (5 cr, 1145-1320 TWTh; FordH 175) Gunderson
Modern Philosophy from Descartes through Hume.

3305. Medical Ethics. (288349) (5 cr, 0840-1015 TWTh; AmundH 162) Hopkins
Moral problems confronting physicians, patients, and others concerned with medical treatment, research, and health care policy.

3970. Directed Studies. (186609) (1-5 cr; prereq #, Δ, college approval) staff

5970. Directed Studies and Research. (586610) (1-5 cr; prereq #, Δ, CLA approval) staff

8777. Thesis Credits: Masters. (788632) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388634) (1-36 cr [max 11 cr per summer term])

8970. Directed Study and Research. (186612) (1-4 cr; prereq passed written prelim exam for the PhD in philosophy; #) staff

Physical Education (PE)

224 Cooke Hall. 625-1007
(School of Kinesiology and Leisure Studies)
College of Education

Courses listed are for students interested in taking physical activity classes for elective credit.

All activity courses listed below are high intensity (participation requiring a high level of energy expenditure) except those otherwise indicated. It is therefore recommended that students who have questions about their ability to participate safely in the physical activities involved in a course seek advice from a physician. All undergraduate, graduate, and professional licensure courses for physical education, adapted physical education, and athletic coaching are listed under KINESIOLOGY. (KIN).

FIRST TERM

R.1007. Swimming. (785519) (1 cr; limited to 22 students; prereq nonswimmer; 0915-1015 MTWTh; CookeH 10)

Course for nonswimmers includes aquatic breathing, floating, bobbing, treading, finning, human stroke, elementary backstroke, sidestroke, front crawl.

R.1014. Conditioning. (289890) (1 cr; limited to 40 students; 0915-1015 MTWTh, Fieldhouse)
Improvement of physical fitness through running, circuit training, and progressive exercises.

R.1015. Weight Training. (189891) (1 cr; limited to 30 students; 1030-1130 MTWTh, URecCtr)
Fundamentals including techniques, theory, and individualized exercise prescription.

R.1029. Handball. (890730) (1 cr; limited to 22 students; 0800-0900 MTWTh, URecCtr)
Basic fundamentals of skills and shots; rules and game strategy.

R.1036. Racquetball. (690731) (1 cr; limited to 20 students; 0915-1015 MTWTh, URecCtr)
Fundamentals of skills and shots; rules and game strategy.

R.1037. Squash Racquets. (490732) (1 cr; limited to 22 students; 0800-0900 MTWTh, URecCtr)
Fundamental strokes and rules with game situations emphasized.

R.1038. Tennis. (1 cr; each section limited to 24 students)
Fundamental strokes of service, forehand and backhand, drives and volley; court positions and strategy for singles and doubles; rules, terminology, and etiquette.
Sec 1, (185520) 0800-0900 MTWTh, Fieldhouse, Tennis Courts
Sec 2, (985521) 0915-1015 MTWTh, Fieldhouse, Tennis Courts
Sec 3, (991612) 1030-1130 MTWTh, Fieldhouse, Tennis Courts

R.1048. Bowling. (1 cr; moderate intensity; each section limited to 32 students)
For the beginning student. Fundamentals of the stance, approach, and delivery; scoring; bowling terminology, and etiquette.

Sec 1, (886855) 0800-0900 MTWTh,
CMU B55
Sec 2, (185380) 0915-1015 MTWTh,
CMU B55

R.1050. Golf. (1 cr; moderate intensity; each section limited to 21 students)
Fundamentals; stance, and swing; etiquette and rules.
Sec 1, (785522) 1030-1130 MTWTh, Golf Course
Sec 2, (385524) 1145-1245 MTWTh, Golf Course

R.1074. Volleyball. (589023) (1 cr; limited to 36 students; 1030-1130 MTWTh; URecCtr)
Fundamental skills and rules of volleyball; basic team play and strategy.

R.1107. Swimming. (085381) (1 cr; limited to 25 students; prereq ability to swim 100 yards; 1030-1130 MTWTh; CookeH 10)
Deep water skills, elementary back stroke, side stroke, front crawl, back crawl, elementary diving, and distance swimming.

R.1138. Tennis. (191611) (1 cr; limited to 24 students; 1300-1400 MTWTh, Fieldhouse, Tennis Courts
Improvement of basic skills, increased emphasis on single and doubles strategy and competitive play.

R.1205. Scuba and Skin Diving. (291610) (1 cr; limited to 18 students; 0800-1000 TTh, Cooke 15, Cooke 400) Whortenburg
Initial course. Certification issued to those who successfully complete the course.

SECOND TERM

R.1007. Swimming—July 21-August 17. (1 cr; prereq nonswimmer; each section limited to 22 students)
See First Term.
Sec 1, (986328) 0800-0900 MTWThF, CookeH 10
Sec 2, (389024) 1030-1130 MTWThF, CookeH 10

R.1014. Conditioning—July 21-August 17. (686856) (1 cr; limited to 40 students; 0800-0900 MTWThF; Fieldhouse)
See First Term.

R.1015. Weight Training—July 21-August 17. (786329) (1 cr; limited to 30 students; 0915-1015 MTWThF; URecCtr)
See First Term.

R.1036. Racquetball—July 21-August 17. (290733) (1 cr; limited to 20 students; 0915-1015 MTWThF, URecCtr)
See First Term.

R.1038. Tennis—July 21-August 17. (1 cr; each section limited to 24 students)
See First Term.
Sec 1, (186330) 0800-0900 MTWThF, Fieldhouse, Tennis Courts

Sec 2, (986331) 0915-1015 MTWThF, Fieldhouse, Tennis Courts

R.1050. Golf—July 21-August 17. (1 cr; moderate intensity; each section limited to 21 students)
Sec 1, (486857) 0915-1015 MTWThF, Golf Course
Sec 2, (688090) 1030-1130 MTWThF, Golf Course
See First Term.

R.1107. Swimming—July 21-August 17. (186232) (1 cr; limited to 24 students; prereq ability to swim 100 yards; 0915-1015 MTWThF; CookeH 10)
See First Term.

R.1138. Tennis—July 21-August 17. (986233) (1 cr; limited to 24 students; prereq 1038 or equiv; 1300-1400 MTWThF; Fieldhouse, Tennis Courts)
See First Term.

R.1205. Scuba and Skin Diving. (786234) (1 cr; limited to 18 students; prereq 1107 or equiv; 0800-1000 T, MechE 202, 0800-1000 Th, CookeH 15) Whortenburg
See First Term.

Physical Medicine and Rehabilitation (PMed)

860 Mayo. 626-5961
Medical School

FIRST TERM

5396. Field Work Education in Occupational Therapy. (486793) (Cr ar; prereq regis OT; S-N only) Berkeland, Meyers

5397. Field Work Education in Occupational Therapy. (186795) (Cr ar; prereq 5396; S-N only) Berkeland, Meyers

5398. Field Work Education in Occupational Therapy. (286908) (1 cr; prereq regis OT; S-N only) Meyers

5410. Adult Rehabilitation Medicine. (587594) (Cr ar; prereq regis med)

5414. Physical Medicine and Rehabilitation for the Family Physician. (985020) (Cr ar; prereq regis med)

5415. Private Practice in Physical Medicine and Rehabilitation. (585148) (4.5-9 cr; prereq regis med)

5416. Physical Medicine and Rehabilitation at St. Paul Ramsey. (385149) (Cr ar; prereq regis med)

5441. Adult Physical Medicine, Rehabilitation: Health Care Psychology Interns. (985177) (Cr ar; prereq #)

5817. Special Topics in Physical Therapy. (085316) (1-3 cr) DiFabio, staff

8103. Clinic. (986796) (Cr ar; prereq regis PT) Ellingham

8130. Seminar: Current Literature in Physical Therapy. (187848) (1 cr) Scudder, DiFabio

8170. Special Topics in Physical Therapy. (986779) (1 cr; prereq #) DiFabio, staff

8185. Problems in Physical Therapy. (286780) (Cr ar; prereq regis PT) DiFabio, staff

8193. Research Problems in Physical Therapy. (186781) (Cr ar; prereq 8192 or #) DiFabio, staff

8195. Research in Physical Therapy. (786783) (Cr ar; prereq #) DiFabio, staff

8200. Physical Medicine and Rehabilitation Service. (686789) (Cr and hrs ar) Awad, staff

8205. Readings in Physical Medicine and Rehabilitation. (886791) (1-2 cr [max 2 cr]; 0900-0955 M) Dykstra

8206. Conference on Physical Medicine and Rehabilitation. (685125) (2 cr; 0800-0900 F) Dykstra

8207. Basic and Applied Physiatry. (487569) (2 cr; 0800-0900 M) staff

R.8210. Research in Physical Medicine. (085008) (ar cr; limited to 10 students)

R.8212. Electromyography. (885009) (Cr and hrs ar; limited to 10 students; prereq #) Dykstra

8214. Readings in Electromyography. (686887) (1 cr; max 3 cr; prereq #; 0900-1000 F) Dykstra

8220. Seminar: Physical Medicine and Rehabilitation. (485126) (Cr ar; 0800-0900 W) Dykstra

8777. Thesis Credits: Masters. (988581) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588583) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5255. Clinical Education in Physical Therapy. (287847) (Cr ar; regis PT) Ellingham
Five weeks of supervised practice at affiliated hospitals.

5817. Special Topics in Physical Therapy. (885317) (1-3 cr) DiFabio

8103. Clinic. (687053) (Cr ar; prereq regis PT) Ellingham

8130. Seminar: Current Literature in Physical Therapy. (487846) (1 cr) Scudder, DiFabio

8170. Special Topics in Physical Therapy. (487054) (1 cr; prereq #) DiFabio, staff

8185. Problems in Physical Therapy. (287055) (Cr ar; prereq regis PT) DiFabio, staff

8193. Research Problems in Physical Therapy. (187056) (Cr ar; prereq 8192 or #) DiFabio, staff

8195. Research in Physical Therapy. (987057) (Cr ar; prereq #) DiFabio

8777. Thesis Credits: Masters. (088748) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888749) (1-36 cr [max 11 cr per summer term])

Physics (PhyS)

148 Physics. 624-7375
Institute of Technology

FIRST TERM

R.3970. Directed Studies. (385023) (1-5 cr; prereq #, Δ; limited to 10 students)
Independent directed study in areas arranged by the student and a faculty member.

R.5124. Experimental Project. (386947) (Cr ar; prereq 5123, #; limited to 10 students)
Research project in some aspect of contemporary physics. Project must be approved by faculty coordinator prior to registration.

R.5940. Physics for High School Teachers: Experimental Foundations and Historical Perspectives: Acoustics—June 20-July 22. (186206) (5 cr; [no cr for physics grad students or grad minors in physics]; prereq general physics, #; may be repeated for credit; 8-10 lecture hours and 18 lab activity hours per week; qualified students may register for graduate credit at the University of Minnesota; limited to 24 students; 0800-1600 MTWThF; offered at Bakken Library, 3537 Zenith Avenue South, Minneapolis) Kipnis

For teachers of physics and physical science. Historical approach is combined with investigative experimentation for an in-depth examination of a conceptual theme in physics and its experimental foundations and historical perspectives. Typical themes are kinematics and dynamics from Aristotle through Einstein; the nature of change; the nature of light; energy and thermodynamics; electricity, magnetism, and quantized fields; the structure of matter. For more information call the Bakken Institute, 927-6508.



COURSE DESCRIPTIONS

R.5970. Directed Studies. (585165) (1-5 cr; prereq #, Δ; limited to 10 students)
See 3970.

R.5990. Directed Research. (987558) (Cr ar; prereq 3rd yr, Δ; limited to 10 students)
Problems, experimental or theoretical, of special interest to students. Written reports.

R.8500. Plan B Project. (289047) (4 cr [no cr toward PhD]; prereq #; limited to 5 students; S-N only)
May be taken once to satisfy project requirement for Plan B master's program. May appear on master's program but does not count toward 20-credit minimum in major field. Project topic to be arranged between student and instructor. Written report required.

8777. Thesis Credits: Masters. (188515) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988516) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

R.1041. Introductory Physics. (5 cr; each lab limited to 18 students; prereq high school algebra and plane geometry; lecture 0800-0900 MTWF; Phys 170)
Lecture, recitation, and lab sessions. Primarily for students interested in technical areas. Fundamental principles of physics in the context of the everyday world; the use of kinematics, dynamics, and conservation principles together with quantitative, and qualitative problem solving techniques to understand phenomena of mechanics, electromagnetism, and the structure of matter.

Lab 1, (490844) 0915-1130 F; rec 0800-0900 Th, Phys 143
Lab 2, (190846) 0915-1130 T; rec 0800-0900 Th, Phys 157
Lab 3, (790848) 0915-1130 W; rec 0800-0900 Th, Phys 236A

R.1042. Introductory Physics. (5 cr; each lab limited to 18 students; prereq 1041; lecture 1030-1130 MTWF; Phys 133)
See 1041.

Lab 1, (390870) 0800-1015 Th; rec 1030-1130 Th, LindH 315
Lab 2, (191933) 0800-1015 W; rec 1030-1130 Th, LindH 320

R.1251. General Physics I. (4 cr; \$1271 thru 1291, 1311 thru 1341, 1411H thru 1441H, 1451 thru 1454H; limited to 18 students; prereq Math 1251 or ¶ 1251; lecture 0800-0900 MTWF; Phys 133)
Lab 1, (390853) 0915-1130 W; rec 0800-0900 Th, LindH 303
Lab 2, (090855) 0915-1130 Th; rec 0800-0900 Th, LindH 320

R.1252. General Physics II. (4 cr; \$1271 thru 1291, 1311 thru 1341, 1411H thru 1441H, 1451 thru 1454H; each lab limited to 18 students; prereq 1251, Math 1252 or ¶ 1252; lecture 0915-1015 MTWF; Phys 133)
Lab 1, (690860) 1030-1245 W; rec 0915-1015 Th, Phys 157
Lab 2, (290862) 1030-1245 W; rec 0915-1015 Th, Phys 236A

R.1253. General Physics III. (4 cr; \$1271 thru 1291, 1311 thru 1341, 1411H thru 1441H, 1451 thru 1454H; each lab limited to 18 students; prereq 1252, Math 1261 or ¶ 1261; lecture 1030-1130 MTWF; Phys 170)
Lab 1, (790865) 0800-1015 W; rec 1030-1130 Th, Phys 236A
Lab 2, (390867) 0800-1015 Th; rec 1030-1130 Th, Phys 157

SECOND TERM

R.3970. Directed Studies. (185024) (1-5 cr; prereq #, Δ; limited to 10 students)
See First Term.

R.5124. Experimental Project. (086207) (Cr ar; prereq 5123, #; limited to 10 students)
See First Term.

R.5970. Directed Studies. (385166) (1-5 cr; prereq #, Δ; limited to 10 students)
See First Term.

R.5990. Directed Research. (187557) (Cr ar; prereq 3rd yr, Δ; limited to 10 students)
See First Term.

R.8500. Plan B Project. (189048) (4 cr [no cr toward PhD]; prereq #; limited to 5 students; S-N only)
See First Term

8777. Thesis Credits: Masters. (188733) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888735) (1-36 cr [max 11 cr per summer term])

Physiology (Phsl)

6-255 Millard Hall. 625-5902
Medical School

FIRST TERM

5113. Problems in Physiology. (386785) (Cr and hrs ar; prereq #) Staff
Topics assigned for laboratory study; conferences and readings.

5552. Readings in Physiology. (186786) (Cr and hrs ar) Staff
Topics selected for each student; written reviews prepared and discussed.

5553. Research in Physiology. (886788) (Cr and hrs ar) Staff

8113. Problems in Physiology. (086790) (Cr and hrs ar; prereq #) Staff
Topics assigned for laboratory study; conferences and readings.

8202. Readings in Physiology. (286794) (Cr and hrs ar) Staff
Topics selected for each student; written reviews prepared and discussed.

8203. Research in Physiology. (686792) (Cr and hrs ar) Staff

8777. Thesis Credits: Masters. (488513) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288514) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5552. Readings in Physiology. (087468) (Cr and hrs ar) Staff
See First Term.

5553. Research in Physiology. (887469) (Cr and hrs ar) Staff

8202. Readings in Physiology. (187470) (Cr and hrs ar) Staff
See First Term.

8203. Research in Physiology. (087471) (Cr and hrs ar) Staff

8777. Thesis Credits: Masters. (988645) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388648) (1-36 cr [max 11 cr per summer term])

Plant Biology (PBio)

220 Biological Science, St. Paul. 625-1234
College of Biological Science

FIRST TERM

R.5801. Plains and Boreal Flora. (090113) (5 cr; limited to 20 students; prereq course in taxonomy, Δ; 0800-1700 TF; Itasca) Vanderpool
Survey of the summer flowering plants and ferns of the state with particular reference to the local flora. Identification by technical keys; important plants families; field recognition of common species; habitat preferences, collecting methods; literature; taxonomic methods.

5890. Research Problems. (089009) (1-5 cr per qtr; prereq admitted to Itasca Biology Program, Δ)
Individual research for undergraduates and graduates. (Taught at Itasca)

5970. Directed Studies. (189008) (Cr ar; prereq #, Δ) Staff

5990. Directed Research. (389007) (Cr ar; prereq #, Δ) Staff
Laboratory or field investigation of selected areas of research.

8777. Thesis Credits: Masters. (088572) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788730) (1-36 cr [max 11 cr per summer term])

8990. Research Problems. (589006) (Cr ar; prereq #, Δ) Staff

SECOND TERM

5970. Directed Studies. (389010) (Cr ar; prereq #, Δ) Staff

5990. Directed Research. (189011) (Cr ar; prereq #, Δ) Staff
See First Term.

8777. Thesis Credits: Masters. (688669) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988791) (1-36 cr [max 11 cr per summer term])

8990. Research Problems. (089012) (Cr ar; prereq #, Δ) Staff

Plant Breeding (PIBr)

411 Borlaug Hall, St. Paul. 625-7773
(Agronomy and Plant Genetics)
College of Agriculture

FIRST TERM

8777. Thesis Credits: Masters. (788517) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588518) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (488737) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188739) (1-36 cr [max 11 cr per summer term])

Plant Pathology (PIPa)

495 Borlaug Hall, St. Paul. 625-8200
College of Agriculture

FIRST TERM

3090. Research in Plant Pathology. (485210) (Cr ar; prereq 1001 or equiv or #) Staff

8090. Advanced Procedures and Research in Plant Pathology. (585263) (Cr ar) Staff

Special assignment in laboratory and field problems in pathological research.

8508. Research in Plant Pathology. (689787) (1-8 cr; S-N only) Staff
Laboratory or field research in selected areas of plant pathology.

8777. Thesis Credits: Masters. (388519) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788744) (1-36 cr [max 11 cr per summer term])

**FIRST AND SECOND TERMS:
TEN-WEEK COURSES**
(Register once in Term I)

5000. Professional Experience Program. (588082) (4 cr; prereq #; ar) Percich

5204. Field Plant Pathology. (391453) (2 cr; prereq 3001 or 3002 or 5200, 5201; 1200-1700 Th, BorH 491) MacDonald

5205. Plant Disease Diagnosis. (2 cr; prereq intro plant path crse or #; lecture 0900-1000 T, BorH 491) Lockhart
Lab 1, (091455) 1000-1200 T, BorH 295, Lockhart

SECOND TERM

3090. Research in Plant Pathology. (285211) (Cr ar; prereq 1001 or equiv or #) Staff

8090. Advanced Procedures and Research in Plant Pathology. (386205) (Cr ar) Staff
See First Term.

8500. Research in Plant Pathology. (089785) (1-8 cr; S-N only) Staff
Laboratory or field research in selected areas of plant pathology.

8777. Thesis Credits: Masters. (188742) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788744) (1-36 cr [max 11 cr per summer term])

**Plant Physiology
(PIPh)**

220 Biological Sciences Center. 625-4222
Agriculture

FIRST TERM

8777. Thesis Credits: Masters. (588521) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388522) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (388746) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188747) (1-36 cr [max 11 cr per summer term])

Political Science (Pol)

1414 Social Sciences. 624-4144
College of Liberal Arts

FIRST TERM

1026. American Foreign Policy. (289307) (4 cr; 1030-1130 MTWThF; BlegH 145) Sampson
Institutions and processes that determine American foreign policy; major developments in U.S. foreign policy since World War II; contemporary issues of U.S. policy.

R.1041. Contemporary Political Ideologies. (191955) (4 cr; limited to 75 students; 0915-1015 MTWThF; BlegH 150)
Major modern ideologies such as liberalism, democracy, conservatism, socialism, communism, fascism, nationalism, imperialism, racism. Adequacy of alternative ideologies for analysis and solution of political and social problems.

R.3051. Introduction to Political Analysis. (091956) (5 cr; limited to 75 students; 0830-1015 MTWThF; BlegH 250)

Formation of political communities, political participation, policymaking, compliance, legitimacy, political development, types of political systems. Empirical and normative problems. Comparisons among major countries.

3070. Directed Field Studies. (785181) (1-4 cr; prereq #, Δ, A-F only)

3080. Internship. (085039) (4 cr [max 8 cr]; prereq Δ; S-N only)
Internship with government or community organizations, arranged by the department and awarded competitively.

3110H. Honors Work in Selected Fields. (187610) (1-6 cr [6 cr max]; open only to political science honors program majors; prereq 3109H)
Individual research and writing of departmental honors thesis.

R.3331. Minnesota Government and Politics. (891957) (4 cr; limited to 50 students; 1030-1130 MTWThF; BlegH 415) Backstrom
The Minnesota political system; demographic and cultural setting, political and governmental processes, contemporary policies.

R.3739. The Politics of Ethnic Communities. (189308) (4 cr; limited to 75 students; prereq 6 cr in social sciences; 1145-1245 MTWThF; BlegH 150) Nimitz
Cross-cultural study of politics of ethnic communities; emphasis on politics of black communities in the United States. Internal community politics and their local and national political systems.

3835. The International System. (989309) (4 cr; 0915-1015 MTWThF; AndH 310) Legro
Structure of international system; balance of power, bi-polar and other international systems; theories of stability, change, conflict, and cooperation.

R.3836. Foreign Policy Decision Making. (691958) (4 cr; limited to 60 students; 0800-0900 MTWThF; BlegH 135)
Theories and examples of foreign policy decision-making processes, including policy formation and implementation. Examples drawn from various foreign policy issues.

3970. Directed Studies. (885205) (1-6 cr; prereq #, Δ, college approval)

R.5471. Politics of Russia and the Commonwealth of Independent States. (990833) (4 cr; limited to 40 students; prereq 3051 or non political science grad stud or #; 1030-1130 MTWThF, BlegH 255) Davidheiser
Politics in the former Soviet Union, now the Commonwealth of Independent States. Course is composed of two parts: the evolution of the system- theories of revolution and their relation to Russia's experience of 1917; and the emergence and breakdown of the stable Soviet system of government-current attempts to re-establish political stability and to cope with the pressing problems facing the political system in the Commonwealth and in Russia more narrowly.

8777. Thesis Credits: Masters. (188523) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (088524) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.1001. American Government and Politics. (790834) (5 cr; limited to 50 students; 0900-1030 MTWThF, BlegH 235) McGuire
Principles, organization, processes, functions of government, and the interplay of political forces in the United States. Attention throughout to current issues.

1025. World Politics. (486888) (4 cr; 1030-1200 TWTh; BlegH 145) Freeman
Contemporary international relations; forms of state interaction; problem of conflict and cooperation.

3070. Directed Field Studies. (585182) (1-4 cr; prereq #, Δ; A/F only)

3080. Internship. (785049) (4 cr [max 8 cr]; prereq Δ; S-N only)
See First Term.

3110H. Honors Work in Selected Fields. (286889) (1-6 cr [6 cr max]; open only to political science honors program majors; prereq 3109H)
See First Term.

R.3308. The United States Congress. (591953) (4 cr; limited to 50 students; prereq 1001 or equiv or #; 1030-1130 MTWThF, BlegH 110) Smith
Internal organization, committee system, party leadership, norms, recruitment; legislative policy making; relationship with the president and bureaucracy; interest group, political party, and constituency influences on the congressional process.

R. 3477. Political Development. (391954) (4 cr; limited to 50 students; prereq 1054 or 3051 or #; 0915-1015 MTWThF; BlegH 420) Duvall
Political processes and problems associated with economic development processes; the political economy of underdevelopment and development; problems of state building and the development of political institutions.

R. 3766. Political Psychology. (190837) (4 cr; limited to 50 students; prereq 1001 or equiv or #; 0800-0900 MTWThF, BlegH 420) Sullivan
Political learning; processes of political perception and information processing; subjectivity and political ideology; personality and political behavior; symbols and politics.

R.5477. Middle Eastern Government and Politics. (792048) (4 cr; limited to 50 students; prereq 3051 or non-political science grad stud or #; 0915-1015 MTWThF; BlegH 125) Kirisci
Domestic politics of Turkey, Iran, selected Arab states, and Israel, with emphasis on ruling elites and linkages between regimes and societies. Other topics include secular/religious tensions, political aspects of ethnic diversity, and political effects of economic change.

R.5765. Political Psychology of Conformity, Enmity, and Heroism. (xxxxxx) (4 cr; limited to 40 students; prereq 1001 or equiv or #; 1030-1200 TWTh; BlegH 335) Sullivan
Conformity and obedience in politics; spiral of silence and groupthink; pathways from conformity and obedience to malignant political aggression; psychological basis, and political use, of torture, terrorism, and genocide; role of individual, group, and institutional preconditions and consequences; political altruism and heroism in the face of malignant aggression; role of ordinary people and extraordinary leadership; case studies.



COURSE DESCRIPTIONS

8777. Thesis Credits: Masters.
(188750) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(088751) (1-36 cr [max 11 cr per summer term])

Portuguese (Port)

34 Folwell Hall. 625-5858
(Spanish and Portuguese)
College of Liberal Arts

FIRST TERM

5970. Directed Readings. (385491) (1-5 cr per qtr [15 cr max]; prereq #, Δ, CLA approval) Staff
Guided individual reading or study.

5990. Directed Research. (889254) (1-5 cr per qtr; prereq #, Δ, CLA approval)

8777. Thesis Credits: Masters.
(888525) (1-16 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)
A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll in all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses.

R.1001-1002-1003. Beginning Portuguese. (15 cr for both terms; limited to 23 students; 0800-1130 MTWThF)

Emphasis on speaking and understanding Portuguese; pronunciation (Brazilian speech stressed); gradual introduction to writing and reading skills; basic grammar, cultural aspects of language, and civilizations of Portuguese-speaking world.

R.1001, Sec 5, (086174) June 14-July 7, CivMinE 213; 5 cr

R.1002, Sec 5, (886175) July 8-20 CivMinE 213, July 21-Aug 1, FolH 218; 5 cr

R.1003, Sec 5, (686176) August 2-24, FolH 218; 5 cr

SECOND TERM

R.5970. Directed Readings. (185492) (1-5 cr per qtr [15 cr max]; prereq #, Δ, CLA approval) Staff
See First Term.

5990. Directed Research. (089253) (1-5 cr per qtr; prereq #, Δ, CLA approval)

8777. Thesis Credits: Masters.
(888752) (1-16 cr [max 11 cr per summer term])

Prosthodontics (Pros)

9-176 Moos Tower. 625-6969
School of Dentistry

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

5100. Art for the Prosthodontist. (889013) (1 cr; prereq grad stu in prosthodontics; S-N only)
For Prosthodontic residents interested in learning basic principles of art as related to prosthodontics. Understanding color concepts, manipulating light and its effect on color, physical principles of color theory, and practical application using oil painting in still life settings.

5500. Evaluation in Prosthodontics. (090130) (1 cr; S-N only)

8006. Advanced Clinical Prosthodontics II. (586364) (Cr ar [may be repeated for cr]; prereq #)
Experience in prosthodontic treatment of patients having systemic complications.

8034. Advanced Clinical Maxillofacial Prosthodontics. (386365) (Cr ar; prereq 8030, 8032, #)

Factors involved in diagnosis and organization of a treatment plan for the maxillofacial patient, and practical experience in associated clinical, and laboratory procedures.

Psychology (Psy)

N-218 Elliott Hall. 625-4042
College of Liberal Arts

FIRST TERM

1001. Introduction to Psychology. (885849) (5 cr; 0900-1100 MTWThF; Phys 131)
Introduction to study of human behavior. Prerequisite for all advanced courses in psychology.

R.1004. Introductory Laboratory Psychology.

(4 cr; each section limited to 20 students; 1004-1005†; prereq soph, 1001 or ¶1001)
Experiments illustrating contemporary subject matter such as sensory psychology, psychophysics, perception, motivation, verbal behavior, animal and human learning, problem solving, and psychological measurement.

Sec 1, (185850) 0915-1215 MF, 0915-1115 W, EltH 150

Sec 2, (085851) 0915-1215 MF, 0915-1115 W, EltH 160

Sec 3, (885852) 1300-1600 MF, 1300-1500 W, EltH 150

Sec 4, (586901) 1300-1600 MF, 1300-1500 W, EltH 160

3051. Introduction to Cognitive Psychology. (586221) (4 cr; prereq 1001; 1030-1130 MTWThF; EltH N119)

Discussion of the basic research problems and theoretical concepts in the study of cognitive factors in perception and memory.

3061. Introduction to Physiological Psychology. (689577) (4 cr; \$5061; prereq 1005 or Biol 1009 or #; 1300-1400 MTWThF, EltH N119) Chapman
Neural mechanisms of motivation, emotion, sleep-wakefulness cycle, learning, and communication in animals and humans.

3101. Introduction to Personality. (889139) (4 cr, \$5101; prereq 1001; 0915-1015 MTWThF; Arch 10)
Concepts and issues in personality, personality theory, personality research, and personality assessment.

3604. Introduction to Abnormal Psychology. (785360) (4 cr, \$5604H; prereq 1001; 0800-0900 MTWThF; EltH N119)
Surveys the field of abnormal psychology. Etiologies of behavioral disorders; available treatment.

3617. Introduction to Clinical Psychology. (585361) (4 cr; prereq 3604 or 5604H, 3801 or equiv; 1145-1245 MTWThF; EltH N119) Grove
Survey of historical developments and contemporary issues in clinical psychology. Focuses upon trends in research and clinical work in the areas of psychological assessment and intervention.

3801. Introduction to Statistical Methods. (588101) (4 cr; prereq 1001 or equiv; 1015-1155 MWF; NichH 213)

Quantification in research problems in psychology. Descriptive and inferential statistics, hypothesis testing, nonparametric statistics. Examples from various areas in psychology.

3970. Directed Studies. (688204) (1-8 cr; prereq #, Δ, college approval)

3990. Directed Research. (488205) (1-8 cr; prereq #, Δ, college approval)

R.5205. Applied Social Psychology. (788209) (4 cr; limited to 20 students; prereq 3201 or grad student or #; 1030-1130 MTWThF; EltH 60)

Gonzales
Overview of field. Applications of social psychology research and theory to the criminal justice system, media, behavioral medicine, desegregation, institutions, and energy conservation programs.

8560. Advanced Practicum/Internship in Counseling Psychology. (285855) (1-6 cr [max 24 cr]; prereq #; hrs ar)

8620. Practicum in Clinical Psychology. (185856) (1-6 cr; prereq #; hrs ar; S-N only)
Field experience in professional work in clinical settings.

8777. Thesis Credits: Masters.
(688526) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(488527) (1-36 cr [max 11 cr per summer term])

8990. Research Problems. (188246) (prereq #; 1-6 cr); Staff

FIRST AND SECOND TERMS; TEN WEEK COURSE

(Register once in Term I)

R.3902. Major Project in Psychology. (486261) (4 cr; limited to 25 students; prereq 1005, 3801, jr or sr psychology major; 1315-1500 Th; Elt N227)

SECOND TERM

1001. Introduction to Psychology. (286617) (5 cr; 0900-1100 MTWThF; *AndH 210)
See First Term.

R.1005. Introductory Laboratory Psychology.

(4 cr; each section limited to 20 students; 1004-1005†; prereq 1004)
See 1004 First Term.

Sec 1, (986619) 0915-1215 MF, 0915-1115 W, EltH 50

Sec 2, (286620) 0915-1215 MF, 0915-1115 W, EltH 60

Sec 3, (186621) 1300-1600 MF, 1300-1500 W, EltH 60

3011. Introduction to Psychology of Learning. (991660) (4 cr; prereq 1001; 1030-1130 MTWThF; NichH 213)
Peterson

Basic methods in study of learning. Fundamental concepts and principles governing the learning process.

R.3201. Introduction to Social Psychology. (489578) (4 cr; limited to 60 students; prereq 1001; 1030-1130 MTWThF; EltH N119)

Theories and research in social psychology. Effects upon attitudes and behavior, situational variables, and group membership.

R.3607. Survey of Clinical Intervention Methods. (989049) (4 cr; limited to 30 students; prereq 3604 or 5604; 1145-1245 MTWThF, NichH 207)
Staff

Introduction to therapeutic procedures for dealing with abnormal behavior in children and adults. Focuses on the theory and philosophy underlying the particular schools of therapy rather than emphasizing specific methods of behavior change.

3801. Introduction to Statistical Methods. (386222) (4 cr; prereq 1001 or equiv; 1300-1500 MW, 1300-1400 F; WullH 230)

Quantification in research problems in psychology. Descriptive and inferential statistics, hypothesis testing, nonparametric statistics. Examples from various areas in psychology.

3970. Directed Studies. (288206) (1-8 cr; prereq #, Δ, college approval)

3990. Directed Research. (188207) (1-8 cr; prereq #, Δ, college approval)

5054. Psychology of Language. (089401) (4 cr; prereq 3011, except for students in honors sequence and grad students; 1145-1245 MTWThF; Elth N227) Fletcher
Theories and experimental evidence in past and present conceptions of psychology of language.

5202. Attitudes and Social Behavior. (688350) (4 cr; prereq 3201 or #; 1145-1245 MTWThF; Elth N119)
Survey of attitude theory, measurement, and attitude change research in social psychology. Focus on structure, function, and formation of attitudes; relationship between attitudes and various social behaviors; attitude change.

8519. Practicum in Rehabilitation Counseling. (786623) (3 cr; prereq 8518, #; hrs ar; S/N only) Athelstan
See First Term.

8560. Advanced Practicum/ Internship in Counseling Psychology. (186626) (1-6 cr [max 24 cr]; prereq #; hrs ar)

8620. Practicum in Clinical Psychology. (886628) (1-6 cr; prereq #; hrs ar; S-N only)
See First Term.

8670. Internship in Clinical Psychology. (686629) (2-4 cr; prereq PhD candidate in clinical psychology program and consent of director of clinical psychology training program; hrs ar)

8777. Thesis Credits: Masters. (488754) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188756) (1-36 cr [max 11 cr per summer term])

8990. Research Problems (388245) (1-6 cr; prereq #) Staff

Public Affairs (PA)

230 Humphrey Center. 625-9505
Humphrey Institute of Public Affairs

FIRST TERM

8910. Independent Study. (286178) (1-3 cr; prereq #; may be taken once toward master's deg in publ aff or planning)
Individual reading or research project.

SECOND TERM

8910. Independent Study. (486180) (1-3 cr; prereq #; may be taken once toward master's deg in publ aff or planning)
See First Term.

SPECIAL TERM: AUGUST 16- SEPTEMBER 16

Econ 3101. Microeconomic Theory. (192054) (4 cr; §3105; limited to 45 students; prereq Econ 1101, 1102, 1 qtr calculus, Humphrey Institute Students only, or equiv; 0915-1015 MTWThF, HHHCTr 30) Kudrle
Microeconomics with a public policy emphasis. For incoming graduate students in public affairs. Course is a prerequisite to the school's core sequence in policy analysis.

PA 3902. Quant Start. (592097) (2 cr; prereq public affairs or planning maj, or Δ; 1145-1345 MTWThF; HHHCTr 25; S-N only) Toutkoushian
The goal of Quant Start is to prepare students to better understand the materials to be presented in the core curriculum of quantitative analysis (Quantitative Methods I and II). The course is designed primarily for students who either: 1) have had virtually no exposure to statistical analysis, or 2) have not recently had a course in statistics and would like an opportunity to review this material. The course will review relevant mathematical functions, discuss common research designs, and introduce students to methods of summarizing and analyzing data.

Public Health (PubH)

A302 Mayo. 624-6669
School of Public Health

FIRST TERM

R.3034. Topics in Alcohol and Drug Problems. (388262) (cr ar; limited to 10 students; prereq #) Staff
Selected readings in alcohol and drug use and problems, and evaluation of student's mastery of the assigned study.

R.5003. Fundamentals of Alcohol and Drug Abuse. (388469) (2 cr; §3003, 3004, 5023; prereq educ major or #; limited to 100 students; 1315-1530 TTh; MoosT 2650) Rothenberger
Lecture, discussion, and readings on the scientific, sociocultural, and attitudinal aspects of alcohol and other drug abuse problems. Emphasis on incidence, prevalence, high risk populations, prevention, and intervention. Meets with 5022, 5023.

5004. Field Instruction in Public Health. (085025) (Cr ar; prereq #) Generalized, function-oriented or discipline-oriented community experience under academic and professional supervision. Emphasis on application of acquired knowledge and skills relevant to health issues and problems.

5005. Topics in Public Health. (786976) (Cr ar; prereq advance proposal, #) Staff
Individualized, directed instruction.

Selected readings in public health with discussion based on these readings.

5015. Topics in Interdisciplinary Studies. (586977) (Cr ar; prereq #) Staff
Individualized, directed instruction. Selected readings in interdisciplinary studies with discussion based on these readings.

R.5022. Personal and Community Health. (788467) (3 cr, §3001, 3004, 5023; prereq educ major or #; limited to 100 students; 1315-1530 MWF; MoosT 2650) Rothenberger
Fundamental principles of health conservation and disease prevention. Meets with 5003, 5023.

R.5023. Basic Concepts in Personal and Community Health. (588468) (5 cr, §3001, 3003, 3004, 5003, 5022; prereq educ major or #; limited to 250 students; prereq educ maj ort #; 1315-1530 MTWThF; MoosT 2650) Rothenberger
Introduction to scientific, sociocultural and attitudinal aspects of communicable and degenerative diseases, environmental and occupational health hazards, alcohol and drug problems; emphasis on role of education in health conservation, disease control, and drug abuse. Meets with 5003, 5022.

5044. Topics in Alcohol and Drug Problems. (189641) (1-4 cr; prereq advanced proposal, #) Staff
Individualized, directed instruction. Selected readings in alcohol and drug problems with discussion based on these readings.

5084. Internship in Health Education Practice I. (285385) (Cr ar; prereq health educ maj and community health educ maj or #; S-N only) Staff
Supervised health education internship in a health or public health setting under academic and professional supervision. Emphasis on application of acquired health education knowledge and skills to relevant health issues and problems.

5085. Internship in Health Education Practice II. (185386) (Cr ar; prereq health educ maj and community health educ maj or #; S-N only) Staff
See 5084.

5090. Research Topics in Health Education. (787576) (2-8 cr; prereq health education maj and community health educ maj or #) Staff
Scholarly review of health education research and experience in a selected area for a Plan B project.

5096. Topics: Research. (587577) (Cr ar; prereq health education maj and community health educ maj or #) Staff
Original research in or secondary analysis of data sets related to health education.

5097. Topics: Selected Readings. (387578) (Cr ar; prereq health science

grad student) Staff
Study of a topic in health education not covered in available courses.

5150. Topics: Environmental and Occupational Health. (Cr ar; prereq #) Sec 1, (186982) Staff

5154. Practicum in Environmental and Occupational Health. (886225) (1-6 cr; §Nurs 5882; prereq env health majj or grad nurs stud; S-N only) Staff
Assignments to work with organizations with environmental health concerns under the joint supervision of a faculty adviser and staff of the organization.

5155. Issues in Environmental and Occupational Health-June 20-24. (889156) (2 cr; §Nurs 5883; prereq public health or grad student or #; 0800-1000 MTWThF; MoosT 5125) Olson
The field, current issues, and principles and methods of environmental and occupational health protection. Independent field visits to observe, review, and analyze environmental health programs is required.

5197. Topics: Injury Prevention in the Workplace, Community, and Home. (889545) (1-3 cr; §5597; prereq #) Gerberich
Selected projects: Students pursue projects relevant to injury problems.

5250. Environmental and Occupational Health Master's Project. (1-4 cr; prereq Environmental Health Major and #)
Directed study toward completion of a master's project or plan B in environmental or occupational health.
Sec 1, (291042) Staff
Sec 2, (191043) Barber
Sec 3, (991044) Brosseau
Sec 4, (791045) Gerberich
Sec 5, (591046) Greaves
Sec 6, (391047) Maldonado
Sec 7, (191048) Mandel
Sec 8, (091049) McGovern
Sec 9, (391050) Olson
Sec 10, (191051) Singer
Sec 11, (091052) Swackhamer
Sec 12, (891053) Vesley
Sec 13, (691054) Vincent

5326. Research in Animal/Human Health. (585084) (Cr ar; prereq VPH or Epi major or #) Staff
Research in the relationship of animal health to human health.

R. 5330. Epidemiology I. (588194) (4 cr; limited to 60 students; prereq PubH, Pharmacy, Med School, School of Nursing, Dentistry, Epi Grad, Biostatistics Grad, Env Hlth Grad or HSRP grad stud or #; lec 1010-1205 MWF, MoosT 5125; lab 1220-1415 MW, MoosT 5125) Luepker, Himes
Basic epidemiologic principles applicable to infectious and noninfectious disease; host-agent-environment complex; factors underlying spread of infectious disease; laboratory applications of statistical and epidemiologic methods.



COURSE DESCRIPTIONS

R.5391. Introduction to Behavioral Epidemiology. (988466) (3 cr; limited to 20 students; prereq PubH, Pharmacy, Med School, School of Nsg, Dentistry, Epi Grad, Biostatistics Grad, Env Hlth Grad or #; 0915-1200 TTh; MoosT 2520) Staff
Theoretical measurement and research issues in behavioral epidemiology. Lifespan patterns in the development, change, and maintenance of behaviors related to major chronic diseases. Examines risk-related behaviors from an epidemiological perspective using the concepts of prevalence, incidence, risk, and trends.

5470. Topics in Biostatistics. (386978) (Cr ar; prereq #) Staff
Selected readings with discussion based on these readings.

5614. Field Experience in Maternal and Child Health (Cr ar; prereq MCH grad student; S-N only)
Field experiences are selected by the student to meet career goals.
Sec 1, (286987) Alexander
Sec 2, (190448) Himes
Sec 3, (090449) Hirshhorn
Sec 4, (390450) Leland
Sec 5, (190451) Patterson
Sec 6, (090452) Story
Sec 7, (291476) ten Bensel

5623. Adolescent Health Topics: Secondary Data Analysis. (191477) (3 cr; prereq 5330, 5625, 5414 or 5450, 5806, 5621 or equivalent, #, public health students only; 0915-1200 TTh; A270 Mayo)

5648. Topics in Maternal and Child Health. (Cr ar; prereq #)
New course offerings, selected readings or individualized directed instruction.

Sec 1, Needs Analysis to Policy Enactment in Maternal and Child Health. (991478) (3 cr, PubH 5610 and MCH or PHA student; 1300-1600 TTh; A270 Mayo; A/F only) Alexander
Sec 2, (391484) Alexander
Sec 3, (890064) Himes
Sec 4, (690065) Hirshhorn
Sec 5, (490066) Leland
Sec 6, (290067) Patterson
Sec 7, (190068) Story
Sec 8, (990069) ten Bensel

5649. Maternal and Child Health Research. (Cr ar; prereq #; S-N only)
Selected readings in maternal and child health with discussion based on these readings.

Sec 1, (186988) Alexander
Sec 2, (887598) Himes
Sec 3, (185427) Hirshhorn
Sec 4, (085428) Leland
Sec 5, (885429) Patterson
Sec 6, (088104) Story
Sec 7, (791479) ten Bensel

5703. Public Health Administration Clerkship. (986989) (1-12 cr; prereq student in public health administration or #; S-N only)
Assignment to State Health Department or other health agency for

supervised work on a project of limited scope. Preparation of a formal report.

5704. Field Experience: Public Health Administration. (1-12 cr; prereq student in the public health administration or #; S-N only) Staff
Supervised field experience at a management level in selected community or public health agencies and institutions.

Sec 1, (286990) Block
Sec 2, (485451) Dornblaser
Sec 3, (285452) Gordon
Sec 4, (185453) Johnson
Sec 5, (985454) Litman
Sec 6, (785455) Resnick
Sec 7, (585456) Spradley
Sec 8, (385457) Veninga
Sec 9, (185458) Weckwerth
Sec 10, (085459) Staff

5707. Independent Study: Public Health Administration. (1-12 cr; prereq public health administration student or #; S-N only)
Independent study, under tutorial guidance, of selected problems and current issues in public health administration.

Sec 1, (985079) Block
Sec 2, (889402) Spradley
Sec 3, (589541) Veninga
Sec 4, (389542) Staff

5723. Administrative Residency. (187915) (Cr ar; prereq public health administration student or #; S-N only)
Ten months of field work in approved health care planning or operating organization, rotation through departments, solution of management problems, special projects. Preparation of thesis and formal reports.

5739. Topics: Public Health Administration. (Cr ar; prereq student in public health administration or #) Staff

Selected readings with discussion based on these readings.
Sec 1, (285080) Block
Sec 2, (991481) Spradley
Sec 3, (791482) Veninga
Sec 4, (591483) Staff

5758. Strategic Financial Planning in Health Care Organizations-June 20-July 8. (985082) (4 cr; prereq 5757; MHA or PHA stu; 1700-2200 TWTh; MoosT 2520; A/F only) Thompson
Case studies and readings involving review and analysis of actual hospital financial statements, third-party payer cost reports, and other financial documents. Students apply key financial ratios to financial statement analysis to test their ability to apply course material presented in the winter and spring quarters and to become familiar with basic financial documents.

5770. Topics: Hospital and Health Care Administration. (prereq hospital administration student or #)
Selected readings in hospital and health care with discussion based on these readings.
Sec 1, June 20-July 8. (285077) 1300-

1700 TTh, MoosT 2520, Weckwerth, staff, 2 cr
Sec 2, (088037) ar, ar cr

5774. Administrative and Professional Relationships Within the Ambulatory Care Facility-July 11-22. (088054) (15 cr; prereq 5773, alternative study student or #; 0800-1700 MTWThF; A/F only) Weckwerth, staff
A 12-month program of on-campus and independent study that includes periodic seminars and monthly sessions with clinical preceptors. Change theory, ethics, epidemiology, prepaid systems, legal aspects, planning.

5776. Administrative and Professional Relationships Within the Health Care Facility-July 11-22. (185078) (15 cr; prereq 5775, alternative study student or #; 0800-1700 MTWThF; A/F only) Weckwerth, staff

A 12-month program consisting of an on-campus residential session and off-campus independent study that includes seminars and monthly classes under program preceptors. Board of trustees, medical staff, nursing, hospital law, medical records, planning, community health systems, continuing health education, change theory.

5779. Managing Multiple Forces: Internal and External Aspects of Patient Care Administration-July 11-22. (686985) (15 cr; prereq present employment as administrator of patient care [director of nursing or equivalent], 5778, alternative study student or #; A/F only; 0800-1700 MTWThF) Madden, staff

A 12-month program of an on-campus and independent study which begins with a two-week introductory residential session. Seminars on planning, organizing and staffing, directing and controlling are scheduled during initial phase of course. Students return to campus the following summer to share and demonstrate their research projects.

5786. Administrative and Professional Relationships Within Mental Health Related Organizations-July 11-22. (685108) (15 cr; prereq 5785; alternative study student or #; 0800-1700 MTWThF; A/F only) Weckwerth, staff

A 12-month program beginning with an on-campus residential session (2 weeks) and involving off-campus independent study that includes periodic seminars and monthly dialogue with program preceptors. Governance, legal aspects, public education and information, evaluation of mental health programs, prevention and primary treatment in mental health, current trends and concepts, public relations and the legislative process.

5906. Field Experience: Public Health Nutrition. (089043) (1-8 cr; prereq public health nutrition maj; S-N only) Krinke
Placement in an approved agency

with opportunity for experience in nutritional aspects of public health programs.

R.5907. Nutrition Assessment—June 20-July 1. (191480) (2 cr; limited to 25 students; 0800-0955 MTh June 20-24, MTThF June 27-July 1, Mayo A367) Buzzard
Methods used to assess nutritional status of populations and individuals with emphasis on anthropometric methods.

5909. Topics in Public Health Nutrition. (1-12 cr; prereq public health nutrition student or #)
Independent study in research topic related to public health nutrition.
Sec 1, (088247) Brown
Sec 2, (888248) Buzzard
Sec 3, (688249) Himes
Sec 4, (088250) Krinke
Sec 5, (585506) Kushi
Sec 6, (385507) Splett
Sec 7, (688395) Story

R.5933. Nutrition: Health/Disease Relationships-June 20-July 8. (986300) (3 cr; limited to 30 students; prereq FSCN 5622 or MdBc 5201 or equiv and PubH 5330 or equiv, or #; 1400-1625 MTWThF; Mayo A367) Kushi
Critical analysis of issues in nutrition and public health through investigation of biological and epidemiological bases for public health dietary recommendations. The relationship of nutrition to heart disease, cancer, hypertension, obesity, and other conditions.

8150. Research: Environmental and Occupational Health. (086983) (1-6 cr; prereq #; S-N only) Staff
Opportunities for qualified students to pursue research in the importance of environmental stresses on human health.

8191. Research: Injury Prevention in the Workplace, Community, and Home. (689546) (3-6 cr; prereq #) Gerberich

8330. Research: In Epidemiology. (886984) (1-8 cr; prereq epi maj) Staff
Opportunities offered by the School of Public Health and various cooperating organizations for qualified students to pursue research work.

8332. Readings in Epidemiology. (788355) (1-4 cr; prereq Epi major and #) Staff
Readings in current research studies in epidemiology.

8400. Seminar in Biostatistics. (186979) (Cr ar; prereq biostat maj; or #) Staff

8449. Topics in Biostatistics. (586980) (Cr ar; prereq 5450, #) Staff
Studies in special topics for advanced students.

8450. Research in Biostatistics. (386981) (Cr ar) Staff

Opportunities for qualified students to pursue research work.

8763. External Forces Affecting Health Services Delivery. (986880) (3 cr; prereq HSRP/A student or #; A-F only) Weckwerth
Development of concepts, models, and principles of financing, social policy making, organizing, and human resource development for health services delivery, including written papers, oral presentations, and cross examination.

8764. Research Applications to Health Services Delivery. (786881) (3 cr; prereq 8763; S-N only) Weckwerth
Tutorial guidance and supervised course development covering research design, application, analysis, and presentation in health services delivery.

8777. Thesis Credits: Masters. (288528) (1-16 cr [max 11 cr per summer term])

8782. Research Practicum. (3 cr; HSRP/A student or #) Litman, Weckwerth, Staff
Field experience in health care research. Supervised independent and team research on selected topics and problems in the field of health care. Sec 1, (085185) Litman, Weckwerth Sec 2, (586882) Weckwerth, Litman

R.8796. Topics in Health Economics-June 20-July 8. (486986) (3 cr; limited to 35 students; prereq hospital administration student or #; 0800-1200 MWF; MoosT 2520; A/F only) Dahl
General principles of health economics applied to current issues in health. Implications for health policy derived and discussed.

8888. Thesis Credits: Doctoral. (188529) (1-36 cr [max 11 cr per summer term])

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register Once in Term I)

5746. Clerkship. (185081) (3 cr for 10 wks; prereq 5744, hospital administration student) Miller, staff
Survey and solution of management problem within a local health services organization and preparation of formal report.

SECOND TERM

R.3034. Topics in Alcohol and Drug Problems. (188263) (cr ar; limited to 10 students; prereq #) Staff
See First Term.

5004. Field Instruction in Public Health. (885026) (Cr ar; prereq #) Staff
See First Term.

R.5005. Topics in Public Health. (986992) (Cr ar; prereq advanced proposal and #; limited to 20 students) Staff
See First Term.

5015. Topics in Interdisciplinary Studies. (786993) (Cr ar; prereq #) Staff
See First Term.

5084. Internship in Health Education Practice I. (985387) (Cr ar; prereq health educ maj and community health educ maj or #; S-N only) Staff
See First Term.

5085. Internship in Health Education Practice II. (785388) (Cr ar; prereq health educ maj and community health educ maj or #; S-N only) Staff
See First Term.

5090. Research Topics in Health Education. (186859) (2-8 cr; prereq health education maj and community health educ maj or #) Staff
See First Term.

5096. Topics: Research. (486860) (Cr ar; prereq health education student and community health educ maj or #) Staff
See First Term.

R.5097. Topics: Selected Readings. (187638) (Cr ar; limited to 5 students; prereq health science grad student) Staff
See First Term.

5150. Topics: Environmental and Occupational Health. (Cr ar; prereq #) Staff
See First Term.

5154. Practicum in Environmental and Occupational Health. (486227) (1-6 cr; \$Nurs 5882; prereq env health maj or grad nurs stud; S-N only) Staff
See First Term.

5197. Topics: Injury Prevention in the Workplace, Community, and Home. (289551) (1-3 cr; \$5597; prereq #) Gerberich
See First Term.

5250. Environmental and Occupational Health Master's Project. (1-4 cr; prereq Environmental Health Major and #; S/N only)
Directed study toward completion of a master's project or plan B in environmental or occupational health. Sec 1, (991061) Staff
Sec 2, (791062) Barber
Sec 3, (591063) Brosseau
Sec 4, (391064) Gerberich
Sec 5, (191065) Greaves
Sec 6, (091066) Maldonado
Sec 7, (891067) Mandel
Sec 8, (691068) McGovern
Sec 9, (491069) Olson
Sec 10, (891070) Singer
Sec 11, (691071) Swackhamer
Sec 12, (491072) Vesley
Sec 13, (291073) Vincent

5326. Research in Animal/Human Health. (187011) (Cr ar; prereq VPH or Epi major or #) Staff
See First Term.

5470. Topics in Biostatistics. (386995) (Cr ar; prereq #) Staff
See First Term.

5614. Field Experience in Maternal and Child Health. (Cr ar; prereq MCH grad student; S-N only)
See First Term.

Sec 1, (487006) Alexander
Sec 2, (690454) Himes
Sec 3, (490455) Hirshhorn
Sec 4, (290456) Leland
Sec 5, (190457) Patterson
Sec 6, (890453) Story
Sec 7, (391470) ten Bensel

5648. Topics in Maternal and Child Health. (cr ar; prereq #)
See First Term.

Sec 1, (989553) Alexander
Sec 2, (589670) Himes
Sec 3, (290070) Hirshhorn
Sec 4, (190071) Leland
Sec 5, (990072) Patterson
Sec 6, (790073) Story
Sec 7, (191471) ten Bensel

5649. Maternal and Child Health Research. (Cr ar; prereq #; S/N only)
See First Term.

Sec 1, (287007) Alexander
Sec 2, (687599) Himes
Sec 3, (185430) Hirshhorn
Sec 4, (085431) Leland
Sec 5, (885432) Patterson
Sec 6, (488107) Story
Sec 7, (091472) ten Bensel

5703. Public Health Administration Clerkship. (187008) (1-12 cr; prereq student in public health administration or #; S-N only)
See First Term.

5704. Field Experience: Public Health Administration. (1-12 cr; prereq student in public health administration or #; S-N only)
See First Term.

Sec 1, (987009) Block
Sec 2, (385460) Dornblaser
Sec 3, (185461) Gordon
Sec 4, (085462) Johnson
Sec 5, (885463) Litman
Sec 6, (685464) Resnick
Sec 7, (485465) Spradley
Sec 8, (285466) Veninga
Sec 9, (185467) Weckwerth
Sec 10, (985468) Staff

5707. Independent Study: Public Health Administration. (1-12 cr; prereq public health administration student or #; S-N only)
See First Term.

Sec 1, (185086) Block
Sec 2, (489404) Spradley
Sec 3, (489547) Veninga
Sec 4, (289548) Staff

5723. Administration Residency. (787917) (Cr ar; prereq public health administration student or #; S-N only)
See First Term.

5739. Topics: Public Health Administration. (Cr ar; prereq student in public health administration or #)
See First Term.

Sec 1, (085087) Block
Sec 2, (891473) Spradley
Sec 3, (691474) Veninga
Sec 4, (491475) Staff

5770. Topics: Hospital and Health Care Administration. (885222) (Cr ar; prereq hospital administration student or #)
See First Term.

R.5773. Management and Organization Within the Ambulatory Care Facility-July 17-29. (888055) (15 cr; limited to 40 students; prereq alternative study student or #; 0800-1700 MTWThF) Weckwerth, staff
A 12-month program of on-campus and independent study that includes periodic seminars and monthly sessions with clinical preceptors. Management, organizational behavior, problem solving, executive role, personnel management, financial management, governance, clinicians, productivity, and efficiency.

R.5775. Management and Organization in Hospital and Health Care Facilities-July 17-29. (887004) (15 cr; limited to 40 students; prereq alternative study student or #; 0800-1700 MTWThF) Weckwerth, staff
A 12-month program consisting of an on-campus residential session and off-campus independent study that includes a seminar and monthly classes under program preceptors. Principles of management, executive role, hospital development and organization, functions of personnel, financial control, business office, and patient care services.

5777. External Forces Affecting Health Care Delivery-August 8-19. (687005) (25 cr; prereq 5774, 5776, 5779, 5786, 5788 alternative study student or #; A/F only; 0800-1700 MTWThF) Weckwerth
A 10-month program consisting of an on-campus residential session and off-campus independent study that includes seminars covering financing, human resources, organizing, social policy, and project planning and design. Requires a project that can be either a management study or a research thesis. Each student must verbally present and defend the project at a week-long symposium at end of course.

R.5778. Patient Care Management and Organization Within the Hospital and Health Care Organization -July 17-29. (385085) (15 cr; limited to 40 students; prereq alternative study student or #; 0800-1700 MTWThF) Madden, staff

A 12-month program consisting of an on-campus residential session in the summer, one week in March, and independent study that includes periodic seminars and monthly sessions with clinical preceptors. Management, organizational behavior, problem solving, executive role, personnel management, financial management, governance, labor relations, and patient care services.

5785. Management and Organization Within Mental Health Related Organizations-July 17-29. (485109) (15 cr; alternative study student or #;

COURSE DESCRIPTIONS

0800-1700 MTWThF) Weckwerth, staff

A 12-month program beginning with an on-campus residential session (2 weeks) and involving off-campus independent study that includes periodic seminars and monthly dialogue with program preceptors. Governance, legal aspects, public education and information, evaluation of mental health programs, prevention and primary treatment in mental health, current trends and concepts, public relations and the legislative process.

5906. Field Experience: Public Health Nutrition. (586946) (1-8 cr; prereq public health nutrition maj; S-N only) Krinke
Placement in an approved agency with opportunity for experience in nutritional aspects of public health programs.

5909. Topics in Public Health Nutrition. (1-12 cr; prereq public health nutrition student or #) See First Term.

Sec 1, (987916) Brown
Sec 2, (685433) Buzzard
Sec 3, (485434) Himes
Sec 4, (285435) Khinke
Sec 5, (185436) Kushi
Sec 6, (985437) Splett
Sec 7, (388195) Story
Sec 8, (689580) Staff

8150. Research: Environmental and Occupational Health. (587000) (1-6 cr; prereq #; S-N only) Staff

8191. Research: Injury Prevention in the Workplace, Community and Home. (189552) (3-6 cr; prereq #; S-N only) Gerberich

8330. Research Epidemiology. (387001) (1-8 cr; prereq epidemiology maj) Staff
See First Term.

R.8332. Readings in Epidemiology. (088264) (1-4 cr; limited to 10 students; prereq Epi major and #) Staff
See First Term.

8400. Seminar in Biostatistics. (186996) (Cr ar; prereq biostat maj or #) Staff

8449. Topics in Biostatistics. (086997) (Cr ar; prereq 5450 and #) Staff
See First Term.

8450. Research in Biostatistics. (886998) (Cr ar) Staff
See First Term.

8763. External Forces Affecting Health Services Delivery. (186867) (3 cr; prereq HSRP/A student or #; A-F only) Weckwerth
See First Term.

8764. Research Applications to Health Services Delivery. (086868) (3

cr; prereq 8763; S-N only) Weckwerth
See First Term.

8777. Thesis Credits: Masters. (788758) (1-16 cr [max 11 cr per summer term])

8782. Research Practicum. (3 cr; HSRP/A student or #) Litman, Weckwerth, Staff
See First Term.

Sec 1, (685237) Litman, Weckwerth
Sec 2, (886869) Weckwerth, Litman

8888. Thesis Credits: Doctoral. (988760) (1-36 cr [max 11 cr per summer term])

Recreation, Park, and Leisure Studies (Rec)

203 Cooke Hall. 625-5300
(School of Kinesiology and Leisure Studies)
College of Education

FIRST TERM

3700. Senior Internship. (086112) (1-15 cr; prereq sr, recreation major or minor, Δ; hrs ar; S-N only) Schultz
Supervised experiences in selected agencies.

5630. Practicum: Therapeutic Recreation. (886113) (3-9 cr; prereq recreation MEd or graduate student; hrs ar; S-N only) Schultz
Supervised experiences in program operation; administrative and supervisory duties.

5640. Practicum: Leisure Services. (686114) (3-9 cr; prereq recreation MEd or graduate student; hrs ar; S-N only) Schultz
Supervised experiences in program

operation; administrative and supervisory duties.

5695. Practicum: Sport Management. (889884) (3-9 cr; prereq Δ; A-F only) Schultz
Theory and application of principles in developing and managing sport programs, including supervised experiences in program operation.

5860. Legal Aspects of Sport and Physical Activity. (089883) (4 cr; \$Kin 5860; prereq 3550 or 5460 or Kin 3143; 0915-1115 MWF; CookeH 206; A-F only) Schultz
A survey of a variety of legal considerations in sport and physical activity programs in schools, colleges, and the private sector. Contracts, legal liability, and civil rights involving sports participants, coaches, and administrators. Meets with Kin 5860.

5983. Readings: Recreation. (486115) (1-3 cr; prereq MEd or grad student or Δ; hrs ar; A-F only) Schultz
Independent study under tutorial guidance.

8777. Thesis Credits: Masters. (488530) (1-16 cr [max 11 cr per summer term])

8981. Research Problems. (689014) (Cr ar; prereq 8980 or #; S-N only) Schultz.
Individual problems.

SECOND TERM

3700. Senior Internship. (786332) (1-15 cr; prereq sr, recreation major or minor, Δ; hrs ar; S-N only) Schleien
See First Term.

3900. Directed Study. (088345) (3 cr [max 9 cr]; S-N optional; prereq recreation majors only and Δ) Schleien
Self-directed study preceded by classroom study and possession of basic competence.

5460. Foundations of Sport Management-July 21-August 5. (989259) (3 cr, \$Kin 5460; prereq Rec or Kin major or #; 0915-1130 MTWThF; CookeH 206; A-F only) Kane
Principles of sport management and

fitness including theories and techniques related to the marketing, administration, and management of sport enterprises. Organizational theory and policy, with practical examples of sport management skills and strategies. Meets with Kin 5460.

5630. Practicum: Therapeutic Recreation (586333) (3-9 cr; prereq recreation MEd or graduate student; hrs ar; S-N only) Schleien
See First Term.

5640. Practicum: Leisure Services. (386334) (3-9 cr; prereq recreation MEd or graduate student; hrs ar; S-N only) Schleien
See First Term.

5695. Practicum: Sport Management. (689885) 3-9 cr; prereq Δ; A-F only) Schleien
See First Term.

5981. Problems. (888346) (cr ar; prereq MEd or MA student or Δ; A-F only) Schleien
Focus on conduct of recreation programs.

5983. Readings: Recreation. (186335) (1-3 cr; prereq MEd or grad student or Δ; hrs ar; A-F only) Schleien
See First Term.

8777. Thesis Credits: Masters. (388763) (1-16 cr [max 11 cr per summer term])

8981. Research Problems. (288092) (cr ar; prereq 8980 or #; S-N only) Schleien
Individual problems.

Religious Studies (RelS)

330 Folwell Hall. 625-5353
College of Liberal Arts
(See also Middle Eastern Languages and Cultures; South Asian Languages and Cultures)

FIRST TERM

R.1031. Introductions to the Religions of South Asia. (189414) (4 cr, limited to 20 students; \$3031, \$5031, \$SALC 1504; 0900-1130 TTh; FolH 138) Malandra
Introduction to Hinduism, Buddhism, and Jainism. Meets with SoAs 1504.

R.1034. Introduction to Judaism. (991562) (4 cr; limited to 25 students; \$3034, \$JwSt 1034, \$JwSt 3034; 0900-1130 MW; FolH 208) Zahavy
Concepts, movements, and institutions in the development of classical Judaism, as manifested in the literature and festivals of the Jewish people from Second Commonwealth times to the present. Meets with 3034 and JwSt 1034, 3034.

R.3034. Introduction to Judaism. (791563) (4 cr, limited to 15 students; \$1034, \$JwSt 1034, \$JwSt 3034; 0900-



1130 MW; FolH 208) Zahavy
Additional written assignments and reading. Meets with 1034 and JwSt 1034, 3034.

R.3541. The Holocaust. (xxxxxx) (4 cr; limited to 25 students; SJwSt 3521; 1820-2050 TTh, FolH 208) Feinstein
Nazi destruction of Jewish life in Europe, 1933-45. Historical, social background of European Jewish communities. Anti-Semitism and Nazism. Ghettoes under Nazi rule; social and cultural organization, government. Nazi terror and destruction; Jewish resistance; historical consequences. Meets with JwSt 3521.

8777. Thesis Credits: Masters. (288531) (1-16 cr [max 11 cr per summer term])

SECOND TERM

3036. The Religion of Islam. (989892) (4 cr; \$5036, \$MELC 3036, \$MELC 5036; 1000-1230 TTh; FolH 234) Farah
See 1036. Additional written assignments and readings.

3201. The Bible: Narrative Texts. (190112) (4 cr; \$ANE 1001, \$ANE 3001; 0900-1130 MW; FolH 306) Paradise
See 1036. Literary and historical texts from: Pentateuch, Joshua, Judges, Samuel, and Kings. Readings of Bible and secondary materials on literary background of texts. Meets with ANE 1001, 3001.

3413. Buddhism. (089415) (4 cr; \$5413, \$SALC 3413, 5413; 1000-1230 TTh, FolH 208) Junghare
Historical account of the Buddhist religion: rise, development, various schools, and common philosophical concepts. Focuses on Indian Buddhism, compares it with Hinduism, and discusses its demise and revival on the Indian subcontinent. Meets with 5413, SoAS 3413, 5413.

5036. The Religion of Islam. (591175) (4 cr, \$ 3036; \$MELC 3036; \$MELC 5036; 1000-1230 TTh; FolH 234) Farah
The rise of Islam in historical context; the role of Muhammad, Koran, traditions; fundamentals and observances of the faith; sectarian movements; the spread of Islam into Asia and Africa; Black Muslim component; Reformist movements and change; Activism and Revivalism in Muslim world today. Meets with MidE 1536, 3036, MidE 1536, 3036, SoAS 3036.

5413. Buddhism. (590124) (4 cr; \$3413, SALC3413, SALC 5413; 1000-1230 TTh; FolH 208) Junghare
See 3413. Meets with 3413, SALC 3413, 5413.

8777. Thesis Credits: Masters. (888766) (1-16 cr [max 11 cr per summer term])

Rhetoric (Rhet)

201 Haecker Hall, St. Paul. 624-3445
College of Agriculture

FIRST TERM

R.1104. Library Research Methods. (388116) (1 cr; limited to 30 students; S-N only; lab 1030-1200 T; Cla Off 145) Richardson

On-site and interactive video instruction in information retrieval techniques designed to strengthen skills in using the library. Students work independently to satisfactorily complete all exercises and problem-solving assignments. Students must attend an orientation session. Computer assisted instruction.

R.1151. Writing in Your Major. (686825) (4 cr; limited to 20 students; computer assisted instruction; prereq soph, completion of fr communication requirements, 1104; A-F only; 0915-1055 MWF; ClaOff 17) Lay
Students investigate and write about subjects related to their majors. Emphasis on gathering, evaluating, synthesizing, and summarizing information; adapting it for various audiences. Assignments include literature review, abstract, fact sheet, instructions, and feature article.

R.1222. Public Speaking. (385264) (4 cr; limited to 18 students; prereq completion of fr communication requirements; A-F only; 0915-1130 TWTh; CentLib 6) Montgomery
Practical course in fundamentals of effective speechmaking. Emphasis on researching and organizing a speech and communicating with an audience.

R.3266. Communication, Discussion in Small Group Decision-Making. (489788) (4 cr; limited to 20 students; prereq 1222 or #; 1030-1245 TWTh; HckrH 302) Wharton
Role of communication techniques in the small group decision-making process. Emphasis on problem-solving discussion requiring some kind of formal outcome.

3374 Special Problems in Humanities. (087633) (1-2 cr; prereq #, Δ) Ferguson, Scanlan, others
Primarily for supervised reading and research on topics not covered in regularly scheduled humanities offerings.

R.3562. Writing in Your Profession. (4 cr; each section limited to 20 students; prereq jr or sr, completion of fr communication requirements, 1151; A-F only)
Projects in writing professional reports. Analysis of audience and situation; writing to effectively meet the needs of particular readers. Assignments include writing instructions, feasibility report, proposal, memorandum, letter of application, and resume.
Sec 1, (185265) 0915-1015 MTWThF,

HckrH 302, Scanlan
Sec 2, (487572) 1030-1210 MWF,
HckrH 111, Ferguson

5100. Technical Communication: Special Problems. (285158) (Cr ar; prereq #, Δ) McDowell, others
Supervised reading, research, and work on advanced technical communication projects not covered in regularly scheduled courses.

5180. Internship in Scientific and Technical Communication. (185159) (2-6 cr; prereq STC/Tech Comm maj or grad stu, #, Δ) McDowell, others
On-the-job experience at the University or in industry or government.

8180. Design Project. (188241) (8 cr req, 4 cr per qtr; prereq MS student in STC/tech comm plan B) McDowell, others
Extended problem-solving situation in business, government, or industry in which student acts as consultant to explore a problem, identify possible solutions, introduce solution, and apply it. Scheduled workshops provide guidance, support, and research findings.

8777. Thesis Credits: Masters. (188532) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (391520) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.1222. Public Speaking. (488348) (4 cr; limited to 18 students; prereq completion of fr communication requirements; A-F only; 1030-1245 TWTh, CentLib 6) Bennett
See First Term.

R.3254. Advanced Public Speaking. (191521) (4 cr; limited to 18 students; prereq 1222; 1030-1245 TWTh; HckrH 222) Schuelke
Training for specific speech situations most likely to be encountered professionally. Emphasis on analysis, design, preparation, and delivery of presentations to provide greater flexibility within a variety of speech environments.

3374. Special Problems in Humanities. (186828) (1-2 cr; prereq #, Δ) Horberg, others
See First Term.

R.3562. Writing in Your Profession. (4 cr; each section limited to 20 students; prereq jr or sr; completion of fr communication requirements, 1151; A-F only)
See First Term.
Sec 1, (887570) 1030-1130 MTWThF, HckrH 111, Horberg
Sec 2, (687571) 0915-1055 MWF, ClaOff 17, Walzer (computer assisted instruction)

5100. Technical Communication: Special Problems. (485160) (Cr ar; prereq #, Δ) Schuelke, others
See First Term.

5180. Internship in Scientific and Technical Communication. (285161) (2-6 cr; prereq STC/Tech Comm maj or grad stu, #, Δ) McDowell, others
See First Term.

8180. Design Project. (988242) (8 cr req, 4 cr per qtr; prereq MS student in STC/tech comm plan B) McDowell, others
See First Term.

8777. Thesis Credits: Masters. (488768) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (091522) (1-36 cr [max 11 cr per summer term])

Russian (Russ)

Institute of Linguistics and Asian and Slavic Languages and Literatures (Slavic and Central Asian Languages & Literature)
192 Klaeber Court. 624-3331
College of Liberal Arts

FIRST AND SECOND TERMS: TEN-WEEK COURSES

(Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit for the beginning course and 15 hours of credit for the intermediate course; each equivalent of a full year's sequence in language. **Students must enroll in all three courses and may not enroll in other summer courses.** Prospective students should talk to an adviser before registering for intensive language courses.

R.1101-1102-1103. Beginning Russian. (15 cr for both terms; each section limited to 40 students; 0800-1100 MTWThF; AmundH 124) Polakiewicz
Speaking, reading, and understanding Russian through acquisition of basic patterns of speech.
1101, Sec 5, (485949) June 14-July 7, 5 cr
1102, Sec 5, (885950) July 8-August 1, 5 cr
1103, Sec 5, (685951) August 2-24, 5 cr

1104-1105-1106. Intermediate Russian. (15 cr for both terms; 0800-1100 MTWThF; SmithH 121) Jahn
Expansion of experience in speaking, reading, and understanding Russian; reading contemporary texts.
1104, Sec 5, (188196) June 14-July 7, 5 cr
1105, Sec 5, (088197), July 8-August 1, 5 cr
1106, Sec 5, (888198), August 2-24, 5 cr

COURSE DESCRIPTIONS

S

Scandinavian (Scan)

205 Folwell Hall, 625-9887
(Scandinavian Languages and Literature)
College of Liberal Arts

FIRST TERM

R.3615. The Family in Scandinavian Literature. (091651) (4 cr; limited to 20 students; 0900-1015 MTWTh; FolH 142) Stockenstrom
Representative texts dealing with family socialization from a historical perspective.

3970. Directed Studies. (486826) (1-5 cr; prereq #, Δ, college approval)

5970. Directed Studies. (286827) (1-15 cr; prereq #, Δ, CLA approval)

8888. Thesis Credits: Doctoral. (188537) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.3505. Scandinavian Fiction from 1890 to Present. (191650) (4 cr; limited to 20 students; 0900-1015 MTWTh; FolH 142) Stockenstrom
Examined in context of breakdown of traditional forms and changing concepts of "reality."

3970. Directed Studies. (286181) (1-5 cr; prereq #, Δ, college approval)

5970. Directed Studies. (186182) (1-15 cr; prereq #, Δ, CLA approval)

8888. Thesis Credits: Doctoral. (588776) (1-36 cr [max 11 cr per summer term])

Science in Agriculture (ScAg)

FIRST TERM

5009. Undergraduate Senior Thesis: Science in Agriculture. (689644) (1-5 cr; not for graduate cr; prereq #; A-F only) Hunter

SECOND TERM

5009. Undergraduate Senior Thesis: Science in Agriculture. (891456) (1-5 cr; not for graduate cr; prereq #; A-F only) Hunter

Secondary Education (SeEd)

125 Peik Hall, 625-6372
(Curriculum and Instruction)
College of Education

FIRST TERM

R.5186. Alternatives in Second Language Education—July 5-19. (391775) (3 cr; limited to 30 students; 1300-1515 MTWThF; PeikH 215) Jorstad

Overview of curricula and instruction in various settings: elementary, secondary, open, free, suburban, and center city schools; bilingual programs, colleges, community colleges, universities, and adult programs including teachers preparation.

R.5191. Workshop: Teaching of Second Languages and Cultures: Exploring Issues of Second Language Pedagogy—June 14-July 19. (989911) (4 cr; [max 10 cr]; limited to 45 students; prereq educ or grad stud; A-F only; 1300-1500 MTWTh; PeikH 375) Tedick

Participants will explore approaches for incorporating authentic materials, current technology, cultural content, contemporary politics, history, etc., into second language classrooms. The first part of the session will involve discussion of curricular planning, instructional techniques and approaches, and assessment procedures for in-service and pre-service teachers of French, German, and Spanish. The second part of the afternoon session will involve separate sessions for participants to be facilitated by mentor teachers representing each of the target languages, who will share strategies and techniques and help the participants in preparing lessons that meet the intended goals of the course.

R.5344. Teaching Reading in Content Areas—June 14-29. (191776) (3 cr; limited to 30 students; 0800-1015 MTWThF; PeikH 315) Graves
Methods of accommodating to student abilities and facilitating reading in regular content classes.

R.5350. Current Developments in English Education. (1 cr; each section limited to 50 students; prereq educ or grad stud; A/F only)

Sec 1, Writing to Learn Across the Curriculum—July 15, 18, 19. (791773) 1300-1600 MTF; PeikH 31, Strot

Survey of different techniques for using writing to foster learning in different subject matter areas; strategies for developing assignments, integrating reading and writing, using writing to foster discussion, and evaluating students' writing. Meets with Elem 5101-2.

Sec 2, The Language of Advertising—July 5, 7, 12, 14. (591774) 1030-1245 TTh; PeikH 31, Slater
Analysis of advertising (print and non-

print media) as persuasive communication with an emphasis on creating visual literacy and analytical writing instruction materials for language arts classes. Meets with Elem 5101-3.

5351. Directed Study. (Cr ar [max 6 cr]; prereq education or graduate student; S-N optional)
Sec 22, (387581) Jorstad

R.5390. Current Developments in Secondary School Science Teaching—June 15-29. (589409) (3 cr; limited to 25 students; prereq 3356, 3357 or equiv undergrad courses or exper in tchg science, educ or grad stud; 0800-1015 MTWThF; PeikH 365; A-F only) Finley
Curricula, methods, materials of instruction, evaluation.

R.5394. Workshop: Science Education: Foundations of Science Education—Demonstration Techniques in Secondary Physical Sciences—June 30-July 19. (890744) (1-12 cr [max 12 cr]; limited to 25 students; 1300-1515 TTh; PeikH 385; A-F only)
Analysis of issues, materials, and instructional techniques on current topics of relevance to secondary school and college science teachers. This 3-credit workshop examines the use of demonstrations in physical science, chemistry, and physics courses at the junior high and high school level. Teachers will share their favorite demonstrations, learn and/or build new demonstrations, and practice different demonstration techniques for introducing a new topic, teaching concepts and principles, and for evaluating student learning.

5395. School-Based Projects in Science Education. (990735) (1-12 cr [max 12 cr]; prereq MEd student in science education; A-F only) Finley
Individual or group work on curricular, instructional, or evaluation problems and projects applicable to school situations.

5659. School-Related Projects in Language Arts. (790736) (1-6 cr [max 6 cr]; prereq MEd student in English education; A-F only) Graves
Individual or group work on curricular, instructional, or evaluation problems and projects applicable to school situations.

8871. Problems: Curriculum Construction. (989925) (Cr and hrs ar; prereq #) Finley

8894. Problems: Second Languages and Cultures Education. (Cr ar [max 8 cr])
Individual research.
Sec 21, (087566) Jorstad

8895. Readings in English Education. (590737)(1-3 cr) Graves
Readings in secondary school English curriculum and instruction.

8896. Problems: Teaching English. (390738) (Cr and hrs ar) Graves

8898. Readings in Second Languages and Cultures Education. (1-3 cr)
Readings in development, research, curriculum, instruction, evaluation, culture, teacher education, as needed by the student.
Sec 21, (887567) Jorstad

SECOND TERM

R.5191. Workshop: Teaching of Second Languages and Cultures: Multicultural Education—August 1-8. (991769) (1 cr; limited to 50 students; prereq educ or grad stud, #; 0800-1015 MWF; PeikH 46; A/F only) Narvaez
Classroom structures and communication styles that facilitate the teaching of diverse students. Students will analyze and develop methods for their own classrooms.

R.5227. Teaching About the Newspaper in the Classroom—July 21-August 25. (189929) (1-3 cr [max 4 cr]; SElem 5227; limited to 15 students; 0915-1245 MTWThF; PeikH 31; A-F only) Avery
The institution of the newspaper; articulation of a series of articles of useful instructional strategies, curriculum development techniques, and teaching materials. This 3-credit offering meets with Elem 5227.

R.5322. Teaching Writing. (491766) (3 cr; limited to 30 students; 0915-1030 MTWThF; PeikH 165; A-F only) Beach
Historical and contemporary context; analysis of composing process; pre-writing and revision; audience analysis, comprehension and coherence; selected problems in assigning and evaluating writing. Concurrent registration in SeEd 5323 is recommended.

R.5323. Diagnosing and Assessing Writing in Secondary Schools. (291767) (3 cr; limited to 30 students; prereq educ jr or sr or grad stud; 1100-1215 MTWThF; PeikH 165; A-F only) Beach
Application of theory and research on composition instruction to analysis of diagnosis of writing samples; evaluation of writing using written or conference feedback; large group writing assessment using different rating scales; development of assignments and curriculum materials for writing instruction. Concurrent registration in SeEd 5322 is recommended.

R.5349. Workshop: Secondary Reading Instruction: Reading Activities Textbooks Don't Include—July 21, 26, 28. (191768) (1 cr [max 12 cr]; limited to 50 students; prereq elem tch exper, #; 1300-1600 TTh; PeikH 48) Pearl
Fostering student success in reading and learning from subject matter materials. Practical, teacher-tested

strategies for middle and secondary school students. Meets with Elem 5339-1.

R.5394. Workshop: Science Education—Foundations of Science Education—Performance Assessment in Math and Science—July 22,25,27,29. (291770) (1 cr; limited to 50 students; prereq educ or grad stud; 1030-1245 MWF; Peik 365) Performance assessment in elementary and secondary science. Use of portfolios, holistic scoring, performance tasks, writing in mathematics and science, observations, check lists, and interviews. Meets with Elem 5101-3, MthE 5102-1.

5659. School-Related Projects in Language Arts. (190756) (1-6 cr [max 6 cr]; prereq MEd student in English education; A-F only) Beach See First Term.

8895. Readings in English Education. (890758) (1-3 cr) Beach

8896. Problems: Teaching English. (090760) (Cr and hrs ar) Beach

Small Animal Clinical Sciences (SACS)

C-339 Veterinary Hospital, St. Paul. 625-7744
College of Veterinary Medicine

FIRST TERM

R. 5257. A Clinician's Analysis of Urinalysis—June 13-July 11. (190966) (1 cr; A/F only; 1300-1500 M; 125 AnScVM) Osborne

R.5398. Independent Research in Veterinary Anesthesiology. (185508) (1-6 cr; prereq regis vet med or grad student or #; limited to 10 students) Raffe, E. Robinson

Special problems course for evaluating research methods. Controlled study, prospective, and retrospective models of evaluation defined, critiqued, and used for experimental design and data collection. Analysis of data collection to validate research methods.

5454. Roentgenology Bone-Large Animals—June 13-July 11. (485448) (1 cr; prereq regis vet med, 3rd or 4th yr or grad student or #; 1500-1650 M; AnScVM 135; S-N only) Walter, Feeney, G. Johnston
Roentgen signs of common bone diseases of large animals. Primary emphasis on the horse.

5455. Roentgenology Bone-Small Animals—July 18-August 15. (190434) (1 cr; prereq regis vet med, 3rd or 4th yr or grad student or #; 1500-1650 M; AnScVM 135; S/N only) Walter, Feeney, G. Johnston
Roentgen signs of common bone diseases of small animals.

8197.* Advanced Dermatologic Clinics. (086093) (4 cr; prereq grad student, #; A-F only) McKeever
In-depth clinical study of dermatologic disease states, diagnosis and therapy in animals.

8198.* Problems in Veterinary Comparative Dermatology. (886094) (2 cr; prereq grad student, #) McKeever
Individual study involving a research study of a selected dermatologic problem.

8200. Directed Studies in Veterinary Comparative Dermatology. (488351) (2 cr; prereq grad, #; A-F only) McKeever
Assigned readings and literature review of veterinary comparative dermatology.

8291. Advanced Diagnosis and Therapeutics of Animal Diseases. (888251) (1 cr; prereq 5172, LACS 5162, #) Staff
Detailed examination, discussions, and treatment of cases of animal diseases.

8293. Medical Conference. (385443) (Cr ar; prereq 5172, LACS 5162, #) Staff
Medical, surgical, or obstetrical cases supported by anatomic, bacteriologic, pathologic, physiologic, pharmacologic, and radiologic evaluations whenever applicable.

8390. Seminar: Veterinary Surgery. (886886) (Cr ar; prereq 5360, 5365, or equiv, #) Caywood, Lipowitz, Wallace

8391. Advanced Small Animal Surgery. (686095) (Cr ar; prereq CVM 5350 or equiv, #) Caywood, Lipowitz, Wallace
Surgery of the various systems in small animals with preoperative and postoperative evaluation and treatment.

8394. Surgery of the Gastro-Intestinal System. (787562) (Cr ar; prereq LACS 5160 or #) Lipowitz, Caywood

8398. Research in Veterinary Anesthesia. (686307) (2-4 cr; prereq grad of professional veterinary curriculum, 8396, CAPS 8397 or equiv, #; A-F only) Raffe, E. Robinson
A special problems course designed to evaluate research methods in veterinary anesthesia. Controlled study prospective and retrospective models of evaluation will be defined, critiqued, and used for experimental design and data collection. Analysis of data collection will validate research methods selected and used.

8399. Seminar: Veterinary Anesthesia. (290943) (1-4 cr; prereq grad of professional vet curriculum, 8396, CAPS 8397, or equiv, #; A-F only) Raffe, E. Robinson
Topics in veterinary anesthesia and critical care in large and small animal species.

8410. Surgical Physiology. (587563) (2 cr; prereq 8391, #) Wallace
Macro and micro physiological changes that occur in the animal body as the result of surgical disease and intervention.

8420. Neurosurgery. (387564) (3 cr; prereq 8391 or equiv, #; A-F only) Wallace
Treatment of surgical diseases of animal nervous system, including pathophysiology of these animals.

8430. Thoracic and Cardiovascular Surgery. (985034) (3 cr; prereq 8391, #; lect 0800-1300 MTWThF, Vet Tch Hos 350; lab 1400-1700 MTWThF, VetTchHos 350) Caywood, Ogburn

8480. Seminar: Veterinary Radiology. (891814) (1 cr; prereq 5452 or equiv, and #) Feeney, others
Current reviews, reports, and discussion of problems.

8490. Advanced Veterinary Radiology. (486096) (1-2 cr; prereq 5450, 5451, 5452 or equiv, #; A-F only) Feeney, others
Advanced radiological procedures and modalities and their interpretation or application to veterinary medicine.

8491. Fundamentals of Nuclear Medicine. (789196) (1 cr; prereq #; A-F only) Feeney, Jessen, G. Johnston, Walter
Lecture and laboratory exercises to orient the graduate student in medical sciences to principles and applications of radio isotopes in medicine.

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)

5111. Internal Medicine. (990153) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only) Hardy, Klausner, others

Includes: problem solving skills (incl. problem definitions); quality patient care; clinical skill acquisition & application; communication skills (for clients, clinicians, technicians) including record keeping; ethics; economics of internal medicine; and referral etiquette.

5121. Comparative Ophthalmology/Dermatology. (590155) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only) Bistner, McKeever, others
Case material that entry level veterinarians face in practice.

5131. Emergency Rotation. (790171) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Assist interns with night and weekend emergency cases.

5141. Clinical Nutrition/Internal Medicine. (590172) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Concepts of clinical nutrition: answering client questions regarding feeding practices of the normal dog

and cat; nutritional aspects of medical patients and knowledge of the use of therapeutic diets.

5151. Community Practice. (390173) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)
Clinical experience in preventative health, behavior, and communication skills; basic small animal husbandry; client education resources; team work within the practice environment, referral cases, and community involvement. Selected pet bird and pocket pet appointments.

5211. Small Animal Surgery. (790154) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only) Wallace, Caywood, others
Diagnostic skills; clinical and technical surgical skills; quality patient care; economics related to surgical practice.

5311. Anesthesiology. (390156) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only) E. Robinson, Raffe, others
Preoperative evaluation, restraint, sedation, anesthetic, and management, and post-operative care of canine, feline, and occasional exotic animal cases.

5321. Small Animal Critical Care Medicine. (190174) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only)

Clinical and seminar exposure to critical care medicine. Provides a blend of individual case contact and nursing assistance in the SAICU, and rounds review of cases in the ICU. Seminar information in CPR, nutrition, fluid therapy, respiratory care, and shock. A self-assessment program will permit mastering skills required in critical care medicine. Rostering in the SAICU will permit case contact with critical patients during assigned time blocks.

5411. Radiology. (190157) (4-24 crs; prereq 3rd or 4th yr vet med student; S-N only) Feeney, Johnston G., others
Positioning of animals, good techniques of standard survey radiographs and special procedures, and interpretive skills.

R.5802. Residency in Veterinary Dermatology. (789635) (Cr ar; prereq #; limited to 10 students; S-N only) McKeever

Rotations in veterinary dermatology clinics and review of dermatopathology slides submitted to the Veterinary Diagnostic Laboratory. Rotations through veterinary internal medicine, human dermatology service (Medical School), and dermatology journal club.

5901. Zoo, Exotic, Raptor, and Companion Birds. (291204) (4-12 cr; prereq 4th yr vet med or #)
Disease prevention/husbandry practice. Treating injured, orphaned, and diseased wild animals, including avian, mammalian, and reptilian

COURSE DESCRIPTIONS

species. Clinical experience with companion birds. Restraint, application of anesthesia procedures, collecting diagnostic samples for various raptors.

SECOND TERM

R.5398. Independent Research in Veterinary Anesthesiology. (085509) (1-6 cr; prereq regis vet med or grad student or #; limited to 20 students) Raffe, E. Robinson
See First Term.

R.5812. Companion Animal Oncology. (289789) (2 cr; prereq DVM or equivalent degree; limited to 10 students) Klausner
Principles of veterinary oncology and the biologic behavior, treatment, and prognosis of various neoplastic disorders.

8192. Special Cardiology Clinics. (190202) (Cr ar; prereq grad student, #)
Intensive clinical studies in investigative clinical cardiology. Diagnosis and management of cardiovascular disease in small animals.

8197. Advanced Dermatologic Clinics. (886953) (4 cr; prereq grad student, #; A-F only) McKeever
See First Term.

8198.* Problems in Veterinary Comparative Dermatology. (686954) (Cr ar; prereq grad student, #) McKeever
See First Term.

8200. Directed Studies in Veterinary Comparative Dermatology. (288352) (2 cr; prereq grad, #; A-F only) McKeever
See First Term.

8290. Advanced Veterinary Medicine. (991254) (cr ar; prereq 5172, CAPS 5162, #) Ames, Hardy, Joo, Osborne, Pijoan, E. Robinson, staff
Discussions of the diseases or organs or systems in animals from the following etiologic group: prenatal, metabolic, toxic infectious, physical influences.

8291. Advanced Diagnosis and Therapeutics of Animal Diseases. (290201) (Cr ar; prereq 5172, CAPS 5162, #)
Detailed examination, discussions, and treatment of cases of animal diseases.

8293. Medical Conference. (585442) (Cr ar; prereq 5172, CAPS 5162, #) Staff
See First Term.

8390. Seminar: Veterinary Surgery. (386883) (Cr ar; prereq 5360, 5365, or equiv, #) Caywood, Lipowitz, Wallace

8391. Advanced Small Animal Surgery. (486955) (Cr ar; prereq CVM 5350 or equiv, #) Lipowitz, Wallace, Caywood, others

See First Term.

8394. Surgery of the Gastrointestinal System. (787559) (Cr ar; prereq CAPS 5160 or #) Lipowitz, Caywood, Wallace

8399. Seminar: Veterinary Anesthesia. (488494) (1-4 cr; prereq grad of professional vet curriculum, 8396, CAPS 8397, or equiv, #; A-F only) Raffe, E. Robinson
Topics in veterinary anesthesia and critical care in large and small animal species.

8410. Surgical Physiology. (187560) (2 cr; prereq 8391, #) Wallace
See First Term.

8420. Neurosurgery. (987561) (3 cr; prereq 8391 or equiv, #; A-F only) Wallace
See First Term.

8430. Thoracic and Cardiovascular Surgery. (086885) (3 cr; prereq 8391, #; lect 0800-1300 MTWThF, Vet Tch Hos 350; lab 1400-1700 MTWThF, VetTchHos 350) Caywood

8490. Advanced Veterinary Radiology. (286956) (1-2 cr; prereq 5450, 5451, 5452 or equiv, #; A-F only) Feeney, others
See First Term.

8491. Fundamentals of Nuclear Medicine. (589197) (1 cr; prereq #; A-F only) Feeney, Jessen, G. Johnston, Walter
See First Term.

Social and Administrative Pharmacy (SAPh)

7-115 Health Sciences Unit F. 624-2112
College of Pharmacy

FIRST TERM

8200. Research Problems. (687554) (Cr ar)

8400. Special Clinical Problems. (085168) (Cr ar)

8777. Thesis Credits: Masters. (988533) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788534) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8200. Research Problems. (885219) (Cr ar)

8400. Special Clinical Problems. (885169) (Cr ar)

8777. Thesis Credits: Masters. (288772) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188773) (1-36 cr [max 11 cr per summer term])

Social and Philosophical Foundations of Education (SPFE)

275 Peik Hall. 624-1006
(Educational Policy and Administration)
College of Education
See also Educational Policy and Administration

FIRST TERM

8777. Thesis Credits: Masters. (988547) (1-16 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (488799) (1-16 cr [max 11 cr per summer term])

Social Work (SW)

400 Ford Hall. 624-5888
College of Human Ecology

FIRST TERM

R.3970. Directed Studies. (185162) (1-15 cr; limited to 10 students)

R.3990. Directed Research. (085364) (ar cr; limited to 10 students; prereq #)

R.5010. Seminar: Special Topics. Sec 1. Life Cycle Therapy—July 13-15, 18-19. (885365) (3 cr; limited to 25 students; 0900-1630 MTWThF, FordH 150) Kivnick

Use of the eight psychosocial themes as a lens for viewing behaviors, experiences, feelings, thoughts, and attitudes. Through "translating" life experience into psychosocial themes, students are taught to "chart" the life cycles of individual clients, and to develop client psychosocial profiles.

Sec 2, AIDS: Biopsychosocial and Policy Aspects—June 27-July 1. (989052) 3 cr; limited to 35 students; 0900-1630 MTWThF; FordH 170, Graham

Understanding HIV epidemiology and approaches to infection control/risk reduction. Examining personal and professional values and fears related to HIV infection. Increase awareness of the psychosocial issues with persons with AIDS-related concerns; develop a framework for thinking about the

impact of AIDS in the areas of civil rights/responsibilities and ethics.
Sec 3, Social Work Practice with the Elderly—July 13-15, 18-19. (xxxxxx) (3 cr; limited to 25 students; 0900-1630 MTWThF; FordH 150) Reinardy
Clinical practice issues in working with older clients individually, with their families, and in groups. Attention will be given to the differences between work with the well elderly and with the frail elderly.

R.5026. Mediation and Conflict Resolution—June 14-18. (689790) (3 cr; limited to 25 students; 0900-1630 TWThFSa; McNH 22) Umbreit
Developing beginning skills as a mediator. Making informed decisions regarding the appropriateness of mediation in relation to conflicts frequently confronting social work practitioners: divorce, neighborhood disputes, conflicts between parents and adolescents, conflicts between spouses, and crime victims and others.

R.5311. Issues and Interventions in Child Sexual Abuse—July 6-8, 11-12. (991934) 3 cr, limited to 30 students, 0900-1630 MTWThF; McNH 146) Gilgun

Major issues and interventions involved in child sexual abuse. Perceptions of victims, perpetrators, mothers, and other family members on the abuse; family dynamics; interviewing, the justice system; child protection; rural and urban treatment programs; prevention. Development of knowledge and skills in working with sexually abused children and their families through lecture, guest speakers, readings, small group discussion, role play, in-class exercises, and audio-visual material.

R. 5426. Intervention with Battered Women and their Families—June 20-24. (791935) (3 cr; \$8426; limited to 30 students, 0900-1630 MTWThF, FordH 150) Edleson
Current theories, research and social work practice in the area of battered women and their families.

R.5970. Independent Study in Social Work. (591936) (cr ar; limited to 10 students)
Independent study in areas of special interest to students and faculty.

8020. Field Instruction II. (485952) (4 cr or cr ar #; prereq 8010; seminar meets weekly for 6-9 cr. students; S-N only) Sullivan

8030. Field Instruction in Social Work III. (685366) (cr ar; 8030; prereq 8020; hrs ar; S-N only) Sullivan

8888. Thesis Credits: Doctoral. (588552) (1-36 cr [max 11 cr per summer term])

8970. Directed Study. (185153) (cr ar; prereq #)

8990. Research Projects. (386849) (cr ar; [max 6 cr])



COURSE DESCRIPTIONS

SECOND TERM

R.3970. Directed Studies. (985163) (1-15 cr; limited to 10 students)

R.3990. Directed Research. (385362) (ar cr; prereq #; limited to 10 students)

R.5010. Seminar: Special Topics. Sec 1. Social Work Practice with Gays, Lesbians and Bisexuals. (586848) 3 cr; limited to 25 students, 0915-1215 MW, FordH 40, Jones, Graham

Psychosocial and public policy issues related to effective advocacy and practice with gay, lesbian, and bisexual individuals and families.

R.5421. Social Work Practice: Psychopathology and Intervention—August 8-19. (391940) (3 cr; limited to 25 students; \$8421; 1300-1600 MTWThF; FordH 150) Van Slyke
Roles and intervention strategies of social workers in a variety of service settings. Emphasis on problems frequently presented, treatment alternatives, interdisciplinary practice and ethical issues.

R.5424. Social Work with Involuntary Clients—July 25-August 5. (192099) 3 cr; \$8424; limited to 25 students; 1300-1600 MTWThF; FordH 170, Rooney
Analysis of involuntary transactions experienced by social workers in a variety of settings. Course emphasizes theory, ethics, and strategies for intervention.

8020. Field Instruction II. (886645) (4 cr or cr ar by #; prereq 8010; seminar meets weekly for 6-9 cr. students; S-N only) Sullivan

8030. Field Instruction in Social Work III. (185363) (Cr ar; 8030+; prereq 8020; hrs ar; S-N only) Sullivan

R.8407. Strategies of Family Intervention. (690485) (3 cr; prereq 8401, 2nd yr MSW student, #; limited to 18 students; 0800-1100 MW; FordH 170) Peterson

Seminar in methods of and strategies for helping families cope with family problems.

8888. Thesis Credits: Doctoral. (988810) (1-36 cr [max 11 cr per summer term])

8970. Directed Study. (185217) (ar cr; prereq #)

8990. Research Problems. (487913) (ar cr; [max 6 cr])

Sociology (Soc)

909 Social Sciences. 624-4300
College of Liberal Arts

FIRST TERM

R.1001. Introduction to Sociology.

(586011) (4 cr; limited to 125 students; 0915-1015 MTWThF; BlegH 10) Kennedy

The scientific study of social behavior. Overview of major theories, methods, concepts, and research findings. Characteristics of the basic social units (social relations, groups, organizations, institutions, society), their patterns of interrelation, and processes of change.

R.3101. Introduction to American Criminal Justice. (286228) (4 cr; limited to 60 students; 0915-1015 MTWThF; HHHCtr 25) Samaha
Components and dynamics as well as philosophical underpinnings of the criminal justice system.

R.3503. Sex, Romance, and Relationships. (991710) (4 cr; limited to 100 students; prereq 1001; 0800-0900 MTWThF; BlegH 10)
Sociological, historical, and feminist perspectives on gender relationships and personal life; ideas of masculinity and femininity; the social and historical construction of love and romance, intimacy, emotional and personal life, and sexuality.

R.3551. World Population Problems. (791711) (4 cr; limited to 100 students; 1145-1245 MTWThF; BlegH10) Kennedy
Population growth and natural resources, population dynamics, fertility and mortality in less developed nations, population forecasts, population policies to reduce fertility.

R.5162. Criminal Procedure in American Society. (889285) (4 cr; limited to 60 students; 1030-1130 MTWThF; HHHCtr 25) Samaha
Power of the state to intrude into lives of citizens and deprive them of life, liberty, and property in order to enforce criminal laws; topics such as arrest, search and seizure, pretrial practices, and prisoners' rights. Suggested limits on discretionary power of police, prosecutors, judges, and corrections authorities.

R.5705. Backgrounds of Modern Social Thought. (591712) (4 cr; limited to 75 students; prereq 8 cr in social science or #; 1030-1130 MTWThF; BlegH 10) Brustein
Originators of modern sociological theory examined through original texts: Marx, Weber, Durkheim, Freud, and Gilman. Division of labor, social cohesion, and social control, gender and social reproduction, class relations and the social organization of production, norms and values, and history.

8090. Topics in Sociology. (585103) (Cr ar; prereq #) Staff

8777. Thesis Credits: Masters. (888539) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188540) (1-36 cr [max 11 cr per

summer term])

SECOND TERM

R.1001. Introduction to Sociology. (686646) (4 cr; limited to 125 students; 1030-1130 MTWThF; BlegH 10) Brustein
See First Term.

R.3214. Understanding Everyday Life—July 25-August 24. (391713) (4 cr; limited to 100 students; prereq soph, jr, or sr; 0915-1020 MTWThF; BlegH10) Fulton
Behaviors (activities, personal associations), orientations (values, attitudes, beliefs), and personal interpretations of "typical" individuals; their relationship to social characteristics; the effects of transitions—anticipated (e.g., educational/occupational choice, marriage) and unexpected (e.g., unemployment, illness).

R.3755. Introduction to Political Sociology—July 25-August 22. (191714) (4 cr; limited to 60 students; prereq 1001 or #; 1000-1200 MWF; BlegH 120) Broadbent
Concepts of power, politics, and state and theoretical traditions rooted in writings of Marx, Weber, and de Tocqueville. Democracy, fascism, communism, and analyses of revolution, nation-building, and dynamics of political change.

R.5161. Criminal Law in American Society. (689286) (4 cr; limited to 60 students; 0915-1015 MTWThF; HHHCtr 25) Samaha
Purposes and principles of criminal law; proper limits of criminal sanction and suggested reforms in existing criminal law.

R.5301. Social Movements in a Changing Society—July 26-August 23. (091715) (4 cr; limited to 35 students; prereq 3401 or 5401 or equiv or #; 1000-1230 TTh, 0845-0945 W; BlegH 225) Broadbent
Origins and organization of social movements. Dilemmas and challenges facing movement organizations. Strategies and tactics of protest movements. Relationship with social movements and political institutions, including parties, the state, and the mass media. Role of social movements in the dynamics of social change.

R. 5956. Sociology of Death—July 25-August 24. (891716) (4 cr; limited to 60 students; prereq jr or sr, 8 cr in sociology or #; 1145-1250 MTWThF; BlegH 230) Fulton
Issues and problems that mortality presents in contemporary society.

8090. Topics in Sociology. (986653) (Cr ar; prereq #) Staff

8777. Thesis Credits: Masters. (388780) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488785) (1-36 cr [max 11 cr per summer term])

Soil Science (Soil)

439 Borlaug Hall, St. Paul. 625-1244
College of Agriculture

FIRST TERM

5114.* Special Problems in Soils. (085266) (1-7 cr per qtr [max 10 cr]; prereq 3125 or Δ) Baker, Bloom, Malzer, Graham, Rust, Grigal, Cooper
Research, readings, instruction.

8124.* Research Problems in Soils. (885267) (2-5 cr; hrs ar) Baker, Bloom, Dowdy, Graham, Malzer, Molina, Rust, Grigal
Individual laboratory or fieldwork on special problems in a phase of soils other than the student's major thesis. Arrangements must be made in advance.

8777. Thesis Credits: Masters. (088541) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888542) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5114.* Special Problems in Soils. (986135) (1-7 cr per qtr [max 10 cr]; prereq 3125 or #) Baker, Bloom, Malzer, Graham, Rust, Grigal
See First Term.

8124.* Research Problems in Soils. (786136) (2-5 cr; hrs ar) Baker, Bloom, Graham, Malzer, Rust, Grigal
See First Term.

8777. Thesis Credits: Masters. (788789) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188790) (1-36 cr [max 11 cr per summer term])

South Asian Languages & Cultures (SALC)

Institute of Linguistics and Asian and Slavic Languages and Cultures (South Asian & Middle Eastern Languages & Cultures)
192 Klaeber Court. 624-3331
College of Liberal Arts

FIRST TERM

3411. Introduction to Indian Philosophy. (690597) (4 cr; \$5411, SoAs 3411; 1000-1230 TTh; FolH 208) Junghare

5411. Introduction to Indian Philosophy. (490598) (4 cr; \$3411, SoAs 5411; 1000-1230 TTh; FolH 208) Junghare



COURSE DESCRIPTIONS

8777. Thesis Credits: Masters. (390139) (1-16 [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (790140) (1-36 [max 11 cr per summer term]).

SECOND TERM

R.3413. Buddhism. (090600) (4 cr; limited to 20 students; \$5413, SoAs 3413, ReIS 3413, ReIS 5413; 1000-1230 TTh; FolH 208) Junghare

R.3521. Gandhi and Non-Violent Revolution. (791627) (4 cr; limited to 40 students; \$SoAs 3521; 0900-1000 MTWThF; FolH 134) Chakrabarty
The character of this man, his influence over contemporaries, and his hold on the world today.

R.5413. Buddhism. (890601) (4 cr; limited to 5 students; \$3413, SoAs 5413, ReIS 3413, ReIS 5413; 1000-1230 TTh; FolH 208) Junghare

8777. Thesis Credits: Masters. (590141) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (390142) (1-36 [max 11 cr per summer term]).

Spanish (Span)

34 Folwell Hall. 625-5858
(Spanish and Portuguese)
College of Liberal Arts

For language immersion course for teachers, see Summer Institute for Teachers, page 41, or call 626-7741.

FIRST TERM

R.1101. Beginning Spanish. (5 cr, each section limited to 23 students) Basic listening, speaking, reading, and writing skills. Stress on the development of communicative competence. Some culture readings.
Sec 1, (086014) 0800-1015 MTWThF, NichH 109
Sec 2, (885480) 0800-1015 MTWThF, FordH 120
Sec 3, (988354) 0800-1015 MTWThF, FordH 60

R.1102. Beginning Spanish. (886015) (5 cr, limited to 23 students; prereq 1101; 0800-1015 MTWThF; Arch 35) See 1101.

R.1103. Beginning Spanish. (686016) (5 cr, limited to 23 students; prereq 1102; 0915-1130 MTWThF; VinH 213) See 1101.

R.1104. Intermediate Spanish. (486017) (5 cr; limited to 23 students; prereq 1103 or 3 yrs high school Spanish; 0915-1130 MTWThF; NichH 122)

Speaking and comprehension; development of reading and writing skills based on materials from Spain and Spanish America. Grammar review; compositions and short presentations.

R.1105. Intermediate Spanish. (889898) (5 cr; limited to 23 students; prereq 1104 or 4 yrs high school Spanish; 0915-1130 MTWThF; KoltH S134) See 1104.

R.1106. Intermediate Spanish. (989181) (5 cr; limited to 23 students; prereq 1105 or 5 years high school Spanish; 0915-1130 MTWThF; AkerH 211) See 1104.

R.3002. Reading for Speed and Comprehension. (891862) (4 cr; limited to 30 students; prereq 1106 or equiv; 0915-1015 MTWThF; FolH 326)
Sharpen reading skills, expand vocabulary, improve comprehension. Variety of practical and literary materials will be read; discussion of readings, student presentations, short papers.

R.3005. Oral Communication: Speaking and Listening. (689899) (4 cr; limited to 15 students; prereq 1106 or equiv; 1030-1200 MTWThF; FolH 344) Ocampo
Dialogues, group discussions, simulated situational conversations, interviews, skits, debates based on themes from sound and video tapes, records, speakers from Spain and Spanish America. Emphasis on fluency in speaking and understanding of oral expression.

R.3104. The Art of Reading Literary Texts. (691863) (4 cr; \$LAS 3104, Span 3104; limited to 15 students; prereq 3002; 1145-1245 MTWThF; FolH 318) O'Connell
Critical reading of Spanish and Spanish-American texts; works representing principal genres—novel, drama, poetry, essay; diverse approaches to literature. Terminology of criticism, literary problems and techniques.

R.3512. Spanish-American Civilization: Modern Latin America. (491864) (5 cr; \$LAS 3513; limited to 30 students; prereq 3002; 1300-1400 MTWThF; FolH 326) Vidal
Spanish American civilization from 1800 to the present. Impact of independence movements on literature, art, and music. Relationship between political development and cultural phenomena in the 19th and 20th centuries. Popular culture. Folklore and the oral tradition (ballads, corridos, folktales, the lyric, and others). Impact of 20th-century ideologies and technology on cultural development in Spanish American republics.

3970. Directed Studies. (986863) (1-5 cr per term; prereq #, Δ, college approval)

Guided individual reading or study.

R.3973. Major Project. (987625) (2 cr; prereq #; A-F only)
Guided individual project for Spanish majors. Used to fulfill graduation requirements. Office of Undergraduate Studies has details.

5015. Methods of Translation. (291865) (4 cr; prereq 10 cr from 3001-3005 series or #; 1300-1400 MTWThF; FolH 344)
Meaning, use, and theories of translation. Techniques and problems of translation from Spanish and Portuguese to English and vice versa. Translation patterns, use of special vocabularies and other adjuncts needed to understand both languages. Practical vocabulary and usage for various fields of work.

5910. Topics in Spanish Peninsular Literature. (189065) (4 cr; prereq 3104 or SpPt 3104 or Δ; 1300-1500 T, 1300-1600 Th; FolH 312) Spadaccini
Important groups, movements, trends, methods, genres. Topics may include conversos; mysticism, poesia tradicional; essay and enlightenment; novela realista; and avant-garde.

5970. Directed Readings. (286018) (1-5 cr per term [max 15 cr]; prereq #, Δ, CLA approval; hrs ar) Staff
To fill gaps in students' preparation, especially when courses in certain indispensable topics, figures, periods, or issues have not been offered. Readings in Spanish and/or Spanish-American areas.

5990. Directed Research. (489211) (1-5 cr per qtr; prereq #, Δ, CLA approval)

8777. Thesis Credits: Masters. (688543) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488544) (1-36 cr [max 11 cr per summer term])

8970. Directed Readings in Romance Languages. (186019) (Cr and hrs ar; prereq Δ; mainly for PhD candidates) Staff
Authors and topics not otherwise offered. Weekly meetings based on student's research and analysis. Student and instructor agree on plan of reading or particular topics, figures, issues, etc. Readings in Spanish and/or Spanish-American areas.

FIRST AND SECOND TERMS: TEN-WEEK COURSE

(Register once in Term I)

A concentrated program of study permitting students to earn 15 hours of credit, the equivalent of a full year's sequence in language. Students must enroll in all three courses and may not enroll in other summer courses. Prospective students should talk to an adviser before registering for intensive language courses.

R.1101-1102-1103. Beginning Spanish. (15 cr for both terms, each section limited to 23 students; prereq Δ. Dept overrides available during registration period only; 0800-1130 MTWThF; section 5, KoltH S133, sec 6, KoltH S132)

See 1101 First Term.
R.1101, Sec 5, (486020) June 14-July 7, 5 cr
R.1102, Sec 5, (286021) July 8-August 1, 5 cr
R.1103, Sec 5, (186022) August 2-24, 5 cr
R.1101, Sec 6, (986023) June 14-July 7, 5 cr
R.1102, Sec 6, (786024) July 8-August 1, 5 cr
R.1103, Sec 6, (586025) August 2-24, 5 cr

R.1104-1105-1106. Intermediate Spanish. (15 cr for both terms, each section limited to 23 students; 0800-1130 MTWThF; sec 5, AmundH 158) See 1104 First Term
R.1104, Sec. 5 (885382) June 14-July 7, 5 cr
R.1105, Sec. 5 (685383) July 8-August 1, 5 cr
R.1106, Sec. 5 (485384) August 2-24, 5 cr

SECOND TERM

R.1102. Beginning Spanish. (5 cr, each section limited to 23 students; prereq 1101)
See 1101 First Term.
Sec 1 (586655) 0800-1015 MTWThF, NichH 122
Sec 2 (588356) 0800-1015 MTWThF, FolH 344

R.1103. Beginning Spanish. (186657) (5 cr, limited to 23 students; prereq 1102; 0800-1015 MTWThF; FolH 148)
See 1101 First Term.

R.1104. Intermediate Spanish. (189901) (5 cr; limited to 23 students; prereq 1103 or 3 yrs high school Spanish; 0915-1130 MTWThF; CivMinE 213)
See First Term.

R.1105. Intermediate Spanish. (486664) (5 cr; limited to 23 students; prereq 1104 or 4 yrs high school Spanish; 0915-1130 MTWThF; AkerH 211)
See 1104 First Term.

R.1106. Intermediate Spanish. (899902) (5 cr; limited to 23 students; prereq 1105 or 5 yrs high school Spanish; 0915-1130 MTWThF; FolH 214)
See 1104 First Term.

3004. Written Communication: Formal and Informal. (191866) (4 cr; prereq 1106 or equiv; 1030-1200 MTWThF; FolH 246)
Exploration of different composition types. Individual and class exercises based on model writings. Grammar review as needed. Emphasis on clarity of expression and structure of composition.



COURSE DESCRIPTIONS

R.3104. The Art of Reading Literary Texts. (689403) (4 cr; limited to 15 students; \$LAS 3104, Spn 3104; prereq 3002; 1300-1400 MTWThF; FolH 114) Reis
See First Term.

3970. Directed Studies. (887634) (1-5 cr per term; prereq #, Δ, college approval)
Guided individual reading or study.

R.3973. Major Project. (787626) (2 cr; prereq #; A-F only)
See First Term.

5950. Figures in Spanish American Literature. (991867) (4 cr; prereq 3104 or SpPt 3104 or Δ; 1300-1500 T, 1300-1600 Th; FolH 142) Jara
One major writer or group of writers whose work has had an impact on thought, literature, or social problems.

5970. Directed Readings. (386673) (1-5 cr per qtr [max 15 cr]; prereq #, Δ, CLA approval; hrs ar) Staff
See First Term.

R.5990. Directed Research. (388486) (1-5 cr per qtr; prereq #, Δ, CLA approval)

8777. Thesis Credits: Masters. (788792) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588793) (1-36 cr [max 11 cr per summer term])

8970. Directed Readings in Romance Languages. (086675) (Cr and hrs ar; prereq Δ; mainly for Ph.D. candidates) Staff
See First Term.

Speech-Communication (Spch)

460 Folwell Hall. 624-5800
College of Liberal Arts

FIRST TERM

R.1101. Fundamentals of Speech Communication: Oral Communication. (4 cr; each section limited to 22 students)
Oral communication processes and elements. Criticism and response to oral discourse. Individual speaking.
Sec 1, (386026) 0800-0900 MTWThF, FolH 318
Sec 2, (186027) 0915-1015 MTWThF, FolH 318

1102. Fundamentals of Speech Communication: Communication Process. (891652) (4 cr; 0915-1015 MTWThF; FolH 306)
Introduction to communication theory and research focusing on interpersonal, intercultural, group, and family settings.

R.1313. Analysis of Oral Argument. (287573) (4 cr; limited to 22 students;

1030-1130 MTWThF; FolH 318)
Strategies for analyzing and evaluating arguments received aurally. Problems in listening and responding to argument.

R.3291. Broadcasting and New Telecommunication Media. (691653) (4 cr; prereq 3211 or #; limited to 20 students; 1145-1245 MTWThF; FolH 326) Rarick
Development and current status of new telecommunication media such as cable, TV, satellites, DBS, MDS, and video disk/cassettes. Technology, historical development, regulation, and programming of these media and their influence on broadcasting.

R.3411. Small Group Communication Processes. (4 cr; each section limited to 22 students; prereq 1101 or #)
Cooperative thinking in task-oriented groups. Planning, preparing for, participating in, and leading private and public meetings.
Sec 1, (485367) 0800-1015 MWF, FolH 419
Sec 2, (188238) 1030-1245 MWF, FolH 419

R.3451. Intercultural Communication: Theory and Practice. (187574) (4 cr; prereq planning an intercultural experience; limited to 20 students; 1030-1130 MTWThF; FolH 326)
Theories of intercultural communication; factors influencing intercultural communication for students wishing to become both knowledgeable and proficient in interaction across cultures.

3601. Approaches to Public Discourse. (188361) (4 cr; prereq 1101; 0800-0900 MTWThF; FolH 326) Scott
Theoretical systems intended to explain or direct the creation of public discourse. Traditional rhetoric to contemporary perspectives. Using theory to explain the practice of public discourse.

3970. Directed Studies. (086028) (Cr ar [cr does not count toward speech-communication major]; prereq at least one course in speech-communication, #, Δ, college approval)
Individual study projects in speech-communication. Consultation with an instructor who agrees to supervise the project is required.

3980. Directed Instruction (886029) (1-4 cr per term [max 8 cr...cr does not count toward speech-communication major]; S-N only; prereq #, Δ, college approval)
Students work with an instructor in planning and teaching an undergraduate course.

R.5414. Authority and Power in Task-Oriented Communication-June 14-28. (888363) (4 cr; limited to 50 students; S-N only; prereq 3411 or #; 1615-1815 MTWThF; 0900-1700 Sa, Su; FolH 306) Shapiro
Authority and power in task-oriented groups. Tavistock type, small group,

intergroup, and large group laboratory experiences. Verbal and nonverbal processes that operate in and among groups to facilitate or inhibit effective leadership and followership.

R.5422. Interviewing and Communication. (491654) (4 cr; prereq 1101, 6 cr in social sciences of #; limited to 24 students; 0800-1015 MTW; FolH 50) Rarick
Theory and practice in the information interview. Interpersonal perception, empathy, and cognitive structure in dyadic communication. Experience in interviewing and communication analysis. Research in interpersonal and mass communication.

5970. Directed Readings. (186030) (Cr ar; prereq 9 cr in 3xxx-5xxx-level speech courses, #, Δ, CLA approval; S/N only)
Directed reading and preparation of reports on selected subjects.

8501. Introduction to Survey Research in Speech-Communication. (390612) (3 cr; prereq Jour 8001 or #; 1030-1245 TTh; FolH 426) Tims
Research-survey-based projects in broadcasting and public address. Execution of small scale, research-based survey; problems attendant upon execution of studies.

8606. Seminar: Rhetorical Analysis of Campaigns and Movements. (291655) (3 cr; prereq 5431, 5617, 10 cr social sciences or #; 1300-1515 MW; FolH 426) Scott
Literature and methodology in historical and contemporary rhetorical campaigns and movements.

8777. Thesis Credits: Masters. (288545) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188546) (1-36 cr [max 11 cr per summer term])

8990. Research. (086031) (Cr ar; prereq #, Δ; S/N only)
Open to graduate students engaged in research on special problems.

SECOND TERM

R.1101. Fundamentals of Speech Communication: Oral Communication. (486678) (4 cr, limited to 22 students; 0800-0900 MTWThF; FolH 419)
See First Term.

R.1313. Analysis of Oral Argument. (987575) (4 cr; limited to 22 students; 1030-1130 MTWThF; FolH 318)
See First Term.

3211. Determinants of Broadcast Programming. (191656) (4 cr; 0915-1130 MTW; FolH 50) Browne
Historical development and contemporary aspects of broadcast programming. Roles of governmental, industrial, and public organizations in influencing programming decisions. Problem areas in programming.

3402. Communication in Relationships. (991657) (4 cr; prereq 1102; limited to 25 students; 0915-1130 MTW; FolH 326) Hewes
Communicative interactions between individuals in acquaintance, friendship, work, and significant ongoing relationships from onset to termination.

R.3411. Small Group Communication Processes. (4 cr; each section limited to 22 students; prereq 1101 or #)
See First Term.
Sec 1, (285368) 0800-1015 MWF; FolH 318
Sec 2, (488480) 1030-1245 MWF; FolH 419

3431. The Role of Persuasion in the Modern World. (890615) (4 cr; soph standing rec; limited to 30; 0800-0900 MTWThF; FolH 326) Omdahl
Persuasion in interpersonal, organizational, intracultural, and intercultural relationships. Contemporary persuasion, with occasional historical segments.

R.3441. Communicating in Organizations. (489063) (4 cr; prereq 1101 or 1102 or equiv; limited to 22 students; 1145-1245 MTWThF; FolH 326)
Theory and practice of communicating in organizations. How communication creates, maintains, and changes organizational culture. Role of individual communicator in organizational culture.

R.3451. Intercultural Communication: Theory and Practice. (289064) (4 cr; prereq planning an intercultural experience; limited to 20 students; 0915-1015 MTWThF; FolH 419)
See First Term.

3970. Directed Studies. (086692) (Cr ar [cr does not count toward speech-communication major]; prereq at least one course in speech-communication, #, Δ, college approval)
See First Term.

3980. Directed Instruction. (686694) (1-4 cr per term [max 8 cr...cr does not count toward speech-communication major]; S-N only; prereq #, Δ, college approval)
See First Term.

R.5110. Advanced Topics in Speech Communication: The Rhetoric of the Abortion Controversy. (792101) (4 cr; limited to 25 students; [may be repeated for cr with #] prereq 3211, 3401, 3601 [whichever is relevant to the topic]; 0915-1130 TTh; FolH 340) Lake
Exploration of the arguments of those supporting and opposing the legalization/availability of abortion, including forms of discourse, such as films (Silent Scream, the Planned Parenthood response, and subsequent talk radio and TV, letters to the editor), specialized perspectives (The Human Life Review, Conscience), and policy-making discourse (Congressional hearings), the evidence advanced, and

COURSE DESCRIPTIONS

efforts by both sides to co-opt the arguments of the opposition.

5403. Theory Construction and Analysis in Communication. (791658) (4 cr; prereq 3401 or #; 1145-1430 TTh; FolH 318) Hewes
Problems in development of communication theory. Analysis of existing theory. Relationship of theory to research.

R.5405. Nonverbal Communication: Theory and Research. (689935) (4 cr; limited to 20 students; 1300-1530 TTh; FolH 419) Sykes
Nonverbal interpersonal communication. Nonverbal categories: gesture, facial expression, posture, clothing, environment.

R.5451. Intercultural Communication. (591659) (4 cr; limited to 20 students; prereq 3401, recommended Anth 1102 or another cultural anthropology course or #; 1300-1545 MW; FolH 419) Albert
Successful interpersonal communication across cultures. Verbal and nonverbal communication.

5970. Directed Readings. (286696) (Cr ar; prereq 9 cr in 3xxx-5xxx-level speech courses, #, Δ, CLA approval) See First Term.

R.8110. Seminar: Advanced Speech Problems—Theory of Argument. (992100) (3 cr; limited to 15 students; prereq undergrad degree in spch-comm or equiv; 1300-1515 TTh; FolH 426) Lake
Exploration of argument theory, particularly of changes that have occurred and controversies that have arisen, moving from Aristotelian notions to Toulmin and field dependent argument to the questions raised by postmodernism.

8777. Thesis Credits: Masters. (188795) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888797) (1-36 cr [max 11 cr per summer term])

8990. Research. (486700) (Cr ar; prereq #, Δ; S/N only) See First Term.

Statistics (Stat)

270 Vincent Hall. 625-8046
College of Liberal Arts

FIRST TERM

R.3011. Statistical Analysis. (188165) (4 cr; limited to 50 students; prereq college algebra; 1030-1130 MWF, 1030-1230 TTh; SmithH 331)
Descriptive statistics; elementary probability; estimation; one- and two-sample tests; introduction to regression and ANOVA.

R.3091. Introduction to Probability and Statistics. (085073) (4 cr, \$5121, \$5131; limited to 40 students; prereq differential and integral calculus; 1030-1230 MW, 1145-1245 TThF; VinH 311)
Elementary probability and probability distributions, sampling and elements of statistical inference.

R.5021. Statistical Analysis. (287914) (5 cr, \$3012; limited to 30 students; prereq college algebra; 0915-1015 MTWThF, 1100-1230 TTh; HckrH 100)
Frequency distributions, descriptive statistics, elementary probability; binomial, Poisson, and normal distributions, estimation and testing, analysis of variance, multiple comparisons, linear regression.

5121. Theory of Statistics. (886032) (5 cr; prereq Math 1252; 0915-1015 MTh, 0915-1115 TWF; Arch 50)
Univariate and multivariate distributions, law of large numbers, sampling, likelihood methods, estimation and hypothesis testing.

R.5302. Applied Regression Analysis. (989410) (5 cr, \$5161; prereq 3012 or 5021 or 5133 or #; limited to 30 students; 0910-1020 MTWThF, 1330-1430 TTh; ClaOff B25)
Simple, multiple, and polynomial regression. Estimation, testing, and prediction. Stepwise and other numerical methods; examination of residuals; weighted least squares; nonlinear models; response surface. Experimental research and economic applications.

5890. Senior Paper. (987608) (2 cr; prereq sr statistics major; A-F only) Satisfies senior project requirement for majors. Directed study. Paper on specified area, a consulting project, or original computer program.

8777. Thesis Credits: Masters. (788548) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (588549) (1-36 cr [max 11 cr per summer term])

SECOND TERM

R.1001. Introduction to Ideas of Statistics. (088166) (4 cr; limited to 40 students; prereq high school algebra; 1030-1130 MWF, 1030-1230 TTh, VinH 1)
Controlled vs. observational studies; presentation and description of data; correlation and causality; sampling, accuracy of estimates; tests.

R.3012. Statistical Analysis. (4 cr; each section limited to 20 students; prereq 3011)
ANOVA; randomized blocks; multiple comparisons; factorial experiments; multiple regression; transformations; goodness of fit; nonparametric

methods; contingency tables; selected topics.

Sec 1, (888167), 0915-1015 MWF, 0915-1115 TF; VinH 203
Sec 2, (989200), 1015-1215 MTh, 1115-1215 TWF; VinH 113

R.3091. Introduction to Probability and Statistics. (986703) (4 cr, \$5121, \$5131; limited to 40 students; prereq differential and integral calculus; 0915-1015 MWF, 0915-1115 TTh; VinH 211)
See First Term.

R.5122. Theory of Statistics. (086708) (5 cr; prereq 5121; limited to 35 students; 0915-1015 MTh, 0915-1115 TWF; VinH 314)
Confidence intervals, testing hypotheses, regression, analysis of variance and covariance, distribution-free methods.

R.5301. Designing Experiments. (789411) (5 cr, \$5163; limited to 30 students; prereq 3012 or 5021 or 5133 or #; 0910-1020 MTWThF, 1330-1430 TTh; ClaOff B45)
Control of variation, construction and analysis of complete and incomplete block, split plot, factorial, and groups of similar experiments. Confounding, crossover, and optimum seeking designs.

5890. Senior Paper. (588499) (2 cr; prereq sr statistics major; A-F only) Satisfies senior project requirement for majors. Directed study. Paper on specified area, a consulting project, or original computer program.

8777. Thesis Credits: Masters. (888802) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688803) (1-36 cr [max 11 cr per summer term])

Surgery (Surg)

11-100 Phillips-Wangensteen Building. 625-1400
Medical School

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in term I)

Elective Courses for Undergraduate Students

5526. Clinical Nutrition Seminar. (689157) (1 cr; prereq acceptance MS program NSS diet or Kellogg fellow; 1300-1430 Th; PWB 11-157; S-N only) Shrouts

5527. Hospital Nutrition Support. (489158) (9 cr; prereq acceptance to MS program NSS diet; S-N only) Shrouts

Required Courses for Graduate Students

8200. Clinical Surgical Problems in Management. (187095) (5 cr; ar)

Najarian, staff

8201. Surgery-Roentgenological Conference. (087096) (1 cr; 1600-1730 F; Mayo C321-Todd Amph) Najarian

8202. Surgical Research. (887097) (5 cr; ar; Sur Res Lab) Staff

8203. Surgery Complications and Research Conference. (687098) (1 cr; 1630-1730 T; PWB 11-157) Najarian, staff

8207. Transplantation and Bone Marrow Conference. (487099) (1 cr; 1630-1730 Th; PWB 11-157) Najarian

FIRST TERM

8777. Thesis Credits: Masters. (988550) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788551) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (188806) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788808) (1-36 cr [max 11 cr per summer term])

T

Textiles and Clothing (TexC)

See Design, Housing and Apparel (DHA) on page 77.

Theatre Arts (Th)

208 Middlebrook Hall. 625-6699
College of Liberal Arts

FIRST TERM

R.1101. Introduction to the Theatre. (691619) (4 cr; limited to 40 students; 1030-1230 MTWTh; RarigC 185) Norwood.

R.3515. Technical Theatre Production II. (091620) (5 cr; limited to 40 students; prereq 1504; 1030-1245 MTWThF; RarigC 275) Montgomery, Trakinat
Theory and practice in design and execution of stage lighting and costuming. Laboratory.

2.3712. Intermediate Stage Direction. (190417) (4 cr; limited to 12 students; prereq 3711, jr or sr; 0915-1115 MTWTh; RarigC 210)

Adey
Script analysis, rehearsal technique, and actor coaching. Rehearsal and production of scenes.

2.3803. Platform Performance. (891621) (4 cr; limited to 18 students; prereq management major; 0800-1000 MTWTh; RarigC 20) Norwood Reading and analyzing selected poems, plays and stories; interpreting literary insights through solo and group performance.

5100. Theatre Practicum. (686033) (1-6 cr; prereq written permission, #, Δ; A-F only) Staff
Arranged individual creative projects in production of approved plays. Playwriting, directing, acting, and design.

5110. Theatre Performance. (486034) (1 cr [9 cr max]); prereq written permission after casting and/or assignment to a production; credit awarded after quarter performance takes place; S-N only) Staff
Participation in the rehearsals and performances of a major University Theatre production.

5720. Plays in Production and Performance. (885074) (2-4 cr [max 6 cr for undergrads]; prereq 5712 and written permission) Staff
Work on campus or in the field with a community, high school, touring, or professional theatre group for experience in stage direction.

5760. Advanced Stage Management. (685075) (1-3 cr [max 6 cr for undergrads]; prereq 5716 or 5716 and written permission) Staff
Practical experience in stage management for specific productions of the University Theatre with emphasis on rehearsal and performance.

2.5930. Topics in Theatre: Dance for Musical Theatre. (590107) (2 cr [max 12 cr]; limited to 30 students; 1415-1630 TTh; RarigC 10) Command
Musical-theatre dance for less-experienced as well as experienced performers. A practical approach to necessary skills, including dance audition techniques.

2.5940. Topics in Theatre: Show Biz: Staging And Performing Musical Theatre. (390108) (4 cr [max 12 cr]; limited to 30 students; 1330-1630 MWF; RarigC 190 and 20) Command, Ruth

An intensive fundamental course in music-theatre performance, staging and choreography. For actors, singers, dancers, directors, and choreographers who would like to expand their skills. Includes audition techniques and contact with professional guest artists. Taught by two music-theatre

professionals with extensive experience in the Twin Cities and Hollywood.

5970. Directed Readings. (1-6 cr; prereq 9 cr in theatre, #, Δ, CLA approval) Staff
Directed reading and preparation of reports on selected subjects.
Sec 1, (186036)
Sec 2, (689210)

8100. Theatre Practicum. (190420) (1-6 crs; prereq #, Δ) Design Faculty
Arranged individual creative advanced projects in the production of a play of an actor, designer, director, dramaturg, or playwright.

8777. Thesis Credits: Masters. (388553) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188554) (1-36 cr [max 11 cr per summer term])

8990. Research. (286035) (Cr ar; prereq #, Δ) Staff
Open to graduate students engaged in research on special problems.

SECOND TERM

3172. History of the Theatre. (091617) (4 cr; prereq 1101, theatre major; 1030-1230 MW; 1030-1130 T; RarigC 275) Kobialka
History of Western theatre and drama; theatrical practices, staging, conventions and dramatic structure of plays. Ancient Greece through Renaissance.

3711. Beginning Stage Direction. (689059) (4 cr; prereq 1504, 3701, jr or sr; 0915-1130 MTWTh; RarigC 185; A-F only) Adey
Theory of direction; concept and analysis. Blocking and production of short scenes.

5100. Theatre Practicum. (790218) (1-6 cr; prereq written permission, #, Δ; A-F only) Staff
Arranged individual creative projects in production of approved plays. Playwriting, directing, acting, and design.

R.5562. Scene Painting Techniques. (891618) (4 cr; prereq 3513 or #; 0800-1100 MTWTh; RarigC 130) Brockman
Practical study of materials, layout and painting techniques used in theatre. Emphasizes painting styles and texturing techniques.

5970. Directed Readings. (prereq 9 cr in theatre, #, Δ, CLA approval) Staff
Directed reading and preparation of reports on selected subjects.
Sec 1, (089673), 4 cr
Sec 2, (190899), 1-6 cr

8100. Theatre Practicum. (890422) (1-6 cr; prereq #, Δ) Design faculty.
Arranged individual creative advanced projects in the production of a play of

an actor, designer, director, dramaturg, or playwright.

8777. Thesis Credits: Masters. (588812) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188814) (1-36 cr [max 11 cr per summer term])

Therapeutic Radiology (TRad)

M-10 Masonic Cancer Center. 626-6700
Medical School

FIRST TERM

3122. Radiation Physics. (185041) (3 cr; prereq 3121)

3151. Radiation Oncology Treatment Planning. (085042) (4 cr; prereq #)

FIRST AND SECOND TERMS: TEN-WEEK COURSES (Register once in Term I)

5508. Special Problems in Radiation Biology. (887102) (Cr ar) Song, others

5512. Dosimetry of Internal and External Radiation Emitters. (687103) (1 cr; 0730-0830 W; UHosp 1243) Khan, Deibel, Gerbi

8310. Fundamentals of Radiation Therapy. (187106) (1 cr; 1600-1700 M; UHosp 1243)

8315. Radiation Therapy Pathology. (987107) (1 cr)

8410. Seminar: Radiation Biology. (787111) (1 cr; prereq #) Song, others

8450. Research in Radiation Biology. (587112) (Cr ar) Song, others

8550. Research of Radiation Physics. (387113) (Cr ar) Khan

SECOND TERM

3122. Radiation Physics. (885043) (3 cr; prereq 3121)

3151. Radiation Oncology Treatment Planning. (685044) (4 cr; prereq #)

3152. Radiation Oncology Treatment Planning. (585053) (4 cr; prereq 3151)

3170. Radium Therapy. (385054) (4 cr; prereq #)

Theriogenology (Tgen)

FIRST TERM

8777. Thesis Credits: Masters. (288934) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188935) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (988936) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (788937) (1-36 cr [max 11 cr per summer term])



U

University College (UC)

12 Morrill Hall. 624-2022

FIRST TERM

3075. Directed Study. (186092) (Cr ar; prereq Δ)

SECOND TERM

3075. Directed Study. (587188) (Cr ar; prereq Δ)

Urban Studies (UrbS)

348 Social Sciences. 626-1626
College of Liberal Arts

SECOND TERM

3900. Internship. (388360) (1-6 cr per term [max 12 cr]; prereq jr or sr, #; 1730-1930 T; SocSci 101; A-F only) Byers

A weekly seminar integrating the internship experience with the academic program. Should be taken during or immediately after the internship. This offering for 3 credits.

3970. Directed Studies. (088362) (2-6 cr; prereq #, Δ, college approval) Martin

COURSE DESCRIPTIONS

Urologic Surgery (Urol)

A-597 Mayo. 625-9933
Medical School

FIRST TERM

Required Courses for Graduate Students

8250. Urological Surgery. (087115) (4 cr; 0900-1200 MTThF; Mayo OR-H) Fraley, others
Urological fellow first assists at operations in the University Hospitals and later is permitted to operate under supervision of the staff.

8251. Cystoscopy and Urological Diagnosis. (887116) (4 cr; 0800-1200 MTWThF; Cysto Suite) Fraley, others.
Urological fellow performs cystoscopies and other diagnostic procedures.

8252. Urological Conference. (687117) (4 cr; 1600-1700 F, Ward Rds, Sta 57; 0900-1100 S, Sta 57 Conf Rm) Fraley, others
Problems in diagnosis and treatment.

8253. Research: Urology. (487118) (4 cr) Fraley, others
Problems in experimental and clinical surgery.

8254. Urological Seminar. (287119) (3 cr) Fraley, others

8255. Urological-Radiological Conference. (687120) (3 cr; 1300-1400 MTWThF; Mayo A503) Fraley, others

8256. Urological-Pathological Conference. (487121) (3 cr; 1645-1745 W; Mayo A503) Fraley, others

8257. Selected Topics: On the Genitourinary System. (587885) (2 cr) Li, Bronson

SECOND TERM

Required Courses for Graduate Students

8250. Urological Surgery. (187484) (4 cr; 0900-1200 MTThF; Mayo OR-H) Fraley, others
See First Term.

8251. Cystoscopy and Urological Diagnosis. (687490) (4 cr; 0800-1200 MTWThF; Cysto Suite) Fraley, others
See First Term.

8252. Urological Conference. (287475) (4 cr; 1600-1700 F; Ward Rds, Sta 57; 0900-1100 S; Sta 57 Conf Rm) Fraley, others
See First Term.

8253. Research: Urology. (787481) (4 cr) Fraley, others
See First Term.

8254. Urological Seminar. (087485) (3 cr) Fraley, others

8255. Urological-Radiological Conference. (287489) (3 cr; 1300-1400 MTWThF; Mayo A503) Fraley, others

8256. Urological-Pathological Conference. (687649) (3 cr; 1645-1745 W; Mayo A503) Fraley, others

V

Veterinary Biology (VB)

295K Animal Science, St. Paul. 624-2700
College of Veterinary Medicine

FIRST TERM

5149.* Topics of Organology. (286097) (1-5 cr [may be repeated for cr]; prereq 5104, #)
Lecture and laboratory presentation of selected organ systems of domestic and laboratory animals.

5950. Directed Studies. (090189) (1-5 cr; prereq #, Δ)
Independent, directed study in veterinary science in area arranged by the student and a faculty member.

8111. Histologic and Ultrahistologic Techniques. (387628) (3 cr; prereq 5106, #)
Principles and methods in preparing animal tissues for histological and ultrahistological observation.

8112-8113-8114. Research Propositions in Morphology. (186098) (986099) (686100) (2 cr per qtr; prereq #) Staff
Each student defines an unsolved morphologic problem, hypothesizes a solution, and proposes an experimental approach to test the hypothesis. Written and oral presentation of proposition are evaluated by departmental graduate faculty.

8134-8135. Comparative Veterinary Neurology. (486101) (286102) (4 cr per qtr; prereq 5100, #) Fletcher, Beitz
Correlated studies of the central nervous system of domestic animals. Emphasis on relating neuroanatomy to neurophysiology.

8136. Experimental Comparative Veterinary Neurology. (186103) (3 cr, \$NSc 8136; prereq 8135, #) Fletcher, Beitz
Principles, methods, and laboratory

exercises in investigating the central nervous system of domestic animals.

8150. Research Problems in Veterinary Anatomy. (986104) (1-5 cr; prereq 8149, #)
Individual research projects under staff direction in selected areas of veterinary anatomy. Topics and species determined by consultation. Project may be a specialized aspect of a thesis problem or an independent problem of mutual interest to graduate student and adviser.

8349. Research in Physiology. (786105) (Cr ar; prereq #) Duke
Individual research under faculty direction. Topics to be determined by consultation; may be a specialized aspect of a thesis problem or an independent problem of mutual interest to graduate student and adviser.

8448. Problems in Veterinary Pharmacology. (586106) (Cr ar; prereq 5401, #) A. Larson, Brown

8550. Seminar: Veterinary Biology. (486230) (1 cr; A-F only; prereq #) Gallant

8777. Thesis Credits: Masters. (088555) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888556) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5149.* Topics of Organology. (186957) (1-5 cr [may be repeated for cr]; prereq 5104, #)
See First Term.

5950. Directed Studies. (390190) (1-5 cr; prereq #, Δ)
Independent, directed study in veterinary science in area arranged by the student and a faculty member.

8111. Histological and Ultrahistologic Techniques. (986829) (3 cr; prereq 5106, #)
See First Term.

8112-8113-8114. Research Propositions in Morphology. (986958) (786959) (186960) (2 cr per qtr; prereq #) Staff
See First Term.

8134-8135. Comparative Veterinary Neurology. (986961) (786962) (4 cr per qtr; prereq 5100, #) Fletcher, Beitz
See First Term.

8136. Experimental Comparative Veterinary Neurology. (586963) (3 cr, \$NSc 8136; prereq 8135, #) Fletcher, Beitz
See First Term.

8150. Research Problems in Veterinary Anatomy. (386964) (1-5 cr; prereq 8149, #) Staff
See First Term.

8349. Research in Physiology. (186965) (Cr ar; prereq #) Duke
See First Term.

8448. Problems in Veterinary Pharmacology. (086966) (Cr ar; prereq 5401, #) A. Larson, Brown

8550. Seminar: Veterinary Biology. (286231) (1 cr; A-F only; prereq #) Gallant

8777. Thesis Credits: Masters. (288819) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688820) (1-36 cr [max 11 cr per summer term])

Veterinary Diagnostic Medicine (VDM)

E-220 Veterinary Diagnostic Laboratories, St. Paul. 625-8787
College of Veterinary Medicine

FIRST TERM

5111. Diagnostic Medicine. (090161) (2-12 crs; prereq 3rd or 4th yr vet med student)
Laboratories devoted to the application of principles and techniques of the basic and clinical medical sciences to veterinary diagnostic medicine.

R.5622. Problems in Diagnostic Virology. (989794) (1-4 cr; limited to 10 students; prereq #; A-F only) Goyal
Laboratory techniques in diagnostic virology and viral research.

FIRST AND SECOND TERMS: TEN-WEEK COURSE (Register once in Term I)

5611. Advanced Veterinary Toxicology. (191678) (4-24 cr; prereq 5164, 5165, or #)
Clinical, diagnostic, mechanistic, and therapeutic aspects of Biotoxins, organic and inorganic toxins that affect livestock, poultry, wildlife, and companion animals or present a potential threat to the public health.

SECOND TERM

5521. Surgical Pathology. (489791) (3 cr; prereq #; A-F only)
Preparation and interpretation of surgical and necropsy specimens.

5522. Diagnostic Pathology. (289792) (5 cr; prereq #; A-F only)
Laboratory techniques in diagnostic virology and viral research.

R.5622. Problems in Diagnostic Virology. (189793) (1-4 cr; limited to 10 students; prereq #; A-F only) Goyal
See First Term.

Veterinary Medicine (CVM)

460 Veterinary Teaching Hospitals, St. Paul. 624-4747
College of Veterinary Medicine

FIRST AND SECOND TERM: TWELVE-WEEK COURSE

1809. Internship in Animal Hospital Practice. (988077) (4 cr; prereq #; 0800-1630 MTWThF; VetTchHos; S-N only) Staff
Laboratories devoted to the principles and techniques of medical and surgical nursing care, examination, diagnostic and therapeutic procedures, and applied procedures in anesthesiology and radiology. Rotations in small animal medicine and surgery, large animal medicine and surgery, anesthesiology, radiology, and intensive care.

5601. Rotations at Other Institutions. (791188) (4-24 cr; prereq 4th yr vet med or #)
Off-site clinical rotations in selected areas of veterinary medicine.

Veterinary Medicine, Graduate (VMed)

FIRST TERM

8777. Thesis Credits: Masters. (688557) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688574) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (488821) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (288822) (1-36 cr [max 11 cr per summer term])

Veterinary Microbiology (VMic)

295k Animal Science/Veterinary Medicine, St. Paul. 624-2700
(Veterinary Biology)
College of Veterinary Medicine

FIRST TERM

8777. Thesis Credits: Masters. (088880) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (688882) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (388892) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (188893) (1-36 cr [max 11 cr per summer term])

Veterinary Parasitology (VPar)

205 Vet Science/Veterinary Medicine, St. Paul. 624-2700
(Veterinary Pathobiology)
College of Veterinary Medicine

FIRST TERM

8777. Thesis Credits: Masters. (188885) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (988886) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (688896) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (488897) (1-36 cr [max 11 cr per summer term])

Veterinary Pathobiology (VPB)

205g Veterinary Science, St. Paul. 625-5255
College of Veterinary Medicine

FIRST TERM

5523. Pathology of Spontaneous Diseases of Laboratory Animals. (485112) (2-3 cr; prereq #) Gunther
Gross and microscopic pathology of laboratory animals.

5721. Poultry Health Rotations. (191141) (4-24 cr; prereq 3rd or 4th yr Vet Med stu; S/N only)
Diagnosing and preventing poultry diseases; performance evaluations; troubleshooting and disease treatment; processing, inspection, and food safety.

5748 Problems in Veterinary Microbiology and Public Health. (185047) (Cr ar; prereq 5703 or equiv, #)

8530. Oncology. (491865) (4 cr; prereq #) Hayden, staff
Spontaneous and induced mammalian neoplasms with emphasis on diagnosis.

8531. Hospital Pathology. (985356) (1-2 cr; prereq 5501, 5502, 5503, #)

Hayden, others
Necropsy and surgical pathology techniques, examination of tissues for diagnosis, preparation of reports and records.

8533. Problems: Pathology. (386107) (Cr ar; prereq #) Johnson, others

8534. Problems: Clinical Pathology. (186108) (Cr ar; prereq #) Perman, Weiss

8648. Problems in Veterinary Parasitology. (086109) (Cr ar; prereq 5602 or equiv, #) Stromberg

8720. Advanced Veterinary Microbiology. (386110) (Cr ar; prereq #) Staff
Special topics, techniques, collateral reading, and conferences.

8724. Advanced Veterinary Diagnostic Microbiology. (186111) (Cr ar; prereq #) Newman
Lectures and laboratory in techniques of diagnostic mycology, bacteriology, virology, and serology.

FIRST TERM: TEN-WEEK COURSES

5011. Veterinary Hospital Necropsy. (691684) (2-12 crs; prereq 3rd or 4th yr vet med students) Hayden, staff
Necropsy techniques, examination of tissue for diagnosis, submission of tissue for laboratory analysis, and preparation of reports and records.

5021. Clinical Hematology and Cytology. (890159) (2-12 crs; prereq 3rd or 4th yr vet med student) Perman, staff
Laboratories devoted to the application of principles and techniques of the basic and clinical medical sciences in hematology and cytology.

5031. Clinical Microbiology. (190160) (2-12 crs; prereq 3rd or 4th yr vet med students) Newman
Laboratories devoted to the application of principles and techniques of veterinary clinical and diagnostic microbiology.

SECOND TERM

5523. Pathology of Spontaneous Diseases of Laboratory Animals. (285225) (2 cr; prereq #) Gunther
See First Term.

5533. Directed Studies in Veterinary Pathobiology. (188496) (Cr ar; prereq regis vet med, 4th yr and #)
Principles, methods, and laboratory exercises in selected pathobiological research problems. Assigned research problems conducted under faculty direction.

8531. Hospital Pathology. (785357) (1-2 cr; prereq 5501, 5502, 5503, #) Hayden, others
See First Term.

8533. Problems: Pathology. (886967) (Cr ar; prereq #) Johnson, others

8534. Problems: Clinical Pathology. (686968) (Cr ar; prereq #) Perman, Weiss

8648. Problems in Veterinary Parasitology. (486969) (Cr ar; prereq 5602 or equiv, #) Stromberg

8720. Advanced Veterinary Microbiology. (886970) (Cr ar; prereq #) Staff
See First Term.

8724. Advanced Veterinary Diagnostic Microbiology. (686971) (Cr ar; prereq #) Newman
See First Term.

8725. Cell Culture Techniques. (186831) (2 cr; prereq 5703 or equiv, #) Shope
Laboratory exercises and discussions on culture of vertebrate cells; proper preparation of all materials necessary for handling cell cultures; establishment of primary cell cultures by various techniques and maintenance of cells as monolayers or in suspension. Animal viruses used for plaque assays, neutralization tests, limited fluorescent antibody techniques, and microtitration. Laboratory work in student's specific area of interest.

Veterinary Pathology (VPh)

205g Veterinary Science, St. Paul. 625-5255
College of Veterinary Medicine

FIRST TERM

8777. Thesis Credits: Masters. (588888) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (388889) (1-36 cr [max 11 cr per summer term])

SECOND TERM

8777. Thesis Credits: Masters. (288898) (1-16 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral. (888900) (1-36 cr [max 11 cr per summer term])

COURSE DESCRIPTIONS

Veterinary Surgery, Radiology and Anesthesiology (VSRA)

C350 Veterinary Hospitals, St. Paul.
625-9731
College of Veterinary Medicine

FIRST TERM

8777. Thesis Credits: Masters.
(788890) (1-11 cr)

8888. Thesis Credits: Doctoral.
(588891) (1-11 cr)

SECOND TERM

8777. Thesis Credits: Masters.
(488902) (1-11 cr [max 11 cr per summer term])

8888. Thesis Credits: Doctoral.
(288903) (1-11)

Vocational Education (VoEd)

R350 Vocational/Technical Building,
St. Paul. 624-1221
(Vocational and Technical Education)
College of Education

FIRST TERM

R.5100. Special Topics in Instruction.
(1-6 cr [max 9 cr])

Sec 1, Effective Management of Diversity in Educational Work Settings—June 14-24. (089057) limited to 25 students; 1630-2030 MTWThF, VoTech R280, A-F only, Brown and Tomervik
This course will provide educators, as well as business and industry representatives, with information and strategies for understanding diversity so that it can be effectively addressed in school and work settings. Specific methods for improving assessment, training, on-the-job and interagency communications; organization transformation concepts and evaluation of students/employees will be examined. This offering for 3 credits.

5101. Special Topics in Curriculum.
(1-6 cr [max 9 cr])

Sec 1, Teaching About Economic Issues Related to Public Policy—June 20-24, (089933) (limited to 25 students; 0830-1500 MTWThF; VoTech R385) Plihal
Designed to help school and non-school educators increase understanding of economic concepts central to current public policy issues and to increase their ability to help others better understand these issues. Policy issues to be examined are health care, entrepreneurship, environment, free trade, and federal deficit. This offering for 3 credits.

5400. Education for Work—July 5-13. (291607) (3 cr; prereq 5300 or #; 1300-1650 MTWThF; VoTech R280) Lewis
Examines contextual bases underlying education for work; implications for practice.

R.5760. Organization Development in Industry and Business—June 20-July 1. (191608) (4 cr; limited to 25 students; 0800-1200 MTWThF; VoTech R285; A/F only)
Introduction to major concepts, skills, and techniques.

R.5761. Team Building in Business and Industry—June 17, 18, 24, 25, July 8, 9. (992050) (3 cr; limited to 25 students; prereq 5760 or #; 1800-2130 F, 0830-1600 Sa; VoTech R385; S-N only) Introduction to the theory and techniques of building effective work teams. Skills development in facilitating team-building activities.

R.5780. Internship: Training and Development. (985065) (Cr ar [max 15 cr]; limited to 15 students; prereq 5750; hrs ar) McLean
Students apply and contract for training and development positions in industry and business; individual contracts describe the specific training and development responsibilities to be fulfilled during internship.

R.5795. HRD Approach to Quality Improvement. (592049) (4 cr; limited to 25 students; 1730-2130 TTh, VoTech R380) Peck-Chapman
This course will focus on an examination of leading quality management and productivity improvement concepts from a training and organization development perspective. Specific processes and strategies to implement Juran's, Deming's, and Crosby's concepts will be developed. This is not a statistical process control course.

R.5900. Using Vocational Education Research—July 5-15. (688364) (3 cr; limited to 30 students; prereq admission to graduate-level program or #; 0830-1145 MTWThF; VoTech R280; A-F only) Lambrecht
An introduction to the role of vocational education research in professional practice, significant problems of practice for research, alternative modes of research, and synthesis and application of the results of research.

5920. Independent Study. (991111) (1-6 cr; prereq Δ)
Self-directed study in areas of special interest.

8810. Internship in Vocational Education. (191110) (1-15 cr; S/N only; prereq Δ)
Students apply for a position in the professional practice of vocational education; individual arrangements describe specific responsibilities during period of internship.

8888. Thesis Credits: Doctoral.
(188577) (1-36 cr [max 11 cr per summer term])

SECOND TERM

5101. Special Topics in Curriculum:
(1-6 cr [max 9 cr])

Sec 1, Improving School to Work Transition—August 12-24. (189289) (limited to 25 students; 1830-2130 MTWThF VoTech R380) Stone
Designed for teachers, administrators, and industry representatives who are engaged in school-to-work transition for youth and adults. Exploration of latest research in how to make youth apprenticeships, tech-prep, internships, school-based enterprises, and cooperative vocational education more effective in meeting the needs of all students.

Sec 2, Integration of Vocational and Academic Education—August 12-24. (591306) (1500-1800 MTWThF; VoTech R280)

Designed for academic and vocational teachers, counselors, and administrators who are interested in curricular integration. Includes key concepts, the latest research and current practice around the country regarding integration of academic and vocational education at the secondary school level. There will be opportunity to develop skills needed to plan and do curricular integration. This offering for 3 credits.

5300. Philosophy and Practice of Vocational Education—August 1-11. (489287) (3 cr; 1300-1600 MTWThF; VoTech R280; A-F only) Peterson
Interpretation of the purposes of vocational education in varying socioeconomic contexts; analysis of vocational fields in regard to recipients, practices, legislation, and funding. This course meets vocational licensure requirements.

5330. Coordination Techniques in Cooperative Education—August 1-11. (289288) (3 or 4 cr; BME 5352, HEEEd 5106, Ind 5310, AgEd 5071; 0915-1215 MTWThF; VoTech R385; A-F only) Leske
Responsibilities of instructor-coordinator; guidance, selection, placement, supervision, and evaluation of students; articulation of related instruction; training sponsor identification, orientation, development, and evaluation; purposes and management of the program. This course meets vocational licensure requirements. This offering for 3 credits.

R.5750. Training in Industry and Business—July 25-August 5. (491606) (4 cr; limited to 25 students; 0800-1200 MTWThF; VoTech R285; A/F only) Lewis
Appraisal of the training function in industry and business; advancement of

competencies in areas of analysis, design, development, delivery, and evaluation of training.

R.5762. Management of Conflict—July 23, 30, August 6, 13. (489936) (3 cr; limited to 25 students; 0800-1430 Sa; VoTech R380; A-F only)
Types, sources, and diagnosis of conflict styles; skills and strategies for managing interpersonal, intergroup, and intragroup conflict.

R.5790. Strategic Planning: Training and Development. (490794) (4 cr; prereq VoEd 5750 or VoEd 5760; limited to 25 students; 1730-2130 TTh; VoTech R285; A-F only) Torrac
Human capital as a component of industry and business strategic planning; analysis and articulation of practices.

5920. Independent Study. (591113) (1-6 cr; prereq Δ)
Self-directed study in areas of special interest.

8810. Internship in Vocational Education. (791112) (1-15 cr; S/N only; prereq Δ)
Students apply for a position in the professional practice of vocational education; individual arrangements describe specific responsibilities during period of internship.

8888. Thesis Credits: Doctoral.
(188823) (1-36 cr [max 11 cr per summer term])

WYZ

Women's Studies (WoSt)

489 Ford Hall. 624-6006
College of Liberal Arts

FIRST TERM

R.3102. Feminist Thought and Theory. (191552) (4 cr; limited to 40 students; 0815-1045 TTh; FordH 130) Kollin
Representative feminist theories and their relations to political action.

R.3304. Women and the Arts: Women Artists and Social Change. (592052) (4 cr; limited to 40 students; 0915-1100 MWF; FordH 130) Katz
Creation and validation of women's art in patriarchal society; women's writing, theater, performance art; feminist aesthetic; art for social change.

R.3306. U.S. Minority Women Writers. (490486) (4 cr; limited to 40 students; prereq 8 cr Women's Studies or 4 cr Women's Studies and 4 cr literature, American Studies, Chicano

Studies, Afro-American Studies, or American Indian Studies; 1100-1330 TTh, FordH 40) Reyes

Analysis of poetry, fiction, and drama written by minority women in the United States.

3970. Directed Studies. (887911) (1-15 cr; prereq #, Δ, college approval)

5100. Summer Institute for Teachers.

Sec 5, Sexual Identity—June 28-July

12. (xxxxxx)(4 cr; 0815-1145

MTWThF; ar) Yoakum, Zita

An exploration of adolescent sexual orientation from the perspective of individual identity. We will study the impact of the school and community, and institutional responses toward gay, lesbian, and bisexual youth. Interventions, roles and curricular issues in the schools and helping professions will be discussed.

Sec 6, Brown Bag Seminar—June 28-

July 8. (xxxxxx) (1 cr; prereq reg in

5100-5; 1200-1300 MTWThF; ar) Zita

Screening of video relevant to lesbian/gay adolescents including history, politics and community issues. Discussion will follow each viewing.

5970. Directed Studies. (085171) (1-5 cr [max 12 cr]; prereq #, Δ, CLA approval)

8970. Directed Study. (786850) (1-8 cr; prereq completion of courses approved by faculty supervisor and DGS)

SECOND TERM

R.1003. Women in World Cultures.

(290487) (4 cr; 0915-1100 MWF,

FordH 130) Knutson

The lives of women in non-Western societies, including their economic, political, and social contributions, familial roles, and status in society.

R.3100. Topics in Women's Studies:

The Ideology of Sexuality in U.S.

History. (392098) (4 cr; limited to 40

students; 1200-1430 TTh; FordH 285)

Trine

Changes in sexual practices, ideologies, and identities of different groups of women over the past two centuries in the U.S.; women's involvement in such change as subjects, enforcers, or reformers.

R.3200. Topics in Women's Studies:

Body and Soul—Feminist Theory on

Eating Disorders. (792051)

(4 cr; limited to 40 students; 0915-

1145 TTh; FordH 130) Doyle and

Macek

Cultural, social, and political factors governing women's views of food and their bodies. Challenge to traditional theories about causes of eating disorders.

3970. Directed Studies. (085235) (1-

15 cr; prereq #, Δ, college approval)

5970. Directed Studies. (885172) (1-5

cr; max 12 cr; prereq #, Δ, CLA

approval)

8970. Directed Study. (586851) (1-8

cr; prereq completion of courses

approved by faculty supervisor and

DGS)

Youth Development and Research (YoSt)

386 McNeal Hall, St. Paul. 624-3700

College of Human Ecology

FIRST TERM

5120. Independent Study in Youth

Studies. (985308) (Cr ar [max 12 cr

per qtr]; prereq #; hrs ar) Beker, Staff

Independent reading and/or research

under faculty supervision.

SECOND TERM

5120. Independent Study in Youth

Studies. (986457) (Cr ar [max 12 cr

per qtr]; prereq #; hrs ar) Beker, Staff

See First Term.

Zoology (Zool)

100 Ecology. 625-4466

College of Biological Sciences

FIRST TERM

8777. Thesis Credits: Masters.

(988578) (1-16 cr [max 11 cr per

summer term])

8888. Thesis Credits: Doctoral.

(788579) (1-36 cr [max 11 cr per

summer term])

SECOND TERM

8777. Thesis Credits: Masters.

(388827) (1-16 cr [max 11 cr per

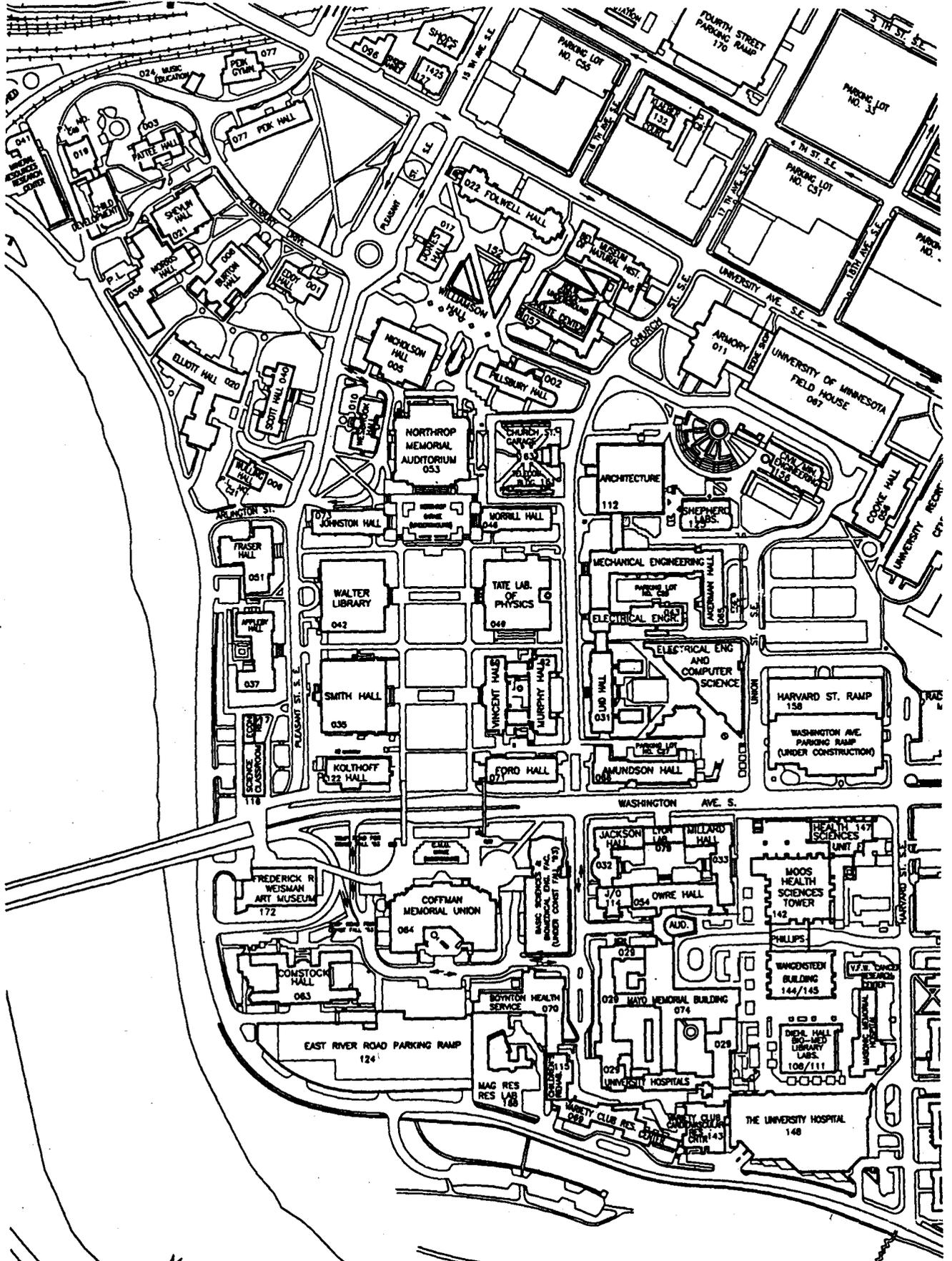
summer term])

8888. Thesis Credits: Doctoral.

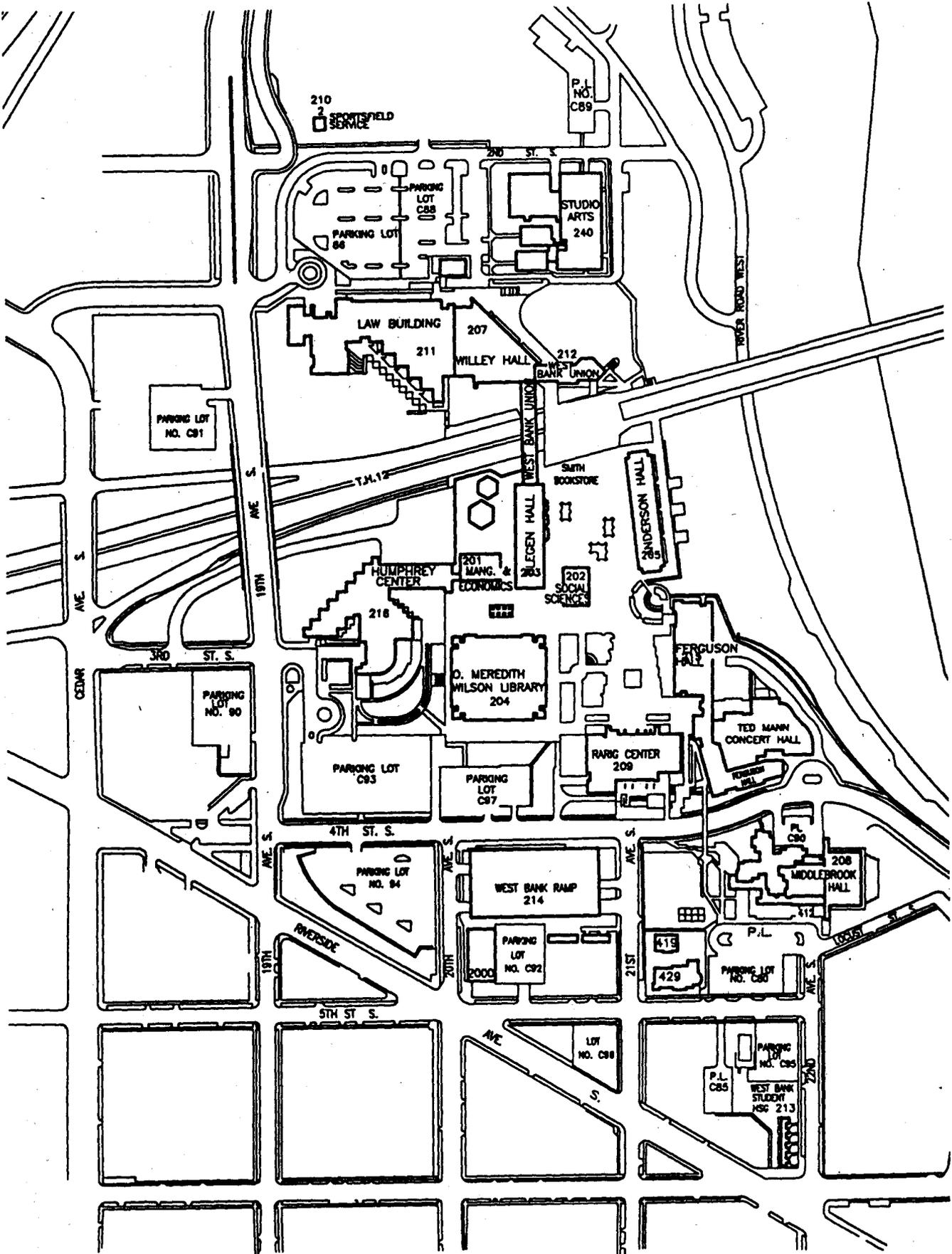
(188828) (1-36 cr [max 11 cr per

summer term])

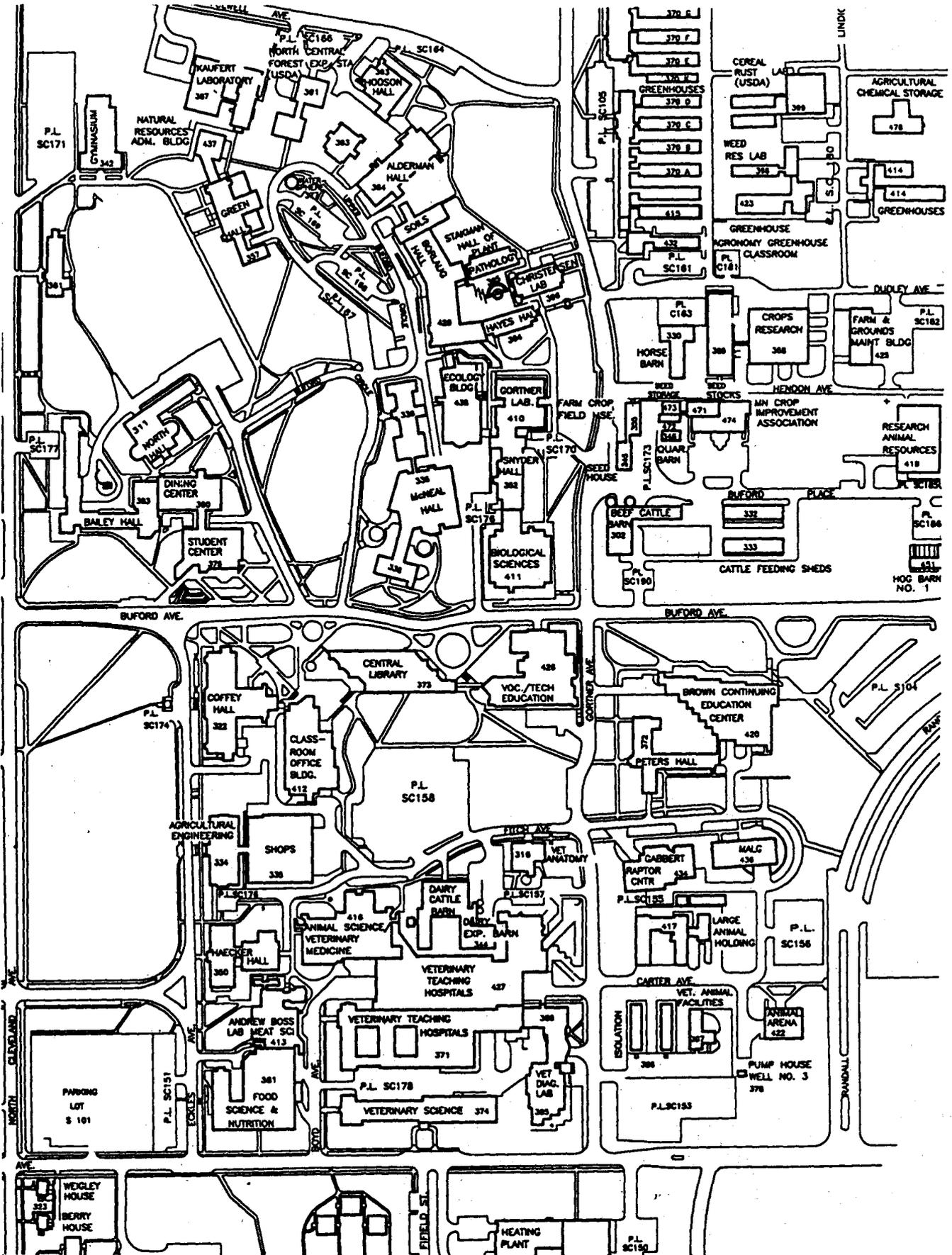
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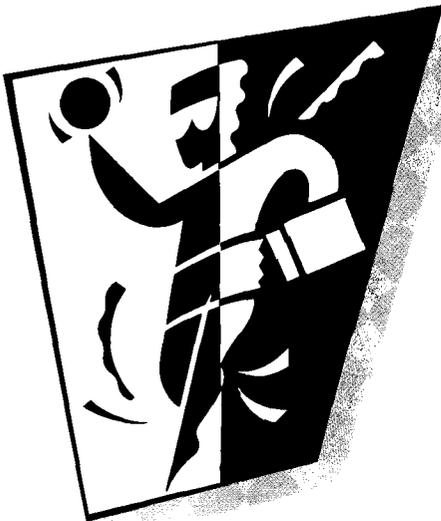
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