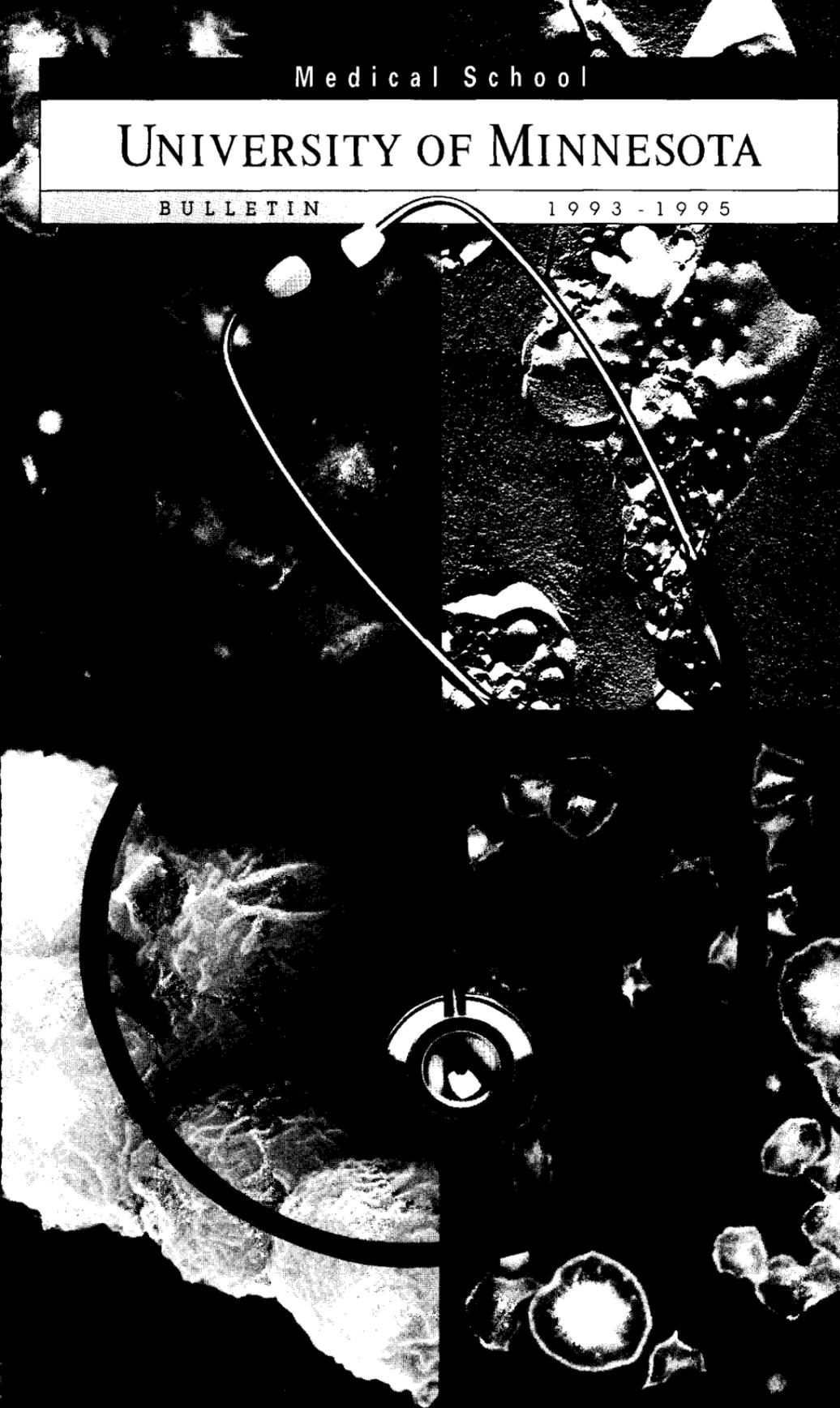


Medical School

# UNIVERSITY OF MINNESOTA

BULLETIN

1993 - 1995



**Background cell images on the cover:**

*Upper left and lower right:*  
Immunofluorescence of actin  
filaments in platelets.

*Upper right:* Freeze-fracture of a giant  
platelet.

*Lower left:* Scanning electron  
micrograph of white blood cells.

Photographs are courtesy of James G. White,  
M.D., Regents' Professor, Laboratory  
Medicine and Pathology, Pediatrics.

# Medical School

- 2 Introduction
- 3 General Information
- 11 Admission and Student Life
- 23 M.D. Program
- 29 Descriptions of Selected Courses
- 63 Campus Map
- 64 Index

# Introduction

## Policies

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

**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, 420 S.C. 20000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; 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., 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.

General Information



# General Information



**Students conducting research, 1926.**

## Resources

The Admission section of this bulletin is a guide to all official policies and procedures related to application for admission to the Medical School.

The department listings of courses represent selections that are relevant primarily to the interests of medical students and, in some instances, those who plan to pursue graduate studies in certain health sciences areas.

For information about special fields or specific undergraduate or graduate degree programs, consult the appropriate University of Minnesota bulletins. Most may be obtained at the Office of the Registrar, 150 Williamson Hall, or by calling 612/625-2008.

## History

The first classes in medicine at the University of Minnesota began in 1888 when three of the four private, or proprietary, medical schools in Minneapolis and St. Paul offered their charters and resources to the state. In accepting this offer, the Board of

Regents assumed responsibility for medical education on behalf of the people of the state of Minnesota. In 1908 the remaining proprietary school was incorporated into the University of Minnesota Medical School. In 1969 the legislature appropriated planning funds for a two-year medical basic science program at the University of Minnesota, Duluth, and in 1971 provided additional support for development of the Duluth school. The charter class in Duluth's Medical School began in 1973.

In 1905 money for the construction of a hospital was offered to the University by the estate of Augustus F. Elliot. After various delays, legislative approval and additional money were obtained. The Elliot Memorial Hospital, the first unit of University Hospitals, was dedicated in 1911. The act of acceptance passed by the legislature stated that the hospital would belong to and be a part of the University, that indigent residents of Minnesota would receive free care and treatment, and that the hospital would be controlled by the University regents. The legislature provided funds for the building of the Institute of Anatomy (Jackson Hall) and

Millard Hall, both completed in 1912. Additional hospital and Medical School buildings have been built with private gifts, supplemented by legislative appropriations. These include the Todd Hospital and Christian Hospitals (1925), Eustis Hospital (1929), Variety Club Heart Hospital (1950), Mayo Memorial Building (1954), Masonic Cancer Center and Veterans of Foreign Wars Cancer Research Center (1958), Diehl Hall (1960), Children's Rehabilitation Center, Dwan Variety Club Cardiovascular Research Center (1975), and the Phillips-Wangensteen Building, (1978)—all designated collectively as the University Hospital and Clinic.

The Medical School at Minnesota has a rich tradition of research and clinical achievements. The excellence of the Medical School's programs can be traced to the early development of strong departments in the basic medical sciences closely linked to the laboratory of the State Board of Health, and to the emergence in the 1920s of clinical departments active in clinical investigation. The pursuit of research in all departments has infused the whole school with a spirit of scientific inquiry.

## Administration

### *University Regents*

Wendell R. Anderson, Wayzata  
 Julie A. Bleyhl, Madison  
 William E. Hogan II, Minnetonka  
 Jean B. Keffeler, Minneapolis  
 H. Bryan Neel III, Rochester  
 Mary J. Page, Olivia  
 Lawrence J. Perlman, Minneapolis  
 William R. Peterson, Eagan  
 Thomas R. Reagan, Gilbert  
 Darrin M. Rosh, Owatonna  
 Stanley D. Sahlstrom, St. Cloud  
 Ann J. Wynia, St. Paul

### *University Administrators*

Nils Hasselmo, President  
 Robert O. Erickson, Senior Vice President  
 for Finance and Operations

Ettore Infante, Senior Vice President for  
 Academic Affairs and Provost  
 C. Eugene Allen, Vice President for  
 Agriculture, Forestry, and Home  
 Economics  
 Robert E. Anderson, Vice President for  
 Health Sciences  
 Anne H. Hopkins, Vice President for Arts,  
 Sciences, and Engineering  
 Marvalene Hughes, Vice President for  
 Student Affairs  
 Anne C. Petersen, Vice President for  
 Research and Dean of the Graduate  
 School  
 Mark B. Rotenberg, General Counsel

### *Medical School Administrators*

David M. Brown, M.D., Dean  
 E. Wayne Drehmel, Ph.D., Associate Dean  
 Helene M. Horwitz, Ph.D., Associate Dean  
 Robert B. Howe, M.D., Associate Dean  
 Robert J. McCollister, M.D., Associate Dean  
 James G. White, M.D., Associate Dean  
 Robert A. Petzel, M.D., Assistant Dean  
 Donald W. Robertson, Ph.D., Assistant Dean  
 Paul G. Quie, M.D., Associate to the Dean  
 Cassius M. C. Ellis, M.D., Assistant to the  
 Dean  
 Barton W. Galle, Ph.D., Director of  
 Continuing Medical Education

The Medical School is one of several health science units organized through the office of the vice president for health sciences. The other units are the School of Dentistry; School of Nursing; College of Pharmacy; School of Public Health; College of Veterinary Medicine; University of Minnesota, Duluth School of Medicine; and the University Hospital. The chief administrative officer of the Medical School is the dean. The dean is assisted by several associate and assistant deans in carrying out the policies developed by the faculty to achieve the goals set forth in the Board of Regents Statement of the Mission of the Health Sciences, as it pertains to the Medical School. The administrative offices of the Medical School are located in Owre Hall on the Minneapolis campus.

## General Information



The dean's office is responsible for the general administration of the Medical School, for the administration of selected aspects of graduate education programs, and for school budget and fiscal matters. Those involved in these activities include Dean David M. Brown, Associate Dean E. Wayne Drehmel, and Associate Dean Robert B. Howe. Special administrative support is provided for the Rural Physician Associate Program, the Program on the History of Medicine, and other special programs. Assistant Dean Robert A. Petzel serves as administrative liaison with the Veterans Affairs Medical Center.

The Student Affairs and Admissions office is concerned with admissions, student counseling, student records, and student progress toward graduation. Those responsible for these activities include Associate Dean Helene M. Horwitz, Assistant Dean Donald W. Robertson, Associate to the Dean Paul G. Quie, and Assistant to the Dean Cassius M. C. Ellis.

The Curriculum Affairs office provides support for faculty teaching activities, assists in curriculum administration and evaluation, and aids in development of all aspects of undergraduate educational programs. It is responsible for central class scheduling and student registration for elective courses. The office is administered by Associate Dean Robert J. McCollister.

The Continuing Education office develops a variety of educational programs for physicians of the state. It is supervised by Barton W. Galle, Director of Continuing Medical Education.

## Faculty

The Medical School full-time faculty numbers about 1,000. The executive faculty, consisting of full-time and associate professors, is the governing body responsible for education policymaking on education matters. The executive faculty has delegated to its appropriate committees the responsibility for determining student qualifications for admission and readmission, decisions pertaining to student scholastic standing and dismissal from the Medical School, and reviewing the Medical School curriculum.

The Medical School Admissions Committee selects each year's entering class and considers applications for transfer or readmission to the Medical School. The Student Scholastic Standing Committee evaluates each student's academic and clinical performance and developing personal and professional attributes periodically throughout the course of medical study in light of the requirements expected of a practicing physician. Each year this committee decides which students are permitted to progress to the succeeding class. The committee reviews each student's academic record for satisfactory completion of all required and elective coursework and of other school requirements before recommending that the M.D. degree be granted by the University. Students may appeal decisions made by this committee. The Educational Policy Committee develops or reviews and evaluates components of the program leading to the M.D. degree and conducts ongoing curriculum review. Committee recommendations for curriculum change are submitted for discussion and final approval by the executive faculty. Each of these major committees includes within its membership at least one student representative.

## Research

Throughout its history the Medical School has emphasized basic biomedical research and its translation into clinical advances. That emphasis has nurtured research pioneers whose efforts continue to advance medical science. In this environment of discovery and innovation, medical students are exposed to the work of internationally renowned researchers in a variety of fields. These include:

**Biomedical Engineering**—The Biomedical Engineering Center includes staff from the Medical School and Institute of Technology, who join with Minnesota's leading biomedical technology firms to develop, test, and generate biomedical products. To date, such products have included pacemakers, nerve stimulators, and hearing and visual aids.

**Biomedical Ethics**—New technology, spiraling health care costs, and judgments about when life begins and ends pose ethical concerns to the medical community. To prepare for such challenges, medical students take courses through the school's Center for Biomedical Ethics.

**Cancer**—Bone marrow transplantation, tumor-focused radiology, and monoclonal antibody-enhanced chemotherapy have improved cancer recovery rates dramatically. These treatments are also the result of coordinated basic and applied research efforts at the Medical School.

**Diabetes**—Heart disease, blindness, kidney disease, circulatory problems, and disorders of the nervous system are among the risks associated with diabetes. At the Diabetes Center, patients receive care and participate in a wide variety of research programs, including the 10-year Diabetes Control and Complications Trial. The center is also a magnet for researchers pursuing cures and improved treatments for the various types of diabetes.

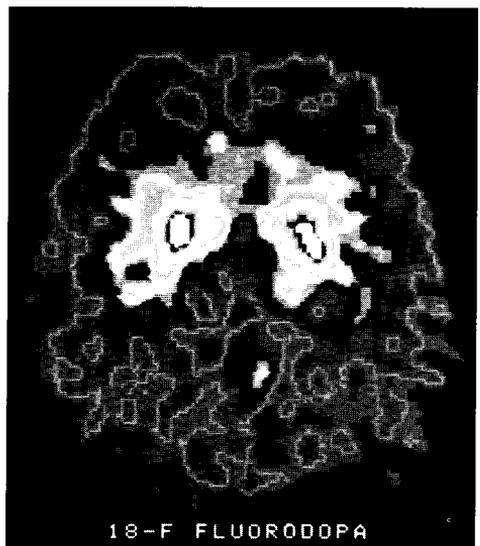
**Human Genetics**—As both a research center and resource for scientists throughout the University, the school's Institute of Human

Genetics brings together students, scientists, and clinicians to investigate the molecular basis for genetic disorders and apply findings to the diagnosis and management of disease.

**Minnesota Heart and Lung Institute**—Building on decades of progress as a world leader in cardiovascular disease research and treatment, the Minnesota Heart and Lung Institute studies circulatory diseases, emphysema, hypertension, emergency care, and congestive heart failure. New treatment methods include lung and heart-lung transplantation.

**Neurosciences**—The cellular and biochemical bases for learning disorders, multiple sclerosis, Alzheimer's disease, schizophrenia, and many other dysfunctions are among the areas of research in this cross-disciplinary approach to the study of the nervous system.

**Nutrition**—The role of diet in the prevention and treatment of disease is the focus of joint research efforts by the Medical School and the colleges of agriculture and human ecology. Efforts also are underway to combine with statewide agencies to promote healthful living through wise eating choices.



## General Information

*Osteoarthritis*—Of the 36 million Americans who have disorders of the joint and connective tissue, about 16 million have osteoarthritis, the most common form of arthritis. Searching for the causes and treatments for osteoarthritis, scientists study spinal arthritis, the role of joint damage on muscles, and threshold injury in joints.

*Transplantation*—The Medical School's transplantation program has achieved some of the world's highest one-year and five-year survival records for kidney, liver, and pancreas transplantation patients.

## Facilities

The basic science complex and administrative offices of the Medical School are located in a quadrangle of buildings adjacent and connected to the Mayo Memorial Building, Moos Health Sciences Tower, and Phillips-Wangensteen Building. In 1986 a new building for the University Hospital was opened. Within Moos Health Sciences Tower are health sciences classrooms and seminar rooms, health science student areas, the Spectrum Cafeteria, some basic medical science laboratories, as well as Medical School, School of Public Health, and School of Dentistry department space. In the Phillips-Wangensteen Building are medical center outpatient clinics, a large clinical amphitheater, the Health Sciences Learning Center, audiovisual support units, as well as several Medical School clinical department offices and laboratories. Other units, each close to and connected with the complex, include the several buildings of University Hospital and Clinic, Variety Club Heart and Research Center, Masonic Cancer Center, Veterans of Foreign Wars Cancer Research Center, Children's Rehabilitation Center, and Paul F. Dwan Cardiovascular Research Center. The close physical relationship of the Medical School and its associated units facilitates professional and scientific communication across department lines. The Medical School maintains affiliate relationships with many hospitals in the



Twin Cities metropolitan area. These affiliations provide resources that afford medical students access to a wide spectrum of health care institutions and, through them, to patients with a variety of medical problems.

**Bio-Medical Library**—The Bio-Medical Library supports the teaching, research, and service programs of the health sciences on the Minneapolis campus. It has a staff of 55 including 13 librarians. The library is one of the major components of the University Libraries and serves as a resource library in the greater Midwest region of the National Network of Libraries of Medicine. The Bio-Medical Library collections cover all health sciences, including the basic life sciences, medicine, nursing, public health, pharmacy, dentistry, and the allied health sciences. The collections include 5,000 current serial subscriptions, 378,000 volumes, 2,000 audiovisuals, and 150 computer programs. The Owen H. Wangensteen Historical Library of Biology and Medicine contains a significant collection of historical and rare materials.

The library staff provides reference, information, and instructional services. Photoduplication services, computer-assisted literature searching, and interlibrary loans are available. Reference staff provide assistance in searching the University Libraries' online catalog, LUMINA, and Minnesota

MEDLINE. Gopher, providing Current Contents and other information sources, may be addressed from the LUMINA terminals. Many CD-ROM-based files are available, including Cancer-CD, Biological Abstracts, Maxwell Compact Libraries-AIDS, ENTREZ (genetic sequences), PsycLit-CD, IPA-CD, Excerpta Medica-CD, and Science Citation Index. A CD-Plus local area network supports the full MEDLINE database (1966-present).

The Learning Resources Center supports the instructional and self-instructional efforts of health sciences students, staff, faculty, and practitioners. Collections include a variety of media, interactive and computer software, as well as computer hardware and audiovisual equipment. Novell and Appletalk networks provide access to tutorial materials as well as to Internet and E-mail.

In the past eight years, the library has filled more interlibrary loan requests than any other health science library in North America. Last year the library filled about 98,000 requests via Docline, Loansome Doc, ARIEL, OCLC, and RLIN.

## Minnesota Medical Foundation

David R. Teslow, President and Chief Executive Officer

Lowell A. Weber, Vice President, Development

David W. Johnson, Ph.D., Vice President, Programs

**Mission**—The Minnesota Medical Foundation (MMF) is an independent organization formed in 1939 to encourage private support of medical research and education at the University of Minnesota. The foundation raises, manages, and distributes private funds for our tax-assisted Medical Schools at Minneapolis and Duluth.

Medical students obtain critical financial help from the foundation's extensive program of student loans and scholarships.

Medical scientists have access to more than \$500,000 granted annually by MMF for medical research aimed at new and better knowledge about disease and health.

Alumni receive news of their Medical School through the *University of Minnesota Medical Bulletin*, published by the foundation, which also sponsors a variety of events linking graduates, students, parents, faculty, and the administration.

To underwrite this work, the foundation solicits contributions from friends of medicine everywhere, particularly alumni of the Medical School. MMF receives and acknowledges gifts, manages special purpose donations, and generally serves as a link between people and medicine at the University.

MMF policies are set by a 40-member Board of Trustees. The foundation is located at 535 Diehl Hall (612/625-1440).

**Student Aid**—MMF's student aid program is coordinated with the Medical School's financial aid program.

MMF provides extended term loans to qualified students that are repayable within the first five years after graduation at 8% simple annual interest. The average loan is \$2,000.

Interim loans from the foundation afford medical students an opportunity to obtain ready cash on brief notice, without interest charges, for educational expenses. Interim loans are usually limited to \$600 and must be repaid within 90 days.

MMF awards more than \$150,000 in scholarships annually. Recipients are chosen on the basis of their qualifications for a particular scholarship and are encouraged to pledge restoration of the funds by future gifts.

**Awards**—Medical Student Achievement Awards of \$1,000 are offered each year to students who demonstrate exceptional accomplishment in academic work, community service, or student leadership. Several other annual prizes are conferred on students for achievement in biomedical research. Distinguished Teaching Awards are bestowed on faculty members whose teaching ability has been recognized by the student body or the medical school community.

---

## General Information

---

**Research Opportunities**—For students with a serious interest in biomedical research and potential for the field of academic medicine, the foundation offers \$1,800 stipends for full-time twelve-week research endeavors that are conducted during free or elective periods. Both basic and clinical research projects are supported. Research is done under the supervision of Medical School faculty.

**Publications**—The foundation is publisher of the *University of Minnesota Medical Bulletin*, a quarterly magazine circulated to alumni of the Medical School, donors, students, faculty, and parents. An annual report of MMF activities is published, as well as a *Directory of Medical Students*.

**Fund Raising**—The foundation coordinates extensive fund-raising programs on behalf of the Medical School, encouraging alumni gifts to the annual fund of the Medical School, and broadly promotes the cause of private support. A full range of development activities are conducted, including annual giving, planned giving, deferred giving, memorial giving, and capital campaigns.

**Outreach Programs**—The foundation promotes public understanding and support of medicine by sponsoring several events at the Medical School: a welcome day for entering students, Parents' Day, a graduation day reception, and other informal gatherings. Medical School alumni reunions at the University and in other states are also supported in concert with the Medical Alumni Society.

## Continuing Medical Education

Earning a degree in any profession is only one milestone in a continuum of education. Physicians faced with rapid advances in medical science and applied clinical knowledge are obliged to continue as students of medicine for the duration of their professional careers. Recognition of this important educational need led, in 1936, to the opening of the Center for Continuation Study, unique for its time, at the University

of Minnesota. In 1937 this nation's first organized Department of Continuing Medical Education was founded to regularly offer a recurring program of short postgraduate courses for physicians.

Today the Office of Continuing Medical Education serves the educational needs of physicians and lifelong students of medicine through its annual series of programs taught by faculty in various disciplines in the Health Sciences Center and guest faculty from around the world.

Each year about 60 individual courses are conducted for more than 7,000 physicians. Many of the physicians come from Minnesota but several courses attract national or international audiences. Instructional methods include lectures, workshops, laboratories, live cases, panels, seminars, and individual instruction. Innovative programs are being developed to meet the changing needs of members of the medical profession and use technological advances in educational media. Overall emphasis is on high-quality education and practical, up-to-date content.

Close liaison with other medical organizations and health care facilities in the state and region allows the Medical School to offer a program that is well rounded, strong, and complementary to other continuing education opportunities so that physicians may select those most appropriate to their own educational goals.

Admission and Student Life



---

# Admission and Student Life

---

## Information Sources

Staff in the Medical School Student Affairs office, 3-100 Owre Hall, are prepared to discuss premedical programs with students, college teachers, and advisers, either in person or through correspondence. *Medical School Admission Requirements*, published by the Association of American Medical Colleges and revised each year in April, is a useful reference booklet that provides general information about applying to medical schools and summarizes the admission requirements of each of the medical schools in the United States and Canada. This publication can be purchased for \$12.50 from the Association of American Medical Colleges, 2450 N. Street N.W., Suite 201, Washington, DC 20037-1131, and is available in most college reference libraries. Another useful reference is the *American Medical College Application Service (AMCAS) Information Booklet*, which contains details about application procedures. This publication is available from AMCAS, 1776 Massachusetts Avenue N.W., Washington, DC 20036.

## Academic Requirements

Although academic excellence is necessary to complete studies in the Medical School, neither high grades nor high MCAT scores alone are adequate to gain admission. In selecting applicants for admission, the Admissions Committee will emphasize those qualities of motivation, intellect, and character essential to the physician. Consideration will also be given to candidates who possess personal integrity, high ethical standards, motivation, intellectual curiosity, enthusiasm, and the ability to work with other professionals. Because physicians must be able to offer care to those who are sick, applicants should give evidence of their capacity to deal effectively with those people who may be ill. They must also be able to organize their activities, set priorities, accept responsibility, and function under stress.

Students *must* earn a bachelor's degree before entering the Medical School.

Because the undergraduate years provide a unique educational opportunity, those who are planning a career in medicine are encouraged to choose courses and independent study according to their own interests. The Admissions Committee has no preference regarding the area of concentration—whether it be in the natural sciences, social and behavioral sciences, humanities, or the arts. Students should approach their chosen field in a scholarly fashion and should demonstrate excellence in whatever course of study they pursue.

The dependence of medicine upon scientific knowledge makes it essential for an applicant to be able and comfortable working in the sciences and to be familiar with the basic principles of biology, chemistry, physics, and mathematics. Because physicians have an increasing responsibility to understand and deal with the social, cultural, and psychological forces that may adversely affect their patients, studies in the humanities, social and behavioral sciences, and English language and literature are required for admission, in addition to preparation in the physical and biological sciences.

Applicants must have competence in writing, speaking, and reading the English language such that they have the ability to write intelligent, expository prose that is clearly organized and free of major errors in grammar, punctuation, and spelling. They should be able to present material orally with appropriate fluency and be able to read critically and appraise general and technical writing. Basic familiarity with computers is advised because of the importance of computer science in essentially all areas of medicine.

Because physicians take on special responsibilities as community leaders, applicants should acquire an education that leads to continuing life long learning—not only in their professional field, but also in those things that will assure well-informed

contributions to the general society in which we live.

The table below lists minimum course and credit requirements. Students will complete additional courses and credits, depending on their own special interests, baccalaureate degree or the other college requirements, and the counsel of their college advisers. Those students with special interests in basic science, research, or careers in academic medicine are encouraged to complete advanced level coursework in the sciences in preparation for entering Medical School.

Because of the Medical School's obligation to ensure patients receive the best medical care possible, candidates for admission and the M.D. degree must meet the following technical standards.

**Medical School Technical Standards**

Candidates for the M.D. degree must have abilities and skills of five varieties, including

observation; communication; motor; conceptual, integrative, and quantitative; and behavioral and social. Technological compensation can be made for some handicaps in some of these areas, but candidates should be able to perform in a reasonably independent manner. The use of a trained intermediary means that candidates' judgment must be mediated by someone else's power of selection and observation.

**I. Observation:** Candidates must be able to observe demonstrations and experiments in the basic sciences, including but not limited to physiologic and pharmacologic demonstrations in animals, microbiologic cultures, and microscopic studies of microorganisms and tissues in normal and pathologic states. Candidates must be able to observe a patient accurately at a distance and close at hand. Observation necessitates the functional use of vision and somatic sensation. It is enhanced by the functional use of smell.

**Course Requirements**

	<i>Semester Credits</i>	<i>Quarter Credits</i>
General Biology or Zoology .....	7	10
Must include laboratory exercises		
Chemistry .....	14	20
General or inorganic and organic required (must include laboratory exercises). (While not required to, applicants are urged to take a course in physical chemistry, quantitative analysis, or biochemistry.)		
English and Literature .....	(one year)	
Exemption from freshman composition does not fulfill requirement		
Mathematics		
Introductory calculus or biostatistics required		
Physics .....	8	12
Must include laboratory exercises		
Social and Behavioral Sciences and Humanities .....	18	27
Examples: psychology, anthropology, history, sociology, economics, philosophy, or a modern or classical language		
Additional academic courses to complete degree requirements		

**II. Communication:** Candidates should be able to speak, hear, and observe patients in order to elicit information, describe changes in mood, activity, and posture, and perceive nonverbal communications. Candidates must be able to communicate effectively and sensitively with patients. Communication includes not only speech but reading and writing. Candidates must be able to communicate effectively and efficiently in oral and written form with all members of the health care team.

**III. Motor:** Candidates should have sufficient motor function to elicit information from patients by palpation, auscultation, percussion, and other diagnostic maneuvers. Candidates should be able to do basic laboratory tests (e.g., urinalysis, CBC), carry out diagnostic procedures (e.g., proctoscopy, paracentesis), and read EKGs and X-rays. Candidates should be able to execute motor movements reasonably required to provide general care and emergency treatment to patients. Examples of emergency treatment reasonably required of physicians are cardiopulmonary resuscitation, the administration of pressure to stop bleeding, the opening of obstructed airways, the suturing of simple wounds, and the performance of simple obstetrical maneuvers. Such actions require coordination of both gross and fine muscular movements, equilibrium, and functional use of touch and vision.

**IV. Intellectual, Conceptual, Integrative, and Quantitative Abilities:** These abilities include measurement, calculation, reasoning analysis, and synthesis. Problem solving, the critical skill demanded of physicians, requires all of these intellectual abilities. In addition, candidates should be able to comprehend three-dimensional relationships and to understand the spatial relationships of structures.

**V. Behavioral and Social Attributes:** Candidates must possess the emotional health required for full use of their intellectual abilities, the exercise of good judgment, the prompt completion of all responsibilities

attendant to the diagnosis and care of patients, and the development of mature, sensitive, and effective relationships with patients.

Candidates must be able to tolerate physically taxing workloads and function effectively under stress. They must be able to adapt to changing environments, display flexibility, and learn to function in the face of uncertainties inherent in the clinical problems of many patients. Compassion, integrity, concern for others, interpersonal skills, interest, and motivation are all personal qualities that are assessed during the admissions and education processes.

### Residence

Preference for admission to the Medical School is given to residents of Minnesota, as indicated at the time of application. Nonresidents with outstanding academic and nonacademic qualifications are encouraged to apply. To be eligible for resident tuition rates at the University of Minnesota, students must be able to show that they have lived in Minnesota continuously for at least one calendar year *before* the first day of their quarter of admission and that attendance at the University is not the primary reason for their Minnesota residency. The Medical School does not determine residency. Students who are unclear about their status should contact the Resident Classification and Reciprocity Office, 240 Williamson Hall (612/625-6330).

### Policy for Foreign Citizens\* Applying to Medical School

1. To be eligible to apply to the University of Minnesota Medical School, foreign citizens must:

A. Have a baccalaureate degree from their country of origin, plus two or more years of postbaccalaureate education in an accredited U.S. school;

or

---

\*"Foreign citizen," for the purpose of this policy, is defined as one who does not have U.S. citizenship or permanent residence or other immigrant status.

Have a baccalaureate degree from an accredited U.S. school located in the continental United States, Hawaii, or Alaska.

B. Have taken the Medical College Admission Test (MCAT).

C. Be able to demonstrate proficiency (spoken and written) in the English language.

2. Only U.S. citizens and immigrants are eligible for the Advanced Admissions Program. Foreign citizens may apply either through the Early Decision Program or the regular admission process.
3. Foreign citizen applicants are responsible for obtaining appropriate visa status in the United States.
4. Foreign citizen applicants are expected to assume total responsibility for financing their medical education. They should be prepared to present detailed financial plans of how they will meet expenses, including tuition at the nonresident rate.

### Application Procedures

The University of Minnesota Medical School participates in the American Medical College Application Service (AMCAS), which is sponsored by the Association of American Medical Colleges. *All applications to the Medical School for the entering freshman class must be processed through AMCAS.* Application forms with detailed instructions can be obtained from AMCAS, 2450 N. Street N.W., Suite 201, Washington, DC 20037-1131. No applications are available at the Medical School. Applications should be completed and returned to AMCAS between June 15 and November 15 of the *calendar year before* the student plans to enter the Medical School. Since all first-year students begin the course of study in September, the application is thus made a little more than a year before matriculation. Additional information concerning letters of evaluation will be provided to applicants *after* the

completed application forms have been sent to the school by AMCAS.

All regular applicants for the freshman class are required to take the Medical College Admission Test (MCAT). This test measures candidates' factual knowledge of the sciences, their reading skills, and their ability to solve problems. It also helps the Admissions Committee learn more about an individual's aptitudes and suitability for a career in medicine.

Premedical students must make their own arrangements to take the Medical College Admission Test. A booklet detailing application deadlines, dates of the tests, sample questions, and testing centers can be obtained by writing to the Medical College Admission Test, American College Testing Program, P.O. Box 414, Iowa City, IA 52240. This booklet is also available from college premedical advisers. The test is given throughout the country at many colleges in the spring and fall of each year. It is strongly suggested that applicants take the MCAT in the spring before submitting their applications for admission. The test results are sent to the student. There is a fee for the examination, which entitles the student to have the scores sent to several medical schools.

In accordance with the acceptance procedures approved by the Association of American Medical Colleges, applicants are notified of the Admissions Committee's decision between October 15 and May 15 before matriculation. Applicants participating in the Early Decision Program will be notified by October 1.

### Early Decision Program

The Medical School participates in the Early Decision Program (EDP) sponsored by the Association of American Medical Colleges, in which early acceptance is granted to students choosing to apply *only* to this Medical School. Both Minnesotans and nonresidents are encouraged to apply for EDP. Applicants must have exceptional

## Admission and Student Life

academic and nonacademic qualifications (including a GPA of 3.50 or above and MCAT scores averaging 10 or above) and must follow the rules set forth for application to this program. Information about EDP application procedures is available from the American Medical College Application Service and from the Admissions office of the Medical School.

### Advanced Admission Program

Students who have a grade point average (GPA) of 3.75 or greater may apply for admission to the University of Minnesota Medical School between March 1 and June 1 of their sophomore year. Accepted students will be assigned a medical school faculty member as a mentor to work with the student's college adviser to plan the last two years of the student's college career. The Advanced Admission Program enables students to maximize their undergraduate opportunities without the constant concern and competition that is often a part of the medical school admission process. The mentor works with the student by introducing him/her to the world of medicine. When possible, the mentor involves the student in educational programs and conferences, research possibilities compatible with the student's interests and abilities, and assists the student in finding available work and study opportunities.

Accepted students must graduate from college, obtain the basic requirements for medical school, maintain at least a B average, and have regularly scheduled contact with their mentor. Successful completion of these requirements will lead to a firm invitation to matriculate at the Medical School without a lengthy admission process and without taking the MCATs. Interested students may contact the Medical School Office of Admissions and Student Affairs.

### Transfers

The Medical School in Minneapolis accepts all students from the accredited two-year branch of the University of Minnesota Medical School in Duluth who have successfully completed their curriculum and passed Step 1 of the United States Medical Licensing Examination (USMLE).

Transfers from other four-year Liaison Committee on Medical Education-accredited medical schools in the United States are considered on a very limited basis and only after they have satisfactorily completed their first two years of medical school and Step 1 of the USMLE.

### Tuition and Fees

*For up-to-date information on tuition and fees, contact the Medical School Financial Aid Office, 535 Diehl Hall, (612/625-4998).*

Estimated tuition per quarter for the academic year 1993-94 for students enrolled in the Medical School in Minneapolis is as follows:

<i>Residents</i>	<i>Nonresidents</i>
\$3,418	\$6,837

Estimated student service fees of \$135.00 per quarter is required of both residents and nonresidents. *Tuition and fees are subject to change by the Board of Regents.* Students who complete the four-year Medical School curriculum and make satisfactory progress may arrange two free or vacation quarters during the third and fourth years. During this eight-quarter continuum, tuition will be charged for the first six quarters, regardless of the number of actual credits in which the student is enrolled. Student services fees will be charged for all quarters students are enrolled.

Books, instruments, and other necessary equipment must be provided by the student. Information about required items and microscope rental is sent to all entering students during the summer before Medical School begins.

## Financial Aid

Financial aid is available to medical students in health professions in the form of federal, state, and institutional loan and grant programs. A number of scholarships are available to entering as well as continuing students based on merit or a combination of academic excellence and need. The Medical School financial aid office coordinates the programs administered by the University's Office of Student Financial Aid with those of the Minnesota Medical Foundation. For further information, contact the Medical School Financial Aid Office (612) 625-4998.

The grants are given for full-time research over a 12-week period.

## Research Grants

A number of student research grants are available for vacation or free-time work in several Medical School departments or under the auspices of the Minnesota Medical Foundation. These grants support students who are pursuing medical or basic science research interests. Medical School faculty members provide advice and counsel for student investigative work. Students with training in education may be able to pursue special projects in medical education and curriculum evaluation.

## Honors and Awards

*Wallace D. Armstrong Award*—Memorializes Dr. Armstrong, former chair of the Department of Biochemistry, by recognizing outstanding achievement in first-year biochemistry.

*Bacaner Awards*—Memorialize Jacob and Minnie Bacaner by recognizing creative research in the basic sciences.

*Cyrus P. Barnum Memorial Teaching Fellowships*—Recognize outstanding teaching by graduate students in biochemistry.

*Leonard P. Burke Memorial Award*—Memorializes Dr. Burke by honoring an

outstanding graduate resident in the Department of Family Practice and Community Health.

*Daniel A. Coyle Award*—Recognizes an outstanding woman medical student in obstetrics and gynecology.

*Kenneth F. Ernst Award*—Honors Dr. Ernst, a 1930 graduate of the University of Minnesota Medical School, by providing an annual award for research by an outstanding resident in anatomical pathology.

*Richard C. Horns Memorial Award*—Memorializes Dr. Horns, former professor of ophthalmology, by recognizing a senior medical student who has shown outstanding clinical promise.

*J. Jacob Kaplan Research Awards*—Established by Dr. Kaplan to recognize, on an annual rotating basis, the best research papers in cardiology, gastroenterology, and immunology in the diagnosis and treatment of cancer.

*Lifson/Johnson Memorial Award*—Memorializes Drs. Nathan Lifson and John A. Johnson by recognizing outstanding teaching by a graduate student in the Department of Physiology.

*J. Thomas Livermore Award*—Recognizes outstanding original research in hematology.

*Medical Student Achievement Awards*—Minnesota Medical Foundation-funded awards that recognize graduating seniors who have excelled in student leadership, community service, academic achievement, and research.

*Medical Student International Study Fellowships*—Established by Drs. Sarah J. and N.L. Gault, Jr. to help medical students enrich their education through international clinical experiences.

*Metropolitan-Mount Sinai Outstanding Medical Student Awards*—Recognize students who show promise of becoming superior physicians and clinicians.

*Mary Bizal Peterson Memorial Award*—Established by Dr. Edward Peterson in honor

## Admission and Student Life

of his wife, the award recognizes a meritorious student starting a first-year residency in neurology at the University of Minnesota Medical School.

*Undergraduate Research Award*—Minnesota Medical Foundation-funded award that recognizes the most meritorious research paper written by a graduating senior.

*Cecil J. Watson Award*—Established in honor of Dr. Watson, Regents' Professor of Medicine, the award recognizes outstanding research by a resident in clinical medicine.

*Zagaris Research Award*—Recognizes original research in cardiology and oncology by an undergraduate.

### Scholarship Funds

The following funds are awarded to students who demonstrate superior academic achievement and/or financial need. Some funds have additional selection criteria.

*Alpha Epsilon Iota Scholarships*—Established by Alpha Epsilon Iota, which since 1901 has served as a support organization for women medical students and alumni.

*Alpha Omega Alpha Scholarships*—Established by the Minneapolis Chapter of Alpha Omega Alpha, an honorary medical society.

*American Cancer Society Scholarships*—Provided by annual grants from the American Cancer Society.

*Charles and Ruth Bagley Scholarships*—Established by Dr. and Mrs. Bagley to benefit second-year medical students at the University of Minnesota, Duluth.

*Dr. A.B. Baker Memorial Scholarships*—Established in memory of Dr. Baker, a leading educator in neurology.

*Russell L. Baker, M.D. and Harry R. Baker, M.D. Scholarship*—Established by Dr. Russell Baker, an alumnus of the Medical School Class of 1934, in memory of his father.

*Ruth Boynton Scholarships*—Honor Dr. Boynton, former director of the University of Minnesota Health Service.

*Dr. H. Mead and June S. Cavert Scholarship*—Established in recognition of Dr. Cavert's many years of service to the Medical School and the University.

*Centennial Scholarships*—Established in commemoration of the Medical School's 100th anniversary.

*Class of 1937 Scholarship*—Established by the Class of 1937 in commemoration of their 50th reunion.

*Class of 1942 Scholarship*—Established by the Class of 1942 in commemoration of their 50th reunion.

*Thomas P. Cook Scholarship*—Honors Mr. Cook, long-time executive director of the Hennepin County Medical Association Foundation.

*Dr. Robert W. Cranston Scholarship*—Recognizes Dr. Cranston's appreciation for the medical education he received at the University.

*Dr. and Mrs. Stanley B. Crosbie Scholarship*—Established in honor of the University of Minnesota Medical School, Dr. Crosbie's alma mater.

*Dr. Luther Forest Davis Memorial Scholarship*—Established in memory of Dr. Davis, a Wadena general practitioner.

*Roger Dell Memorial Scholarship*—Funded by the Roger L. and Agnes C. Dell Charitable Trust.

*Margaret Dowell-Gravatt Scholarship*—Established by Dr. Dowell-Gravatt, a 1945 graduate of the University of Minnesota Medical School.

*H.E. "Tiny" and Violet C. Drill Scholarships*—Established by Dr. Drill, past president of the Minnesota Medical Foundation and an alumnus of the Medical School, Class of 1929.

*Duluth Clinic Scholarships*—Established by physicians at the Duluth Clinic to benefit

University of Minnesota, Duluth medical students.

*Dan Gall Human Spirit Scholarship*—Established in memory of Dr. Gall, an alumnus of the Medical School, Class of 1989.

*Barry E. Greimann Memorial Scholarship*—Established to benefit medical students at the University of Minnesota, Duluth.

*Dr. Harry B. Hall Scholarship*—Established to honor Dr. and Mrs. Hall and to recognize his contribution to the medical profession.

*Allan Hemingway Scholarship*—Established in memory of Dr. Hemingway, long-time member of the Medical Schools Department of Physiology.

*Delia Tenille Hobbs Scholarship*—Established by John Hobbs, M.D., an alumnus of the Medical School, Class of 1975, in honor of his daughter.

*Ludolf J. Hoyer Memorial Scholarship*—Established in memory of Dr. Hoyer, an alumnus of the Medical School, Class of 1932, by his son Leon, an alumnus of the Class of 1962.

*Chester and Charlotte Johanson Scholarships*—Established in memory of Mr. Johanson's parents, Christine and Per Johanson, who were Traverse County, Minnesota pioneer homesteaders.

*Robert Wood Johnson Scholarships*—Provided by funds from the Robert Wood Johnson Foundation.

*Knobloch Scholarships*—Established by William H. Knobloch, M.D., and his wife, Donna K. Irlbeck.

*James Lillehei, M.D. Scholarship*—Established by the Aspen Medical Group of St. Paul to honor the professional contributions of their colleague.

*Walter and Elva Lovell Scholarships*—Established by a gift from Elva Lovell.

*Medical Alley Scholarship*—Established by the Minnesota Medical Alley Association.

*Metropolitan-Mount Sinai Scholarship*—Established by the medical staff of the former Metropolitan-Mount Sinai Hospital in recognition and remembrance of its contributions.

*Minority Higher Ability Scholarships*—Awarded for academic achievement and financial need.

*Mixer Family Scholarship*—Established by Dr. Mixer, an alumnus of the Medical School, Class of 1944, and his wife, Delores Mixer.

*Lester W. and Lois P. Netz Scholarships*—Established by Dr. Lester Netz, an alumnus of the Medical School, Class of 1926, and his wife Lois Netz.

*Nicolette Norton Memorial Scholarship*—Established by Mr. Thomas Grossman and the Metropolitan Corporation in memory of Nicolette Norton.

*William A. O'Brien Scholarship*—Honors the memory of Dr. O'Brien, a Minnesota public health physician and educator.

*Parents' Scholarship*—Established by Medical School parents in conjunction with the Centennial Scholarship Campaign.

*Park Nicollet Medical Foundation's Nicollet Clinic Founders Scholarships*—Established by the Park Nicollet Medical Center.

*Malcolm and Ruth Pearson Scholarship*—Established by Dr. and Mrs. Pearson.

*Phi Delta Epsilon Jewish Medical Fraternity Scholarship*—Made possible by a grant from the fraternity.

*Dr. Albert E. Ritt Endowed Scholarship*—Made possible by the generosity of Dr. Ritt, a 1932 graduate of the University of Minnesota Medical School.

*Jean Covert Sauer and Carolyn Patrice Sauer Scholarship*—Established by Dr. Jean Sauer, an alumnus of the Medical School, Class of 1956, to honor Carolyn P. Sauer, her daughter.

*Dr. Vernon D.E. Smith Scholarships*—Given in memory of Dr. Smith, a St. Paul surgeon

## Admission and Student Life

and founder of the Minnesota Medical Foundation.

*Albert Sullivan Endowed Scholarship*—Honors the memory of Dr. Sullivan, associate dean of the Medical School and faculty member for 34 years.

*Luigi Taddeini Scholarship*—Established in memory of Dr. Taddeini, who served as chairman and president of Ramsey Clinic in St. Paul.

*Dr. Hulda Thelander Scholarships*—Established by Dr. Thelander, an alumnus of the Medical School, Class of 1924.

*Vines Scholarships*—Established in memory of Harold Thomas Vines by Lillian Vines.

*Harold and Rhea Walder Memorial Scholarship*—Established through a trust created by Harold Walder to benefit medical students at the University of Minnesota, Duluth.

*George E. Williams Scholarships*—Established in memory of Dr. Williams, former professor of psychiatry and assistant dean of student affairs.

*George H. and Lillian K. Williams Scholarships*—Established by George and Lillian Williams.

The following medical school scholarship funds are awarded on the basis of financial need: General Medical Student Scholarship, Schoberg Medical Student Scholarship, American Medical Association Education and Research Foundation (AMA-ERF) Scholarships, Wetzel Medical Fellowships, and Dr. Robert Christian Strand Scholarship.

## Student Life

**The Adytum and Other Facilities**—A major center of medical student activities is the Medical Student Adytum. The word adytum is a transliteration of the Greek word meaning an innermost sanctuary; hence the Medical School Adytum is an area to be used *only* by medical students and their guests. This spacious, comfortable area is centrally located on the first floor of the Mayo

Memorial Building. It is a place for students to eat and relax, and it has a quiet room for study. Funds for constructing and equipping the Adytum were donated by the Minnesota Medical Alumni Association. The facilities were dedicated in 1964. A center for medical students and other health sciences students is also located in Moos Health Sciences Tower, convenient to lockers, health sciences classrooms, and the cafeteria. Active exchange among students from a variety of health professions is fostered through the sharing of these facilities.

**Living Arrangements**—Dormitory housing with meals is available to medical students on an annual contract basis in University-operated residence halls conveniently located near the medical center. Information on dormitory and off-campus housing can be obtained by contacting the University Housing Office, Comstock Hall, 210 Delaware St. S.E. (612/624-2994). The average cost of single room and board is \$1,314 per quarter for the 1993-94 school year. Accommodations with meals are also available on a space-available basis in the several medical fraternities located near the medical center. Privately owned apartments adjacent to the campus are rented by students, often on a shared basis. Information about married student housing is available from Commonwealth Terrace, 1250 Fifield Place, St. Paul, MN 55108 (612/646-7526) and Como Student Community, 1024 27th Ave. SE, St. Paul, MN 55414 (612/378-2434).

Students may purchase meals in the University Hospital, Coffman Union, the Spectrum Cafeteria in Moos Health Sciences Tower, or the Outside Inn in the Phillips-Wangensteen Building. The University Hospital offers the Bridges Cafeteria, as well as sandwich and beverage vending machines in other convenient locations as alternative food sources.

**Boynton Health Service**—Boynton Health Service provides medical care for full-time students and maintains outpatient clinic facilities close to the medical center. All



students are entitled to certain outpatient services as part of their quarterly student services fee payment. Hospitalization insurance coverage is required for all students. Students desiring medical-surgical hospital insurance coverage through the University-sponsored program must purchase it each quarter at registration. The cost is added to the fee statement. Supplementary health care benefits, including hospital coverage during vacation, extended benefits, and family coverage, are available for an additional charge through a group plan. For more details, contact the Boynton Health Service (612/624-7700).

**Employment**—The Medical School undergraduate program is organized on a schedule that generally requires the student's full-time commitment to make the most of the coursework and experience. Therefore, students are urged not to seek employment or schedule other activities and obligations outside their medical studies that could significantly interfere with the pursuit of their medical education. Prospective students should carefully scrutinize their projected financial needs for their complete Medical

School program and should make appropriate long-range plans to meet these needs primarily through personal savings, the help of parents, and loans when needed.

**Graduate Assistantships**—Medical students are eligible to hold graduate assistantships as research or teaching assistants. Students with at least a 25% appointment, which equals 130 hours per quarter, are eligible for tuition remission at double the percentage of their appointment. Thus, for a student on a quarter-time appointment, 50% of the tuition is remitted. Furthermore, if a medical student is not a resident, the nonresident portion of the tuition is also remitted. To be eligible for the tuition remission benefit, the required number of hours must be worked within the quarterly and summer payroll dates, which may not be identical to the beginning and end of the quarter. Further information about the benefits and stipulations of these appointments may be found in the *Handbook for Graduate Assistants*. A copy may be obtained from the Graduate Assistant Office, 416 Johnston Hall, Minneapolis, MN 55455 (612/626-1310).

---

## Admission and Student Life

---

Medical students holding assistantships must have their appointment papers approved by the Associate Dean of Student Affairs. For Years One and Two, approval is granted to students holding 25% appointments if they are not in academic difficulty. Third and fourth year students must schedule three weeks of free time during each quarter that they hold a 25% appointment.

**Medical Student Government**—The Medical Student Council, the student governing body, is composed of representatives from each class and from several minority groups who are elected each year. Council members meet regularly and frequently to discuss problems common to members of the student body and to plan a variety of projects and service activities. The council represents the interests of the medical students to the administration and the faculty. The medical students, through the council, have adopted an honor code. Upon acceptance by the Medical School, students, after suitable briefing, will sign a statement indicating that they are well acquainted with the provisions of this code and agree to abide by it. The Peer Review Committee of the Medical Student Council is responsible for investigating reports of any suspected violations of this code.

**Student Organizations**—The Confidential Peer Assistance Program (CPAP) is a council organized by and composed of University of Minnesota medical students to provide support and resources to fellow medical students having difficulty coping with the stresses of medical school. Several faculty physicians and psychologists contribute their expertise and support to the council as well.

The Council for Health Interdisciplinary Participation (C.H.I.P.) is an organization dedicated to enhancing the quality of life and education of health sciences students at the University of Minnesota.

The C.H.I.P. lounge, located at 1-425 Malcolm Moos Tower, is a comfortable meeting area complete with sofas, tables and chairs, a refrigerator and microwave,

inexpensive coffee, a telephone, free notary public service, free typewriter use, a library of popular magazines, and informal counseling and referral.

Four committees, each led by two student co-chairs and comprised of health sciences students, plan lectures, potlucks, retreats, and symposia in the areas of ethics, international health, women's issues, and the psychological/social/spiritual aspects of health care.

Other student organizations include the Student International Health Committee and the Student Peer Tutoring Program.

The National Honor Medical Society, Alpha Omega Alpha, selects academically high-ranking students from the junior and senior classes for election to membership.

The local chapter of the American Medical Student Association (AMSA) is incorporated as an integral part of the Medical Student Council. The association chairperson acts as local AMSA chapter president. This group sponsors certain school-wide functions through the student council. The membership fee is nominal and members receive monthly copies of the national periodical.

There are also several medical fraternities available for students. These organizations play a major role in the social life of many medical students.

The American Medical Association-Medical Student Section (AMA-MSS) plays an important role in the formulation of health care policy. The local chapter sponsors many student activities. Membership is at the national, state, county, and school levels.

The spouses of many medical students are active in the Auxiliary of the Student American Medical Association (A-SAMA). This group holds monthly meetings featuring speakers who discuss topics of interest.

3  
M.D. Program



# M.D. Program

## M.D. Program

The Medical School provides the faculty and facilities for instruction of students in medicine. The primary goal of medical education is to produce good physicians possessing sound training in quantitative human biology. Beyond the Medical School and awarding of the M.D. degree, all graduates are obliged, by requirements for specialization and/or licensure, to undertake additional formal education or training. And beyond these formal programs are the continuing education activities in which individuals in practice must participate to keep abreast of developments in medicine. Much of the success of the sequence of undergraduate-graduate-continuing education, called the continuum of medical education, is dependent on individual responsibility and initiative. Therefore, to encourage such development in medical students, the concept of the student as an independent learner is emphasized in the curriculum.

The course of study for the M.D. degree requires completion of 13 quarters of academic work in the Medical School.

The number of quarters in each year and the approximate calendar location are:

Year 1	4 quarters	Sept.–July (end)
Year 2	3 quarters	Sept.–May (mid)
Years 3 & 4	6 quarters	June–year-round

The first four quarters, termed Year One, include coursework in basic medical sciences, behavioral science, and introductory experiences with patients. The next three academic quarters of the core program, termed Year Two, consist of both department and integrated interdepartment courses organized and taught along organ system and topical lines. Years Three and Four comprise a total of 74 weeks of academic requirements. Before beginning the Years Three and Four program, the student selects a faculty adviser and develops a plan for the two calendar years. For most students this period begins in June following Year Two and ends in June of the senior year, with graduation and awarding of the M.D. degree. This two-year program

includes (50 weeks of required clinical courses: 12 weeks of internal medicine; 6 weeks each of surgery, obstetrics-gynecology, pediatrics, psychiatry; 4 weeks of neurology, 4 weeks in one of the surgical specialties and a 6 week outpatient clinical experience in internal medicine, pediatrics, family practice, or geriatrics). The balance of the program includes two quarters (24 weeks) of electives and 22 weeks of free time. The curriculum outlined on page 25 depicts one of many possible arrangements of this two-year Years Three and Four portion of the M.D. program. Students must pass Steps 1 and 2 of the United States Medical Licensing Examination (USMLE) as a requirement for graduation and the M.D. degree.

## Year One

Year One study is focused on structure and function of the human body and includes an introduction to the emotional, social, and psychological development of the individual. Instruction begins with normal structure and biochemical processes in anatomy and biochemistry. A new course in biochemistry, molecular and cell biology provides opportunity for in-depth study of most modern concepts in this expanding field. In winter, spring, and summer quarters the focus shifts to the normal functioning of body systems and the reaction of the human organism to disease processes and to the study of microorganisms and their relationships to man and disease. These topics are presented in courses in microbiology, physiology, neuroscience, clinical correlations, and pharmacology. In the summer course on clinical medicine, students learn to apply communication skills needed to obtain a medical history and are introduced to the techniques of physical diagnosis. Coursework in genetics, human sexuality, human behavior, pathology and preventive medicine compose the balance of the Year One program. Some elective courses are offered.

The required courses in Year One are (quarter abbreviation follows in parentheses):

Gross Anatomy (F, W)  
 Human Histology (F)  
 Biochemistry, Molecular and Cell Biology (F)  
 Human Nutrition (W)  
 Medical Physiology (W, Sp)  
 Neurosciences (W, Sp)  
 Microbiology (W, Sp)  
 Pathology (Su)  
 Human Behavior (Sp)  
 Human Sexuality (Su)  
 Human Genetics (Su)  
 Preventive Medicine (Su)  
 Clinical Correlations (W, Sp)  
 Clinical Medicine I (Su)  
 Pharmacology (Sp)

Students may elect to participate in weekly discussion groups to consider topics of personal concern or of current interest. Students also can establish an informal adviser relationship with a member of the faculty. The Year One program ends in late July and is followed by a four- to five-week vacation before the Year Two program begins the following September.

**Year Two**

The three-quarter sequence of Year Two begins in the fall and consists of lectures and laboratories in organ system pathology, pharmacology, and interdisciplinary courses in pathophysiology and practice tutorials in

**Outline of Curriculum**

Year 1			
Fall - 14 weeks	Winter - 10 weeks	Spring - 9 weeks	Summer - 6 weeks
Gross Anatomy		Physiology	
Histology		Microbiology	
Biochemistry, Molecular and Cell Biology		Nutrition	Human Behavior
		Neuroscience	Pharm.
Clinical Correlations			Clin. Med. I
			Pathology
			Prev. Med.

Year 2				
30 weeks				4 weeks
Pathology-Systemic				Board Review
Pharmacology			Clinical Pharm	
Pathophysiology				
Cardiovascular Respiratory Neurology Psyche	Renal/Electrolytes Endo/Repro Lab Medicine	Gut Blood Bones-Joints Lab Medicine	Inf. Disease ENT Eye Skin	
Clin. Med. II	Clin. Med. III FP Tutorial	Clin. Med. III IM Tutorial	Clin. Med. III Neur Tutorial	Clin. Med III Peds Tutorial

Year 3								
12 weeks Summer		12 weeks Fall		12 weeks Winter		12 weeks (Spring)		
						4 weeks	4 weeks	4 weeks
* # Medicine	* # Ob/Gyn	* # Surgery	* Elective	* # Pediatrics	* # Psychiatry	* Free	* # Neurology	* # Surg Spec

Year 4							
12 weeks		12 weeks		12 weeks		12 weeks	
* # Clinical Med IV: Ambulatory Med.	* Elective	* # Advanced Med.	* Free	* Elective	* Free	* Elective	* Free

\* The arrangement of courses, electives, and free time shown is only one example of many possibilities. # Required course.

## M.D. Program

clinical medicine. The pathophysiology course examines the basis of disease mechanisms, signs, and symptoms through lectures, small group discussions, and assigned readings. Topics in pharmacology and pathology run concurrently in sequence with organ system pathophysiology.

The clinical medicine tutorials begin with a continuation of the general principles of history taking and physical examination begun in Year One. It is followed by four six-week tutorials in internal medicine, family practice, pediatrics, and neurology in which the student begins to learn the diagnostic skills used in these disciplines. During these tutorials students spend two half days each week evaluating and discussing assigned patients with their tutors.

The required program in Year Two consists of (credits in parentheses):

- Phcl 5111—Pharmacology (7)
- Phcl5112—Clinical Pharmacology (1)
- LaMP 5102—Organ System Pathology (10)
- InMD 5201—Pathophysiology I (13)
- InMD 5202—Pathophysiology II (10)
- InMD 5203—Pathophysiology III (11)
- InMD 5204—Pathophysiology IV (6)
- InMD 5290—Laboratory Medicine (1)
- InMD 5101—Clinical Medicine II (4)
- InMD 5102—Clinical Medicine: Internal Medicine (4)
- InMD 5103—Clinical Medicine: Family Practice (4)
- InMD 5104—Clinical Medicine: Pediatrics (4)
- InMD 5105—Clinical Medicine: Neurology (2)

### Years Three and Four

The student in Years Three and Four works to extend knowledge of medicine through full-time clinical work, participating in the care of patients in hospitals, clinics, and office practice settings. The student faces two short-term goals during this period of clinical study: selection of a specialty field for further and continued study beyond medical school and preparation for the duties and responsibilities to be assumed in the

residency program in a chosen specialty field beginning after graduation from medical school.

The balance of the academic program required for the M.D. degree comprises six quarters of required work taken during the eight academic quarters in Years Three and Four. The schedule thus provides for two free quarters during Years Three and Four, which students may take as quarters or in smaller portions scattered throughout the two years. Planning the sequence of required courses and electives for the wisest possible uses of free time, while progressing toward long-term career goals, is an important activity, which requires the student to work closely with a faculty adviser and faculty in administrative positions in the Dean's Office, as well as those coordinators who are responsible for programs in specialty and special career opportunity offices.

The required courses in Years Three and Four are:

- Internal Medicine Externship I (6 weeks)
- Internal Medicine Externship II (6 weeks)
- Surgery Externship (6 weeks)
- Pediatrics Externship (6 weeks)
- Obstetrics and Gynecology Externship (6 weeks)
- Psychiatry Externship (6 weeks)
- Neurology (4 weeks)
- Surgical Specialty (4 weeks)
- Ambulatory Care Externship (6 weeks)

The remaining clinical work is individualized, relating specifically to personal interests and career goals. Courses are selected from the extensive list of elective courses offered by each Medical School department. With special permission, students may take a maximum of one quarter of credit in elective work at other medical schools in this country or abroad but must include at least 12 weeks of full-time elective clinical work in caring for patients in the affiliated metropolitan area hospitals and clinics as part of their total program. Students who have taken programs with coursework away from the metropolitan teaching hospital units are permitted less of such elective experience.

The flexibility of the elective program provides an opportunity for all students to pursue creative interests and to further their professional growth through diverse experiences.

Students are eligible to begin the program in Years Three and Four upon completion of work in Year Two and after taking and passing Step 1 of the United States Medical Licensing Examination (USMLE). Students with any remaining academic deficiencies or those who do not pass Step 1 are reviewed by the Student Scholastic Standing Committee for a decision regarding arrangement of their remaining academic program. Each student's Years Three and Four program is subject to review and approval by a student-selected adviser who will operate under general policy guidelines developed by the Years Three and Four faculty committee. Special programs, such as those combining the M.D. with the master's degree, and special requests will be reviewed for approval by this committee.

### **Rural Physician Associate Program**

Each year through the Rural Physician Associate Program (RPAP) of the Medical School, up to 40 third-year medical students engage in primary health care in Minnesota communities under the experienced supervision of the RPAP staff and Medical School faculty, including many physician-preceptors who devote their time and resources to this unique medical/educational/community partnership.

These selected students, in several cases accompanied by their spouses and families, spend November through July working closely with community health care professionals and learning through daily experiences the values, systems, and environment of patient care and medical practice in non-metropolitan settings throughout Minnesota. Since the inception of the RPAP in 1971, 675 medical students have participated in the program under the tutelage of experienced physician-preceptors in 96 Minnesota communities.

### **Evaluation and Academic Progress**

Examinations and other methods, both subjective and objective, to evaluate performance of medical students, are administered by the various departments and interdepartment teaching sections. All students will receive feedback regarding their performance on examinations. Each student has an opportunity for personal review of clinical work with a faculty supervisor. Written evaluations of each student's clinical performance are submitted so that students may be informed of their educational progress and may take steps to improve areas in which deficiencies may exist.

Grades are reported as O (outstanding), E (excellent), S (satisfactory), I (incomplete), and N (no credit, fail). Students who receive I or N grades in courses are reviewed by the Student Scholastic Standing Committee. Opportunity for makeup work is one option that permits students to satisfy course requirements and continue their progress toward the M.D. degree. On admission to the program in medicine, students sign and pledge to abide by provisions of an honor code that is detailed in the Statement of Intellectual Responsibility. According to these provisions, the faculty does not monitor Medical School examinations, and students are strictly on their individual honor to maintain ethical personal conduct during examinations. The statement is also a guide to professional conduct for medical students in their years in Medical School and beyond.

### **Scholastic Standing and Dismissal**

Students may be dismissed from Medical School if, in the opinion of the Student Scholastic Standing Committee, they have not performed at a satisfactory academic level in individual courses or if there are other factors, such as personality, attitude, or emotional instability, that would prevent the individual from responsibly undertaking the duties of a physician.

## M.D. Program

### Graduation

Requirements for graduation and award of the M.D. degree include satisfactory performance in all courses in the Year One and Year Two programs plus satisfactory completion of the Years Three and Four program, approved by an adviser and faculty group. Passing scores on Parts I and II of the National Board Examinations must be earned and final review and approval by the Student Scholastic Standing Committee must be obtained before a recommendation that the M.D. degree be granted is forwarded to the Board of Regents.

Most students elect to graduate in June, just before beginning their specialty training. Students who wish to graduate in mid-year must make special arrangements through the Medical School Office of Admissions and Student Affairs.

### Combined M.D.-Ph.D. Program

The University of Minnesota Medical School has a long tradition of dual degree programs in medical science. The current program is one of 30 national programs funded by a Medical Scientist Training Program Grant from the National Institutes of Health. The program combines, in about seven years, coursework, fundamental biomedical research and clinical training culminating in a dissertation, a Ph.D. degree, and an M.D. degree. Because of the additional financial burden this adds to an already expensive training period, those students selected for the program receive a yearly stipend and also have their tuition paid. This support extends throughout the training period.

The program encourages those students interested in biomedical research to use their aptitude and skills to embark on a career that combines opportunities for research with training in clinical areas. The program's goal is to train future academicians in the biomedical sciences. Interested students should write to the M.D.-Ph.D. Program Office for the M.D.-Ph.D. Program brochure. *Note:* A separate application and interviews are required for consideration by the M.D.-

Ph.D. Program. Please contact: M.D.-Ph.D. Program Office, Dana Rechtzigel, Box 293 UMHC, 420 Delaware Street S.E., Minneapolis, MN 55455 (612/625-3680).

### Graduate Degree Programs in Biomedical Disciplines

Students may also pursue the M.D. and Ph.D. degrees by enrolling in the Graduate School with a major in one of the basic sciences after completing some portion of the M.D. curriculum in the Medical School. Funding of stipends may be available for such students enrolled in the Graduate School even though not available while students are registered in the Medical School pursuing the M.D. degree. Information concerning this type of combined medical and graduate degree program can be obtained by contacting the Medical School Office of Admissions and Student Affairs or the individual department heads.

Under the aegis of the Graduate School, all the basic health sciences departments conduct active and extensive programs of graduate student research and study leading to the master's or Ph.D. degree. Some research fellowships, teaching assistantships, or scholarships are available to academically qualified students for advanced study in these or other disciplines related to the biomedical and health sciences. Inquiry should be directed to a faculty member or the department office of the student's field of interest.

More than 1,000 physicians are enrolled each year in post-M.D. graduate training programs (residency or clinical fellowship programs) in the clinical departments of the Medical School and its affiliated hospitals. These physicians are engaged in advanced training as specialists in their chosen medical or surgical fields. They have qualified for appointments and registration as medical fellow specialists in the Medical School or as medical fellows in the Graduate School and receive academic credit during their residency training.

## Descriptions of Selected Courses



# Descriptions of Selected Courses

**Symbols**—The following symbols are used throughout the course descriptions in lieu of page footnotes:

§ 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.

# Consent of instructor is required before registration.

Δ Consent of division, department, or school offering the course is required before registration.

f,w,s,su Following a course number indicates fall, winter, spring, or summer terms.

A hyphen between course numbers (e.g., 5142-5143-5144) indicates a sequence of courses that must be taken in the order listed.

A comma between course numbers (e.g., 8234, 8235, 8236) indicates a series of courses that may be entered any quarter. In prerequisite listings, comma means "and" (e.g., "prereq 5101, 5102 or 5103" means the prerequisites are 5101 and either 5102 or 5103).

## Anesthesiology (Anes)

Richard J. Palahniuk, M.D., professor and head

### *Professor Emeritus*

Frederick Van Bergen, M.D.  
Joseph J. Buckley, M.D.  
John R. Gordon, M.D.

### *Associate Professor*

Kumar G. Belani, M.D.  
Calvin B. Cameron, M.D.  
Ji-Chia Liao, M.D., Ph.D.

### *Assistant Professor*

James V. Anderson, M.D.  
William W. Anderson, M.D., Ph.D.  
Scott D. Augustine, M.D.  
David S. Beebe, M.D.  
Robert L. Gauthier, M.D.  
Ian J. Gilmour, M.D.  
Barbara S. Gold, M.D.  
Paul A. Iazzo, Ph.D.  
John M. Jackson, M.D.  
Chris H. Kehler, M.D.  
Douglas E. Koehntop, M.D.  
Russell H. Larsen, M.D.  
Josephine Lo, M.D.  
Paul S. Molinari, M.D.  
Mark W. Stuckey, M.D.  
Michael F. Sweeney, M.D.

The anesthesiology department offers instruction in a wide range of surgical and obstetric anesthetic techniques. Because of its unique role in a diverse spectrum of medical care, it also encompasses intensive

care and acute and chronic pain management. Patients with an array of complex medical and surgical disorders offer challenges in the management of these conditions as well as in their possible interactions with the stress of surgery and anesthesia.

The department's educational programs reflect the diversity of involvement in various modes of patient care. The programs emphasize basic sciences such as physiology, pharmacology, and anatomy as well as clinical sciences related to organ system pathophysiology, respiratory care, cardiac disease, and many other medical, surgical, pediatric, and obstetric subspecialties.

Operating room anesthesia and life support systems offers the student opportunities for active involvement in airway management, ventilatory care, and invasive monitoring. The department is active in surgical intensive care, pediatric intensive care, and pain management and provides a 24-hour emergency service in the hospital.

Anesthesiology 5181 is described in the *Medical School Years Three and Four Course Book*. All advanced courses in the 8xxx series are offered as part of the anesthesiology residency (fellowship), prerequisite 5181 and the M.D. degree.

## Elective Courses

**5181. EXTERNSHIP IN CLINICAL PRACTICE OF ANESTHESIOLOGY.** (Cr ar; prereq regis med)

**5182. INDEPENDENT STUDY, ANESTHESIOLOGY.** (Cr ar)

## Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Biochemistry (MdBc)

James W. Bodley, Ph.D., professor and interim head

### *Professor*

Leonard J. Banaszek, Ph.D.  
Michael D. Caldwell, M.D., Ph.D.  
Mary E. Dempsey, Ph.D.  
Nelson D. Goldberg, Ph.D.

Ernest D. Gray, Ph.D.  
 Henricus P. Hogenkamp, Ph.D.  
 James B. Howard, Ph.D.  
 James F. Koerner, Ph.D.  
 David C. LaPorte, Ph.D.  
 John D. Lipscomb, Ph.D.  
 Dennis M. Livingston, Ph.D.  
 Theodore R. Oegema, Ph.D.  
 Andreas Rosenberg, D.Sc., Ph.D.  
 David D. Thomas, Ph.D.  
 Howard C. Towle, Ph.D.  
 Kamil Ugurbil, Ph.D.  
 Brian G. VanNess, Ph.D.

*Adjunct Professor*

Quenton T. Smith, Ph.D.

*Associate Professor*

Kenneth W. Adolph, Ph.D.  
 Rodney L. Johnson, Ph.D.  
 Douglas H. Ohlendorf, Ph.D.  
 Robert J. Roon, Ph.D.  
 Michel M. Sanders, Ph.D.

*Assistant Professor*

Daniel P. Gilboe, Ph.D.  
 John P. Perentesis, M.D., Ph.D.  
 Paul G. Siliciano, Ph.D.

*Lecturer*

Charles H. Blomquist, Ph.D.

Biochemistry is the scientific foundation for all medical fields. Biochemistry courses establish that foundation by describing the chemical structures and workings of cells within the context of the tissues and the body. The major themes explore how chemistry has been adapted by our bodies to build a multitude of functional molecules through the required expenditure of energy. Much of fundamental biochemistry is combined with molecular and cell biology to show how the chemical architecture of macromolecules and the intricacies of metabolic transformations provide cells with the ability to divide and to differentiate for the purpose of carrying out such specialized functions as muscle contraction, nerve conduction, digestive secretion, and hormonal signaling. Accompanying the lecture portion of the courses are class periods devoted to discussions of particular diseases whose understanding and treatment have been advanced by biochemistry. Students emerging from the courses have a basic knowledge of biochemistry that serves as a basis for their understanding of pathophysiology presented in the second

year of the medical curriculum. Students may increase their understanding of biochemistry by pursuing advanced courses or by participating in the research efforts of the department.

**Required Courses**

**5100. BIOCHEMISTRY.** (9 cr; prereq regis med fr, physics, organic chemistry)

**5101. BIOCHEMISTRY.** (1 cr; prereq regis med fr, physics, organic chemistry)

**Elective Course**

**5053. PROBLEMS IN BIOCHEMISTRY.** (Cr ar [may be repeated for cr]; prereq 5100)

**Advanced Credit Courses**

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

**Cell Biology and Neuroanatomy (CBN)**

David W. Hamilton, Ph.D., professor and head

*Professor Emeritus*

Anna-Mary Carpenter, M.D., Ph.D.  
 Padmakar Dixit, Ph.D.  
 Morris Smithberg, Ph.D.

*Professor*

G. Eric Bauer, Ph.D.  
 Edward H. Egelman, Ph.D.  
 Robert P. Elde, Ph.D.  
 Stanley L. Erlandsen, Ph.D.  
 Glenn J. Giesler, Ph.D.  
 Ryoko Kuriyama, Ph.D.  
 Paul C. Letourneau, Ph.D.  
 Richard W. Linck, Ph.D.  
 Steven C. McLoon, Ph.D.  
 Jonathan A. Parsons, Ph.D.  
 Virginia S. Seybold, Ph.D.  
 Robert Sorenson, Ph.D.

*Associate Professor*

Donald W. Robertson, Ph.D.

*Assistant Professor*

Christopher N. Honda, Ph.D.  
 Jean Magney, M.S.  
 Mary E. Porter, Ph.D.  
 H. Joseph Yost, Ph.D.

Coursework in the Department of Cell Biology and Neuroanatomy provides an integrated approach to study of structure of the human body. In gross anatomy, the three-dimensional architecture and organ development in all body regions are studied

## Descriptions of Selected Courses

through lectures, dissections, and modern imaging techniques (e.g., X-rays, CAT scans). In histology/cell biology, the organization of cells, tissues, and organs is assessed from sections using light microscopy and electron micrographs. Neuroanatomy is taught in conjunction with neurophysiology as an integrated course in Human Neuroscience. Biochemistry, Molecular and Cell Biology integrates aspects of biochemistry, genetics, and cell biology to give students a modern view of how a cell works. Where appropriate, the courses are correlated with clinical disciplines. The courses help students enhance their powers of observation, their ability to communicate using specific terminology, and their synthesis of morphology with biochemistry and physiology. Greater depth in any of the subjects can be obtained through advanced coursework during elective time.

### Required Courses

**5100. GROSS HUMAN ANATOMY.** (12-13 cr; prereq regis med or grad student, #)  
Dissection of the human body.

**5103. HUMAN HISTOLOGY.** (3-8 cr; prereq regis med or grad student, #)  
Microscopic structure, cytochemical and functional aspects of cells, tissues, and organs.

**5104. BIOCHEMISTRY, MOLECULAR AND CELL BIOLOGY.** (1 cr; prereq regis med or grad student, #, ¶MdB 5100)  
An integrated, introductory course in biochemistry, molecular biology, genetics, cell biology, and developmental biology for freshman medical students.

**5111. HUMAN NEUROSCIENCE A.** (3-4 cr, \$Phs1 5112; prereq regis med)  
Structure and function of the nervous system including the organs of special sense.

### Elective Courses

**5190. ADVANCED ANATOMY.** (2 cr; prereq regis med, 5103, #)  
Instruction in teaching methods or supervision of student's original research or combination of both.

**5301. SURGICAL ANATOMY FOR ORAL SURGEONS**

**5304. HEAD AND NECK ANATOMY FOR MEDICAL AND DENTAL RESIDENTS**

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

### Years Three and Four Elective Courses

**5500. GENERAL GROSS ANATOMY**

**5501. THE EXTREMITIES**

**5502. HEAD, NECK**

**5504. THE ENDOCRINE SYSTEM**

**5508. THE THORAX**

**5509. THE ABDOMEN**

**5510. PERINEUM, GENITAL-URINARY SYSTEM, PELVIS**

### Dermatology (Derm)

Peter J. Lynch, M.D., professor and head

#### Professor

Mark V. Dahl, M.D.  
Robert J. Gorlin, D.D.S.  
Carl J. Witkop, Jr., D.D.S.

#### Associate Professor

Maria D. Hordinsky, M.D.  
Robert D. Nelson, Ph.D.

#### Assistant Professor

Kenneth E. Bloom, M.D.  
Jane S. Lindholm, M.D.  
Sherri A. Long, M.D.  
Mary E. Meighan, M.D.  
Ellen B. Rest, M.D.  
Janellen Smith, M.D.  
J. Corwin Vance, M.D.  
Christopher B. Zachary, M.B., M.R.C.P.

The elective program in the clinics of the major hospitals in the Twin Cities offers the student an opportunity to acquire diagnostic skills and to learn medical and surgical techniques for treatment of diseases of the skin. This program prepares the graduate for the management of dermatologic problems as a family practitioner or as a clinician in pediatrics or internal medicine.

### Elective Courses

**5182. PRECEPTORSHIP IN DERMATOLOGY**

**5183. ADVANCED COURSE IN DERMATOLOGY**

**5184. SPECIAL COURSE: DERMATOLOGY**

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Family Practice and Community Health (FPCH)

Edward W. Ciriacy, M.D., professor and head

John T. Kelly, M.D., M.P.H., professor and associate head

### *Professor*

Carole J. Bland, Ph.D.  
Theodore R. Thompson, M.D.

### *Associate Professor*

Donald S. Asp, M.D.  
Steven J. Boros, M.D.  
Edmund J. Coleman, Ph.D.  
Dwenda K. Gjerdingen, M.D.  
John G. Halvorsen, M.D.  
Harold R. Ireton, Ph.D.  
William E. Jacott, M.D.  
Joseph M. Kcenan, M.D.  
John W. McConnell, M.D.  
Richard L. Reed, M.D., M.P.H.  
Sharon B. Satterfield, M.D.  
Krishna M. Saxena, M.D.

### *Assistant Professor*

Sharon Allen, M.D., Ph.D.  
Charles R. Anderson, M.D.  
Nancy Baker, M.D.  
Kent D. Bergh, M.D.  
Mark R. Bixby, M.D.  
Ruth A. Bolton, M.D.  
Robert M. Bostick, M.D., M.P.H.  
Charles E. Boulton, M.D., M.P.H.  
R. Craig Christianson, M.D.  
Patricia M. Cole, M.D.  
Patricia Fontaine Conboy, M.D.  
Alison J. Coulter-Knoff, M.D.  
Byron J. Crouse, M.D.  
David C. Current, M.D.  
Diane A. Dahl, M.D.  
Michael L. Daly, M.D.  
Thomas W. Day, M.D.  
Gregory J. Gepner, M.D.  
Gwen W. Halaas, M.D.  
Peter G. Harper, M.D.  
Kenneth W. Hepburn, Ph.D.  
Donald R. Houge, Ph.D.  
Mary C. Hrosickoski, OSF, M.D.  
Joel P. Jahraus, M.D.  
Robert J. Johnson, M.D.  
Kenneth N. Kephart, M.D.  
Phillip M. Kofron, M.D., M.P.H.  
Herbert H. Laube, Ph.D.  
Barbara A. Leone, M.D.  
Maurice L. Lindblom, M.D.  
Malcolm MacDonald, M.D.  
Kathleen Macken, M.D.  
Diane Madlon-Kay, M.D.  
David J. Mersy, M.D.  
Michael E. Metz, Ph.D.  
Deborah Mielke, M.D.  
Michael H. Miner, Ph.D.

David A. Nelsen, M.D., M.S.  
Leon J. Nesvacil, M.D.  
Bernard L. O'Neil, M.D.  
Eugene C. Ott, M.D.  
James T. Pacala, M.D., M.S.  
James J. Pattee, M.D.  
Sonia E. Patten, Ph.D.  
Earl J. Peterson, M.D., M.S.  
Lawrence M. Poston, M.D.  
Jerome Potts, M.D.  
Christopher J. Reif, M.D., M.P.H.  
Daniel N. Riley, M.D.  
Beatrice E. Robinson, Ph.D.  
B.R. Simon Rosser, Ph.D.  
Harold C. Seim, M.D., M.P.H.  
Peter A. Setness, M.D.  
James S. Van Vooren, M.D.  
Angela M. Vargas, M.D., M.S.  
Dennis R. Weslander, M.D.  
Mark W. Yeazel, M.D.

### *Instructor*

Walter O. Bockting, Drs.  
Margretta Dwyer, R.S.M., M.A.

### *Lecturer*

Faruk Abuzzahab, M.D., Ph.D.  
William J. Doherty, Ph.D.  
Thomas W. Hoban, M.A.  
Thomas R. Rollic, M.D.  
John E. Simon, M.D.

### *Research Fellow*

Sandra L. Nohre, M.A.

### *Assistant to Department Head*

Gareth Degolier

### *Coordinator*

Pamela J. Weiss, Ph.D.

### *Counselor*

Wayne A. Caron, Ph.D.

Coursework in the Department of Family Practice and Community Health introduces students to the fundamentals of continuing and comprehensive patient care within the context of the patient's family and community. Consistent with the breadth of interests and responsibilities of the family physician, training in all basic areas of medical knowledge is emphasized. Preventive medicine and the behavioral science aspects of patient care are also emphasized.

During Year One, the Department of Family Practice and Community Health participates in planning, teaching, and providing clinical facilities for the introduction to clinical medicine (Clinical Medicine I). Department faculty share

## Descriptions of Selected Courses

responsibility for teaching the medical history taking, interviewing techniques, and physical diagnosis sections of the course. The Department of Family Practice and Community Health also contributes small group leaders for first-year small groups.

In Year Two, family practice faculty teach in the second portion of physical diagnosis (Clinical Medicine II). In Clinical Medicine III, students spend two half days in lectures and small groups and ten half days with a family physician, caring for patients in the clinic and hospital. Through this experience, students gain firsthand knowledge of the role of the family physician in the health care system.

During Years Three and Four, students have the opportunity to participate in a variety of family practice programs and courses. In Clinical Medicine IV (a required ambulatory medicine course), the department participates in teaching students along with internal medicine, pediatrics, and geriatrics; more than one-third of the students select the family practice alternative. Before completing the M.D. requirements, students may elect to spend nine months with a rural family doctor as part of the Rural Physician Associate Program, a combined educational-service program of the Medical School administered by Department of Family Practice and Community Health faculty. The program acquaints students with the world of rural family practice. The department offers a variety of elective courses relevant to family practice; these are listed below.

Model family practice units have been established at the University and at five additional sites located within or near hospitals affiliated with the department. These units are designed primarily for the graduate education of residents in the family practice training program. In addition, they serve as classrooms for teaching continuing and comprehensive primary health care to medical students. The patients represent a cross section of age and socioeconomic status. Students may elect to participate in the ongoing care of patients in these model family practice units.

The Program in Human Sexuality is an administrative and academic unit of the Department of Family Practice and Community Health. It conducts the Human Sexuality course in the Year One core curriculum and offers elective courses in Years Three and Four as well as advanced workshops, internships, and fellowships for residents and practicing physicians.

Additional educational opportunities in the Department of Family Practice and Community Health are available through the offices of individual practicing physicians and through affiliated hospitals in both rural and urban settings.

### Elective Courses

#### **5500. PRECEPTORSHIP IN CLINICAL PRACTICE.** (9 cr; prereq regis med)

Participation in delivery of primary medical care as performed by a practitioner within the community.

#### **5501. RURAL PHYSICIAN ASSOCIATE PROGRAM (RPAP).** (36 cr; prereq minimum completion of Year One and Year Two curricula of University of Minnesota Medical School)

Nine-month (optional three-month extension) participation in the practice of an outstate clinical faculty member. Patient care in a nonurban community. Extensive exposure to clinical medicine and delivery of primary health care. Includes stipend.

#### **5502. THE PHYSICIAN AS COUNSELOR IN MARRIAGE AND FAMILY PROBLEMS.** (2 cr; prereq 5501)

Four seminars, three hours each, held over seven months for RPAP participants. Opportunity to do clinical interviewing, examine relevant literature, and review case studies.

#### **5503. RURAL PHYSICIAN ASSOCIATE PROGRAM SUMMARY PAPER.** (1 cr; prereq 5501)

Requires a typewritten essay of at least 1,000 words that provides a comprehensive overview of the RPAP experience.

#### **5505. PROBLEM-FOCUSED INTERACTIVE LEARNING.** (4.5 cr; prereq regis med or peds or surg or neuro)

Elective that uses and coordinates prior basic science, clinical experience, and clinical problem solving using three styles for interactive learning: patient's simulation guide books; computer-assisted patient problem cases; and live, simulated patient problems.

#### **5514. INTRODUCTION TO FAMILY PRACTICE.** (4.5 cr; prereq 1 previous clinical rotation)

Student will gain a better understanding of problem-solving methods used for most common complaints in family practice.

**5515. PRECEPTORSHIP IN GERONTOLOGIC COMMUNITY HEALTH.** (9 cr; prereq regis med)  
In-depth experience in all facets of health care for elderly patients.

**5516. RESEARCH IN HUMAN SEXUALITY.** (Cr ar; prereq #)  
Clinical and/or laboratory research related to human sexuality. Adaptable to interests of the student and faculty member. Ongoing research projects include such areas as incest, rape, sexuality of prisoners, and sexual dysfunctioning. Contact the director to make arrangements.

**5520. RURAL ROTATION IN FAMILY PRACTICE.** (4.5-9 cr; prereq regis med)  
Participation in delivery of primary medical care in a small town setting with an emphasis on a team approach. Room and board furnished at several sites.

**5521. CLINICAL PRACTICE PRECEPTORSHIP: KENAI, ALASKA.** (9 cr; prereq regis med)  
Sixty-day participation in delivery of primary medical care as performed by a practitioner in Kenai, Alaska. Includes expenses.

**5525. CARDIOVASCULAR MEDICINE IN THE COMMUNITY HOSPITAL.** (9 cr; prereq regis med)  
Practicum that increases understanding of cardiovascular disease and provides experience in treating patients.

**5530. CLINICAL PROBLEMS IN FAMILY PRACTICE.** (9 cr; prereq regis med)  
Participation in patient care in a model family practice clinic.

**5535. COMMUNITY HEALTH IN FAMILY PRACTICE.** (9 cr; prereq regis med or #)  
Introduction to community health problems and to resources available in different practice settings. Practicum, readings, and seminars.

**5537. PRIMARY CARE SPORTS MEDICINE.** (9 cr; students regis for Years Three or Four of med school; not offered periods I and II)  
Familiarizes medical students with the role of exercise and sport in promoting health and preventing disease. Athletic trauma evaluation, treatment and rehabilitation, and exercise prescription.

**5540. AMBULATORY HMO ROTATION/FAMILY PRACTICE.** (9 cr; min two 6-wk rotations from med or peds or ob/gyn or surg)  
Six-week course for students interested in primary care in an HMO setting. Rotation will be divided between two clinic sites (three weeks each). Weekly seminars covering compliance, clinical reasoning, the family, interviewing, preventive medicine, quality care, cost containment, and critical review of the literature. Joint conferences giving students opportunity to observe and practice suturing and casting procedures, and explore topics such as medical economics and professional liability.

**5560. ALCOHOL AND DRUG ADDICTION TREATMENT CENTER.** (4.5 cr; prereq regis med)  
Current methods and approaches to therapy and rehabilitation of chemically dependent patients.

**5562. MEDICAL INTERVIEWING: DEALING WITH PROBLEM PATIENTS IN A WHOLISTIC APPROACH.** (Cr ar; prereq 5501)  
Helps students understand and deal with all aspects of patients' health needs.

**5580. COMMUNITY EMERGENCY MEDICINE.** (9 cr; prereq med or ped or surg)  
Student assigned to one of five community hospital emergency services, exposed to medical and surgical problems, and taught how to evaluate and treat these acute problems.

**5585. SEXUAL PROBLEMS IN CLINICAL PRACTICE.** (Cr ar; open to med students only; prereq #)  
Clinical management of sex-related problems.

**5595. RESEARCH IN FAMILY PRACTICE: INDEPENDENT STUDY.** (4.5 cr; prereq #)  
Provides student the opportunity to pursue academic research, develop knowledge and skills essential for academic careers in family practice.

**5599. INDEPENDENT STUDY.** (Cr ar; prereq regis med)  
On- or off-campus learning experiences individually arranged between the student and a faculty member for earning credit in areas not covered by regular courses. May include basic science research, library research, or special projects.

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

#### 5247. INTRO TO FAMILY SYSTEMS

#### 5531. POPULATION-BASED PRIMARY CARE CLERKSHIP

#### 5596. INTRODUCTION TO INTERNATIONAL AND INTERCULTURAL MEDICINE

#### 5843. HEALTH PROMOTION

#### 5903. COMMUNITY HEALTH

#### 5904. COMMUNITY HEALTH

**5950. CLINICAL ISSUES IN HUMAN SEXUALITY.** (3 cr; also offered to grad students in health sciences, family social science, education, and psychology)  
Clinical issues and assessment and treatment techniques pertaining to common sexual problems.

#### 5951. RESEARCH IN HUMAN SEXUALITY

**5952-5953-5954. PRACTICUM IN SEXUAL COUNSELING.** (3-6 cr per qtr)  
Supervised experience in sex-related counseling of individuals, couples, and groups. Work with problems of sexual adjustment, dysfunction, and couple conflict.

**5955. DIRECTED STUDY.** (1-15 cr; qualified students may regis with consent of instructor for work on a tutorial basis)

## Descriptions of Selected Courses

### **5956. HUMAN SEXUALITY THROUGHOUT THE LIFE CYCLE FOR THE PRIMARY CARE PHYSICIAN.** (3 cr per qtr; offered alt yrs)

Developmental aspects of sexuality throughout the life cycle examined from such theories as psychodynamics and social role theory, with emphasis on significance of psychosocial aspects of sexuality for the primary care physician.

### **5957. FEMALE SEXUALITY.** (3 cr per qtr; offered alt yrs)

Lectures and discussion on basic aspects of female experience of sexuality.

### **5958. SMALL GROUP PROCESS.** (3 cr; prereq consent of instructor)

Group dynamics; various schools of group process and therapy active today. Experiential and cognitive methods.

### **5960. BASIC RESEARCH METHODS SEMINAR AND PRACTICUM**

### **5962. CLINICAL HYPNOSIS WORKSHOP**

### **5963. INTRODUCTION TO PREVENTIVE MEDICINE**

### **5964. HEALTH CARE DELIVERY SYSTEMS**

### **5965. SEMINAR ON PSYCHOLOGICAL MEDICINE: PRINCIPALS OF HUMAN DEVELOPMENT THROUGH LIFE CYCLES**

### **5967. INTRODUCTION TO HEALTH DATA SYSTEMS**

### **5968. COMPUTERS IN THEORY AND PRACTICE**

### **5969. INDEPENDENT STUDY**

### **5970. PSYCHOLOGICAL CRISIS INTERVENTION WORKSHOP**

## History of Medicine (HMed)

Leonard G. Wilson, M.Sc., Ph.D., professor and head

*Associate Professor*

John M. Eyer, Ph.D.

The history of medicine is essential to the understanding of the present state of medicine. It explores the sources of medical concepts and the development of the traditions of medical theory and practice. Knowledge of the history of medicine is valuable to a physician because it makes the physician aware of the foundations of medical knowledge and provides historical perspective on contemporary medical problems.

Department courses provide students with a broad survey of the history of medicine

(5400, 5401, 5402), which may be followed by a seminar dealing more intensively with specific developments in the history of medicine. Seminars give students an opportunity to read original literature and investigate a historical problem for themselves, with assistance from faculty as needed.

The department also offers a series of public noon-hour lectures on selected subjects to acquaint both faculty and students with the interest and diversity of medical history.

## Elective Courses

### **5002. PUBLIC HEALTH ISSUES IN HISTORICAL PERSPECTIVE.** (4 cr, §PubH 5002) Eyer

Introduction to the evolution of major recurring problems and issues in public health including environment and health, food customs and nutrition, control of alcohol and drugs, venereal diseases and public policy, human resources regulation, and relationship of science to promotion of health.

### **5035. THE GERM THEORY AND THE MEDICAL PROFESSION.** (4 cr, §Hist 5035)

Analysis of the formulation of the germ theory of disease and of its consequences for medical procedures (therapeutics, surgery, management of hospitals), public health programs, and the structure and prestige of the medical profession.

### **5045. MEDICAL PROFESSION IN AMERICA.** (4 cr, §Hist 5045)

Historical analysis of the American medical profession in the 19th and 20th centuries; the role of institutions, influence of social and moral values, and consequences of specialization and scientific innovation.

### **5102. SEMINAR: MEDICINE AND SOCIETY IN THE ENLIGHTENMENT.** (3 cr, §Hist 5702; prereq #) Eyer

The interrelations of medicine and society from the late 17th to the early 19th centuries.

### **5120-5130. HISTORICAL TOPICS: MEDICINE AND THE MODERN STATE.** (4 cr per qtr [sequence may be repeated for a max of 16 cr], §Hist 5940-5950; prereq #) Eyer

Seminar on the historical relations between medicine and the State from the 18th to 20th centuries. Topics vary yearly.

### **5400f. EARLY HISTORY OF MEDICINE.** (4 cr; 3 lect hrs per wk) Wilson

The archaeology of disease, disease concepts in primitive medicine, medicine in Egypt and Mesopotamia, ancient Greek medicine, the transmission of Greek medicine through the Islamic and Byzantine cultures, the recovery of ancient Greek medical writings in the Renaissance, Vesalius and the revival of anatomy, Harvey and the discovery of circulation of the blood.

**5401w. MEDICINE DURING THE SCIENTIFIC REVOLUTION, 1650-1830.** (4 cr; 3 lect hrs per wk)

Wilson  
Impact of the discovery of circulation on medical thought, new chemical and mechanical theories of medicine, rise of medical teaching, inoculation and vaccination for smallpox, the growth of hospitals, the rise of surgery, the emergence of the concept of specific diseases.

**5402s. MEDICINE IN THE 19TH AND 20TH CENTURIES.** (4 cr; 3 lect hrs per wk)

Wilson  
Growth of clinical medicine and pathology, cell theory and cellular pathology, the germ theory of disease, anesthesia and antiseptic surgery, the revolution in surgery, the rise of bacteriology and immunology, nutritional deficiency diseases and the discovery of vitamins, the discovery of malaria parasites and the control of malaria, chemotherapy and antibiotics, the reform of medical education and the rise of medical research.

**5410f, 5411w, 5412s. SEMINAR: THE EMERGENCE OF MODERN MEDICINE, 1750-1900.** (3 cr per qtr; one 2-hr seminar per wk)

Wilson  
Study of the development of modern medicine through reading, discussion, and pursuit of a selected problem in depth. Ordinarily, students do general reading during fall quarter, select a topic for intensive study and write the first draft of a paper on it during winter quarter, and revise the first draft and submit their paper in final form during spring quarter. Intended to enable students to gain experience in research and writing in the history of medicine.

**Interdisciplinary Medicine (InMd)**

The courses listed below are required of all medical students. Direct administrative responsibility for organ-system segments of the pathophysiology course is vested in the individual organ system coordinators; planning, teaching, and evaluation of the course and of student performance is carried out by interdisciplinary committees.

**Required Courses**

**5100s. CLINICAL MEDICINE I.** (6 cr; prereq regis med) Kvasnicka, Ytterberg, staff

**5101f. CLINICAL MEDICINE II.** (4 cr; prereq regis med) Kvasnicka, Ytterberg, staff

**5102. CLINICAL MEDICINE: INTERNAL MEDICINE.** (4 cr; prereq regis med) Whitley, Ytterberg, staff

**5103. CLINICAL MEDICINE: FAMILY PRACTICE.** (4 cr; prereq regis med) Allen, Ytterberg, staff

**5104. CLINICAL MEDICINE: PEDIATRICS.** (4 cr; prereq regis med) Moller, Ytterberg, staff

**5105. CLINICAL MEDICINE: NEUROLOGY.** (2 cr; prereq regis med) Anderson, Ytterberg, staff

**5110. HUMAN GENETICS.** (2 cr; prereq regis med) Berry, staff  
Principles of genetics and their application to human diseases.

**5115. CLINICAL CORRELATIONS.** (1 cr; prereq regis med) Kaplan, staff  
Application of basic science principles to clinical problems and approaches to problem solving.

**5120. PREVENTIVE MEDICINE.** (1 cr; prereq regis med) Kofron, staff  
Introduction to determinants, distribution, and prevention of disease and promotion of health.

**5201. PATHOPHYSIOLOGY I.** (13 cr; prereq regis med) Davies, Knopman, Mackenzie, Ulstad, staff  
Fundamental concepts in the pathophysiology of respiratory, cardiovascular, neurological, and psychiatric diseases.

**5202. PATHOPHYSIOLOGY II.** (10 cr; prereq regis med) Davidman, Niewoehner, staff  
Fundamental concepts in the pathophysiology of renal diseases; fluid, electrolyte, and acid-base disturbances; endocrine and metabolic diseases. Overview of normal reproductive biology.

**5203. PATHOPHYSIOLOGY III.** (11 cr; prereq regis med) Meryhew, Miller, Soltis, Transfeldt, staff  
Fundamental concepts in the pathophysiology of gastrointestinal, liver, hematologic, bone, joint, and connective tissue diseases.

**5204. PATHOPHYSIOLOGY IV.** (6 cr; prereq regis med) Egbert, Levine, Long, Kaplan, Tsukayama, staff  
Fundamental concepts in the pathophysiology of infectious diseases; skin diseases; eye diseases; and ear, nose, and throat diseases.

**5233. HUMAN SEXUALITY.** (2 cr; prereq regis med) Coleman, staff

**5290. LABORATORY MEDICINE.** (1 cr; prereq regis med) Bradley, staff  
Introduction to principles and techniques of laboratory medicine.

**5500. CLINICAL MEDICINE IV: AMBULATORY MEDICINE.** (9 cr; prereq regis med) Watson, staff  
Participation in patient care in outpatient primary care settings located at internal medicine, family practice, pediatric, and geriatric clinics.

**Elective Courses**

**5501. EMERGENCY ROOM EXTERNSHIP—Hennepin County Medical Center.** (6 cr; prereq regis med. Med 5500) Ruiz, staff  
Active clinical participation in care of surgical emergency room.

## Descriptions of Selected Courses

### **5552. INDIAN HEALTH SERVICE ELECTIVE.**

(Cr ar; prereq regis med) McCollister  
Clinical experience in a major hospital/center in any of the approved (through Curriculum Affairs Medical School) Indian Health Service areas.

### **5553. ELECTIVE AWAY AT CENTERS FOR DISEASE CONTROL (CDC).** (Cr ar; prereq regis med) McCollister

Full-time experience in one of the sections of CDC.

### **5555. ELECTIVE AWAY FOR CREDIT.** (Cr ar; prereq regis med) McCollister

Student-arranged, adviser/administration-approved experience at an approved *medical school* location.

### **5560. ELECTIVE AWAY AT THE NATIONAL INSTITUTES OF HEALTH (NIH).** (Cr ar; prereq regis med) McCollister

Clinical experiences at NIH in Bethesda, Maryland.

### **5566. CLINICAL EXPERIENCE IN INTERNATIONAL MEDICINE.** (4.5 or 9 cr ar; prereq regis med) McCollister

Student-arranged, structured, approved (through Curriculum Affairs Medical School) clinical experience in a foreign medical institution.

## Laboratory Medicine and Pathology (LaMP)

Leo Furcht, M.D., professor and head  
Allen Pardee, professor of cancer biology  
professor and director, Biomedical  
Engineering Center

### *Regents' Professor*

James G. White, M.D.

### *Professor*

Eugene Ackerman, Ph.D.

Kahlil Ahmed, M.D.

Robert E. Anderson, M.D.

W. Robert Anderson, M.D.

Miguel M. Azar, M.D., Ph.D.

Henry Balfour, M.D.

Ellis S. Benson, M.D.

Richard Brunning, M.D.

Barbara A. Burke, M.D.

Donald P. Connelly, M.D.

Agustin P. Dalmaso, M.D.

John H. Eckfeldt, M.D., Ph.D.

J. Roger Edson, M.D.

Jesse Edwards, M.D.

Richard Estensen, M.D.

Patricia Ferriero, M.D.

Stanley M. Finkelstein, Ph.D.

Esther F. Freier, M.S.

Kazimiera Gajl-Peczalska, M.D., Ph.D.

Laël C. Gatewood, Ph.D.

Leonard J. Greenberg, Ph.D.

Franz Halberg, M.D.

Erhard Haus, M.D., Ph.D.

Charles A. Horwitz, M.D.

John H. Kersey, M.D.

Tucker W. LeBien, Ph.D.

Catherine Limas, M.D.

Patrick Manning, D.V.M.

Jeffrey McCullough, M.D.

Takshi Okagaki, M.D., Ph.D.

Harry T. Orr, Ph.D.

Herbert Polesky, M.D.

Gundu H. R. Rao, Ph.D.

Andreas Rosenberg, Ph.D.

Frederick H. Silver, Ph.D.

Dale C. Snover, M.D.

Michael Steffes, M.D., Ph.D.

Joo Ho Sung, M.D.

Jack L. Titus, M.D.

Lee W. Wattenberg, M.D.

### *Associate Professor*

Fred Apple, Ph.D.

Diane C. Arthur, M.D.

Sue A. Bartow, M.D.

G. Mary Bradley, M.D.

H. Brent Clark, M.D., Ph.D.

John T. Crosson, M.D.

Lynda B. Ellis, Ph.D.

Vincent F. Garry, M.D.

Danuta M. Giganti, Ph.D.

Helen M. Hallgren, M.S.

Karen S. Karni, Ph.D.

Larry Lasky, M.D.

James B. McCarthy, Ph.D.

James J. O'Leary, M.D., Ph.D.

Theresa L. Perrone, M.D.

Zoltan Posalaky, M.D.

Stephen S. Rich, Ph.D.

Miriam Segall, Ph.D.

William Swaim, M.D.

Michael Tsai, Ph.D.

Photini-Effie Tsilibary, M.D., Ph.D.

Carol L. Wells, Ph.D.

Michael J. Wilson, Ph.D.

Walid G. Yasmineh, Ph.D.

### *Assistant Professor*

Pascual Abenoza, M.D.

Michael Altmann, Ph.D.

Thomas Arlander, M.D.

Calvin M. Bandt, M.D.

Robert Bowman, M.D.

Frederick T. Boyd, Ph.D.

Doris C. Brooker, M.D., M.S.

Gary J. Carlson, M.D.

Aristidis S. Charonis, M.D., Ph.D.

David Cherwitz, M.D.

Douglas J. Christie, Ph.D.

Gregg Fields, Ph.D.

Susan A. Fuhrman, M.D.

William B. Gleason, Ph.D.

Said A. Goueli, Ph.D.

Robert P. Gruninger, M.D.

Patrick E. Guier, Ph.D.

Seymour Handler, M.D.

Betsy Hirsch, Ph.D.

J.P. Houchins, Ph.D.

Waclaw Jaszcz, M.D., Ph.D.

Anthony Killeen, M.D., Ph.D.

Virginia Kubic, M.D., Ph.D.  
 David J. Lakatua, M.D.  
 Paul H. Larson, M.D.  
 Craig E. Litz, M.D.  
 Karen G. Lofsness, M.S.  
 Ronald C. McGlennen, M.D.  
 R. Scott McIvor, Ph.D.  
 Daniel L. Mooradian, Ph.D.  
 Gloria Niehans, M.D.  
 Christopher Pennell, Ph.D.  
 Elizabeth H. Perry, M.D.  
 Garry F. Peterson, M.D.  
 Karen Ringsrud, M.S.  
 Amy P. Skubitz, Ph.D.  
 Nancy A. Staley, M.D.  
 Theresa A. Steeper, M.D.  
 Robert L. Strom, M.D.  
 David F. Stroneck, M.D.  
 Thomas O. Swallen, M.D.  
 Cheryl D. Swinehart, M.S.  
 Elizabeth Wayner, Ph.D.  
 Keith Willard, M.D.

*Instructor*

Michael L. Basara, M.D.  
 Peter J. Benson, M.D.  
 Virginia Dale, M.D.

*Lecturer*

Joseph Goswitz, M.D.  
 John S. McClure, M.D.  
 Mark Wilke, M.D.

Pathology is the study of disease. The two required courses LaMP 5101—General Pathology and LaMP 5102—Systemic Pathology, offered by the Department of Laboratory Medicine and Pathology, are an introduction to the processes that lead to clinical signs and symptoms. They are also an introduction to a career in pathology. An understanding of pathology is a prerequisite for the practice of medicine, regardless of the specialty chosen.

The two courses extend from the summer quarter of Year One through the first three periods of Year Two.

General pathology introduces students to general principles, including cellular injury, inflammation and repair, immunopathologic processes, abnormal hemodynamics, metabolic diseases, and neoplasia. Examples of specific diseases are used to illustrate these principles. In Year Two, the course presents diseases in the context of the organ systems, i.e., cardiac, respiratory, renal, female and male reproductive, neurologic, hematologic, gastrointestinal, endocrine, and orthopedic.

Throughout the course the visual aspect of disease is emphasized. Gross specimens, microscopic slides, and videotapes are used. Appropriate use of laboratory tests is also discussed. The course not only conveys information about disease processes but also tries to convey what a pathologist actually does from day to day, emphasizing the critical role of the pathologist in patient care.

Pathophysiology and pharmacology courses are taught in Year Two concurrently with pathology. The subject matter taught by the three disciplines is coordinated.

In Years Three and Four the Department of Laboratory Medicine and Pathology offers a variety of electives. The department's major areas include surgical pathology, cytology, autopsy pathology, hematology (with coagulation), clinical chemistry, blood banking, microbiology, genetics, immunology, and computer medicine. In addition, there are many other elective specialized laboratory divisions and research activities in which study may be elected.

**Required Courses**

**5101,su. GENERAL PATHOLOGY.** (4 cr; prereq regis med or grad student, #)

**5102f,w. SYSTEMIC PATHOLOGY.** (10 cr; prereq regis med or grad student, #)

**Elective Courses**

*General Courses in Anatomic Pathology*

**5150. ANATOMIC PATHOLOGY IN A HOSPITAL SETTING—University Hospital.** (Cr ar; prereq #)

The student works in the anatomic pathology department taking part in autopsy pathology, surgical pathology, and clinicopathology correlation sessions.

**5151. ANATOMIC PATHOLOGY IN A HOSPITAL SETTING—Hennepin County Medical Center.** (Cr ar; prereq #) Anderson  
 For a description, see 5150.

**5152. ANATOMIC PATHOLOGY IN A HOSPITAL SETTING—Veterans Administration Hospital.** (Cr ar; prereq #) Niehans  
 For a description, see 5150.

**5153. ANATOMIC PATHOLOGY IN A HOSPITAL SETTING—St. Paul-Ramsey Medical Center.** (Cr ar; prereq #) Posalaky  
 For a description, see 5150.

## Descriptions of Selected Courses

**5154. ANATOMIC PATHOLOGY IN A HOSPITAL SETTING—Abbott-Northwestern Hospital.** (Cr ar; prereq #) Arneson, Horwitz

### *General Courses in Clinical Pathology*

**5186. LABORATORY MEDICINE IN A COMMUNITY HOSPITAL.** (Cr ar; prereq #) Bandt  
Correlations between clinical presentations and laboratory results from the perspective of a busy general hospital clinical laboratory.

**5187. INTERPRETATION OF LAB DATA.** (Cr ar; prereq #) Fuhrman, Staff  
Daily teaching sessions are conducted in the following areas: laboratory aspects and diagnosis of acid-base and electrolyte disturbances; hematologic and coagulative disorders; immunologic disorders; endocrinologic disease; enzymology and isoenzyme screening procedures; SMA12-60 chemical profile; renal disease; cerebrospinal fluid; synovial fluid.

**5188. CLINICAL PATHOLOGY EXTERNSHIP—Methodist Hospital.** (Cr ar; prereq #) Manoles  
Students study a variety of laboratory analyses in hematology, microbiology, chemistry, radioisotope use, and blood banking and accompany physicians on ward rounds. Individual cases involving cytology, surgery, and pathologic anatomy are studied. Daily laboratory and weekly clinical conferences.

**5192. LABORATORY MEDICINE FOR PRIMARY CARE—Virginia.** (Cr ar; prereq #)  
Students participate in certain daily activities of the laboratory to learn what services are available, how they are provided, and how they are best used by primary care physicians. Through selected case studies students examine the cost-benefit aspects of laboratory services and how these services contribute to health care costs. Offered at Virginia Municipal Hospital, Virginia, Minnesota.

**5193. CLINICAL PATHOLOGY EXTERNSHIP—Hibbing.** (Cr ar; prereq #)  
The student works directly with hospital pathologists in all phases of laboratory practice. Emphasis on close clinical correlations, with daily rounds of selected patients and review of all laboratory work. Surgical, cytologic, and autopsy pathology material available for review. Daily conference with clinicians and radiologists.

### *Courses in Specialized Subjects*

**5113. SURGICAL PATHOLOGY—University Hospital.** (Cr ar; prereq #) Manivel, Snover  
Students participate in the dissection, gross description, microscopic description, diagnosis, and coding of surgical pathology specimens; in frozen section procedures; and in intradepartment conferences.

**5114. SURGICAL PATHOLOGY—Hennepin County Medical Center.** (Cr ar; prereq #) Anderson  
For a description, see 5113.

**5115. SURGICAL PATHOLOGY—Veterans Administration Hospital.** (Cr ar; prereq #) Niehans  
For a description, see 5113.

**5119. FORENSIC PATHOLOGY—Medical Examiner's Office, Hennepin County Medical Center.** (Cr ar; prereq Year 3 or 4) Peterson  
The function of a medical examiner's office in determining the cause and manner of types of death.

**5125. CHRONOBIOLOGY.** (Cr ar; prereq #) Halberg  
Implementation of chronobiologic medicine in the many instances in which it can prevent illness or save life in established disease.

**5141. PROBLEMS IN EXPERIMENTAL PATHOLOGY.** (Cr ar; prereq #) Staff  
Work in ongoing programs in the department. Topics under investigation include membrane structure and function, chemical carcinogenesis, viral carcinogenesis, and chronobiology. Any member of the staff will discuss a project on these topics.

**5158. CARDIAC PATHOLOGY—United Hospital.** (Cr ar; prereq #)  
Work with Dr. Jesse Edwards and Dr. Jack Titus in the cardiac pathology laboratory.

**5181. LABORATORY AND CLINICAL HEMATOLOGY.** (Cr ar; prereq #) Brunning  
Peripheral blood, bone marrow morphology, and other hematologic analyses are related to case studies. Clinical case conferences, hematology slide sessions, and ward rounds.

**5184. CLINICAL AND LABORATORY ASPECTS OF BLOOD TRANSFUSION.** (Cr ar; prereq #) McCullough  
Blood donor evaluation, blood collection, blood storage, and the clinical use of blood components. Suspected transfusion reactions, hemolytic diseases of the newborn, and other clinical problems studied using immuno-hematologic methods. Experience at the St. Paul Regional Red Cross Blood Center available.

**5195. COMPUTER APPLICATIONS IN MEDICAL RESEARCH.** (Cr ar; prereq #) Ellis  
Students observe operation of the nine computer facilities currently used for medical research, including monitoring in the intensive care ward and in radiation therapy. Roles of computers in current and future medical research studied through reading and special seminars.

### *Lecture Courses and Seminars—Predominantly for Students in Other Graduate Programs*

**5166. FORENSIC PATHOLOGY.** (2 cr; prereq #) Peterson

**5210. SURGICAL PATHOLOGY FOR POST M.D.'s.** (Cr ar; prereq #) Staff

**5211. AUTOPSIES FOR POST M.D.'s.** (Cr ar; prereq #) Staff

**5213. LABORATORY MEDICINE FOR POST M.D.'s.** (prereq regis med, fellow spec, #)

**5765f. HEMATOLOGY.** (4 cr per qtr; prereq #)

Lofsness

Blood and blood-forming organs; blood and bone marrow from the standpoint of diagnosis and prognosis.

**Medicine (Med)**

Thomas F. Ferris, M.D., professor and head

*Professor*

David W. Allen, M.D.  
 Inderjit Anand, M.D.  
 Robert Asinger, M.D.  
 Robert Bache, M.D.  
 Jose Barbosa, M.D.  
 David Benditt, M.D.  
 Henry W. Blackburn, Jr., M.D.  
 Joseph Bloomer, M.D.  
 John Bond, M.D.  
 Elliot Chesler, M.D.  
 Jay N. Cohn, M.D.  
 Kent Crossley, M.D.  
 Pablo Denes, M.D.  
 William Duane, M.D.  
 Gary Francis, M.D.  
 Arthur From, M.D.  
 Roger Gebhard, M.D.  
 Gordon Ginder, M.D.  
 Ashley Haase, M.D.  
 Robert Hebbel, M.D.  
 Morrison Hodges, M.D.  
 Jordan L. Holtzman, M.D.  
 Thomas H. Hostetter, M.D.  
 Robert B. Howe, M.D.  
 Donald B. Hunninghake, M.D.  
 Harry S. Jacob, M.D.  
 Maynard E. Jacobson, M.D.  
 Gerhard Johnson, M.D.  
 M. Colin Jordan, M.D.  
 Robert L. Kane, M.D.  
 Manuel E. Kaplan, M.D.  
 Neil Kay, M.D.  
 William Keane, M.D.  
 Richard King, M.D.  
 David Kiang, M.D.  
 John LaBree, M.D.  
 Allen Levine, M.D.  
 Michael D. Levitt, M.D.  
 Constance Limas, M.D.  
 Russell Luepker, M.D.  
 Cary N. Mariash, M.D.  
 John Marini, M.D.  
 Philip B. McGlave, M.D.  
 Ronald Messner, M.D.  
 Charles R. Moldow, M.D.  
 Robert O. Mulhausen, M.D., M.S.  
 M. John Murray, M.D.  
 Dennis E. Niewoehner, M.D.  
 Frank Q. Nuttall, M.D., Ph.D.  
 Jack Oppenheimer, M.D.  
 Bruce A. Peterson, M.D.  
 Lance Peterson, M.D.  
 Phillip K. Peterson, M.D.  
 Leopoldo Raij, M.D.

Koppanadham V. Rao, M.D.  
 R. Paul Robertson, M.D.  
 L. D. Sabath, M.D.  
 Fred Shapiro, M.D.  
 Clifford Steer, M.D.  
 Athanasios Theologides, M.D., Ph.D.  
 Naip Tuna, M.D.  
 Kamil Urgubil, M.D.  
 Edward Weir, M.D.  
 Carl White, M.D.  
 Leonard G. Wilson, M.D.

*Associate Professor*

Paul Abraham, M.D.  
 Stephen Archer, M.D.  
 Silvia Azar, M.D.  
 John Bantle, M.D.  
 Charles Billington, M.D.  
 Peter B. Bitterman, M.D.  
 Morris Davidman, M.D.  
 Scott Davies, M.D.  
 Greg Filice, M.D.  
 Angeliki Georgopoulos, M.D.  
 Steven Goldsmith, M.D.  
 Jesse L. Goodman, M.D.  
 Charles Gornick, M.D.  
 Richard Grimm, M.D.  
 Dale Hammerschmidt, M.D.  
 Marshall Hertz, M.D.  
 David C. Homans, M.D.  
 David Ingbar, M.D.  
 Edward Janoff, M.D.  
 Bert L. Kasiske, M.D.  
 Spencer Kubo, M.D.  
 Frank Lederle, M.D.  
 Sharon D. Luikart, M.D.  
 Nicole Lurie, M.D.  
 Thomas MacKenzie, M.D.  
 Maren L. Mahowald, M.D.  
 Connie Manske, M.D.  
 Robert McCollister, M.D.  
 Nancy Meryhew, M.D.  
 Steven Miles, M.D.  
 Wesley Miller, M.D.  
 Karl A. Nath, M.D.  
 Kristen Nichols, M.D.  
 Catherine Niewoehner, M.D.  
 Gerald R. Onstad, M.D.  
 Mark Paller, M.D.  
 Paul Pentel, M.D.  
 Robert Perri, M.D.  
 Claus A. Pierach, M.D.  
 Gordan Pierpont, M.D.  
 Claire Pomeroy, M.D.  
 Frank Rhame, M.D.  
 Mark Rosenberg, M.D.  
 David Salerno, M.D.  
 Scott Sharkey, M.D.  
 Burt Sharp, M.D.  
 Geza Simon, M.D.  
 Keith Skubitz, M.D.  
 Arne Slungaard, M.D.  
 Ronald D. Soltis, M.D.  
 Bradford Stone, M.D.  
 William R. Swaim, M.D.  
 Greg Vercellotti, M.D.

## Descriptions of Selected Courses

Kathleen Watson, M.D.  
Daniel J. Weisdorf, M.D.  
Robert Wilson, M.D.  
John Winkelmann, M.D.

### *Assistant Professor*

Stuart Adler, M.D.  
John Allen, M.D.  
Thomas Amatruda, III, M.D.  
Charles Andres, M.D.  
Alan Bank, M.D.  
Susan Bannick, M.D.  
Jack Beaird, M.D.  
Timothy Behrens, M.D.  
Michael Belzer, M.D.  
Robert Berkseth, M.D.  
Stephen Beyer, M.D.  
Thomas Bloss, M.D.  
Milton L. Bullock, M.D.  
Linda Burns, M.D.  
Oliver Cass, M.D.  
Alan Collins, M.D.  
Terese Collins, M.D.  
Terry W. Crowson, M.D.  
David Dahl, M.D.  
Barbara Daniels, M.D.  
Terry Dennis, M.D.  
John Degelau, M.D.  
David Dunbar, M.D.  
John Eggert, M.D.  
Sally Ehlers, M.D.  
Michael Elson, M.D.  
Ken Engberg, M.D.  
Winslow Engel, M.D.  
Helen Enright, M.D.  
Kathy Faber-Langendoen, M.D.  
John Flack, M.D.  
Joan Fox, M.D.  
Martin Freeman, M.D.  
Juan Fried, M.D.  
Mary Gannon, M.D.  
Craig Garrett, M.D.  
Elie Gertner, M.D.  
Michael Goodman, M.D.  
Frank Grund, M.D.  
Robert Gruninger, M.D.  
George Haidet, M.D.  
Kathleen Hall, M.D.  
Keith Harmon, M.D.  
Craig Henke, M.D.  
William Henry, M.D.  
Charles Herzog, M.D.  
Steven Hillson, M.D.  
Alan Hirsch, M.D.  
Samuel Ho, M.D.  
Neal Holtan, M.D.  
Conrad Iber, M.D.  
Patrick W. Irvine, M.D.  
Jeffrey Jaffe, M.D.  
James Johnson, M.D.  
Anne Joseph, M.D.  
Nigel Key, M.D.  
Floyd Knight, M.D.  
Ann Kools, M.D.  
William P. Korchik, M.D.  
John Kvasnicka, M.D.

David Laxson, M.D.  
James Leatherman, M.D.  
George Logan, M.D.  
Linda A. Long, M.D.  
Keith Lurie, M.D.  
King-Wai Ma, M.D.  
Thelma Madhok, M.D.  
Richard Madlon-Kay, M.D.  
Theodore Marcy, M.D.  
Karen Margolis, M.D.  
William Marinelli, M.D.  
Donald S. Masler, M.D.  
Shannon Matta, M.D.  
John W. McBride, M.D.  
Kenneth McDonald, M.D.  
Edward McFalls, M.D.  
Gary McVeigh, M.D.  
Peter Meier, M.D.  
Jeffrey Miller, M.D.  
Simon Milstein, M.D.  
Kulwant Modi, M.D.  
Daniel Mueller, M.D.  
Avi Nahum, M.D.  
Robert C. Olson, M.D.  
Thomas A. Ophoven, M.D.  
John Opsahl, M.D.  
Craig Peine, M.D.  
Thomas Pence, M.D.  
Douglas Peterson, M.D.  
Robert A. Petzel, M.D.  
James Radford, M.D.  
Brian Rank, M.D.  
Jeffrey Rank, M.D.  
J. Bruce Redmon, M.D.  
Steve Remole, M.D.  
Kathryn Rice, M.D.  
Kirk Rodysill, M.D.  
Terry Rosborough, M.D.  
Peter Schlesinger, M.D.  
Anna Schorer, M.D.  
Leonard Schlossberg, M.D.  
Elizabeth Seaquist, M.D.  
Nahid Shahabi, M.D.  
Pamela Shultz, M.D.  
Gregory Silvis, M.D.  
Margaret Simpson, M.D.  
Charles Smith, M.D.  
Michael T. Spilane, M.D.  
David A. Stuart, M.D.  
Lyle Swenson, M.D.  
Jonathan Tolins, M.D.  
Dean Tsukayama, M.D.  
Valeria Ulstad, M.D.  
Tryg Velde, M.D.  
Catherine Verfaillie, M.D.  
David Warden, M.D.  
James Warren, M.D.  
Kathleen Whitley, M.D.  
Georgia Wiesner, M.D.  
Anthony Woolley, M.D.  
Paul Yakshe, M.D.  
Steven Yetterberg, M.D.  
Steven Zimmer, M.D.

## Elective Courses

**5500. MEDICINE EXTERNSHIP I.** (9 cr per period; offered all periods) Parenti  
Students identify clinical problems and care for inpatients on internal medicine services.

**5501. MEDICINE EXTERNSHIP II.** (9 cr per period; offered all periods) Parenti  
Emphasis on patient management and therapeutics on medical wards, giving students as much individual care responsibility as possible.

**5505. INFECTIOUS DISEASE RESEARCH.** (9 cr; offered all periods) Jordan  
Examination in depth of a clinical or laboratory problem related to infectious diseases.

**5507. RESEARCH IN ONCOLOGY.** (9 cr; offered all periods) Ginder  
Research on a problem or problems currently under investigation in oncology.

**5508. RESEARCH/SPECIAL PROBLEMS IN MEDICINE.** (9 cr per period; offered all periods) Nath  
Research experience in medical problems arranged with various staff members of the Department of Medicine on an individual basis.

**5509. RESEARCH IN IMMUNOLOGY—RHEUMATOLOGY.** (9 cr per period) Messner/Mahowald  
Research in rheumatology with emphasis on immune mechanisms of injury, inflammatory reactions, innovative therapeutic trials in induced disease. Broad latitude allowed student in designing individual research project. Multidisciplinary approach encouraged.

**5511. RESEARCH IN GASTROENTEROLOGY—Veterans Administration Hospital.** (9 cr per period; offered all periods) Levitt  
Students carry on an active research program under the direction of a gastroenterology section staff member.

**5512. RESEARCH IN HEMATOLOGY.** (9 cr; offered all periods) Jacob  
Research on a problem or problems currently under investigation in hematology.

**5518. RESEARCH IN ENDOCRINOLOGY.** (9 cr per period; offered all periods) Oppenheimer  
Students plan and execute a research project under the supervision of an endocrinology section faculty member.

**5521. INFECTIOUS DISEASE, CLINICAL ASPECTS.** (9 cr per period; offered all periods) Jordan  
Students participate in clinical evaluation and management of inpatient problems, attend formal conferences, and observe the role of the clinical microbiology laboratory in investigation of infectious disease.

**5522. MEDICAL GASTROENTEROLOGY.** (9 cr per period; offered all periods) Soltis  
Students do workups and attend teaching rounds dealing with patients with gastrointestinal disease. Includes conferences and outpatient clinical experience.

**5523. MEDICAL ENDOCRINOLOGY AND METABOLISM.** (9 cr per period; offered all periods) Oppenheimer  
Introductory experience in clinical endocrinology and metabolic disease. Emphasis on clinical diagnosis, efficient and incisive workups, and clinical management in both inpatient and outpatient settings.

**5525. CARDIOVASCULAR MEDICINE.** (9 cr per period) Bache  
Introduction to the diagnosis and management of cardiovascular disease occurring in adult patients.

**5526. MEDICAL ONCOLOGY OUTPATIENT/CONSULTATION.** (9 cr per period; offered all periods; prereq Med 5500) Luikart  
Students do patient evaluations in the oncology clinic and participate in oncology conferences. Emphasis on clinical evaluation and management of new cancer patients.

**5527. RESEARCH IN CARDIOLOGY.** (9 cr per period; offered all periods) Bache  
Acquaints students with current research in several areas of cardiovascular medicine in which important gaps of knowledge exist.

**5528. CLINICAL HEMATOLOGY.** (9 cr per period; offered all periods) Weisdorf  
Clinical and research aspects of hematology. Course is structured to the student's specific goals, but generally the student is given initial responsibility for proposing diagnosis and treatment plans for patients with hematologic illnesses.

**5531. CLINICAL RHEUMATOLOGY.** (9 cr per period; offered all periods) Mahowald, Messner  
Emphasis on clinical aspects of diseases of rheumatic and immunologic nature including the broad areas of collagen disease, autoimmune disease, and all types of arthritic and musculoskeletal disease.

**5532. PULMONARY DISEASE.** (9 cr per period; offered all periods) Bitterman  
Emphasis on evaluation of clinical pulmonary problems and pathophysiology of pulmonary disease. Pulmonary physiology is taught in the pulmonary function laboratories and correlated with clinical data and chest X-rays.

**5533. CLINICAL ALLERGY—University Hospital.** (4.5 or 9 cr; offered all periods; hrs ar) Blumenthal  
Emphasis on the practical features of doing an allergic and immunologic workup and of treating patients in a safe and medically acceptable fashion.

**5534. RESEARCH IN ALLERGY.** (9 cr per period; offered all periods) Blumenthal  
Student participates in on-going research within the program or in an original investigative project of the student's design. Student plans, performs, and interprets the study; makes a presentation; and writes a report on the project.

## Descriptions of Selected Courses

**5548. CLINICAL GENETICS.** (9 cr per period; offered all periods) King

Students learn the fundamentals of clinical genetics including cytogenetics, biochemical genetics, and genetic counseling and develop an understanding of the application of genetic principles to clinical medicine.

**5554. FLUID ELECTROLYTE AND ACID-BASE METABOLISM.** (9 cr per period; offered all periods) Ma

Prevention, diagnosis, and treatment of acid-base (A/B) and fluid and electrolyte (F/E) disorders. Evaluation of acute and chronic renal failure. Students will be members of a consulting team that evaluates patients with A/B and F/E abnormalities associated with a variety of medical and surgical diseases.

**5556. RENAL CONSULTATION—University Hospital.** (9 cr per period; offered all periods) Nath  
Students gain proficiency in the diagnostic workup, treatment, and management of kidney patients.

**5557. RESEARCH IN NEPHROLOGY.** (18 cr; prereq Med 5500; offered all periods) Nath  
Research, particularly clinical research, in nephrology.

**5562. CLINICAL NEPHROLOGY—Hennepin County Medical Center.** (9 cr per period; prereq Med 5500; offered all periods) Rao  
Clinical problems in the diagnosis and management of patients with renal disease.

**5570. CLINICAL MEDICINE ON THE GENERAL CLINICAL RESEARCH CENTER.** (9 cr per period; offered all periods) Bantle

Students learn accepted methods of clinical research involving human subjects and share in primary care of adult and pediatric patients with a variety of disorders.

**5571. CLINICAL TOXICOLOGY AND EMERGENCY MEDICINE.** (9 cr per period; offered period 3) Saxena

Opportunity to be involved in initial stages of providing critical care to patients with serious, sometimes life-threatening medical problems. Students will develop understanding of the application of certain procedural principles of critical care and the fundamentals of clinical toxicology.

**5580. CORONARY CARE UNIT AT VA.** (6 cr per period; offered all periods) Pierpont

After completing 5500, students provide primary care for patients in the Coronary Care Unit (CCU) at the VA Medical Center under direct supervision of a resident and a staff cardiology attending. Involves aspects of both acute and longitudinal care as patients are followed after transfer out of CCU through to hospital discharge. Concomitant educational conferences, ECG reading, etc., coordinated with cardiology and medicine schedules.

**5581. MEDICINE INTENSIVE CARE UNIT AT HC.** (6 cr per period; offered all periods) Leatherman

The student functions as a member of the critical care service that consults on all ICU patients. Emphasis on respiratory failure, shock, mechanical ventilation, hemodynamic monitoring, central line management, nutrition, acid-base, and fluid-electrolyte issues. Follow 2-6 patients.

**5582. MEDICAL INTENSIVE CARE.** (6 cr per period; offered all periods) Marini

One-month clinical rotation that familiarizes students with key principles of diagnosing and managing critical illness. Cardiopulmonary assessment and management emphasized using mechanical ventilation and hemodynamic monitoring as prime focus points.

**5583. FUNDAMENTALS OF CLINICAL ONCOLOGY.** (6 cr per period; offered fall and spring qtr [periods 3b,7]) Peterson

For medical students interested in entering a specialty. Emphasis on understanding important oncology concepts and acquiring practical skills relevant to diagnosing and treating common malignancies.

**5590. PRECEPTORSHIP IN INTERNAL MEDICINE.** (9 cr per period; offered all periods) McCollister

Students examine and participate in medical practices in a setting different from the large institution, working with physicians by arrangement in either rural or city practices.

**5591. INTERNAL MEDICINE-OUTPATIENT.** (9 cr per period; prereq Med 5500; offered all periods) McCollister

Provides advanced medical student with a broad exposure to adult medicine as practiced in the outpatient setting of a busy, multi-specialty clinic. Emphasis on developing student's diagnostic and therapeutic skills.

**5592. RURAL PHYSICIAN ASSOCIATE PROGRAM IN INTERNAL MEDICINE.** (Cr ar; offered 9 or 12 months) McCollister

Provides students with experience as a full-time associate to practicing physicians and preceptors who provide primary care in a rural clinic setting.

**5593. PRECEPTORSHIPS IN INTERNAL MEDICINE IN AN HMO SETTING.** (9 cr per period; offered all periods) Nichol

Students work with internists in an HMO clinic setting and perform clinical evaluations of ambulatory patients and formulate diagnostic and treatment plans. Students must contact Dr. Nichol at least two months before the preceptorship begins.

**5596. OCCUPATIONAL HEALTH.** (4.5 cr per period; offered fall and spring qtr [periods 3a, 3b, 7a, 7b]) Lohman

Provides students with the rudimentary skills necessary for the recognition, evaluation, and treatment of occupationally related injury and illness.

## Microbiology (MicB)

Ashley T. Haase, M.D., professor and head

*Regents' Professor Emeritus*

Dennis W. Watson, Ph.D.

*Professor*

Arthur Johnson, M.D., head, UMD

Dwight L. Anderson, Ph.D.

P. Patrick Cleary, Ph.D.

Gary Dunny, Ph.D.  
 Martin Dworkin, Ph.D.  
 David P. Fan, Ph.D.  
 Anthony J. Faras, Ph.D.  
 Gregory Germaine, Ph.D.  
 Beulah H. Gray, Ph.D.  
 Richard Hanson, Ph.D.  
 Alan B. Hooper, Ph.D.  
 Russell C. Johnson, Ph.D.  
 M. Colin Jordan, M.D.  
 Tucker W. LeBien, Ph.D.  
 Paul T. Magee, Ph.D., deah, CBS\*\*  
 Larry McKay, Ph.D.  
 Harry T. Orr, Ph.D.  
 Peter G. W. Plagemann, Ph.D.  
 Paul Quie, M.D.  
 Palmer Rogers, Ph.D.  
 Walter Sauerbier, Ph.D.  
 Charles Schachtele, Ph.D.  
 Patrick Schlievert, Ph.D.  
 James F. Zissler, Ph.D.

*Associate Professor*

Russell F. Bey, Ph.D.  
 Robert Brooker, Ph.D.  
 Kathleen Conklin, Ph.D.  
 Michael Flickinger, Ph.D.  
 Florence Gleason, Ph.D.  
 Dale Gregerson, M.D.  
 Ronald Jemmerson, Ph.D.  
 Marc Jenkins, Ph.D.  
 Robert Nelson, Ph.D.  
 Bernard E. Reilly, Ph.D.  
 Janet Schottel, Ph.D.  
 Peter Southern, Ph.D.  
 Carol Wells, Ph.D.

*Assistant Professor*

Donna Fontana, Ph.D.  
 Ambika Mathur, Ph.D.  
 R. Scott McIvor, Ph.D.  
 Michael Sadowsky, Ph.D.  
 Stewart Scherer, Ph.D.  
 David Sherman, Ph.D.  
 Leslie Schiff, Ph.D.  
 Lawrence Wackett, Ph.D.

*Research Associate*

Lautaro Perez, Ph.D.

Microbiology for freshman medical students covers the principles and techniques necessary to understand host-parasite relationships and the pathogenesis of infectious diseases. The application of microbiology to medical diagnosis guides the future physician in the treatment and prevention of infectious diseases and in the use of chemotherapeutic and antibiotic

agents. In the lecture portion of the course, basic principles in medical immunology, parasitology, mycology, bacteriology, and virology are reviewed. Through laboratory experience the future clinician learns to interpret laboratory results as well as to appreciate the need for cooperation between the physician and the diagnostic laboratory.

Elective courses are offered to medical students during their second through fourth years of school. These courses present advanced studies and in-depth treatment of such topics as basic microbiology, immunobiology, immunochemistry, virology, microbial physiology, and mechanisms of pathogenicity.

### Required Courses

#### 5205w.<sup>1</sup> BASIC AND MEDICAL ASPECTS OF MICROBIOLOGY FOR MEDICAL STUDENTS.

(5 cr; prereq regis med fr) Schlievert, staff  
 Basic and medical aspects of immunology, parasitology, mycology, medical bacteriology, and virology with emphasis on pathogenesis. Principles and techniques for diagnosis, treatment (especially chemotherapy), and prevention of infectious disease.

#### 5206s.<sup>1</sup> BASIC AND MEDICAL ASPECTS OF MICROBIOLOGY FOR MEDICAL STUDENTS.

(5 cr)  
 Continuation of 5205. Lecture and laboratory.

### Elective Courses

The following microbiology courses are available on a quarterly basis to medical students.

#### 5105f.w.s.<sup>1</sup> BIOLOGY OF MICROORGANISMS.

(5 cr, §3103, §Biol 5013; prereq 5 cr biological sciences, Biol 5001 or #) Dunny, Hanson, Sherman  
 Lectures, demonstrations, and laboratory exercises in taxonomy, anatomy, physiology, biochemistry, and ecology of microbes. Molecular structure in relation to bacterial function.

5218w. IMMUNOLOGY. (3 cr; prereq Biol 5001) Gray  
 Cellular, protein, and genetic bases of humoral immunity; methods for measuring antibodies and antigens. T lymphocytes: interaction of T helper cells with B lymphocytes and other T cells in cell-mediated immunity. Clinical immunology: immunodeficiency, allergy, autoimmunity, transplantation.

#### 5234w.<sup>1</sup> IMMUNOLOGY AND MEDICAL MICROBIOLOGY LABORATORY.

(3 cr; prereq 5218 or ¶5218, ¶5232 or ¶5232) Cleary, Gray  
 Principles that determine outcome of host-parasite interactions. Methods basic to host defense and immunology, including immunochemical and microbiological methods for diagnosing infectious disease.

<sup>1</sup>University of Minnesota, Duluth

\*\*College of Biological Sciences

<sup>1</sup>Microscope required. Students may obtain use of microscope by purchasing two \$3 microscope cards from the bursar.

## Descriptions of Selected Courses

**5235f. MICROORGANISMS AND DISEASE.** (4 cr; prereq 10 cr chemistry, 5 cr biological sciences or #; not open to microbiology majors) Johnson  
Lectures and demonstrations on nature of microorganisms, immunology, medical bacteriology, virology, mycology, parasitology, and principles of disease control.

**5321f. PHYSIOLOGY OF BACTERIA.** (3 cr; prereq 3103 or 5105 or Biol 5013 or VPB 3103, Biol 5001, 10 cr organic chemistry, 3 cr genetics) Rogers  
Chemical and physical organization of bacteria as related to function; growth; energy metabolism including oxidations and fermentations; nutritional requirements; antimicrobial agents; autotrophic mechanisms; microbial differentiation.

**5322f. MICROBIAL DIVERSITY AND PHYSIOLOGY LABORATORY.** (3 cr; prereq 5321 or ¶5321 or equiv) Dworkin, Rogers  
Isolation from natural sources; physiology and metabolism of wide variety of microorganisms, such as *Clostridium*, yeast, *Caulobacter*, myxobacteria, *Leptospira*, photosynthetic bacteria, *Bdellovibrio*, luminescent bacteria, and others. Laboratory only.

**5352s. APPLIED MICROBIOLOGY.** (4 cr; prereq MicB 5321 or #) Flickinger  
Microbial adaptation to various environments; role of microorganisms in the Earth's biogeochemical cycles. Application of microbial systems to industrial processes; basic principles of fermentation technology; microbial bioconversions and product formation. Biodegradation of chemicals.

**5424s. BIOLOGY OF VIRUSES.** (4 cr; prereq 5321 or Biol 5001, #) Plagemann  
Structure, composition, and properties of bacterial, plant, and animal viruses; their interaction with cells and effects on host cell metabolism; biochemistry of viral replication; techniques used in study of viruses and viral infections; viral tumorigenesis. Includes laboratory.

**5425s. VIROLOGY AND MICROBIAL GENETICS LABORATORY.** (3 cr; prereq ¶5424 or equiv, Biol 5001, GCB 5022) Plagemann, Sauerbier, Schiff  
Modern techniques: animal cell culture, virus infectivity titrations, analysis of viral nucleic acids and proteins by radiolabeling, gel electrophoresis and blot hybridizations, cell transformation by tumor viruses and DNA, analysis and mapping of mutants in microorganisms.

**5611w. MICROBIAL ECOLOGY.** (3 cr; prereq 3103 or 5105 or Biol 5013 or Soil 5610 or #) Sadowsky  
Interrelationship of microorganisms with terrestrial, aquatic, and organismal environments; survey of bacterial, fungal, and algal components of ecosystems; evolution and structure of microbial communities; population interactions within ecosystems; quantitative and habitat ecology; biogeochemical cycling; biotechnological approaches to the study of microbial ecology.

## Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Neurology (Neur)

Richard W. Price, M.D., professor and head

### Professor

Gary Birnbaum, M.D.  
Milton G. Ettinger, M.D.  
William R. Kennedy, M.D.  
Arthur C. Klassen, M.D.  
Edward H. Lambert, M.D.  
Ilo Leppik, M.D.  
Gareth Parry, M.D.  
David Rottenberg, M.D.  
Joo Ho Sung, M.D.  
Kenneth F. Swaiman, M.D.  
Fernando Torres, M.D.  
Jonathan D. Wirtschafter, M.D.

### Associate Professor

David C. Anderson, M.D.  
Khurshed A. Ansari, M.D.  
H. Brent Clark, M.D.  
Ronald E. Cranford, M.D.  
William Dobyns, M.D.  
Robert Gross, M.D., Ph.D.  
Costantino Iadecola, M.D.  
David Knopman, M.D.  
Robert Kriel, M.D.  
Myoung C. Lee, M.D.  
Lawrence Lockman, M.D.  
Winfried Raabe, M.D.  
Manuel Ramirez-Lassepas, M.D.  
Robert Roelofs, M.D.  
Phyllis Sher, M.D.

### Assistant Professor

James Ashe, M.D.  
Paul E. Barkhaus, M.D.  
Scott Bundlie, M.D.  
Kathy J. Christensen, Ph.D.  
John Corboy, M.D.  
John G. Davenport, M.D.  
William David, M.D.  
John Day, M.D., Ph.D.  
William H. Frey, M.D.  
Christopher Gomez, M.D.  
Sandra Hanson, M.D.  
Karen Hsiao, M.D., Ph.D.  
Frederick M. Langendorf, M.D.  
Sandra Lundgren, Ph.D.  
Mark W. Mahowald, M.D.  
J. Riley McCarten, M.D.  
James A. Moriarty, M.D.  
James Mortimer, M.D.  
Kendra Peterson, M.D.  
M. Elizabeth Ross, M.D., Ph.D.  
Lawrence Schut, M.D.  
Elsa G. Shapiro, Ph.D.  
Stephen A. Smith, M.D.  
John W. Tulloch, M.D.

Govin T. Vatassery, Ph.D.  
Gilbert Westreich, M.D.

*Instructor*

Thomas Ala, M.D.  
Miles Belgrade, M.D.  
Anil Dhuna, M.D.  
Martha Nance, M.D.  
Betty Y. Ong, M.D.  
Mario Quinones, M.D.

The Department of Neurology participates in an interdisciplinary course emphasizing the pathophysiologic basis for the clinical neurosciences. This course is intended primarily for medical students in Year Two. The department also offers externships in clinical neurology including supervised clinical experiences with inpatients and outpatients suffering from neurologic disorders. The elective courses are for students with special interests and/or educational requirements in a wide variety of clinical and laboratory settings.

**Elective Courses**

**5120. SELECTED PROBLEMS IN NEUROLOGY.** (Cr and hrs ar; prereq regis med) Staff

**5125. NEUROIMMUNOLOGY RESEARCH.** (Cr and hrs ar; prereq BA, some coursework in immunology) Birnbaum

**5510. EXTERNSHIP IN CLINICAL NEUROLOGY—University Hospital and affiliated hospitals.** (Cr and hrs ar; prereq regis med) Staff

**5542. PEDIATRIC NEUROLOGY.** (Cr and hrs ar; prereq regis med) Swaiman

**Advanced Credit Courses**

For a description of 8xxx courses, see the *Graduate School Bulletin*.

**Neurosurgery (NSu)**

Roberto C. Heros, M.D., professor and head

*Professor Emeritus*

Shelley N. Chou, M.D., Ph.D.  
Lyle A. French, M.D., Ph.D.

*Professor*

Timothy J. Ebner, M.D., Ph.D.  
Stephen J. Haines, M.D.  
Walter C. Low, Ph.D.  
Robert E. Maxwell, M.D., Ph.D.  
Manfred J. Meier, Ph.D.  
Gaylan L. Rockswold, M.D., Ph.D.

*Associate Professor*

Donald L. Erickson, M.D.

*Assistant Professor*

Thomas A. Bergman, M.D.  
M.H. Biros, M.D.  
Paul J. Camarata, M.D.  
Christine M. Cox, M.D.  
William F. Ganz, M.D.  
Walter A. Hall, M.D.  
Dennis Y.K. Wen, M.D.

*Psychologist*

John Hung, Ph.D.  
William N. Robiner, Ph.D.

The courses in neurological surgery introduce medical students to the theory, philosophy, and treatment of surgical diseases of the nervous system. The primary emphasis is on the recognition of neurological problems, with special emphasis on the broad scope of methodology used in diagnosis. Experience in methods of treatment is obtained through a close working relationship with the staff. The program provides a broad base of experience for the individual interested in general medicine but may, in certain instances, be adapted for the individual specifically interested in the neurological sciences.

The courses in neuropsychology introduce medical students to neuropsychological screening for assessing deficits in higher cortical functions. Selected courses are directed at graduate students in psychology, clinical psychology interns, and postdoctoral fellows in neuropsychology.

**Elective Courses**

**5500. EXTERNSHIP—University Hospital.** (4.5 or 9 cr; prereq regis med)

**5510. EXTERNSHIP—Veterans Administration Hospital.** (4.5 or 9 cr; prereq regis med)

**5511. EXTERNSHIP—Hennepin County Medical Center.** (4.5 or 9 cr; prereq regis med)

**5512. EXTERNSHIP—St. Paul-Ramsey Medical Center.** (4.5 or 9 cr; prereq regis med)

**5520. NEUROSURGICAL INVESTIGATION.** (9 cr; prereq regis med)

**5530. NEUROPSYCHOLOGY.** (3 cr; prereq regis med)

**5531. ADVANCED NEUROPSYCHOLOGICAL SEMINAR**

## Descriptions of Selected Courses

### 5532. CLERKSHIP IN NEUROPSYCHOLOGICAL ASSESSMENT

### 5533. CASE CONFERENCE IN NEUROPSYCHOLOGY

### 5534. INTRODUCTION TO NEUROPSYCHOLOGICAL ASSESSMENT

### 5535. CASE CONFERENCE IN CLINICAL PSYCHOLOGY

### 5536. SEMINAR IN CLINICAL PSYCHOLOGY

### 5550. NEUROPHYSIOLOGICAL LITERATURE SEMINAR. (1 cr; prereq med school course in physiology, #)

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Obstetrics and Gynecology (Obst)

Leo B. Twiggs, M.D., professor and head

*Professor Emeritus*

Harry Foreman, M.D.

*Professor*

Leon L. Adcock, M.D.  
Stephen H. Cruikshank, M.D.  
Robert J. Gorlin, D.D.S., M.S.  
Benjamin S. Leung, Ph.D.  
Takashi Okagaki, M.D., Ph.D.  
Roger A. Potish, M.D.  
Konald A. Prem, M.D.  
George E. Tagatz, M.D.  
Theodore R. Thompson, M.D.  
Leo B. Twiggs, M.D.

*Associate Professor*

Charles H. Blomquist, Ph.D.  
Linda F. Carson, M.D.  
Laura E. Edwards, M.D.  
Hardin E. Olson, M.D.  
Preston P. Williams, M.D.

*Assistant Professor*

Dennis B. Bealka, M.D.  
Calvin P. Boyd, M.D.  
Doris C. Brooker, M.D.  
Linda Hammer Burns, Ph.D.  
Laura L. Coultrip, M.D.  
Catherine L. Cowart, M.D.  
Peter D'Ascoli, M.D.  
William F. Dickes, M.D.  
Jeffrey M. Fowler, M.D.  
Melvin J. Frisch, M.D.  
Rise C. Hatten, M.D.  
Hugh Hensleigh, Ph.D.  
Marilyn S. Joseph, M.D.  
Peter Kapernick, M.D.  
Walid S. Kassem, M.D.  
Fredrick H. Kravitz, M.D.

June LaValleur, M.D.  
Gary T. Lundborg, M.D.  
Virginia R. Lupo, M.D.  
Jon L. Pryor, M.D.  
Sundaram Ramakrishnan, Ph.D.  
Jacques P. Stassart, M.D.  
Mark L. Tanz, M.D.  
Marianne M. Westerheim, M.D.

*Instructor*

Lowell J. Byers, M.D.  
Jay W. Carlson, D.O.  
Jonathan R. Carter, M.D.  
Ellen M. Hartenbach, M.D.  
Andrew K. Saltzman, M.D.

The field of obstetrics and gynecology encompasses all aspects of human reproduction. The course of study in the Medical School provides the student with a basic understanding of the function of the female reproductive system. At University Hospital, obstetrical experience is gained in the management of normal pregnancy, evaluation of the status of the fetus *in utero*, supervision of labor, and conduct of delivery. Experience in gynecology includes a systematic study of the diagnosis and therapy of diseases of the female reproductive system, gynecological endocrinology, gynecological oncology, and gynecological pathology. In seminars and small group discussions, problems of current importance in human reproductive biology are discussed.

The primary aim of the Department of Obstetrics and Gynecology is to provide a basic foundation that will enable the student to understand human reproduction. The department offers a series of clinical and investigative courses to fit students' varied interests.

### Elective Courses

**5500. EXTERNSHIP ON THE PRIMARY CARE OF WOMEN.** (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, Waconia, St. John's, or St. Luke's (Duluth). 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.** (Course and cr ar) 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. To devote full energy to association with a busy specialist, student will have no other assignments during this time. To be arranged individually with course coordinator.

**5540. ADVANCED EXTERNSHIP IN OBSTETRICS AND GYNECOLOGY.** (Cr ar; prereq 5500) Twiggs, staff

Full-time clinical experience on obstetrical and gynecological service at one of three hospitals: Hennepin County Medical Center, St. Paul-Ramsey, or University. Students may express hospital preference, but final assignments will be made by course coordinator. Emphasis is on total care of obstetrical patients and on management of major gynecological conditions.

**5560. RESEARCH IN REPRODUCTION.** (Cr and hrs ar) Twiggs, staff

Topics selected for each student.

**5575. GYNECOLOGICAL PATHOLOGY AND DIAGNOSTIC CYTOLOGY.** (Cr ar; prereq 5500) Brooker, Okagaki, Twiggs

Review of daily gynecological histopathology material on surgical and clinical cases from Ob-Gyn Service. Includes diagnostic cytology of Pap smears encountered in actual practice.

**5590. PRECEPTORSHIP IN OBSTETRICS AND GYNECOLOGY.** (Course and cr ar; prereq 5500) Twiggs

Full-time preceptorship in clinical obstetrics and gynecology offered in outstate Minnesota. Similar to experience in 5520, but in smaller community.

**Advanced Credit Courses**

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

**8217-8221. SEMINAR: OBSTETRICS AND GYNECOLOGY**

**8222-8223. GYNECOLOGICAL ONCOLOGY**

**Ophthalmology (Oph)**

Jay H. Krachmer, M.D., professor and head

*Professor Emeritus*

John E. Harris, M.D.

*Professor*

Donald J. Doughman, M.D.

William H. Knobloch, M.D.

Jay H. Krachmer, M.D.

Jonathan D. Wirtschafter, M.D.

*Associate Professor*

J. Douglas Cameron, M.D.

Dale S. Gregerson, Ph.D.

Edward J. Holland, M.D.  
Robert D. Letson, M.D.  
J. Daniel Nelson, M.D.  
William R. Rathbun, Ph.D.  
C. Gail Summers, M.D.

*Assistant Professor*

Mark W. Balles, M.D.  
James E. Egbert, M.D.  
Susan Keirstead, Ph.D.  
Linda K. McLoon, Ph.D.  
Martha M. Wright, M.D.

**Elective Courses**

**5100. INTRODUCTION TO OPHTHALMIC PATHOLOGY.** (1 cr; prereq #) Cameron

**5180. EXTERNSHIP IN OPHTHALMOLOGY.** (4.5 cr; prereq #)

**5190. RESEARCH PROBLEMS.** (Cr ar)

**Advanced Credit Courses**

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

**Orthopaedic Surgery (OrSu)**

Roby C. Thompson, Jr., M.D., professor and head

*Professor*

James R. Gage, M.D.  
Ramon B. Gustilo, M.D.  
James H. House, M.D.  
Jack L. Lewis, Ph.D.  
Theodore E. Oegema, Ph.D.

*Associate Professor*

Edward V. Craig, M.D.  
Richard F. Kyle, M.D.  
James W. Ogilvie, M.D.  
Robert F. Premer, M.D.  
Ensor E. Transfeldt, M.D.

*Assistant Professor*

Elizabeth A. Arendt, M.D.  
Garry Banks, M.D.  
Joan E. Bechtold, Ph.D.  
Edward Y. Cheng, M.D.  
Denis Clohisy, M.D.  
Leo J. de Souza, M.D.  
Lars Engebretsen, M.D.  
Daniel W. Gaither, M.D.  
Timothy A. Garvey, M.D.  
Steven E. Koop, M.D.  
Tom Novacheck, M.D.  
Matthew Putnam, M.D.  
Deborah Quanbeck, M.D.  
Harry J. Robinson, Jr., M.D.  
David C. Templeman, M.D.  
Thomas F. Varecka, M.D.  
Kirkham Wood, M.D.

## Descriptions of Selected Courses

The major goals of the courses in orthopaedic surgery are to provide the medical student with the foundation necessary for performing a basic neuromusculoskeletal examination of the patient, for correlating the clinical expressions of disease with a knowledge of basic science, and for recognizing those patient problems that require immediate appraisal and resolution. In a number of clinical electives, the student has the option of participating in the diagnostic and therapeutic management of patients with orthopaedic and traumatic disabilities; this advanced experience provides an understanding of fundamental orthopaedic principles, the scope of orthopaedic surgery, and the opportunities for both clinical and basic investigation in orthopaedic surgery.

### Elective Courses

**5180. ORTHOPAEDICS I.** (Cr ar; prereq regis med)

**5185. ORTHOPAEDICS II—EXTERNSHIP IN ORTHOPAEDIC SURGERY.** (Cr ar; prereq regis med)

**5186. RESEARCH PROBLEMS IN ORTHOPAEDIC SURGERY.** (Cr ar; prereq regis med)

**5187. EXTERNSHIP IN ORTHOPAEDIC SURGERY—St. Paul Ramsey Medical Center.** (Cr ar; prereq regis med)

**5188. EXTERNSHIP IN ORTHOPAEDIC SURGERY AND FRACTURES—Gillette Children's Hospital, St. Paul.** (Cr ar; prereq regis med)

**5190. EXTERNSHIP IN ORTHOPAEDIC SURGERY AND FRACTURES—Veterans Hospital.** (Cr ar; prereq regis med)

**5191. ORTHOPAEDIC EXTERNSHIP—Hennepin County Medical Center.** (Cr ar; prereq regis med)

**5192. PRECEPTORSHIP IN ORTHOPAEDIC SURGERY.** (Cr ar; prereq regis med jr or sr)

**5193. SCOLIOSIS AND OTHER SPINAL DEFORMITIES.** (Cr ar; prereq regis med)

**5194. ORTHOPAEDIC EXTERNSHIP—Centennial Lakes Medical Center.** (Cr. ar; prereq regis med)

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Otolaryngology (Otol)

George L. Adams, M.D., professor and head

*Professor Emeritus*

Frank M. Lassman, Ph.D.

*Professor*

Arndt J. Duvall III, M.D.

G. Scott Giebink, M.D.

Robert Gorlin, D.D.S., M.S.

S. K. Juhn, M.D.

Robert H. Margolis, Ph.D.

David A. Nelson, Ph.D.

Mario Ruggero, Ph.D.

W. Dixon Ward, Ph.D.

*Associate Professor*

John H. Anderson, M.D., Ph.D.

Lawrence R. Boies, Jr., M.D.

Stephen J. Haines, M.D.

Peter A. Hilger, M.D.

Samuel C. Levine, M.D.

Robert H. Maisel, M.D.

Tetsuo Morizono, M.D.

Donald W. Robertson, Ph.D.

Peter A. Santi, Ph.D.

*Assistant Professor*

Kathleen A. Daly, M.P.H., Ph.D.

Timothy Doyle, Ph.D.

Markus Gapany, M.D.

George S. Goding, Jr., M.D.

David B. Hom, M.D.

David W. Johnson, M.S.

Lawrence J. Marentette, M.D.

Gary E. Schnitker, M.D.

Edward Szachowicz II, M.D., Ph.D.

Students are introduced to otolaryngology through a series of didactic lectures that emphasize broad aspects of the field and discussions of basic principles when applicable. The coursework in the Department of Otolaryngology involves student participation in the clinical examination of patients with otolaryngological disorders. During this time, the student develops skills in examination (especially indirect laryngoscopy) and in interpretation of findings. The practical work is supplemented by discussions and seminars with the faculty. The student is encouraged to spend additional elective time in clinical, surgical, and research services in the department.

### Elective Courses

**5200. SURGICAL SPECIALTY:  
OTOLARYNGOLOGY**

**5500. GENERAL ENT ELECTIVE****5501. ACTING INTERNSHIP IN ENT****5503. RESEARCH: BASIC SCIENCE ENT ELECTIVE****Advanced Credit Courses****5504. EXTERNSHIP IN OTOLARYNGOLOGY—OVERSEAS****5970. DIRECTED STUDIES****Pediatrics (Ped)**

Alfred Michael, M.D., regents' professor and head

*Professor Emeritus*

John A. Anderson, M.D., Ph.D.  
Ray Anderson, M.D.  
Richard Raile, M.D.  
Robert Ulstrom, M.D.

*Professor*

Henry Balfour, M.D.  
Robert Blum, M.D., Ph.D.  
Stephen J. Boros, M.D.  
David M. Brown, M.D.  
Barbara Burke, M.D.  
C. Carlyle Clawson, M.D.  
Patricia Ferrieri, M.D.  
Alexandra Filipovich, M.D.  
Robert Fisch, M.D.  
Alfred Fish, M.D.  
Richard Gehrz, M.D.  
G. Scott Giebink, M.D.  
Ricardo Gonzalez, M.D.  
Robert Gorlin, D.D.S., M.S.  
Ernest Gray, Ph.D.  
Thomas Green, M.D.  
Stephen Haines, M.D.  
Margaret Hostetter, M.D.  
Dana Johnson, M.D., Ph.D.  
Stephen C. Joseph, M.D.  
Edward Kaplan, M.D.  
John Kersey, M.D.  
Youngki Kim, M.D.  
Richard King, M.D., Ph.D.  
Robert Kriel, M.D.  
William Krivit, M.D., Ph.D.  
Russell Lucas, M.D.  
S. Michael Mauer, M.D.  
James Moller, M.D.  
Charles Nelson, Ph.D.  
Mark Nesbit, M.D.  
Thomas Nevins, M.D.  
George Noren, M.D.  
Anne C. Petersen, Ph.D.  
Paul Quie, M.D.  
Norma Ramsay, M.D.  
Albert Rocchini, M.D.  
Harvey Sharp, M.D.  
Alan R. Sinaiko, M.D.  
Kenneth Swaiman, M.D.

Robert ten Benschel, M.D.  
Theodore N. Thompson, M.D.  
Faith Uckun, M.D.  
Homer Venters, M.D.  
Robert Vernier, M.D.  
Warren Warwick, M.D.  
James White, M.D.  
William Woods, M.D.

*Associate Professor*

Diane Arthur, M.D.  
John Bass, M.D.  
Susan Berry, M.D.  
Peter Blasco, M.D.  
Bruce R. Blazar, M.D.  
Elizabeth Braunlin, M.D., Ph.D.  
Blanche Chavers, M.D.  
Amos Deinard, M.D.  
William Dobyns, M.D.  
Ann Dunnigan, M.D.  
Dennis Dykstra, M.D., Ph.D.  
Rolf Engel, M.D.  
David Fisher, M.D.  
Deborah Freese, M.D.  
Michael Georgieff, M.D.  
Peter Hesslein, M.D.  
Mathur Kannan, B.V.Sc., Ph.D.  
Kim Krabill, M.D.  
Lawrence Lockman, M.D.  
Mark C. Mammel, M.D.  
Joseph Neglia, M.D.  
Robert O'Dea, M.D., Ph.D.  
Charles Oberg, M.D.  
Mary Ella Pierpont, M.D., Ph.D.  
Warren Regelman, M.D.  
Michael Resnick, Ph.D.  
Les Robison, Ph.D.  
Krishna Saxena, M.D.  
Sarah Jane Schwarzenberg, M.D.  
Phyllis Sher, M.D.  
Clark Smith II, M.D.  
C. Gail Summers, M.D.  
Mendel Tuchman, M.D.  
John Wagner, M.D.  
O. Douglas Wangenstein, Ph.D.  
Sally Weisdorf, M.D.  
Chester Whitley, M.D., Ph.D.

*Assistant Professor*

Richard Andersen, M.D.  
Peter Anderson, M.D., Ph.D.  
Bruce Bostrom, M.D.  
Ralph Butkowski, Ph.D.  
Becky Murray Carpenter, M.D.  
Pi-Nian Chang, Ph.D.  
Raul Cifuentes, M.D.  
J. Michael Coleman, M.D.  
Terese Collins, M.D.  
Jane Crosson, M.D.  
Ralph Faville, M.D.  
Bruce Ferrara, M.D.  
Gary Fifield, M.D.  
Dana Filipovich, M.D.  
Catherine Gatto, M.D.  
Denise Goodman, M.D.  
J. Margaret Horrobin, M.D.

## Descriptions of Selected Courses

Harumi Jyonouchi, M.D.  
Clifford Kashan, M.D.  
Mary Kleppel, Ph.D.  
Daniel Kohen, M.D.  
Carolyn Levitt, M.D.  
Ambika Mathur, Ph.D.  
Antoinette Moran, M.D.  
Paul Orchard, M.D.  
Andrew Ozolins, M.D.  
John Perentesis, M.D.  
John Priest, M.D.  
Michael Reiff, M.D.  
Yuri Reinberg, M.D.  
Gary Remafedi, M.D.  
Thomas Rolewicz, M.D.  
Gerald Rosen, M.D.  
Kumud Sane, M.D.  
Leon Satran, M.D.  
Michael Shannon, M.D.  
Elsa Shapiro, Ph.D.  
Ralph Shapiro, M.D.  
Stephen Smith, M.D.  
Joseph Sockalosky, M.D.  
Michael Sweeney, M.D.  
John D. Tobin, M.D.  
Rachel Trockman, M.D.  
Michael Vespasiano, M.D.

### *Instructor*

Catherine Bendel, M.D.  
Stephen Blythe, M.D.  
Carroll Brennan, M.D.  
Gail Brotzman, M.D.  
Mark Butterbrodt, M.D.  
April Connell, M.D.  
Erik Hagen, M.D.  
Marjorie Hogan, M.D.  
Emmanuel Katsanis, M.D.  
V. Jill Kempthorne, M.D.  
Helena Kosina, M.D.  
Paul Kubic, M.D.  
Richard Lussky, M.D.  
Christopher L. Meyer, M.D.  
Judson Reaney, M.D.  
Marcia Shew, M.D.  
Joseph Stenzel, M.D.  
David Thompson, M.D.  
Linda Thompson, M.D.  
Albert Tsai, M.D.  
Janet West, M.D.  
Sarah Winter, M.D.

Pediatrics is concerned with the basic aspects of human developmental biology both in the prenatal period and postnatal life. Applying knowledge of growth and development is very important to studying diseases in the interdisciplinary organ system courses offered during Year Two. Applying this knowledge to pediatric patients and acquiring skills in assessing and applying growth and developmental aspects are learned through the Student as Physician

tutorials. The student examines, studies, and discusses, with the faculty tutor, children with the following pediatric conditions and problems: normal newborn, sick infant, respiratory disease, genetic disease, congenital malformation, fluid and electrolyte imbalance, failure to thrive, neurologic disorders, and adolescent.

In Years Three and Four, students may choose several types of pediatric experience. They may participate in caring for children in the inpatient and outpatient services of the University Hospital and affiliated community hospitals. In these experiences, diagnosing and managing pediatric disorders and the effect of illness on the child's growth and development emphasized. Students may choose to observe and participate in diagnostic and care programs concerned with specific aspects of pediatrics: the premature and newborn, development, endocrinology, allergy, cardiology, psychiatry, nephrology, and communicable diseases. Finally, students may elect a research experience or other opportunity in an area of special interest in selected basic areas of pediatrics.

To reinforce fundamental concepts in the clinical programs, applying basic knowledge in preventing diagnosing, and managing diseases of infants and children is emphasized.

### **Elective Courses**

- 5501. PEDIATRIC EXTERNSHIP.** (Cr ar)  
**5512. PEDIATRIC ACTING INTERNSHIP.** (Cr ar)  
**5520. PEDIATRICS AMBULATORY COURSE.** (Cr ar)  
**5525. INTERNATIONAL HEALTH.** (Cr ar)  
**5533. PEDIATRIC ALLERGY AT UNIVERSITY HOSPITAL.** (Cr ar)  
**5534. PEDIATRIC CARDIOLOGY AT THE UNIVERSITY.** (Cr ar)  
**5535. PEDIATRIC INFECTIOUS DISEASES.** (Cr ar)  
**5536. PEDIATRIC HEMATOLOGY/ONCOLOGY/ BONE MARROW TRANSPLANTATION AT UNIVERSITY HOSPITAL.** (Cr ar)  
**5537. PEDIATRIC ENDOCRINOLOGY AND METABOLISM AT THE UNIVERSITY.** (Cr ar)

**5538. PEDIATRIC GASTROENTEROLOGY AND NUTRITION.** (Cr ar)

**5539. NEONATAL MEDICINE EXTERNSHIP.** (Cr ar)

**5540. PEDIATRIC NEUROLOGY.** (Cr ar)

**5543. PEDIATRIC NEPHROLOGY AT THE UNIVERSITY.** (Cr ar)

**5544. PULMONARY DISEASE IN PEDIATRICS.** (Cr ar)

**5547. TOPICS IN MATERNAL AND CHILD HEALTH.** (Cr ar)

**5548. CLINICAL GENETICS.** (Cr ar; same as Med 5548)

**5553. ADOLESCENT MEDICINE.** (Cr ar)

**5555. NEONATAL CLERKSHIP.** (Cr ar)

**5556. CLINICAL PEDIATRICS CLERKSHIP.** (Cr ar)

**5559. PEDIATRIC CRITICAL CARE MEDICINE.** (Cr ar)

**5560. RESEARCH/SPECIAL PROBLEMS IN PEDIATRICS.** (Cr ar)

**5565. PEDIATRIC IMMUNOLOGY.** (Cr ar)

## Pharmacology (Phcl)

Horace H. Loh, Ph.D., professor and head  
Jack W. Miller, Ph.D., professor and  
associate head

### Professor

Bianca Conti-Tronconi, M.D.  
Patrick E. Hanna, Ph.D.  
Jordan L. Holtzman, Ph.D., M.D.  
Donald B. Hunninghake, M.D.  
Nancy M. Lee, Ph.D.  
Alan R. Sinaiko, M.D.  
Norman E. Sladek, Ph.D.  
Sheldon B. Sparber, Ph.D.  
Akira E. Takemori, Ph.D.  
Fatih M. Uckun, M.D., Ph.D.  
George L. Wilcox, Ph.D.  
Ben G. Zimmerman, Ph.D.

### Associate Professor

Earl W. Dunham, Ph.D.  
Kenneth M. Hargreaves, D.D.S., Ph.D.  
Ping-Yee Law, Ph.D.  
Rita B. Messing, Ph.D.  
Robert F. O'Dea, M.D., Ph.D.  
Paul R. Pentel, M.D.  
Aloysius J. Quebbemann, Ph.D.  
Timothy F. Walseth, Ph.D.  
W. Gibson Wood III, Ph.D.

### Assistant Professor

David K. Ann, Ph.D.  
Colin R. Campbell, Ph.D.  
Leonard Lichtblau, Ph.D.  
Louise M. Nutter, Ph.D.  
S. Ramakrishnan, Ph.D.  
Daniel Romero, Ph.D.  
Paul J. Sammak, Ph.D.  
Stanley A. Thayer, Ph.D.  
Li-Na Wei, Ph.D.

### Lecturer

Faruk S. Abuzzahab, M.D., Ph.D.  
Donald C. Kvam, Ph.D.  
Ji-Chia Liao, M.D., Ph.D.  
Sabita Roy, Ph.D.

Pharmacology courses provide an in-depth understanding of fundamental principles of rational drug therapy. Emphasis is on the mechanisms of action, absorption, distribution, biotransformation, excretion, and clinical use of drugs, both in general and specific terms. Work in laboratories and therapeutic conferences supplements the lectures to illustrate the actions of drugs in health and disease. Clinical pharmacologists show, by means of ward rounds and clinical conferences, how principles of pharmacology are applied to disease treatment. Elective courses provide opportunity to explore various specialized areas of pharmacology.

## Required Courses

**5110s. PHARMACOLOGY.** (2 cr; prereq regis med or #) Hunninghake

**5111f,w. PHARMACOLOGY.** (7 cr; [3 cr F, 4 cr W] prereq 5110 or #) Hunninghake

**5112s. PHARMACOLOGY.** (1 cr; prereq 5111 or #) Holtzman  
Continuation of Phcl 5111. Small group case-oriented sessions. Applying pharmacological principles to clinical practice.

## Elective Courses

**5109. PROBLEMS IN PHARMACOLOGY.** (Cr and hrs ar; prereq #)

**5503. BASIC PSYCHOPHARMACOLOGY.** (1 cr) Sparber  
Discussions of biochemical mechanisms and behavioral correlates of psychotropic compounds. Emphasis on experimental design and interpretation of data as they relate to normal and abnormal CNS function.

## Descriptions of Selected Courses

**5504. NEUROPHARMACOLOGY.** (1 cr) Wilcox  
Discussions of neurophysiological mechanisms by which drugs and neurotransmitters affect neurons in the CNS. Students help select course topics and papers to be discussed.

**5512. RENAL PHARMACOLOGY REVIEW.** (1 cr)  
Quebbemann  
Drugs that affect kidney function and metabolism.

**5513. CONCEPTS INVOLVED IN  
CARDIOVASCULAR PHARMACOLOGY.** (1 cr)  
Zimmerman  
Mechanisms of action of drugs employed to treat hypertension and to modify the renin-angiotensin system and other topics.

**5515. CLINICAL PHARMACOLOGY—University  
Hospital.** (9 cr) O'Dea, Sinaiko  
Clinical application of therapeutic agents in pathophysiologic states. Correlations between basic pharmacologic knowledge and its use at the bedside emphasized. Each student is involved in the management of inpatients and outpatients experiencing therapeutic problems. Opportunity to participate in ongoing clinical research programs within the Division of Clinical Pharmacology. Regularly scheduled activities include:

Monday afternoon—Clinical pharmacology rounds,  
University Hospital (inpatients), seminar or journal club

Thursday afternoon—Hypertension-renal clinic  
(outpatients); drug therapy studies

Friday—Tutorial with O'Dea, Sinaiko, or staff

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Physical Medicine and Rehabilitation (PMed)

Dennis Dykstra, M.D., Ph.D., associate  
professor and head

### Professor

Gary T. Athelstan, Ph.D.  
Frank M. Lassman, Ph.D.  
Jack Lewis, Ph.D.

### Associate Professor

John Allison, M.S.  
Richard DiFabio, M.S., Ph.D.  
Corinne Ellingham, M.S.  
Steven Fisher, M.D., M.S.  
Robert Patterson, Ph.D.  
Glenn Scudder, M.S.

### Assistant Professor

Sumada Apte, M.D.  
Warren Bilkey, M.D.  
Robert Bollinger, B.S.  
Elizabeth Davis, M.D.  
Mary Foshager, M.D.  
Gary Goldish, M.D.

Rebecca Koerner, M.D.  
Michael Kosiak, M.D.  
James Lauck, D.O.  
Loren Leslie, M.D.  
Cheryl Meyers, B.S.  
Patricia Montgomery, B.S., M.A., Ph.D.  
Michael Mustonen, D.O.  
John E. Quast, M.D.  
Judith Reisman, B.S., M.A., Ph.D.  
Charlotte Roehr, M.D.  
Barbara Sigford, M.D.  
Erica Stern, B.S., M.S., Ph.D.  
Marshall Taniguchi, M.D.  
Richard Timming, M.D.  
Ensor Transfeldt, M.D.  
Marilyn Weber, M.D.

### Instructor

Krista Coleman, B.S., M.S.  
Marguerite Gardner, M.S.  
LeAnn Snow, M.D.  
Juliani Thomas, B.S., M.H.E.

Care of patients with physical disabilities or chronic diseases has become an important part of medical practice. Comprehensive medical management of such patients requires that the physician evaluate those abilities of the patient that may be used to restore the individual to useful function. Rehabilitation may require the use of multiple types of therapy. The allied health professions participate with the physician in a coordinated rehabilitation program. In the Rehabilitation Center, this multidisciplinary approach is used in the treatment of patients. The student learns about the comprehensive care of disabled patients and participates in the program of rehabilitation. By active involvement in the management of patients, the student learns the methods of coordination of care, communication, leadership, and administration necessary for professional practice. There is also opportunity to participate in research related to neuromuscular and circulatory functions, techniques of therapy, programs for management of patients, and methods of education in the health professions.

### Elective Courses

**5410. ADULT REHABILITATION MEDICINE.**  
(Cr ar; prereq regis med)

**5411. PEDIATRIC REHABILITATION MEDICINE.**  
(Cr ar; prereq regis med)

**5412. PHYSICAL MEDICINE AND REHABILITATION—VA Medical Center.** (Cr ar; prereq regis med)

**5414. PHYSICAL MEDICINE AND REHABILITATION FOR THE FAMILY PHYSICIAN.** (Cr ar; prereq regis med)

**5415. PRIVATE PRACTICE IN PHYSICAL MEDICINE AND REHABILITATION IN DULUTH.** (Cr ar; prereq regis med)

**5416. PHYSICAL MEDICINE AND REHABILITATION—St. Paul-Ramsey Medical Center.** (Cr ar; prereq regis med)

**5420. HISTOPATHOLOGY, ELECTRODIAGNOSIS, AND KINESIOLOGY.** (Cr ar; prereq regis med)

**5430. RESEARCH IN PHYSICAL MEDICINE AND REHABILITATION.** (Cr ar; prereq regis med)

**5440. BEHAVIOR MODIFICATION IN HEALTH CARE.** (2 cr; prereq 8 cr psychology or #)  
Theoretical and practical applications of the principles of behavioral psychology to physiological, neurological, and behavioral dysfunctions of patients. Problem-oriented approach to patient management emphasized.

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Physiology (Phsl)

Robert F. Miller, M.D., 3M Cross Professor and head

### Professor Emeritus

Eugene Grim, Ph.D.

### Professor

Dwight A. Burkhardt, Ph.D.

Sue Donaldson, R.N., Ph.D.

Timothy J. Ebner, M.D., Ph.D.

Apostolos P. Georgopoulos, M.D., Ph.D.

Hon Cheung Lee, Ph.D.

David Levitt, M.D., Ph.D.

Walter C. Low, Ph.D.

Eric A. Newman, Ph.D.

Richard E. Poppele, Ph.D.

Richard Purple, Ph.D.

John Soechting, Ph.D.

### Associate Professor Emeritus

Chung P. Lee, Ph.D.

Jui S. Lee, Ph.D.

### Associate Professor

John H. Anderson, M.D., Ph.D.

Jurgen F. Fohlmeister, Ph.D.

Esther M. Gallant, Ph.D.

Scott M. O'Grady, Ph.D.

John W. Osborn, Ph.D.

Winfried A. Raabe, M.D.

O. Douglas Wangensteen, Ph.D.

### Assistant Professor

Vincent A. Barnett, Ph.D.

W. Dale Branton, Ph.D.

Martha Flanders, Ph.D.

Kevin D. Fox, Ph.D.

Paul A. Iazzo, Ph.D.

Stephen Katz, Ph.D.

### Instructor

George Bloom, B.S.

## Required Courses

**5110w. HUMAN PHYSIOLOGY.** (3 cr; prereq anatomy, biochemistry)

**5111s. HUMAN PHYSIOLOGY.** (4 cr; prereq 5110)

**5112s. HUMAN NEUROSCIENCE B.** (3 cr; for first-yr med and grad students; second qtr of two-qtr sequence—must complete PHSL 5112 to get credit for CBN 5111 Human Neuroscience A)

## Elective Courses

**5113f,w,s. PROBLEMS IN PHYSIOLOGY.** (Cr and hrs ar; prereq 5111 or #)  
Topics assigned for readings or lab study; conferences.

**5201f. COMPUTATIONAL NEUROSCIENCE I—MEMBRANES AND CHANNELS.** (5 cr; prereq Phsl 5112 or equiv)

Comprehensive examination of membrane ion channels using UNIX workstations to simulate their properties. Topics include Hodgkin-Huxley model, non-linear dynamic systems, voltage and ligand gated ion channels, impulse propagation.

**5202w. COMPUTATIONAL NEUROSCIENCE II—CELLS AND CIRCUITS.** (5 cr; prereq an understanding of UNIX, Phsl 5201 or equiv)

Comprehensive investigation of the computational properties of single neurons and locally connected cell networks. Topics will include linear cable theory, compartmental modeling of single neuron properties, spatio-temporal interactions between synaptic inputs in neuronal dendritic tree, computational properties of passive and active dendritic spines and spine clusters, quantitative interpretation of whole-cell voltage-clamp data, and dynamics of locally connected cell networks.

**5203s. COMPUTATIONAL NEUROSCIENCE III—NEURAL SYSTEMS AND INFORMATION PROCESSING.** (5 cr; prereq Phsl 5202)

Quantitative examination of information processing by networks of neurons based on experimental data and theoretical models. Topics include neural codes, neural network models and information processing, neural control systems, and computational maps.

**5444s. MUSCLE CONTRACTION.** (3 cr, \$MdBc 5444; prereq undergrad courses in biochemistry or physiology, #)

Introduction to the physiology, biochemical regulation, and physical chemistry of muscle contraction.

## Descriptions of Selected Courses

**5552f, w.s. READINGS IN PHYSIOLOGY.** (Cr and hrs ar)

Topics selected for each student; written reviews prepared and discussed.

**5553f, w.s. RESEARCH IN PHYSIOLOGY.** (Cr and hrs ar)

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

**5568f. PHYSIOLOGY OF VISUAL SYSTEMS.** (3 cr; prereq #; offered even yrs only)

**5569s. SPINAL CORD PHYSIOLOGY AND MOTOR CONTROL.** (3 cr; prereq #; offered odd yrs only)

## Psychiatry

Paula J. Clayton, M.D., professor and head

### Adult Psychiatry (AdPy)

#### Professor

Maurice Dysken, M.D.  
Elke Eckert, M.D.  
Lawrence Greenberg, M.D.  
James Halikas, M.D.  
Boyd Hartman, M.D.  
John T. Kelly, M.D.  
Thomas Kiresuk, Ph.D.  
Jerome Kroll, M.D.  
Richard Magraw, M.D.  
Manfred Meier, Ph.D.  
James Mitchell, M.D.  
Michael Popkin, M.D.  
Joseph Westermeyer, M.D., Ph.D.

#### Associate Professor

Marilyn Carroll, Ph.D.  
Eduardo Colon, M.D.  
Esam El-Fakahany, Ph.D.  
Dorothy Hatsukami, Ph.D.  
Thomas B. Mackenzie, M.D.  
Richard Pyle, M.D.

#### Assistant Professor

Edward J. Bardon, M.D.  
Gary Christenson, M.D.  
Ray Conroe, M.D.  
Nancy Crewe, M.D.  
Scott Crow, M.D.  
Vernon Devine, Ph.D.  
Philip Edwardson, M.D.  
Patricia Faris, Ph.D.  
William Frey, M.D.  
John Heefner, M.D.  
Thomas Hurwitz, M.D.  
Young-Ho Kang, M.D.  
Suck Won Kim, M.D.  
Matt Kushner, Ph.D.  
Daniel Larson, M.D.

Gabe Maletta, M.D.  
Manuel Mejia, M.D.  
William Meller, M.D.  
Robert Murtaugh, M.D.  
Edward W. Posey, M.D.  
Nancy Raymond, M.D.  
Nicholas Rogers, M.D.  
Donald Simone, Ph.D.  
Sheila Specker, M.D.  
Thomas Weier, M.D.  
Mark Willenbring, M.D.  
Marlin Wiemer, Ph.D.  
Janet Zander, M.D.

The Department of Psychiatry teaches required courses in each of the first three years of the Medical School curriculum. The overall goal is to teach the relationship of brain and behavior in normal and pathological states so that students can recognize and treat mental disorders. Developments in neurobiology, comparative ethology, developmental psychology, cognitive psychology, psychopharmacology, and clinical research indicate that the coming decades will see an explosive growth of psychiatry and the brain sciences. Students of medicine will need a firm grounding in the relationship of brain and behavior and an ability to think critically to absorb and use these developments. Thus the curriculum in the first three years tries to impart a conceptual and clinical foundation and a curiosity and fascination that will enhance the pleasure of practicing medicine in the future.

Human Behavior is a 27-hour course taught in the spring-summer quarters of the first year. This course focuses on the development of the individual from a cognitive and emotional point of view. Contrasting models of development are presented and critically assessed. The environment in which the individual develops is examined. Special attention is given to familial, cultural, and religious factors. The concepts of stress response and defense mechanisms are introduced. The psychological implications of aging and chronic illness are discussed. Looking forward to second year consideration of substance abuse, non-pathological substance use is explored.

Psyche, a 25-hour course on specific mental disorders, is given in the second year in conjunction with neurology, respiratory, cardiovascular and the pharmacology of drugs affecting the central nervous system. The epidemiology, descriptive psychopathology, etiology, and prognosis of the major child and adult mental disorders are presented. The focus is on the chronic, severe mental disorders, such as schizophrenia, manic-depression, and alcoholism, which have an early onset and will affect as much as 20% of the population. Consideration of treatment is limited to elucidation of etiology. Six hours of the course are taught in a small-group format (12-15 students), which uses videotaped examples of psychopathology.

In the third year, every student takes a full-time six-week clerkship in psychiatry. The clerkship emphasizes inpatient care of adult patients. Attention is given to the psychiatric examination, diagnosis, and treatment. All students should be proficient at assessing depression, psychosis, suicidal potential, and cognitive function. Both somatic and psychosocial treatments are used, and the student is expected to be knowledgeable about the dosages, side effects, and drug interactions of the classes of major psychotropic drugs. Students are instructed on the recognition and discussion of psychosocial factors in the genesis and continuation of psychiatric disorders, but are not trained in psychotherapy. Students will work up and follow specific patients and be responsible for designing and implementing a treatment plan and maintaining the medical record. Each clerkship site gives a series of lectures on diagnosis and treatment of the major mental disorders and a specific text is assigned during the clerkship.

Electives offered to fourth-year students include consultation-liaison psychiatry, child psychiatry, outpatient psychiatry, community psychiatry, chemical dependency, clinical psychopharmacology, neuropsychology, and geriatric psychiatry. Students may participate

in psychiatric research projects as part of a formal elective for credit or in an informal manner through arrangement with a faculty member.

### Required Courses

**AdPy 5107. HUMAN BEHAVIOR.** (Cr ar; Year One) Garfinkel

**InMD 5202. PSYCHE SECTION.** (Cr ar; Year Two) Mackenzie

**ADPy 5500. PSYCHIATRY EXTERNSHIP—Abbott Northwestern, Anoka State Hospital, Hennepin County Medical Center, St. Paul-Ramsey Medical Center, University Hospital, Veterans Administration Hospital.** (Cr ar; Year Three) Eckert

### Elective Courses

**5516. ST. MARY'S EXTENDED CARE CENTER: ALCOHOLIC TREATMENT UNIT—St. Mary's ECC.** (4.5 or 9 cr; prereq regis med) Mann

**5530. INDEPENDENT STUDY.** (Cr ar; prereq regis med; location ar) Mackenzie

**5800. CASE CONFERENCE: PSYCHIATRY IN MEDICINE**

**5801. CONSULTATION-LIAISON PSYCHIATRY**

**5811. APPLIED BEHAVIORAL ANALYSIS**

**5825. INTERVIEWING TECHNIQUES**

### Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

### *Child and Adolescent Psychiatry (CAPy)*

Barry Garfinkel, M.D., associate professor

*Associate Professor*

Gerald August, Ph.D.

Gail Bernstein, M.D.

George Realmuto, M.D.

*Assistant Professor*

Carrie Borchardt, M.D.

Harry Hoberman, Ph.D.

Jonathan Jensen, M.D.

Michael Koch, M.D.

Kathleen Myers, M.D.

### Elective Courses

**5201. DIAGNOSTIC PRACTICUM IN CHILD AND ADOLESCENT PSYCHIATRY—University Hospital.** (Cr ar; prereq #: A-F only) Garfinkel

## Descriptions of Selected Courses

### **5203. CHILD AND ADOLESCENT PSYCHIATRY FOR PSYCHOLOGY INTERNS—University Hospital.** (Cr ar; prereq #) Hoberman

Experience in assessment and therapeutic interventions with children, adolescents, and families in child and adolescent psychiatric setting.

**5204. DIAGNOSTIC METHODS IN CHILD, ADOLESCENT, AND FAMILY PSYCHIATRY—University Hospital.** (1 cr; prereq med, #) Garfinkel  
Multidisciplinary evaluations of children, adolescents, and their families are presented for discussion, dynamic and diagnostic formulations, and disposition planning in a conference setting.

**5520f, w.s. OUTPATIENT CLINICAL CHILD AND ADOLESCENT PSYCHIATRY FOR PRIMARY CARE PHYSICIANS—University Hospital.** (Cr ar; prereq med, #; not offered period 5; hrs ar) Bernstein  
Supervised diagnostic and therapeutic experiences in an outpatient setting.

**5521f, w.s. OUTPATIENT CLINICAL CHILD AND ADOLESCENT PSYCHIATRY—University Hospital.** (9-18 cr; prereq med student, #) Bernstein

**5522. CLINICAL INPATIENT ADOLESCENT PSYCHIATRY—University Hospital.** (Cr and hrs ar) Borchardt  
Supervised diagnostic and therapeutic experiences in an inpatient, multidisciplinary child psychiatric unit with emphasis on group and milieu therapies.

**5602f, w. INTRODUCTORY READINGS IN CHILD, ADOLESCENT, AND FAMILY PSYCHIATRY AND RESEARCH METHODS—University Hospital.** (3 cr; prereq med, #; hrs ar) Garfinkel  
Assigned readings and discussions with faculty. Topics include child development, diagnostic and therapeutic techniques, and psychopathology.

**5603f, w.s. INPATIENT CLINICAL CHILD PSYCHIATRY FOR PRIMARY CARE PHYSICIANS—University Hospital.** (Cr ar; prereq med; hrs ar) Borchardt  
Supervised diagnostic and therapeutic experiences in an inpatient, multidisciplinary child psychiatric unit with emphasis on group and milieu therapies.

**5604. OUTPATIENT ASSESSMENT OF MOOD DISORDERS IN YOUTH—University Hospital.** (9-18 cr; prereq med student, #) Myers

**5610s. BIOMEDICAL RESEARCH: PRINCIPLES AND DESIGN—University Hospital.** (2 cr; prereq #) August

Basic knowledge and skills necessary to plan and carry out biomedical research and to critically read research reports and articles. Topics include theoretical models, generation of research hypotheses, selection of appropriate research strategies, determination of appropriate statistical analyses, interpretation of results, issues related to research with human subjects, the relationship between research and clinical work, the computer as a research tool, and resources available for literature searches.

## Advanced Credit Courses

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

## Public Health, School of

The School of Public Health is a distinct academic unit reporting to the Vice President for Health Sciences. It prepares future practitioners, researchers, and teachers across the broad field of public health. The School of Public Health also serves as the preventive medicine department for the Medical School. For further information, contact the School of Public Health, 420 Delaware St. S.E., Box 197, Minneapolis, MN 55455-0381 (612/624-6669).

### *Administrator*

Stephen C. Joseph, M.D., M.P.H., dean  
Edith D. Leyasmeyer, Ph.D., M.P.H., associate dean and executive officer  
James R. Boen, Ph.D., associate dean for academic affairs

### *Professor*

Donald Barber, Ph.D., M.P.H.  
Henry Blackburn, M.D.  
James R. Boen, Ph.D.  
Judith Brown, Ph.D., M.P.H.  
Jon Christianson, Ph.D.  
Bright Dornblaser, M.H.A.  
Roger Feldman, Ph.D.  
Judith Garrard, Ph.D.  
Anne Goldman, Ph.D.  
John Himes, Ph.D., M.P.H.  
David Jacobs, Ph.D.  
Robert Jeffery, Ph.D.  
Stephen C. Joseph, M.D., M.P.H.  
Robert Kane, M.D.  
Rosalie Kane, D.S.W., M.S.W.  
Marcus Kjelsberg, Ph.D.  
John Kralewski, Ph.D., M.H.A.  
Harry Lando, Ph.D.  
Chap T. Le, Ph.D.  
Theodore Litman, Ph.D.  
Thomas Louis, Ph.D.  
Russell Luepker, M.D.  
Jack S. Mandel, Ph.D., M.P.H.  
Willard Manning, Ph.D.  
Ira Moscovice, Ph.D.  
Cheryl Perry, Ph.D.  
John Potter, M.D., Ph.D.  
Robert W. ten Benschel, M.D., M.P.H.  
Robert Veninga, Ph.D.  
Donald Vesley, Ph.D.  
James Vincent, Ph.D., Sc.D.  
Vernon Weckwerth, Ph.D.

*Associate Professor*

Greg R. Alexander, Sc.D., M.P.H.  
 Mila A. Aroskar, Ed.D.  
 Lester Block, D.D.S., M.P.H.  
 Thomas Choi, Ph.D.  
 John Connett, Ph.D.  
 Richard Crow, M.D.  
 Bryan Dowd, Ph.D.  
 Aaron Folsom, M.D., M.P.H.  
 Jean Forster, Ph.D., M.P.H.  
 Susan Gerberich, Ph.D.  
 Ian Greaves, M.D.  
 G. Kenneth Gordon, Ed.D.  
 George Johnson, Ph.D., M.H.A.  
 David Murray, Ph.D.  
 James Neaton, Ph.D.  
 John Nyman, Ph.D.  
 Phyllis Pirie, Ph.D.  
 Michael Resnick, Ph.D.  
 Rexford D. Singer, M.S.  
 Barbara Spradley, M.N.  
 J. Michael Sprafka, Ph.D., M.P.H.  
 Mary Story, Ph.D.  
 Deborah Swackhammer, Ph.D.  
 Alexander Wagenaar, Ph.D., M.S.W.  
 Carolyn Williams, Ph.D.  
 Daniel Zelterman, Ph.D.

*Assistant Professor*

John Belcher, Ph.D.  
 Lisa M. Brosseau, Sc.D.  
 I. Marilyn Buzzard, Ph.D.  
 Bradley Carlin, Ph.D.  
 Robert Connor, Ph.D., M.H.A.  
 Patricia Elmer, Ph.D.  
 Michael Finch, Ph.D.  
 John Finnegan, Jr., Ph.D.  
 James Goes, Ph.D., M.B.A.  
 Leslie Grant, Ph.D.  
 Patricia Grambsch, Ph.D.  
 Myron Gross, Ph.D.  
 Rhonda Jones-Webb, Dr.PH  
 Alexander Kramer, M.D.  
 Lawrence Kushi, Sc.D.  
 Nancy Leland, Ph.D., M.S.W., M.P.H.  
 Edith D. Leyasmeyer, Ph.D., M.P.H.  
 Leslie Lytle, Ph.D.  
 Mary Jane Madden, Ph.D.  
 George S. Maldonado, Ph.D.  
 Paul McGovern, Ph.D.  
 Joan Patterson, Ph.D.  
 Sandra Potthoff, Ph.D.  
 Thomas Sellers, Ph.D., M.P.H.  
 Richard Severson, Ph.D.  
 Eyal Shahar, M.D., M.P.H.  
 Patricia Splett, Ph.D., M.P.H.  
 William Thomas, Ph.D.  
 Mark Wolfson, Ph.D.  
 Wei Zheng, M.D., Ph.D., M.P.H.

*Instructor*

U. Beate Krinke, M.P.H.  
 Patricia McGovern, M.P.H.  
 Debra Olson, M.P.H.  
 James Rothenberger, M.P.H.

For descriptions of courses in the following disciplines, see the *School of Public Health Bulletin*.

Biostatistics  
 Community Health Education  
 Environmental Health  
 Epidemiology  
 Health Services Administration  
 Health Services Research and Policy  
 Health Services Research, Policy, and Administration  
 Healthcare Administration  
 Maternal and Child Health  
 Public Health  
 Public Health Administration  
 Public Health Nutrition

**Radiology (Rad)**

William M. Thompson, M.D., professor and head

*Division of Roentgen Diagnosis*

William M. Thompson, M.D., professor and director

*Professor Emeritus*

Eugene Gedgaudas, M.D.

*Professor*

Kurt Amplatz, M.D.  
 Robert Boudreau, M.D., Ph.D.  
 Harry Griffiths, M.D.  
 David Hunter, M.D.  
 Christopher Kuni, M.D.  
 Richard Latchaw, M.D.  
 David Rottenberg, M.D.  
 Kamil Ugurbil, Ph.D.  
 James Walsh, M.D.

*Associate Professor*

Howard Ansel, M.D.  
 Carroll Arnett, M.D.  
 Carol Coleman, M.D.  
 Deborah Day, M.D.  
 René duCret, M.D.  
 Simon Efange, Ph.D.  
 Michael Garwood, Ph.D.  
 Marvin E. Goldberg, M.D.  
 Janis Letourneau, M.D.  
 Donovan B. Reinke, M.D.  
 E. Russell Ritenour, Ph.D.  
 Zeev Vlodayer, M.D.

*Assistant Professor*

Quentin Anderson, M.D.  
 Earl Bender, M.D.  
 Haraldur Bjarnason, M.D.  
 Karen Blumberg, M.D.  
 Becky Carpenter, M.D.  
 Kenneth Cross, M.D.  
 Charles Dietz, M.D.

## Descriptions of Selected Courses

Christopher Engeler, M.D.  
Lenore Everson, M.D.  
Brian Fiedler, M.D.  
David Finlay, M.D.  
Mary Foshager, M.D.  
Richard Geise, Ph.D.  
David Gross, M.D.  
Frank Grund, M.D.  
Bruce Hammer, Ph.D.  
Bruce Hasselquist, Ph.D.  
Walter Hildebrandt, M.D.  
Jeremy Hollerman, M.D.  
Xiaoping Hu, Ph.D.  
John Knoedler, M.D.  
Charlens Krenzler, M.D.  
Steven Krueckeberg, M.D.  
Bert Larson, M.D.  
Robert Low, M.D.  
Robert Miller, M.D.  
Paul Mulcahy, M.D.  
Mary Jo Nelson, M.D.  
Patrick O'Brien, M.D.  
Richard Patterson, M.D.  
Leland Prewitt, M.D.  
Shashikant Sane, M.D.  
Warren Stanchfield, M.D.  
Stephen Strother, M.D.  
Martin Strandness, M.D.  
Arthur Stillman, M.D., Ph.D.  
David Swanson, M.D.  
Joseph Tashjian, M.D.  
Stephen Trenkner, M.D.  
Joaquim Vieira, M.D.  
Neil Wasserman, M.D.  
Deborah Wadsworth, M.D.  
Irwin Weisman, M.D.

### *Division of Nuclear Medicine*

Robert J. Boudreau, M.D., Ph.D., professor  
and director

*Professor Emeritus*

Merle Loken, M.D., Ph.D.

*Professor*

Christopher Kuni, M.D.

*Associate Professor*

René duCret, M.D.

Simon Efang, Ph.D.

*Assistant Professor*

Frank Grund, M.D.

Bert Larson, M.D.

### **Elective Courses**

**5101. EXTERNSHIP: DIAGNOSTIC RADIOLOGY**—University Hospital. (Cr ar; prereq regis med)

**5102. EXTERNSHIP: DIAGNOSTIC RADIOLOGY**—Veterans Administration Hospital. (Cr ar; prereq regis med)

**5103. EXTERNSHIP: DIAGNOSTIC RADIOLOGY**—Hennepin County Medical Center. (Cr ar; prereq regis med)

**5104. EXTERNSHIP: DIAGNOSTIC RADIOLOGY**—St. Paul-Ramsey Medical Center. (Cr ar; prereq regis med)

**5105. EXTERNSHIP DIAGNOSTIC RADIOLOGY**—ST. LUKES-DULUTH. (Cr ar; prereq regis med)

**5140. SPECIAL PROBLEMS: ROENTGENOLOGY.** (Cr ar; prereq regis med)

**5240. SPECIAL PROBLEMS: NUCLEAR MEDICINE.** (Cr ar; prereq regis med)

**5511. ROENTGEN TECHNIQUE.** (1 cr)

**5512. DOSIMETRY OF INTERNAL-EXTERNAL RADIATION EMITTERS.** (1 cr)

**5530. SPECIAL PROBLEMS: RADIATION BIOLOGY.** (Cr ar; prereq regis med)

**5540. SPECIAL PROBLEMS: RADIOLOGICAL PHYSICS.** (Cr ar; prereq regis med)

**5570, 5571, 5572. RADIATION PHYSICS.** (3 cr per qtr; prereq #)

### **Advanced Credit Courses**

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

### **Surgery (Surg)**

Edward W. Humphrey, M.D., professor and acting chair

*Regents' Professor Emeritus*

Richard L. Varco, M.D.

*Regents' Professor*

John S. Najarian, M.D.

*Professor*

R. Morton Bolman III, M.D.

Henry Buchwald, M.D.

Michael D. Caldwell, M.D.

Daniel Canafax, Pharm.D.

Arthur L. Caplan, Ph.D.

Frank B. Cerra, M.D.

John P. Delaney, M.D.

David L. Dunn, M.D.

John E. Foker, M.D.

Robert L. Goodale, M.D.

John J. Haglin, M.D.

Edward W. Humphrey, M.D.

Arnold S. Leonard, M.D.

Allen S. Levine, Ph.D.

Arthur J. Matas, M.D.

Donald G. McQuarrie, M.D.

Ernesto Molina, M.D.

David Reynolds, Ph.D.

Yoshio Sako, M.D.  
David E.R. Sutherland, M.D.  
John Weigelt, M.D.

*Associate Professor*

Jerome H. Abrams, M.D.  
Robert C. Andersen, M.D.  
Melvin P. Bubrick, M.D.  
Bruce Cunningham, M.D.  
William Engeland, Ph.D.  
Martin Finch, M.A.  
Hovald Helseth, M.D.  
James T. Lee, M.D.  
Caliant T. Lum, M.D.  
William D. Payne, M.D.  
Sara J. Shumway, M.D.  
Carol L. Wells, Ph.D.

*Assistant Professor*

David Ahrenholz, M.D.  
Jeffrey H. Aldridge, M.D.  
Roderick A. Barke, M.D.  
David Borgstrom, M.D.  
Steven D. Eyer, M.D.  
Paul F. Gores, M.D.  
Rainer Gruessner, M.D.  
Terrence P. Horrigan, M.D.  
Elmer H. Kasperon, M.D.  
Brett Levay-Young, Ph.D.  
Michael A. Maddaus, M.D.  
John R. Mahoney, Ph.D.  
Charles Mills, Ph.D.  
Gregg D. Phillips, Ph.D.  
Edgar Pineda, M.D.  
Nancy L. Reinsmoen, Ph.D.  
Ernest Ruiz, M.D.  
Warren Schubert, M.D.  
Lynn D. Solem, M.D.  
Richard Strate, M.D.  
Herbert B. Ward, M.D.

*Instructor*

James H. Andrisevic, M.D.  
Stanley Williams

*Special Lecturer*

Darwin E. Zaska, Pharm.D.

Elective courses are offered in general surgery and in all surgical subspecialties, primarily to increase the scope of clinical exposure and to give the student an opportunity to participate in a wide variety of surgical problems including surgical research.

**5500. EXTERNSHIP IN GENERAL SURGERY—University Hospital and affiliated hospitals.** (Cr ar; prereq regis med) Najarian, staff  
Initial history and physical examination of surgical patient; systematic approach to diagnosis and treatment; preoperative preparation of surgical patient; OR's function, surgeon's role; operative procedures used in treating surgical diseases; managing postoperative patient; techniques of follow-ups and long-term postoperative care; published literature on surgical diseases; oral presentation of surgical problems with which the student has dealt. Students attend conferences, animal laboratory sessions, team discussions, and group seminars and familiarize themselves with pertinent surgical literature in preparation for didactic aspects of rotation.

**5502. EXTERNSHIP IN THE SURGICAL INTENSIVE CARE UNIT—St. Paul Ramsey Hospital and University Hospital.** (Cr ar; prereq Surg 5500) Cerra, Eyer  
In-depth patient care experience in the management of the critically ill and injured.

**5503. RESEARCH PROBLEMS IN SURGERY—University Hospital.** (Cr ar) Sutherland  
Participation in a research experience designed around a specific topic, arranged on an individual basis by Dr. Sutherland with members of the Surgery Department. Suggested topics include problems in surgical infectious disease, metabolic and nutritional problems in surgery, transplantation and immunology, or another topic of the student's choosing.

**5504. EXTERNSHIP IN HOSPITAL BASE NUTRITION—University Hospital.** (Cr ar) Cerra  
Direct experience in hospital base parenteral and enteral nutrition is provided in this multidisciplinary patient care service consisting of a medical director, pharmacist, nurse clinician, and dietician.

**5510. ADVANCED SURGERY EXTERNSHIP: SUBINTERNSHIP—University Hospital.** (Cr ar) Najarian  
Instruction and special experience in surgery for students who have completed a basic externship or clerkship in surgery. Students work under direct faculty supervision and participate fully with the surgical team on the assigned service, in the care of hospitalized patients, in the operating room, and in clinics.

**5511. EMERGENCY MEDICINE—St. Paul Ramsey.** (9 cr) Cerra  
Students acquire first-hand experience in dealing with emergency problems. Students work one-to-one with trained physicians who evaluate and discuss each patient with them.

**5522. PLASTIC AND RECONSTRUCTIVE SURGERY—University Hospital and Affiliates.** (Cr ar; prereq 5500) Cunningham  
Students cover full spectrum of plastic and reconstructive problems while on rotation. Basic hand surgery, breast reconstruction, aesthetic surgery, facial reconstruction, micro-surgery, wound management, surgical research.

## Descriptions of Selected Courses

**5524. BIOMEDICAL ETHICS**—University Hospital and affiliated hospitals. (4.5 cr) Caplan  
Allows students to identify and participate in an in-depth exploration of a particular problem in medical ethics.

**5526. CLINICAL NUTRITION SEMINAR.** (1 cr; prereq acceptance to master's program in nutrition support or dietetics or Kellogg M.D. Fellowship Program) Shronts  
Presentation by graduate students in nutrition on current topics in hospital support or research.

**5527. HOSPITAL NUTRITION SUPPORT.** (9 cr; prereq acceptance to master's program in nutrition support; S-N only) Shronts  
Ten-week course.

### *Colon and Rectal Surgery*

David Rothenberger, M.D., clinical professor and director

**5523. EXTERNSHIP IN COLON AND RECTAL SURGERY**—University Hospital and affiliated hospitals. (Cr ar) Buls, Gemlo, Goldberg, Rothenberger, Wong  
Practical experience in managing common anorectal problems. The student acts as an intern on a surgical service with a busy clinic, "first assists" with surgical procedures, attends the colon and rectal seminars, and presets cases. The student becomes adept in the use of the sigmoidoscope and is exposed to colonoscopy. Further opportunities to learn are available with various members of the teaching staff at affiliated hospitals.

### **Therapeutic Radiology-Radiation Oncology (TRad)**

Seymour H. Levitt, M.D., professor and head

#### *Professor*

Faiz M. Khan, Ph.D.  
Roger A. Potish, M.D.  
Chang W. Song, Ph.D.  
Fatih M. Uckun, M.D., Ph.D.  
Daniel A. Vallera, Ph.D.

#### *Associate Professor*

Chung Kyu Kim Lee, M.D.

#### *Assistant Professor*

Elizabeth A. Auger, Ph.D.  
Kathryn Dusenbery, M.D.  
Kathryn E. Farniok, M.D.  
Bruce Gerbi, M.S.  
Paul W. Sperduto, M.D.

#### *Research Associate*

Firmin C. Deibel, Ph.D.

### **Elective Courses**

**5170f. RADIOLOGICAL PHYSICS.** (3 cr)

**5171w. MEDICAL NUCLEAR PHYSICS.** (3 cr)

**5172s. RADIATION BIOLOGY.** (3 cr)

**5173w. PHYSICS OF RADIATION THERAPY.** (3 cr)

**5174s. PHYSICS OF DIAGNOSTIC RADIOLOGY.** (3 cr)

**5340f,w,s,su. SPECIAL PROBLEMS IN RADIATION THERAPY.** (Cr ar)

**5505f,w,s,su. EXTERNSHIP IN RADIATION THERAPY.** (Cr ar; prereq regis med)

**5506f,w,s,su. CANCER DIAGNOSIS AND TREATMENT.** (Cr ar; prereq regis med)

**5507f,w,s,su. ADVANCED EXTERNSHIP IN RADIATION THERAPY.** (Cr ar; prereq regis med)

**5508f,w,s,su. SPECIAL PROBLEMS IN RADIATION BIOLOGY.** (Cr ar)

**5511. DIAGNOSIS, EVALUATION, AND CARE OF ADULTS AND CHILDREN WITH CANCER.** (9 cr)

**5512f,w,s,su. DOSIMETRY OF INTERNAL AND EXTERNAL RADIATION.** (1 cr)

**5540f,w,s,su. SPECIAL PROBLEMS IN RADIOLOGICAL PHYSICS.** (Cr ar)

**5800. RADIATION ONCOLOGY PATHOLOGY.** (Cr ar)

### **Advanced Credit Courses**

For a description and complete list of 8xxx courses, see the *Graduate School Bulletin*.

### **Urology (Urol)**

Elwin E. Fraley, M.D., professor and head

#### *Professor*

Ricardo Gonzalez, M.D.  
John Hulbert, M.D.  
Pratap Reddy, M.D.

#### *Assistant Professor*

Kevin Billups, M.D.  
Jon Pryor, M.D.  
Kevin Zhang, M.D.

#### *Instructor*

Steven Epple, M.D.  
Cesar Ercole, M.D.  
Deepak Kapoor, M.D.

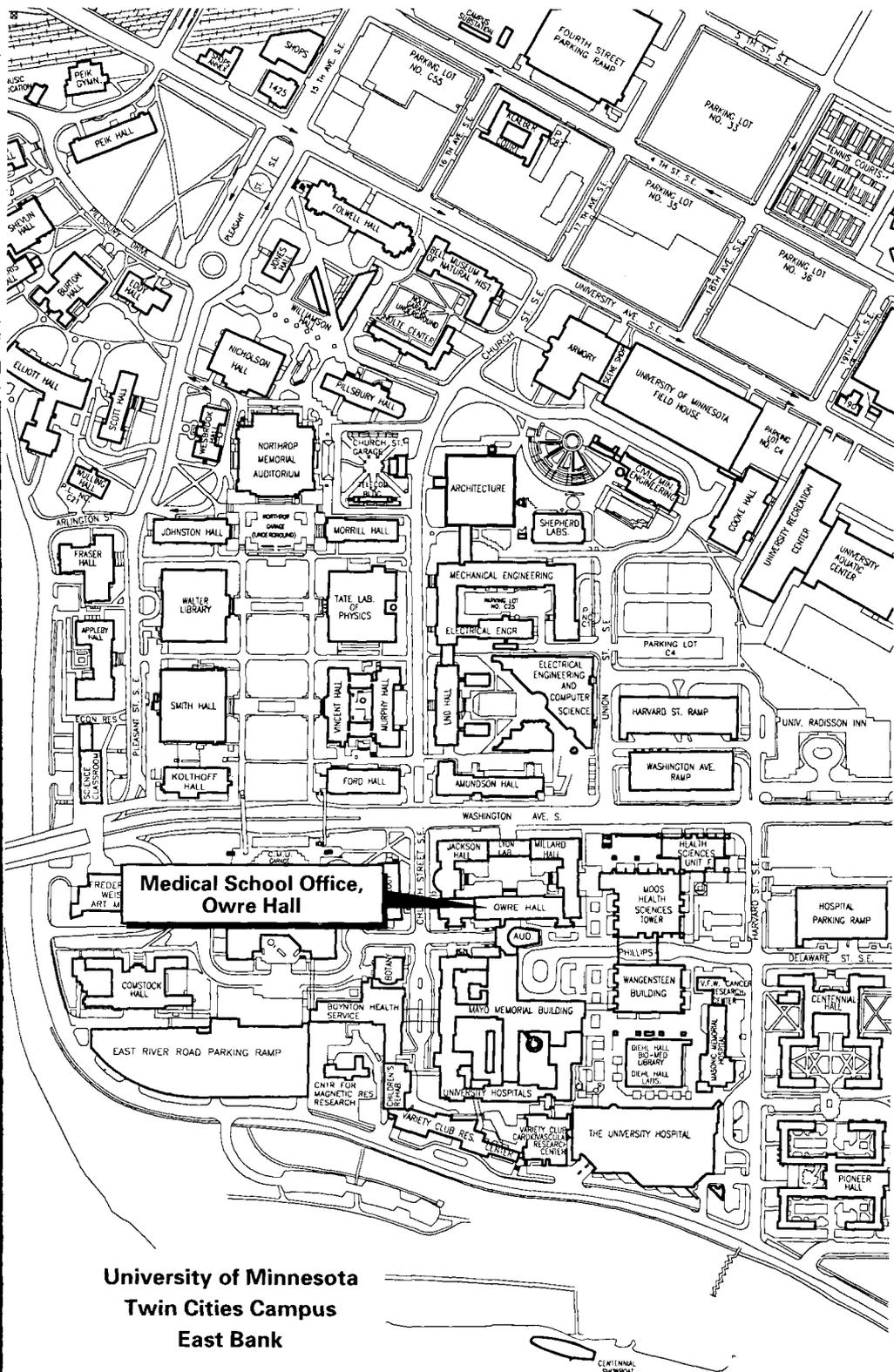
#### *Research Associate*

David Bronson, Ph.D.

### **Elective Course**

**5180. EXTERNSHIP IN UROLOGY.** (Cr ar; prereq regis med)

**5200. SURGICAL SPECIALTIES: UROLOGY.** (Cr ar; prereq regis med)



**Medical School Office,  
Owre Hall**

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

RIVER

# Index

- Academic Progress 27
- Academic Requirements 12
- Administration 5
- Admission 12
- Advanced Admission Program 16
- Adytum 20
- Anesthesiology 30
- Application Procedures 15
- Biochemistry 30
- Cell Biology and Neuroanatomy 31
- Colon and Rectal Surgery 62
- Continuing Medical Education 10
- Course Descriptions 30
- Course Requirements 13
- Curriculum Chart 25
- Dermatology 32
- Dismissal 27
- Early Decision Program 15
- Employment 21
- Equal Opportunity 2
- Extracurricular Events 2
- Facilities 8
- Faculty 6
- Family Practice and Community Health 33
- Financial Aid 16
- Foreign Citizen Policy 14
- General Information 4
- Graduate Assistantships 21
- Graduate Degree Programs in Biomedical Disciplines 28
- Graduation 28
- Health Service 20
- History of Medical School 4
- History of Medicine 36
- Honors and Awards 17
- Housing 20
- Immunization 2
- Interdisciplinary Medicine 37
- Laboratory Medicine and Pathology 38
- Library (Bio-medical) 8
- Map, Campus 63
- M.D. Program 24
- M.D.-Ph.D. Program (combined) 28
- Medicine 41
- Microbiology 44
- Minnesota Medical Foundation 9
- Neurology 46
- Neurosurgery 47
- Obstetrics and Gynecology 48
- Ophthalmology 49
- Orthopaedic Surgery 49
- Otolaryngology 50
- Pediatrics 51
- Pharmacology 53
- Physical Medicine and Rehabilitation 54
- Physiology 55
- Psychiatry 56
  - Adult 56
  - Child and Adolescent 57
- Public Health 58
- Radiology 59
  - Nuclear Medicine 60
  - Roentgen Diagnosis 59
- Records 2
- Regents 5
- Research 7
- Research Grants 17
- Residence Classification 14
- Rural Physician Associate Program 27
- Scholarship Funds 18
- Student Government 22
- Student Life 20
- Student Organizations 22
- Surgery 60
- Therapeutic Radiology 62
- Transfer Students 16
- Tuition and Fees 16
- Urology 62

## Postal Statement

Volume 96, Number 7  
June 21, 1993

University of Minnesota  
(USPS 651-720)

Published by the University of Minnesota,  
Office of the Vice President for Student  
Affairs, Communications & Publications,  
110 Williamson Hall, 231 Pillsbury Drive  
S.E., Minneapolis, MN 55455-0213; once in  
May and June; twice in February,  
September, and October; three times in  
April; and five times in July. Second-class  
postage paid at Minneapolis, Minnesota.  
POSTMASTER: Send address changes to  
University of Minnesota, 110 Williamson  
Hall, 231 Pillsbury Drive S.E., Minneapolis,  
MN 55455-0213.



Paper for the cover and text of this bulletin  
was selected for use in the University  
Recycling Program. The paper contains 10  
percent post-consumer material.

Please keep this bulletin for future use, pass  
it along, or drop it in a University office  
paper recycling barrel.

University of Minnesota  
(USPS 651-720)  
Communications & Publications  
110 Williamson Hall  
231 Pillsbury Drive S.E.  
Minneapolis, MN 55455-0213

Second-Class  
U.S. Postage  
Paid  
Minneapolis, MN

1325                    3  
WALTER SERIALS PROCESSING  
108 WALTER LIBRARY  
MPLS, EAST BANK

Allied Health Programs

# UNIVERSITY OF MINNESOTA

BULLETIN

1993 - 1995



# Allied Health Programs

- 3 Introduction
- 11 Medical Technology
- 23 Mortuary Science
- 31 Occupational and  
Physical Therapy
- 47 Related Undergraduate  
Offerings
- 52 Campus Maps
- 55 Index

---

# Resources and Policies

---

## Resources

This biennial bulletin focuses on undergraduate offerings in medical technology, mortuary science, and occupational and physical therapy on the Twin Cities campus of the University of Minnesota.

The *Class Schedule*, distributed with registration materials before the registration period each quarter, lists course offerings with prerequisites, class hours, rooms, and instructors. It also includes registration instructions, final exam schedules, and other useful information.

Information about evening courses and summer school offerings is contained in the *Extension Bulletin* and *Summer Session Bulletin*, respectively.

## Policies

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

**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. 20000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; by Executive Order 11246, as amended; by 38 U.S.C. 2012, the Vietnam Era Veterans Readjustment Assistance Act of 1972, as amended; by the Americans with Disabilities Act (ADA), 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., Minneapolis, MN 55455 (612/624-9547).

**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.

## Accreditation

The University of Minnesota is fully accredited by the North Central Association of Colleges and Secondary Schools.

Introduction



# Introduction

## University Regents

Jean B. Keffeler, Minneapolis, Chair  
Thomas R. Reagan, Gilbert, Vice Chair  
Wendell R. Anderson, Wayzata  
Julie A. Bleyhl, Madison  
William E. Hogan II, Minnetonka  
H. Bryan Neel III, Rochester  
Mary J. Page, Olivia  
Lawrence J. Perlman, Minneapolis  
William R. Peterson, Eagan  
Darrin M. Rosha, Owatonna  
Stanley D. Sahlstrom, St. Cloud  
Ann J. Wynia, St. Paul

## University Administrators

Nils Hasselmo, President  
Robert O. Erickson, Senior Vice President  
for Finance and Operations  
Ettore Infante, Senior Vice President for  
Academic Affairs and Provost  
C. Eugene Allen, Vice President for  
Agriculture, Forestry, and Home  
Economics  
Robert E. Anderson, Vice President for  
Health Sciences  
Anne H. Hopkins, Vice President for Arts,  
Sciences, and Engineering  
Marvalene Hughes, Vice President for  
Student Affairs  
Anne C. Petersen, Vice President for  
Research and Dean of the Graduate  
School  
Mark B. Rotenberg, General Counsel

## Campus Contacts

**Medical Technology:** Karen Karni, Box 198  
UMHC, University of Minnesota, 420  
Delaware Street S.E., Minneapolis, MN  
55455. Offices at 15-170 Phillips-  
Wangenstein Building (612/625-9490).

**Mortuary Science:** John M. Kroshus, Box  
740 UMC, Harvard Street at East River  
Road, Minneapolis, MN 55455. Offices at  
A275 Mayo, 401 Church Street S.E. (612/  
624-6464).

**Occupational Therapy:** Rondell Berkeland,  
378 Children's Rehabilitation Center,  
University of Minnesota, 426 Church Street  
S.E., Minneapolis, MN 55455 (612/626-  
5887).

**Physical Therapy:** Glenn Scudder, Acting  
Director, R366 Children's Rehabilitation  
Center, University of Minnesota, 426 Church  
Street S.E., Minneapolis, MN 55455 (612/  
626-5887).

## Overview

This bulletin contains information about the following undergraduate programs in the health sciences at the University of Minnesota: medical technology, mortuary science, occupational therapy, and physical therapy. Also included is information about several related undergraduate health sciences offerings. Graduate programs are described in the *Graduate School Bulletin*.

The University of Minnesota health sciences are academic and service units including the Schools of Dentistry, Medicine, Nursing, and Public Health; the Colleges of Pharmacy and Veterinary Medicine; University of Minnesota Hospital and Clinic (UMHC); and many programs within these schools. The health sciences units share a three-fold mission of service, education, and research.

Health sciences facilities are located in a complex of buildings on the East Bank of the Minneapolis campus, including the Mayo Memorial Building, Malcolm Moos Health Sciences Tower, Health Sciences Unit F, and the Phillips-Wangenstein Building. Close to or connected with the complex are several facilities of the Jackson-Owre-Millard-Lyon quadrangle, University of Minnesota Hospital and Clinic, Variety Club Heart Hospital, Masonic Cancer Center, Dwan Variety Club Cardiovascular Research Center, Veterans of Foreign Wars Cancer Research Center, and Children's Rehabilitation Center. Extensive resources and services of the Bio-Medical Library, including the Learning Resources Center, are housed in Diehl Hall.

These facilities provide clinical learning, research, and internship sites for many students. The hospitals are excellent research centers, not only for studying diseases, healthy physiological processes, and environmental health problems, but also for developing new procedures and delivering expert health care. The proximity of the health sciences units to each other and to the rest of the campus facilitates interdepartment communication and underscores the interdisciplinary nature of health professions. The health sciences units also maintain affiliations with many hospitals and other health care facilities around the Twin Cities, which afford students access to a wide spectrum of health care situations.

### Admission

Each health sciences unit sets its own standards and requirements for admission. All units, however, require a strong background in the natural sciences (specifically biology and chemistry), as well as in the social and behavioral sciences. They also strongly recommend that applicants be keenly and genuinely interested in human services and that they be sincerely committed to promoting the health and general welfare of the community.

Students generally enter the programs described in this bulletin at the beginning of their junior year, after they have completed the required preprofessional courses. To discourage students from focusing too narrowly on a field of specialization and to ensure that all students will receive a broad general education in the liberal arts, certain minimum requirements in several liberal arts categories have been established. To qualify for admission to most of the professional programs, students are expected to complete these group distribution requirements as specified in the individual program sections of this bulletin. In addition, students must complete specified preprofessional courses, some of which fulfill group distribution requirements.

Students already enrolled at the University in day school and seeking admission to one of these programs should obtain an Application for Change of College or Status from the Office of the Registrar, 150 Williamson Hall, University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455. Students from outside the University should obtain an Application for Undergraduate Admission from the Office of Admissions, 240 Williamson Hall. Application procedures and admission standards for individual units are described in the individual program sections of this bulletin.

Students planning to enroll in one of the programs described in this bulletin should begin their planning early. Advisers are available in the College of Liberal Arts Pre-Health Sciences Advising Office to help.

### 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 Pre-Health Science Advising Center, 30 Johnston Hall, 612/624-9006.
- 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 GPA.

---

## Introduction

---

— 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 director of the program to which you are applying.

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

*For help with your transfer questions or problems, see a pre-health sciences adviser.*

## Expenses

Tuition assessed at the University generally changes annually, subject to approval by the regents. The most up-to-date information about tuition and other fees, including the student services fee, appears in the quarterly *Class Schedule*. All tuition and fee charges are subject to change.

Students in some programs should plan for additional expenses, such as charges for uniforms, special equipment, and insurance. These program-related expenses are described in the individual program sections of this bulletin.

## Financial Aid

The Office of Student Financial Aid (OSFA) offers students financial assistance, including student employment and financial advising.

For most financial aid programs, students should submit application materials in January or February to be eligible for aid the following fall. Most aid programs require a completed American College Testing-Family Financial Statement (ACT-FFS) and a supplemental form, which is only available from the Office of Student Financial Aid. Most aid is awarded on the basis of financial need and the availability of funds. For more information, contact the Office of Student Financial Aid, 210 Fraser Hall, 106 Pleasant Street S.E., Minneapolis, MN 55455 (612/624-1665).

The OSFA-Student Employment Center posts job vacancies and refers qualified students for interviews in a variety of on- and off-campus jobs. The center is located in 120 Fraser Hall, Minneapolis campus (612/624-8070).

## Residency and Reciprocity

To qualify for resident tuition rates, students must demonstrate their eligibility by fulfilling residency requirements. To request a change in residency status, students should contact the residency counselor in the Office of Admissions, 240 Williamson Hall. All reclassification requests must be made in writing.

The University has reciprocity agreements with Wisconsin, North Dakota, South Dakota, and Manitoba; and a limited Western Undergraduate Exchange Program with Alaska, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. If you are a resident of any of these states or provinces, you may qualify for reciprocity tuition rates, which are lower than nonresident tuition rates and, in some cases, comparable to resident rates.

You must apply for reciprocity before the quarter in which you wish your reciprocity to begin. After your first year, *provided you have earned credits*, your reciprocity will automatically be renewed. For more information, see the quarterly *Class Schedule*.

Some programs limit nonresident enrollment. Consult the individual program sections of this bulletin for details.

## Health Sciences Student Services

**Pre-Health Sciences Advising**—The College of Liberal Arts Pre-Health Sciences Advising Center, 30 Johnston Hall, is a centralized resource offering a wide range of services to University students and others. Health sciences specialists offer academic advising services such as assistance with course planning and registration, evaluation of coursework already completed, and information about admission requirements and application or testing procedures. Specialists also assist individuals in exploring various health care fields and careers. Programs on topics relating to health sciences majors and careers are sponsored throughout the year.

## Introduction

A health sciences library is available in 30 Johnston Hall. It contains a collection of bulletins from schools throughout the country with health-related programs, videotapes from many health sciences schools, occupational files with information about health sciences professions, and general reference materials about health care fields.

For more information or to arrange an advising appointment, call 612/624-9006.

**Minority Program**—The Health Sciences Minority Program (HSMP) is committed to the recruitment and retention of minority persons who come from groups underrepresented in the health professions. At the undergraduate level, the program provides summer enrichment programs and a minority pre-health sciences student organization. Advising and special classes are offered through the Martin Luther King Center.

Special services offered by the Health Sciences Minority Program include one-to-one advising, interviews with health sciences faculty, scholarships for entrance test preparation programs, and training for admissions interviews. The Health Sciences Minority Program will also provide information on a variety of health careers and their admission requirements and competitiveness. For students with special interests, short-term research experiences can be arranged.

The office is at 1-125 Moos Tower, 515 Delaware St. S.E., 612/624-9400.

**Council for Health Interdisciplinary Participation**—The Council for Health Interdisciplinary Participation (CHIP) is an interdisciplinary student service organization dedicated to enhancing the quality of life and education of students in dentistry, medicine, nursing, pharmacy, public health, veterinary medicine, and the allied health sciences. Activities include noontime lectures, evening workshops, and weekend symposia in areas such as bioethics, international health, alternative health care, and women's issues. CHIP publishes a monthly newsletter

featuring announcements of upcoming health sciences events, volunteer opportunities, and articles about topics of current interest to students. CHIP headquarters are located in an informal, comfortable lounge at 1-425 Moos Health Sciences Tower. For more information, call 612/625-7100.

## Academic Policies and Regulations

**Grading**—Students have a choice of two grading systems: A-B-C-D-F or Satisfactory-No Credit (S-N). Each academic unit determines which courses, and what percentage of courses, its students can take under the S-N system. Some courses, usually required preprofessional and professional courses, may be taken A-F only; others may be taken under either system. See the appropriate program section of this bulletin for grading regulations in a specific program. The quarterly *Class Schedule* contains detailed information on grading policies and practices.

**Grade Reports and Transcripts**—The academic records of all health sciences students on the Twin Cities campus are maintained by the Office of the Registrar. These records show all courses for which students were registered beyond the second week of each quarter and the grades or symbols earned for those courses. Transcripts are available on request from Transcripts, 155 Williamson Hall, University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455.

**Academic Standing**—Each academic unit establishes its own criteria and procedures for monitoring students' academic progress and determining whether students are progressing satisfactorily toward a degree. In most units, students must maintain a 2.00 grade point average (GPA) and satisfy certain other criteria. For information about the policies and procedures of the individual units, see the program sections of this bulletin.

**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).

**Grievance Procedures and Appeals**—Students who have complaints or criticism about the content or conduct of a course have recourse through well-established grievance procedures. Students are expected to confer first with the course instructor. If no satisfactory solution is reached, the complaint should be presented to the department, school, or program head. If these informal processes fail to reach a satisfactory resolution, the department's committee on academic freedom and responsibility will be assembled to hear the evidence. Further appeals go to college-level and University-level committees.

Staff advisers in the college offices are competent sources for interpretation of college procedures or regulations, and they can often suggest suitable alternatives when a problem is involved.

Other sources of assistance include the Student Ombuds Service (102 Johnston Hall), a student-fee-supported service that helps students resolve problems, and the CLA Student Intermediary Board, the college's official student organization (101 Johnston Hall).

## Using the Course Descriptions

The course descriptions in this bulletin are primarily for courses offered by the health sciences academic units and taught by members of the program faculty or by cooperating faculty from other educational units of the University. Descriptions of courses offered by the individual units appear at the end of the program sections of this bulletin. Meeting hours, days, and rooms for these courses are listed in the quarterly *Class Schedule*.

For complete listings and descriptions of courses taught by other educational units of the University, see the bulletins of those units.

**Course Numbers 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 open only to graduate students. The following symbols are used throughout the descriptions:

† All the 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 been received for the course listed after this symbol.

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

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

---

## Introduction

---

Δ Registration Override Permit, completed and signed by the division, department, or school offering the course, is required for registration.

A hyphen between course numbers (e.g., 3142-3143-3144) indicates a sequence of courses that must be taken in the order listed.

A comma between course numbers (e.g., 1234, 1235, 1236) indicates a series of courses that may be entered any quarter. In prerequisite listings, comma means "and" (e.g., "prereq 1101, 1102 or 1103" means the prerequisites are 1101 and either 1102 or 1103).

Medical Technology



---

# Program in Medical Technology

---

## General Information

### Development and Objectives

The program in medical technology was established at the University of Minnesota in 1922 to prepare men and women for professional work in clinical laboratory science and for advanced study in the basic sciences and laboratory medicine. This program attempts to provide both a strong foundation in basic sciences and experience in the clinical laboratory.

The medical technologist performs various diagnostic procedures used in the diagnosis, treatment, and monitoring of disease. Using reagents and complex procedures and instruments, technologists analyze blood and other body fluids. They identify organisms that cause disease, determine blood compatibility, and identify coagulation disorders.

As a general rule, a student who has excelled in scientific subjects in high school will succeed in medical technology.

As complexities of clinical laboratories increase, many medical technologists specialize in blood banking, hematology, microbiology, chemistry, immunology, coagulation, administration, computer science, education, quality assurance, and other areas. There are many opportunities for graduates to work in hospital laboratories, clinics, physician offices, public health agencies, research, and industry.

### Admission

The curriculum in medical technology consists of the preprofessional program in the College of Liberal Arts or its equivalent at another regionally accredited institution and the professional program in the Division of Medical Technology, which is part of the Department of Laboratory Medicine and Pathology of the Medical School.

### Admission to the Preprofessional Program

—The student in the preprofessional program must meet the admission criteria and is subject to the academic regulations of the College of

Liberal Arts (or their equivalent at another institution). For complete information, consult the *College of Liberal Arts Bulletin*.

Qualified applicants may enter the College of Liberal Arts at the beginning of any quarter, but the sequence outlined is based on entrance to the professional program in the fall quarter of year three or four, depending on completion of prerequisites.

Admission to the preprofessional program does not assure admission to the professional program.

It is recommended that prospective students take mathematics, physics, chemistry, and biology in high school.

### Admission to the Professional

**Program**—For admission to the Division of Medical Technology, the student must have completed 90 quarter credits, including the required courses. The major criterion for admission is satisfactory academic performance as judged by the student's grade point average (GPA) in required courses. Students are usually admitted once a year for the fall quarter. Admission to the professional program is competitive because of the limited number of students that can be accommodated in the teaching and clinical facilities.

Students in residence at the University of Minnesota who expect to complete the requirements for admission to the professional program must file a Request for Change of College Within the University form with the Office of Admissions by May 30. Those who have sufficient credits but have course deficiencies should consult with advisers in the Medical Technology Office regarding their status.

Students from other regionally accredited colleges and universities may transfer to the University of Minnesota to complete the program in medical technology. Courses completed that are equivalent to those offered at the University of Minnesota are accepted to satisfy the requirements for admission to the Division of Medical Technology. Students who hold a

baccalaureate degree in a science curriculum and have prerequisites completed, may finish the program in 15 months. Students transferring from other colleges may obtain the Application for Admission from the Office of Admissions, 240 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455. These applications must be filed with the Office of Admissions by May 30. It is strongly advised that transfer students ascertain their status by writing to the Director, Division of Medical Technology, Box 198 UMHC, University of Minnesota, 420 Delaware Street S.E., Minneapolis, MN 55455, so that, if necessary, they may complete required courses during the summer session.

**English Proficiency**—If English is not your native language, you are required to take the Test of English as a Foreign Language (TOEFL) or the Michigan English Language Assessment Battery (MELAB). To register for the TOEFL, contact the agency that handles TOEFL registration in your country or write to the Educational Testing Service (Box 899, Princeton, NJ 08540 USA) at least 10 weeks before any scheduled test date. If you are already in the Twin Cities area, you may register for the MELAB with the Minnesota English Center, 320 16th Ave. S.E., University of Minnesota, Minneapolis, MN 55455, or call (612) 624-1503. To register for the MELAB outside the Twin Cities area, contact the English Language Institute, Testing and Certification Division, University of Michigan, Ann Arbor, MI 48109 USA, or call (313) 764-2416. The minimum scores required are 550 for the TOEFL or 85 for the MELAB.

**Immunizations**—All students in the medical technology program are expected to arrange appointments at the Boynton Health Service for necessary immunizations before assignment to the clinical courses of the professional program. This procedure is required to protect the student.

### **Registration Procedures and Advisers**

Students registering for the first time at the University of Minnesota, as new freshmen in the preprofessional program or as transfer students with less than two full years of previous college work, are expected to participate in a special orientation-registration program. As part of this program, students consult with an adviser in the Medical Technology Office for selection of courses and approval of their registration.

Students admitted to the professional program will receive instructions and information about registration procedures from the Medical Technology Office in advance of the fall quarter registration period.

All students, whether in the preprofessional curriculum in the College of Liberal Arts or in the professional curriculum in the Division of Medical Technology, are expected to plan their class schedule each quarter with an adviser in the Medical Technology Office.

### **Satisfactory Progress**

Students in the professional program are subject to the regulations established by the Division of Medical Technology.

Students are expected to maintain satisfactory academic progress in the medical technology program. Any student not achieving satisfactory progress may be placed on scholastic probation upon recommendation of the Student Concerns Committee. This committee is composed of members of the faculty of the Division of Medical Technology and student representatives.

Students who fail to earn satisfactory grades after being on probation for one quarter may be dropped from the program. If a student fails to maintain satisfactory performance in any course or in any laboratory area while registered in this division, the student's record will be reviewed by the Student Concerns Committee. If, after investigation, the committee judges it inadvisable for the

---

## Medical Technology

---

student to continue in the curriculum, the student will be notified.

A student's work is considered unsatisfactory when she or he earns less than a C grade average (2.00 grade points for each credit) for all credits earned in a given year or a given quarter. In addition, a student must earn a minimum grade of C in selected courses in the curriculum in order to enroll in related clinical practice.

If a student receives an unsatisfactory grade in one course, remedial work in the course may be provided, if possible; if not, the student must repeat the course the next time it is offered. If a student receives unsatisfactory grades in more than one course, either concurrently or in different quarters, the matter will be referred to the Student Concerns Committee for investigation and action. Ordinarily, unsatisfactory grades in two courses will be sufficient basis for discontinuation.

Satisfactory performance is considered to be not only a passing level in technical skill and theoretical knowledge, but also complete personal integrity and honesty.

### Graduation

The minimum requirements for graduation are completion of the curriculum requirements and a total of 180 credits with 360 grade points, an average of 2.00 grade points per credit.

Upon satisfactory completion of the prescribed course of study, the bachelor of science degree will be conferred by the Board of Regents. Students completing the courses in the professional program with a GPA of at least 3.00 may graduate "with distinction," and those with a GPA of 3.60 or higher may graduate "with high distinction."

Application for a degree must be filed with Student Relations (150 Williamson Hall) three quarters before graduation. Students completing the related clinical courses any time before February will be eligible to participate in fall graduation ceremonies.

---

### Certification and Placement

Graduates from the Division of Medical Technology of the University of Minnesota are eligible to take national examinations for certification as medical technologists or clinical laboratory scientists. These examinations are conducted by national certifying agencies. Many institutions require certification for employment.

Program graduates are assisted in finding employment by advisers in the Medical Technology Office. Notices of employment opportunities in the field are received from all parts of the United States and are posted in this office as an aid to students.

### Student Organizations

Students in the professional or preprofessional program are represented on the Medical Technology Council by elected members from each class. The purpose of the Medical Technology Council is to promote student-faculty relationships, to sponsor social and educational activities, and to consider matters affecting students in the program.

Students in the undergraduate program in medical technology are eligible for student membership in the American Society for Medical Technology. Students in medical technology are also eligible to participate in the activities of the Council for Health Interdisciplinary Participation (CHIP) and other University student organizations. For more information, see the introduction to this bulletin.

### Curricular Requirements

#### Bachelor of Science Program

To help students achieve the goals of a liberal education, the Division of Medical Technology expects each student to distribute some part of his or her coursework in areas of study outside of the major. To integrate the goals of both a liberal and a professional education in a manner appropriate to a baccalaureate curriculum in medical technology, the program emphasizes

vigorous training in the physical and biological sciences, with special emphasis on acquiring a knowledge of chemistry and biology that is basic to all facets of laboratory medicine. The program is designed to include not only scientific information and technical skills but also the development of professional attitudes.

In addition to specific required courses, general education requirements include a minimum of 8 to 10 credits selected from each of the three liberal education categories listed below. The distribution requirements may be fulfilled at any time before graduation. The credits in each category must be earned in courses in at least two different departments. They do not have to be completed during the preprofessional years. Consult the *College of Liberal Arts Bulletin* for a complete listing of courses commonly used to meet distribution requirements.

Students applying to the Division of Medical Technology who will be earning their first baccalaureate degree are required to meet the University of Minnesota course requirements established by the Council on Liberal Education:

### *Diversified Core*

- Physical and Biological Sciences, 12 cr minimum, must include lab.
- History and Social Science, three courses, 12 cr minimum. One course must be in a historical perspective category.
- Arts and Humanities, three courses, 12 cr minimum.
- Mathematical Thinking, one course, 3 cr minimum.

### *Designated Themes*

- Six courses from the following :
- cultural diversity
  - international relations
  - citizenship and public ethics
  - environment

### *Writing Intensive*

One rhetoric composition course plus four courses classified as writing intensive.

**Preprofessional Program**—Students register in the College of Liberal Arts (CLA) or another comparable college for the preprofessional program. The following courses or their equivalents must be completed before admission to the professional program. (Quarter credits are indicated in parentheses.)

- CBN 3001—Elementary Anatomy (5)
- Biol 1009—General Biology (5)
- Chem 1051-1052—General Principles (8)
- Chem 3100—Quantitative Analysis (3)
- Chem 3101—Quantitative Analysis Laboratory (2)
- Chem 3301-3302—Organic Chemistry (8)
- Chem 3305-3306—Organic Chemistry Laboratory (4)
- Completion of the freshman composition requirement as defined by CLA.
- Math 1031 or Math 1051 or Math 1251—College Algebra or Precalculus or Calculus (4)
- MedT 1010—Orientation in Medical Technology (1) (optional)
- Phys 1041-1042—Introductory Physics (10)
- SAHP 5210—Terminology of the Health Sciences is strongly recommended.
- Electives satisfying distribution requirements to make a total of 90 credits.

The following program schedule is suggested for the preprofessional years (credits in parentheses):

	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>
FIRST YEAR	Gen Chem 1051 (4) Engl Comp 1011 (5) Math 1031 or 1051 or 1251 (4) MedT 1010 (1) recommended	Gen Chem 1052 (4) Group C (4-5) Group A (4-5)	Gen Biol 1009 (5) Group D (4-5) Elective
SECOND YEAR	Quant Chem 3100/3101 (5) Phys 1041 (5) Group C (4-5)	Organic Chem 3301/3305 (6) Phys 1042 (5) Group D (4-5)	Organic Chem 3302/3306 (6) Anat: CBN 3001 (5) Elective

## Medical Technology

Other courses that are equivalent or more comprehensive may be substituted for the required courses. Students planning to pursue graduate programs should take three quarters of calculus and upper division physics. Students should complete the freshman composition requirement immediately upon entering the University.

Students who transfer into the preprofessional program after the freshman year are exempted from the MedT 1010 requirement. The credit earned in this course does not count toward a B.S. degree.

**Professional Program**—Students register in the Division of Medical Technology for the professional program. The following courses must be completed to satisfy requirements for graduation. (Quarter credits are indicated in parentheses.)

Math 1031 or 1051 or 1251 or Stat 3011 (4)  
 MdBc 5300, 5301—Biochemistry (7)  
 MedT 5010—Introduction to Clinical Laboratory Science (2)  
 MedT 5011—Introduction to Urinalysis and Body Fluids (2)  
 MedT 5064, 5065—Introduction to Clinical Immunohematology (5)  
 MedT 5077, 5078—Hematology, Hemostasis/Instrumentation (6)  
 MedT 5080—Seminar: Specialty Rotations (1)  
 MedT 5082—Applied Clinical Chemistry (4)  
 MedT 5084—Applied Clinical Virology (1)  
 MedT 5085—Applied Clinical Hematology (4)

MedT 5086—Applied Clinical Immunohematology (4)  
 MedT 5088—Applied Diagnostic Microbiology (4)  
 MedT 5089—Specialty Rotation (1)  
 MedT 5100—Virology/Mycology/Parasitology (3)  
 MedT 5102—Principles of Diagnostic Microbiology (5)  
 MedT 5112—Introduction to Clinical Chemistry (5)  
 MedT 5113—Principles of Clinical Chemistry (5)  
 MedT 5127—Introduction to Management and Education (1)  
 MedT 5765—Hematology Morphology (4)  
 MicB 5235—Microorganisms and Disease (3)  
 Phs1 3051—Human Physiology (5)

### *Elective Courses:*

LaMP 5177—Pathology (4) strongly recommended  
 GCB 3022—Genetics (4)  
 GCB 5015—Histology (5)  
 MicB 5218—Immunology (3)  
 MedT 5090—Special Laboratory Methods (1-2)  
 MedT 5092—Honors Program in Laboratory Methods (5)

Other courses in communications, economics, business, and computer science are recommended but not required.

The following program schedule is suggested for the professional years (credits in parentheses):

	<i>Fall</i>	<i>Winter</i>	<i>Spring</i>	<i>Summer Session</i>
THIRD YEAR	Elective Biochem 5300 (4) Micro 5235 (3)	Engl Comp 3033 (4) Biochem 5301 (3) Phs1 3051 (5)	Elective Math (4) or Stat (4) LaMP 5177 (Path) or Elective	
FOURTH YEAR	MedT 5010 Intro CLS (2) MedT 5077 Heme (3) MedT 5102 Micro (5) MedT 5011 Urinalysis/Body Fluids (2)	MedT 5112 Chem (5) MedT 5100 Vir/Mycol/Parasit (3) MedT 5078 Hemostasis/Instrumentation (3) MedT 5089 Seminar (1) MedT 5127 Mgmt/Ed (1)	MedT 5113 Chem (5) MedT 5064/5065 Immunohematology (5) MedT 5765 Heme Morphology (4)	Clin Rot (8-9) or Electives
FIFTH YEAR	Clin Rot (8-9) or Electives	Clinical Courses only if needed (Two quarters [18 credits] of clinical courses are required)		

The clinical courses (MedT 5082, 5084, 5085, 5086, 5088, and 5089) consist of application of basic methods and techniques in chemistry, virology, hematology, immunohematology, and microbiology in the clinical laboratories of the University of Minnesota Hospital and other affiliated institutions. These clinical courses are offered fall and winter quarters and each summer term. Assignment to these courses is made on an individual basis and is contingent upon the availability of space in the clinical facilities as well as satisfactory completion of prerequisite coursework and elective coursework required for graduation.

A minimum grade of C is required in each introductory course in order to enroll in each related clinical course. The introductory and related clinical courses are:

<i>Introductory Courses</i>	<i>Related Clinical Courses</i>
MedT 5064, 5065	MedT 5086
MedT 5077, 5078, 5765	MedT 5085
MedT 5011, 5112, 5113	MedT 5082
MedT 5100, 5102	MedT 5084, 5088

Registration in courses in Continuing Education and Extension (CEE) concurrently with registration in clinical courses requires the consent of the director of the Division of Medical Technology. A maximum of five quarter/semester credits may be taken in CEE concurrently with the clinical courses.

### Master of Science Program

Graduate work in the field of clinical laboratory science is available for the qualified candidate who wishes to prepare for a career of investigation and teaching. A master of science degree program in clinical laboratory science is offered by the Graduate School. The program is offered only under Graduate School Plan A (master's degree with thesis). Each student is required to complete a thesis involving independent research in one of the subareas of this field under the direction of an adviser.

Admission requirements include a bachelor's degree from an accredited institution of higher learning with sufficient scholarly attainment in chemistry and the biological sciences to justify graduate work in these areas.

More information about the program is available in the *Graduate School Bulletin*. For detailed information, contact Claire Bjorklund, Graduate Programs Coordinator, Box 198 UMHC, 420 Delaware Street S.E., Minneapolis, MN 55455 (612/625-8952).

## Medical Technology Courses (MedT)

**1010. ORIENTATION IN MEDICAL TECHNOLOGY.** (1 cr [no cr toward degree])  
Orientation to the profession of medical technology.

**5010. INTRODUCTION TO CLINICAL LABORATORY SCIENCE.** (2 cr; prereq regis professional MedT program)  
Basic lab techniques. Centrifuges, analytical balances, photometry. Microscopy and pipetting. Calculations and quality control. Blood collection and specimen handling. Safety.

**5011. INTRODUCTION TO URINALYSIS AND BODY FLUIDS.** (2 cr)  
Basic techniques in the chemical and microscopic study of urine and body fluids. Lecture and lab.

**5064. INTRODUCTION TO CLINICAL IMMUNOHEMATOLOGY.** (3 cr; prereq MicB 5235)  
Lecture. Principles of blood grouping, antibody identification, compatibility testing, serology and immunology.

**5065. INTRODUCTION TO CLINICAL IMMUNOHEMATOLOGY.** (2 cr; prereq MicB 5235)  
Lab exercises illustrating basic techniques used in blood banking and immunology.

**5077. HEMATOLOGY I: BASIC TECHNIQUES.** (3 cr)  
Theory and application of basic principles and techniques in clinical hematology. Lecture and lab.

**5078. HEMATOLOGY II: HEMOSTASIS/ INSTRUMENTATION.** (3 cr; prereq 5077)  
Theory and application of basic principles and techniques in hemostasis and hematology instrumentation. Lecture and lab.

**5080. SEMINAR: SPECIALTY ROTATIONS.** (1 cr; prereq regis professional MedT program)  
Presentations describing each laboratory offering specialty rotations. For seniors planning their clinical rotation programs.

**5082. APPLIED CLINICAL CHEMISTRY.** (4 cr; prereq 5112, 5113)  
Application of basic methods and techniques in chemistry in the clinical laboratory.

**5084. APPLIED CLINICAL VIROLOGY.** (1 cr; prereq 5064, 5065, 5100, 5102)  
Application of basic methods and techniques in the virology laboratory.

## Medical Technology

**5085. APPLIED CLINICAL HEMATOLOGY.** (4 cr; prereq 5077, 5078, 5765)

Application of methods and techniques in clinical hematology, morphology, and hemostasis.

**5086. APPLIED CLINICAL IMMUNOHEMATOLOGY.** (4 cr; prereq 5064, 5065)

Application of basic techniques and methods in blood banking and immunology in the clinical laboratory. Blood grouping, compatibility testing, and immunologic procedures.

**5088. APPLIED DIAGNOSTIC MICROBIOLOGY.** (4 cr; prereq 5100, 5102)

Identification of bacteria by biochemical and microscopic techniques. Correlation with clinical cases. Identification of parasites and fungi.

**5089. SPECIALTY ROTATION.** (1 cr; prereq completion of MedT preclinical professional courses)

One-week clinical rotation in a specialty laboratory such as immunophenotyping, cytogenetics, cardiac catheterization, pulmonary function, surgical pathology, EKG, molecular diagnostics, advanced virology, or advanced coagulation.

**5090. SPECIAL LABORATORY METHODS.** (1-2 cr)

Assignment on an individual basis to one of a wide variety of special areas of experience in the clinical laboratory; field experience.

**5092. HONORS PROGRAM IN LABORATORY METHODS.** (5 cr)

Individual assignment to special projects or research with more intensive treatment in theory in one of the clinical areas of chemistry, hematology, immunohematology, or microbiology.

**5100. VIROLOGY/MYCOLOGY/PARASITOLOGY FOR MEDICAL TECHNOLOGISTS.** (3 cr; prereq MicB 5235)

Basic aspects of laboratory diagnosis of viral, fungal, and parasitic infections; part of the curriculum in medical technology. Lecture.

**5102. PRINCIPLES OF DIAGNOSTIC MICROBIOLOGY.** (5 cr; prereq MicB 5235)

Current techniques used in the laboratory diagnosis of infectious disease; isolation and identification of bacteria and yeasts; antimicrobial susceptibility testing. Lecture and lab.

**5112. INTRODUCTION TO CLINICAL CHEMISTRY.** (5 cr; prereq Chem 3100-3101, MdBc 5300-5301)

Basic concepts and techniques in clinical chemistry. Quality control, approaches to methods comparison, spectrophotometry and fluorometry and chromatography techniques such as electrophoresis, ion exchange, and thin layer chromatography. Lecture and lab.

**5113. PRINCIPLES OF CLINICAL CHEMISTRY.** (5 cr; prereq 5112)

Lecture and laboratory course emphasizing measurement and physiological relevance of various serum constituents. Includes discussion of electrolytes, proteins, enzymes, steroids, lipids, toxicology, and RIA. Laboratory exercises involving relevant techniques, both manual and instrumental.

**5127. INTRODUCTION TO MANAGEMENT AND EDUCATION.** (1 cr)

Basic concepts in management and education.

**5765. HEMATOLOGY MORPHOLOGY.** (4 cr)

The morphology, development, and function of hematopoietic cells, with emphasis on the examination of peripheral blood and bone marrow. Correlation of morphologic findings with specific physiologic or pathologic processes.

### Required Courses Offered by Other Units

**CBN 3001. ELEMENTARY ANATOMY.** (5 cr; prereq regis paramed fields, 1 qtr college biology)

A general survey of human anatomy including histology, embryology, gross anatomy, and neuroanatomy, with some clinical and physiological correlations.

**Biol 1009. GENERAL BIOLOGY.** (5 cr)

Introduction to the principles of biology. The cell, metabolism, heredity, reproduction, ecology, and evolution.

**Chem 1051-1052. CHEMICAL PRINCIPLES I-II.**

(4 cr per qtr; primarily for science or engineering majors; prereq 1001 or passing placement examination; 3 lect, 1 lab discussion, one 3-hr lab per wk)

Atomic theory; periodic properties of elements; chemical thermodynamics; development of structural concepts; geometry of molecules; bonding theory; behavior of gaseous and liquid states; solid state and materials; chemistry; dynamics; equilibrium; behavior of solutions; acids and bases; descriptive chemistry of elements and compounds.

**Chem 3100. QUANTITATIVE ANALYSIS**

**LECTURE.** (3 cr, 3100-3101 †; for non-chemistry majors; prereq 1005 or 1032)

Introduction to the theory of quantitative chemical analysis.

**Chem 3101. QUANTITATIVE ANALYSIS**

**LABORATORY.** (2 cr, 3100-3101 †; prereq 3100 or ¶3100)

Introductory laboratory in quantitative chemical analysis.

**Chem 3301-3302. ELEMENTARY ORGANIC**

**CHEMISTRY I-II.** (4 cr per qtr; prereq 1005 or 1032 or equiv)

Important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds.

**Chem 3305. ELEMENTARY ORGANIC**

**CHEMISTRY LABORATORY I.** (2 cr; prereq 3301 or ¶3301)

Laboratory work includes the preparation of typical substances.

**Chem 3306. ELEMENTARY ORGANIC**

**CHEMISTRY LABORATORY II.** (2 cr; prereq 3302 or ¶3302)

**LaMP 5177. PATHOLOGY FOR ALLIED HEALTH STUDENTS.** (4 cr)

General and systems pathology. Strongly recommended.

**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.

**Math 1051. PRECALCULUS I.** (4 cr; §1008, §1031, §1111, §1151, §1201; prereq 3 yrs high school mathematics, placement exam or GC 0631 with a grade of C or better)

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.

**Math 1251-1252. ONE-VARIABLE DIFFERENTIAL AND INTEGRAL CALCULUS I-II.** (4 cr each, §1211-1221, §1411H-1421H, §1451H-1452H; prereq 4 yrs high school mathematics including trigonometry or grade of C or better in 1151 or equiv; grade of C or better in 1251 required for 1252)

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

**MdBe 5300. BIOCHEMISTRY.** (4 cr; prereq organic chemistry and physics)

Biochemical principles. Includes proteins, enzymes, biological energy metabolism, glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis, glycogen metabolism, fatty acid metabolism, amino acid metabolism, biological membranes. DNA, RNA, the genetic code, control of gene expression.

**MdBe 5301. BIOCHEMISTRY.** (3 cr; prereq MdBC 5300 or Biol 5001)

Biochemical principles. Includes protein synthesis, body fluids, hemoglobin, respiration, kidney function, acid base balance, endocrinology, nutrition, and vitamins.

**MicB 5235. MICROORGANISMS AND DISEASE.**

(3 cr; prereq 10 cr in chemistry and 5 cr in biological sciences or #)

The nature of microorganisms, immunology, medical bacteriology, virology, mycology, parasitology, and principles of disease control.

**Phsl 3051. HUMAN PHYSIOLOGY.** (5 cr)

The study of normal function (processes) in humans.

**Phys 1041-1042. INTRODUCTORY PHYSICS.** (5 cr per qtr; prereq high school algebra and plane geometry; 4 lect, 1 rec, 2 lab hrs per wk)

Lectures, recitation, and lab sessions. Primarily for students interested in topics useful in technical areas. Fundamental principles of physics in context of the everyday world. Use of kinematics, dynamics, and conservation principles with quantitative and qualitative problem-solving techniques to understand phenomena of mechanics, electromagnetism, and the structure of matter.

**Stat 3011. STATISTICAL ANALYSIS.** (4 cr per qtr, prereq college algebra)

Descriptive statistics; elementary probability; estimation; one- and two-sample tests; correlation; introduction to regression; ANOVA; randomized blocks; multiple comparisons; factorial experiments; multiple regression; goodness of fit; nonparametric methods; contingency tables; selected topics.

**Graduate Courses in Medical Technology (MedT) or Clinical Laboratory Science (CLS)**

**5120. SEMINAR: MEDICAL TECHNOLOGY** (1-3 cr)

**5125. PRACTICUM: TEACHING** (max 3 cr)

**5128. ELEMENTS OF LABORATORY ADMINISTRATION** (3 cr)

**5130. PRACTICUM IN LABORATORY ADMINISTRATION** (3 cr)

**5133. MEDICAL MYCOLOGY** (4 cr)

**5135. ADVANCED CLINICAL MICROBIOLOGY** (5 cr)

**5136. ANAEROBIC BACTERIOLOGY** (4 cr)

**5138. CLINICAL MICROBIOLOGY SEMINAR** (1 cr)

**5140. TECHNIQUES FOR TEACHING** (3 cr)

**5145. DEVELOPMENT OF MEDICAL TECHNOLOGY** (3 cr)

**5155. ADVANCED CLINICAL HEMATOLOGY** (5 cr)

**5165. ADVANCED CLINICAL IMMUNOHEMATOLOGY** (5 cr)

**5173. ANALYTIC TECHNIQUES IN LABORATORY MEDICINE**

**5175. ADVANCED CLINICAL CHEMISTRY** (5 cr)

**5179. CHEMISTRY SEMINAR** (1 cr)

**8176. ADVANCED TOPICS IN CLINICAL CHEMISTRY** (Cr ar)

**8178. PRINCIPLES OF DIAGNOSTIC ENZYMOLOGY** (Cr ar)

**8230. ADVANCED MEDICAL BACTERIOLOGY** (Cr ar)

## Faculty and Staff

### Administration

- Leo Furcht, M.D., professor and head, Department of Laboratory Medicine and Pathology  
Jeffrey McCullough, M.D., director of laboratory medicine  
Karen R. Karni, Ph.D., associate professor and director, Division of Medical Technology  
Patricia Solberg, B.A., administrative associate, Division of Medical Technology

### Faculty

- Nancy Brunzel, B.A., laboratory manager, chemistry and urinalysis  
Douglas Christie, Ph.D. associate professor, immunohematology  
Heleen Hallgren, M.S., associate professor, immunology  
Naomi Hanson, M.S., assistant professor, chemistry  
Bob Jechorek, M.A., scientist, microbiology  
Karen Lofsness, M.S., assistant professor, hematology  
Cheryl Swinehart, M.S., assistant professor, hematology, coagulation  
Michael Tsai, Ph.D., associate professor, chemistry  
Carol Wells, Ph.D., associate professor, microbiology

### Teaching Specialists

- Salli Clysdale, B.S.  
Stella Cook, B.S.  
Susan Feist, B.S.

### Laboratory Directors

- Henry Balfour, M.D., professor, medical microbiology  
G. Mary Bradley, M.D., associate professor, associate director, clinical laboratories  
Richard Brunning, M.D., professor, hematology  
John Eckfeldt, M.D., Ph.D., professor, clinical chemistry  
J. Roger Edson, M.D., professor, coagulation  
Patricia Ferrieri, M.D., professor, bacteriology  
David Stroncek, M.D., associate professor, immunohematology

### Clinical Staff at Affiliated Institutions

- Norine Anderson, B.S., Abbott-Northwestern Hospital  
Rosemary Anderson, B.A., Veterans Administration Medical Center  
Miguel Azar, M.D., Veterans Administration Medical Center  
Roger Barrett, Veterans Administration Medical Center  
Greg Butler, B.S., Mayo Clinic  
Stephanie Church, B.S., Hennepin County Medical Center  
Joan Converse, M.A., Mayo Clinic  
Agustin Dalmasso, M.D., Veterans Administration Medical Center  
Nancy C. Denny, B.A., Abbott-Northwestern Hospital  
Janice M. Engberg, M.S., Mayo Clinic  
Patricia Frykholm, B.S., Veterans Administration Medical Center  
Margaret Gabrik, B.S., Veterans Administration Medical Center  
Charles Greiner, B.S., Veterans Administration Medical Center

- B.J. Hockinson, B.S., St. Paul Regional Red Cross Blood Center  
Patricia Holland, B.S., Abbott-Northwestern Hospital  
Darrell Isebrand, B.S., Veterans Administration Medical Center  
Mary F. Jones, B.S., Mayo Clinic  
Teresa K. Kimlinger, B.A., Mayo Clinic  
Cynthia Lais, M.D., Abbott-Northwestern Hospital  
Carol McLimans, M.A., S.M., Mayo Clinic  
Marsha Olson, B.S., Veterans Administration Medical Center  
Alvaro Pineda, M.D., Mayo Clinic  
Herbert Polesky, M.D., Memorial Blood Center—Minneapolis  
Jane Reinke, M.S., Abbott-Northwestern Hospital  
Eileen L. Rogers, B.S., S.B.B., Abbott-Northwestern Hospital  
Carol Shanholtzer, B.S., Veterans Administration Medical Center  
Steve R. Tschider, M.S., Abbott-Northwestern Hospital  
Cheryl Stakston, B.S., St. Paul Regional Red Cross Blood Center

### University of Minnesota Hospital and Clinic Laboratory Staff: Administrators, Laboratory Managers, and Senior Medical Technologists

- Joanna George, B.S., Teaching Laboratories Manager

#### Administration

- Jayne Gillen, B.S.  
Jan Lohman, B.S.  
Kay Malerich, B.S.  
Arlene Meadows, B.S.  
Susan Preston, B.S.  
Aija Vikmanis, B.S.

#### Bacteriology Laboratory

- Evelyn Busch, M.S.  
Kathleen Fennema, B.S.  
David Guse, M.S.  
Barbara Holmen, B.S.  
Karin Libby, B.S.  
Norynne Schiminsky, B.S.  
Marcia Weber, M.S.

#### Blood Bank Laboratory

- Susan Fautsch, B.S.  
Lorie Latimer, B.S.  
Clareyse Nelson, B.S.  
Ruth Peterson, M.A.  
Mary Sastry, B.S.  
Terry Scofield, B.S.  
Nancy Ward, B.S.  
Sherri Wilkening, B.S.

#### Chemistry Laboratory

- Jean Buckska, B.S.  
Mary Fowler, B.S.  
Kathleen Hansen, B.S.  
Lucinda Hudson, B.S.  
Cynthia Johnson, B.S.  
Vickie Larson, B.S.  
Judith Moriguchi, B.S.  
Kay Nelson Olson, B.S.

Mary Ramey, B.S.  
 Alice Reineke, B.S.  
 Chris Senn, B.S.  
 Cynthia Skare, B.S.  
 Linda Wessels, B.S.

*Coagulation Laboratory*

Karen Meyer, B.S.  
 Cynthia Nelson, B.A.  
 Janice Vogt, B.S.

*Cytogenetics*

Merry Duffy, B.S.

*Hematology Laboratory*

Sandra Dale, B.S.  
 Nancy Geier, B.S.  
 Bonnie McCollam, B.S.  
 Mary Schmalz, B.S.  
 Ella Spanjers, B.S.

*Immunology Laboratory*

Harriet Noreen, B.S.

*Virology Laboratory*

Cynthia Dirksen, B.S.

*Boynton Health Service Laboratory*

Mary Richardt, M.B.A.

*Cardiac Catheterization*

Frank Gams, B.S.  
 Audrey Martinson, B.S.

*EKG*

Gretchen Saecker, B.S.

*Immunophenotyping/Flow Cytometry*

Mary Jane Kraft-Weisjahn, B.S.

*Molecular Genetics*

Catherine Leiendecker-Foster, M.S.

*Pulmonary Function*

Marnie Loven-Bell, M.A.

*Surgical Pathology*

Willard White, HTL (ASCP)

## Career Paths

The following career paths list represents positions taken by University of Minnesota medical technology graduates. It depicts the opportunity and versatility afforded by a degree in medical technology.

### Health Care Agency/Government

Administrator for Veterans Administration hospital  
 Biometrist in a government health agency  
 Crime laboratory scientist  
 Department of Health—Educator  
 Department of Health—Proficiency test consultant  
 Employee recruiter/Placement officer  
 Environmental health specialist (inspector)  
 Environmental pathology technologist  
 Fraud investigator  
 Health management organization—Health educator  
 JCAHO Survey team member/CAP inspector  
 Medical examiner investigator, e.g. for coroner  
 Military service—Armed Forces, ROTC, National Guard  
 NASA mission specialist  
 Patient educator  
 Private investigator FBI/Special agent (forensic lab)

### Hospital/Medical Center: Laboratory Areas

Andrology/Fertility testing  
 Blood bank  
 Bone marrow  
 Cell markers  
 Chemistry  
 Coagulation  
 Computer science  
 Components—Transfusion service  
 Cytogenetics  
 Cyodiagnostic urinalysis  
 Cytology/Histology  
 Development laboratory  
 Drug analysis (toxicology)  
 Endocrinology  
 Forensic science  
 Genetics  
 Hematology  
 Immunology  
 Immunopathology  
 Immunophenotyping  
 Infection control  
 Microbiology  
 Mycology  
 Nuclear medicine  
 Out patient or clinic laboratory  
 Parasitology  
 Pathology—Surgical, autopsy  
 Phlebotomy/Specimen processing  
 Platelet studies  
 Photography/Illustration (e.g. in forensic medicine)  
 Quality assurance  
 Serology  
 Skin or bone bank  
 Special stains  
 STAT laboratory  
 Tissue typing

## Hospital/Medical Center

Transplant services  
Virology

## Health Care Administration

Clinic manager  
Coder—Abstractor (business or medical records office)  
Consultant service specialist  
Personnel director  
Emergency medical services coordinator  
Financial manager  
Group practice administrator  
Hazardous waste coordinator  
Health care administrator  
Health insurance administrator  
Health policy analyst  
Health promotion coordinator  
Hospital quality assurance coordinator  
Infection control officer→Epidemiologist  
Laboratory supervisor→Laboratory director  
Laboratory utilization review coordinator  
Long-term care administrator  
Mental health administrator  
Purchaser (laboratory/hospital/medical center)  
Staffing coordinator (laboratory or home care)

## Management Information System

Biometrician  
Director—Division of Biometry  
Installer/Educator  
Systems analyst  
Programmer

## Health Maintenance Organization

Laboratory supervisor→Administrator

## Consultant to Physician Office Laboratories

## Reference/Commercial Laboratory Scientist

## Veterinary Medicine Laboratory Scientist

## Humanitarian Work

Medical missionary work  
Peace Corps  
Project HOPE, others

## Education

Academician  
Allied health dean/Health sciences administrator  
Education coordinator→Program director  
Educator of students in clinical settings  
Faculty member in CLS/CLTC/Cyto/SBB program  
Higher education administrator  
Instructor in veterinary medicine or other allied health program  
Medical community services program coordinator

## Other professional routes

Accounting  
Dentistry  
Health radiation science  
Law (e.g. patent attorney)  
Legislature—Politician, lobbyist, regulations writer  
Medical Physics/Engineering  
Medicine  
Optometry  
Public health  
Veterinary medicine

## Industry (U.S. or International)

Adviser to or inventor of "home" or other lab tests  
Biomedical specialist—Occupational health  
Cell culture consultant  
Computer consultant  
Director of marketing  
Editor/manager—Medical publications  
Food technologist—Quality assurance manager  
Health care reimbursement coordinator  
Health promotion and education specialist  
Industrial hygiene specialist  
Installation specialist  
Insurance underwriter  
Manager—Health claims administration  
Medical claims reviewer/Auditor/Insurance processor  
Medical consultant (TV/Movie industry)  
Medical fee analyst—Insurance  
Owner/Director of employee placement service  
Product specialist  
Quality control/Quality assurance monitor/Director  
Research and development director  
Research scientist  
Risk management representative—Insurance  
Salesperson  
Technical representative

## Research—Basic and Applied

Research assistant  
Associate scientist/Scientist  
Director of research

Mortuary Science



# Program of Mortuary Science

## General Information

### Development

The Program of Mortuary Science at the University of Minnesota, established in 1908, was the first program of its kind in this country to be organized at a state university. During the first 50 years of its existence, the program grew from a 6-week session to a 36-week course of study. In 1951, a two-year curriculum leading to the associate in mortuary science degree was approved. The course of study for the associate degree was expanded to three years in 1955. The bachelor of science degree with a major in mortuary science, granted upon satisfactory completion of a four-year curriculum, was approved by the Board of Regents in 1968. Impetus for the changes in program length and academic credentials resulted from changes in the philosophy and needs of the funeral service profession.

In 1970, the program was placed under the administrative supervision of the vice president for health sciences and in 1990 under the head of the Department of Cell Biology and Neuroanatomy.

The program is accredited by the American Board of Funeral Service Education, Inc., an agency recognized by the United States Office of Education, and the Conference of Funeral Service Examining Boards of the United States, Inc.

### Aims and Purposes

Upon completing the curriculum requirements, the graduate will have:

- received a solid liberal arts foundation;
- synthesized the psycho-social aspects of grief and the funeral directing arts;
- developed technical competence in the application of funeral service sciences; and
- identified business, legal, and ethical principles related to funeral service practice.

## Objectives

The objectives of the program recognize an obligation to students, the profession, and the community. They have been adopted with respect to requirements of the Program of Mortuary Science, the University of Minnesota, the American Board of Funeral Service Education, the Conference of Funeral Service Examining Boards, and the State of Minnesota Department of Health.

Upon completing the curriculum requirements for a bachelor of science degree with a major in mortuary science, the graduate will have identified and applied principles and theoretical concepts in:

- public health
- ethics
- behavioral sciences
- law
- natural sciences
- business

In addition, the graduate will have:

- completed the educational requirements prescribed by the American Board of Funeral Service Education; and
- completed the requirements to become eligible for admittance to the Conference of Funeral Service Examining Boards National Board Examination.

## Admission Requirements

Students usually enter the Program of Mortuary Science at the start of their junior year. Freshmen and sophomores interested in a mortuary science major are urged to contact the program office at A275 Mayo, Box 740 UMHC, 420 Delaware Street S.E., Minneapolis, MN 55455, 612/624-6464 for counsel in planning an appropriate pre-professional program. On the Twin Cities campus, freshmen and sophomores usually register in the College of Liberal Arts (CLA) or General College (GC) for their pre-mortuary science work. Admission criteria and other information related to CLA and GC can be found in their respective bulletins. The Program of Mortuary Science considers applicants transferring from any regionally accredited college or university.

Applicants seeking admission to the program must have completed a total of 90 quarter credits, as outlined below, with grades of A,B,C, or S; and a cumulative GPA of at least 2.00 on a 4.00 scale for all college-level coursework.

The required 90 quarter credits must include credits distributed to fulfill liberal education requirements plus additional credits of electives. Students entering the program must demonstrate adequate typing or computer keyboard skills. The liberal education group distribution requirements are detailed as follows:

**English Composition**—One writing course (in addition, an upper-level course is required for graduation).

**Business Studies**—(8 credits) Introduction to business and small business operation courses.

**Group A. Language, Logic, Mathematics, and the Study of Argument**—(minimum of 12 credits) Speech, accounting, medical terminology, computer science, and electives.

Study of formal languages and symbolic systems and their use in deduction, computation, information processing, and the study of natural language; analysis of argument as used in ordinary discourse and communication; theory, methods, and application of logic, mathematics, statistics, computer science, linguistics, and rhetoric.

**Group B. The Physical and Biological Universe**—(minimum of 18 credits) One general course in each of the following: biology, chemistry, human anatomy,\* microbiology,\*\* and community public health; a laboratory in at least two of the above. Other electives.

Observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena; explorations and methods of scientists concerning earth, space, matter, and life.

**Group C. The Individual and Society**—(minimum of 20 credits) A minimum of one general course in psychology and sociology.

Suggested electives include death studies; child, adolescent, and aging psychology; family studies; and anthropology.

Empirical study of individual and institutional behavior; empirical study of psychological, economic, social, cultural, geographical, and political phenomena. Historical study of societies and cultures or major aspects thereof. Analytical study of social, political, moral, philosophical, and religious thought.

**Group D. Literary and Artistic Expression**—(minimum of 12 credits of electives) Study of literature, music, the visual arts, theatre, and film; analysis of significant works of literature and the other arts; study of principles and techniques of criticism.

### Application Procedures

*Transfer Within the University*—Students already admitted and registered at one college or campus of the University of Minnesota must submit an Application for Change of Status or College, available from the Office of Admissions on any campus. Application deadlines for internal transfer are July 15 for fall quarter admission, November 15 for winter quarter admission, and February 15 for spring quarter admission.

*\*Students must complete anatomy before enrolling in mortuary science.*

*Prerequisites for enrolling in anatomy at different colleges and universities vary and some students complete prerequisite coursework at institutions that do not offer anatomy. Therefore, when there is no other alternative and students elect to complete anatomy at the University of Minnesota, they must take one college biology course before enrolling in anatomy at the University.*

*\*\*Students must complete microbiology before enrolling in mortuary science.*

*Prerequisites for enrolling in microbiology at different colleges and universities vary and some students complete prerequisite coursework at institutions that do not offer microbiology. Therefore, when there is no other alternative and students elect to complete microbiology at the University of Minnesota, they must take ten credits of chemistry and five credits of biological science before enrolling in microbiology at the University.*

### *Transfer From Outside the University—*

Those who have completed their preprofessional work at another university must apply for admission to the University of Minnesota. Transfer students should obtain the Application for Undergraduate Admission from the Office of Admissions, 240 Williamson Hall, University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455; complete the form; and return it to that office along with an official transcript from each institution outside the University where college work was attempted or completed and a nonrefundable application fee.

### **Financial Aid and Awards**

For information concerning financial aid available to all University students, refer to the introduction to this bulletin.

The following funds are available to mortuary science students:

**The American Board of Funeral Service Education** administers a scholarship fund available to students nationwide. Students may contact the board at 14 Crestwood Road, Cumberland, ME 04021.

**The Past Presidents' Fund**, established by former presidents of the Minnesota Funeral Directors Association, grants a scholarship for continuing education.

**The Minnesota Funeral Directors Association Robert C. Slater Scholarship** provides a \$1,000 award to a Minnesota resident to be used for tuition in the first quarter of the senior year of enrollment in the Program of Mortuary Science at the University of Minnesota. Applicants may be high school seniors or college students. The award is retained by the Minnesota Funeral Directors Association until the recipient is admitted to the Program of Mortuary Science at the University of Minnesota. An application may be received by writing to the Program of Mortuary Science at the address listed in this bulletin.

### **Prairie States Life Insurance Scholarship.**

As a reflection of its continued commitment to funeral service and funeral service education, the Prairie States Life Insurance Company offers this \$500 scholarship to two students who have completed a minimum of two years at an accredited college/university with grades of C or better and who are enrolled as full-time students in the Program of Mortuary Science at the University of Minnesota. An application may be received by writing to the Program of Mortuary Science at the address listed in this bulletin.

**The University of Minnesota Mortuary Science Alumni Society Scholarship** is awarded to a full-time senior in the Program of Mortuary Science. Applications are provided to seniors in the program.

The following awards are presented annually at spring quarter graduation:

**The J.M. Nolte Scholar Award** was established by the University Mortuary Science Education Association in honor of Julius M. Nolte, former dean of the General Extension Division of the University of Minnesota, to recognize his contribution to the organization of the association and his dedication to the advancement of funeral service education at the university level. The award is given to recognize academic and other achievement of graduating students in funeral service.

**Minnesota Funeral Directors Association Award of Merit**—Mortuary science faculty may nominate graduating seniors for this award. One student is then selected from among the nominees by a faculty committee and recommended to MFDA to receive the award. The recipient is chosen on the basis of scholarship, citizenship, professional attitude, and personality.

### **Student Services**

*Orientation*—A variety of orientation activities are offered to help students get acquainted with one another, the campus, and the program. These activities usually last one day and include individual and group

meetings for program planning and presentations on University resources and regulations. Students are notified of orientation dates at the time they receive registration information.

*Advising*—The staff adviser assists the student with program and career planning and other concerns the student may have. The adviser may also refer the student to another University agency for assistance. Each quarter the adviser must approve the student's registration.

*University Organizations*—Opportunities for recreational, social, political, vocational, and service activities are available. Interested students should contact the Student Activities Office, 220 Coffman Memorial Union (612/624-5101).

*National Certification*—Graduates of the Program of Mortuary Science are eligible to take the National Board Examination for Mortuary Science. The program arranges to have the test given on campus by the Conference of Funeral Service Examining Boards of the United States, Inc.

**Student Activities**

*Student Association of the Program of Mortuary Science*—Mortuary science majors automatically become members of this association, a forum for expressing student opinion, developing a liaison between students and faculty, and fostering and supporting mortuary science education.

**Curriculum and Academic Regulations**

**Curriculum for the Bachelor of Science Degree**

**JUNIOR YEAR**

*Fall Quarter*

Mort 3001 .....	3
Electives .....	12
	15

*Winter Quarter*

Mort 3040 .....	3
Mort 3070 .....	2
Electives .....	10
	15

*Spring Quarter*

Mort 3010 .....	4
Mort 3030 .....	4
LaMP 3050 .....	4
Mort 3073 .....	3
	15

**SENIOR YEAR**

*Fall Quarter*

Mort 3050 .....	4
Mort 3060 .....	8
Mort 3062 .....	2
Mort 3270 .....	1
	15

*Winter Quarter*

Mort 3071 .....	6
Mort 3074 .....	2
Mort 3271 .....	1
Electives .....	6
	15

*Spring Quarter*

Mort 3080 .....	15
-----------------	----

Prospective students who have completed a college degree or completed more than 90 credits should consult with the program's student adviser to determine the most appropriate quarter for admission. A student

---

## Mortuary Science

---

who has completed all of the admission requirements and upper division electives may be able to complete the mortuary science curriculum in four quarters.

### Graduation Requirements

To be recommended for the bachelor of science degree with a major in mortuary science, students must:

1. Complete a minimum of 180 credits with A,B,C, and/or S grades. Included in the 180 credits are the admission requirements, an upper division writing course, and the required mortuary science courses. A minimum of 15 credits must be in upper division electives.
2. Complete the 90 credits of freshman and sophomore liberal education distribution requirements. The distribution of these credits and categories of study required are detailed under the heading Admission Requirements in this section of the bulletin.
3. Complete at least one-half of the degree credits earned while a student at the University of Minnesota with grades of A, B, or C.
4. Complete at least 30 of the last 45 credits earned before graduation in coursework completed at the University of Minnesota.

Students planning to practice in a state other than Minnesota should determine the qualifications for licensure by writing to the licensing agency in the capital city of the state in which they intend to practice. These regulations vary from state to state, are frequently changed, and students should make certain they have accurate information.

### Honors

Students who have completed their most recent 90 undergraduate credits (A-F), whether transfer or within the University, with a GPA of 3.50 to 3.75 may graduate "with distinction," and those with a GPA of 3.76 to 4.00 may graduate "with high distinction."

### Registration

Students are notified of either a special registration appointment or the specified days for registration. When students register, they are given a set of detailed instructions and a suggested program plan for the completion of all degree requirements. These make the process of registration relatively simple.

### Credit Load

Most students take about 15 credits of coursework each quarter. To take fewer than 12 credits or more than 18 a quarter requires permission from the Student Scholastic Standing Committee.

### Scholastic Progress

The scholastic probation system identifies, advises, and, if necessary, excludes students who are having problems meeting academic standards.

A student's work is considered unsatisfactory when he/she earns less than a C average (2.00 GPA) for all credits earned in a given quarter.

If a student receives unsatisfactory grades in more than one course, either concurrently or in different quarters, the matter will be referred to the Student Scholastic Standing Committee for investigation and action. The student ordinarily will be placed on probation. The student is then required to make a contract with the Student Scholastic Standing Committee agreeing to complete a specified number of credits during the following quarter with grades of C or better. If terms of the contract are not fulfilled, the student may be declared academically ineligible to continue in the program.

Students may be excluded from the program for one of the following reasons:

*Dropped for Low Scholarship*—Students who fail to meet the terms of their probation.

*Hold for Committee Clearance*—Students who have scholastic difficulties that indicate they should interrupt their studies for the time being even though their record may not

require official drop action. The Student Scholastic Standing Committee must approve a subsequent return to the program in such cases.

A student admitted to the program on probation must achieve satisfactory academic status during the first quarter of enrollment.

## Mortuary Science Courses (Mort)

### 3001. ORIENTATION IN FUNERAL SERVICE.

(3 cr)

Funeral service profession, including history, vocabulary, professional experiences in technical and management areas, and sociology of funeral service.

### 3010. FUNERAL SERVICE LAW. (4 cr; prereq regis mort sci)

Licensing/government regulations; restrictions on funeral home sites; legal status of dead bodies; duty of burial/disposal; right to control final disposition; liability for payment of funeral expenses; torts relating to funeral service; cemetery law; applied elements of business law.

### 3030. CHEMISTRY. (4 cr; prereq intro general chem, regis mort sci)

Fundamentals of organic chemistry and biochemistry. Chemical changes in the human body during life, after death, and during chemical preservation. Disinfection, toxicology, embalming fluids.

### 3040. FUNERAL SERVICE PSYCHOLOGY. (3 cr; prereq intro general psych)

Applied psychological principles helpful in dealing with clients, especially those experiencing emotional crisis.

### 3050. RESTORATIVE ART. (4 cr; prereq regis mort sci)

Theory and procedures of restorative art; lab.

### 3060. EMBALMING. (8 cr; prereq biol, human anat, regis mort sci or #)

Theory and procedures of embalming; lab.

### 3062. GROSS HUMAN ANATOMY. (2 cr; prereq biology, human anatomy, regis mort sci)

Gross human anatomy with emphasis on the vascular system.

### 3070. FUNERAL SERVICE MANAGEMENT. (2 cr; prereq regis mort sci)

Professional overview and image; government agencies, state rules and regulations, cemetery rules and regulations.

### 3071. FUNERAL SERVICE PRACTICE. (6 cr; prereq regis mort sci)

Funeral directing; ethics, funeral home operations, records, forms, pricing, accounting, computer applications for funeral home management; Federal Trade Commission Practice Rule for the funeral industry.

### 3073. FUNERAL SERVICE COUNSELING. (3 cr; prereq regis mort sci)

Principles, techniques, and basic helping skills of counseling as applied to the funeral arrangement conference.

### 3074. FUNERAL SERVICE SMALL BUSINESS. (2 cr; prereq regis mort sci)

Roles of small business; risks of ownership; starting a funeral business (funeral home valuation, market analysis); financing; marketing; advertising; public relations; credits and collections; insurance and risk management.

### 3080. FUNERAL SERVICE PRACTICUM. (15 cr; prereq completed all requirements for graduation except 3080, Δ; S-N)

Practical experience during one quarter in a funeral home as assigned by the program.

### 3090. INDEPENDENT STUDY. (1-3 cr; prereq regis mort sci, #)

A report based on study and research in an area of the student's interest in funeral service.

### 3270. FUNERAL SERVICE SEMINAR. (1 cr; prereq regis mort sci; S-N)

### 3271. FUNERAL SERVICE SEMINAR. (1 cr; prereq regis in mort sci; S-N)

### 3273. ADVANCED FUNERAL SERVICE COUNSELING. (Cr ar; prereq regis mort sci or #)

### 5040. DYING AND DEATH IN CONTEMPORARY SOCIETY. (3 cr, §HSU 5040, §PubH 5040; prereq hlth sci student or public hlth grad or ed sr or certified tchr or mort sci student or #)

Concepts, attitudes, ethics, and lifestyle management in relation to dying, death, grief, and bereavement. Emphasis on educational aspects for community health and helping professionals and educators.

### LaMP. PATHOLOGY FOR MORTUARY SCIENCE. (4 cr; prereq human anat, microbiol)

**Faculty and Staff**

John M. Kroshus, Ph.D., M.Ed., B.S.,  
director, assistant professor

Richard A. Grayson, J.D., B.A.,  
assistant professor

Michael C. Mathews, M.A., B.S., A.M.S.,  
assistant professor

Dale E. Stroud, B.S., A.M.S.,  
assistant professor

Steven P. Tibbetts, M.A., B.S., B.A.,  
teaching specialist

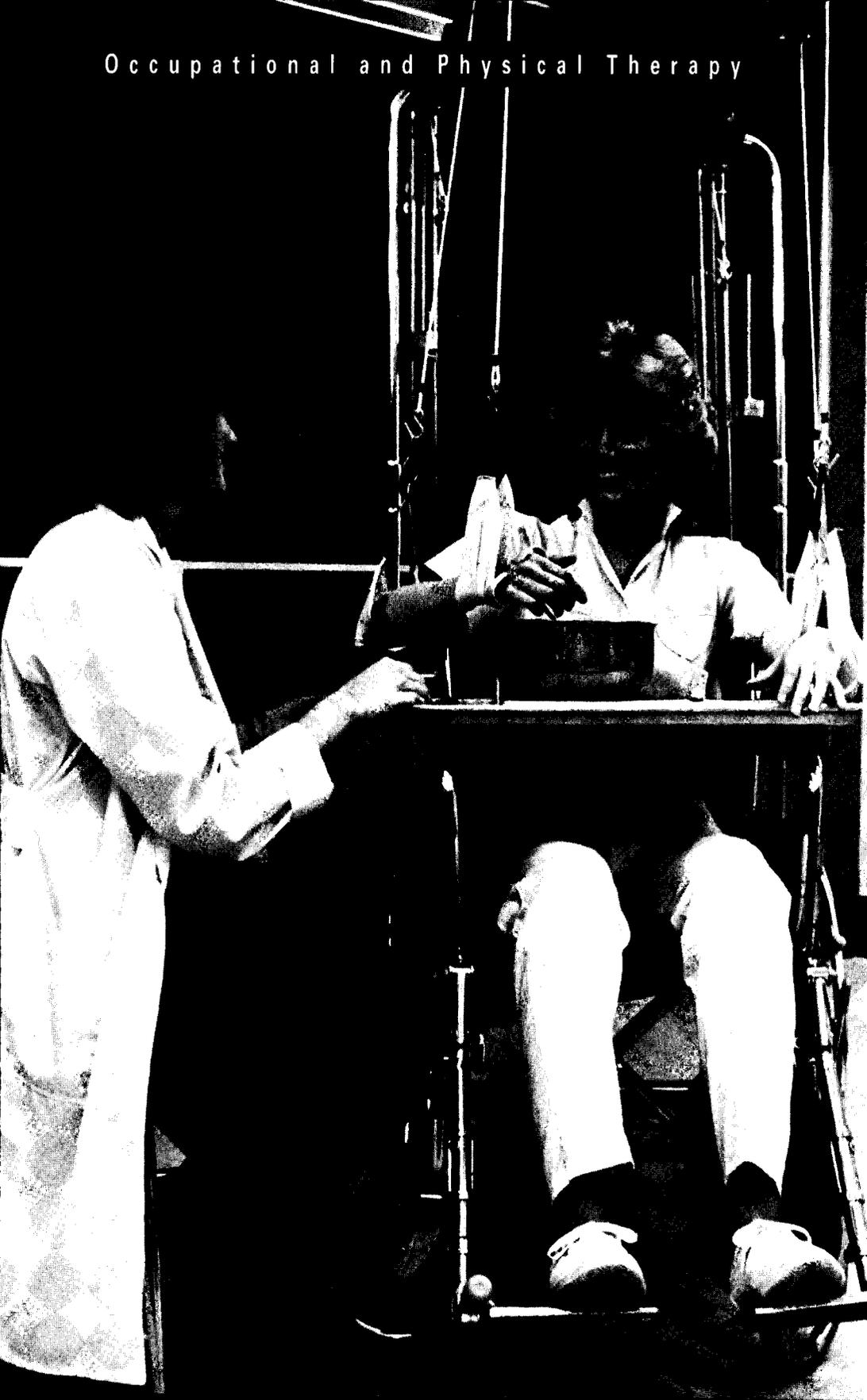
Lana R. Palmberg, B.S.,  
principal student personnel worker

Earl L. Burger, M.A., B.S., B.A., A.M.S.,  
professor emeritus

Robert C. Slater, B.S.,  
professor emeritus

*All other appointees are staff members of the  
cooperating colleges, programs, and  
departments.*

Occupational and Physical Therapy



# Programs in Occupational and Physical Therapy

## General Information

### Objectives

The University of Minnesota Programs in Occupational and Physical Therapy are in the Department of Physical Medicine and Rehabilitation, a part of the Medical School. They provide students with a strong foundation in biological and physical sciences. Theory and application courses focus on functional outcomes that maximize the patient's potential for independence.

Because the nation's health care needs can be met only by multidisciplinary teams of specialists, it is essential that the training of students in occupational therapy and physical therapy reflect an integrated approach to comprehensive health care. The Department of Physical Medicine and Rehabilitation offers its students the opportunity to work with and learn from other health professionals and thus to achieve an integrated perspective.

Occupational therapy and physical therapy students must have a knowledge of medical conditions and must understand psychology, physiological processes, and social theories. With this background they can acquire the skills and develop the ability to make the decisions required in the evaluation and treatment process.

Upon completion of the professional program the student should be able to:

- Determine the stage of growth and development at which the patient or client is functioning and make adjustments that demonstrate an awareness of the physical and psychological effects of an interruption of the normal process.
- Select, administer, and interpret the tests and procedures necessary to evaluate the physical and emotional problems that forms of therapy may remedy.
- Develop a plan of therapy and select and administer the treatment procedures indicated by the physical, emotional, economic, and social needs of the patient or client.

- Evaluate the effectiveness of a treatment regimen and make appropriate adjustments in the treatment plan.
- Effectively communicate, orally and in writing, with patients or clients, the health care team, the family, and others responsible for and interested in the patient's or client's welfare.
- Respond professionally to the patient's or client's illness, disability, and problems.
- Use the scientific method for solving treatment problems.
- Work closely with other people, and be aware of his or her own feelings and sensitive to the impact of his or her behavior on others.
- Determine her or his individual need for personal and professional growth and accept the responsibility for continuing to improve her or his abilities.

The therapist in rehabilitation provides specialized services that require high moral standards, optimum mental and physical well-being, and an understanding of the nature of the therapist's own life and the world in which he or she lives.

### Admission

Students currently complete a minimum of two years of preprofessional study in liberal arts before applying for admission to the professional programs, which begin in the junior year. Requirements for preprofessional curricula are detailed under separate sections for occupational therapy and physical therapy.

For detailed information about application procedures for the programs in occupational therapy and physical therapy, refer to their separate sections. Because enrollment in both these professional programs is limited, it is suggested that all students intending to pursue these majors consider applying to other universities and colleges as well as to the University of Minnesota.

The Programs in Occupational Therapy and Physical Therapy acknowledge that a qualified individual with a disability may be admitted to either of these accredited

programs. Graduates must meet entry level criteria of the professions, successfully pass certification examinations and meet individual state practice acts in order to practice their respective professions.

For information about admission to other colleges and universities offering professional programs in physical therapy, career opportunities, and sources of financial aid, write to the American Physical Therapy Association, 1111 North Fairfax Street, Alexandria, VA 22314 (1-800-999-2782).

For information about admission to other professional programs in occupational therapy, career opportunities, and sources of financial aid, write to the American Occupational Therapy Association, 1383 Piccard Drive, Rockville, MD 20850.

**New Students**—Students who have not completed any college work should apply for admission to the College of Liberal Arts and declare a major in pre-occupational or pre-physical therapy. Students already enrolled at the University of Minnesota who wish to change majors should see an adviser as early as possible (refer to the section on advisers).

**Students With Advanced Standing**—Students transferring from other colleges or universities may be admitted with advanced standing by applying to the University and having their credits evaluated. Students who have satisfied all preprofessional requirements may apply directly to the Program in Occupational Therapy or the Program in Physical Therapy. Advanced standing students who have not satisfied preprofessional requirements will usually enroll in the College of Liberal Arts until they are eligible to apply for the professional curriculum. Those who transfer to the University of Minnesota to make up deficiencies in their educational background cannot be assured of being admitted to one of the professional programs and should always consider alternate goals. Students with degrees in other majors may seek admission to one of the undergraduate professional programs on the same basis as other students, or they may want to consider one of the

programs offered at other universities that offer basic professional preparation at the graduate level.

### **Facilities and Resources**

Most of the professional courses are taught in classrooms located on the second floor of the Children's Rehabilitation Center, 426 Church Street S.E., Minneapolis. The offices of the occupational and physical therapy faculty and program directors are on the second and third floors. The secretary is in room 271; for more information, call (612/626-5887).

Students learn occupational and physical therapy concepts in seminars, lectures, recitations, and group discussions, and through group assignments. Professional skills are taught in laboratory sessions. Videotape and many other audiovisual aids are used in classroom teaching, and in some courses programmed textbooks are used. Open communication between students and teachers is encouraged.

### **Advisers**

*Preprofessional Program*—College of Liberal Arts students should seek assistance in program planning at the Pre-Health Sciences Advising Center, 30 Johnston Hall (612/624-9006). Advisers in this office are also able to provide information about other health science programs.

Freshmen and sophomores attending other colleges or universities should contact the appropriate health sciences adviser on their campus or write to the occupational therapy or physical therapy program for advice on program planning.

*Professional Program*—Students in the professional programs will be assigned to faculty advisers in the Department of Physical Medicine and Rehabilitation. These advisers are available to assist students in professional development as well as in scholastic or personal matters. Advisers also can direct students to other sources of assistance.

# Occupational and Physical Therapy

## Expenses

*Fees*—Tuition and incidental fees are subject to change; refer to the quarterly *Class Schedule* for current information.

*Other Expenses*—The following is an estimate of special expenses for the professional programs:

*Locker Fee*—\$25

*Uniforms*—\$75

*Books and Laboratory Manuals*—\$1,400-\$1600 (Books may be purchased at the Health Sciences Bookstore, 2-554 Moos Health Sciences Tower.)

*Clinical Education*—Some additional travel expenses may be incurred during clinical education; these expenses will vary according to individual plans. Students do not have to leave the Twin Cities area. Some fieldwork education centers for occupational therapy provide students with small stipends or maintenance expenses, but these cannot be guaranteed, and students should not make plans that depend on such support.

Occupational therapy students are required to pay the same tuition during the summer session as they do during the academic year, because summer fieldwork in occupational therapy involves a full 12-week period. Physical therapy students are required to register for a summer session between their junior and senior year.

## Financial Aid

Students needing financial assistance should apply as soon as possible after January 1 for consideration for the following academic year. Applications should be filed with the Health Professions Program, 2-693 Moos Tower (612/626-2290).

Some financial assistance is available for students in the junior and senior years of professional school. For information about any of the following awards, see an adviser or the director of the Program in Occupational Therapy or Physical Therapy.

*Crippled Child Relief, Inc., Loan Fund*

Short-term interest-free loans are provided in emergency situations.

*Crippled Child Relief, Inc., Scholarship*

Sponsor: Members of Crippled Child Relief, Inc., Minneapolis, Minnesota.

Basis of Award: Awarded to a student in the field of physical medicine and rehabilitation who shows scholarly excellence and dedication and a special interest in helping crippled children.

*Mary McMillan Scholarship*

Sponsor: McMillan Scholarship Program.

Basis of Award: Scholarships of \$500 awarded to outstanding physical therapy students. Only one candidate may be recommended by an institution. Awards are made on a competitive basis; consideration is given to superior scholastic ability and evidence of potential for professional contributions.

*Minnesota Occupational Therapy Association Scholarship*

Sponsor: Members of the state professional association for occupational therapists.

Basis of Award: Awarded annually to a junior or senior in occupational therapy on the basis of scholastic standing, financial need, and professional promise.

In addition, the armed services have professional programs that offer academic preparation. Information may be obtained from local Air Force, Army, and Navy recruiting offices.

## Academic Regulations

*S-N Grading System*—A student may elect to take courses outside of the major field on the S-N (Satisfactory-No Credit) grading system. The credits earned in this manner are not used in computing the student's grade point average (GPA). During the first two years, prerequisite courses for the professional programs may not be taken S-N. (See the preprofessional curricula under the separate occupational therapy and physical therapy sections.) Certain professional level courses may be taken S-N with instructor and department approval.

**Symbols**—A temporary symbol I (incomplete) is assigned when the instructor has insufficient information to assign a permanent grade. To remove an incomplete the student must complete the coursework by the end of the next quarter, unless special permission is obtained in writing from the instructor. If coursework is not completed within the specified time limit, the I becomes a permanent grade of F or N, subject to review by the Student Progress Committee.

**Attendance**—Students are expected to be regular and punctual in class attendance and in clinical work. They are asked to notify instructors in advance, whenever possible, if they do not expect to be present. It is the student's responsibility to make up work missed. Students who fail to appear for an examination without previous permission from the instructor will usually not be allowed to make up the examination.

**Satisfactory Progress and Probation**—Students are expected to maintain satisfactory progress in the professional programs. The programs in physical and occupational therapy each have a Student Progress Committee that reviews the progress of each student at regular intervals. Students must earn no grade lower than a C. Students receiving a grade lower than a C will be placed on academic probation. Subsequent grades lower than a C may result in dismissal from the program. Violations of the conduct code of the University or unsatisfactory classroom/clinical behavior may also be grounds for committee action. See *Policies and Procedures of the Student Progress Committee* revised by the faculties of the programs in occupational and physical therapy in the summer of 1991.

Students should see their instructors or advisers early for help with courses in which they are having difficulty or with problems that are interfering with their progress.

**Discontinuation**—Students whose academic progress is hampered by poor health or personal or family problems may be asked to discontinue their academic work until these conditions have improved.

**Cancelling Out**—Students who are considering cancelling out of school should discuss these plans with their adviser or the program director.

**Readmission**—Students who have left the program in good standing and wish to return to school should discuss their plans with the program director at least a quarter ahead of time.

**Graduation**—The bachelor of science degree will be recommended for students who have successfully completed their program of study with a minimum GPA of 2.00 overall and in the courses of the professional curriculum. In addition, they must have satisfied the liberal education distribution requirements.

In compliance with University guidelines, graduation with honors is limited to 10% of the graduating class. Honors graduates are screened and selected by the Student Progress Committee, with final approval by the faculty. Criteria include a specified GPA in the professional program and superior performance during the full-time clinical placement. To graduate "with distinction," students must earn a GPA of 3.50 to 3.75. To graduate "with high distinction," students must earn a GPA of 3.76 to 4.00.

It is the responsibility of the student to file an application for graduation at Student Relations, 150 Williamson Hall.

### **Student Activities**

In addition to social events available to all students at the University, there are many informal activities arranged by students and faculty members in the occupational and physical therapy professional programs.

Occupational and physical therapy students are encouraged to participate in program planning and decision making. For example, students serve on the occupational therapy curriculum committee.

Student memberships are available in the American Occupational Therapy Association, the American Physical Therapy Association, and the Minnesota Occupational Therapy Association. Students may also join

the Student Occupational Therapy Association at the University.

### **Continuing Education and Graduate Study**

Graduates in occupational and physical therapy, and others with proper educational qualifications, may be allowed to take professional courses to update their knowledge and skills. Those interested must receive permission from the program director, who determines student eligibility and availability of space. Information regarding continuing education for occupational therapy may be obtained from the Director's Office, 378 Children's Rehabilitation Center, Box 388 UMHC, University of Minnesota, Minneapolis, MN 55455 (612/626-5111). Some continuing education courses are offered through the Department of Extension Classes.

Information about continuing education offerings for physical therapy may be obtained from the coordinator of continuing education, John Allison (612/626-5517).

A master of science (M.S.) degree program for physical therapists is offered by the Graduate School. An applicant's record must provide evidence of academic ability and potential to pursue advanced study. Previous or concurrent clinical experience in the practice of physical therapy is preferred. Graduates are expected to be qualified physical therapists with additional advanced expertise in one or more of the following areas: education, administration, clinical specialty, or clinical research.

For the M.S. program the student may select either a Plan A (with thesis) or Plan B (without thesis) curriculum. Further details regarding the program and application procedures are available in the *Graduate School Bulletin*. Information about the graduate program in physical therapy may also be obtained from L. Amundsen, Ph.D., director of graduate study in physical therapy (612/626-3591 or 626-5303).

### **Occupational Therapy**

Dennis Dykstra, M.D., Ph.D., head,  
Department of Physical Medicine and Rehabilitation

*Associate Professor*

Judith Reisman, Ph.D.

*Academic Professional Staff*

Diane R. Anderson, M.P.H.

Rondell R. Berkeland, M.P.H., director

Cheryl L. Meyers, M.S., coordinator,  
clinical education

*Assistant Professor*

Erica Stern, Ph.D.

Julie Thomas, Ph.D.

*Clinical Instructor*

Linda Brodsky, B.S.

Kathryn N. Dole, B.S.

Judy Eggleston, M.P.H.

Anita A. Folch, B.S.

Karen L. Kendrick, B.S.

Linda Lorentzen, B.S.

Elizabeth Rivers, B.S.

Jacqueline V. Zschokke, M.P.H.

### **Overview**

*History*—During World War I, the University of Minnesota offered a short training course for what were then called "reconstruction aides." These people, mostly artists, were given instruction in activities that were thought to be useful in the rehabilitation of soldiers returning from the front. In 1924 the College of Education organized a program in occupational therapy, but it was discontinued during the early 1930s. In 1946, because of a renewed interest in occupational therapy following World War II, the present Program in Occupational Therapy was established in the College of Medical Sciences. Borghild Hansen was appointed director and remained in that position until her death in 1966. Marvin G. Lepley was director of the Program in Occupational Therapy until July of 1986 when Rondell S. Berkeland became the new director.

The Program in Occupational Therapy is accredited by the Committee on Allied Health Education and Accreditation of the American Medical Association and by the American Occupational Therapy Association.

*Philosophy and Objectives*—The occupational therapist is a human service professional who assesses needs, establishes goals, and develops treatment programs for individuals whose abilities to cope with the tasks of living are threatened or impaired by congenital or developmental disability, the aging process, physical injury or illness, or psychological and social disability. An occupational therapist uses task-oriented activities to prevent, minimize, or correct disabling emotional, behavioral, or physical handicaps.

Specific occupational therapy services include providing evaluation of and training in performance of life tasks (including activities of daily living and homemaking); use of adapted equipment and hand splints; use of therapeutic activities to enhance physical, emotional, perceptual-motor, and sensory integrative skills; development of prevocational skills; and removal of architectural barriers. Occupational therapists serve as vital members of a treatment team, consulting with physicians, physical and speech therapists, nurses, social workers, psychologists, vocational counselors, teachers, and other specialists.

*Professional Employment*—Qualified therapists find a variety of employment opportunities. Graduates are employed in rehabilitation centers, hospitals and outpatient clinics, psychiatric facilities, sheltered workshops, public and special schools, nursing homes, home health programs, day care centers, and community health agencies. Therapists may receive commissions in the armed forces or may find employment with the U.S. Public Health Service.

*Program of Study*—Students spend the first two years of study in the College of Liberal Arts at the University of Minnesota or at any

other approved college or university. During this time course emphasis is on the biological sciences, behavioral sciences, and artistic expression. Although there are prerequisite courses, the first two years provide reasonable flexibility for students to use elective courses to broaden their education. At the end of the sophomore year, students apply on a competitive basis for admission to the professional program. The last two years include academic work combined with part-time fieldwork and a minimum of six months of full-time fieldwork. When they complete the prescribed program of study, students receive the bachelor of science degree. Graduates are eligible to become registered occupational therapists by successfully completing the national certification examination of the American Occupational Therapy Certification Board.

### Admission

Resident and nonresident students will be considered. Only those students with a GPA of 2.50 or higher overall and in the required courses in the Physical and Biological Universe and the Individual and Society will be considered. Applicants must have completed some successful work or volunteer experience in a health care or related facility that provided them an opportunity to evaluate their potential for working with persons who are sick or who have physical disabilities or psychosocial dysfunctions. Applicants should assess their interest in the profession by visiting, volunteering, or working in an occupational therapy department. They should be in good health and have the physical capacity to do the work of a therapist. It is particularly important that they have sufficient maturity for and be sincerely interested in working closely with people and dealing with their problems. Because of limitations in space and facilities, admission is currently restricted to 30 students each year. Selection is made on a competitive basis. It is expected that students entering the program intend to complete it.

## Occupational and Physical Therapy

### Application Procedure

University of Minnesota students who have satisfactorily completed the prerequisite courses and have accumulated 80 to 85 credits by end of summer session may apply in 240 Williamson Hall for a change of college transfer to the Program in Occupational Therapy. Students attending other colleges may request an Application for Admission with Advanced Standing from the Office of Admissions, 240 Williamson Hall, University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-2008). Applications and transcripts should be submitted as soon as possible after January 1 and *no later than March 15* for the professional program that begins each fall quarter. The following additional materials should be submitted to the chair of the Occupational Therapy Admissions Committee, Program in Occupational Therapy, 271 Children's Rehabilitation Center, University of Minnesota, 426 Church Street S.E., Minneapolis, MN 55455 (612/626-5887):

- Form A-1, Face Sheet
- Personal Data form
- Check list of course requirements and GPAs
- Evaluations of work and volunteer experience
- Profile of Minnesota Multiphasic Personality Inventory
- Profile of Strong-Campbell Interest Inventory
- Transcript that includes sophomore fall quarter grades
- Transcript or grade report of winter quarter grades (as soon as available)
- List of courses to be taken during spring quarter and the summer session (if applicable)

Forms for and information regarding the above items are available after January 1 each year at the above address. On-campus students are expected to pick up an application packet. Packets will be mailed to off-campus students upon request. The

deadline for submission of these materials is *April 1*.

*American Occupational Therapy Association*—For further information regarding other universities and colleges offering programs in occupational therapy, career opportunities, and sources of financial aid, write to the American Occupational Therapy Association, Inc., 1383 Piccard Drive, P.O. Box 1725, Rockville, Maryland 20850 (301/948-9626).

### Preprofessional Curriculum

Students applying to the Program in Occupational Therapy who will be earning their first baccalaureate degree are required to meet the University of Minnesota course requirements established by the Council on Liberal Education (CLE). These include courses from the Diversified Core, Designated Themes, and Writing Intensive areas. Writing Intensive requirements will become effective for students beginning full-time enrollment in fall 1995. Students with a college degree applying to the Program in Occupational Therapy are exempt from the CLE requirements but must have completed specific occupational therapy prerequisites identified below. Refer to your adviser or the *College of Liberal Arts Bulletin* for information on appropriate categories for specific courses not in this bulletin.

#### *Diversified Core*

Physical and Biological Sciences, 12 cr minimum, must include lab.  
History and Social Science, three courses, 12 cr minimum. One course must be in a historical perspective category.  
Arts and Humanities, three courses, 12 cr minimum.  
Mathematical Thinking, one course, 3 cr minimum.

#### *Designated Themes*

Six courses from the following:  
cultural diversity  
international relations  
citizenship and public ethics  
environment

*Writing Intensive*

One rhetoric composition course plus four courses classified as writing intensive.

*Occupational Therapy prerequisites:*

Two English composition courses

Medical terminology

Descriptive statistics

Philosophy/logic

Students must have basic word processing skills.

General biology/zoology

Human anatomy

Human physiology

Public health: personal and community health

General psychology

Abnormal psychology

Human development across the life span

One additional cultural diversity course (3-5 credits): The course should enhance student's diversity, broaden perspective differences between cultures, families, individuals, as a basis for personal and professional interaction. The course may be from numerous areas of study, including, but not limited to psychology, sociology, anthropology, and cultural studies.

Complete a minimum of nine credits representing three different studio/applied arts. At least one of the three must be a craft-based course.

Prospective students should consult with the Pre-Health Sciences Advising Center, 30 Johnston Hall (612/624-9006), to ensure they have met both CLE requirements and the occupational therapy prerequisites.

**Professional Curriculum****JUNIOR YEAR***Fall*

CBN 3058 .....	5
LaMP 5172 .....	4
PMed 5300 .....	5
PMed 5340 .....	4
PMed 5343 .....	2

*Winter*

AdPy 5121 .....	2
Neur 5121 .....	2
PMed 5182 .....	5
PMed 5311 .....	3
PMed 5312 .....	2

*Spring*

PMed 5161 .....	5
PMed 5341 .....	5
PMed 5342 .....	6
PMed 5392 .....	4

**SENIOR YEAR***Fall*

PMed 5343 .....	5
PMed 5360 .....	3
PMed 5375 .....	4
PMed 5394 .....	4

*Winter*

PMed 5344 .....	3
PMed 5380 .....	3
PMed 5391 .....	4

*Spring*

PMed 5396 .....	Ar
-----------------	----

**SUMMER SESSION (BOTH TERMS)  
OR FALL QUARTER**

PMed 5397 .....	Ar
PMed 5398 .....	Ar

**Fieldwork Education** (PMed 5396-5397-5398)—A minimum of six months of fieldwork is required. During this period the student works with patients with both physical and psychosocial dysfunctions; some students elect an additional experience in a community setting.

Students are individually assigned to cooperating hospitals and community agencies within the limitations of available openings. Students must agree to abide by the hospital's/agency's policies and conduct code. Unsatisfactory performance in the clinical setting may be grounds for academic probation or dismissal from the program.

## Physical Therapy

### Professor

Dennis Dykstra, M.D., Ph.D., head,  
Department of Physical Medicine and  
Rehabilitation

### Associate Professor

John D. Allison, M.S., PT  
Corinne T. Ellingham, M.S., PT, coordinator,  
clinical education  
Richard DiFabio, M.S., Ph.D., PT, director  
of graduate studies  
Glenn N. Scudder, M.S., PT, assistant  
director

### Assistant Professor

Patricia Montgomery, Ph.D., PT  
LaDora Thompson, Ph.D., PT

### Instructor

Krista Coleman, M.S., M.S.C., PT  
Marguerite Gardner, M.S., PT, coordinator,  
continuing education

### Clinical Instructor

Joan Bohmert, B.S., PT  
Eugene Connolly, B.S., PT  
Thomas Coplin, B.S., PT  
Kathleen Fleischaker, B.S., PT  
Michael Gosha, B.S., PT  
Donnabelle Hansen, B.S., PT  
Joyce Jensen, B.S., PT  
Barbara Jirik, B.S., PT  
Barbara Linderman, B.S., PT  
Dennis Lutterman, B.S., PT  
Michael Parker, Ph.D., PT  
Peter Polga, B.S., PT  
Greg Santema, B.S., PT  
Judy Taplin, B.S., PT

## Overview

*History*—The Program in Physical Therapy at the University of Minnesota began in 1942 as a 12-month certificate program under the direction of Miland E. Knapp, M.D. In 1946 it became a four-year degree program and was placed under the direction of Ruby Green Overmann, education director, and Frederic J. Kottke, M.D., medical director. After Ruby Green Overmann's retirement in

1957, Wilbur L. Moen became educational director. From 1978 to 1993, John D. Allison was educational director.

Throughout its history, the Program in Physical Therapy has been approved by a national accrediting agency.

*Physical Therapy Practice*—Physical therapy is concerned with the prevention of disability and the restoration of function following disease, injury, or loss of bodily part. Its goal is to help patients reach their maximum performance potentials and assume their places in society while learning to live within the limits of their capabilities. Physical therapists interact with a wide variety of health professionals in providing services. Physical therapy involves evaluation, treatment planning, performance of tests and measurements, instruction, consultative services, and supervision of support personnel. The therapeutic properties of exercise, heat, cold, electricity, ultrasound, massage, and other rehabilitative procedures are used during treatment. In order to adapt treatment to the patient's reactions, the therapist must have a thorough background in the biological and physical sciences and pathology.

*Program of Study*—The educational program in physical therapy requires four years of study and leads to a bachelor of science degree with a major in physical therapy. A minimum of 180 quarter credits are required for the degree. The student spends a minimum of two years in a pre-physical therapy program that emphasizes liberal education studies and includes a foundation in the behavioral, biological, and physical sciences. At the end of the sophomore year, students apply for admission to the professional program, which takes two academic years and one summer term to complete. Graduates of the program are eligible for state registration or licensure according to the laws of various states.

### Admission

A student planning to enter a health profession such as physical therapy should seriously consider whether she or he has the necessary personal qualifications for working closely with people and for dealing with their problems. Exposure to the health care delivery system through employment or volunteer work is considered an important prerequisite. The student must be in good physical and mental health to achieve success in physical therapy; a physical examination by a physician is required before beginning the professional program.

Because of limitations in space, facilities, and resources, enrollment is restricted. Applicants are selected on a competitive basis. To be eligible for admission, the student should complete a minimum of 86 quarter credits including the required courses or their equivalents. A GPA above 2.50 (C+) in coursework in the physical, biological, and behavioral sciences is required as an indication of probable success in the program. In selecting students, applicants who meet University requirements for Minnesota residency are given priority. Consideration will be given to minority applicants (regardless of their residency status) and nonresidents who have special reasons to attend the University of Minnesota. Applicants to the Program in Physical Therapy who are residents of states or provinces that have tuition reciprocity agreements with Minnesota and have taken 40 credits at the University or other Minnesota colleges under reciprocity agreements, are given the same consideration for admission as Minnesota residents.

### Application Procedure

University students who have satisfactorily completed the prerequisite courses and have accumulated 85 to 90 credits may apply in 240 Williamson Hall for transfer to the Program in Physical Therapy. Students attending other colleges may request an Application for Admission from the Office of Admissions, 240 Williamson Hall,

University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-2008). Applications and transcripts should be submitted as soon as possible after December 1 and no later than February 1 for the professional program that begins each fall quarter. The following additional materials should be submitted to the chair of the Physical Therapy Admissions Committee, Program in Physical Therapy, 271 Children's Rehabilitation Center, University of Minnesota, Box 388 UMHC, Minneapolis, MN 55455 (612/626-5887):

- Personal Data form
- Checklist of course requirements and GPAs
- Evaluations of work and volunteer experience
- Summary of objective measures
- Profile of Minnesota Multiphasic Personality Inventory
- Profile of Strong-Campbell Interest Inventory
- Transcript that includes sophomore fall quarter grades
- List of courses to be taken during spring quarter and the summer session (if applicable)

*Forms for and information regarding the above items are available after December 1 each year at the above address. Packets will be sent to applicants upon receipt of their application from Admissions. The deadline for submission of the packet materials is March 1.*

### Preprofessional Curriculum

Students applying to the Program in Physical Therapy who will be earning their first baccalaureate degree are required to meet the University of Minnesota course requirements established by the Council on Liberal Education (CLE). These include courses from the Diversified Core, Designated Themes, and Writing Intensive areas. Writing Intensive requirements will become effective for students beginning full-time enrollment in fall 1995. Students with a college degree applying to the Program in

# Occupational and Physical Therapy

Physical Therapy are exempt from the CLE requirements but must have completed specific (or comparable) courses listed under the categories below.

Required and elective courses to be taken before entering the program are listed below. Courses may be taken S-N unless otherwise indicated.

### Diversified Core

Physical and Biological Sciences, 12 cr minimum, must include lab.

Biol 1009—General Biology (5)

A second biology course of the student's choice.

CBN 3001—Elementary Anatomy (4)

Phsl 3051—Human Physiology (5)

Chem 1051-1052—Chemical Principles I-II (10) or Chem 1001-1002

—Chemical Principles and Covalent Systems

Phys 1041-1042—Introductory Physics

I-II (8) or Phys 1104-1105-1106

—General Physics I-III (12)

History and Social Science, three courses, 12 cr minimum. One course must be in a historical perspective category.

Psy 1001—General Psychology (5)

Psy 3604—Introduction to Abnormal Psychology (4)

Human development across the life span course(s) (4-5 cr)

Arts and Humanities, three courses, 12 cr minimum.

Mathematical Thinking, one course, 3 cr minimum.

### Designated Themes

Six courses from the following :

cultural diversity

international relations

citizenship and public ethics

environment

### Writing Intensive

One rhetoric composition course plus four courses classified as writing intensive.

*Note:* All prerequisite courses must be completed before the student enrolls in the professional program. If more than one course (maximum of five quarter credits)

remains to be completed after the spring quarter of the sophomore year, the student will not be considered for admission in that year. A student with only one course remaining at the end of the spring quarter will be required to complete the course by September 1.

**Suggested Program**—Students attending other colleges should select equivalent courses carrying comparable credit. All physical and biological sciences, except physics (suggested, however), should have an integral laboratory section. Physics courses should include electricity, magnetism, waves, electric circuits, light, mechanics, heat, atoms and spectra, fluids, and gases. Statistics content should include descriptive statistics, measures of central tendency, deviation, and correlation. It is recommended that content in hypothesis testing for simple 2 and K-group designs be included. The anatomy course should cover major organ systems of the human. Physiology content should include mammalian if not specific human physiology.

Approximate quarter credits follow the courses for the suggested program below.

### FRESHMAN YEAR

English Composition (or exemption) .....	8
General Biology .....	9-10
Elementary Anatomy .....	4
General Chemistry .....	10
Electives .....	14
	45-46

### SOPHOMORE YEAR

Physics .....	8-10
General Psychology .....	5
Abnormal Psychology .....	4
Human Physiology .....	5
Medical Terminology .....	2
Statistics .....	4-5
Human development across life span .....	4-5
Electives .....	13-15
	45-51

**Professional Curriculum**

**JUNIOR YEAR**

*Fall*

CBN 3058 .....	5
EPsy 5260 .....	4
LaMP 5170 .....	4
PMed 5215 .....	2
PMed 5340 .....	4
	19

*Winter*

PMed 5221 .....	4
PMed 5230 .....	5
PMed 5182 .....	5
Neur 5121 .....	2
	16

*Spring*

PMed 5161 .....	5
PMed 5222 .....	4
PMed 5281 .....	4
PMed 5283 .....	4
	17

**SUMMER SESSION**

PMed 5255 .....	3
-----------------	---

**SENIOR YEAR**

*Fall*

PMed 5256 .....	2
PMed 5275 .....	3
PMed 5282 .....	4
PMed 5284 .....	4
PMed 5288 .....	4
	17

*Winter*

PMed 5270 .....	4
PMed 5289 .....	3
PMed 5290 .....	3
PMed 5293 .....	3
AdPy 5121 .....	2
	15

*Spring*

PMed 5295 .....	15
-----------------	----

**Clinical Education**—Each student in physical therapy is required to complete a minimum of 19 weeks of full-time clinical education. This full-time experience is divided into four blocks of time: five weeks late summer between the first and second year; two to three weeks fall quarter, second year; two six-week blocks spring quarter; and first summer session of the second year of the professional program. These internships are chosen from the following areas: general-acute, pediatrics, geriatrics, rehabilitation, orthopedic, home health, and sports medicine. A supervised two- or three-week interim affiliation is scheduled fall quarter of the senior year. Integrated, part-time clinical experience is scheduled in conjunction with selected laboratory courses.

Within the limits of availability of assignments, students are allowed some choice in planning their clinical education experiences. Assignments are arranged by the Academic Coordinator for Clinical Education (ACCE) and the supervisor of the clinical center. Once a student has accepted an assignment, she or he agrees to abide by the policies, procedures, and regulations of the center. The Program In Physical Therapy faculty believe that direct patient care is a privilege and an essential part of professional health care education. It is also recognized that the primary responsibility of the clinical centers is to provide health care to its clients, and that students assigned to clinical centers must follow the policies and procedures of that center. Written agreements of affiliation between the University and the clinical training center are to be reviewed by the student before the clinical assignment begins. Individual centers may have special requirements such as dress codes, unusual hours, or specific physical examinations or health requirements. In addition, upon admission to the professional program, students are required to have a general physical examination before participating in full-time clinical education experiences. This includes an update of their vaccinations.

Generally, students will be expected to wear a white uniform top, navy blue slacks/

---

## Occupational and Physical Therapy

---

skirt and appropriate street/walking shoes. University of Minnesota nametags are required as part of the clinical dress code.

During clinical education, students will be responsible for their own health insurance, transportation, parking, and board and room, unless stated otherwise by the clinical center.

A student may miss one full day of clinical education for a legitimate reason without being required to make it up; any additional absence, for whatever reason, must be made up. The clinical instructor at the center and the academic coordinator of clinical education will decide what constitutes a legitimate absence. Physical therapy departments may be open seven days per week and 10 to 12 hours per day. Thus students may be required to work extended hours or weekends, and they should plan accordingly to avoid scheduling conflicts and absences.

Clinical education courses (PMed 5215, 5255, 5256, and 5295) carry academic credit and are graded S-N. Students pay regular tuition and fees during clinical education. They may, however, be exempted from paying the student services fee if their clinical assignment is outside the nine-county Twin Cities metropolitan area (Hennepin, Ramsey, Dakota, Washington, Scott, Carver, Chisago, Anoka, and Wright counties). If the exemption is allowed, students will be expected to pay for their own health care and arrange for their own insurance. The University requires that students have hospitalization insurance. Students may elect to purchase outpatient coverage and University-sponsored hospital coverage directly from the Boynton Health Service. Further information about the fee exemption and health coverage is available at Boynton Health Service.

Clinical practice performance is reviewed and evaluated by the student and the clinical instructor. Students are responsible for keeping records while in the clinic and evaluating their experience. Unsatisfactory behavior or performance in the clinical setting may be grounds for academic

probation or dismissal from the program. Students who receive a grade of N in a clinical education course are required to complete the course before graduation.

Students may appeal any policies or decisions made by a clinical center or the University by following the appeals procedure outlined by the University Senate and available to all students through the University appeals committees.

## Occupational and Physical Therapy Courses

### Physical Medicine and Rehabilitation (PMed)

#### **1002. ORIENTATION TO PHYSICAL THERAPY.**

(1 cr; offered fall and winter only; S-N only)  
Overview of the profession through lectures, demonstrations, films, and tours. Provides factual information and guidance for students planning to enter professional training in physical therapy.

#### **1003. ORIENTATION TO OCCUPATIONAL THERAPY.** (1 cr; offered fall and spring only; S-N only) Survey of the profession through lectures, films, demonstrations, and tours. For students investigating the field of occupational therapy.

#### **5161. THEORY OF PHYSICAL MEDICINE AND REHABILITATION APPLIED TO MEDICAL SCIENCES.** (5 cr; prereq regis OT or PT)

Lectures focusing on such related fields as surgery, orthopedics, pediatrics, dermatology, medicine, neurology and speech. Correlation clinic includes presentation of patients and discussion of treatment problems.

#### **5182. FUNCTIONAL NEUROANATOMY AND NEUROPHYSIOLOGY.** (5 cr; prereq regis OT or PT) Neuroanatomic structures as functional systems and basic neurophysiologic concepts with emphasis on applications for understanding and treating physical dysfunctions.

#### **5215. INTRODUCTION TO PHYSICAL THERAPY CLINICAL EDUCATION.** (1 cr; prereq regis PT)

An attitudinal approach to health care using exposure to the affective domain of patient care. Development of communication and observational skills. Periods of supervised clinical education followed by group discussion. Tours, lectures, and discussions used to develop professional attitudes toward death and dying, the aging process, and medical ethics.

#### **5221. THERAPEUTIC PROCEDURES I.** (5 cr)

Theory and techniques, therapeutic massage, ultraviolet radiation, medical and athletic bandaging, asepsis and isolation, thermotherapy, hydrotherapy, positive pressure devices and volumetric measurements.

**5222. THERAPEUTIC PROCEDURES II.** (4 cr; prereq regis PT)

Theory and technique of electrotherapy. Methodology used in measuring patients responses to treatment. Use of goniometry, sensory testing, and muscle testing procedures with patients. Problems in evaluation, documentation, and ambulation training.

**5230. THEORY AND TECHNIQUE OF MUSCLE FUNCTION, TESTS, AND MEASUREMENTS.** (5 cr; prereq regis PT)

Review of muscles and joints with regard to anatomical and physiological functions; analysis of body mechanics, coordinated movement, and strength. Procedures in assessment of body function.

**5255. CLINICAL EDUCATION IN PHYSICAL THERAPY.** (Cr ar; prereq regis PT; offered either summer term)

Supervised clinical practice at affiliated hospitals.

**5256. SPECIAL INTERIM CLINICAL EDUCATION IN PHYSICAL THERAPY.** (Cr ar; prereq regis PT; offered every qtr and both summer terms)

Full-time, supervised clinical experience at a center that reflects the student's interest.

**5270. REHABILITATION PROCEDURES.** (3 cr; prereq regis PT)

Integration of theoretical principles with treatment techniques in the management of selected long-term disabilities. Consideration of the patient's environment, lifestyle, and needs in the selection of treatment goals.

**5275. PATIENT MANAGEMENT AND CLINICAL ANATOMY.** (3 cr)

Integration of anatomy and pathokinesiology in physical therapy assessment and treatment planning for musculoskeletal conditions.

**5281. THEORY OF THERAPEUTIC EXERCISE.** (4 cr)

Fundamental principles of physiology, physics, and neurology as a basis for therapeutic exercise. Response of tissue to treatment for loss of mobility and strength; cardiopulmonary treatment.

**5282. THEORY OF THERAPEUTIC EXERCISE.** (4 cr)

Fundamental principles of neurodevelopment, neurophysiology, and neurology as a basis for therapeutic intervention in motor dysfunction.

**5283. TECHNIQUES OF THERAPEUTIC EXERCISE.** (4 cr)

Application of principles and techniques of therapeutic exercise for mobility, strength, and selected clinical problems.

**5284. TECHNIQUES OF THERAPEUTIC EXERCISE.** (4 cr)

Application of the principles and techniques of therapeutic exercise for movement dysfunction related to conditions of musculoskeletal and central nervous systems.

**5288. EVALUATION PROCEDURES II.** (4 cr; prereq regis PT)

Techniques of electrodiagnosis, gait analysis, posture evaluation, motor and perceptual testing. Principles of orthotics.

**5289. PATIENT ASSESSMENT.** (3 cr; prereq regis PT)

Assessment of clinical patients and rationale of treatment to attain rehabilitation goals.

**5290. ADMINISTRATION.** (3 cr; prereq regis PT)

Physical therapy administration and management. Field experience with physical therapy consultants, teaching practicum, individual student projects, and pilot research studies designed to illustrate the role of the practicing physical therapist in the areas of education, research, and consultation with professional colleagues.

**5292. INTRODUCTION TO RESEARCH.** (2 cr; prereq regis PT)

Basic concepts of research; introduction to research design; levels of measurement, sampling methods.

**5293. INTRODUCTION TO RESEARCH DESIGN.** (3 cr; prereq regis PT)

Predictive research; elementary statistical concepts; analysis of scientific literature; research proposals.

**5294. INDEPENDENT STUDY IN PHYSICAL THERAPY.** (Cr ar; prereq regis PT)

Individual study in areas related to physical therapy.

**5295. CLINICAL EDUCATION IN PHYSICAL THERAPY.** (15 cr; prereq regis PT)

Supervised clinical practice at affiliated hospitals.

**5300. CONCEPTS FOR OCCUPATIONAL THERAPY PRACTICE.** (5 cr; prereq regis OT)

Critical thinking, ethics, professional resources/organizations, patient-therapist relationship. Level I fieldwork experience.

**5311. THERAPEUTIC OCCUPATION:**

**INDIVIDUAL FOCUS.** (3 cr; prereq regis OT)

Bases for therapeutic occupation, activity analysis, application to patient performance deficits.

**5312. THERAPEUTIC OCCUPATION: GROUP FOCUS.** (2 cr; prereq regis OT)

Development, practical application, and analysis of activity groups as therapeutic occupation.

**5341. INTRODUCTION TO ASSESSMENT AND INTERVENTION PROCESSES.** (5 cr; prereq regis OT)

Assessment concepts, techniques, and application to patient populations with both mental health and physical disabilities components. Treatment planning and documentation.

**5342. COMPENSATORY REHABILITATION: ASSESSMENT AND INTERVENTION.** (6 cr; prereq regis OT)

Assessment of daily living performance areas; adaptation techniques to compensate for performance deficits. Level I fieldwork experience.

# Occupational and Physical Therapy

## **5343. SPECIALTY TOPICS: ASSESSMENT AND INTERVENTION.** (5 cr; prereq regis OT)

Assessment of intervention for patient populations requiring specialized approaches. Application of critical thinking skills to unique case problems. Level I fieldwork experience.

## **5344. NEUROREHABILITATION: ASSESSMENT AND INTERVENTION.** (8 cr; prereq regis OT)

Assessment and intervention related to perception, cognition, reflexes, sensory integration, and motor control. Application to individuals with multiple performance component deficits.

## **5360. DYNAMICS OF GROUP MODELS.** (3 cr; prereq regis OT)

Application of group/team dynamics in diverse professional settings.

## **5370. THEORY OF OCCUPATION.** (3 cr; prereq regis OT)

Occupational therapy frames of reference, role of activity, and historical development of profession.

## **5375. COMMUNITY RESOURCES AND HEALTH CARE ISSUES.** (4 cr; prereq regis OT)

Impact of individual and system characteristics on availability, accessibility, and acceptability of service delivery models. Identification and evaluation of community resources; principles of adult education.

## **5380. MANAGEMENT OF OCCUPATIONAL THERAPY SERVICES.** (3 cr; prereq regis OT)

Principles of administration, supervision, and organization of occupational therapy services.

## **5391. WORK ACROSS THE LIFE SPAN: ASSESSMENT AND INTERVENTION.** (4 cr; prereq regis OT)

Assessment and intervention to facilitate work roles throughout the life span. Field experience.

## **5392. METHODS OF SCIENTIFIC RESEARCH.** (4 cr; prereq regis OT)

Analysis of scientific literature and development of research proposals.

## **5393. KINESIOLOGY.** (3 cr; prereq regis OT)

Analysis of body mechanics and coordinated movement.

## **5394. ORTHOTICS.** (4 cr; prereq regis OT)

Analysis, design, and construction of orthotic devices.

## **5395. INDEPENDENT STUDY IN OCCUPATIONAL THERAPY.** (Cr ar; prereq regis OT)

Individual study in areas related to occupational therapy.

## **5396-5397-5398. FIELDWORK EDUCATION IN OCCUPATIONAL THERAPY.** (Cr ar; prereq regis OT)

Six to eight months of supervised training in affiliated hospitals and community agencies.

## **Required Courses Offered by Other Units**

### **AdPy 5121. DESCRIPTIVE PSYCHIATRY.** (2 cr; prereq regis OT or PT)

Etiology of mental illness including dynamic concepts, personality development, symptom formation, classification of mental illness, treatment presentation. Case presentation.

### **CBN 3058. ANATOMY OF THE EXTREMITIES.** (5 cr; prereq 1004, regis OT or PT)

Regional approach to gross human anatomy emphasizing skeletal, muscular, circulatory, and peripheral nervous systems of the extremities and trunk. Lecture, prosection, and lab with dissection of cadavers.

### **EPsy 5260. INTRODUCTORY STATISTICAL METHODS** (4 cr; prereq physical therapy student or #)

Techniques for organizing and presenting data; descriptive indices of central tendency, variability, and bivariable correlation/regression; procedures for making inferences concerning means and proportions.

### **LaMP 5172. LABORATORY MEDICINE AND PATHOLOGY.** (4 cr; prereq regis nursing or OT or PT or #)

Basic pathologic disease process; terminology. Disease by organ system; clinical and lab manifestations.

### **Neur 5121. DESCRIPTIVE NEUROLOGY.** (2 cr; prereq regis OT or PT)

Central and peripheral nervous system. Correlation of neuroanatomy, neurophysiology, clinical neurology, and pathology of the nervous system.

Related Undergraduate Offerings



---

## Related Undergraduate Offerings

---

*For general information about allied health professions, contact the Office of the Coordinator for Allied Health Programs, 15-170 Phillips-Wangensteen Building, Box 198, 516 Delaware Street S.E., Minneapolis, MN 55455 (612/625-9490).*

### Dental Hygiene Program

The Program in Dental Hygiene was established at the University of Minnesota in 1919 and is fully accredited by the Commission on Dental Accreditation. A baccalaureate degree program was initiated in 1990. It is the only degree-granting program in Minnesota as well as the only program affiliated with a school of dentistry.

The goal of the program is to prepare a liberally educated person who can practice as a dental hygienist in a variety of dental hygiene roles and health care settings. This educational program emphasizes the liberal arts and the basic, behavioral, and dental sciences. Students develop dental hygiene clinical and interpersonal skills in a variety of clinical settings in preparation for providing preventive dental hygiene services to the public. The curriculum consists of the preprofessional program (one year) in the College of Liberal Arts or its equivalent and the professional program (three years) in the School of Dentistry Division of Dental Hygiene.

The graduate is eligible for licensure upon successful completion of both a written National Board Dental Hygiene Examination and a clinical examination. The licensed dental hygienist practices in accordance with the requirements of individual state dental practice acts.

For admission to the professional program, the student must have completed, or present adequate plans to complete, the preprofessional course requirements. The major criteria for admission are satisfactory academic performance as judged by the applicant's GPA in prerequisite coursework and standardized tests. Admission is competitive and occurs once a year for fall quarter. Contact the Division of Dental

Hygiene for complete information on the preprofessional and professional course requirements.

Students in residence at the University of Minnesota apply by submitting an Application for Change of College or Status with the Office of the Registrar between January 1 and April 15 of the desired year of entry. Students attending other colleges and universities apply by submitting the Application for Admission to the Office of Admissions. For more information, see the *School of Dentistry Bulletin* or contact Dr. Kathleen Newell, 9-436 Moos Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-9121).

### Health Sciences Interdisciplinary Courses

The Health Sciences Educational Policy Committee has identified several courses that serve interdisciplinary educational objectives. These courses improve student access to general health sciences activities and prepare students for the cooperative delivery of health care as members of health professional teams.

For a course guide or more information, contact Health Sciences Learning Resources, Box 734 UMHC, 420 Delaware Street S.E., University of Minnesota, Minneapolis, MN 55455 (612/624-5909 or 612/624-7102).

### Inter-College Program

The Inter-College Program of University College allows students to design an individual program of study that is a credit-based alternative to traditionally structured degree majors. Students work with college advisers to plan an intercollegiate or interdisciplinary program leading to a bachelor's degree. The application process usually takes six to ten weeks and includes preparing a carefully conceived statement of educational objectives and a proposed list of courses.

The Inter-College Program has guidelines for students who wish to design an individualized degree program in health and wellness. The guidelines include a set of core requirements, suggested courses to fulfill these requirements, and a matrix comparing the health and wellness guidelines with requirements for other baccalaureate and professional programs in health sciences.

For more information, contact the Inter-College Program, 107 Armory, University of Minnesota, 15 Church Street S.E., Minneapolis, MN 55455 (612/624-2004).

### **Nurse Anesthesia Program**

The nurse anesthesia program, offered by the Medical School through the Department of Anesthesiology, trains certified registered nurse anesthetists (CRNAs) to be educators and managers in nurse anesthesia and enhances the technical competencies of certified nurse anesthetists.

To be admitted to the program, applicants must be nurses who are certified as anesthetists. After admission to the program, students are given 150 "blanket credits" based on previous academic and professional work. To complete the program, students complete 60 more academic credits: 15 credits of clinical work, 25 credits of coursework in the Medical School, and 20 credits of electives. Students who complete the program are granted a bachelor of science in nurse anesthesia (B.S.N.A.) by the Medical School.

Detailed information about the program is available from Shirley Bell, Director, Nurse Anesthesia Program, Box 294 Mayo Memorial Building, University of Minnesota, 420 Delaware Street S.E., Minneapolis, MN 55455 (612/624-3161).

### **Nursing**

The School of Nursing offers a four-year program leading to the bachelor of science in nursing (B.S.N.) and eligibility to take the state examination for licensure as a registered nurse (RN). The program prepares

nurses who are fully responsible practitioners of professional nursing in the contemporary health care system and ready to participate in molding the future direction of nursing. The program builds a foundation for graduate study and for leadership roles.

The two years of preprofessional (pre-nursing) study (90 quarter credits) may be taken at the College of Liberal Arts, University of Minnesota, or at any regionally accredited college or university where the required courses may be completed. Prerequisites for admission include:

- Writing practice (Composition)
- General chemistry
- General biology
- Biochemistry or organic chemistry
- Human anatomy
- Human physiology
- Microbiology
- General nutrition
- Introductory sociology
- Cultural anthropology
- General psychology
- Abnormal psychology
- Small group dynamics
- Family theory
- Human growth and development
- Statistics
- Upper division writing

The professional major is a two-year plan during which students acquire the knowledge and develop the skills of professional nursing. Through classes, seminars, projects, and laboratories (including clinical assignments), the role of nursing and nurses and the major health care issues of the day are learned. Clinical assignments are likely to be in acute care settings, homes, communities, schools, laboratories, and with clients of all age groups and varied sociocultural backgrounds.

In addition to the required courses listed above, an admission GPA of 2.80 is preferred and applicants must submit a written goal statement. An honors program is offered to those students who qualify, which allows for individual explorations by nursing majors.

---

## Related Undergraduate Offerings

---

The school also offers programs leading to the master of science degree and Ph.D. in nursing.

For more information, see the *School of Nursing Bulletin* or contact the Admissions Office, School of Nursing, 5-160 Health Sciences Unit F, 308 Harvard Street S.E., Minneapolis, MN 55455 (612/624-4454).

### Nutrition

This bachelor of science degree program is for those interested in the field of nutrition and its various applications in dietetics, public health, and nutrition science. Employment opportunities are wide-ranging in the areas of health and wellness.

Students must complete the organic chemistry sequence before beginning courses normally scheduled in the junior year; in addition, FSCN 1612—Principles of Nutrition is highly recommended. Transfer students who have completed organic chemistry or biochemistry courses that are not as extensive as those required must take additional courses.

All students completing 100 credits or more are required to meet with the nutrition special adviser for program evaluation and selection of the dietetics or nutrition science option. To be admitted, transfer students must have a 2.50 GPA and students expecting to apply for graduate school, an internship, or the Coordinated Program in Dietetics should maintain a GPA above 2.80.

Students wanting to become Registered Dietitians need to complete an approved or accredited professional experience and pass the national registration examination. The professional experience can be completed through a postbaccalaureate dietetic internship or by completion of the Coordinated Program in Dietetics offered by the University's Department of Food Science and Nutrition. After completing the academic and experience requirements, graduates are eligible to take the registration examination.

Students interested in medical school, graduate school, or other professional postgraduate programs should complete the nutrition science option and maintain a GPA above 3.00.

This program is open to students registered in either the College of Agriculture or the College of Human Ecology. Faculty advisers are normally from the Department of Food Science and Nutrition, which is jointly administered by the two colleges. For more information, see the bulletin of the College of Human Ecology or the College of Agriculture, or contact Linda Brady, Department of Food Science and Nutrition, 225 Food Science and Nutrition Building, University of Minnesota, 1334 Eckles Avenue, St. Paul, MN 55108 (612/624-9211).

### Pharmacy

The only pharmacy school in Minnesota, the College of Pharmacy ranks as one of the top three pharmacy schools in the country. Career options for pharmacy graduates are expanding as pharmacists become increasingly involved in primary patient care. Graduates are eligible to complete the examination for licensure as registered pharmacists by the Minnesota Board of Pharmacy and to practice pharmacy in Minnesota.

The college has offered two professional degrees, the bachelor of science (B.S.) in pharmacy and the doctor of pharmacy (Pharm.D.). However, it is uncertain whether the B.S. will be available for students entering fall 1994. For more information contact the College of Pharmacy, Office of Student Affairs, 5-110 Health Sciences Unit F, University of Minnesota, 308 Harvard Street S.E., Minneapolis, MN 55455 (612/624-9490).

## **Radiologic Technology Program**

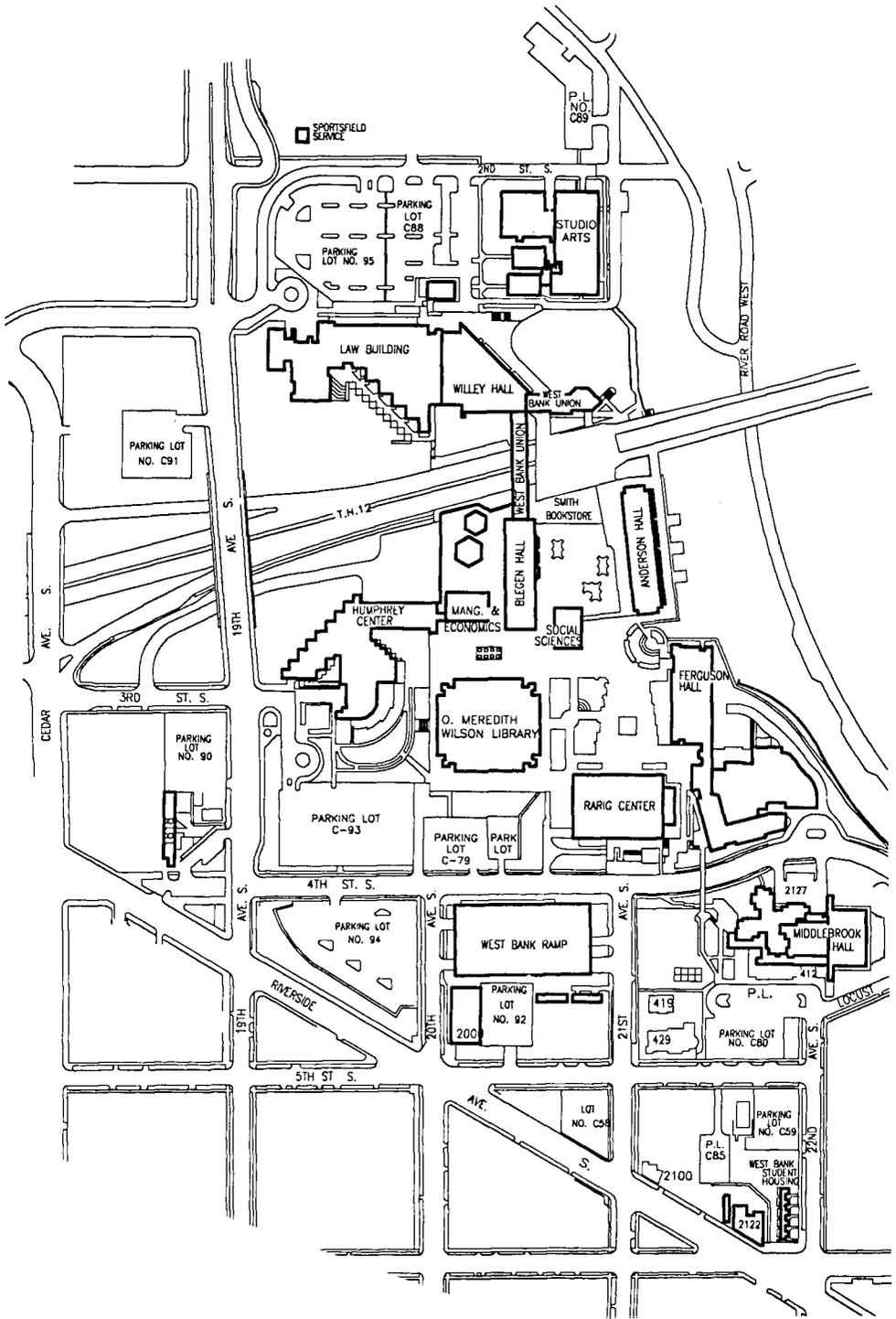
Students in the radiologic technology program combine 45 credits of radiologic technology coursework and experience with 47 credits of general education coursework through Normandale Community College (NCC). Students who complete the program earn an associate in science degree from NCC.

After successful completion of the national registry examination, students will receive certification from the American Registry of Radiologic Technologists and may join the American Society of Radiologic Technologists. Students who complete the radiologic technology program and are certified as radiographers are qualified to use radiographic equipment, perform patient procedures, process film, and assist radiologists in special procedures.

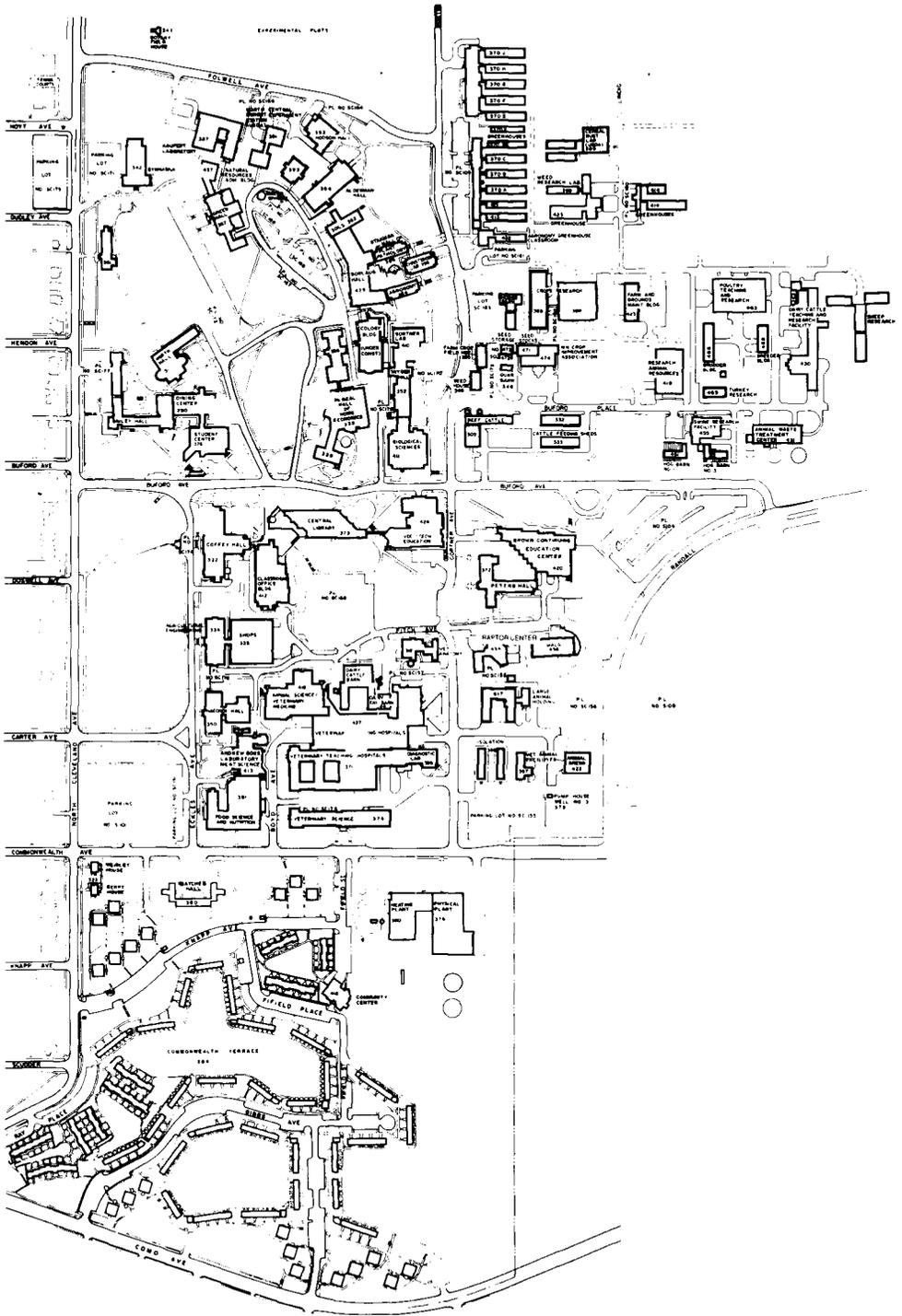
Radiologic technology courses include orientation to radiologic technology, medical terminology, related ethics, darkroom chemistry and techniques, nursing procedures, medical and surgical diseases, radiographic positioning, principles of radiographic exposure, radiographic anatomy, fundamental electricity, radiological physics, special radiographic programs, basics of nuclear medicine, basics of radiation therapy, radiographic equipment, and systems analysis.

For more information, contact Patricia Skundberg, Coordinator, Department of Radiology, University of Minnesota, 420 Delaware Street S.E., Minneapolis, MN 55455 (612/626-6886); Normandale Community College Admissions (612/830-9315).





University of Minnesota—Twin Cities  
 Minneapolis / West Bank



University of Minnesota—Twin Cities  
St. Paul

# Index

- Academic Standing (see Satisfactory Progress)
- Accreditation
  - Mortuary Science 24
  - Occupational Therapy 37
  - Physical Therapy 40
- Admission Requirements
  - Medical Technology 12
  - Mortuary Science 24
  - Occupational Therapy 37
  - Physical Therapy 41
  - University 5
- Advanced Standing
  - Medical Technology 13
  - Mortuary Science 24
  - Occupational Therapy 33
  - Physical Therapy 33
  - University 5
- Advising
  - Health Sciences 7
  - Medical Technology 13
  - Mortuary Science 27
  - Occupational Therapy 33
  - Physical Therapy 33
- Application Procedures
  - Medical Technology 12
  - Mortuary Science 25
  - Occupational Therapy 38
  - Physical Therapy 41
  - University 5
- Attendance
  - Occupational Therapy 35
  - Physical Therapy 35
- Awards
  - Mortuary Science 26
  - Occupational Therapy 34
  - Physical Therapy 34
- Change of College
  - Medical Technology 12
  - Mortuary Science 25
  - Occupational Therapy 38
  - Physical Therapy 41
  - University 5
- Clinical Education
  - (Physical Therapy) 43
- Continuing Education
  - Medical Technology 17
  - Occupational Therapy 36
  - Physical Therapy 36
- Council for Health Interdisciplinary Participation 8
- Course Numbers and Symbols 8, 30
- Courses
  - Medical Technology 17
  - Mortuary Science 29
  - Occupational Therapy 44
  - Physical Therapy 44
- Credit Load
  - Medical Technology 14, 16
  - Mortuary Science 29
  - Occupational Therapy 39
  - Physical Therapy 42
- Curricular Requirements
  - Medical Technology 14
  - Mortuary Science 27
  - Occupational Therapy 38
  - Physical Therapy 43
- Degree Requirements
  - Medical Technology 14
  - Mortuary Science 24
  - Occupational Therapy 35
  - Physical Therapy 35
- Dental Hygiene, Program in 48
- Dismissal (see Satisfactory Progress)
- Electives
  - Medical Technology 15
  - Mortuary Science 25
  - Occupational Therapy 38
  - Physical Therapy 42
- Employment, Student 7
- Expenses
  - Occupational Therapy 34
  - Physical Therapy 34
  - University 7
- Extracurricular Events 2
- Facilities 4, 33
- Faculty
  - Medical Technology 20
  - Mortuary Science 30
  - Occupational Therapy 33
  - Physical Therapy 40
- Fieldwork (Occupational Therapy) 36
- Financial Aid
  - Mortuary Science 26
  - Occupational Therapy 34
  - Physical Therapy 34
  - Twin Cities Campus 5

---

## Index

---

- Grade Reports 8
- Grading
  - Occupational Therapy 34
  - Physical Therapy 34
  - Twin Cities Campus 8
- Graduate Programs
  - Medical Technology 17
  - Occupational Therapy 36
  - Physical Therapy 36
- Graduation (see Degree Requirements)
- Grievance Procedures 9
- Health Sciences
  - Interdisciplinary Courses 48
- Honors
  - Mortuary Science 28
  - Occupational Therapy 35
  - Physical Therapy 35
- Immunization 2
- Immunization, Medical Technology 13
- Inter-College Program 48
- Liberal Education Distribution Requirements
  - Medical Technology 15
  - Mortuary Science 25
  - Occupational Therapy 38
  - Physical Therapy 41
- Loans (see Financial Aid)
- Medical Technology, Program in 12
- Minority Program 8
- Mortuary Science, Department of 24
- Nurse Anesthesia Program 49
- Nursing, School of 49
- Nutrition and Dietetics Program 50
- Occupational Therapy, Program in 32
- Orientation
  - Medical Technology 17
  - Mortuary Science 26
- Organizations
  - Medical Technology 14
  - Mortuary Science 27
  - Occupational Therapy 35
  - Physical Therapy 35
- Pharmacy, College of 50
- Physical Therapy, Program in 32
- Placement Services
  - Medical Technology 14
- Preprofessional Program
  - Medical Technology 12, 15
  - Mortuary Science 24
  - Occupational Therapy 38
  - Physical Therapy 41
- Probation (see Satisfactory Progress)
- Professional Certification
  - Medical Technology 14
  - Mortuary Science 27
- Professional Program
  - Medical Technology 12, 16
  - Mortuary Science 23
  - Occupational Therapy 39
  - Physical Therapy 43
- Radiologic Technology 51
- Registration
  - Medical Technology 13
  - Mortuary Science 28
- Residency
  - Occupational Therapy 37
  - Physical Therapy 41
  - University 7
- Satisfactory Progress
  - Medical Technology 13
  - Mortuary Science 29
  - Occupational Therapy 35
  - Physical Therapy 35
- Scholarships (see Financial Aid)
- Student Educational Records, Access to 9
- Student Services 6, 22
- Transcripts 8
- Transfer Credits (see Change of College)
- Tuition (see Expenses)

## Postal Statement

Volume 96, Number 12  
August 5, 1993

University of Minnesota  
(USPS 651-720)

Published by the University of Minnesota,  
Office of the Vice President for Student  
Affairs, Communications & Publications, 110  
Williamson Hall, 231 Pillsbury Drive S.E.,  
Minneapolis, MN 55455; once in May, June,  
August, October, and December; twice in  
February and September; three times in April;  
and four times in July. Second-class postage  
paid at Minneapolis, Minnesota.

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



Paper for the cover and text of this bulletin  
was selected for use in the University  
Recycling Program. The paper contains 10  
percent post-consumer material.

Please keep this bulletin for future use, pass  
it along, or drop it in a University office  
paper recycling barrel.

University of Minnesota  
(USPS 651-720)  
Communications & Publications  
110 Williamson Hall  
231 Pillsbury Drive S.E.  
Minneapolis, MN 55455-0213

Second-Class  
U.S. Postage  
Paid  
Minneapolis, MN

2236  
UNIVERSITY ARCHIVES  
10 WALTER LIBRARY  
MPLS, EAST BANK

College of Veterinary Medicine

# UNIVERSITY OF MINNESOTA

BULLETIN

1993 - 1995

*A spectrum of practice...*



*...public service, research...*



*...and career opportunities.*

# **College of Veterinary Medicine**

<b>2</b>	<b>Introduction</b>
<b>5</b>	<b>Programs and Services</b>
<b>15</b>	<b>Curriculum and Academic Policies</b>
<b>25</b>	<b>Course Descriptions</b>
<b>36</b>	<b>Administration and Faculty</b>
<b>39</b>	<b>Campus Map</b>
<b>40</b>	<b>Index</b>

# Introduction

## History

Veterinary medicine deals with the prevention, control, and treatment of diseases of animals. Legal documents and other records from about 2200 B.C. found in Babylonia, China, Egypt, and India contain the earliest references to veterinary medical practice. In India, where veterinary hospitals were established by the state, the practice of veterinary medicine became very sophisticated.

After several false starts, veterinary medical education in the United States originated with the Veterinary College of Philadelphia's charter, granted in 1852. During the next 75 years, 55 veterinary schools opened in this country, and 34 of them closed. The oldest successful veterinary college in the United States is the College of Veterinary Medicine of Iowa State University, established in 1879. Currently there are 31 veterinary schools in the United States and Canada.

## Veterinary Medical Education at the University

The College of Veterinary Medicine (CVM) at the University of Minnesota was established in 1947 in response to the veterinary medical needs of the livestock industry and pet owners, the need for research in animal diseases, and growing student interest in the study of veterinary medicine. Since its establishment, the college has graduated 43 classes with a total of 2,500 veterinarians.

CVM is fully accredited by the Council on Education of the American Veterinary Medical Association.

## Career Opportunities

Career opportunities for veterinarians are available in a wide variety of work settings and involve diverse activities. Most veterinarians are engaged in private clinical practice. Veterinarians in general practice provide care for food and companion animals, both large and small. Those in

specialized practice may provide care primarily for a single species, or they may concentrate in clinical disciplines such as animal reproduction, surgery, or diseases of specific systems. Other veterinarians pursue careers in education, research, and industry. Challenging careers are offered by government agencies such as the Department of Health and Human Services, the Department of Agriculture, the Armed Forces, the Department of Energy, and the National Aeronautics and Space Administration. Careers in laboratory animal medicine, zoo animal practice, public health, and food inspection also are available. There are new opportunities for research and service in such areas as comparative medical research and aquatic and wildlife animal medicine.

In 1982, a National Academy of Sciences report titled "Specialized Veterinary Manpower Needs Through 1990" showed that a balance existed in the supply versus demand for veterinarians. This report identified 18 specialty careers in government, industry, and academia where employment opportunities will be greatest. In 1984, the U.S. Department of Health and Human Services identified a number of areas in high demand, including food animal veterinarians and teaching and research specialty areas such as toxicology and pathology. In 1986, the U.S. Department of Health and Human Services issued a report on the status of health personnel in the United States. This report projected a need for 59,500 veterinarians by the year 2000. The demand for veterinarians continues and the need in several areas of employment continues to exceed the supply.

All students graduating from this college have found employment or pursued further advanced education in veterinary medicine.

Although veterinary medicine traditionally has been viewed as a man's field, women are now entering the profession in increasing numbers. In 1980 approximately 90 percent of veterinarians were male and 10 percent were female. In 1990 nearly 26 percent of veterinarians were female and 74 percent

were male. In just over 10 years the proportion of females increased from 1 of 10 to 1 of 4 veterinarians.

## Resources

This biennial bulletin is the basic source of information about the College of Veterinary Medicine.

The *Class Schedule*, distributed with registration materials before the registration period each quarter, lists course offerings with prerequisites, class hours, rooms, and instructors. It also includes registration instructions, fees, final exam schedules, and other useful information.

Information about evening and summer courses is contained in the *Extension Classes Bulletin* and *Summer Session Bulletin*, respectively.

## Policies

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

**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. 20000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; 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., 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.

## Welcome to Prospective Students

**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.

### Welcome to Prospective Students



I am pleased to introduce the University of Minnesota's College of Veterinary Medicine. The college is committed to training veterinary professionals, furthering knowledge in veterinary

medicine, and providing consultative and referral services to veterinary practitioners and livestock producers in Minnesota and the North Central region. Protecting our animal kingdom is one of humankind's noblest missions. Our satisfaction is unmatched as we care for the livestock, companion, and wild animal species, all of which depend on humankind for their ultimate welfare.

The University's CVM prepares veterinary and graduate students to enter a variety of careers. It offers internationally recognized programs for the D.V.M., M.S., and Ph.D. degrees as well as internship and residency training. Many graduate students attain board certification in a veterinary specialty. New programs encourage professional students interested in research careers to undertake the D.V.M. and Ph.D. degrees simultaneously.

Strong basic science programs encourage students to fine-tune their investigative skills in progressive research programs. The University is an exciting intellectual environment for both learning

and contributing creatively to the advancement of knowledge while participating in debate on issues facing the veterinary profession. It encompasses all the health, agricultural, biological, and engineering sciences, providing unique opportunities for interdisciplinary studies. Minnesota has remarkably large and diverse livestock and poultry industries, and a genuine concern for its wildlife heritage. The twin cities of Minneapolis and St. Paul form a metropolis rich in animal companions as well as a great center for education, culture, and diverse employment opportunities. Thus, CVM is exceptionally well situated to offer balanced educational programs of the highest quality in superb facilities. To complement this, in 1992 the college introduced a new curriculum that permits students to select clinical experience in their final year that will provide them with optimal preparation for the type of practice they anticipate entering following graduation.

This bulletin describes the college's academic programs. Please read it and direct any questions you may have to my office or to appropriate faculty. We are very pleased you are interested in veterinary medicine and in our college and University.



David G. Thawley  
Dean

Programs and Services



# Programs and Services

## Professional Curriculum

CVM awards two degrees, the bachelor of science (B.S.) in veterinary science and the doctor of veterinary medicine (D.V.M.). Students who wish to earn the B.S. degree in veterinary science may do so at the end of the second year of the veterinary curriculum, providing they have not already earned a B.S. degree from another college or university.

The college has instituted an Advanced Degree Track Option (ADTO) program designed to provide selected veterinary students with experiences and credits that can be applied toward an advanced degree (M.S. or Ph.D.). The program is expected to enable students to earn a D.V.M. and a graduate degree in less time than delayed pursuit of a graduate degree after earning the D.V.M. Students may apply for admission to the ADTO program at any time after admission to the college, but most students are advised to wait until completion of the first three quarters of the veterinary curriculum.

The primary goal of the veterinary curriculum is to provide students with the education and training necessary for the general practice of veterinary medicine. Secondary to this goal, the curriculum is designed to allow the student to pursue some degree of specialized training. Graduates of the program are prepared to enter veterinary medical practice or residency or graduate education programs.

The curriculum focuses on providing students with a sound foundation of training in the basic biomedical sciences to enable them to understand the causes and control of animal diseases and the maintenance of animal health. Students develop clinical skills in the diagnosis, treatment, and prevention of disease. Students can obtain additional education or training in areas of special interest. Studies are designed to nurture the students' professional identity, including their commitment to lifelong learning and service to clients and the community. The curriculum should provide

necessary background for evaluating and assimilating new information in the biomedical sciences and should facilitate development of the future veterinarian's ability to apply useful new information in the practice of veterinary medicine.

A substantial portion of the veterinary training takes place in the teaching hospital, where students apply knowledge of the basic sciences to solving clinical problems. By working directly with clients' animals and hospital equipment under the supervision of clinical faculty members, students gain the experience necessary to integrate classroom knowledge with the practice of veterinary medicine.

In the first year of the veterinary curriculum, students examine the structure and function of normal animals and begin to study the pathogenesis of diseases and pathophysiologic concepts. In the second year, emphasis is on the pathogenesis of diseases. The third year of the program is devoted chiefly to the study of the prevention, alleviation, and clinical therapy of diseases. In the fourth year, students learn methods of veterinary care and develop skills needed for professional practice by dealing with clients and diagnosing and managing patients.

## Animal Use

Animals are used in the D.V.M. curriculum to illustrate medical principles and to provide students with firsthand experience in the art and practice of veterinary medicine and surgery. The animals are treated with genuine concern for their welfare; however, in some cases animals must eventually be euthanized in accordance with the Animal Welfare Act. Efforts have been made and are ongoing to reduce the number of animals required in non-clinical teaching.

Given the need to use animals for instructional purposes, prospective students must recognize that successful completion of the D.V.M. curriculum requires that both live and dead animals be incorporated into students' learning experience. In all instances

the animals will be treated with dignity and handled in accordance with the Animal Welfare Act. In some cases, procedures will result in termination of the animal's life.

The University and college animal care committees review all courses offered in the college and determine the appropriateness of using animals in each course.

## Facilities

CVM is housed primarily in three buildings on the St. Paul campus. Most of the classrooms and laboratories students use during their first two years in the professional curriculum are in the Animal Science-Veterinary Medicine and the Veterinary Science buildings. Extensive research facilities, including the college library and the Learning Resources and Computer Center, are also located in these buildings. In the Veterinary Teaching Hospitals building, space and facilities are provided for various diagnostic and therapeutic procedures. Clinical laboratories for hematology, chemistry, pathology, toxicology, parasitology, microbiology, and radiology, as well as animal holding facilities, are housed in this building. In addition, the Veterinary Diagnostic Laboratory is attached to the east end of the Veterinary Teaching Hospitals building.

Additional animal holding facilities, for teaching and research, are located east of Gortner Avenue and across from the Veterinary Teaching Hospitals building.

The off-campus facilities of the Minneapolis and St. Paul Health Departments, Minnesota Board of Animal Health, veterinary services of the Department of Agriculture, and food industries in the State are also used in teaching the public health aspects of veterinary medicine.

## High School Preparation

First consideration should be given to meeting the admission requirements of the college or university the student plans to attend to complete the preprofessional course requirements. Furthermore, prospective students are urged to take as many mathematics and science courses as possible in high school.

## Preprofessional Curriculum

To qualify for admission to CVM, students must complete specified courses—about three years of work—at an accredited college. Application to the professional curriculum must be made nearly one year in advance or not later than November 15 in the year before the fall quarter in which they wish to be admitted.

All coursework used to meet the preprofessional requirements should be evaluated with the A-F letter grading system, except when a college does not offer a required course under that grading system or when advanced placement (exemption) is granted.

Distribution requirements in liberal arts studies have been established for all programs leading to the bachelor's degree conferred by the University of Minnesota. Students entering CVM must fulfill these requirements before admission unless they have completed a bachelor's degree.

The required areas of study, including the number of quarter credits required for admission to CVM, are:

### 1. Language, Logic, Mathematics, and the Study of Argument

English Composition, Communication (8-12 credits)

Normally the student must satisfy the requirement for graduation of the college he or she is attending.

Mathematics (5-10 credits)

College algebra (with prerequisite high school higher algebra) or precalculus or calculus.

### 2. The Physical and Biological Universe

#### Chemistry (22-27 credits)

To include general inorganic and organic, nonterminal. All courses must include laboratory.

#### Physics (10-15 credits)

To include mechanics, heat, sound, light, electricity, magnetism, and atomic physics, topics normally covered in an introductory sequence with laboratory.

#### Biology (10-15 credits)

To include an introductory sequence in general biology and animal biology, or animal biology and plant biology.

#### Genetics (4 or 5 credits)

To include the mechanisms of heredity and their applications.

#### Biochemistry (4 or 5 credits)

To include metabolic pathways, cellular energetics, and biosynthesis of cellular constituents; either a 4-credit lecture course or a 5-credit lecture and laboratory course with an organic chemistry prerequisite.

#### Microbiology (4 or 5 credits)

An introductory course with laboratory to include taxonomy, morphology, physiology, and ecology of microbes.

### 3. Other Courses (16-20 credits)

To include four courses from the following areas of study: anthropology, art, economics, geography, history, humanities, literature (including foreign language literature), music, political science, psychology, public speaking or small group (interpersonal) communication, sociology, or theatre. No more than two courses can be from the same area of study. Introductory macro or micro economics and public speaking are recommended as two of these courses.

### 4. Electives

Electives may be selected on the basis of the student's interests in a broad educational program and completion of a degree program in a desired major(s). Students are encouraged to choose courses in the care and management of cattle, dogs, horses, sheep, and swine if they are available. Students not having experiences with food-producing animals are especially encouraged to select

courses in the care and management of cattle, sheep, and swine. A course in analytical chemistry and introductory courses in statistics and computer science are recommended for all applicants. Students planning academic or research careers should consider additional courses in science, mathematics, and computer science.

Applicants who have not earned the baccalaureate degree before entering CVM must have completed the minimum credit requirements in The Individual and Society and the Literary and Artistic Expression categories. Those entering with a degree may meet the remaining credit requirements in the two above-mentioned categories by completing 16 credits of courses in either or both areas.

Examples of courses offered on the University of Minnesota, Twin Cities campus that meet the admission requirements follow.

### 1. Language, Logic, Mathematics, and the Study of Argument

English Composition, Communication—The student must satisfy the requirement for graduation of the college he or she is attending.

Math 1111—College Algebra, Analytic Geometry  
(or) Math 1142—Short Calculus  
(or) Math 1201—Pre-Calculus

### 2. The Physical and Biological Universe

Biol 1009—General Biology  
Biol 1106—General Zoology  
BioC 3021—Biochemistry  
or BioC 3031—Survey of Biochemistry  
Chem 1001—General Principles of Chemistry  
(placement in Chem sequence determined by chemistry dept.)  
Chem 1051—Chemistry Principles I  
Chem 1052—Chemistry Principles II  
Chem 3301/3305, 3302/3306—Elementary Organic Chemistry I and II/Lab  
GCB 3022—Genetics  
Phys 1041/1045-1042/1046—Introductory Physics/Lab  
VPB 3103—General Microbiology

### 3. The Individual and Society

See the group distribution and course lists in the *College of Liberal Arts Bulletin* to total 8 or more credits.

### 4. Literary and Artistic Expression

See the group distribution and course lists in the *College of Liberal Arts Bulletin* for selection of courses to total 8 or more credits.

### 5. Electives

For additional courses, see suggestions listed above.

*The University of Minnesota is implementing a new liberal education curriculum fall 1994. Check in 462 Veterinary Teaching Hospitals for changes affecting CVM students.*

## Admission Procedures for the Professional Curriculum

Enrollment in the professional curriculum of CVM is limited; many applicants cannot be accepted. A first-year class enters the program in the fall quarter of each year, and applicants must satisfy the admission requirements by the end of the preceding spring term. To apply, prospective students should request the CVM application packet, which is available *only* from the Office of the Registrar—St. Paul, 130 Coffey Hall, University of Minnesota, 1420 Eckles Avenue, St. Paul, MN 55108. Neither Graduate School nor Advanced Standing applications may be used to apply to CVM. First priority is given to residents of Minnesota and of states and Canadian provinces with which reciprocity or contractual agreements exist. These states/provinces are North Dakota, South Dakota, and Manitoba. Minority applicants are given special consideration. Residents of other states are welcome to apply.

Applicants are encouraged to read carefully and follow all directions in the packet because failure to provide all information requested delays admission decisions.

The completed application form should be returned to the Office of the Registrar—St. Paul as soon as possible and *not later than*

*November 15 before the fall quarter the applicant wishes to start the program.*

Applications *must* be accompanied by an application fee.

Applicants for fall 1994 will be rated according to a 100-point scale based on the following areas of evaluation.<sup>1</sup>

- A. Objective Measures of Educational Background (70 points)
  - 1. GPA in required courses (20 points)
  - 2. Cumulative GPA for most recent terms, starting with the fall the student applies and going back to include a minimum of 60 quarter (45 semester) credits of letter-graded undergraduate or graduate courses (20 points)
  - 3. Graduate Record Examination (20 points)
  - 4. Multiplier-Points (1+2) x Points (3) (10 points)
- B. Subjective Measures of Personal Experience (30 points)
  - 1. Knowledge of and interest in the veterinary medical profession and animals—experiences with veterinarians and experiences with and responsibility for the care and management of animals (15 points)
  - 2. Maturity and reliability—employment experience and responsibilities, ability to communicate with others, experience demonstrating leadership, extracurricular activities, academic load, and amount of time devoted to employment and other activities while enrolled in college (15 points)

All correspondence concerning applications should be sent to the Office of the Registrar—St. Paul, 130 Coffey Hall, University of Minnesota, 1420 Eckles Avenue, St. Paul, MN 55108. Applicants from Minnesota, North Dakota, and South Dakota who are accepted receive a preliminary fee statement of \$100 and applicants from other states receive a preliminary fee statement of \$250; payment is applied to the first quarter's tuition and confirms the applicant's intention to enroll.

<sup>1</sup> Selection criteria are subject to change.

### Estimated Yearly Expenses

Students in the first three years pay the following fees and expenses for the 1993-94 academic year. These fees and expenses are subject to change.

#### Tuition

Resident (\$2,400 per qtr) .....	\$7,200
Nonresident (\$3,600 per qtr) .....	\$10,800
Student Services Fee (\$133 per quarter) .....	\$399
Microscope .....	\$500-\$1,000
Books, laboratory equipment, notes, dissecting set, and supplies .....	\$450-\$550

The above expenses do not include room and board, laundry and clothing, required health insurance, recreation, travel, and other incidental expenses. For more information, consult the Office for Student Affairs, 462 Veterinary Teaching Hospitals, 1365 Gortner Avenue, St. Paul, MN 55108 (612/624-4747).

### Awards, Scholarships, and Loans

CVM students compete for awards and scholarships designated specifically for veterinary medical students. In general, it is the responsibility of the interested student to obtain, complete, and submit appropriate applications for loans and other financial aid.

For additional information about financial aid, contact the Office of Student Financial Aid, 210 Fraser Hall, 106 Pleasant Street S.E., Minneapolis, MN 55455.

Awards and scholarships limited to veterinary medical students include the following (most awards are available only to students in the second, third, and fourth years of the veterinary medical program).

**AAHA (American Animal Hospital Association) Award**—To a senior with clinical proficiency in small animal medicine and surgery. (\$250 and plaque)

**Dr. John Aldrich Memorial Scholarship**—To a senior who has chosen to enter a large animal practice. (\$500)

**The American Board of Veterinary Practitioners—SCAVMA Case Report Contest.** (\$100 and plaque)

**American College of Veterinary Radiology Award**—To a senior who excels in clinical radiology. (certificate and 1-year subscription to the journal *Veterinary Radiology and Ultrasound*)

**American College of Veterinary Surgeons Student Surgery Award**—Student selected by surgery faculty. (certificate)

**ARDESIGN, Inc. Award**—To student with financial need specializing in small animal care. (\$1200)

**The Donna Ant Scholarship**—For veterinary medicine students with financial need. (cash awards)

**James Ford Bell, Jr. Memorial Award**—For a student who has completed three years in the college. This award is provided by Dr. Ford Bell in memory of his father, James Ford Bell, Jr., based on academic achievement and concern for professionalism as reflected in willingness to work well with classmates, faculty, and staff. (\$500 and plaque)

**Caleb Dorr**—Cash awards for the top individuals in the freshman, sophomore, and junior classes. The highest-ranking individual in the graduating class is awarded a medal.

**Caleb Dorr Certificates**—To individuals in the top 10 percent of each class.

**Certificates of Commendation**—To students for outstanding service to the college and University.

**The Class of 1961 Memorial Scholarship**—Members of the class of 1961 have created a fund in memory of their classmates and give this award to a senior to acknowledge excellence and motivate students toward excellence based on scholastic standing and good collegiate citizenship. (plaque and cash award)

**Robert F. Hammer Memorial Award**—A plaque for a CVM student who has demonstrated a high level of interest in and understanding of the ultrastructure of animal cells and tissues.

**Hill's Pet Products, Inc. Scholarship**—One to a student in each of the four classes, based on financial need. (\$1,000)

**Hill's Senior Student Award**—To three seniors who exhibit proficiency in clinically applying nutritional controls to the diagnosis, treatment, and management of diseases of pet animals. (cash awards and plaques).

**Harvey H. Hoyt Memorial Scholarship Award**—Given in memory of Dr. Harvey H. Hoyt to an outstanding senior based on scholarship and intent to pursue a career in teaching and research in veterinary medicine. Emphasis on clinical veterinary medicine. (\$100)

**IMPROMED, Inc.**—To a junior who exhibits the greatest potential and interest in the art and science of small animal diagnosis. (state-of-the-art diagnostic program, PROVIDES)

**H. C. H. Kernkamp Student Award**—This fund, provided through the generosity of the alumni of the college, makes an award to a senior in recognition of student contributions to veterinary medicine. (plaque)

**Colin A. Krog Memorial Award**—To a senior with a commitment to large animal practice and academic excellence. (\$100 and plaque)

**The Dr. Allen D. Leman Outstanding Award in Swine Medicine**—To an outstanding veterinary student who has demonstrated good citizenship, clinical proficiency, and scholastic achievement in swine medicine. (\$500)

**Lewis Memorial Scholarship**—To a first-year student who is academically outstanding, preferably from Minnesota, and a member of an underrepresented, disadvantaged racial or ethnic group.

**Lee McDonald Memorial Award in Feline Medicine**—To a senior with expertise in feline medicine and surgery. (\$400 and plaque)

**Dr. Jeffrey Lindstrom Memorial Scholarship**—To a third-year student who has completed the first two years at the University of Minnesota, financial need, and preferably interest in large animal medicine. (\$500)

**Merck Veterinary Medicine Award**—*Merck Veterinary Manuals* are awarded to seniors based on scholastic record and dedication to clinical veterinary medicine.

**Minneapolis Kennel Club Scholarship in Veterinary Medicine**—Established to provide recognition for and financial assistance to several qualified students in veterinary medicine at the University of Minnesota. Preference is given to Minnesota residents with special interest in the treatment of small animals. (cash awards)

**Minnesota Veterinary Medical Association**—Two awards given by this state association. A plaque is awarded to an outstanding senior in clinical veterinary medicine, and a cash award based on need and scholarship is made to a sophomore or junior. (\$1,000)

**Bob Monico Memorial Awards**—Awards are made to two seniors for excellence in equine medicine in memory of Bob Monico, a senior who was fatally injured in the summer of 1970 while vacationing in Norway. (plaques)

**Ned E. Olson Memorial Scholarship Award**—Given in memory of Dr. Ned E. Olson to a senior who demonstrates great proficiency and professional promise in large animal medicine. (\$100)

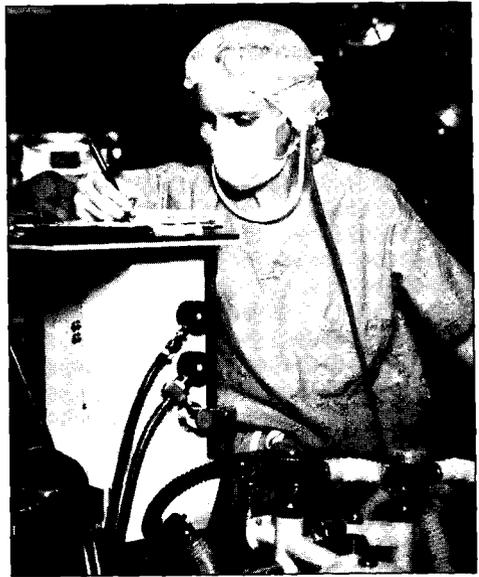
**Oxford Swine Proficiency Award**—To a senior who has exhibited a high level of interest and achievement in swine medicine and swine production during his/her matriculation at the University of Minnesota.

**PARTNERS Award**—To a third- or fourth-year student who has a definite interest in either small animal oncology or cardiology. In memory of Maxwell. (\$75 voucher/certificate for book on either oncology or cardiology)

**Pfizer Award**—To a senior based on scholarship, leadership, and financial need. (\$1,000 and plaque)

**Purina Mills, Inc.**—To a senior who exhibits proficiency in swine medicine. (\$200 and plaque)

**Steve Ramsdell Memorial Scholarship Fund**—To a junior based on "a positive attitude toward life and people, having strong interests outside of veterinary school, and being liked by all but not necessarily being the most popular member of the class—an all-around nice person." (\$500)



**Dr. J. E. Salsbury Veterinary Medicine Scholarships**—To senior University of Minnesota veterinary students based on superior scholarship, initiative, perseverance, and potential for leadership. (cash awards)

**Carl F. and John C. Schlotthauer Memorial Surgery Award**—To a senior who has demonstrated strong interest and outstanding ability in veterinary surgery and/or veterinary pathobiology. (plaque)

**Augustus Searles Scholarship for Women**—For women veterinary students based on scholastic standing. (cash awards)

**The Upjohn Company Awards**—Cash awards and plaques to a senior with proficiency in large animal clinical medicine and a senior with proficiency in small animal clinical medicine.

**Veterinary Medicine Student Council Awards**—To juniors who have been active in extracurricular activities and service to the University, the college, and the community. (cash awards)

**The Ted Wikoff Memorial Award**—To a sophomore based on academic achievement during the first year. (\$600)

**Auxiliary to the American Veterinary Medical Association**—To a senior who makes an outstanding contribution to campus activities. (\$200)

**Auxiliary to the Minnesota Veterinary Medical Association**—To a senior based on need and scholarship. (\$225)

## Programs and Services

Loans administered by the Office of Student Financial Aid, Auxiliary to the American Veterinary Medical Association, Auxiliary to the Minnesota Veterinary Medical Association, or Minnesota Veterinary Medical Association include:

**Federal Stafford Student Loan**—Loans up to \$8,500 for loan period after October 1, 1993 are available for students who qualify via the needs test. Interest is waived while the student is enrolled at least half time in school. Repayment installments and interest begin six months after graduation or termination.

**Federal Unsubsidized Stafford Student Loan**—Loans up to \$8,500 per year are available for students who qualify via the needs test. Interest while the student is enrolled at least half time in school; however, repayment installments begin six months after graduation, withdrawal, or when the student drops below half time.

**Health Professions Loan**—Available in limited amounts to students who have financial need. Interest of 5 percent is deferred while the student is enrolled.

**Health Education Assistance Loan**—Available to meet most needs but the interest rate is higher and accrues from the date the loan is issued.

**Minnesota Veterinary Medical Association Trust Fund**—Loans are available for those with exceptional financial need (3 percent interest while in school and 6 percent thereafter).

Financial aid for all veterinary medical students is administered by the Office of Student Financial Aid, 210 Fraser Hall, University of Minnesota, 106 Pleasant Street S.E., Minneapolis, MN 55455.

**Auxiliary to the American Veterinary Medical Association**—Loans are available to junior, senior, and graduate students in veterinary medicine. Seniors receive preference. The debt limit is \$2,500.

**MVMA Auxiliary Emergency Student Loan Fund**—Loans of up to \$500 can be arranged on short notice.

For more information on the auxiliary loans, contact the Office for Student Affairs and Recruitment, 462 Veterinary Teaching Hospitals, 1365 Gortner Avenue, St. Paul, MN 55108 (612/624-4747).

## Student Services

High school and college students interested in entering CVM are urged to contact the Office of the Associate Dean for Academic and Student Affairs, 462 Veterinary Teaching Hospitals (612/624-4747), for assistance in planning their educational

programs. This office arranges meetings for advisers, applicants, and prospective applicants each fall before the November 15 application deadline for discussion of selection criteria and application procedures. Meetings are held in Minnesota and surrounding states. High school counselors and college advisers are encouraged to contact this office for current information about admission requirements.

Minority students interested in veterinary medicine as a career are encouraged to contact the Office for Student Affairs and Recruitment (612/624-4747) for special assistance in planning their educational programs.

The Office for Student Affairs and Recruitment serves faculty committees on admissions, curriculum, scholastic standing, and awards and scholarships. This office is administratively responsible for maintenance of student and alumni records, admission, registration, scholastic standing and degree requirements, and the issuance of awards and scholarships specific to the college and the D.V.M. graduation ceremony.

Each of the four classes in the college has a faculty adviser. The Office for Student Affairs and Recruitment provides assistance to these advisers and to student organizations, which include Student Council, Honor Case Commission, Student Chapter and the Auxiliary to the Student Chapter of the American Veterinary Medical Association, and University of Minnesota Preveterinary Medicine Club. Specialty organizations including Bovine and Swine Club; Canine Club; Equine Club; Feline Club; Food Animal Club; Sheep, Goat, Llama Club; and the Zoo, Exotic Wildlife, Companion Bird Club are also provided administrative assistance by this office.

## Student Activities

CVM Student Council advises and makes recommendations to the dean on matters of student concern, elects members to several faculty committees, and coordinates its activities with the St. Paul Board of Colleges



and the Twin Cities Student Assembly. Members are elected to represent each of the four undergraduate classes and graduate students. Nine students serve as representatives on other units of student government in the college.

The Student Chapter of the American Veterinary Medical Association sponsors a variety of activities including the annual CVM Open House (held on a Sunday in April), a booth at the Minnesota State Fair, a speakers' bureau that provides speakers for groups located within 60 miles of the campus, lectures by prominent scientists, and a variety of social events. Most activities of the chapter are joint efforts with the college, its alumni, and/or the Minnesota Veterinary Medical Association.

The national honor society of veterinary medicine, Phi Zeta, recognizes and promotes scholarship and research in matters pertaining to the welfare and diseases of animals. The local chapter sponsors lectures by outstanding scientists in fields related to veterinary medicine.

The St. Paul Board of Colleges directs and coordinates student activities on the St. Paul campus and encourages student

leadership. Its membership is drawn from the five colleges located on the campus. The board cooperates with the Minnesota Student Association, brings questions from the student body to the attention of the colleges, and discusses matters of general interest to students and faculty.

The Student Center Board of Governors (SCBG) guides the activities of the St. Paul Campus Student Center, the focal point of social activities on the St. Paul campus. A varied recreational program that enables students to exercise, improve special skills, and cultivate hobbies is provided. Membership is drawn from the five colleges on the campus, including graduate students and faculty.

## Graduate Programs

Graduate study at the University of Minnesota is coordinated and administered by the Graduate School. The college offers M.S. and Ph.D. degrees in five major fields of veterinary medicine. These are veterinary biology (anatomy, biochemistry, physiology, and pharmacology); veterinary pathobiology (microbiology, pathology, and parasitology); veterinary medicine; veterinary surgery, radiology, and anesthesiology; and theriogenology.

Refer to the *Graduate School Bulletin* for details about general policies regarding admission requirements, registration procedures, and requirements for graduate degrees. Application materials may be obtained from the directors of graduate studies.

Questions regarding specific programs should be addressed to the directors of graduate studies in the appropriate program area:

Veterinary biology ..... Esther Gallant  
 Veterinary pathobiology ..... Bert Stromberg  
 Veterinary medicine ..... Robert Dunlop  
 Veterinary surgery, radiology  
 and anesthesiology ..... Daniel Feeney  
 Theriogenology ..... Brad Seguin

### **Continuing Education**

CVM regularly schedules Continuing Education programs for members of the veterinary medical profession to bring them up to date on advances in the field. Innovative clinical procedures, new concepts, and recent developments in research are presented. Veterinary medical associations may arrange for specific courses. Sessions include one- and two-day conferences, seminars, and laboratory workshops. Courses are also offered to the general public.

### **CVM Alumni Society**

CVM Alumni Society sponsors several events, including an annual luncheon for all University of Minnesota alumni held during the Minnesota Veterinary Medical Association annual meeting. The Society also hosts a reception every June for CVM graduates, their families, and faculty.

A student mentoring program matches first- and second-year veterinary students with practicing veterinarians so the students get "hands-on" practical experience. This program won an award from the Minnesota Alumni Association in 1990.

CVM Alumni Society is also active in promoting student recruitment by alumni. A highlight of the recruitment activity is a brunch held during CVM Open House in April.

Curriculum and Academic Policies



# Curriculum and Academic Policies

## Areas of Study Within the Curriculum

Following are brief descriptions of areas of study in the College of Veterinary Medicine. Students in veterinary medicine take courses in each of these areas. In addition, fourth-year students learn through various field experiences described under Clinic Rotation.

**Anatomy**—Professors Beitz, Cox, Czarnecki, Fletcher, Gallant. Anatomy is divided into four related areas: gross anatomy, histology, embryology, and neuroanatomy. In gross anatomy, students learn the normal structure and function of domestic animals by dissecting the dog, cat, horse, and cow and comparing them with the pig, sheep, goat, laboratory mammals, and avian species. In histology, students use microscopy to examine the cellular features of tissues and organs. In embryology, students discover normal and abnormal developmental processes as they relate to adult structures. The focus in neuroanatomy is on identification of structural units of the central nervous system that control perception, movement, and overall behavior.

**Anesthesiology**—Professors Raffe, E. Robinson. Anesthesiology lectures cover the pharmacology of anesthetic agents, cardiopulmonary physiology, and the use of anesthetic agents and equipment for various types of patients and surgical procedures. Students also learn to deal with shock, the traumatized or critically ill patient, and various methods of monitoring the surgical patient. Techniques are practiced in special anesthesiology laboratories, in the surgery teaching laboratory, and on patients in the Veterinary Hospitals.

**Avian Health**—Professors Duke, Halvorson, Nagaraja, Newman, Redig, Sharma, Sivanandan, Walser. The goals are to acquaint students with the importance of the normal anatomy and physiology of birds as well as the host-parasite-environment interaction in the pathophysiology of avian diseases. This includes a working knowledge of management practices currently being

used in the diverse aspects of domestic avian production and companion bird medicine. The courses are arranged on a systems basis and deal with a wide variety of etiologies including nutritional and management factors and infectious agents. Courses are offered at the undergraduate, professional, graduate, and continuing education and extension levels. Their structure includes lectures, laboratories, autotutorial programs, and field trips where possible. Additional exposure is available through the Avian Research Center and the Raptor Center.

**Biochemistry**—Professors Jorgensen, Louis, Mickelson, Murtaugh. The functioning of biological systems at the molecular level is the subject of study in this discipline. Students learn the mechanisms by which animals digest and absorb nutrients, how they use the absorbed molecules to maintain normal physiological processes, and how the end products of metabolism are eliminated. The role of the different hormones in regulatory metabolism of the whole animal under different nutritional states is discussed. Study of the metabolic role of different tissues in the body and the molecular basis for some metabolic abnormalities provides the foundation for understanding disease. Recombinant DNA applications in animal health are introduced and molecular biological aspects of growth, gene expression, and cellular regulation in bacteria and animals are presented.

**Clinical Pathology**—Professors Greig, Perman, Weiss. Clinical pathology is a broad area of laboratory medicine that crosses several disciplines including hematology, cytology, surgical pathology, immunohematology, blood coagulation, clinical chemistry, and urine analysis. Although students learn techniques, appropriate text selection and interpretation are emphasized.

**Diagnostic Medicine**—Professors Bergeland, Collins, Felice, Goyal, Kurtz, Murphy, Ruth, Shaw, Singh, Werdin. This program identifies the etiologic basis of animal diseases by collecting, correlating,

and interpreting laboratory and epidemiological data. Techniques of various disciplines including anatomical pathology, biochemistry, endocrinology, epidemiology, genetics, hematology, immunology, microbiology, nutrition, parasitology, toxicology, and virology are applied to the evaluation of animal and environmental specimens and feeds submitted to the Diagnostic Laboratory by veterinary practitioners. Food animals receive major emphasis, but companion animals, zoo animals, and wildlife also are evaluated.

**Epidemiology, Food Hygiene, and Public Health**—Professors Diesch, Pullen, R. Robinson. By studying epidemiology, public health, and public practice, veterinary students learn the principles of epidemiology, statistics, food hygiene, environmental health, and zoonoses. These principles are then applied to solve problems encountered in the practice of preventive medicine for all animal species, in herd health management for food animals, in production economics, in clinical epidemiology, in food protection and hygiene maintenance throughout food production, in transmission of diseases between animals and humans, and in management of environmental factors affecting the health of animals and humans. Problems relating to state, national, and international diseases are also presented.

**Microbiology**—Professors Bey, Maheswaran, Mellencamp, Molitor, Rutherford, Schook, Shope. Microbiology includes the areas of immunology, virology, bacteriology, and mycology. Courses expand the student's basic background in microbiology acquired in the preveterinary curriculum. Microbiology provides a basis for the study of many disciplinary areas of the curriculum including pathology, medicine, surgery, pharmacology, and public health. Emphasis is on basic mechanisms and interactions between microbial pathogens and their animal hosts.

**Nutrition**—Professors Armstrong, Jorgensen, W. Olson, Otterby, Pettigrew, Waibel. Students learn how to assess an animal's

dietary requirements for water, energy, protein, vitamins, and minerals. The role of these nutrients in the overall metabolism of the animal is reviewed and related to the metabolic pathways covered in biochemistry. Factors affecting the relative amounts of nutrients required at different stages of growth and lactation and in an adult animal are discussed. The signs of deficiency and excess are described in relation to the metabolic role of each nutrient. Later the focus is on sources of nutrients in animal feeds, feed quality and antiquality factors, and formulation of diets to meet the requirements for various species. Finally, a series of lectures is presented on applying these principles to feeding monogastrics (swine, poultry, and dogs), ruminants (dairy, beef, sheep), and horses given by faculty who have expertise with particular species.

**Parasitology**—Professor Stromberg. Parasitology deals with the protozoa, arthropods, and helminths that infest animals. Students learn about life cycles of parasites, the effect of parasites on the health of animals, and parasite control. Both internal and external parasites are studied. Special attention is given to detecting and identifying parasites and to drugs and management procedures used to control them.

**Pathology**—Professors Bergeland, Collins, Hayden, K. Johnson, O'Brien, O'Leary, Rose, Ruth, Shaw, Walser, Werdin. Courses in this field explain how cells and tissues react to injury and relate morphologic changes to functional changes. Cell degeneration, cell death, inflammation, immunopathology, and neoplastic and nonneoplastic growth abnormalities are some of the topics examined. Students are expected to differentiate abnormal from normal cells or tissues at the gross and microscopic levels, identify abnormalities using appropriate terminology, and understand mechanisms (pathogenesis) involved in the development of the abnormalities. Pathology related to organ systems and diagnosis of species specific diseases are discussed.

**Pharmacology**—Professors Brown, Kannan, Larson. The goals for students in this course are twofold: to understand the general principles of pharmacology as the conceptual basis of rational drug therapy and to acquire detailed knowledge of specific drugs and their applications in veterinary practice through study of examples from the major drug groups. The general principles of pharmacology involve mechanisms of drug action and drug disposition, dose-response relationships, pharmacokinetics, drug interactions, and adverse effects. Specific drug groups studied include anesthetics, analgesics, tranquilizers, anti-inflammatory agents, chemotherapeutic (antibiotic, antiparasitic) drugs, and drugs that act on specific organ systems.

**Physiology**—Professors Duke, Dunlop, Hunter, O'Grady, Osborn, Redig, Wheaton. This discipline, which is closely related to both anatomy and biochemistry, focuses on the basic mechanisms of all the major body organs and organ systems, such as the circulatory, digestive, renal, reproductive, and respiratory systems. Since clinical problems frequently involve digestion and reproduction, these areas are emphasized. The endocrine organs are studied relative to the principal effects, target organs, interrelationships, and regulation of hormones.

**Radiology**—Professors Feeney, Jessen, G. Johnston, Walter. Radiology concentrates on the properties and production of X-rays: their use in diagnosis and therapy; safety factors, including the major safety regulations; and film processing. Interpretation of radiographs and basic principles of radiation therapy, ultrasound, and nuclear medicine are also highlighted.

**Theriogenology**—Professors Fahning, S. Johnston, J. Olson, Seguin, Troedsson. The discipline includes animal reproduction, infertility, obstetrics, and breeding technology. Students learn the effect of management, genetics, nutrition, environment, and disease on reproductive performance of most domestic animal species. Laboratories, hospital cases, and

extensive reproductive herd health programs provide opportunities for students to develop skills for monitoring reproductive efficiency and managing infertility (see Clinic Rotation below).

**Large Animal Medicine**—Professors Ames, Anderson, Dial, Farnsworth, Haggard, D. Johnson (on assignment in Morocco), Joo, Marsh, Morrison, W. Olson, Pijoan, R. Robinson, Thawley, Valberg. This field includes work with food- and fiber-producing animals, horses, and zoo animals. Students learn how to approach a clinical case, do a thorough physical examination, reach a diagnosis, carry out a course of therapy, give a prognosis, and recommend methods to control and prevent a disease. Field investigations of disease problems are a valuable part of the learning experience. Students also participate in establishing and conducting herd health programs and in handling diseases in herds of animals. Precepteeships (see Clinic Rotation below) enable fourth-year students to work with animal health problems in veterinary medical practices throughout the country.

**Small Animal Medicine**—Professors Armstrong, Bell, Bistner, Hardy, S. Johnston, Klausner, Lulich, McKeever, Ogburn, Osborne, Polzin. Current information about all aspects of diseases of companion animals is presented. Techniques and procedures used in the diagnosis, therapy, and management of such diseases are demonstrated and practiced. Courses in diagnostic and therapeutic techniques and physical diagnosis prepare students for active participation in small animal clinical care. In the teaching hospital, students integrate and use information obtained in both basic science and clinical courses to solve companion animal health problems.

**Large Animal Surgery**—Professors Kobluk, Trent, Turner. Theories and techniques of veterinary surgery are applied to large animals in this disciplinary area. Additional important areas of study are the etiology and pathophysiology of diseases that require surgical intervention. Students

learn to correlate information from both preclinical and clinical courses in making decisions about surgery and in managing the surgical patient. Course work includes basic principles of veterinary surgery, surgical diagnosis, therapeutic techniques, and aftercare for specific diseases. Surgery laboratory courses afford firsthand experience in certain surgical procedures: casting, splinting, and bandaging techniques; patient care; and large animal anesthesia.

**Small Animal Surgery**—Professors Caywood, Lipowitz, Wallace. The small animal surgery program provides students with a broad basic education in principles, theories, and techniques of veterinary surgery. The program includes study of the etiology and pathophysiology of diseases that require surgical intervention. Knowledge of the other clinical sciences and of the basic sciences is brought to bear in developing sound programs for the management and therapy of surgical patients.

**Toxicology**—Professors Felice, Murphy, Singh. The formal sequence of courses in the professional curriculum deals initially with the active principles, toxic effects, and recognition of poisonous plants of the United States and Canada, particularly those of the upper midwestern states. The second phase of the sequence is directed toward the toxicology of heavy metals, rodenticides, molluscicides, herbicides, and the several classes of insecticides including the xenobiotic halogenated compounds. When applicable, issues regarding environmental toxicology are clarified.

**Clinic Rotations**—The clinical teaching program includes assignments for students to gain experience with veterinary medical problems in the Veterinary Teaching Hospitals, livestock production units in the field, private veterinary practices, public health and animal disease regulatory agencies, and other veterinary medical institutions.

The curriculum consists of 39 two-week rotations. Students are required to complete 22 of these rotations and are allowed one

two-week vacation rotation and three two-week precepteeship rotations. Students must select one of three options: small companion animal, food animal, or mixed animal. Each option has specific requirements to provide an opportunity for students to specialize. The small companion animal option has 26 weeks of required rotations, 16 weeks of elective clinical rotations, and 6 weeks of precepteeship. The food animal option requires 20 weeks of large animal rotations, 2 weeks of public health, 2 weeks of necropsy, 6 weeks of precepteeship, and 18 weeks of elective clinical rotations. The mixed animal option requires 10 weeks of large animal rotations, 2 weeks of public health, 2 weeks of necropsy, 2 weeks of radiology, 2 weeks of community practice, 2 weeks of specialties, 2 weeks of anesthesiology, 4 weeks of small animal surgery, 4 weeks of small animal medicine, and 6 weeks of precepteeship.

The two-week clinical rotations available are *companion animal* emergency medicine, internal medicine, ophthalmology/dermatology, surgery, clinical nutrition, community practice, critical care medicine; *food animal*: poultry health, large animal medicine, large animal surgery, total herd health practice, general theriogenology, dairy theriogenology management, beef cow/calf practice, beef feedlot practice, bovine surgery, dairy diseases, youngstock management, dairy—mastitis, dairy—ruminant nutrition, dairy—applied nutrition, dairy records analysis, small ruminants, swine disease diagnoses, swine production systems, swine nutrition, swine record analysis, swine advanced immunology and viral diseases; *equine*: lameness, podiatry, sports—preventive medicine, equine theriogenology; *comparative services*: anesthesiology, hematology/cytology/microbiology, necropsy, public health, radiology, zoo, wildlife, raptor, and laboratory animal; *other rotations*: precepteeship, rotations at other institutions, vacation.

Students electing precepteeships off campus are supervised for periods of up to

# Curriculum and Academic Policies

six weeks by practicing veterinarians who are selected by, but not associated with, the college. Location and type of practice covers a broad range. For example, students serve preceptships in equine practice in Kentucky, beef feedlot practice in Texas, small animal practice in California, and specialty practice all over the United States.

## Professional Curriculum

The college's four-year curriculum is based on standards established by the Council on Education of the American Veterinary Medical Association. Course requirements for the first three years are similar for all members of a class. Basic science courses (anatomy, biochemistry, physiology) predominate in the first year of the curriculum. The second year begins with emphasis on pathobiology and ends with emphasis on animal disease prevention and management. Third-year courses deal largely with medicine, surgery, reproduction, and other subjects directly used in the practice of veterinary medicine. All required coursework is completed by the beginning of the fourth year, which lasts for four quarters and is devoted chiefly to clinical training. Students may pursue special interests through optional clinical assignments and elective coursework. A breakdown of the program by year and term follows.

### First Year

Fall Quarter		Credits
CAPS 5150	Diagnostic and Therapeutic Techniques ...	1
CVM 5100	Introduction to Veterinary Medicine .....	2
VB 5100	Veterinary Anatomy I .....	6
VB 5103	Veterinary Developmental Anatomy .....	3
VB 5104	Microscopic Anatomy of Domestic Animals .....	5
VB 5210	Veterinary Biochemistry .....	3
	Total .....	20
Winter Quarter		Credits
SACS 5270	Animal Behavior .....	2
VB 5102	Veterinary Neurobiology .....	3
VB 5105	Microscopic Anatomy of Domestic Animals .....	4
VB 5211	Veterinary Biochemistry Laboratory .....	1
VB 5212	Veterinary Biochemistry .....	4
VB 5306	Animal Physiology .....	4
	Total .....	18

### Spring Quarter

AnSc 5404	Applied Animal Nutrition .....	2
CAPS 5165	Introduction to Animal Nutrition .....	2
CAPS 5650	Veterinary Epidemiology and Statistics ...	4
VB 5308	Animal Physiology .....	4
VPB 5501	Basic Veterinary Pathology .....	5
VPB 5701	Advanced Veterinary Microbiology, Immunology .....	3
	Total .....	20

### Second Year

Fall Quarter		Credits
VB 5310	Animal Physiology .....	3
VB 5400	Veterinary Pharmacology and Therapeutics I .....	4
VPB 5502	Systemic Veterinary Pathology .....	6
VPB 5601	Veterinary Parasitology I .....	4
VPB 5703	Veterinary Virology .....	4
	Total .....	21

### Winter Quarter

CAPS 5151	Diagnostic and Therapeutic Techniques I .....	1
VB 5401	Veterinary Pharmacology and Therapeutics II .....	4
VPB 5400	Laboratory Animal Medicine .....	2
VPB 5504	Veterinary Clinical Pathology .....	4
VPB 5602	Veterinary Parasitology II .....	4
VPB 5702	Pathogenic Bacteria and Fungi .....	5
VPB 5704	Avian Diseases .....	3
	Total .....	23

### Spring Quarter

CAPS 5160	Large Animal Medicine .....	6
CAPS 5550	Diagnostics and Obstetrics in Theriogenology .....	2
CAPS 5551	Theriogenology Diagnostics Laboratory ..	1
SACS 5170	Small Animal Medicine .....	4
SACS 5451	Veterinary Radiology I .....	1
VB 5126	Veterinary Anatomy II .....	5
VB 5402	Veterinary Pharmacology and Therapeutics III .....	3
	Total .....	22

### Third Year

Fall Quarter		Credits
CAPS 5161	Large Animal Medicine .....	5
CAPS 5552	Veterinary Obstetrics Laboratory .....	1
SACS 5171	Small Animal Medicine .....	4
SACS 5350	Principles of Veterinary Surgery .....	5
SACS 5380	Anesthesiology and Critical Care .....	3
SACS 5452	Veterinary Radiology II .....	3
VDM 5164	Toxicology of Poisonous Plants .....	1
	Total .....	22

### Winter Quarter

CAPS 5162	Large Animal Medicine .....	6
CAPS 5570	Reproductive Diseases of Domestic Animals .....	5
SACS 5152	Diagnostic and Therapeutic Techniques ..	2
SACS 5172	Small Animal Medicine .....	5
SACS 5351	Veterinary Surgery .....	5
	Total .....	23

**Spring Quarter**

CAPS 5153	Diagnostic and Therapeutic Techniques II	1
CAPS 5270	Economics and Practice Management	2
CAPS 5271	Law and Ethics in Veterinary Medicine	2
CAPS 5352	Large Animal Surgery	5
CAPS 5651	Veterinary Community Medicine	3
CAPS 5663	International Animal Disease Problems	1
CVM 5200	Clinical Virology, Immunology, Parasitology, and Toxicology	1
SACS 5260	The Problem-Oriented Medical System	1
VDM 5165	Veterinary Toxicology	2
VDM 5503	Diagnostic Pathology	3
VPB 5180	Applied Immunology	1
	Total	22

**Fourth Year**

**Required Core Clinical Rotation Courses**

**Summer Sessions**

**Credits**

CAPS 5011	Veterinary Public Health	4
CAPS 5091	Precepteeship	4
CAPS 5111	Large Animal Medicine	4
CAPS 5211	Large Animal Surgery	4
CAPS 5221	Equine Lameness	4
CAPS 5231	Equine Podiatry	4
CAPS 5241	Bovine Surgery	4
CAPS 5511	Equine Theriogenology	4
CAPS 5531	Dairy Palpation	4
CAPS 5541	Dairy Theriogenology Management	4
CAPS 5591	General Theriogenology	4
CAPS 5611	Swine Disease Diagnostics, Therapeutics, and Prevention	4
CAPS 5621	Swine Production Systems	4
CAPS 5631	Swine Nutrition	4
CAPS 5641	Swine Economics, Financial Management, and Marketing	4
CAPS 5711	Equine Sports and Preventive Medicine	4
CAPS 5811	Dairy Disease Control, Parasitology, Youngstock Management	4
CAPS 5821	Mastitis, Milking Machines and Milk Quality	4
CAPS 5831	Ruminant Nutrition	4
CAPS 5841	Applied Dairy Nutrition	4
CAPS 5851	Dairy Record Analysis, Epidemiology, and Economics	4
CAPS 5911	Advanced Building Design and Total Herd Evaluation	4
CAPS 5921	Beef Cow/Calving Production Medicine	4
CAPS 5931	Beef Feedlot Production Medicine	4
CAPS 5941	Small Ruminant Health and Production	4
CVM 5601	Rotations at Other Institutions	4
SACS 5111	Internal Medicine	4
SACS 5121	Comparative Ophthalmology/ Dermatology	4
SACS 5131	Emergency Rotation	4
SACS 5141	Clinical Nutrition/Internal Medicine	4
SACS 5151	Community Practice	4
SACS 5211	Small Animal Surgery	4
SACS 5311	Anesthesiology	4
SACS 5321	Small Animal Critical Care Medicine	4
SACS 5411	Radiology	4
SACS 5901	Zoo, Exotic, Raptor, and Companion Birds	4
VDM 5111	Diagnostic Medicine	2
VDM 5611	Advanced Veterinary Toxicology	4

VPB 5011	Veterinary Hospital Necropsy	2
VPB 5021	Clinical Hematology and Cytology	2
VPB 5031	Clinical Microbiology	2
VPB 5721	Poultry Health Rotations	4

**Fall Quarter**

CAPS 5012	Veterinary Public Health	4
CAPS 5092	Precepteeship	4
CAPS 5112	Large Animal Medicine	4
CAPS 5212	Large Animal Surgery	4
CAPS 5222	Equine Lameness	4
CAPS 5232	Equine Podiatry	4
CAPS 5242	Bovine Surgery	4
CAPS 5512	Equine Theriogenology	4
CAPS 5532	Dairy Palpation	4
CAPS 5542	Dairy Theriogenology Management	4
CAPS 5592	General Theriogenology	4
CAPS 5612	Swine Disease Diagnostics, Therapeutics, and Prevention	4
CAPS 5622	Swine Production Systems	4
CAPS 5632	Swine Nutrition	4
CAPS 5642	Swine Economics, Financial Management, and Marketing	4
CAPS 5712	Equine Sports and Preventive Medicine	4
CAPS 5812	Dairy Disease Control, Parasitology, Youngstock Management	4
CAPS 5822	Mastitis, Milking Machines and Milk Quality	4
CAPS 5832	Ruminant Nutrition	4
CAPS 5842	Applied Dairy Nutrition	4
CAPS 5852	Dairy Record Analysis, Epidemiology, and Economics	4
CAPS 5912	Advanced Building Design and Total Herd Evaluation	4
CAPS 5932	Beef Feedlot Production Medicine	4
CAPS 5942	Small Ruminant Health and Production	4
CVM 5602	Rotations at Other Institutions	4
SACS 5112	Internal Medicine	4
SACS 5122	Comparative Ophthalmology/ Dermatology	4
SACS 5132	Emergency Rotation	4
SACS 5142	Clinical Nutrition/Internal Medicine	4
SACS 5152	Community Practice	4
SACS 5212	Small Animal Surgery	4
SACS 5312	Anesthesiology	4
SACS 5322	Small Animal Critical Care Medicine	4
SACS 5412	Radiology	4
SACS 5902	Zoo, Exotic, Raptor, and Companion Birds	4
VDM 5112	Diagnostic Medicine	2
VDM 5612	Advanced Veterinary Toxicology	4
VPB 5012	Veterinary Hospital Necropsy	2
VPB 5022	Clinical Hematology and Cytology	2
VPB 5032	Clinical Microbiology	2
VPB 5722	Poultry Health Rotations	4

**Winter Quarter**

CAPS 5013	Veterinary Public Health	4
CAPS 5093	Precepteeship	4
CAPS 5113	Large Animal Medicine	4
CAPS 5213	Large Animal Surgery	4
CAPS 5223	Equine Lameness	4
CAPS 5233	Equine Podiatry	4
CAPS 5243	Bovine Surgery	4
CAPS 5513	Equine Theriogenology	4
CAPS 5533	Dairy Palpation	4

# Curriculum and Academic Policies

CAPS 5543	Dairy Theriogenology Management .....	4	CAPS 5914	Advanced Building Design and Total Herd Evaluation .....	4
CAPS 5593	General Theriogenology .....	4	CAPS 5924	Beef Cow/Calf Production Medicine .....	4
CAPS 5613	Swine Disease Diagnostics, Therapeutics, and Prevention .....	4	CAPS 5934	Beef Feedlot Production Medicine .....	4
CAPS 5623	Swine Production Systems .....	4	CAPS 5944	Small Ruminant Health and Production ...	4
CAPS 5633	Swine Nutrition .....	4	CVM 5604	Rotations at Other Institutions .....	4
CAPS 5643	Swine Economics, Financial Management, and Marketing .....	4	SACS 5114	Internal Medicine .....	4
CAPS 5713	Equine Sports and Preventive Medicine ...	4	SACS 5124	Comparative Ophthalmology/ Dermatology .....	4
CAPS 5813	Dairy Disease Control, Parasitology, Youngstock Management .....	4	SACS 5134	Emergency Rotation .....	4
CAPS 5823	Mastitis, Milking Machines and Milk Quality .....	4	SACS 5144	Clinical Nutrition/Internal Medicine .....	4
CAPS 5833	Ruminant Nutrition .....	4	SACS 5154	Community Practice .....	4
CAPS 5843	Applied Dairy Nutrition .....	4	SACS 5214	Small Animal Surgery .....	4
CAPS 5853	Dairy Record Analysis, Epidemiology, and Economics .....	4	SACS 5314	Anesthesiology .....	4
CAPS 5913	Advanced Building Design and Total Herd Evaluation .....	4	SACS 5324	Small Animal Critical Care Medicine .....	4
CAPS 5923	Beef Cow/Calf Production Medicine .....	4	SACS 5414	Radiology .....	4
CAPS 5933	Beef Feedlot Production Medicine .....	4	SACS 5904	Zoo, Exotic, Raptor, and Companion Birds .....	4
CAPS 5943	Small Ruminant Health and Production ...	4	VDM 5114	Diagnostic Medicine .....	2
CVM 5603	Rotations at Other Institutions .....	4	VDM 5614	Advanced Veterinary Toxicology .....	4
SACS 5113	Internal Medicine .....	4	VPB 5014	Veterinary Hospital Necropsy .....	2
SACS 5123	Comparative Ophthalmology/ Dermatology .....	4	VPB 5024	Clinical Hematology and Cytology .....	2
SACS 5133	Emergency Rotation .....	4	VPB 5034	Clinical Microbiology .....	2
SACS 5143	Clinical Nutrition/Internal Medicine .....	4	VPB 5724	Poultry Health Rotations .....	4
SACS 5213	Small Animal Surgery .....	4			
SACS 5313	Anesthesiology .....	4			
SACS 5323	Small Animal Critical Care Medicine .....	4			
SACS 5903	Zoo, Exotic, Raptor, and Companion Birds .....	4			
VDM 5113	Diagnostic Medicine .....	2			
VDM 5613	Advanced Veterinary Toxicology .....	4			
VPB 5013	Veterinary Hospital Necropsy .....	2			
VPB 5023	Clinical Hematology and Cytology .....	2			
VPB 5033	Clinical Microbiology .....	2			
VPB 5723	Poultry Health Rotations .....	4			
<b>Spring Quarter</b>					
CAPS 5014	Veterinary Public Health .....	4			
CAPS 5094	Precepteeship .....	4			
CAPS 5114	Large Animal Medicine .....	4			
CAPS 5214	Large Animal Surgery .....	4			
CAPS 5224	Equine Lameness .....	4			
CAPS 5234	Equine Podiatry .....	4			
CAPS 5244	Bovine Surgery .....	4			
CAPS 5514	Equine Theriogenology .....	4			
CAPS 5534	Dairy Palpation .....	4			
CAPS 5544	Dairy Theriogenology Management .....	4			
CAPS 5594	General Theriogenology .....	4			
CAPS 5614	Swine Disease Diagnostics, Therapeutics, and Prevention .....	4			
CAPS 5624	Swine Production Systems .....	4			
CAPS 5634	Swine Nutrition .....	4			
CAPS 5644	Swine Economics, Financial Management, and Marketing .....	4			
CAPS 5714	Equine Sports and Preventive Medicine ...	4			
CAPS 5814	Dairy Disease Control, Parasitology, Youngstock Management .....	4			
CAPS 5824	Mastitis, Milking Machines and Milk Quality .....	4			
CAPS 5834	Ruminant Nutrition .....	4			
CAPS 5844	Applied Dairy Nutrition .....	4			
CAPS 5854	Dairy Record Analysis, Epidemiology, and Economics .....	4			

## Academic Policies

**Registration**—Students admitted to the first-year class receive complete registration information from the Office for Student Affairs and Recruitment.

**Equipment**—Each student is required to purchase a microscope that meets the minimum specifications announced at the time of acceptance. Used microscopes must be examined and approved by designated faculty members before they are purchased. In addition to a microscope and textbooks, the student will be expected to purchase certain special items of clothing and some instruments.

**Animal Use**—Animals are used in the D.V.M. curriculum to illustrate medical principles and to provide students with firsthand experience in the art and practice of veterinary medicine and surgery. The animals are treated with genuine concern for their welfare; however, in some cases animals must eventually be euthanized in accordance with the Animal Welfare Act. Efforts have been made and are ongoing to reduce the number of animals required in non-clinical teaching.

Given the need to use animals for instructional purposes, prospective students must recognize that successful completion of

the D.V.M. curriculum requires that both live and dead animals be incorporated into students' learning experience. In all instances the animals will be treated with dignity and handled in accordance with the Animal Welfare Act. In some cases, procedures will result in termination of the animal's life.

The University and college animal care committees review all courses offered in the College and determine the appropriateness of using animals in each course.

**Degree Requirements**—The bachelor of science (B.S.) degree with a major in veterinary science is granted to students upon satisfactory completion of the first two years of the program of studies with a grade point average of 2.00 or above, providing they have not already earned a bachelor's degree from another college or university. Students earning the bachelor's degree must also satisfy the distribution requirements in liberal studies.

Students in the upper 6 to 10 percent of their class are awarded baccalaureate degrees with distinction and those in the upper 5 percent of their class receive degrees with high distinction.

The doctor of veterinary medicine (D.V.M.) degree is awarded following the satisfactory completion of the four-year professional curriculum with a grade point average of 2.00 or above.

**Honor System**—CVM students, rather than the faculty, monitor examinations. An honor system operates on the assumption that students are honest. Students are trusted not to give or receive aid during examinations and are responsible for their own honesty.

The Honor Case Commission, composed of students elected from the four classes, confidentially considers reports of suspected acts of dishonesty during examinations. The commission may request that a hearing be held to determine if scholastic dishonesty has occurred. In this case, four faculty representatives are selected by the dean and the Faculty Council to form a Student-Faculty Honor Case Commission that will participate in the hearing. If they determine that the student involved is guilty, an

appropriate penalty will be determined and referred to the dean for implementation.

The honor system is a preventive rather than a punitive system. New students receive a brochure on the honor system, and it is also explained to them by a member of the Honor Case Commission during the course Introduction to Veterinary Medicine.

**Examinations and Assignments**—All students have a responsibility to inform the instructor if they must miss a scheduled examination, quiz, or deadline for any course assignment that will count toward their grade.

**Grades**—For courses titled Clinical Rotation there are two permanent grades: O, representing achievement that is outstanding relative to the level necessary to satisfy course requirements, and S, representing achievement that is satisfactory to the instructors. An N is assigned when the student does not earn an O or an S and is not assigned an incomplete.

Doctor of veterinary medicine degree candidates are evaluated under the A-B-C-D-F grading system for most other courses offered by the college. Under this system there are four permanent passing grades: A, representing achievement that is outstanding relative to the level necessary to meet course requirements; B, representing achievement that is significantly above the level necessary to meet course requirements; C, representing achievement that meets the basic course requirements in every respect; and D, representing achievement that is worthy of credit though it does not fully meet the basic course requirements in every respect. F represents performance that fails to meet basic course requirements and is unworthy of credit.

An instructor is obligated to define to a class in its early meetings, as explicitly as possible, the performance that will be necessary to earn each grade. An N (no credit) or F is assigned when a student does not earn an S or a D or a higher grade and is not assigned an incomplete.

The symbol I is assigned to indicate an incomplete when in the instructor's opinion there is a reasonable expectation that a

student can complete successfully any coursework left unfinished at the end of a quarter. An I that is not made up by the end of the quarter break following the next quarter in residence (or summer break in the case of an I received spring quarter) becomes an F or N. When an I is changed to a permanent grade, the I is removed from the record.

The symbol W is entered by the recorder when a student officially withdraws from a course. This symbol is assigned in all cases of official cancellation during the first six weeks of classes and requires the approval of the instructor, the class adviser, and the chair of the Admissions and Scholastic Standing Committee. After the sixth calendar week, a W is recorded only if the student is doing at least D- or S-level work at the time of official cancellation; students who are not achieving at this level receive a grade of F or N.

The symbol X is reported in a continuing course in which a grade cannot be determined until the full sequence of quarters is completed. The instructor submits a grade for each X when the student completes the sequence.

The symbol V indicates registration as an auditor or visitor, a noncredit, nongrade registration.

**Scholastic Requirements**—Each student must maintain a grade point average (GPA) of 1.50 or higher for any single quarter and must earn a passing grade in each course. Students failing to achieve a GPA of at least 1.50 or receiving a grade of F or N (no credit) in any single quarter in a required course or clinic rotation will be dropped from the professional curriculum. Those having a quarterly GPA lower than 2.00 are placed on probation. A student will be allowed to proceed from one quarter to the next on academic probation for no more than three quarters. The fourth time a student achieves a quarterly GPA of less than 2.00 during any block of eight consecutive quarters, he/she will be dropped from the professional curriculum. A GPA of 2.00 must be maintained at the end of each

academic year to continue in the professional curriculum and to earn the D.V.M. degree.

Any student having completed a course(s) similar or identical to required courses in the D.V.M. curriculum may petition the Admissions and Scholastic Standing Committee to substitute for that requirement. Forms for this purpose are available in the Office for Student Affairs and Recruitment, 462 Veterinary Teaching Hospitals.

**Readmission**—If students are dropped from the program, they may not be reinstated without the permission of the Admissions and Scholastic Standing Committee. Credits earned at other institutions during the period of suspension will not apply toward graduation from the University of Minnesota unless permission was given in advance by the Admissions and Scholastic Standing Committee. Students dismissed for the second time, or second-, third-, or fourth-year students who have attained quarterly GPAs of less than 2.00 in more than 40% of the quarters enrolled, or students who have incomplete (I) grades in required courses will not be considered for readmission.

The Admissions and Scholastic Standing Committee, upon granting readmission, will stipulate the courses to be repeated and the level of performance that must be achieved. Failure to achieve these requirements will result in permanent dismissal from the professional curriculum. If permitted to return, students will be placed on probation and may be dropped again any time their work is unsatisfactory.

**Grievance Procedures**—Persons who wish to file grievances or appeals within the College may do so through procedures that conform to the principles of fairness and accessibility defined in the University Senate Statement on Academic Freedom and Responsibility. The Student Conduct Code is published annually in *The Minnesota Daily*. Grievances must be presented in accordance with the regulations of the University Senate and the procedures established by the college.

Descriptions



# Course Descriptions

**Symbols**—The following symbols are used throughout the course descriptions in lieu of page footnotes:

# Registration Override Permit, completed and signed by instructor, is required before registration.

Δ Registration Override Permit, completed and signed by the department, division, or school offering the course is required before registration.

f,w,s,su Following course number indicate fall, winter, spring, or summer terms.

A hyphen between course numbers (e.g., 3142-3143-3144) indicates a sequence of courses that must be taken in the order listed.

A comma between course numbers (e.g., 1234, 1235, 1236) indicates a series of courses that may be entered any quarter. In prerequisite listings, comma means “and” (e.g., “prereq 5101, 5102 or 5103” means the prerequisites are 5101 and either 5102 or 5103).

Elective courses available to third-year students are identified in groupings titled “Other Courses” and are listed by departments.

## College of Veterinary Medicine (CVM)

### Required Courses

#### **5100. INTRODUCTION TO VETERINARY MEDICINE.** (2 cr; prereq 1st-yr vet med)

Lectures and lab on academic policies, student support services, curriculum, student government, personal health and safety, and legal issues related to the D.V.M. program.

#### **5200. CLINICAL VIROLOGY, IMMUNOLOGY, PARASITOLOGY, AND TOXICOLOGY.** (1 cr; prereq VDM 5601, VPB 5601, VPB 5602, VPB 5701, VPB 5702, VPB 5703, #: to be taken concurrently with VDM 5165)

Diagnostic techniques and their clinical application for viral and immunologic diseases; parasite identification methods and their application in preventing and controlling animal parasitisms; clinical signs, differential considerations, and diagnostic alternatives for toxicologic disorders.

#### **5601-5602-5603-5604. ROTATIONS AT OTHER INSTITUTIONS.** (4-24 cr; prereq 4th-yr vet med or #)

Off-site clinical rotations in selected areas of veterinary medicine.

#### **AnSc 5404. APPLIED ANIMAL NUTRITION.** (2 cr; prereq #)

Nutrient requirements of beef and dairy cattle, swine, horses; nutrient content of feedstuffs; protein and nonprotein nitrogen use; energy use; nutritional disorders; formation of adequate rations.

### Other Courses

#### **1100. ORIENTATION TO VETERINARY MEDICINE.** (1 cr)

History of the veterinary profession, careers within the profession, and employment trends. Resources available to those interested in a career in the profession, including the College of Veterinary Medicine and the animal health technology courses offered in Minnesota.

#### **1809. INTERNSHIP IN ANIMAL HOSPITAL PRACTICE.** (4 cr; prereq #)

Labs on 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.

#### **3100. PERSPECTIVES: INTERRELATIONSHIPS OF PEOPLE AND ANIMALS IN SOCIETY TODAY.** (2 cr)

(Same as PubH 3301 and 5301) Interrelationships of people and animals from several viewpoints. Social, economic, and health consequences of these relationships, including issues such as pets and people sharing an urban environment, animal rights, and the influence of differences in cultures on animal-human relationships.

#### **5800. PROBLEMS IN VETERINARY RESEARCH.** (5 cr; prereq #)

Develop and undertake an approved research project in the laboratory of a faculty member who supervises conduct of the research over a ten-week summer period. Course grade is based on performance in the lab and the quality of a written report.

#### **5801. VETERINARY RESEARCH SURVEY SEMINAR.** (1 cr; prereq #)

Fixed format seminars presented by University researchers to expose students to a range of research problems and techniques. Course grade is based on student essays critically discussing one or more of the topics presented.

## Clinical and Population Sciences (CAPS)

### Required Courses

#### **5011-5012-5013-5014. VETERINARY PUBLIC HEALTH CLINIC ROTATION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Preparation for health and social responsibility roles in veterinary community medicine (rural and/or urban) and for federal accreditation. Introduction to public practice veterinarians.

#### **5091-5092-5093-5094. PRECEPTESHIP.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Participation in a practice setting involving large, mixed, or small animal; equine; specialty; or other fields of veterinary medicine as approved by precepteeship program director.

**5111-5112-5113-5114. LARGE ANIMAL MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Diseases of horses, cattle, and small ruminants. History taking, clinical diagnosis, patient management.

**5150. DIAGNOSTIC AND THERAPEUTIC TECHNIQUES.** (1 cr)

Demonstration and application of diagnostic techniques and procedures and restraint of animals. Discussion of therapeutic regimens and demonstration of therapeutic procedures.

**5151. DIAGNOSTIC AND THERAPEUTIC TECHNIQUES I.** (1 cr; prereq 5150 or #)

Application of general physical examination procedures, special diagnostic techniques, and therapeutic procedures for large animals.

**5153. DIAGNOSTIC AND THERAPEUTIC TECHNIQUES II.** (1 cr; prereq #)

Demonstration and practice of restraint of and diagnostic and therapeutic techniques for large animals.

**5160. LARGE ANIMAL MEDICINE.** (6 cr; prereq 5151 or #)

Ruminant diseases covered on a system basis.

**5161. LARGE ANIMAL MEDICINE.** (5 cr; prereq 5160 or #)

Continuation of study of ruminant diseases plus equine diseases, covered on a system basis.

**5162. LARGE ANIMAL MEDICINE.** (6 cr; prereq 5161 or #)

Continuation of equine diseases plus porcine diseases, covered on a system basis.

**5165. INTRODUCTION TO ANIMAL NUTRITION.** (2 cr; prereq VB 5210, VB 5212, VB 5306 or #)

Requirements and functions of nutrients in large and small animals. Sources of nutrients and evaluation of feedstuffs.

**5200. CLINICAL VIROLOGY, IMMUNOLOGY, PARASITOLOGY, AND TOXICOLOGY.** (1 cr; prereq VDM 5164, VPB 5601, VPB 5602, VPB 5701, VPB 5702, VPB 5703, #; to be taken concurrently with VDM 5165)

Diagnostic techniques and their clinical application for viral and immunologic diseases; parasite identification methods and their application in preventing and controlling animal parasitisms; clinical signs, differential consideration, and diagnostic alternatives for toxicologic disorders.

**5211-5212—5213-5214. LARGE ANIMAL SURGERY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Diagnostic and therapeutic management of lameness and surgical diseases of large animals (equine, bovine, small ruminants) in a hospital setting.

**5221-5222-5223-5224. EQUINE LAMENESS.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Two-week course involving clinical, didactic, and lab learning.

**5231-5232-5233-5234. EQUINE PODIATRY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

**5241-5242-5243-5244. BOVINE SURGERY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Technical and theoretical skills necessary for working in a mixed or dairy practice involving individual cow surgical disease management.

**5270. ECONOMICS AND PRACTICE MANAGEMENT.** (2 cr; prereq vet med or #)

Basic economic concepts and terminology, relationship of animal health to productivity, cost/benefit relationships for disease control programs, financial return and economic analysis of livestock operations, economics of practice management, trends in livestock production.

**5271. LAW AND ETHICS IN VETERINARY MEDICINE.** (2 cr; prereq vet med or #)

Legal and ethical issues in veterinary medicine.

**5352. LARGE ANIMAL SURGERY.** (5 cr; prereq #)

Common surgical procedures applied to large animals.

**5511-5512-5513-5514. EQUINE THERIOGENOLOGY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Skills in equine reproduction: teasing for estrus detection, rectal palpation and ultrasound examination of ovaries and pregnancy diagnosis, breeding management, vaginal examination, uterine culture and biopsy, intrauterine therapy, artificial insemination, semen collection and evaluation.

**5531-5532-5533-5534. DAIRY PALPATION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Technical skills of palpating the reproductive tract of cows per rectum.

**5541-5542-5543-5544. DAIRY THERIOGENOLOGY MANAGEMENT.** (4-24 cr; prereq 5531, 5532, 5533, 5534, 3rd- or 4th-yr vet med)

Two-week rotation on embryo transfer, breeding soundness evaluation, obstetrics, and dairy herd reproductive management.

**5550. DIAGNOSTICS AND OBSTETRICS IN THERIOGENOLOGY.** (2 cr; prereq vet med or grad or #)

Diagnostic, therapeutic, and obstetrical procedures in theriogenology.

**5551. THERIOGENOLOGY DIAGNOSTICS LABORATORY.** (1 cr; prereq vet med or grad or #)

Demonstration and lab practice in diagnostic and therapeutic procedures in theriogenology.

**5552. VETERINARY OBSTETRICS LABORATORY.** (1 cr; prereq 5550 or #)

Demonstration and lab practice in obstetrical procedures.

**5570. REPRODUCTIVE DISEASES OF DOMESTIC ANIMALS.** (5 cr; prereq 5550 or #)

Physiology and pathology of reproduction, artificial insemination, abortive diseases, postpartum injuries, breeding management in domestic animals.

**5591-5592-5593-5594. GENERAL THERIOGENOLOGY.** (prereq #)

Comparative theriogenology training program based on clinical case load in the 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.

**5611-5612-5613-5614. SWINE DISEASE DIAGNOSTICS, THERAPEUTICS, AND PREVENTION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Two-week rotation dealing primarily with on-farm disease diagnostics, treatment, and control programs.

## Course Descriptions

**5621-5622-5623-5624. SWINE PRODUCTION SYSTEMS.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
American swine industry.

**5631-5632-5633-5634. SWINE NUTRITION.** (4-24 cr; prereq 3rd- or 4th-yr vet med or DVM or grad)  
Nutrition and feeding of pigs.

**5641-5642-5643-5644. SWINE ECONOMICS, FINANCIAL MANAGEMENT, AND MARKETING.** (4-24 cr; prereq #)

Manipulation, analysis, and interpretation of data from all phases of swine production using biological and financial records. Case studies used to develop diagnostic skills in identifying causes of suboptimal productivity. Financial analysis techniques used to develop cost-effective and feasible solutions to production problems, and swine marketing alternatives.

**5650. VETERINARY EPIDEMIOLOGY AND STATISTICS.** (4 cr; prereq 10 cr biol, 12 cr chem or #)  
Principles of epidemiology, ecology, and veterinary public health. Biostatistics applied to measuring health and disease in populations.

**5651. VETERINARY COMMUNITY MEDICINE.** (3 cr; prereq VPB 5503, VPB 5703 or #)  
Principles and practices of environmental health and food hygiene; meat, poultry, milk, and other foods as they are important for animal and human health. Diseases transmitted between animals and humans.

**5663. INTERNATIONAL ANIMAL DISEASE PROBLEMS.** (1 cr; prereq #)  
Diagnosis, transmission, and epidemiology of animal diseases not currently present in the United States. International role of veterinarians in reducing disease and increasing world animal production.

**5691-5692-5693-5694. EPIDEMIOLOGY AND BIOSTATISTICS.** (4-24 cr; prereq #)  
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.

**5711-5712-5713-5714. EQUINE SPORTS AND PREVENTIVE MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Equine industry. Emphasizes various sports performance activities and the veterinarian's role.

**5811-5812-5813-5814. DAIRY DISEASE CONTROL, PARASITOLOGY, YOUNGSTOCK MANAGEMENT.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Common infectious diseases and parasites that limit dairy calf performance.

**5821-5822-5823-5824. MASTITIS, MILKING MACHINES AND MILK QUALITY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Develops skills to evaluate herd mastitis problems and recommend solutions.

**5831-5832-5833-5834. RUMINANT NUTRITION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Strongly recommended for students interested in dairy and suggested for students interested in beef. Nutrient requirements for ruminants, nutrient content of feedstuffs (primarily forages), energy use, protein and nonprotein nitrogen use, nutritional disorders, formulation of adequate rations, techniques for analyzing rations.

**5841-5842-5843-5844. APPLIED DAIRY NUTRITION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Principles, techniques, goals, and objectives of providing nutritional advice, counseling, and/or assessment to a dairy farm.

**5851-5852-5853-5854. DAIRY RECORD ANALYSIS, EPIDEMIOLOGY, AND ECONOMICS.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Evaluation of a dairy herd using biological and economic records.

**5911-5912-5913-5914. ADVANCED BUILDING DESIGN AND TOTAL HERD EVALUATION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Advanced housing, ventilation, equipment, and building design principles using the epidemiologic approach to promoting animal health. Integration of total animal health care, environmental control, and herd management into herd veterinary services.

**5921-5922-5923-5924. BEEF COW/CALF PRODUCTION MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Maximizing efficiency of the beef cow/calf herd.

**5931-5932-5933-5934. BEEF FEEDLOT PRODUCTION MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Maximizing production and efficiency in the beef feedlot.

**5941-5942-5943-5944. SMALL RUMINANT HEALTH AND PRODUCTION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Sheep and goat production, medicine and health management.

### Other Courses

**3502. ANIMAL HEALTH AND DISEASE.** (5 cr)  
For nonveterinary students to give a broad understanding of veterinary science as it applies to the health and diseases of domestic animals. Emphasis on basic concepts of disease and common animal diseases that demonstrate them. How stress and management practices aggravate and create new disease conditions.

**5180. INTRODUCTION TO HERD HEALTH AND DAIRY HERD HEALTH MANAGEMENT.** (2.5 cr; prereq 3rd- or 4th-yr vet med or grad student or #)  
Herd health management, general epidemiology, disease surveillance, economics of farming. Dairy cattle genetics and breeding, reproduction, applied nutrition, housing, preventive medicine programs, management practices.

**5184. EQUINE NEONATOLOGY.** (1 cr; prereq 3rd- or 4th-yr vet med or #)  
Instruction, emergency duty, and practical application of principles in evaluating and treating sick equine neonates. Seasonal participation in clinically managing hospitalized foals and periodically reviewing past cases.

**5274. UNDERSTANDING THE BUSINESS OF VETERINARY PRACTICE.** (1 cr; prereq 5270 or #)

For senior veterinary students. Veterinary business management including choosing a practice; interviewing for an associate position; negotiating contracts, benefits, hours, covenants; law, tax, business, and financial concepts; insurance; ownership or partnership.

**5275. DISEASES OF ZOO ANIMALS AND EXOTIC PETS.** (1 cr; prereq 3rd- or 4th-yr vet med or grad student or #)

Diseases of and management procedures for zoo animals and exotic pets; restraint procedures, medication, diagnosis.

**5276. ADVANCED ZOO ANIMAL MEDICINE.** (1 cr; prereq 5275, 3rd- or 4th-yr vet med or #)

Adapting existing veterinarian techniques and principles to zoo animal medicine. Animal management and preventive medicine programs used in zoo animal medicine.

**5280. WORLD FOOD PROBLEMS.** (3 cr; prereq major in ag or vet med or nutr sci or soc sci or #; grad by #) (Same as AgEc 5790, FScN 5643, Soc 5675)

Multidisciplinary approach to the social, economic, and technical problems of feeding the world's growing population. Principles sought from the social and economic, plant, animal, and nutritional sciences for their application to food problems.

**5355. EQUINE COLIC MANAGEMENT.** (2 cr; prereq 1st-yr vet med)

Principles and techniques evaluating and treating equine colic cases.

**5356. EQUINE COLIC TEAM.** (1 cr; prereq 5355, vet med)

Four quarters of clinically managing equine colic cases and periodically reviewing past cases, success rates, and topics in related fields.

**5357. ADVANCED COLIC TEAM.** (1 cr; prereq 5356, vet med)

Four quarters of clinically managing cases and periodically reviewing past cases, success rates, and topics in related fields. Students act as team leaders during clinical management and assist in lab exercises for 5355.

**5562. INFERTILITY CLINICS.** (Cr ar; prereq 5560, 5570 or #)

Investigation of hospital cases and field problems involving infertility in domestic animals. Clinical examination, discussion of diagnosis, prognosis, and therapy. Special study of certain reproductive disorders.

**5571. REPRODUCTION AND INFERTILITY IN THE HORSE.** (1 cr; prereq 5570, 4th-yr vet med or grad or #)

Reproductive patterns, breeding practices, management, artificial insemination, economics of reproductive performance, and infertility in horses.

**5573. ADVANCED DAIRY CATTLE REPRODUCTION.** (1 cr; prereq 5570, 3rd- or 4th-yr vet med or grad or #)

Pathology of reproduction, artificial insemination, and abortive diseases of dairy cattle. Evaluation of applied research on fertility, herd health problems, and management programs.

**5574. REPRODUCTION AND INFERTILITY IN THE BULL.** (1 cr; prereq 5570, 4th-yr vet med or grad or #)

Reproductive patterns, management, fertility, and infertility of the bull. Emphasis on clinical approach to diagnosis, prognosis, and treatment.

**5575. REPRODUCTION AND INFERTILITY IN SWINE.** (1 cr; prereq 5570, 4th-yr vet med or grad or #)

Reproductive patterns, breeding practices, management, artificial insemination, synchronization of estrus, economics of reproductive performance, and infertility in swine.

**5615. ADVANCED SWINE DISEASE DIAGNOSTICS, THERAPEUTICS, AND PREVENTION.** (4 cr; prereq IV track or grad or #)

Two week rotation dealing primarily with on-farm disease diagnostics, treatment, and control programs.

**5625. SWINE PRODUCTION SYSTEMS.** (4 cr; prereq IV track or grad or #)

Factors affecting the biological productivity and financial competitiveness of commercial swine farms.

**5645. ADVANCED SWINE ECONOMICS, FINANCIAL MANAGEMENT, AND MARKETING.** (4 cr; prereq IV track or grad or #)

Manipulation, analysis, and interpretation of data from all phases of swine production using biological and financial records. Case studies used to develop diagnostic skills in identifying causes of suboptimal productivity. Financial analysis techniques used to develop cost-effective and feasible solutions to production problems, and swine marketing alternatives.

**5665. MONITORING AND SURVEILLANCE OF DISEASE.** (Cr ar; prereq #: offered odd yrs)

Techniques used to monitor disease in animal populations.

**5671. BIOHAZARDS IN VETERINARY MEDICINE.** (Cr ar; prereq #)

Microbiological, toxicological, drug, and other hazards in veterinary medicine.

**5672. PERSPECTIVES: ANIMAL-HUMAN RELATIONSHIPS AND COMMUNITY HEALTH.** (2-3 cr; prereq #)

(Same as PubH 5303) Perspectives on cultural, psychological, ethological, and environmental aspects of the interrelationships of people and animals as they affect individual and community health.

**5673. PROBLEMS IN DISEASE CONTROL AND ERADICATION.** (Cr ar; prereq PubH 5330 or #; offered odd yrs)

Past and present disease control and eradication programs and factors influencing degree of success and failure. Students develop models for proposed disease control and eradication programs in the United States or a foreign country for group evaluation and analysis.

**5680. PROBLEMS IN VETERINARY EPIDEMIOLOGY AND PUBLIC HEALTH.** (Cr ar; prereq 5650 or equiv or #)

Individual study arranged with a faculty member.

**5695. ADVANCED EPIDEMIOLOGY AND BIOSTATISTICS.** (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.

## Course Descriptions

**5855. ADVANCED DAIRY RECORD ANALYSIS, EPIDEMIOLOGY, AND ECONOMICS.** (4 cr; prereq IV track or grad or #)  
Evaluation of a dairy herd using biological and economic records.

### Graduate Courses

(See the *Graduate School Bulletin* for course descriptions)

**5015. ADVANCED VETERINARY PUBLIC HEALTH (VPH) CLINIC ROTATION**

**5115. ADVANCED LARGE ANIMAL MEDICINE**

**5190. LARGE ANIMAL INTERNAL MEDICINE I**

**5191. LARGE ANIMAL INTERNAL MEDICINE II**

**5215. ADVANCED LARGE ANIMAL SURGERY**

**5225. ADVANCED EQUINE LAMENESS**

**5235. ADVANCED EQUINE PODIATRY**

**5245. ADVANCED BOVINE SURGERY**

**5535. ADVANCED DAIRY PALPATION**

**5545. ADVANCED DAIRY THERIOGENOLOGY MANAGEMENT**

**5595. ADVANCED GENERAL THERIOGENOLOGY**

**5615. ADVANCED SWINE DISEASE DIAGNOSTICS, THERAPEUTICS, AND PREVENTION**

**5635. ADVANCED SWINE NUTRITION**

**5645. ADVANCED SWINE ECONOMICS, FINANCIAL MANAGEMENT, AND MARKETING**

**5715. ADVANCED EQUINE SPORTS AND PREVENTIVE MEDICINE**

**5815. ADVANCED DAIRY DISEASE CONTROL, PARASITOLOGY, YOUNGSTOCK MANAGEMENT**

**5825. ADVANCED MASTITIS, MILKING MACHINES AND MILK QUALITY**

**5835. ADVANCED RUMINANT NUTRITION**

**5845. ADVANCED DAIRY NUTRITION**

**5915. ADVANCED BUILDING DESIGN AND TOTAL HERD EVALUATION**

**5925. ADVANCED BEEF COW/CALF PRODUCTION MEDICINE**

**5935. ADVANCED BEEF FEEDLOT PRODUCTION MEDICINE**

**5945. ADVANCED SMALL RUMINANT HEALTH AND PRODUCTION**

**5951. DIRECTED STUDIES**

**8193. ADVANCES IN CLINICAL IMMUNOBIOLOGY**

**8194. PROBLEMS IN DIAGNOSTIC VIROLOGY, SEROLOGY, AND IMMUNOLOGY**

**8195. PREVENTIVE VETERINARY MEDICINE**

**8197. METABOLIC AND NUTRITIONALLY INDUCED DISEASES OF CATTLE**

**8199. PROBLEMS IN ECONOMICS OF ANIMAL HEALTH**

**8290. ADVANCED VETERINARY MEDICINE**

**8291. ADVANCED DIAGNOSIS AND THERAPEUTICS OF ANIMAL DISEASES**

**8292. SEMINAR: VETERINARY MEDICINE**

**8293. MEDICAL CONFERENCE**

**8299. RESEARCH IN VETERINARY MEDICINE**

**8390. SEMINAR: VETERINARY SURGERY**

**8392. ADVANCED LARGE ANIMAL SURGERY**

**8393. PROBLEMS IN LARGE ANIMAL ORTHOPEDICS**

**8397. LARGE ANIMAL ANESTHESIA**

**8590. ADVANCED DIAGNOSTIC METHODS IN REPRODUCTIVE DISEASES**

**8591, 8592, 8593. ADVANCED ENDOCRINOLOGY OF REPRODUCTION**

**8594. SPECIAL PROBLEMS IN ANIMAL REPRODUCTION**

**8595. SEMINAR: VETERINARY OBSTETRICS**

**8690. EPIDEMIOLOGY OF ZOOSES AND DISEASES COMMON TO HUMANS AND ANIMALS**

**8790. PROBLEMS IN VETERINARY CLINICAL PHARMACOLOGY AND THERAPEUTICS**

**8791. SEMINAR IN CLINICAL PHARMACOLOGY AND THERAPEUTICS**

### Small Animal Clinical Sciences (SACS)

#### Required Courses

**5111-5112-5113-5114. INTERNAL MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Problem-solving skills including problem definition; quality patient care; clinical skill acquisition and application; communication skills including record keeping; ethics; economics of internal medicine; referral etiquette.

**5121-5122-5123-5124. COMPARATIVE OPHTHALMOLOGY/DERMATOLOGY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Case material that entry-level veterinarians face in practice.

**5131-5132-5133-5134. EMERGENCY ROTATION.** (4-24 cr; prereq 3rd- or 4th-yr vet med)  
Assist interns with night and weekend emergency cases.

**5141-5142-5143-5144. CLINICAL NUTRITION/INTERNAL MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Answers to client questions about feeding practices for the normal dog and cat; nutritional aspects of medical patients and use of therapeutic diets.

**5151-5152-5153-5154. COMMUNITY PRACTICE.**

(4-24 cr; prereq 3rd- or 4th-yr vet med)  
Clinical experience using preventive health, behavior, and communication skills. Basic small animal husbandry. Client education resources. Importance of teamwork regarding the practice environment, referral cases, and community involvement. Selected pet bird and pocket pet appointments.

**5170. SMALL ANIMAL MEDICINE.** (4 cr; prereq #)

Etiology, pathophysiology, diagnosis, prognosis, and treatment of disorders of various companion animal body systems. Fundamental principles of diagnosis and treatment. Polysystemic disorders including nutritional abnormalities, immune-mediated diseases, infectious diseases, intoxications, and neoplasia.

**5171. SMALL ANIMAL MEDICINE.** (4 cr; prereq 5170 or #)

Continuation of 5170.

**5172. SMALL ANIMAL MEDICINE.** (5 cr; prereq 5171 or #)

Continuation of 5171.

**5211-5212-5213-5214. SMALL ANIMAL SURGERY.**

(4-24 cr; prereq 3rd- or 4th-yr vet med)  
Diagnostic skills; clinical and technical surgical skills; quality patient care; economics related to surgical practice.

**5260. THE PROBLEM-ORIENTED MEDICAL SYSTEM.** (1 cr; prereq #)

Fundamentals of problem definition and solution. Problem-oriented system of diagnosis and therapy, with emphasis on the problem-oriented medical record.

**5270. ANIMAL BEHAVIOR.** (2 cr; prereq #)

Principles of animal behavior and applied aspects relating to managing clinical behavioral problems. Emphasizes companion and food animals.

**5311-5312-5313-5314. ANESTHESIOLOGY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Preoperative evaluation; restraint; sedation; anesthetic, management, and post-operative care of canine, feline, and occasional exotic animal cases.

**5321-5322-5323-5324. SMALL ANIMAL CRITICAL CARE MEDICINE.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Individual case contact and nursing, assistance in the SAICU, rounds review of SAICU cases. CPR, nutrition, fluid therapy, respiratory care, shock. Rostering in the SAICU allows case contact with critical patients during assigned time blocks.

**5350. PRINCIPLES OF VETERINARY SURGERY.** (5 cr; prereq VB 5126 or #)

Basic materials necessary for clinically managing large and small animal surgical patients. Aseptic technique, patient evaluation, physiologic responses of body systems to surgery, repair and healing of tissue, surgical anatomy.

**5351. VETERINARY SURGERY.** (5 cr; prereq CVM 5350 or #)

Common surgical procedures applied to small animals.

**5380. ANESTHESIOLOGY AND CRITICAL CARE.** (3 cr; prereq 5170 or #)

Principles and application of anesthesia. Managing severely injured patient.

**5411-5412-5413-5414. RADIOLOGY.** (4-24 cr; prereq 3rd- or 4th-yr vet med)

Positioning of animals, standard survey radiograph techniques and special procedures, interpretive skills.

**5451. VETERINARY RADIOLOGY I.** (1 cr; prereq #)

Radiographic interpretation of normal systems.

**5452. VETERINARY RADIOLOGY II.** (3 cr; prereq 5451 or #)

Principles of radiography and radiographic interpretation of abnormal systems.

**5901-5902-5903-5904. ZOO, EXOTIC, RAPTOR, AND COMPANION BIRDS.** (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 species. Clinical experience with companion birds. Restraint, application of anesthesia procedures, collecting diagnostic samples for various raptors.

**Other Courses**

**5180. CRITICAL CARE TEAM.** (2 cr prereq 2nd- or 3rd- or 4th-yr vet med or #)

Instruction, rostered duty in the critical care unit, and practical application of principles and practices related to critically ill patients. Clinically managing hospitalized patients in the critical care unit and periodic review of past cases.

**5250. SMALL ANIMAL DERMATOLOGY.** (1-2 cr; prereq 3rd- or 4th-yr vet med or grad student or #)

Pathogenesis, clinical features, diagnosis, and therapy of skin diseases of companion animals.

**5251. COMPARATIVE CLINICAL VETERINARY DERMATOLOGIC PATHOLOGY.** (1-2 cr; grad or #)

Microscopic pathology of basic dermatologic reactions and variable disease states.

**5255. DISEASES OF THE URINARY SYSTEM.**

(2 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Etiology, pathophysiology, clinical and laboratory findings, diagnosis, prognosis, and treatment of urinary system disorders. Case-oriented format with student participation in discussion emphasized.

**5256. DISEASES OF THE LIVER AND PANCREAS.**

(2 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Etiopathogenesis, diagnosis, and treatment of hepatic and pancreatic diseases in companion animals.

**5257. A CLINICIAN'S ANALYSIS OF URINALYSIS.** (1 cr; prereq completion of first 3 yrs of veterinary curriculum)

Interpret urinalysis findings in patients with a variety of disorders of various body systems.

**5265. COMPARATIVE CARDIOLOGY.** (2 cr; prereq 3rd- or 4th-yr vet med or grad or #)

Develops skills in recognizing, defining, and resolving problems involving the cardiovascular system.

**5271. HOSPITAL MANAGEMENT.** (1 cr; prereq 3rd- or 4th-yr vet med or grad or #)

Managing a small animal hospital. Emphasizes zoning restrictions, employee supervision, drug purchases, facilities, and fees.

## Course Descriptions

**5285. CANINE CLINICAL NEUROLOGY.** (1 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Anatomic and physiologic bases for neurological examination of the dog. Emphasis on a clinical approach to neurology, illustrated with case materials.

**5330. WILD BIRD MEDICINE.** (2 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Important aspects of avian anatomy and physiology. Diseases common to wild birds and surgical repair of common injuries and fractures.

**5360. SMALL ANIMAL ORTHOPEDICS.** (2-3 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Small animal orthopedic problems and surgical procedures to correct them.

**5396. INDEPENDENT STUDY IN VETERINARY MEDICINE.** (2 cr; prereq #)  
Independent study, by arrangement, in a clinical specialty area of veterinary medicine.

**5398. INDEPENDENT RESEARCH IN VETERINARY ANESTHESIOLOGY.** (1-6 cr; prereq vet med or grad or #)  
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.

**5453. SPECIAL PROCEDURES IN VETERINARY RADIOLOGY.** (2 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Contrast agents and procedures used to examine various body systems or anatomical areas.

**5454. ROENTGENOLOGY BONE—LARGE ANIMALS.** (1 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Roentgen signs of common bone diseases of large animals. Emphasizes the horse.

**5455. ROENTGENOLOGY BONE—SMALL ANIMALS.** (1 cr; prereq 3rd- or 4th-yr vet med or grad or #)  
Roentgen signs of common bone diseases of small animals.

**5572. REPRODUCTIVE PATTERNS AND INFERTILITY IN THE DOG AND CAT.** (1 cr; prereq CAPS 5570, 3rd- or 4th-yr vet med or grad or #)  
Reproductive patterns, breeding management, artificial insemination, and infertility in dogs and cats.

**5802. RESIDENCY IN VETERINARY DERMATOLOGY.** (Cr ar; prereq #)  
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.

**5812. COMPANION ANIMAL ONCOLOGY.** (2 cr; prereq DVM or equiv; offered spring alt yrs)  
Biologic behavior, treatment, and prognosis of various neoplastic disorders.

### Graduate Courses

(See the *Graduate School Bulletin* for course descriptions)

**8180. ADVANCED CLINICAL NEUROLOGY**

**8190. COMPARATIVE CARDIOVASCULAR DISEASES**

**8191. ADVANCED COMPARATIVE ELECTROCARDIOLOGY**

**8192. SPECIAL CARDIOLOGY CLINICS**

**8196. INTERNAL MEDICINE IN SMALL COMPANION ANIMALS**

**8197. ADVANCED DERMATOLOGIC CLINICS**

**8198. PROBLEMS IN VETERINARY COMPARATIVE DERMATOLOGY**

**8200. DIRECTED STUDIES IN VETERINARY COMPARATIVE DERMATOLOGY**

**8290. ADVANCED VETERINARY MEDICINE**

**8291. ADVANCED DIAGNOSIS AND THERAPEUTICS OF ANIMAL DISEASES**

**8292. SEMINAR: VETERINARY MEDICINE**

**8293. MEDICAL CONFERENCE**

**8295. COMPARATIVE VETERINARY MEDICAL OPHTHALMOLOGY**

**8296. COMPARATIVE VETERINARY SURGICAL OPHTHALMOLOGY**

**8297. ADVANCED CLINICAL VETERINARY OPHTHALMOLOGY**

**8298. RESEARCH IN VETERINARY OPHTHALMOLOGY**

**8299. RESEARCH IN VETERINARY MEDICINE**

**8390. SEMINAR: VETERINARY SURGERY**

**8391. ADVANCED SMALL ANIMAL SURGERY**

**8394. SURGERY OF THE GASTROINTESTINAL SYSTEM**

**8396. ADVANCED VETERINARY ANESTHESIA**

**8398. RESEARCH IN VETERINARY ANESTHESIA**

**8399. SEMINAR: VETERINARY ANESTHESIA**

**8410. SURGICAL PHYSIOLOGY**

**8420. NEUROSURGERY**

**8430. THORACIC AND CARDIOVASCULAR SURGERY**

**8471. THERAPEUTIC RADIOLOGY**

**8480. SEMINAR: VETERINARY RADIOLOGY**

**8483. ABDOMINAL ROENTGENOLOGY**

**8484. UROLOGIC AND GYNECOLOGIC ROENTGENOLOGY**

**8485. THORACIC ROENTGENOLOGY**

**8490. ADVANCED VETERINARY RADIOLOGY**

**8491. FUNDAMENTALS OF NUCLEAR MEDICINE**

**8492. RADIATION BIOLOGY**

## Veterinary Diagnostic Medicine (VDM)

### Required Courses

**5111-5112-5113-5114. DIAGNOSTIC MEDICINE.** (2-12 cr; prereq 3rd- or 4th-yr vet med)  
Applying principles and techniques of the basic and clinical medical sciences to veterinary diagnostic medicine.

**5164. TOXICOLOGY OF POISONOUS PLANTS.** (1 cr; prereq VB 5401 or #)  
Toxicology and identification of poisonous plants.

**5165. VETERINARY TOXICOLOGY.** (2 cr; prereq VB 5401 or #)  
Toxicology of minerals, pesticides, herbicides, venoms, and miscellaneous toxicants.

**5503. DIAGNOSTIC PATHOLOGY.** (3 cr; prereq VPB 5502 or #)  
Gross and microscopic changes associated with specific infectious and noninfectious diseases of domestic animals.

**5611-5612-5613-5614. ADVANCED VETERINARY TOXICOLOGY.** (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.

### Graduate Courses

(See the *Graduate School Bulletin* for course descriptions)

**5511. SWINE DISEASE DIAGNOSIS**

**5521. SURGICAL PATHOLOGY**

**5522. DIAGNOSTIC PATHOLOGY**

**5524. PROBLEMS IN DIAGNOSTIC PATHOLOGY**

**5620. SCIENTIFIC WRITING AND SPEAKING**

**5621. LABORATORY DIAGNOSIS OF VIRAL DISEASES**

**5622. PROBLEMS IN DIAGNOSTIC VIROLOGY**

**5851. SEMINAR: DIAGNOSTIC MEDICINE**

**8503. ADVANCED DIAGNOSTIC PATHOLOGY**

**8602. COLLOQUIUM IN VIROLOGY**

**8792. SEMINAR IN VETERINARY TOXICOLOGY**

## Veterinary PathoBiology (VPB and VB)

### Required Courses

**VPB 5011-5012-5013-5014. VETERINARY HOSPITAL NECROSPY.** (2-12 cr; 3rd- or 4th-yr vet med)  
Necropsy techniques. Examining tissue for diagnosis, submitting tissue for lab analysis, preparing reports and records.

**VPB 5021-5022-5023-5024. CLINICAL HEMATOLOGY AND CYTOLOGY.** (2-12 cr; prereq 3rd- or 4th-yr vet med)  
Applying principles and techniques of the basic and clinical medical sciences to hematology and cytology.

**VPB 5031-5032-5033-5034. CLINICAL MICROBIOLOGY.** (2-12 cr; prereq 3rd- or 4th-yr vet med)  
Applying principles and techniques of veterinary clinical and diagnostic microbiology.

**VB 5100. VETERINARY ANATOMY I.** (6 cr; prereq #)  
Gross anatomic structure and function. The dog is used as a type species to introduce nomenclature and principles of mammalian gross anatomy. Cervical, thoracic, and abdominal viscera of the dog, cat, ruminant, horse, pig, and lab animals presented from a comparative approach.

**VB 5102. VETERINARY NEUROBIOLOGY.** (3 cr; prereq #)  
(Same as NSc 5102) Structural and functional organization of the central nervous system of domestic animals.

**VB 5103. VETERINARY DEVELOPMENTAL ANATOMY.** (3 cr; prereq #)  
Ontogenetic processes in organ systems of domestic animals and developmental anomalies of clinical significance.

**VB 5104. MICROSCOPIC ANATOMY OF DOMESTIC ANIMALS.** (5 cr; prereq #)  
Light microscopic and relevant ultrastructural studies of cells, tissues, and organ systems.

**VB 5105. MICROSCOPIC ANATOMY OF DOMESTIC ANIMALS.** (4 cr; prereq #)  
Continuation of 5104.

**VB 5126. VETERINARY ANATOMY II.** (5 cr; prereq VB 5100 or #)  
Comparative anatomy with emphasis on the pelvis, reproductive system, limbs, and head from a morphodynamic and radiographic approach. Species covered include horse, domestic ruminants, swine, dog, cat, and bird.

**VB 5210. VETERINARY BIOCHEMISTRY.** (3 cr; prereq 1st-yr vet med or #)  
Molecular nature of cells and tissues, and the ways in which dietary carbohydrates, lipids, and proteins are metabolized to generate energy for growth and maintenance of the animal.

**VB 5211. VETERINARY BIOCHEMISTRY LABORATORY.** (1 cr; prereq #)  
Basic biochemical lab techniques and analyses of biological materials.

**VB 5212. VETERINARY BIOCHEMISTRY.** (4 cr; prereq VB 5210 or #)  
Control and integration of metabolism in the whole animal. Includes hormonal regulation, specialized metabolism in different mammalian tissues and species, and applications of molecular biology to animal health.

**VB 5306. ANIMAL PHYSIOLOGY.** (5 cr; prereq vet med or #)  
Physiology of cell membranes, cardiovascular, renal, and body fluid systems of animals.

## Course Descriptions

**VB 5308. ANIMAL PHYSIOLOGY.** (4 cr; prereq vet med or #)

Physiology of digestion, respiration, and the mechanisms of temperature regulation and heat production in animals.

**VB 5310. ANIMAL PHYSIOLOGY.** (4 cr; prereq VB 5308 or #)

Physiology of the endocrine and reproductive systems of domestic animals.

**VB 5400. VETERINARY PHARMACOLOGY AND THERAPEUTICS I.** (3 cr; prereq VB 5310 or equiv or #)

(Same as NSc 5400) General principles of drug action, disposition, and use, focusing on drug action in the central and peripheral nervous systems. Topics include pharmacology of autonomic drugs, local anesthetics, parenteral general anesthetics, tranquilizing agents, analeptics, anticonvulsants, and neuromuscular blockers. Veterinary applications.

**VB 5401. VETERINARY PHARMACOLOGY AND THERAPEUTICS II.** (5 cr; prereq VB 5310, VB 5400 or #)

Pharmacology of cardiopulmonary drugs (i.e., inhalational anesthetics, antiarrhythmic agents, cardiac glycosides), anti-inflammatory agents (i.e., NSAIDs, corticosteroids, antihistamines), and drugs affecting fluid and electrolyte homeostasis (e.g., diuretics, gastrointestinal drugs). Veterinary applications.

**VB 5402. VETERINARY PHARMACOLOGY AND THERAPEUTICS III.** (3 cr; prereq VB 5401 or #)

Pharmacology of sulfonamides, nitrofurans, arsenicals, antibiotics, coccidiostats, and other antiprotozoan drugs and antifungal agents, anthelmintics, and other anti-infectious drugs. Principles and applications in preventing and treating microbial and parasitic diseases of domestic animals.

**VPB 5501. BASIC VETERINARY PATHOLOGY.** (5 cr; prereq #)

Basic mechanisms involved in reactions of cells/tissues to injury. Emphasis on retrogressive changes in cells, cell death, pigments, circulatory disturbances, inflammation, and alterations in cell growth and multiplication (including neoplasia). Applying basic principles of pathology to evaluation of gross and microscopic tissue alterations.

**VPB 5502. SYSTEMIC VETERINARY PATHOLOGY.** (6 cr; prereq VPB 5501 or #)

Reaction of specific systems to injury emphasizing basic response capabilities of the tissue or organ, with materials illustrating gross and microscopic changes.

**VPB 5504. VETERINARY CLINICAL PATHOLOGY.** (4 cr; prereq VPB 5503 or #)

Technique, application, and interpretation of basic lab tests applied to clinical diagnosis.

**VPB 5550. LABORATORY ANIMAL MEDICINE.** (2 cr; prereq VPB 5502 or #)

Care and management of lab animals. Diseases, nutrition, zoonoses, gnotobiotics, restraint, anesthesia, and environmental practices.

**VPB 5601. VETERINARY PARASITOLOGY I.** (4 cr; prereq VPB 5501 or #)

Helminth parasites and parasitic diseases of animals with emphasis on principles of control.

**VPB 5602. VETERINARY PARASITOLOGY II.** (4 cr; prereq VPB 5601 or #)

Systematic and biologic study of protozoan and arthropod parasites of animals. Emphasis on their relationships to diseases and principles of parasite control.

**VPB 5701. ADVANCED VETERINARY MICROBIOLOGY, IMMUNOLOGY.** (3 cr; prereq VPB 5103, 1st-yr vet med, #)

Humoral and cellular immune responses, hypersensitivity, bacterial genetics, antimicrobial agents and their actions.

**VPB 5702. PATHOGENIC BACTERIA AND FUNGI.** (5 cr; prereq VPB 5701 or equiv or #)

Animal pathogens with emphasis on basic infection mechanisms.

**VPB 5703. VETERINARY VIROLOGY.** (4 cr; prereq VPB 5701 or equiv or #)

Basic virology techniques with emphasis on viral and rickettsial agents causing animal diseases.

**VPB 5704. AVIAN DISEASES.** (3 cr; prereq VPB 5703 or #)

Diseases of poultry and caged and aviary birds.

**VPB 5721-5722-5723-5724. POULTRY HEALTH ROTATIONS.** (4-24 cr; prereq #)

Diagnosing and preventing poultry diseases; performance evaluation; troubleshooting and disease treatment; processing, inspection, and food safety.

**VPB 5780. APPLIED IMMUNOLOGY.** (1 cr; prereq vet med or grad or #)

Principles of immunology and their clinical application.

### Other Courses

**VPB 3103. GENERAL MICROBIOLOGY.** (3-5 cr; not open to vet med students; prereq 10 cr chem, 4 cr biol sci) Morphology, taxonomy, genetics, physiology, and ecology of microorganisms. Practical application of fundamental principles of microbiology to other phases of science and industry.

**VB 5110. CYTOGENETIC EVALUATION OF ANIMAL DISEASES.** (1 cr; prereq 3rd- or 4th-yr vet med or grad or #)

Five lectures dealing with using cytogenetics in animal disease diagnosis and methods of lab preparation and analysis of chromosomes. Five lab periods devoted to preparing prophase spreads of chromosomes, staining and photographing them, and preparing karyograms for analysis.

**VB 5140. VERTEBRATE MICROANATOMY.** (1-6 cr; prereq #)

Microscopic structure and cytochemical and functional aspects of cells, tissues, and organs of representative vertebrates. Four units: basic tissues (2 cr); gastrointestinal tract (1 cr); respiratory and integumentary systems (1 cr); and excretory, reproductive, and endocrine systems (2 cr). Depending on background and interest, students may register for any or all units.

**VB 5320w. AVIAN PHYSIOLOGY.** (4 cr; prereq AnSc 3301 or 5 cr systemic physiology or equiv. #; offered even yrs)

Wild and domestic bird physiology.

**VB 5460w. NEUROCHEMICAL COMMUNICATION.** (4 cr; prereq biochem)  
(Same as NSc 5460 and MdBc 5460) Electrophysiology and biochemistry of neuronal signaling and its manipulation of pharmacological agents, in context of historical findings and current research techniques. Information on most systems (e.g., autonomic and central nervous) in context of specific transmitter systems wherever practical. Two objective, short-answer examinations.

**VPB 5533. DIRECTED STUDIES IN VETERINARY PATHOBIOLOGY.** (Cr ar; prereq 4th-yr vet med, #)  
Principles, methods, and lab exercises for selected pathobiological research problems. Study conducted under faculty supervision.

**VPB 5603s. PARASITES OF WILDLIFE.** (2 cr; prereq VPB 5601, VPB 5602 or #; offered odd yrs)  
Epidemiology and disease potential of some of the more significant helminth, arthropod, and protozoan parasites of regional wild mammals and birds. Term paper required.

**VPB 5707. POULTRY DISEASE CONTROL.** (3 cr; not open to vet med students; prereq AnSc 1100, Biol 1106, VPB 3103 or equiv)  
General anatomy; physiology of digestion and reproduction; prevention and control of important poultry diseases.

**VPB 5709. PREVENTIVE AVIAN MEDICINE.** (1-2 cr; prereq 4th-yr vet med or grad or #)  
Preventive avian disease programs and management practices. Visits to poultry and aviary establishments.

**VB 5748. PROBLEMS IN VETERINARY MICROBIOLOGY AND PUBLIC HEALTH.** (Cr ar; prereq VPB 5703 or equiv, #)

### Graduate Courses (VPB)

(See the *Graduate School Bulletin* for course descriptions)

**5513. PATHOLOGY OF WILDLIFE DISEASES**

**5520. ADVANCED VETERINARY CLINICAL PATHOLOGY**

**5523. PATHOLOGY OF SPONTANEOUS DISEASES OF LABORATORY ANIMALS**

**5524. PATHOLOGY OF SPONTANEOUS DISEASES OF POULTRY**

**5720. ADVANCED CLINICAL MICROBIOLOGY**

**8500. SEMINAR: VETERINARY PATHOLOGY**

**8501. ADVANCED VETERINARY BASIC PATHOLOGY**

**8502. ADVANCED SYSTEMIC PATHOLOGY**

**8504. SEMINAR: ADVANCED VETERINARY HISTOPATHOLOGY**

**8530. ONCOLOGY**

**8531. HOSPITAL PATHOLOGY**

**8532. COMPARATIVE NEUROPATHOLOGY**

**8533. PROBLEMS: PATHOLOGY**

**8534. PROBLEMS: CLINICAL PATHOLOGY**

**8601. ADVANCED VETERINARY PARASITOLOGY**

**8602. ADVANCED VETERINARY PARASITOLOGY**

**8611. IMMUNITY AND PARASITIC INFECTIONS: PROTOZOA AND ARTHROPODS**

**8612. IMMUNITY TO PARASITIC INFECTIONS: HELMINTHS**

**8648. PROBLEMS IN VETERINARY PARASITOLOGY**

**8700. SEMINAR: VETERINARY MICROBIOLOGY**

**8720. ADVANCED VETERINARY MICROBIOLOGY**

**8721. IMMUNODIAGNOSTIC TECHNIQUES FOR AVIAN DISEASES**

**8723. IMMUNOBIOLOGY OF THE LYMPHOCYTE**

**8724. ADVANCED VETERINARY DIAGNOSTIC MICROBIOLOGY**

**8725. CELL CULTURE TECHNIQUES**

**8726. COLLOQUIUM IN IMMUNOLOGY**

### Graduate Courses (VB)

(See the *Graduate School Bulletin* for course descriptions)

**5149. TOPICS OF ORGANOLGY**

**5444. MUSCLE CONTRACTION**

**5920. INDEPENDENT RESEARCH IN VETERINARY BIOLOGY**

**5950. DIRECTED STUDIES**

**8111. HISTOLOGIC AND ULTRAHISTOLOGIC TECHNIQUES**

**8112-8113-8114. RESEARCH PROPOSITIONS IN MORPHOLOGY**

**8134-8135. COMPARATIVE VETERINARY NEUROLOGY**

**8136. EXPERIMENTAL COMPARATIVE VETERINARY NEUROLOGY**

**8149. RESEARCH IN VETERINARY ANATOMY**

**8150. RESEARCH PROBLEMS IN VETERINARY ANATOMY**

**8349. RESEARCH IN PHYSIOLOGY**

**8448. PROBLEMS IN VETERINARY PHARMACOLOGY**

**8449. NEUROTOXICITY OF ORGANOPHOSPHORUS INSECTICIDES**

**8450. DRUG-RECEPTOR INTERACTIONS**

**8460. NEUROCHEMICAL COMMUNICATION**

**8550. SEMINAR: VETERINARY BIOLOGY**

# Administration and Faculty

## University Regents

Jean B. Keffeler, Minneapolis, Chair  
Thomas R. Reagan, Gilbert, Vice Chair  
Wendell R. Anderson, Wayzata  
Julie A. Bleyhl, Madison  
William E. Hogan II, Minnetonka  
H. Bryan Neel III, Rochester  
Mary J. Page, Olivia  
Lawrence J. Perlman, Minneapolis  
William R. Peterson, Eagan  
Darrin M. Roshka, Owatonna  
Stanley D. Sahlstrom, St. Cloud  
Ann J. Wynia, St. Paul

## University Administrators

Nils Hasselmo, President  
Robert O. Erickson, Senior Vice President  
for Finance and Operations  
Ettore F. Infante, Senior Vice President for  
Academic Affairs and Provost  
C. Eugene Allen, Vice President for  
Agriculture, Forestry, and Home  
Economics  
Shelley N. Chou, Interim Dean of the  
Medical School  
Richard P. Elzay, Deputy Vice President for  
Health Sciences  
Anne H. Hopkins, Vice President for Arts,  
Sciences, and Engineering  
Marvalene Hughes, Vice President for  
Student Affairs  
Anne C. Petersen, Vice President for  
Research and Dean of the Graduate  
School  
Mark B. Rotenberg, General Counsel

## College of Veterinary Medicine Administrators

David G. Thawley, B.V.Sc., Ph.D., professor  
and dean (455A Veterinary Teaching  
Hospitals; 624-6244)  
Carl R. Jessen, D.V.M., Ph.D., professor and  
associate dean for planning and veterinary  
medical services (447 Veterinary  
Teaching Hospitals; 625-9268)  
Victor Perman, D.V.M., Ph.D., professor and  
acting associate dean for research (443  
Veterinary Teaching Hospitals; 624-2744)

Dale K. Sorensen, D.V.M., Ph.D., professor  
and acting associate dean for academic  
and student affairs (457 Veterinary  
Teaching Hospitals; 624-4731)  
Martin E. Bergeland, D.V.M., Ph.D.,  
professor and director of Minnesota  
Veterinary Diagnostic Laboratory (244  
Diagnostic Laboratory; 625-8787)  
Stanley L. Diesch, D.V.M., M.P.H., professor  
and director of international programs  
(424 Veterinary Teaching Hospitals; 625-  
7296)  
Donald C. Plumb, B.S., Pharm.D., director of  
Veterinary Teaching Hospitals (305  
Veterinary Teaching Hospitals; 625-9268)  
Charles H. Casey, D.V.M., director of  
Veterinary Continuing Education and  
Extension (414 Veterinary Teaching  
Hospitals; 624-1711)  
Larry D. Bjorklund, B.S., M.S., coordinator  
of recruitment and admissions (462B  
Veterinary Teaching Hospitals; 624-4747)  
Barbara M. O'Leary, D.V.M., M.S.,  
coordinator, public relations (432  
Veterinary Teaching Hospitals; 624-7720)  
Philip C. Oswald, M.S., development officer  
(410 Veterinary Teaching Hospitals; 624-  
5315)

## Faculty

### Department of Clinical and Population Sciences

#### *Professor*

David G. Thawley, B.V.Sc., Ph.D., *dean*  
John P. Fetrow, V.M.D., M.B.A., *chair*  
Trevor R. Ames, D.V.M., M.S.  
John F. Anderson, D.V.M., M.S.  
Stanley L. Diesch, D.V.M., M.P.H.  
Robert H. Dunlop, D.V.M., Ph.D.  
Melvyn L. Fahning, D.V.M., M.S., Ph.D.  
Ralph J. Farnsworth, D.V.M., M.S.  
Donald W. Johnson, D.V.M., Ph.D.  
Han Soo Joo, D.V.M., M.S., Ph.D.  
Carlos B. J. Pijoan, D.V.M., Ph.D.  
Michael M. Pullen, D.V.M., M.S.  
Robert A. Robinson, B.V.Sc., Ph.D.  
Bradley E. Seguin, D.V.M., M.S., Ph.D.

*Associate Professor*

Gary D. Dial, D.V.M., Ph.D.  
 Dale L. Haggard, D.V.M., M.S.  
 Martha A. Mellencamp, B.S., M.S., Ph.D.  
 Thomas W. Molitor, B.A., M.S., Ph.D.  
 Robert B. Morrison, D.V.M., Ph.D.  
 Jerry D. Olson, D.V.M., M.S.  
 William G. Olson, D.V.M., M.S., Ph.D.  
 Ava Michelle Trent, D.V.M., M.V.Sc.  
 Tracy A. Turner, D.V.M., M.S.  
 James E. Waddell, B.Sc., Ph.D.

*Assistant Professor*

Calvin N. Kobluk, D.V.M., D.V.Sc.  
 William E. Marsh, B.S., M.S., Ph.D.

**Department of Small Animal Clinical Sciences**

*Professor*

Carl R. Jessen, D.V.M., Ph.D., *associate dean, planning and veterinary medical services*  
 Jeffrey S. Klausner, D.V.M., M.S., *chair*  
 Stephen I. Bistner, D.V.M.  
 Dennis D. Caywood, D.V.M., M.S.  
 Daniel A. Feeney, D.V.M., M.S.  
 Robert M. Hardy, D.V.M., M.S.  
 Gary R. Johnston, D.V.M., M.S.  
 Shirley D. Johnston, D.V.M., Ph.D.  
 Alan J. Lipowitz, D.V.M., M.S.  
 Patrick J. McKeever, D.V.M., M.S.  
 Carl A. Osborne, D.V.M., Ph.D.  
 Marc R. Raffé, D.V.M., M.S.  
 Larry J. Wallace, D.V.M., M.S.

*Associate Professor*

P. Jane Armstrong, D.V.M., M.S.  
 Phillip N. Ogburn, D.V.M., Ph.D.  
 David J. Polzin, D.V.M., Ph.D.  
 Patrick T. Redig, D.V.M., Ph.D.  
 Elaine P. Robinson, B.Vet.Med., M.V.Sc.  
 Patricia A. Walter, D.V.M., M.S.

*Assistant Professor*

Ford W. Bell, D.V.M.  
 Jody P. Lulich, D.V.M., Ph.D.

*Associate Clinical Specialist*

Elizabeth P. Boynton, D.V.M.  
 Betty A. Heffernan, D.V.M., M.S.  
 Sheila M. Torres, D.V.M., M.S., Ph.D.

**Department of Veterinary Diagnostic Medicine**

*Professor*

Martin E. Bergeland, D.V.M., Ph.D., *chair*  
 Sagar M. Goyal, B.V.Sc., Ph.D.  
 Harold J. Kurtz, D.V.M., Ph.D.  
 George R. Ruth, D.V.M., Ph.D.  
 Ronald E. Werdin, D.V.M., Ph.D.

*Associate Professor*

James E. Collins, D.V.M., Ph.D.  
 Lawrence J. Felice, Ph.D.  
 Michael J. Murphy, D.V.M., Ph.D.  
 Ashok K. Singh, Ph.D.

*Assistant Professor*

Barbara Greig, D.V.M.  
 Daniel P. Shaw, D.V.M., Ph.D.

**Department of Veterinary Pathobiology**

*Professor*

Victor Perman, D.V.M., Ph.D., *acting associate dean for research*  
 Lawrence B. Schook, Ph.D., *chair*  
 Alvin J. Beitz, Ph.D.  
 Caroline M. Czarniecki, Ph.D.  
 Gary E. Duke, Ph.D.  
 Thomas F. Fletcher, D.V.M., Ph.D.  
 Esther M. Gallant, Ph.D.  
 David A. Halvorson, D.V.M.  
 David W. Hayden, D.V.M., Ph.D.  
 Kenneth H. Johnson, D.V.M., Ph.D.  
 Alice A. Larson, Ph.D.  
 Keith I. Loken, D.V.M., Ph.D.  
 Charles F. Louis, D.Phil.  
 Samuel K. Maheswaran, D.V.M., Ph.D.  
 Kakambi V. Nagaraja, B.V.Sc., Ph.D.  
 John A. Newman, D.V.M., Ph.D.  
 Jagdev M. Sharma, B.V.Sc., Ph.D.  
 Bert E. Stromberg, Ph.D.  
 Mary M. Walser, V.M.D., Ph.D.  
 Gilbert E. Ward, D.V.M., Ph.D.

*Associate Professor*

Russell R. Bey, B.A., Ph.D.  
 David R. Brown, Ph.D.  
 Victor S. Cox, D.V.M., Ph.D.  
 Sally E. Jorgensen, Ph.D.  
 Mathur S., Kannan, B.V.Sc., M.Sc., Ph.D.  
 Michael P. Murtaugh, B.S., Ph.D.

---

## Administration and Faculty

---

Timothy D. O'Brien, D.V.M., Ph.D.  
Terrance P. O'Leary, D.V.M., Ph.D.  
Richard E. Shope, Jr., D.V.M., Ph.D.  
V. Sivanandan, B.V.Sc., Ph.D.  
Douglas J. Weiss, D.V.M., M.S., Ph.D.

### *Assistant Professor*

James R. Michelson, Ph.D.  
Rebecca Rose, D.V.M., Ph.D.  
Barbara J. Waurzyniak, D.V.M., M.S.

### **Department of Animal Science**

(affiliate department of College of Veterinary Medicine)

### *Professor*

Richard D. Goodrich, Ph.D., *head*  
William J. Boylan, Ph.D.  
Charles J. Christians, Ph.D.  
B. Joseph Conlin, Ph.D.  
Craig N. Coon, Ph.D.  
Bo G. Crabo, Ph.D.  
William R. Dayton, Ph.D.  
Mohamed E. El Halawani, Ph.D.  
Richard J. Epley, Ph.D.  
Melvin L. Hamre, Ph.D.  
Leslie B. Hansen, Ph.D.  
Jerry D. Hawton, Ph.D.  
Alan G. Hunter, Ph.D.  
James G. Linn, Ph.D.  
Jay C. Meiske, Ph.D.  
Donald E. Otterby, Ph.D.  
James E. Pettigrew, Ph.D.  
Jeffrey K. Reneau, D.V.M.  
Anthony J. Seykora, Ph.D.  
Marshall D. Stern, Ph.D.  
Paul E. Waibel, Ph.D.  
Jonathan E. Wheaton, Ph.D.

### *Associate Professor*

Brian A. Crooker, Ph.D.  
Douglas N. Foster, Ph.D.  
Marcia R. Hathaway, Ph.D.  
Sally N. Noll, Ph.D.  
Scott M. O'Grady, Ph.D.  
John W. Osborn, Ph.D.  
Gerald C. Shurson, Ph.D.  
Gerald R. Steuernagel, Ph.D.  
Michael E. White, Ph.D.

### *Assistant Professor*

Alfredo DiCostanzo, Ph.D.  
Brent W. Woodward, Ph.D.



# Index

## A

Administration 36  
Admission Procedures 9  
Alumni Society 14  
Anatomy 16  
Anesthesiology 16  
Animal Use 6, 22  
Assignments 23  
Avian Health 16

## B

Biochemistry 16

## C

Campus Map 39  
Career Opportunities 2  
Clinical Pathology 16  
Clinic Rotation 19  
Continuing Education 14  
Course Descriptions  
    Clinical and Population Sciences 26  
    College of Veterinary Medicine 26  
    Small Animal Clinical Sciences 30  
    Veterinary Biology 33  
    Veterinary Diagnostic Medicine 33  
    Veterinary PathoBiology 33  
Curriculum and Academic Policies 16

## D

Degree Requirements 23  
Diagnostic Medicine 16

## E

Education, Veterinary Medical 2  
Epidemiology, Food Hygiene, and  
    Public Health 17  
Equal Opportunity 3  
Equipment 22  
Examinations 23  
Expenses 10  
Extracurricular Events 4

## F

Facilities 7  
Faculty 36  
Financial Aid 10

## G

Grades 23  
Graduate Programs 13  
Grievance Procedures 24

## H

High School Preparation 7  
History, Veterinary Medicine 2  
Honor System 23

## I

Immunization 3

## L

Large Animal Medicine 18  
Large Animal Surgery 18

## M

Microbiology 17

## N

Nutrition 17

## P

Parasitology 17  
Pathology 17  
Pharmacology 18  
Physiology 18  
Preprofessional Curriculum 7  
Professional Curriculum 6, 20  
Programs and Services 5

## R

Radiology 18  
Readmission 24  
Records, Access to 3  
Regents 36  
Registration 22

## S

Scholastic Requirements 24  
Small Animal Medicine 18  
Small Animal Surgery 19  
Student Activities 12  
Student Services 12  
Symbols 26

## T

Theriogenology 18  
Toxicology 19

## Postal Statement

Volume 96, Number 13  
October 20, 1993

University of Minnesota  
(USPS 651-720)

Published by the University of Minnesota, Office of the Vice President for Student Affairs, Communications & Publications, 110 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455; once in May, June, August, November, and December; twice in February and October; three times in April; and four times in July. Second-class postage paid at Minneapolis, Minnesota. POSTMASTER: Send address changes to University of Minnesota, 110 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455-0213.



Paper for the cover and text of this bulletin was selected for use in the University Recycling Program. The paper contains 10 percent post-consumer material.

Please keep this bulletin for future use, pass it along, or drop it in a University office paper recycling barrel.

University of Minnesota  
(USPS 651-720)  
Communications & Publications  
110 Williamson Hall  
231 Pillsbury Drive S.E.  
Minneapolis, MN 55455-0213

Second-Class  
U.S. Postage  
Paid  
Minneapolis, MN

2236  
UNIVERSITY ARCHIVES  
10 WALTER LIBRARY  
MPLS, EAST BANK

School of Dentistry

# UNIVERSITY OF MINNESOTA

BULLETIN

1993-1995

A TRADITION  
OF EXCELLENCE

*Dedicated to educating  
clinically competent  
professionals and  
generating new knowledge  
and technology.*

## **School of Dentistry**

<b>2</b>	<b>Dentistry in Minnesota</b>
<b>5</b>	<b>General Information</b>
<b>9</b>	<b>Student Life</b>
<b>15</b>	<b>Bachelor of Science Degree in Dental Hygiene</b>
<b>23</b>	<b>Doctor of Dental Surgery Program</b>
<b>38</b>	<b>Resource Guide</b>
<b>39</b>	<b>Campus Map</b>
<b>40</b>	<b>Index</b>



## Message from the Dean

We're glad to know of your interest in the University of Minnesota School of Dentistry. As one of the outstanding schools of dentistry in the United States, we're committed not only to generating new knowledge and technology for our profession and the people it serves, but also to providing a supportive, nurturing environment in which future dental practitioners can develop the skills they need to provide quality patient care. We're proud of our school and its historic excellence, and we invite you to explore more fully the opportunities we offer.

Richard P. Elzay, dean

## A Brief History

The School of Dentistry celebrated its centennial in 1988. In its long history, the school has developed an international reputation for research, education, and service that includes

### *A strong tradition:*

- Twenty-two students and four faculty members composed the University of Minnesota College of Dentistry when it began in 1888 as a division of the Department of Medicine. The college became the School of Dentistry in 1932.
- Early students used a dental engine driven by a foot pedal and made some of their own laboratory and clinical instruments in class.
- By the 1938-39 academic year, the original three-year program of study had been lengthened to four years, preceded by two years of prescribed undergraduate courses. In 1976, the prerequisites were changed to include three years of undergraduate coursework.
- A two-year dental hygiene program was added in 1920. The two-year program remained until 1989 when it was replaced by a baccalaureate program.
- A dental graduate degree program began in 1937; from 1957 to 1993, several programs were developed to give dental graduates the opportunity to earn a Ph.D. in various disciplines.

### *Research excellence:*

- School of Dentistry faculty have earned worldwide reputations for their contributions to the understanding of fluoride and decay prevention, microbiology and oral-facial genetic anomalies, periodontal disease prevention, pain control, oral cancer, and effective care delivery.
- The Dental Research Institute, which applies high technology to oral health problems, and the Clinical Research Center for Periodontal Diseases, which collaborates with international corporations, offer specialized research opportunities.
- Undergraduates can participate in summer research programs, in which they work in areas of interest with faculty mentors.

### *International exchange:*

- Since 1969, international student exchange programs have offered undergraduates an opportunity to study with faculty from Guatemala, Denmark, Germany, and Norway.
- Undergraduate students have provided dental care to people in 89 countries. The school has hosted faculty and students from 57 countries for education and research experiences.
- In 1967, the Lasby Visiting Professorship was created to bring American and foreign scientists and clinicians to the School of Dentistry.

*A history of the School of Dentistry, written by professor Mellor Holland, is available.*

## The Dental Profession

New knowledge, concepts, and techniques have made dental and dental hygiene care beneficial for patients and more challenging, interesting, and comprehensive for practitioners. Today's dentist can reorganize crowded teeth; replace missing teeth with implants; seal enamel defects; and whiten, laminate, or crown discolored or cracked teeth. Tomorrow's dentists, particularly general practitioners and dental hygienists, will be expected to provide an even greater range of dental and personal health services. And more dental professionals will be needed. In 1990, it was estimated that the United States would have only 44.8 dentists per hundred thousand population, the fewest since World War I. Yet by the year 2000, it is estimated there will be 30 million more Americans for the profession to serve.

More than 140,000 dentists are practicing in the United States today and roughly half of these are over the age of 45. About 90 percent are in private practices (solo or groups), with the rest working in a variety of other settings: city, state, and federal agencies such as public health departments; community and nonprofit agencies; dental educational institutions; research programs sponsored by universities, foundations, and corporations; and armed forces programs. Of those dentists in private practice, approximately 95 percent have an ownership interest. Fewer dentists are now going into solo practice (approximately 70 percent); more are forming partnerships and other group practices (30 percent). About 80 percent of all dentists practice general dentistry; the remainder practice a dental specialty.

## The Community

With more than 2.2 million residents, the Twin Cities provide the educational and cultural advantages of a major metropolitan area while offering easy access to abundant natural and wildlife areas. Plentiful parks, lakes, and rivers are close to most metropolitan homes and provide year-round opportunities for outdoor recreation, including skiing, skating, and hiking in the winter; and swimming, sailing, fishing, cycling, golfing, tennis, and jogging in the warmer seasons. Major league sports teams include baseball's Minnesota Twins, football's Vikings, and basketball's Timberwolves.

Cultural opportunities abound. The Minnesota Orchestra, St. Paul Chamber Orchestra, Minneapolis Institute of Arts, Guthrie Theater, and Walker Art Center set the pace for many vigorous theaters, galleries, dance companies, museums, and musical groups. With such cultural, sporting, and recreational opportunities, it is no surprise to Minnesotans that quality-of-life studies rank us consistently among the top metropolitan areas in the nation.

## The University

With four campuses, 4,500 faculty members, and more than 55,000 students, the University of Minnesota is one of the nation's largest, most comprehensive public institutions of higher learning. It is both a land-grant university with a strong tradition of education and public service, and a major research institution with scholars of national and international reputation.

The Twin Cities campus is the largest of the four campuses. Made up of 20 colleges, it offers a full range of undergraduate, graduate, and professional degrees. The Twin Cities campus is actually two close but geographically separate campuses, one in Minneapolis and the other in St. Paul. The Mississippi River divides the Minneapolis campus into the East Bank—where the School of Dentistry and the health sciences center are located—and the West Bank. Adjacent campus neighborhoods cater to student interests, while readily accessible downtowns in both Minneapolis and St. Paul offer metropolitan services and activities.

## The School of Dentistry

**Location**—The School of Dentistry, including the Division of Dental Hygiene, is headquartered on the East Bank of the University of Minnesota's Twin Cities campus. The school's main administrative office is in 15-209 Malcolm Moos Health Sciences Tower, 515 Delaware Street S.E., Minneapolis, MN 55455. Dental Hygiene offices are in 9-436 Malcolm Moos Health Sciences Tower.

**Rich Curriculum**—The professional D.D.S. program features diversified courses in the preclinical and clinical disciplines; basic medical sciences; professional, interpersonal, and ecological aspects of dental care; and practice management. Designed to meet student needs, the curriculum emphasizes the



scientific, scholarly, interpersonal, and communication skills graduates will need to deal with a continually changing profession. Teaching methodologies range from traditional lectures to small group tutorials to clinical practice in a comprehensive, group care setting where students apply the skills they learn. In addition, career planning and placement are integrated into the core of the curriculum so students can prepare for the transition to practice or advanced education.

Graduate dentists can earn the M.S. degree in eight specialties. Seven of those programs are offered through the Graduate School, while the program in oral health services for older adults is offered through the School of Dentistry. Ph.D. degrees are offered in oral biology and the basic medical sciences. Post-D.D.S. residency and training programs are also available in several areas; the school provides generous financial support for these programs through federally funded research traineeships.

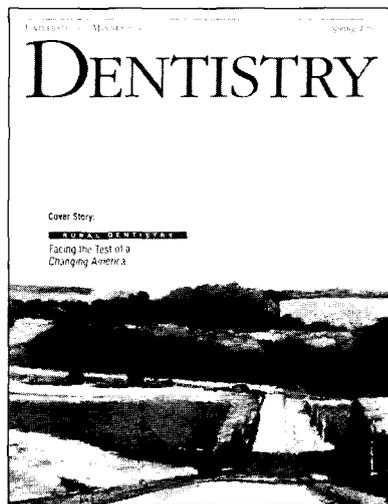
The professional dental hygiene program, established in 1919, has an illustrious record of accomplishment and innovation and is one of the country's premiere programs. Today's graduates complete a baccalaureate degree program that blends a solid dental hygiene clinical education with the biological, behavioral, and social sciences as well as the liberal arts.

**Important Research**—Vital clinical and basic research, conducted by the faculty in superb research facilities, includes work in areas such as oral microbiology; fluoride chemistry; bone substitutes; genetic study of viruses; dental restorative materials in a simulated, computerized artificial mouth; and microcirculation. Dental and dental hygiene students benefit from this research through new information provided by the faculty as well as summer research fellows under the guidance of faculty mentors.

**Facilities**—The School of Dentistry offices are in the Malcolm Moos Health Sciences Tower, a flexible, innovative environment for teaching and practicing dentistry and dental hygiene and conducting research. All the basic science teaching laboratories are in Moos Tower, except for the adjacent anatomy

and histology laboratories. Reference books and periodicals for dental and dental hygiene students are in the Reading Room on the ninth floor, and nonprint materials are in the Learning Resources Room on the eighth floor. The Bio-Medical Library in Diehl Hall, one block south of the Moos Tower, features an extensive selection of reference materials in the fundamental and clinical health sciences. The large Twin Cities campus library system is headquartered in Wilson Library on the West Bank.

**Dentistry**—A magazine for University of Minnesota alumni, donors, parents, and friends, *Dentistry* is distributed nationally twice a year. Feature stories on important topics in dentistry, alumni news, and a special message from the dean are included.



*General Information*



## Mission

As part of a large metropolitan university with a strong commitment to the health sciences, the School of Dentistry offers a variety of academic and cultural opportunities. It is a member of the American Association of Dental Schools, and the undergraduate programs in dentistry and dental hygiene are approved by the Commission on Dental Accreditation.

The mission of the School of Dentistry is to educate dental professionals; discover new knowledge, technology, and skills; and apply those discoveries to the dental profession and the community it serves.

The goal of the D.D.S. curriculum is to educate dental professionals whose scholarly capabilities, scientific acumen, and interpersonal skills are commensurate with their clinical mastery.

## Outstanding Reputation

The School of Dentistry has a proud and productive history. It has gained a national and international reputation for the quality of its educational, clinical, research, service, and patient-care programs. Its faculty have wide-ranging educational and research experience in many institutions throughout the nation and the world.

**Special Clinics**—Special services and teaching clinics include a cleft palate and maxillofacial clinic for patients with congenital or acquired defects; and a head and facial pain clinic, which provides broad evaluation and treatment services for patients with complicated pain problems. Both clinics have extensive consulting and in-house staffs of dental and medical specialists.



**Small Group Learning**—Dental and dental hygiene students work in small groups on a number of problems/case studies using paper cases, simulations, and their own patients. This stimulates group discussion of clinical and basic science concepts within a problem-solving framework and a cooperative learning environment.

**Excellent External Support**—The School of Dentistry enjoys strong support from its large, active alumni society, which has the highest percentage of membership of any major school at the University of Minnesota. A large pool of friends, including our alumni, are generous with their monetary support for endowments, current gifts, and educational programs. We are constantly expanding the use of endowments to include private support for research activities among our faculty and students.

## Degrees Offered

**Doctor of Dental Surgery**—The professional doctor of dental surgery (D.D.S.) program involves a four-year curriculum. Requirements are explained in the D.D.S. section of this bulletin.

A B.S. degree is not offered through the University of Minnesota School of Dentistry. However, an individual can still earn a B.S. degree while completing the dental curriculum if the institution at which the individual took preprofessional coursework recognizes the basic science coursework taken at the School of Dentistry and awards the degree independently.

**Bachelor of Science in Dental Hygiene**—The B.S. degree in dental hygiene is offered through the Program in Dental Hygiene. Requirements are explained in the dental hygiene section of this bulletin.

**Graduate Programs**—Graduate programs prepare dental professionals for careers in education, research, and specialty practice. The master of science (M.S.) degree is offered through the Graduate School in a variety of disciplines: endodontics, oral and maxillofacial surgery, oral biology, oral pathology, orthodontics, pediatric dentistry, periodontics, and prosthodontics. The Ph.D. degree in oral biology and the Dentist Scientist Award Program, providing Ph.D. training in basic sciences and



advanced education in a clinical dental specialty, are also offered through the Graduate School. Two one-year residency programs are offered through the School of Dentistry (general practice residency and advanced education program in general dentistry). Students can also obtain advanced education degrees (M.S., Ph.D.) in all the basic biological sciences and public health through the Graduate School. For details, consult the *Graduate School Bulletin*.

**Continuing Education**—Short courses are regularly offered to keep members of the dental profession informed of new developments in clinical and research procedures. Special brochures listing courses, dates, and costs are available through the Continuing Dental Education Program, 6-406 Malcolm Moos Health Sciences Tower (612/625-1418).

Dental and dental hygiene students may attend selected continuing education courses during their senior year on a space-available basis. These courses expose seniors to a broad scope of information and technology from a variety of local and national speakers. Students gain by selecting their own educational experiences and interacting with practicing dentists and dental hygienists.



## **Administration**

### **University Regents**

Jean B. Keffeler, Minneapolis, Chair  
Thomas R. Reagan, Gilbert, Vice Chair  
Wendell R. Anderson, Wayzata  
Julie A. Bleyhl, Madison  
William E. Hogan II, Minnetonka  
H. Bryan Neel III, Rochester  
Mary J. Page, Olivia  
Lawrence J. Perlman, Minneapolis  
William R. Peterson, Eagan  
Darrin M. Rosha, Owatonna  
Stanley D. Sahlstrom, St. Cloud  
Ann J. Wynia, St. Paul

### **University Administrators**

Nils Hasselmo, President  
Robert O. Erickson, Senior Vice President for Finance and Operations  
Ettore F. Infante, Senior Vice President for Academic Affairs and Provost  
C. Eugene Allen, Vice President for Agriculture, Forestry, and Home Economics  
Shelley N. Chou, Interim Dean of the Medical School  
Richard P. Elzay, Deputy Vice President for Health Sciences  
Anne H. Hopkins, Vice President for Arts, Sciences, and Engineering  
Marvalene Hughes, Vice President for Student Affairs  
Anne C. Petersen, Vice President for Research and Dean of the Graduate School  
Mark B. Rotenberg, General Counsel

### **School of Dentistry Administrators**

Richard P. Elzay, D.D.S., M.S.D., Dean, Deputy Vice President for Health Sciences  
Harvey L. Colman, D.D.S., M.S.D., Director of Clinical Systems  
Gale L. Shea, B.A., Director of Enrollment Management  
Thomas D. Larson, D.D.S., M.S.D., Director of Educational Research, Planning, and Development  
Nicholas N. Molitor, M.B.A., M.P.A., Director of Finance and Personnel  
Charles F. Schachtele, M.S., Ph.D., Director of Dental Research Institute

*Student Life*



## Organizations

**Student and State Organizations**—Each year, undergraduate dental and dental hygiene students elect the School of Dentistry Council of Students, which discusses matters of mutual interest with faculty advisers and promotes many projects and activities. Undergraduates also have representatives with voting privileges on School of Dentistry committees pertaining to student admission, educational policy, student affairs, and clinical systems. The Student Affairs Committee, composed of both dental and dental hygiene students and faculty, is responsible for student concerns such as membership in local and national organizations, ethics, counseling, tutorial assistance, questions on the educational programs, financial aid, publications, housing, and alumni relations. Students have representatives on the Board of Directors of the School of Dentistry Alumni Society and the Executive Council of the

School of Dentistry Century Club. They also serve as student delegates for the House of Delegates of the Minnesota Dental Association and Minnesota Dental Hygienists' Association.

**National Organizations**—Dental and dental hygiene students may join several national organizations that provide students with exposure to organized dentistry and a voice in shaping the future of dental professions. Organizations for dental students include the American Association of Dental Students (AADS) and American Student Dental Association (ASDA). Organizations for dental hygiene students include the American Dental Hygienists Association, the Minnesota Dental Hygienists Association, and the American Association of Dental Schools. Membership fees for these organizations entitle students to various dental publications and special services.

**Fraternalities**—The professional dental fraternity provides all the advantages of fraternal affiliation and also offers the means through which students with a common professional interest develop close ties among themselves and with alumni in the fraternity who are practicing in the community. Chapters generally have strong faculty support because they bridge the gap between the student, the faculty, and the profession.

Each dental fraternity emphasizes the importance of high professional ethics and practices in the selection and

development of its members. The dental fraternities emphasize the importance of professional development, often conducting programs of speakers, tours, and forums. In addition, dental fraternity chapters foster social and athletic functions to promote each member's full personal development.

One of the most important benefits of dental fraternity membership comes after graduation. Each dental fraternity has alumni organizations across the nation providing professional and social contacts of great value to the alumnus that offers the opportunity for obtaining expert advice and professional guidance from fellow members.

At the University of Minnesota, all four of the professional dental fraternities are represented: Alpha Omega, Delta Sigma Delta, Psi Omega, and Xi Psi Phi. These fraternities have more than 140 undergraduate chapters in this country and more than 150 active alumni chapters scattered throughout the world. Eighty-five percent of the men and women active in the dental profession have fraternity affiliation.

**Honor Societies**—Fourth-year dental students may be elected by the faculty to the Beta Beta Chapter of the national dental honor society, Omicron Kappa Upsilon. Graduating dental hygiene students may be elected the Eta Chapter of the National Dental Hygiene Honor Society, Sigma Phi Alpha.



## Student Volunteer Outreach Activities

Many students at the School of Dentistry are interested in serving the community while they are in dental school. While many opportunities exist, some are specifically related to the delivery of dental care.

**The Jamaica Volunteer Mission**—This program was initiated in 1986 in response to a recent report that cited Jamaicans as having one of the highest rates of dental caries and periodontal disease in the world due to a diet very high in sugar, an unfluoridated water supply, and a severe shortage of dental personnel.

Each year, students raise funds to cover the expense of sending faculty, fourth-year students, and supplies to the island to treat patients seeking assistance. Initially, treatment of pain and acute infection were the primary concern. However, the program is still evolving to include a wider variety of preventive and restorative procedures.

While conditions are extremely primitive, this ten-day mission provides students with some unique life experiences and real-world dental experiences.

**The Union Gospel Mission**—Two evenings each week, School of Dentistry students and staff volunteer to meet the dental needs of the lower income and homeless population in the inner city. Many of those seeking dental care are suffering from conditions that require immediate attention. The primary concern is to relieve pain and provide appropriate services to prevent reoccurrence of the problem.

**The High-Rise Program**—Established in 1979, this elective program broadens fourth-year dental students' exposure to fabricating and maintaining removable prosthodontic appliances and provides greater insight into the behavioral aspect of aging. Students visit various high-rise complexes in Minneapolis to provide dental care for older adults. For more information, contact Cynthia Johnson, Division of Health Ecology, 15-141 Malcolm Moos Health Sciences Tower, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-1417).

## Special Opportunities

**International Exchange Opportunities**—The School of Dentistry has had an active exchange program with a variety of universities over the last 20 years. Currently we have formal exchange agreements with the Colleges of Dentistry in Århus and Copenhagen in Denmark; the Universities of Göttingen and Munich in Germany; the University of Bergen, Norway; The University of Nijmegen, The Netherlands; and the University of Melbourne, Australia.

This program provides a cultural and educational exchange and increases awareness of and appreciation for dentistry in a more global context. Students experience a different culture, political system, and lifestyle and return with greater understanding, sensitivity, and acceptance of differences in people, their customs, and culture. Experiences have been extremely positive. Better understanding and mutual respect gained through these experiences contribute to the personal growth of our future health professionals.

**Summer Research Fellowship**—The School of Dentistry Summer Research Fellowship Program provides research experiences for exceptional dental and dental hygiene students with an interest in research careers and in relating that interest to postgraduate research training. Freshmen, sophomores, and juniors are invited to apply for a research fellowship position in the spring. If selected, they are assigned to a faculty mentor for the summer. During a ten-week period, students collect and analyze data, undertake a structured research project, and prepare a formal report. Research fellows attend a weekly research training seminar where they learn research methods. They also evaluate selected journal articles and review abstracts and oral presentations of former trainees. Stipends of \$2,000 are provided. Each year, 19 to 22 students participate in this program.





## Policies

**Grading Policies and Practices**—There are two grading systems, A-B-C-D-F and S-N. The School of Dentistry determines to what extent and under what conditions each system may be available to its students and faculty.

The two systems may not be combined for a particular student in a particular course. Students may receive symbols only from the grading system under which they are registered. S grades do not affect the GPA; N grades are calculated as F.

When the two grading systems are available, students must declare a choice of systems as part of their initial registration. The choice may not be changed after the end of the second week of classes.

The following symbols, as defined, may be used on the University's official transcript, the chronological quarterly record of the student's registrations, after the end of the second week of classes (or at the end of the first five days of classes for summer sessions). The official transcript is released by the University only at the student's request, with the official seal imprinted.

- A- Represents achievement that is outstanding relative to the level necessary to meet course requirements.
- B- Represents achievement that is significantly above the level necessary to meet course requirements.
- C- Represents achievement that meets the basic course requirements in every respect.
- D- Represents achievement that is worthy of credit even though it does not fully meet the basic course requirements in every respect.
- F- Represents performance that fails to meet basic course requirements and is unworthy of credit.
- S- Represents achievement that is deemed by the instructor to be satisfactory for the course in which the student is registered. This definition is intended to imply that the standard for S may vary from one course to another.
- W- Entered by the Office of the Registrar when a student officially withdraws from a course. School of Dentistry students may withdraw at any time before the final examination if they have earned a passing grade up to that point, or if no grade is available, with course director's permission.
- I- Assigned by the instructor to indicate incomplete, in accordance with provisions announced in class at the beginning of the quarter, when in the instructor's opinion there is a reasonable expectation that the student can complete successfully the work of the course. An I that is not made up by the end of the next quarter of residence may become an F if the course was taken on an A-F grading system or an N if the course was taken on a S-N grading system. Instructors may set dates

within the quarter for make-up examinations. When an I is changed to another symbol, the I is removed from the record.

- N- Assigned when the student does not earn an S and is not assigned an I. It stands for no credit.
- X- Reported to indicate that a student may continue in a sequence course in which a grade cannot be determined until the full sequence of quarters is completed. The instructor will submit a grade for each X when the student has completed the sequence.
- V- Indicates registration as an auditor or visitor; a no-credit, no-grade registration.
- T- Posted in front of the original grade indicates credits transferred from another institution and not included in the calculation of the student's University GPA.

In connection with all achievement symbols, but especially in connection with the S, the instructor is obligated to define to a class as explicitly as possible in its early meetings the performance that will be necessary to earn each symbol.

Each course director should announce the grading policies, including policies regarding I grades, at the beginning of each quarter. Each course director should make opportunities for remediation available to dental students so they have an opportunity to resolve I, F, or N grades before the beginning of the following academic year. If prompt remediation is not possible, the course director should discuss the student's situation with the appropriate class committee.

All final examinations in the School of Dentistry will be given on the assigned date. No examinations will be permitted earlier than that date. Persons failing to take examinations at the appointed time and place may take the examinations at a later date with the course director's permission. The date and place of the make-up examination will be set by the course director. Excuses for missing the regularly scheduled examination must be acceptable to the course director. Final examinations must be given no less than 48 hours or no more than two weeks following the last formal class meeting.

**Confidentiality of Student Grades**—Under provisions of federal and state legislation, examination scores, course grades, and similar indicators of student academic progress are not public information. Accordingly, such information cannot be released or made public without written student permission, except for normal educational and administrative uses within the University.

Posting lists of examination scores or course grades, or returning test materials to students in ways which make it possible for students to obtain information about other students' scores or grades is inappropriate.

Of course, it is permissible to post grades or return graded materials using an identification number which cannot be associated with an individual student by others who view the materials. It is not permissible to leave blue books or other examination materials with students' names on them in halls or other public places for retrieval.

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

**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, 420 S.C. 20000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; 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., 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.

All dental health care workers, including students, are required to provide evidence of a hepatitis vaccination or to sign a waiver of vaccination form. See the Director of Clinical Systems in 8-434 Moos Tower for the waiver 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 Education 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.

*Bachelor of Science  
Degree in  
Dental Hygiene*



## **General Information**

The dental hygiene program was established at the University of Minnesota in 1919 and is fully accredited by the Commission on Dental Accreditation. It is the only dental hygiene program in Minnesota that grants a B.S. degree and is affiliated with a school of dentistry.

The program offers qualified individuals the opportunity to fulfill both professional and personal goals while developing competence in dental hygiene. The program prepares graduates with professional and theoretical knowledge, skills, and attitudes to serve them in both career and life.

The dental hygienist is a licensed preventive oral health professional who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health. A dental hygienist is that member of the dental team responsible for providing treatment that helps prevent oral diseases such as dental caries (cavities) and periodontal (gum) disease and for educating the patient to maintain optimal oral health.

The education of the dental hygienist blends a solid dental hygiene clinical education with the biological, behavioral, and social sciences as well as the liberal arts.

Dental hygienists practice in settings such as private dental offices and clinics; federal, state, and local health departments or associated institutions; hospitals and nursing homes; school districts or departments of education; educational programs for dental, dental hygiene, and dental assisting students; private business/industry; correctional facilities; private and public centers for pediatric, geriatric, and other groups/individuals with special needs; and health maintenance organizations.

The dental hygiene curriculum consists of the preprofessional program in the College of Liberal Arts or its equivalent at some other regionally accredited institution and the professional program in the School of Dentistry Division of Dental Hygiene.

## **Admission Requirements**

Admission to the program is competitive and occurs once a year for fall quarter. Applications are accepted from January 1 of the desired year of entry until April 15. Applications received after the deadline are considered on a space-available basis.

Requirements for application include: high school graduate or equivalent; high school or college chemistry; ACT, PSAT, or SAT scores; transcripts of all high school and college courses; at least a 2.00 grade point average (GPA) (cumulative and preprofessional coursework); and evidence of plans for completion of preprofessional coursework before proposed entry.

## **Application Procedures**

Students enrolled at the University of Minnesota apply by submitting a Request for Change of College Within the University to the Office of Admissions. Students attending other colleges and universities apply by submitting the Application for Undergraduate Admission, an official transcript from each institution previously attended, and an application fee to the Office of Admissions.

Applications and Change of College forms are available from the Office of Admissions, 240 Williamson Hall, University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-2006).

## **Dental Hygiene Office**

The Division of Dental Hygiene is located in 9-436 Malcolm Moos Health Sciences Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-9121; fax: 612/626-2652).

## **Advising**

The Division of Dental Hygiene provides counseling and advising to students. Counseling is also available through the School of Dentistry counselor, University Counseling Services, and faculty of the student's own choice.

## **Tuition and Fees**

For information on current tuition, fees, and estimated total expenses, consult the quarterly *Class Schedule* or the estimated expense information provided by the Division of Dental Hygiene. The School of Dentistry provides virtually all dental instruments and supplies needed by students. Students pay a quarterly instrument usage fee.



## **Residency and Reciprocity**

To qualify for resident tuition rates, students must fulfill all residency requirements. To request consideration of a change in your residency status, contact the residency counselor in the Office of Admissions, 240 Williamson Hall, University of Minnesota, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-6330). All reclassification requests must be made in writing.

If you are a resident of North Dakota, South Dakota, Wisconsin, or Manitoba you may qualify for reciprocity privileges, in which case you will not pay the considerably higher tuition rates for nonresidents. You must apply for reciprocity at the beginning of each academic year. For information and applications, check with your home state/province reciprocity office.

## **Financial Aid**

The Office of Student Financial Aid offers students financial assistance, including student employment and financial advising. Applications should be filed as soon after January 1 as possible. Students should apply for financial aid at the time they are applying for admission. Most aid is awarded on the basis of financial need and the availability of funds. For more information, contact the Office of Student Financial Aid, 210 Fraser Hall, University of Minnesota, 106 Pleasant Street S.E., Minneapolis, MN 55455 (612/624-1665 or, toll-free, 1-800-400-UOFM).

The Student Employment Center posts job vacancies and refers qualified students for interviews for a variety of jobs on and off campus. The center is located in 120 Fraser Hall (612/624-8070).

## **Honors and Awards**

The following awards are presented annually by the program faculty to selected dental hygiene students.

*Louise C. Ball Scholarship*—For selected juniors and seniors who are in good academic standing and have established financial need.

*Ione M. Jackson Scholarship*—Established to honor Ione M. Jackson, former program director; awarded to a qualified senior who wishes to become a dental hygiene educator.

*Shirley Burgan Lichtwardt Memorial Scholarship*—For selected juniors and seniors who are in good academic standing and have established financial need.

*Sigma Phi Alpha, Eta Chapter Membership*—National Dental Hygiene Honor Society established to recognize and honor excellence in scholarship, service, and character among graduating dental hygiene students. A maximum of 10 percent of each graduating class is selected for membership.

*Sigma Phi Alpha Award*—Awarded to the sophomore and junior who maintain the highest GPAs.

*Procter & Gamble Excellence in Dental Hygiene Award*—For a selected junior who exhibits scholarship, leadership, service, and contribution to the dental hygiene profession.

*Naomi Rhode Dental Hygienist-Patient Relationship Award*—For a selected senior who exhibits the most interest and skill in the dental hygienist-patient relationship.

## **Student Activities**

Students in the professional program are represented by the Student Dental Hygiene Organization. In addition, members from each class are elected to serve on the School of Dentistry Student Council. Students are also eligible for membership in the Student American Dental Hygienists' Association. Participation in activities of the Council for Health Interdisciplinary Participation (CHIP) are also encouraged.

## **Graduation**

The minimum requirements for graduation are completion of the curricular requirements and a minimum of 180 credits with at least a 2.00 cumulative GPA.

## **Licensure**

The graduate is eligible for licensure upon successful completion of both a written National Board Dental Hygiene Examination and a clinical examination. The licensed dental hygienist practices in accordance with the requirements of individual state dental practice acts. In many states, a dental hygienist must participate in continuing education courses for license renewal.

## **Preprofessional Program**

### **Admission**

*Students entering the preprofessional program (one year) must meet the admission criteria of the College of Liberal Arts or their equivalent at some other regionally accredited institution. Consult the College of Liberal Arts Bulletin for complete information.*

Admission to the preprofessional program does not ensure admission to the professional program.

### **Curriculum**

The following courses or their equivalents must be completed before entering the professional program (quarter credits follow in parentheses).

High school or college chemistry (one course)  
Anatomy 3001—Elementary Anatomy (4)  
Biology 1009—General Biology (5)  
Comp 1011—Writing Practice I (5)  
FScN 1612—Principles of Nutrition (4)\*  
Psy 1001—General Psychology (5)  
Soc 1001—Introduction to Sociology (4)  
Spch 1101—Fundamentals of Speech Communication (4)  
Stat 1001—Introduction to Ideas of Statistics (4)  
Liberal education electives

*\*May be taken through Extension or Independent Study before fall quarter of junior year if unavailability of nutrition course is documented.*

### **Liberal Education Requirements**

Liberal education requirements are completed during the preprofessional program or during the summer(s) during the professional program. The Council on Liberal Education is in the process of revising the liberal education requirements. For more current information, please contact the Division of Dental Hygiene, 9-436 Malcolm Moos Health Sciences Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-9121).

## Professional Program

### Curriculum

Students register in the Division of Dental Hygiene for the professional program. The following courses must be completed to satisfy graduation requirements (quarter credits follow in parentheses).

### Sophomore Year

#### *Fall Quarter*

DH 1001—Dental Anatomy (3)  
DH 1002—Head and Neck Anatomy (1)  
DH 1190—The Dental Hygiene Care Process (6)  
MdBc 1030—Elementary Biochemistry (4)  
MicB 5235—Microorganisms and Disease (3)

#### *Winter Quarter*

DH 1092—Introduction to Dental Hygienist-Patient Relationships (3)  
DH 1191—The Dental Hygiene Care Process: Clinical Application I (3)  
DH 3175—Oral Histology and Embryology (3)  
Phs1 3051—Human Physiology (5)

#### *Spring Quarter*

DH 1093—Cariology (3)  
DH 1094—Periodontology (3)  
DH 1192—The Dental Hygiene Care Process: Clinical Application II (4)  
DH 3176—General and Oral Pathology (3)  
DH 3275—Oral Radiology I (2)

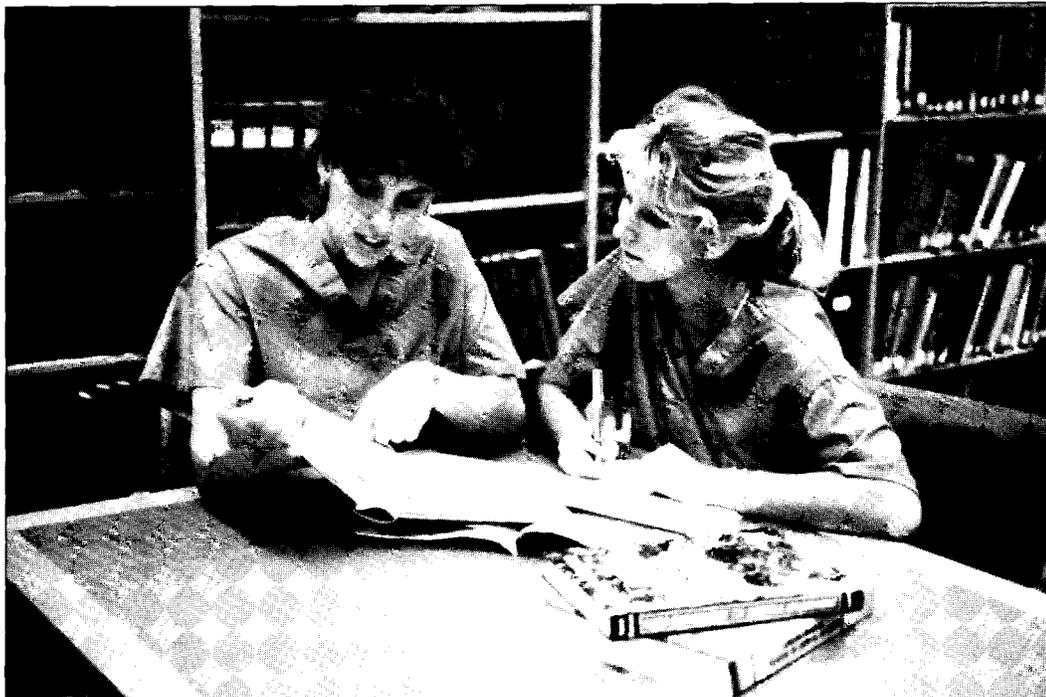
### Junior Year

#### *Fall Quarter*

DH 1203—Dental Specialties (2)  
DH 1204—Dental Specialties Practicum (0)  
DH 3030—Applied Nutrition in Dental Hygiene Care (2)  
DH 3193—The Dental Hygiene Care Process: Clinical Application III (4)  
DH 3202—Dental Hygiene Care for the Pediatric/Orthodontic Patient (2)  
DH 3276—Oral Radiology II: Theory and Principles of Radiology (2)  
DH 3278—Clinical Oral Radiology (0)  
Phel 1001—Pharmacology (2)

#### *Winter Quarter*

DH 1202—Introduction to Biomaterials (3)  
DH 1205—Dental Specialties Practicum (0)  
DH 3194—The Dental Hygiene Care Process: Clinical Application IV (4)  
DH 3203—Dental Hygiene Care for the Older Adult (2)  
DH 3277—Oral Radiology III: Radiographic Analysis (1)  
DH 3279—Clinical Oral Radiology (0)  
Dent 5451—Periodontology I (2)





#### *Spring Quarter*

- Comp 3033—Writing in the Health Sciences (4)
- DH 1206—Dental Specialties Practicum (0)
- DH 3095—Adjunct Clinical Procedures (2)
- DH 3195—The Dental Hygiene Care Process: Clinical Application V (4)
- DH 3204—Dental Hygiene Care for the Individual with Handicapping Conditions (2)
- DH 3280—Clinical Oral Radiology (0)
- HSU 5011—The Teaching-Learning Process in the Health Care Setting (3)
- PH 3001—Personal and Community Health (3)

#### **Senior Year**

##### *Fall Quarter*

- DH 1207—Dental Specialties Practicum (0)
- DH 3050—Research Methods in Dental Hygiene (3)
- DH 3196—The Dental Hygiene Care Process: Clinical Application VI (5)
- DH 3281—Clinical Oral Radiology (0)
- Dent 5027—Epidemiology, Prevention, and Dental Public Health (3)
- Dent 5184—Patient Management (1)
- Dent 5453—Periodontology III (2)

##### *Winter Quarter*

- DH 1208—Dental Specialties Practicum (3)
- DH 3061—Community Outreach (3)
- DH 3096—Ethics, Jurisprudence, and Principles of Practice (3)
- DH 3197—The Dental Hygiene Care Process: Clinical Application VII (5)
- DH 3282—Clinical Oral Radiology (0)
- Dent 5185—Patient Management (1)

##### *Spring Quarter*

- DH 3097—Social, Economic, and Practice Factors in Oral Health (3)
- DH 3198—The Dental Hygiene Care Process: Clinical Application VIII (5)
- DH 3283—Clinical Oral Radiology (3)
- Dent 5186—Patient Management (1)

## **Dental Hygiene Courses (DH)**

### **1001. DENTAL ANATOMY. (3 cr)**

All deciduous and permanent teeth, including tooth form, function, and relationship to oral health; calcification, eruption, and exfoliation patterns; ideal static occlusion; dental terminology and tooth annotation systems. Lab experiences include identification and annotation of teeth and restoration, in wax, of portions of selected typodont teeth.

### **1002. HEAD AND NECK ANATOMY. (1 cr)**

Anatomical structures of the head and neck as they relate to dental treatment.

### **1092. INTRODUCTION TO DENTAL HYGIENIST-PATIENT RELATIONSHIPS. (3 cr)**

Oral hygiene techniques implemented through communication between patient and oral health provider. Co-therapeutic problem solving.

### **1093. CARIOLOGY. (3 cr)**

Dental caries: etiology, pathology, and prevention.

### **1094. PERIODONTOLOGY. (3 cr)**

Periodontal disease; etiology, assessment, and treatment options. Clinical experience in root planing and placing periodontal dressings.

### **1190. THE DENTAL HYGIENE CARE PROCESS. (6 cr)**

Normal oral structures, assessment of oral health, clinical instrumentation skills. Lecture, lab, clinical experiences.

### **1191. THE DENTAL HYGIENE CARE PROCESS: CLINICAL APPLICATION I. (3 cr)**

School of Dentistry Comprehensive Dental Clinics and assessment in dental hygiene care.

### **1192. THE DENTAL HYGIENE CARE PROCESS: CLINICAL APPLICATION II. (4 cr)**

Prevention and control of dental caries and periodontal diseases; skill development in ultrasonic scaling and hypertension screening; evaluation of products used in treating dental caries and periodontal diseases.

### **1202. INTRODUCTION TO BIOMATERIALS. (3 cr)**

Physical, chemical, and mechanical properties of materials used in dentistry. Lab.

### **1203. DENTAL SPECIALTIES. (2 cr)**

Various dental specialties and the dental hygienist's role in services provided.

### **1204-1205-1206-1207. DENTAL SPECIALTIES PRACTICUM. (0 cr)**

Various dental specialties and the dental hygienist's role in services provided.

### **1208. DENTAL SPECIALTIES PRACTICUM. (3 cr)**

Various dental specialties and the dental hygienist's role in services provided.

### **3030. APPLIED NUTRITION IN DENTAL HYGIENE CARE. (2 cr)**

Principles of diet and nutrition applied to dental hygiene patient care; skills for dental caries counseling.

### **3050. RESEARCH METHODS IN DENTAL HYGIENE. (3 cr)**

Skills in the scientific method and critical analysis of research findings; emphasis on types of research, problem selection, hypothesis writing, research planning and design, data collection and measuring techniques, analysis and interpretation of data, and writing the research proposal.



*The advantage  
of the University  
of Minnesota...*

...a major research university in the heart of a dynamic metropolitan area, where a large and diverse population base of just over 2 million support dentistry clinical programs.

...supports the nation's largest health sciences center between the Mississippi River and the West Coast.

...includes the Malcolm Moos Health Sciences Tower, one of the nation's premier dental education facilities.

# UNIVERSITY School of

## Dynamic research program...

- ranks among the top five dental research programs in the nation.
- provides an opportunity for students to take projects from start to finish under the direction of a faculty mentor.
- furthers career tracks in education and research through the postdoctoral research/clinical program.



## Comprehensive program and specialty offerings

- provide students the opportunity to treat patients' comprehensive dental needs.
- have earned a strong reputation for educating clinicians and diagnosticians.
- offer programs including orthodontics, pediatric dentistry, oral and maxillofacial surgery, periodontics, prosthodontics, endodontics, and oral pathology.



OF MINNESOTA

# Dentistry



m  
...  
es'  
ne  
e  
ontics,  
v.



## Small group learning...

- integrates basic and clinical sciences with patient care skills.
- develops interpersonal skills required to practice dentistry.
- models and promotes attitudes conducive to lifelong learning.



## The Twin Cities...

- rank second on *Money* magazine's list of most desirable cities.
- offer a wealth of cultural opportunities including major theatre, two world-class orchestras, and many musical, dance, film, and entertainment activities.
- sponsor several professional and college sports teams.
- feature a wide variety of outdoor recreational opportunities that change with the seasons.

**3051. DIRECTED RESEARCH.** (Cr ar)

Individual empirical research project leading to a written report and/or intensive observation/participation in the clinical research center.

**3061. COMMUNITY OUTREACH.** (3 cr)

Dental hygiene care in a variety of community settings.

**3095. ADJUNCT CLINICAL PROCEDURES.** (2 cr)

Lab and clinical experiences in the principles and techniques of impression making; finishing and polishing restorations; margination; monitoring nitrous oxide sedation; placing and removing rubber dam; and placing temporary restorations and pit and fissure sealants.

**3096. ETHICS, JURISPRUDENCE, AND PRINCIPLES OF PRACTICE.** (3 cr)

Employment, economic, and business management aspects of dental practice. Current and extended roles for dental hygienists.

**3097. SOCIAL, ECONOMIC, AND PRACTICE FACTORS IN ORAL HEALTH.** (3 cr)

Factors and issues related to health care promotion, regulation, and delivery as well as the political/legislative process as related to current status and trends in dentistry.

**3175. ORAL HISTOLOGY AND EMBRYOLOGY.** (3 cr)

Embryology and histology of human oral structures as well as other parts of the head and neck. Teeth, mandible, maxilla, palate, tongue, and salivary glands emphasized and correlated with development abnormalities.

**3176. GENERAL AND ORAL PATHOLOGY.** (3 cr)

Circulatory disturbances, inflammation, and tremors with emphasis on diseases affecting the oral cavity, dental caries, periodontal diseases, oral neoplasias, and similar problems.

**3193. THE DENTAL HYGIENE CARE PROCESS: CLINICAL APPLICATION III.** (4 cr)

Treatment planning in dental hygiene care.

**3194. THE DENTAL HYGIENE CARE PROCESS: CLINICAL APPLICATION IV.** (4 cr)

Implementation component of the dental hygiene care process.

**3195. THE DENTAL HYGIENE CARE PROCESS: CLINICAL APPLICATION V.** (4 cr)

Evaluation component of the dental hygiene care process.

**3196-3197-3198. THE DENTAL HYGIENE CARE PROCESS: CLINICAL APPLICATION VI-VII-VIII.** (15 cr total)

Orientation to outreach experiences. Adaptation of dental hygiene care to meet preventive and treatment needs of patient populations in particular outreach assignments. Analysis of patient preventive and treatment needs through case studies/presentations. Students participate in Comprehensive Dental Clinics and outreach assignments.

**3202. DENTAL HYGIENE CARE FOR THE PEDIATRIC/ORTHODONTIC PATIENT.** (2 cr)

Knowledge, skills, and attitudes required for providing dental hygiene care for pediatric/orthodontic patient.

**3203. DENTAL HYGIENE CARE FOR THE OLDER ADULT PATIENT.** (2 cr)

Knowledge, skills, and attitudes required for providing dental hygiene care for the older adult in various states of change associated with aging, with or without concomitant disease.

**3204. DENTAL HYGIENE CARE FOR THE INDIVIDUAL WITH HANDICAPPING CONDITIONS.** (2 cr)

Knowledge, skills, and attitudes required for providing dental hygiene care for individuals with mental, physical, and social/emotional handicapping conditions.

**3275. ORAL RADIOLOGY I.** (2 cr)

Intraoral and extraoral films and radiographs used in dentistry; descriptions and identification of individual radiographs and intraoral radiographic surveys; intraoral radiograph mounting and viewing; radiographic density and contrast; geometry of image formation; nature and characteristics of radiographic film; chemistry of darkroom processing techniques; intraoral radiographic technique; quality evaluation; radiographic anatomy.

**3276. ORAL RADIOLOGY II: THEORY AND PRINCIPLES OF RADIOLOGY.** (2 cr)

Nature of particulate and electromagnetic radiations; production and control of X-rays; characteristics of radiographic film and image; mathematics of exposure; intensifying screens, cassettes, and grids; stain removal and radiographic density reduction; radiation biology, dosimetry, law, controversy.

**3277. ORAL RADIOLOGY III: RADIOGRAPHIC ANALYSIS.** (1 cr)

Discrepancies and technical errors in intraoral radiographs produced by angle-bisector and paralleling techniques, radiographic anatomy, and radiographic evidence of deviations from the spectrum of normal anatomic variations.

**3278-3279-3280-3281-3282. CLINICAL ORAL RADIOLOGY.** (0 cr)

Students observe and participate in demonstrations of various radiographic procedures (intraoral and extraoral, including panoramic radiography) to produce acceptable, complete periapical-bitewing radiographic surveys on mounted skulls and patients, process exposed films, qualitatively evaluate their results, mount and interpret their radiographs, and discuss oral radiology topics.

**3283. CLINICAL ORAL RADIOLOGY.** (3 cr)

Same as 3278-3279-3280-3281-3282.

**5027. EPIDEMIOLOGY, PREVENTION, AND DENTAL PUBLIC HEALTH.** (3 cr)

Scientific method in dentistry.

**5184-5185-5186. PATIENT MANAGEMENT IV.** (1 cr per qtr)

Educational setting (clinic) for students to integrate, apply, and develop skills taught in 5810, 5811, and 5157.

**5451. PERIODONTOLOGY I LECTURES.** (2 cr)

Periodontal anatomy, physiology, and etiology of periodontal diseases. The clinical, histopathological study, and pathogenesis of gingivitis and periodontitis, as well as the role of genetics and systemic disorders. Preventive and therapeutic procedures associated with diagnosis, prognosis, treatment planning, and initial phase of periodontal therapy.

**5453. PERIODONTOLOGY III LECTURES.** (2 cr)

Clinical procedures associated with surgical phase of periodontal therapy. Emphasis on evaluation of periodontal treatment, maintenance phase, relationship between periodontics and other dentistry disciplines, roles of clinical research in periodontics.

## Required Courses Offered by Other Units

**MdBc 1030. ELEMENTARY BIOCHEMISTRY.** (4 cr)

**Comp 3033. WRITING IN THE HEALTH SCIENCES.** (4 cr)

Thoughts, forms, and modes of expression common to health sciences writing.

**HSU 5011. THE TEACHING-LEARNING PROCESS IN THE HEALTH CARE SETTING.** (3 cr)

Teaching skills to effectively transmit knowledge, attitudes, and skills to patients, the public, and other health workers.

**MicB 5235. MICROORGANISMS AND DISEASE.** (3 cr)

Nature of microorganisms, immunology, medical bacteriology, virology, mycology, parasitology, and principles of disease control.

**PH 3001. PERSONAL AND COMMUNITY HEALTH.** (3 cr)

Fundamental principles of health conservation and disease prevention.

**Phcl 1001. PHARMACOLOGY.** (2 cr)

**Phst 3051. HUMAN PHYSIOLOGY.** (5 cr)

## Faculty

### *Associate Professor*

Kathleen J. Newell, R.D.H., Ph.D., Director, Division of Dental Hygiene

Joy B. Osborn, R.D.H., M.A.

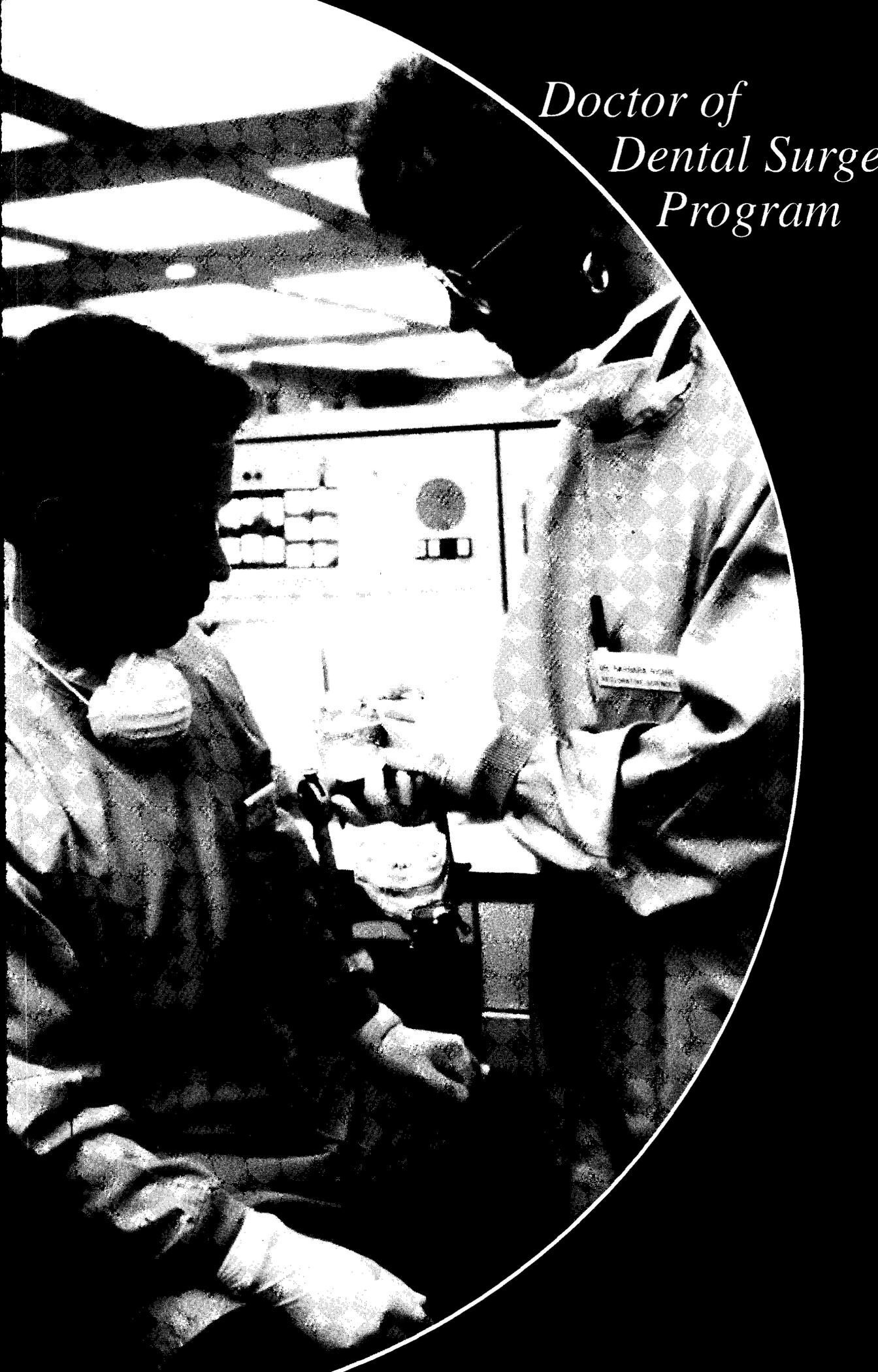
Jill L. Stoltenberg, R.D.H., M.A., Clinic Director

Lynda J. Young, R.D.H., M.A., Director, Continuing Dental Education

### *Assistant Professor*

Susan Kyle Dittmar, R.D.H., B.S., Assistant Clinical Specialist

*Doctor of  
Dental Surge  
Program*



## Admission

The School of Dentistry is committed to improving educational and professional dental career opportunities for underrepresented minorities. As part of pursuing this goal, the School of Dentistry publicizes dental career opportunities for prospective students, actively recruits qualified individuals, and provides a broad range of support services for currently enrolled minority students.

**General Requirements**—A first-year class is admitted to the dentistry program once a year in the fall, although students planning to enter dental school can begin their pre dental studies at any time.

High school credentials are not examined as part of the admission evaluation, but students anticipating dental careers should take a sound academic program in high school to prepare properly for the pre dental and dental programs. Coursework should include mathematics, chemistry, physics, biology, foreign languages, English, and social studies.

A minimum of 130 quarter credits or 87 semester credits of liberal arts courses from an officially accredited U.S. or Canadian college or university is required. A maximum of 96 quarter credits from community or junior colleges will be applied to the 135 quarter credits that are considered equivalent to 3 full years of college education, or to the 180 quarter credits considered equivalent to a 4-year college program. A minimum of 170 quarter credits is accepted for a 4-year classification. (One semester credit is equivalent to 1½ quarter credits.) While acceptance is based primarily on performance quality, applicants are encouraged to have a broad liberal education.

To help achieve the goals of a liberal education, the School of Dentistry prefers that all students distribute some part of their pre dental college coursework in areas of study other than those related to the biological and physical sciences. Pre dental students are urged to plan their coursework to satisfy the University's liberal education distribution requirements.

An overall GPA of 2.50 is the minimum required for admission consideration. However, acceptance is on a competitive basis and an average well above this is usually necessary to be admitted.

Courses and minimum credits required for admission are listed below. Required courses should be completed by the end of the regular academic year (spring quarter) for enrollment the following fall. Completing required courses the summer before the fall of enrollment is discouraged.

Science coursework must include both lecture and lab instruction. Exemptions and advanced courses with fewer credits will be recognized, but transcripts or other academic records must clearly identify them and individual evaluations will be made. Courses in biology, chemistry, and physics may be considered outdated if taken more than five years before the time of application. Only under unusual circumstances will credits graded on a satisfactory-no credit evaluation system be accepted for required courses. Applicants may submit a maximum of the following percentage of S credits in elective courses: 10 percent of the minimum total credits for 3-year students, and 15 percent of the minimum total credits for 4-year students. Incomplete grades are looked upon with disfavor by the Admissions Committee. Any incomplete and withdrawal grades in excess of one per academic year must be explained in the application.

### Required Courses

1. *English*—12 quarter credits. Two composition and one speech course preferred; or one composition course, one speech course, and one additional course in either literature or humanities that has a composition component.
2. *General Biology or Zoology*—10 quarter credits. General zoology alone is acceptable but not preferred.
3. *Physics*—10 to 12 quarter credits. Complete basic course series required.
4. *General Principles of Chemistry*—12 quarter credits. Complete basic course series required.
5. *Organic Chemistry*—8 to 10 quarter credits. Course content must include study of both the aliphatic and aromatic series. One-semester courses generally do not have sufficient credits or depth to be acceptable.
6. *Mathematics*—A minimum of 3 quarter credits in one of the following courses: college algebra or precalculus by college credit or college validation, computer science, or statistics.
7. *Applied Human Psychology*—At least 4 quarter credits in general human psychology, child and adolescent human psychology, or business psychology.

### Recommended Elective Courses

Elective courses should be selected to achieve as broad and liberal an education as possible. However, students are encouraged to take the following preferred electives: art, biochemistry, cell biology, histology, human anatomy, microbiology, and physiology. These electives are especially important for persons who have completed only the minimum credits required (130 quarter/87 semester) to enter



dental school. Additional electives can be chosen from among the following subjects: accounting, analytical chemistry, anthropology, biochemistry, business (practical courses), classics, comparative anatomy, economics, etymology, history, humanities, higher mathematics, logic, microbiology, microscopic anatomy, political science, sociology, and a foreign language.

Individuals considering dental careers are expected to gain information about dentistry through discussions with professionals in the field and through observation of or participation in patient care and lab procedures in dental offices, dental labs, and dental school clinics and labs. Other expected orientations to dentistry include experiences involving fine manual dexterity, knowledge of health fields, and direct personal services to people on a one-to-one basis.

**Early Admission**—An early admission program is available for prospective applicants. To be considered for early admission, qualified applicants must complete at least one year of college, including science coursework. Applicants will then meet with School of Dentistry Enrollment Management staff during or after their sophomore year to evaluate their qualifications. At that time, provisional acceptance may be granted to qualified applicants for the appropriate entering first-year class. Those participating in this program will maintain at least a 3.00 overall GPA while completing specified prerequisite and elective coursework and achieve a Dental Admission Test (DAT) score at or above the national average (16). For further details, contact the Office of Enrollment Management, 15-106 Malcom Moos Health Sciences Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-7149).

**Required Entrance Tests**—All applicants are required to take the DAT prepared by the American Dental Association. It is given two times a year, usually in October and April, in many testing centers throughout the United States and in several foreign countries. It is administered on the Minneapolis campus of the University of Minnesota. Many applicants take the test as soon as they have completed the required courses in biology, general chemistry, and organic chemistry.

Candidates should take the test by October for enrollment the following fall. Although the test generally measures aptitude rather than special knowledge, some specific questions are asked in biology, general chemistry, and organic chemistry; thus a review of these subjects before taking the test is recommended. Applicants are encouraged to study test preparation materials such as those provided free of charge by the American Dental Association's Division of Educational Measurements. An application and a brochure describing the test, testing centers, and test dates are available from the School of Dentistry. These materials can also be obtained by writing to the Division of Educational Measurements, American Dental Association, 211 East Chicago Avenue, Chicago, IL 60611 (1-800/621-8099).

**English Proficiency**—The School of Dentistry requires all applicants who are not native speakers of English to submit written evidence of either a Test of English as a Foreign Language (TOEFL) score of at least 550 with a minimum score of 55 in Part I, Oral Comprehension, and a minimum score of

5 on the Written Test of English; or a Michigan English Language Assessment Battery (MELAB) score of at least 85 with a mean score of 85 in Part II, Listening. The tests must have been administered within two years before the date of application to the School of Dentistry. TOEFL exams that include the Test of Written English are given nationally in August, September, October, February, and May. To register for the TOEFL, contact the agency that handles TOEFL registration in your country or write to the Educational Testing Service (Box 899, Princeton, NJ 08540 USA) at least 10 weeks before any scheduled test date. If you are already in the Twin Cities area, you may register for the MELAB with the Minnesota English Center, 320 16th Ave. S.E., University of Minnesota, Minneapolis, MN 55455, or call (612) 624-1503. To register for the MELAB outside the Twin Cities area, contact the English Language Institute, Testing and Certification Division, University of Michigan, Ann Arbor, MI 48109 USA, or call (313) 764-2416.

**Residence Requirements**—First priority for admission is given to Minnesota residents, second to residents of neighboring states and provinces with which the University of Minnesota has special admission arrangements, and third to other nonresidents who have acceptable reasons for attending the University of Minnesota School of Dentistry.

**Personal Interview**—Although candidates are not required to appear for an interview as part of the admission process, it is highly recommended that they make a personal visit to the School of Dentistry to tour our state-of-the-art facilities and meet with our Office of Enrollment Management professionals. The address is Office of Enrollment Management, 15-106 Malcolm Moos Health Sciences Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-7149; fax: 612/626-2654).

### **Application Procedures**

The School of Dentistry participates in the American Association of Dental Schools Application Service (AADSAS), a national agency that coordinates dental application services. All students seeking admission to the school must apply through this service, whether they are new applicants or reapplicants. AADSAS application materials may be obtained from AADSAS through an application request card, which is available from the Office of Enrollment Management. The AADSAS application materials can also be obtained directly from the School of Dentistry while supplies are available or from the Pre-Health Sciences Advising Office, 30 Johnston Hall, 101 Pleasant Street S.E., University of Minnesota, Minneapolis, MN 55455 (612/624-9006). After the application materials are completed, they should be mailed to AADSAS, P.O. Box 4000, Iowa City, IA 52240.

After the University of Minnesota has received the AADSAS application, each applicant will be sent a University of Minnesota School of Dentistry application to complete and a request for the following additional materials:

1. One *official* transcript from each college attended. Transcripts must be submitted to the School of Dentistry at the time of application and after each quarter or semester of subsequent work until a decision is made on the application. They are in addition to those submitted to AADSAS. Transcripts marked "student copy" or with a similar reference are not acceptable. Appearance on one college/university transcript of courses and credits transferred from other institutions is not sufficient. Accepted students must continue to submit a transcript after each quarter or semester of study until completion of all coursework.
2. Three written recommendations submitted on special recommendation forms sent to the applicant with the request for supplemental information. These recommendations should come from persons who have been very familiar with the applicant and the applicant's work within the last four years. At least one recommendation should come from an employer, if possible. The rest may come from peers, college teachers, college recommendation committees, college counselors, and other appropriate individuals. All recommendations must be accompanied by a letter of reference in addition to the completed form. Applicants are requested to limit their recommendations to three. The recommendations must be submitted directly from the recommender to the School of Dentistry.
3. A \$30 application processing fee.
4. Test results—DAT scores, and TOEFL or MELAB scores (as required).

Applications should be filed between June 1 and March 1 of the preceding academic year for entry the following fall. The AADSAS application must be received by AADSAS before March 1; filing by November 1 is strongly encouraged.

## Tuition and Fees

The figures below are for the 1993-94 academic year. Future increases are possible.

### Tuition

Full-time students (per quarter)

Residents .....	\$2,600.00
Nonresidents .....	3,900.00

Students carrying fewer than  
12 credits (per credit)

Residents .....	217.00
Nonresidents .....	325.00

**Student Services Fee** (per quarter) ..... 134.36

**Instrument Usage Fee** (per quarter) ..... 430.00

### Precious Metals

Second year—fall ..... 450.00

### Typodonts

First year ..... 175.00

### Books

First year ..... 894.00

Second year ..... 637.00

Third year ..... 362.00

Fourth year ..... 112.00

**Other Fees**—See the current *Class Schedule* or contact the Office of Enrollment Management for information on late registration, late payment, installment payment, or other miscellaneous fees, and current information on the fees listed above.

**Instrument Usage Fee (listed above)**—The School of Dentistry provides virtually all dental instruments and supplies needed by students. This reduces costs for students, provides a convenient and efficient system, and permits the school to maintain control over the sterility and maintenance of the instruments and supplies used in the clinics. As part of the financial support of this system, students pay a usage fee. The usage fee per quarter was \$430 for the 1993-94 academic year. Increases will depend on cost factors.

## Financial Aid

Special loans, scholarships, fellowships, awards, and honors for qualified School of Dentistry students are sponsored by a variety of individuals, graduating classes, foundations, philanthropic groups, societies, and commercial firms. For more information, contact the Office of Enrollment Management (612/625-7149) or the University's Office of Student Financial Aid (612/626-2290 or, toll-free, 1-800-400-UOFM).

The Student Employment Center, 120 Fraser Hall (612/624-8070), posts part-time and summer job openings, but the demands of the dentistry program make it difficult for students to devote much time to outside employment. A number of summer research fellowships are available to School of Dentistry students.

## Student Affairs Support Program

The School of Dentistry provides a student support program that enhances the success of its students. Students' performance is monitored test-by-test and additional academic assistance through tutoring, seminars, and consultation is encouraged and provided for those in need. A School of Dentistry Learning and Academic Skills counselor assists faculty and administration in assessing students' academic, financial, and psychological needs and makes referrals accordingly. This program also encourages and promotes student study groups, a student mentorship program, and consultation and resource development with faculty.

## Special Opportunities

The School of Dentistry offers resident tuition to higher ability minority or disadvantaged persons who reside outside Minnesota. Contact the Office of Enrollment Management (612/625-7149) for further information.

## Oral and Maxillofacial Surgery Externships

The School of Dentistry helps place its students in off-site oral surgery externships. Contact the Division of Oral and Maxillofacial Surgery (612/624-9959).

## Honors and Awards

The School of Dentistry offers many scholarships and awards to current students and sponsors an annual Honors Day. For a list of the scholarship awards, contact the Office of Enrollment Management, 15-106 Malcolm Moos Health Sciences Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-7149).

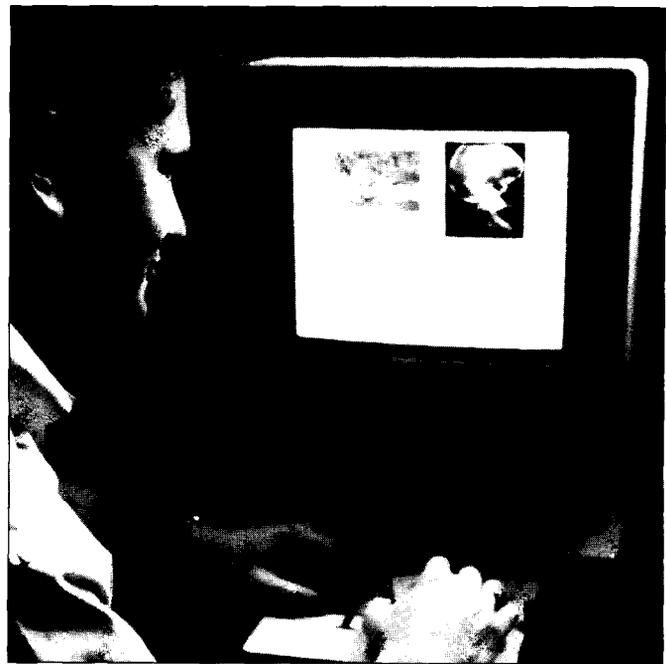
## Retention and Promotion in the D.D.S. Curriculum

For purposes of retention and promotion in the School of Dentistry, the grades A, B, C, D, and S are passing grades. The grades F, N, and I are not passing grades. Students who receive I grades are expected to meet with the faculty immediately and make arrangements to complete the incomplete coursework. I grades that remain unresolved for more than one quarter may be changed to F at the discretion of the faculty.

To be promoted from one year to the next or to graduate, a student must have received passing grades in all required courses and earned a GPA of at least 2.00.

Any student with a grade point deficiency of 16 or more honor points at the end of any quarter will be dismissed from the School of Dentistry, but will be given the option of withdrawing. Honor points equal credits multiplied by grade value (A=4, B=3, C=2, D=1, F=0) summed over all courses. An honor point deficiency exists when the total honor points are less than the sum of credits taken, multiplied by two. Students with grades of F or N or GPAs below 2.00 are placed on academic probation until the deficiencies are resolved.

The director of the Office of Educational Research, Planning, and Development notifies students of academic deficiencies following class committee meetings. Each class committee makes decisions regarding retention and promotion of students in their classes. The chairs of the class committees meet quarterly with the directors of Educational Research, Planning, and Development and Enrollment Management to review the actions of their committees.



Students repeating parts of the curriculum for whatever reason will have all grades calculated into their GPA.

Students dropped for low scholarship who have applied for readmission and have been accepted to repeat the entire curriculum of the first year will not have their previous grades calculated in their School of Dentistry GPA. However, these grades will remain on the official University of Minnesota transcript.

Students must receive passing grades in all clinically related courses before they may engage in primary patient care. In order for a third-year student to participate in any patient care/clinical activities, all first- and second-year courses must be satisfactorily completed, and with a minimum combined 2.00 GPA. No student can enter the third year without completing these requirements.

Students not completing clinical requirements by June of the fourth academic year must register for and attend classes (clinical or otherwise) beginning with the summer session, until such requirements have been completed.

**Leave of Absence**—A leave of absence from the School of Dentistry, not to exceed one year, may be granted to a student in good standing (not on scholastic probation and with no pending unsatisfactory grades). Application for a leave of absence is made at the Office of Educational Research, Planning, and Development, 15-234 Malcolm Moos Health Sciences Tower, University of Minnesota, 515 Delaware Street S.E., Minneapolis, MN 55455 (612/625-9945).

## Graduation Requirements

Candidates for the doctor of dental surgery (D.D.S.) degree must have

1. complied with the rules and regulations of the School of Dentistry and the University of Minnesota;
2. demonstrated sound moral character;
3. received a passing grade in all required courses;
4. completed all department clinical requirements;
5. completed treatment of all clinical patients;
6. completed half-time clinic attendance in the summer session after the second year and full-time clinic attendance for seven quarters thereafter;
7. returned all equipment and supplies assigned for their use;
8. earned a minimum GPA of 2.00 (C);
9. discharged all financial obligations to the University; and
10. been recommended by School of Dentistry faculty for the degree.

## National Board Dental Examinations

The National Board Dental Examinations are held on the Minneapolis campus. Virtually all students elect to take these written examinations, which are recognized by all 53 licensing jurisdictions in the United States.

## Placement

The School of Dentistry has provided placement assistance to graduates and Minnesota dentists since the early 1970s, and to Minnesota dental hygienists since the early 1980s. The program extends to those wishing to recruit associates or hygienists, or buy or sell a dental practice. Dentists, hygienists, and others interested in posting positions or in reviewing available positions may do so through the Office of Enrollment Management (612/626-0171).

## Evaluation of Student Performance

Student progress and achievement are evaluated through a variety of means including written and oral examinations, practical examinations, observation of clinical performance, and course assignments. Students must attain a minimum GPA of 2.00 before graduation and also must complete many experiential requirements in a variety of disciplines. The University's grading systems of A-B-C-D-F and S-N are used. Refer to pages 12-13 for specific academic and grading policies.

Faculty class committees review grades and course progress and make quarterly evaluations of each student's achievement and personal conduct. Recommendations on a student's status and promotion are made by these committees and are given to the director of the Office of Educational Research, Planning, and Development. In general, a 2.00 GPA is required for promotion between academic years and required prerequisite coursework must be completed with a passing grade before students are permitted to begin patient care.

Students are expected to learn professional behaviors in addition to achieving academically, and a student conduct code stipulates guidelines for this (see *Student Handbook*). Students can be dismissed from school for disciplinary as well as scholastic reasons.

Students must exercise their clinical responsibilities with discretion and display concern for the dignity and importance of patients.

## Special Programs

**Guarantee of Quality**—When you receive your degree from the School of Dentistry you will be among the most qualified practitioners in the country. Nevertheless, as a new graduate you may find areas in which you would like to be more skilled or confident. That is why the school offers a Guarantee of Quality program. The program's purpose is to offer new graduates the opportunity to enhance their knowledge of the practice of general dentistry as inexpensively as possible.

Up to 18 months after you graduate, you may enhance your knowledge of the practice of general dentistry in two ways. First, when you graduate the school will give you coupons that you can redeem

for applicable continuing dental education courses. To find out what courses are available or to register, call Continuing Dental Education (612/625-1418).

Second, you may apply for admission as a full-time adult special student for a maximum of one academic year of study. To sign up to audit any didactic or preclinical course listed in the school's bulletin, call the Office of Enrollment Management (612/625-7149).

**Professional Reentry Program for Dentists**—There may be times in your professional career when you take time out. You may have encountered an accident, illness, or disability. Whatever the reason, you may find that before you can return to professional dental practice you need assistance to upgrade your clinical or technological skills and restore your knowledge base.

To enhance your knowledge or clinical skills, you may enroll in more than 100 continuing dental education programs offered through the school each year. To find out what courses are available or to register, call Continuing Dental Education (612/625-1418).

You may enroll as an adult special student in selected courses to update or enhance your knowledge in areas of general dental practice. Special clinical mentorships can be arranged if you need to relearn clinical skills in general dentistry. To apply for this program or for more information, call the Office of Enrollment Management (612/625-7149).

## Program in Dentistry (D.D.S.)

### First Year

Coursework includes basic science courses on normal human tissues from the molecular to the cellular to organ systems. Technical dental courses, analysis of dental literature, and ethical training inherent in the profession begin during the first year.

#### Fall Quarter

CBN 5103—Human Histology .....	7
CBN 5107—Gross Anatomy for Dental Students: Extremities .....	4
CBN 5108—Gross Anatomy for Dental Students: Torso .....	4
Dent 5026—Introduction to Dental Care Delivery .....	2
Dent 5091—Professional Problem Solving .....	0
Dent 5648—Oral Anatomy I .....	3
Dent 5670—Introduction to Oral Biology .....	1
MdBe 5201—Biochemistry for Dental Students .....	4
	25

#### Winter Quarter

CBN 5109—Gross Anatomy for Dental Students: Head and Neck .....	4
Dent 5092—Professional Problem Solving .....	0
Dent 5200—Current Literature Seminar .....	2
Dent 5210—Introduction to Clinical Preventive Dentistry I .....	2
Dent 5600—Introduction to Biomaterials I .....	1
Dent 5649—Oral Anatomy II .....	3
Dent 5725—Oral Histology and Embryology .....	4
MdBe 5202—Biochemistry .....	3
Phsl 5100—System Physiology .....	5
	24

#### Spring Quarter

CBN 5110—Neuroscience for Dentistry Students .....	1.5
Dent 5000—Fixed Prosthodontics Technique Lecture .....	1
Dent 5003—Fixed Prosthodontics Laboratory .....	3
Dent 5093—Professional Problem Solving .....	1
Dent 5150—Operative Dentistry I .....	2
Dent 5153—Operative Dentistry Laboratory I .....	4
Dent 5201—Current Literature Seminar .....	2
Dent 5211—Introduction to Clinical Preventive Dentistry II .....	1
Dent 5401—Pediatric Dentistry I .....	1
Dent 5601—Introduction to Biomaterials II .....	4
Dent 5775—Oral Radiology I .....	2
Dent 5810—Physical Evaluation I .....	1
Phsl 5101—Neuroscience for Dentistry Students .....	1.5
	25

### Second Year

Basic science courses focus on pathology. Technical dental courses culminate in treating patients.

#### Fall Quarter

Dent 5001—Fixed Prosthodontics Technique Lecture .....	2
Dent 5004—Fixed Prosthodontics Laboratory .....	4
Dent 5151—Operative Dentistry II .....	2
Dent 5154—Operative Dentistry Laboratory II .....	4
Dent 5202—Current Literature Seminar .....	2
Dent 5317—Pain and Anxiety Control .....	2
Dent 5776—Oral Radiology II .....	2
Dent 5786—Oral Radiology Preclinical Laboratory .....	0
MdBe 5203—Topics: Dental Biochemistry .....	3
MicB 5201—Microbiology .....	8
	29

#### Winter Quarter

Dent 5002—Fixed Prosthodontics Technique Lectures .....	1
Dent 5005—Fixed Prosthodontics Laboratory .....	2
Dent 5100—Genetics: An Introduction for Dentistry Students .....	1
Dent 5152—Operative Dentistry III .....	1
Dent 5155—Operative Dentistry Laboratory III .....	3
Dent 5402—Pediatric Dentistry II .....	1
Dent 5451—Periodontology I .....	2
Dent 5464—Periodontology Technique .....	2
Dent 5550—Removable Prosthodontics Lecture I .....	2
Dent 5554—Removable Prosthodontics Laboratory I .....	3
Dent 5559—Special Prosthodontics .....	0
Dent 5787—Oral Radiology Preclinical Laboratory .....	0
Dent 5809—Patient Management I .....	1
Dent 5811—Physical Evaluation II .....	3
LaMP 5099—General Pathology .....	2
	24

#### Spring Quarter

Dent 5157—Patient Management II .....	2
Dent 5212—Introduction to Comprehensive Clinics .....	1
Dent 5452—Patient Management II .....	1
Dent 5551—Removable Partial Dentures Lecture .....	2
Dent 5555—Removable Partial Dentures Laboratory .....	2
Dent 5560—Special Prosthodontics .....	2
Dent 5624—Endodontics Technique .....	1
Dent 5625—Endodontics .....	2
Dent 5751—Occlusion .....	3
Dent 5788—Oral Radiology Preclinical Laboratory .....	1
LaMP 5100—Systemic Pathology .....	3
	20

#### Summer Session (half-time attendance required)

Dent 5900—Dental Clinic (students may elect 3 or 6 cr)	
--	--

### Third Year

Clinical science courses occupy much of the student's time. Correlations among basic, behavioral, and clinical sciences are established in the clinical setting.

#### Fall Quarter

Dent 5010—Fixed Prosthodontics Clinic .....	4
Dent 5036—Organization and Management of Dental Practice I .....	2
Dent 5094—Professional Problem Solving .....	0
Dent 5161—Operative Dentistry Clinic .....	3
Dent 5180—Patient Management III .....	1
Dent 5251—Oral Pathology .....	2
Dent 5310—Oral and Maxillofacial Surgery I .....	1
Dent 5409—Clinical Pediatric Dentistry .....	0
Dent 5453—Periodontology Lecture III .....	2
Dent 5465—Periodontology Clinic .....	1
Dent 5562—Removable Prosthodontics Clinic .....	3
Dent 5778—Oral Radiology Clinic .....	0
Dent 5800—Oral Medicine/Diagnosis .....	1
Phc1 5103—Pharmacology .....	5
	25

#### Winter Quarter

Dent 5006—Fixed Prosthodontics I .....	1
Dent 5011—Fixed Prosthodontics Clinic .....	3
Dent 5052—Dental Auxiliary Utilization Clinic (DAU I-II) .....	0
Dent 5095—Professional Problem Solving .....	0
Dent 5160—Operative Dentistry IV .....	1
Dent 5162—Operative Dentistry Clinic .....	3
Dent 5181—Patient Management III .....	1
Dent 5311—Oral and Maxillofacial Surgery II .....	1
Dent 5328—Medical Emergencies in the Dental Office .....	1
Dent 5371—Orthodontics I .....	3
Dent 5410—Clinical Pediatric Dentistry .....	0
Dent 5466—Periodontology Clinic .....	1
Dent 5563—Removable Prosthodontics Clinic .....	4
Dent 5777—Oral Radiology III .....	1
Dent 5779—Oral Radiology Clinic .....	0
Dent 5801—Oral Medicine/Diagnosis .....	1
Dent 5812—Physical Evaluation III .....	2
	23

#### Spring Quarter

Dent 5007—Fixed Prosthodontics II .....	1
Dent 5012—Fixed Prosthodontics Clinic .....	3
Dent 5030—Health Ecology: Update .....	2
Dent 5053—Dental Auxiliary Utilization Clinic (DAU I, II) .....	0
Dent 5096—Professional Problem Solving .....	0
Dent 5163—Operative Dentistry Clinic .....	3
Dent 5182—Patient Management III .....	1
Dent 5252—Oral Pathology .....	3
Dent 5315—Oral and Maxillofacial Surgery III .....	1
Dent 5372—Orthodontics II .....	2
Dent 5376—Orthodontics Laboratory .....	1
Dent 5411—Clinical Pediatric Dentistry .....	0
Dent 5467—Periodontology Clinic .....	2
Dent 5564—Removable Prosthodontic Clinic .....	3
Dent 5780—Oral Radiology Clinic .....	2
Dent 5802—Oral Medicine/Diagnosis .....	1
	25

#### Summer Session (required)

Dent 5900—Dental Clinic .....	6
-------------------------------	---

### Fourth Year

Clinical science training is completed and the transition from school to practice begins.

#### Fall Quarter

Dent 5015—Fixed Prosthodontics Clinic .....	4
Dent 5027—Epidemiology, Prevention, and Dental Public Health .....	3
Dent 5054—Dental Auxiliary Utilization Clinic (DAU I-II) .....	2
Dent 5090—Business and Legal Aspects of a Dental Practice .....	5
Dent 5097—Professional Problem Solving .....	0
Dent 5165—Operative Dentistry Clinic .....	4
Dent 5184—Patient Management IV .....	1
Dent 5316—Oral and Maxillofacial Surgery Clinic Rotation .....	1
Dent 5340—Hospital Dentistry Lecture .....	1
Dent 5412—Clinical Pediatric Dentistry .....	0
Dent 5468—Periodontology Clinic .....	1
Dent 5565—Removable Prosthodontic Clinic .....	2
Dent 5626—Endodontics Clinic .....	1
Dent 5642—Hospital Dentistry Rotation .....	0
Dent 5804—Emergency Clinic .....	0
	25

#### Winter Quarter

Dent 5016—Fixed Prosthodontics Clinic .....	3
Dent 5098—Professional Problem Solving .....	0
Dent 5164—Operative Dentistry V .....	1
Dent 5166—Operative Dentistry Clinic .....	3
Dent 5185—Patient Management IV .....	1
Dent 5318—Oral and Maxillofacial Surgery Clinic Rotation .....	1
Dent 5377—Orthodontic Clinic Rotation .....	0
Dent 5404—Dental Care for the Handicapped .....	1
Dent 5413—Clinical Pediatric Dentistry .....	0
Dent 5469—Periodontology Clinic .....	1
Dent 5566—Removable Prosthodontics Clinic .....	2
Dent 5627—Endodontics Clinic .....	1
Dent 5643—Hospital Dentistry Rotation .....	0
Dent 5675—Oral Biology: Fundamental and Applied .....	2
Dent 5753—TMJ Disorders: Diagnosis and Treatment .....	1
Dent 5805—Emergency Clinic .....	0
	17

#### Spring Quarter

Dent 5017—Fixed Prosthodontics Clinic .....	3
Dent 5099—Professional Problem Solving .....	1
Dent 5167—Operative Dentistry Clinic .....	3
Dent 5186—Patient Management IV .....	1
Dent 5319—Oral and Maxillofacial Surgery Clinic Rotation .....	1
Dent 5378—Orthodontic Clinic Rotation .....	1
Dent 5414—Clinical Pediatric Dentistry .....	5
Dent 5470—Periodontology Clinic .....	2
Dent 5567—Removable Prosthodontic Clinic .....	2
Dent 5628—Endodontics Clinic .....	1
Dent 5644—Hospital Dentistry Rotation .....	1
Dent 5806—Emergency Clinic .....	2
	23



# Dentistry (Dent) Course Descriptions

## Department of Diagnostic/ Surgical Sciences

William F. Liljemark, D.D.S., Ph.D., Chair

### Division of Oral Medicine and Diagnosis

#### Professor

James W. Little, D.M.D., M.S.D.

#### Associate Professor

Ramesh K. Kuba, B.D.S., D.D.S., M.S.D., Oral and Maxillofacial Radiology

Gene P. Nystrom, D.D.S., M.P.H., M.S.

Nelson L. Rhodus, D.M.D., M.P.H., Director

#### 5775. ORAL RADIOLOGY I. (2 cr)

Films, roentgenograms, cassettes, and grids used in dentistry.

#### 5776. ORAL RADIOLOGY II. (2 cr)

Roentgenographic anatomy; application of image shift principles in localization; nature and characteristics of atomic radiations; production and control of X-rays; mathematics of roentgenographic exposure; biological effects of ionizing radiations; radiation dosimetry, protection, and regulations.

#### 5777. ORAL RADIOLOGY III. (1 cr)

Interpretation of intraoral and extraoral roentgenograms.

#### 5778-5779-5780. ORAL RADIOLOGY CLINIC. (2 cr total)

Roentgenographic procedures (intraoral and extraoral, including panoramic techniques).

#### 5786-5787-5788. ORAL RADIOLOGY PRECLINICAL LABORATORY. (1 cr total)

5800-5801-5802. ORAL MEDICINE/DIAGNOSIS. (3 cr total)  
Patient evaluation, treatment planning, providing emergency dental care.

#### 5809. PATIENT MANAGEMENT I. (1 cr)

Patient admission, use of dental record, phase I treatment planning, billing and accounting, patient assignment.

#### 5810. PHYSICAL EVALUATION I. (1 cr)

Basics of oral diagnosis, case history, diagnostic process, physical signs and symptoms of disease.

#### 5811. PHYSICAL EVALUATION II. (3 cr)

Principles of disease and oral pathology, normal versus abnormal oral tissues, managing medically compromised dental patients.

#### 5812. PHYSICAL EVALUATION III. (2 cr)

Oral medicine; managing dental patients with systemic disease; recognizing, preventing, and managing medical problems and emergencies in dental practice.

### Division of Oral and Maxillofacial Surgery

#### Professor

Mohamed E. El Deeb, B.D.S., D.O.S., M.S.D.

Mellor R. Holland, D.D.S., M.S.D.

#### Assistant Professor

Matthew J. Roszkowski, D.D.S., M.S.

James Q. Swift, D.D.S., Director and Graduate Program Director

#### 5310. ORAL AND MAXILLOFACIAL SURGERY I. (1 cr)

Principles of surgery; armamentarium.

#### 5311. ORAL AND MAXILLOFACIAL SURGERY II. (1 cr)

Complications in oral surgery.

#### 5315. ORAL AND MAXILLOFACIAL SURGERY III. (1 cr)

TMJ; salivary glands; trauma; developmental deformities; oral malignancies; facial space infections.

#### 5316-5318-5319. ORAL AND MAXILLOFACIAL SURGERY CLINIC ROTATION. (1 cr per qtr)

Oral Surgery Clinic experience.

#### 5317. PAIN AND ANXIETY CONTROL. (2 cr)

Use of local and general anesthetic agents in dentistry.

#### 5328. MEDICAL EMERGENCIES IN THE DENTAL OFFICE. (1 cr)

(1 cr)

Acute management of medical emergencies in dental practice.

#### 5340. HOSPITAL DENTISTRY LECTURE. (1 cr)

Providing dental care in a hospital setting. Hospital organization, privileges, credentialing, chart entries and records requirements, operating room procedure and protocol.

### Division of Orthodontics

#### Professor

T. Michael Speidel, D.D.S., M.S.D., Director and Graduate Program Director

#### Assistant Professor

Patricia A. Macchiarulo, D.M.Sc., D.M.D.

#### 5371. ORTHODONTICS I. (3 cr)

Factors contributing to normal and abnormal development of deciduous, mixed, and permanent dentitions; space maintenance and tooth guidance procedures; biomechanics and construction of fixed and removable appliances.

#### 5372. ORTHODONTICS II. (2 cr)

Clinical management of specific orthodontic problems.

#### 5376. ORTHODONTICS LABORATORY. (1 cr)

Practical applications of developing occlusion analysis. Fundamentals of orthodontic appliances.

#### 5377-5378. ORTHODONTIC CLINIC ROTATION. (1 cr total)

Diagnosis, treatment timing and objectives, skills required to perform orthodontic procedures.

### TMJ/Occlusion Program

#### Associate Professor

James R. Friction, D.D.S., M.S., Codirector

John K. Schulte, D.D.S., M.S.D., Codirector

Eric L. Schiffman, D.D.S., M.S.

#### 5753. TEMPOROMANDIBULAR DISORDERS: DIAGNOSIS AND TREATMENT. (1 cr)

Etiology, pathophysiology, diagnosis, and treatment of temporomandibular and other masticatory disorders.

### Department of Oral Sciences

Gregory R. Germaine, M.S., Ph.D., Chair

#### Professor Emeritus

Maurice W. Meyer, D.D.S., M.S.D., Ph.D.

#### Professor

Dwight L. Anderson, M.S., Ph.D.

Jaroslav Cervenka, M.D., C.Sc.

Gregory R. Germaine, M.S., Ph.D.

Charles F. Schachtele, M.S., Ph.D.

Burton L. Shapiro, D.D.S., M.S.D., Ph.D.

Quenton T. Smith, M.S., Ph.D., Graduate Program Director

#### Associate Professor

Kathleen M. Keenan, M.S., Ph.D.

Robert H. Ophaug, Ph.D.

Bernard E. Reilly, Ph.D.

Joel D. Rudney, M.A., M.S., Ph.D.

#### Assistant Professor

Keith Kajander, D.D.S., Ph.D.

Ambika Mathur, M.S., Ph.D.

#### 5200, 5201, 5202. CURRENT LITERATURE SEMINARS. (2 cr per qtr)

Reading and discussion of current literature that relates basic sciences to clinical topics.

**5670. INTRODUCTION TO ORAL BIOLOGY.** (1 cr)  
Major biological and pathological issues relevant to dentistry.

**5675. ORAL BIOLOGY: FUNDAMENTAL AND APPLIED.** (2 cr)  
Specialists discuss major and current problems in dentistry and oral biology.

### **Biomaterials Research Center**

#### *Professor Emeritus*

Anna T. Hampel, D.D.S., M.S.D.

#### *Professor*

William H. Douglas, B.D.S., M.S., Ph.D., Director

#### *Associate Professor*

Ralph DeLong, D.D.S., M.S.D., Ph.D.

Maria R. Pintado, M.P.H.

Ronald L. Sakaguchi, D.D.S., M.S.D., Ph.D.

**5600. INTRODUCTION TO BIOMATERIALS I.** (1 cr)  
Physical, chemical, and mechanical properties of materials used in dentistry.

**5601. INTRODUCTION TO BIOMATERIALS II.** (4 cr)  
Continuation of 5600 with lab exercises.

### **Division of Oral Pathology**

#### *Professor Emeritus*

Robert J. Gorlin, D.D.S., M.S.D.

#### *Professor*

Richard P. Elzay, D.D.S., M.S.D., Dean, School of Dentistry

Heddie O. Sedano, D.D.S., Dr. Odont.

Robert A. Vickers, D.D.S., M.S.D., Head and Director of Graduate Studies

**5100. GENETICS: AN INTRODUCTION FOR DENTAL STUDENTS.** (1 cr)  
Chemical basis of heredity; cytogenetics, genetic ratios, methodology of human genetics, heredity and environment, mutation and radiation.

**5251-5252. ORAL PATHOLOGY.** (5 cr total)  
Diseases of oral and paraoral tissues and teeth, including embryologic considerations.

**5725. ORAL HISTOLOGY AND EMBRYOLOGY.** (4 cr)  
Embryology and histology of human oral structures and other parts of the head and neck.

## **Department of Preventive Sciences**

Carl L. Bandt, D.D.S., M.S.D., M.S., Chair

### **Division of Dental Hygiene**

See Bachelor of Science Degree in Dental Hygiene section of this bulletin.

### **Division of Health Ecology**

#### *Professor*

David O. Born, Ph.D.

Anthony J. DiAngelis, D.M.D., M.P.H.

Leslie V. Martens, D.D.S., M.P.H., Director

#### *Associate Professor*

Muriel J. Bebeau, Ph.D.

Lester E. Block, D.D.S., M.P.H.

James R. Gambucci, D.D.S., M.P.H., Graduate Program Director for Advanced General Dentistry and General Practice Residency

#### *Assistant Professor*

Stephen K. Shuman, D.D.S., M.S., Graduate Program Director for Oral Health Services for Older Adults

#### *Associate Program Director*

Barbara J. Smith, R.D.H., M.P.H., Graduate Program in Oral Health Services for Older Adults

#### *Associate Clinical Dental Specialist*

Kevin N. Nakagaki, D.D.S., General Practice Residency Program

Students are introduced to the (a) basic principles of epidemiology and health assessment, (b) role and practice of dentistry as a health care delivery system, and (c) factors influencing the availability and use of health services and preventive oral health procedures and methods.

**5026. INTRODUCTION TO DENTAL CARE DELIVERY.** (2 cr)  
Public need and demand for dental services, variety of practices and personnel nationally and internationally.

**5027. EPIDEMIOLOGY, PREVENTION, AND DENTAL PUBLIC HEALTH.** (3 cr)  
Scientific method in dentistry.

**5030. HEALTH ECOLOGY: UPDATE.** (2 cr)  
Current information on geriatric dentistry, dental ramifications of anorexia and bulimia, dentistry for the hearing impaired, occupational health concerns of dentists, chemical abuse.

**5036. ORGANIZATION AND MANAGEMENT OF DENTAL PRACTICE I.** (2 cr)

Skills in planning, organizing, leading, and controlling the human environment of the dental practice.

**5052-5053-5054. DENTAL AUXILIARY UTILIZATION CLINIC (DAU I-II).** (2 cr total)

Specific skills in four-handed dentistry with emphasis on efficient use of chairside dental assistants.

**5090. BUSINESS AND LEGAL ASPECTS OF A DENTAL PRACTICE.** (5 cr)

Essential business and legal considerations, including regulation of the profession, forms of practice, associateships, purchasing a practice, starting a practice, leases, office design, marketing, advertising, financing, malpractice and contract case law.

**5091-5092-5093. PROFESSIONAL PROBLEM SOLVING.** (1 cr total)

Issues, rights, responsibilities, codes, and consequences in resolving recurrent ethical dilemmas of the student dentist.

**5094-5095-5096-5097-5098-5099. PROFESSIONAL PROBLEM SOLVING.** (1 cr total)

**5804-5805-5806. EMERGENCY CLINIC.** (2 cr total)  
Treatment planning and providing emergency dental care.

### **Division of Pediatric Dentistry**

#### *Professor*

Michael J. Till, D.D.S., M.S.D., Ph.D.

Karlind T. Moller, M.A., Ph.D., Director, Cleft Palate Program

#### *Associate Professor*

John P. Conry, B.Dent.Sc., M.S., Director

Paul O. Walker, D.D.S., M.S., Director, Hospital Dental Clinic and Graduate Program Director

#### *Assistant Professor*

Pamela Erickson, D.D.S., Ph.D.

Isaac Liu, D.D.S., M.S.

**5401. PEDIATRIC DENTISTRY I.** (1 cr)

Dentition development; restorative dentistry and pulpal therapy in the primary and permanent dentition; principles of preventive dentistry.

**5402. PEDIATRIC DENTISTRY II.** (1 cr)

Physical and emotional development of the child; patient management; treatment of congenital disorders and traumatic dental injuries; clinical aspects of preventive, interceptive, and corrective orthodontics in the primary and mixed dentitions.

**5404. DENTAL CARE FOR THE HANDICAPPED.** (1 cr)

Handicapping conditions frequently encountered by the general practitioner.

**5409-5410-5411-5412-5413-5414. CLINICAL PEDIATRIC DENTISTRY.** (5 cr total)

Clinic-seminar program reviewing preventive and clinical topics and techniques together with diagnosis, treatment planning, and clinical treatment of pediatric patients.



**Division of Periodontology**

*Professor Emeritus*

Erwin M. Schaffer, D.D.S., M.S.D.

*Professor*

Bashar Bakdash, D.D.S., M.P.H., M.S.D., Director  
Carl L. Bandt, D.D.S., M.S.D., M.S.  
Mark C. Herzberg, M.S., D.D.S., Ph.D.  
Richard C. Oliver, D.D.S., M.S.  
Bruce L. Pihlstrom, D.D.S., M.S.D.

*Associate Professor*

James E. Hinrichs, D.D.S., M.S., Graduate Program Director  
Larry F. Wolff, M.A., Ph.D., D.D.S.

*Assistant Professor*

Bryan S. Michalowiez, D.D.S., M.S.

*Clinical Dental Specialist*

Eric E. Stafne, D.D.S., M.S.D.

**5210, 5211. INTRODUCTION TO CLINICAL PREVENTIVE DENTISTRY I-II.** (2 cr; 1 cr)

Clinical protocols, observation of patient care, assisting and preventive care.

**5451. PERIODONTOLOGY LECTURE I.** (2 cr)

Periodontal anatomy, physiology and etiology of periodontal diseases. The clinical, histopathological and pathogenesis of gingivitis and periodontitis, as well as the role of genetics and systemic disorders. Preventive and therapeutic procedures associated with diagnosis, prognosis, treatment planning, and initial phase of periodontal therapy.

**5452. PATIENT MANAGEMENT II.** (1 cr)

Lectures and small group seminars to discuss periodontal diagnosis, prognosis, treatment planning, case presentation, the referral process, clinical strategies, radiographic interpretation, and role of the dentist in tobacco cessation.

**5453. PERIODONTOLOGY LECTURE III.** (2 cr)

Clinical procedures associated with surgical phase of periodontal therapy. Emphasis on evaluation of periodontal treatment as well as the maintenance phase and the relationship between periodontics and other dentistry disciplines. Roles of clinical research in periodontics.

**5464. PERIODONTOLOGY TECHNIQUE LABORATORY.** (1 cr)

Presurgical procedures in periodontics.

**5465-5466-5467-5468-5469-5470. PERIODONTOLOGY CLINIC.** (8 cr total)

Nonsurgical and surgical treatment of periodontal diseases, evaluation of periodontal therapy, implementation of maintenance programs.

**Department of Restorative Sciences**

Ralph DeLong, D.D.S., Ph.D., M.S., Chair

**Division of Endodontics**

*Professor Emeritus*

James R. Jensen, D.D.S., M.S.D.

*Associate Professor*

Mahmoud El Deeb, B.D.S., M.S.D., Graduate Program Director  
Kenneth M. Hargreaves, D.D.S., M.S., Ph.D.

*Assistant Professor*

Ernest S. Reeh

**5624. ENDODONTICS TECHNIQUE.** (1 cr)

Seminars and lab exercises.

**5625. ENDODONTICS.** (2 cr)

Pulp biology, diagnosis and treatment of pulp and periapically involved teeth.

**5626-5627-5628. ENDODONTICS CLINIC.** (1 cr per qtr)

Principles of diagnosis and treatment of pulp and periapically involved teeth. Seminars, clinical demonstrations, and practical experience with clinical patients.

**Division of Operative Dentistry**

*Professor Emeritus*

Frederick W. Noble, D.D.S.

*Professor*

Ronald E. Geistfeld, D.D.S.

*Associate Professor*

Gary L. Hill, D.D.S., M.S., Director  
Thomas D. Larson, D.D.S., M.S.D.  
Craig B. Phair, D.D.S., M.S.D.  
Omar A. Zidan, B.D.S., H.D.D., M.S.D., Ph.D., Graduate Program Director

*Assistant Professor*

Ignatius K. Lee, D.D.S., M.S.D., M.S.

*Clinical Dental Specialist*

Richard T. Ford, D.D.S., M.A.  
Chester J. Schultz, D.D.S., M.S.D., M.A.

*Coordinator of Undergraduate Hospital Education*

Charles F. Bungum, D.D.S.

**5150-5151-5152. OPERATIVE DENTISTRY I-II-III.** (2/2/1 cr)

Nomenclature of operative dentistry, cavity design and classification, composition of materials, instrumentation, and basis of techniques.

**5153-5154-5155. OPERATIVE DENTISTRY LABORATORY I-II-III.** (4/4/3 cr)

Techniques and principles of cavity preparation, manipulation of restorative materials, instrumentation.

**5157. PATIENT MANAGEMENT II.** (2 cr)

Comprehensive treatment plan. How treatment planning is performed in the private practice setting.

**5160. OPERATIVE DENTISTRY IV.** (1 cr)

Clinical applications and modifications of basic operative techniques. Direct esthetic techniques and materials.

**5161-5162-5163. OPERATIVE DENTISTRY CLINIC.** (3 cr per qtr)

Application of basic operative techniques and materials in clinical setting.

**5164. OPERATIVE DENTISTRY V.** (1 cr)

Reading, interpreting, and discussing scientific literature relevant to operative dentistry.

**5165-5166-5167. OPERATIVE DENTISTRY CLINIC.** (4/3/3 cr)  
Applying basic and advanced operative techniques and materials in clinical setting.

**5180-5181-5182. PATIENT MANAGEMENT III.** (1 cr per qtr)  
Educational setting (clinic) for students to integrate, apply, and develop skills taught in 5810, 5811, 5809, and 5157.

**5184-5185-5186. PATIENT MANAGEMENT IV.** (1 cr per qtr)  
Educational setting (clinic) for students to integrate, apply, and develop skills taught in 5810, 5811, 5809, and 5157.

**5642-5643-5644. HOSPITAL DENTISTRY ROTATION.** (1 cr total)  
Managing hospitalized patients, operating room protocol, admission and discharge of patients, and ambulatory patients.

**5648-5649. ORAL ANATOMY I-II.** (3 cr per qtr)  
Tooth morphology, nomenclature, classification, charting, calcification and eruption sequences, growth and development of the oral cavity.

**Division of Prosthodontics***Professor Emeritus*

Andrew T. Morstad, D.D.S., M.S.D.

*Professor*

Harvey L. Colman, D.D.S., M.S.D.

Richard J. Goodkind, D.M.D., M.S.D., Graduate Program Director

*Associate Professor*

Gary C. Anderson, D.D.S., M.S.

James L. Baker, D.D.S., M.S.D.

James L. Donahue, D.D.S.

Paul S. Olin, D.D.S., Director

*Assistant Professor*

James R. Holtan, D.D.S.

Marie Joycelyn Lua, M.S., D.M.D.

*Clinical Dental Specialist*

David J. Clay, D.D.S., M.S.D.

James E. Schreiner, D.D.S., M.S.D.

**5000-5001-5002. FIXED PROSTHODONTICS TECHNIQUE LECTURES.** (1/2/1 cr)

Lab techniques and fundamentals of tooth preparation.

**5003-5004-5005. FIXED PROSTHODONTICS LABORATORIES.** (3/4/2 cr)

Demonstrations of clinical and lab procedures. Exercises in casting, soldering, and constructing bridges and porcelain crowns.

**5006. FIXED PROSTHODONTICS I.** (1 cr)

Treatment planning for abutments, retainers, and pontics.

**5007. FIXED PROSTHODONTICS II.** (1 cr)

Design principles for porcelain fused to metal restorations, pontic designs, occlusion.

**5010-5011-5012. FIXED PROSTHODONTICS CLINIC.** (4/3/3 cr)

Diagnosis, design, and construction of fixed prosthodontic cases.

**5015-5016-5017. FIXED PROSTHODONTICS CLINIC.** (4/3/3 cr)**5212. INTRODUCTION TO COMPREHENSIVE CLINICS.** (1 cr)
**5550. REMOVABLE PROSTHODONTICS LECTURE I.** (2 cr)

Use of prosthetic dental materials and principles of complete denture fabrication.

**5551. REMOVABLE PARTIAL DENTURES LECTURE.** (2 cr)

Design principles and fabrication of removable partial dentures.

**5554. REMOVABLE PROSTHODONTICS LABORATORY I.** (3 cr)

Complete denture fabrication.

**5555. REMOVABLE PARTIAL DENTURES LABORATORY.** (2 cr)

Design and fabrication of removable partial dentures.

**5559-5560. SPECIAL PROSTHODONTICS.** (2 cr total)

Complete denture prosthesis correlated with students' accumulated knowledge from basic and clinical sciences.

**5562-5563-5564. REMOVABLE PROSTHODONTICS CLINIC.** (3/4/3 cr)

Clinical practice in complete and partial removable denture prosthodontics.

**5565-5566-5567. REMOVABLE PROSTHODONTICS CLINIC.** (2 cr per qtr)**5751. OCCLUSION.** (3 cr)

Examination, diagnosis, and treatment of occlusal problems.

**Contributing Departments****Biochemistry (MdBc)****5201. BIOCHEMISTRY FOR DENTAL STUDENTS.** (4 cr)

Chemical properties, biosynthesis, catabolism, structure, and function of biomolecules. Fundamental aspects of molecular biology and metabolic regulation.

**5202. BIOCHEMISTRY FOR DENTAL STUDENTS.** (3 cr)

Physiological chemistry with emphasis on biological processes that occur in human tissue and fluid compartments.

**5203. TOPICS IN DENTAL BIOCHEMISTRY.** (3 cr)

Biochemical phenomenon in the oral cavity. Oral fluid and deposits, hard and soft specialized tissues of the mouth.

**Cell Biology and Neuroanatomy (CBN)****5103. HUMAN HISTOLOGY.** (7 cr)

Microscopic structure; cytochemical and functional aspects of cells, tissues, and organs.

**5107. GROSS ANATOMY FOR DENTAL STUDENTS: EXTREMITIES.** (4 cr)

Dissection of human cadavers (upper and lower extremities) supplemented with lectures, readings, and consideration of clinical problems. Includes embryology and radiographic anatomy.

**5108. GROSS ANATOMY FOR DENTAL STUDENTS: TORSO.** (4 cr)

Continuation of CBN 5107, to include thorax, abdomen, and pelvis.

**5109. GROSS ANATOMY FOR DENTAL STUDENTS: HEAD AND NECK.** (4 cr)

Continuation of CBN 5108, to include head and neck.

**5110. NEUROSCIENCE FOR DENTAL STUDENTS.** (1.5 cr)

Structure and function of the central nervous system. Correlation between morphology and physiology.

**Laboratory Medicine and Pathology (LaMP)****5099. GENERAL PATHOLOGY FOR DENTAL STUDENTS.** (2 cr)**5100. SYSTEMIC PATHOLOGY FOR DENTAL STUDENTS.** (3 cr)

Lectures, self-study with recitations (histopathology, microfiche).

## Microbiology (MicB)

### 5201. MICROBIOLOGY FOR DENTAL STUDENTS. (8 cr)

Nature and diversity of microorganisms; microbial structure and function; metabolism and growth; genetics and virology; principles of sterilization and disinfection; chemotherapy; host-parasite relationships; fundamentals of immunology; pathogenic bacteria, fungi, and viruses; ecology of oral microorganisms; microbiology of dental caries and periodontal disease.

## Pharmacology (Phcl)

### 5103. PHARMACOLOGY FOR DENTAL STUDENTS. (5 cr)

Pharmacologic principles and actions of drugs.

## Physiology (Phsl)

### 5100. SYSTEM PHYSIOLOGY. (5 cr)

Principles of physiology, circulation, respiration, digestion, excretion, metabolism, and endocrine gland function.

### 5101. NEUROSCIENCE FOR DENTAL STUDENTS. (1.5 cr)

Principles of nervous function studied through neuroanatomy and neurophysiology.

## A Clinical Honor Incentive Program for Undergraduate D.D.S. Students

**Purpose**—Students accepted as clinical honor students will have the opportunity to enhance their clinical competency, increase their clinic proficiency, develop professional confidence and self-esteem, and participate in a monetary reward system. For more information, contact the Office of Clinical Systems, 8-434 Malcolm Moos Health Sciences Tower, 515 Delaware Street S.E., University of Minnesota, Minneapolis, MN 55455 (612/625-0653).

**Qualifications**—Fourth-year dental students who have completed their divisional clinical requirements, passed applicable practical/competency examinations before spring quarter, and are not on academic probation may apply for the Clinical Honors Program through their patient care group director for the balance of the required seven quarters in residence as full-time clinical students. Divisions in which students wish to work will assign faculty mentors to each student applying. Continuation in the program is contingent upon performance.

**Program Description**—Honor students will

1. be assigned additional patients who will, as much as possible, have clinical needs that reflect the clinical experiences desired by the honor student. Honor students will be expected to complete all work on patients assigned to them in keeping with the school's comprehensive patient care policy.

2. be given a starting check and a final check at completion and, as decided by the faculty mentor in the division, at each phase of the patient's care with the understanding that they will, at any time, solicit assistance and/or consultation.
3. be expected to continue to fully use their available clinic/lab time.
4. have their transcripts notated indicating that they have been clinical honor students.
5. receive a financial scholarship based on their time in the program.

Students may elect to take additional courses by requesting admission from the course director or appropriate division director. Prior approval is required for registration.

## Department of Diagnostic/Surgical Sciences

### Division of Oral Medicine and Diagnosis

5781. ADVANCED ORAL RADIOLOGY CLINIC. (Cr and hrs ar)

5785. ORAL RADIOLOGY: INDEPENDENT STUDY. (Cr and hrs ar)

5815. ORAL MEDICINE ELECTIVE. (2 cr)

Advanced clinical experience managing medically compromised patients, advanced diagnostic modalities, oral soft tissue lesions, salivary gland dysfunction. Research in oral medicine. Special clinics, e.g., xerostomia, CPCs. Seminars and student CPC presentations.

### Division of Oral and Maxillofacial Surgery

5320. ORAL AND MAXILLOFACIAL SURGERY: INDEPENDENT STUDY. (Cr and hrs ar)

5330. NITROUS OXIDE INHALATION ANALGESIA/ EMERGENCY DRUG UTILIZATION. (1 cr)

Instruction and demonstration in the use of nitrous oxide and emergency drugs.

5335. ORAL AND MAXILLOFACIAL SURGERY CLINIC ELECTIVE ROTATION. (Cr ar)

Examination, diagnostic, treatment planning, and clinical skills.

### Division of Orthodontics

5380. ORTHODONTICS. (Cr and hrs ar)

Principles and procedures in preventive, interceptive, and corrective orthodontics interrelated through case analysis and treatment planning.

5381. HEAD AND NECK ANATOMY REVIEW. (Cr and hrs ar)

Vascular supply and innervation, facial planes and their relationship to the spread of infection, radiographic anomalies.

5385. ORTHODONTICS: INDEPENDENT STUDY. (Cr and hrs ar)

### TMJ/Occlusion Program

5755. OCCLUSION: INDEPENDENT STUDY. (Cr and hrs ar)

8440. TMJ AND CRANIOFACIAL PAIN: ADVANCED THEORY AND PRINCIPLES. (3 cr; prereq undergrad TMJ course)

Differential diagnosis of TMJ and craniofacial pain and the science used in decision making.

8443. CURRENT LITERATURE IN TMJ AND CRANIOFACIAL PAIN. (1 cr)

## Department of Oral Sciences

**5677. DENTAL RESEARCH TRAINING.** (3 cr; hrs ar)  
Following completion of the research project, students submit a written report describing their research activities.

**5680. ORAL BIOLOGY: INDEPENDENT STUDY.** (Cr and hrs ar)

### Biomaterials Research Center

**5602. BIOMATERIALS: INDEPENDENT STUDY.** (Cr and hrs ar)

### Division of Oral Pathology

**5102. HUMAN AND ORAL GENETICS: INDEPENDENT STUDY.** (Cr and hrs ar)

**5250. ORAL PATHOLOGY: INDEPENDENT STUDY.** (Cr and hrs ar)

## Department of Preventive Sciences

### Division of Health Ecology

**5055. HEALTH ECOLOGY: INDEPENDENT STUDY.** (Cr and hrs ar)

Arranged with any health ecology faculty member.

**5070. HEALTH ECOLOGY ELECTIVE.** (Cr ar)

Allows highly motivated students to undertake study and receive academic credit for activities in special-interest areas.

**5073. ADVANCED GENERAL DENTISTRY ELECTIVE.** (Cr ar)

Block rotations of 2 to 10 weeks in selected special clinics and programs such as prisons, regional treatment centers, and migrant worker health care.

**5075. HEALTH ECOLOGY: DENTAL ASSOCIATESHIPS.** (Cr ar)

Individually designed reading and research course focused on dental practice, associateships, career decision making, and career tracks.

### Division of Pediatric Dentistry

**5420. PEDIATRIC DENTISTRY: INDEPENDENT STUDY.** (Cr and hrs ar)

**5425. TREATMENT OF THE DIFFICULT PEDIATRIC PATIENT.** (1 cr)

Students may be assigned an additional rotation to clinically more challenging pediatric patients.

### Division of Periodontology

**5460. PERIODONTOLOGY: INDEPENDENT STUDY.** (Cr ar)

**5475. CLINICAL SEMINAR IN PERIODONTOLOGY.** (1 cr)

Each week clinical case reports are discussed by faculty and students. Patients with challenging treatment needs are discussed from viewpoints of total care.

**5476. PERIODONTOLOGY SEMINAR.** (2 cr)

Topics assigned weekly and discussed in detail using the literature as background.

**5477. BACTERIOLOGY AND IMMUNOLOGY OF PERIODONTAL DISEASE.** (1 cr)

Bacteriology and role of possible immunological mechanisms in the pathogenesis of chronic periodontal disease discussed using current literature as background.

**5478. TREATMENT OF MORE COMPLICATED PERIODONTAL PATIENTS.** (Cr ar)

Students request assignment to patients with more complicated type III and IV periodontal disease.

## Department of Restorative Sciences

### Division of Endodontics

**5630. ENDODONTICS: INDEPENDENT STUDY.** (Cr and hrs ar)

### Division of Operative Dentistry

**5158. OPERATIVE DENTISTRY: INDEPENDENT STUDY.** (Cr and hrs ar)

**5173. CLERKSHIP IN OPERATIVE DENTISTRY.** (2 cr)

Assist preclinical faculty in teaching techniques and procedures used in operative dentistry.

**5175. ESTHETIC DENTISTRY CLINIC.** (1 cr)

Review literature and learning model and treat patients clinically using direct bonded composites for problems such as diastema closures, alignment discrepancies, discoloration. Student must identify patient to be treated. Involves one-to-one clinical teaching.

**5654. ORAL ANATOMY: INDEPENDENT STUDY.** (Cr and hrs ar)

### Division of Prosthodontics

**5008. PORCELAIN VENEERS.** (1 cr)

Review literature and treat patients clinically using bonded porcelain veneers. Student must identify patient to be treated.

**5009. FIXED PROSTHODONTICS: INDEPENDENT STUDY.** (Cr and hrs ar)

**5553. REMOVABLE PROSTHODONTICS: INDEPENDENT STUDY.** (Cr and hrs ar)

**5568. REVIEW OF PARTIAL REMOVABLE PROSTHETICS.** (1 cr; hrs ar)

Treatment planning, case analysis, overlay dentures.

**5573. TREATMENT OF THE DIFFICULT PROSTHODONTIC PATIENT.** (1 cr)

Work with faculty treating occlusal plane problems, occlusion discrepancies, opposing bridgework, reconstructions.

**5575. OVERVIEW OF IMPLANTS USED IN DENTISTRY.** (1 cr)

**5577. REVIEW OF COMPLETE DENTURE PROSTHETICS.** (1 cr)

Various phases of complete denture prosthetics.

## **School of Dentistry and University Personnel and Resources**

### *Office of the Dean*

Dr. Richard P. Elzay  
Deputy Vice President for the Health Sciences  
Dean  
15-209 Moos Tower  
612/625-9982

### *Office of Educational Research, Planning, and Development*

Dr. Thomas D. Larson  
Director  
15-238 Moos Tower  
612/625-9945

### *Office of Enrollment Management*

Ms. Gale L. Shea  
Director  
15-106 Moos Tower  
612/625-7149  
  
Ms. Laura Boland  
Recruitment Coordinator  
15-106 Moos Tower  
612/624-6960

## **School of Dentistry Departments**

### *Clinical Systems*

Dr. Harvey Colman  
Director  
8-434 Moos Tower  
612/625-0653

### *Diagnostic/Surgical Sciences*

Dr. William Liljemark  
Chairperson  
7-194 Moos Tower  
612/624-5938

### *Oral Sciences*

Dr. Gregory Germaine  
Chairperson  
17-252 Moos Tower  
612/624-0478

### *Preventive Sciences*

Dr. Carl Bandt  
Chairperson  
7-368C Moos Tower  
612/625-5169

### *Restorative Sciences*

Dr. Ralph DeLong  
Chairperson  
8-426 Moos Tower  
612/625-0968

## **Other School of Dentistry Resources**

### *Equal Opportunity/Affirmative Action*

Dr. Kate Hathaway  
6-320 Moos Tower  
612/624-6946

### *Office of Student Financial Aid*

Ms. Rose Miskowicz  
2-693 Moos Tower  
612/624-1665

### *Student Affairs Support Program*

Learning and Academic Skills Counselor  
2-693 Moos Tower  
612/625-0612

### *Health Sciences Minority Program*

Ms. Jaki Cottingham-Zierdt  
Director  
1-125 Moos Tower  
612/624-9400

## **University of Minnesota Resources**

### *Boynton Health Service*

General Information  
410 Church St. S.E., Minneapolis  
612/625-8400

### *Disability Services*

16 Johnston Hall  
612/624-4037

### *Housing Services*

Comstock Hall East  
612/624-2994

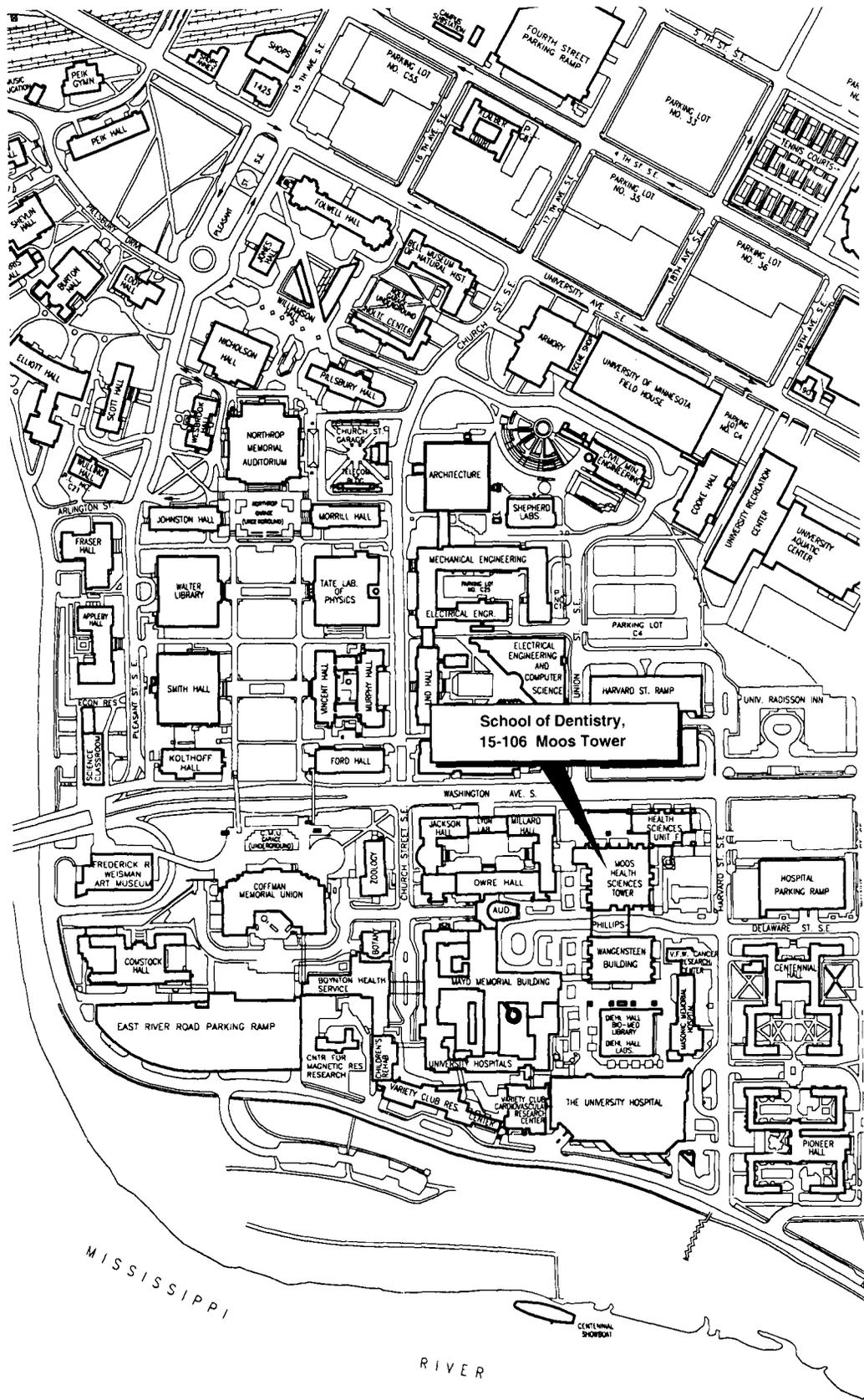
### *Parking Services*

216 Printing Services Building  
612/626-PARK

### *Transit Services*

216 Printing Services Building  
612/625-9000

# Campus Map



School of Dentistry,  
15-106 Moos Tower

University of Minnesota  
Twin Cities Campus  
East Bank

- Accreditation 6, 16  
 Access to Student Educational Records 13-14  
 Administration 8  
 Admission Requirements 16\*, 24  
 Advising (see Counseling) 16\*, 27  
 Alpha Omega 10  
 Application Procedures 16\*, 26  
 Arts and Entertainment 2-3  
  
 Bachelor of Science Degree 6  
 Bachelor of Science Degree in Dental Hygiene 6  
 Basic Sciences for Dental Students 35  
 Biochemistry, Department of 35  
 Biomaterials Research Center 33, 37  
 Bulletin Use 13  
  
 Campus and Community 2-3  
 Cell Biology and Neuroanatomy, Department of 35  
 Clinical Honor Incentive Program 36  
 Clinics 6  
 Confidentiality of Student Grades 13  
 Continuing Dental Education Program 7  
 Counseling 16\*, 27  
 Course Descriptions 20-22\*  
 Curriculum 3, 18\*, 19\*  
  
 Delta Sigma Delta 10  
 Dental Hygiene, Program in 16-22\*  
 Dental Profession 2  
 Diagnostic/Surgical Sciences, Department of 32, 36  
 Doctor of Dental Surgery 6  
 Doctor of Dental Surgery Program 24-37  
  
 Early Admission 25  
 Elective Courses 24  
 Endodontics, Division of 34, 37  
 English Proficiency 25-26  
 Entrance Tests 16\*, 25  
 Equal Opportunity 13  
 External Support 6  
 Externships 27  
 Evaluation of Student Performance 29  
 Extracurricular Events 14  
  
 Facilities 4  
 Faculty 22\*, 32, 33, 34, 35  
 Fees 16\*  
 Financial Aid 17\*, 27  
 Fraternities 10  
  
 Grading Policies and Practices 12-13  
 Graduate Programs 6  
 Graduation Requirements 18\*, 29  
 Guarantee of Quality Program 29-30  
  
 Health Ecology, Division of 33, 37  
 High-Rise Program 11  
 History of School of Dentistry 2  
 Honors and Awards 17\*, 28  
 Honor Societies 10  
  
 Immunization 14  
 International Exchange Opportunities 11  
 Interview (Preadmission) 26  
  
 Jamaica Volunteer Mission 11  
  
 Laboratory Medicine and Pathology, Department of 35  
 Leave of Absence 28  
 Licensure 18\*  
  
 Map 39  
 Microbiology, Department of 36  
 Mission 6  
  
 National Board Dental Examinations 29  
 National Organizations 10  
  
 Omicron Kappa Upsilon 10  
 Operative Dentistry, Division of 34, 37  
 Oral and Maxillofacial Surgery, Division of 32, 36  
 Oral Medicine/Diagnosis, Division of 32, 36  
 Oral Pathology 33, 37  
  
 Oral Sciences, Department of 32-33, 36-37  
 Orthodontics, Division of 32, 36  
  
 Pediatric Dentistry, Division of 33, 37  
 Periodontology, Division of 34, 37  
 Pharmacology, Department of 36  
 Physiology, Department of 36  
 Placement 29  
 Preprofessional Program 18\*  
 Preventive Sciences, Department of 33, 37  
 Professional Program 19\*  
 Professional Reentry Program for Dentists 30  
 Program (listed by academic year) 19-20\*, 30-31  
 Prosthodontics, Division of 35, 37  
 Psi Omega 10  
 Publication 4  
  
 Reciprocity 17\*  
 Records, Access to 13-14  
 Recreation 2-3  
 Required Courses 24  
 Research 4, 11  
 Residency and Reciprocity 17\*, 26  
 Resource Guide 38  
 Restorative Sciences, Department of 34, 27  
 Retention and Promotion 28  
  
 Scholarships 27  
 Small Group Learning 6  
 Societies 27  
 Special Opportunities 11, 27  
 Special Programs 29  
 State Organizations 10  
 Student Activities 11, 18\*  
 Student Organizations 10  
 Summer Research Fellowship 11  
 Support Program 27  
  
 TMJ/Occlusion Program 32, 36  
 Tuition and Fees 16\*, 27  
  
 Union Gospel Mission 11  
  
 Xi Psi Phi 10
- 
- \* Pertains to Dental Hygiene*
- Photos on back page of "The Advantage of the University of Minnesota" color section courtesy of Minnesota Office of Tourism.

## Postal Statement

Volume 96, Number 15  
December 15, 1993

University of Minnesota  
(USPS 651-720)

Published by the University of Minnesota,  
Office of the Vice President for Student  
Affairs, Communications & Publications,  
110 Williamson Hall, 231 Pillsbury Drive  
S.E., Minneapolis, MN 55455-0213; once in  
May, June, August, October, November, and  
December; twice in February; three times in  
April; and four times in July. Second-class  
postage paid at Minneapolis, Minnesota.  
POSTMASTER: Send address changes to  
University of Minnesota, 110 Williamson  
Hall, 231 Pillsbury Drive S.E., Minneapolis,  
MN 55455-0213.