

*The Bulletin of the*  
UNIVERSITY of MINNESOTA

The College of Agriculture, Forestry,  
and Home Economics  
Announcement of Courses for the Years  
1947-1949

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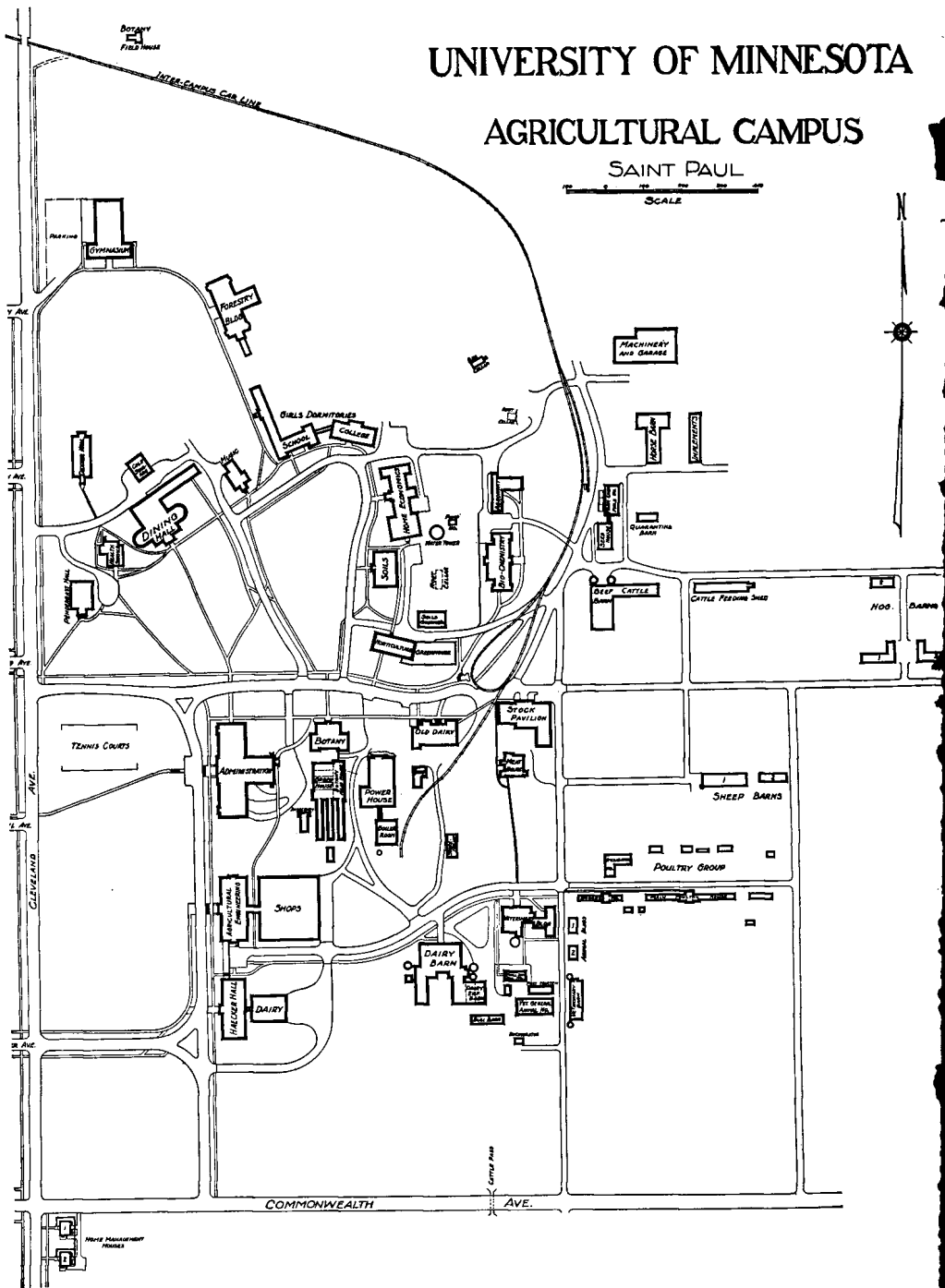
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# UNIVERSITY OF MINNESOTA

## AGRICULTURAL CAMPUS

SAINT PAUL

SCALE



# THE COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

## FACULTY

### ADMINISTRATION

James Lewis Morrill, B.A., LL.D., President  
Malcolm M. Willey, Ph.D., L.H.D., Vice President, Academic Administration  
Clyde H. Bailey, Ph.D., Dean and Director of the Department of Agriculture and Professor of Agricultural Biochemistry  
Henry Schmitz, Ph.D., Dean of the College of Agriculture, Forestry, and Home Economics and Professor of Forestry  
Edmund G. Williamson, Ph.D., Dean of Students  
Anne D. Blitz, M.A., LL.D., Dean of Women  
Robert Edward Summers, M.S., M.E., Dean of Admissions and Records and Professor  
True E. Pettengill, M.S., Recorder  
Harold Macy, Ph.D., Associate Director of the Agricultural Experiment Station and Professor of Dairy Bacteriology  
Theodore H. Fenske, M.S., Associate Director of Field Operations and Professor

### AGRICULTURAL BIOCHEMISTRY

Professors William F. Geddes, Ph.D., Clyde H. Bailey, Ph.D., David R. Briggs, Ph.D., W. Martin Sandstrom, Ph.D., Max O. Schultze, Ph.D., Fred Smith, Ph.D.; Associate Professors Paul D. Boyer, Ph.D., Robert Jenness, Ph.D., Cornelia Kennedy, Ph.D.; Instructor Donald E. Smith, M.S.

### AGRICULTURAL ECONOMICS

Professors Oscar B. Jespers, Ph.D., Austin A. Dowell, Ph.D., E. Fred Koller, Ph.D., George A. Pond, Ph.D., Warren C. Waite, Ph.D.; Assistant Professors Rex W. Cox, Ph.D., Selmer E. Engene, Ph.D.; Instructors Harlow W. Halverson, M.S., Percy M. Lowe, M.S.

### AGRICULTURAL EDUCATION

Professor Albert M. Field, Ph.D.; Assistant Professor Milo J. Peterson, Ph.D.

### AGRICULTURAL ENGINEERING

Professors Arthur J. Schwantes, M.S.(Ag.E.), Andrew Hustrulid, Ph.D., Associate Professors Clarence H. Christopherson, M.A., Philip W. Manson, M.S.(Ag.E.), Charles K. Otis, M.S.(Ag.E.); Assistant Professors Evan A. Allred, M.S.(Ag.E.); John Strait, M.S.(Ag.E.), James B. Torrance, B.S.(Agr.), Arthur G. Tyler, B.S.(M.E.); Instructors J. Grant Dent, Arnold M. Flikke, M.S.(Ag.E.), Virgil H. Johnson, B.(Ag.E.)

### AGRICULTURAL JOURNALISM

Associate Professor Paul C. Johnson, B.A.

### AGRONOMY AND PLANT GENETICS

Professors Herbert K. Hayes, D.Sc., Charles R. Burnham, Ph.D.; Associate Professors Ray S. Dunham, M.S., Ernest H. Rinke, Ph.D., Assistant Professors Jean W. Lambert, Ph.D., Olois R. Schmid, Ph.D., Horace L. Thomas, Ph.D.; Instructor Emmett L. Pinnell, M.S.

## ANIMAL AND POULTRY HUSBANDRY

## ANIMAL HUSBANDRY

Professors Walter H. Peters, M.Agr., Evan F. Ferrin, M.Agr., Laurence M. Winters, Ph.D.; Associate Professors Philip A. Anderson, B.S. in Agr., Alfred L. Harvey, Ph.D., Willard W. Green, Ph.D.

## POULTRY HUSBANDRY

Professor Hubert J. Sloan, Ph.D.; Associate Professor Thomas H. Canfield, M.S.; Assistant Professor Robert N. Shoffner, Ph.D.

## DAIRY HUSBANDRY

Professors James B. Fitch, M.S., Willes B. Combs, M.A., Harold Macy, Ph.D., William E. Petersen, Ph.D., Samuel T. Coulter, Ph.D.; Associate Professors Lester O. Gilmore, Ph.D., Thor W. Gullickson, Ph.D.; Instructors Joseph C. Olson, M.S., Elmer L. Thomas, M.S.

## ENTOMOLOGY AND ECONOMIC ZOOLOGY

Professors Clarence E. Mickel, Ph.D., Alexander A. Granovsky, Ph.D., Alexander C. Hodson, Ph.D.; Associate Professors Mykola H. Haydak, Ph.D., William H. Marshall, Ph.D., A. Glenn Richards, Ph.D., Lloyd L. Smith, Ph.D.; Assistant Professors Torfine L. Aamodt, B.S., Albert L. Burroughs, Ph.D., Lawrence K. Cutkomp, Ph.D.; Instructor Don C. Quimby, M.S.

## FORESTRY

Professors Frank H. Kaufert, Ph.D., John H. Allison, Ph.B., M.F., Henry Schmitz, Ph.D., Thorwald Schantz-Hansen, Ph.D.; Associate Professors Randolph M. Brown, B.S., M.F., Louis W. Rees, Ph.D., Ralph L. Hossfeld, Ph.D.; Instructor John A. Zivnuska, M.S.

## HOME ECONOMICS

Professors Wylle B. McNeal, M.A., Alice Biester, M.A., Harriet I. Goldstein, Jane M. Leichsenring, Ph.D., Isabel Noble, Ph.D., Ethel L. Phelps, M.S.; Associate Professors Frances Dunning, M.S.; Assistant Professors Edith E. Ames, M.S., Vetta Goldstein, Kathleen M. Jeary, M.A., Lucy A. Studley, M.A.; Instructors Stephania E. Bayor, M.A., Mary B. Briggs, M.S., Gertrude Esteros, M.A., Kathryn H. Francis, M.S., Ethel B. Gorham, M.A., Hedda Kafka, M.A., Janet Laws, B.S., Melva McCart, B.S., Juliette Myren, M.S., Mavis Nymon, M.S., Marguerite Paulsen, M.S., Florence Turnbull, M.S., Juanita Walter, M.A., Catherine Zander, M.S.

## HOME ECONOMICS EDUCATION

Professors Wylle B. McNeal, M.A., Clara Brown Army, M.A., Harriet I. Goldstein, Ella J. Rose, Ph.D.; Instructors Kathryn H. Francis, M.S., Melva McCart, B.S.

## HORTICULTURE

Professors William H. Alderman, B.S.A., Wilfrid G. Brierley, Ph.D., Fred A. Krantz, Ph.D.; Associate Professors Troy M. Currence, Ph.D., Arthur N. Wilcox, Ph.D.; Assistant Professors Arthur E. Hutchins, Ph.D., Lewis E. Longley, Ph.D., Theodore S. Weir, M.S.; Instructor Robert A. Phillips, B.S.

## ORIENTATION

Instructor Keith N. McFarland, B.S.

## PLANT PATHOLOGY AND BOTANY

Professors Elvin C. Stakman, Ph.D., Jonas J. Christensen, Ph.D.; Carl J. Eide, Ph.D., Helen Hart, Ph.D.; Associate Professor Clyde M. Christensen, Ph.D.; Assistant Professors Louise Dosedall, Ph.D., Alvin H. Larson, B.S., Milton F. Kernkamp, Ph.D., Raymond H. Landon, Ph.D., Eric O. Mader, Ph.D.; Instructors Harold G. Heggeness, M.S., Matthew W. Moore, M.S.

## RHETORIC

Associate Professor Ralph G. Nichols, M.A.; Assistant Professor Marjorie H. Thurston, Ph.D., James I. Brown, M.A.; Instructors Francis E. Drake, M.A., Donald Woods, M.A., Walter W. Seidenkranz, M.A.

## SOILS

Professor Clayton O. Rost, Ph.D.; Paul R. McMiller, M.S.; Associate Professor Alfred C. Caldwell, Ph.D.; Assistant Professor John M. MacGregor, Ph.D.; Instructor Harold F. Arneman, M.S.

## VETERINARY MEDICINE

Professors Willard L. Boyd, D.V.S., Howard C. H. Kernkamp, D.V.M., M.S.; Assistant Professor Benjamin S. Pomeroy, D.V.M., Ph.D.

For faculty of departments in other colleges contributing required and elective courses, see the respective bulletins of those colleges.

## GENERAL INFORMATION

For detailed information concerning the following see the *General Information Bulletin* of the University: admission, entrance requirements, advanced standing, adult special students, nonresident students, fees, expenses, financial aids, board and room, information for men and women with military service records.

Graduates of the schools of agriculture of the University of Minnesota who have completed the two summers of supervised work offered in the school course, one additional school year, and one additional summer's work, or the equivalent thereof, and who graduate in the upper seventy-five per cent of their class will be admitted to the College of Agriculture, Forestry, and Home Economics.

### PREAGRICULTURE AND PREFORESTRY COURSES IN JUNIOR COLLEGES

Students from accredited junior colleges who have completed the general requirements described below will be admitted to the junior class in the agricultural and forestry courses. The amount of additional time required to complete the work for the degree of bachelor of science will depend (1) upon the quality and quantity of work which such students can do and (2) upon the special curriculum which they elect. Many of these curricula may be completed in two years by students who maintain at least the average quality and quantity of work. Additional work in summer sessions or regular quarters may be necessary in some of the special curricula. Since a large number of fields of specialization are open to students, and since these curricula vary so greatly in the subject-matter courses required, it is impossible to make any more specific statement. The requirements given below can be satisfied in the average junior college which offers a fundamental arts and science curriculum. Students in some junior colleges can select additional subjects which may be directly applicable and very helpful in the field of specialization to be followed later. Students who have not completely met the requirements will be given proportional credit.

1. A total of 90 quarter credits (1 semester credit = 1.5 quarter credits).

Required courses:

- (a) Botany 6 to 10 credits; general chemistry 8 to 12 credits; zoology 9 to 15 credits; rhetoric and English 9 to 15 credits; public speaking 3 credits.
- (b) At least two of the following: mathematics 5 to 15 credits; economics 8 to 15 credits; modern language 15 credits (in some curricula).

Electives: Sufficient to bring total credits to a minimum of 90.

The following is a general list of electives applicable in one or more of the specialization fields: sociology, psychology, economics, physics, history, advanced mathematics, technical business, agriculture and engineering subjects, advanced English, public speaking, mechanical drawing, freehand drawing, surveying, qualitative, quantitative, and organic chemistry, advanced courses in zoology and botany, bacteriology, modern language (especially French and German). These subjects are, of course, not equally applicable in all fields. For prospective forestry students, sociology, physics, mechanical drawing, higher algebra, trigonometry, and surveying are especially recommended.

Attention is called to the college requirement that all students must complete for graduation a total of not less than 18 credits (inclusive of courses required in the various curricula) in social science courses included in the following departments: Anthropology, Agricultural Economics, Economics, Geography, History, Humanities, Philosophy, Political Science, Psychology, and Sociology.

See special requirements for each of the curricula in Agriculture or Forestry.

## HOME ECONOMICS COURSES IN JUNIOR COLLEGES

In planning a program of studies in the Junior College the student who plans to transfer to one of the Home Economics curricula should study the course requirements as given for each specialization in this bulletin (pp. 50-71) and take courses in the Junior College insofar as possible which will be equivalent to those in the freshman and sophomore years at the University.

Transfer credit will be applied on required work for English, physical, biological, social science, psychology, and home economics courses. Credits for courses in other areas and for work beyond the requirement in the areas above will be given as elective credit.

## REGISTRATION

In planning registration note particularly (a) prerequisites, (b) classes of students (fr., soph., jr., or sr.) to which courses are offered, (c) number of credits, (d) quarter or quarters offered, and be sure that provision is made in registration for the proper sequence of continuation courses.

Registration for courses as electives in other colleges of the University must be in conformity with regulations of the college offering the course.

Elective courses in the College of Science, Literature, and the Arts are separated into Junior College courses (numbered 1 to 49) open to freshmen and sophomores, and Senior College courses (numbered 50 to 99) open to juniors and seniors. In addition to satisfying other prerequisites a minimum of 90 credits and an honor point ratio of at least 1.0 must be earned before registering for a Senior College elective.

## COLLEGE APTITUDE EXAMINATION

All new students are required to take a college aptitude examination in high school or on entrance as a part of the matriculation procedure. Admission, however, does not depend upon the results of the examination.

## PLACEMENT TESTS

The college desires to bring about the best correlation possible between the technical courses in the fields of agriculture, forestry, and home economics, as taught in the schools of agriculture, in the high schools, and in other institutions. Where students have taken considerable work in these technical courses, it may be desirable for them not to be required to repeat a part or all of this work in the elementary courses in the college. The amount of work taken in the preparatory school and the quality of that work, and, finally, the question as to whether or not the subject-matter course has been used for entrance to the University, must be taken into consideration. In general, two possibilities for placement tests are offered:

1. For subjects not used for entrance to the University and in which the student has had adequate training, examinations may be taken for full credit in the elementary technical course in the college. These examinations may be taken during the first six weeks of residence without fee. After that time, a five-dollar fee is required.

2. For subjects which the student has used for entrance to the University, the student may, by satisfactory examination or by the presentation of other satisfactory evidence, be given permission to omit the elementary subject in the college course, substituting therefor credits in other subjects and taking immediately the more advanced courses in this field.

## FEES\*

Cloquet Forest Experiment Seniors (Seniors in Forestry curricula—spring quarter)	
Tuition: Residents of Minnesota.....	\$30.00
Nonresidents .....	75.00
Dormitory and dining hall fee.....	10.00
Health fee .....	2.50
Lake Itasca Forestry and Biological Station (Freshmen in Forestry curricula—Summer Session)	
Tuition (prorated on basis of regular quarter tuition per quarter of 12 weeks):	
Residents of Minnesota .....	15.00
Nonresidents .....	37.50
Dormitory and dining hall fee.....	5.00
Health fee .....	2.50

## FACULTY REGULATIONS

Students are held responsible for compliance with all faculty regulations. These regulations are published in a booklet issued to students at the time of registration.

## GRADING SYSTEM AND HONOR POINTS

There are four passing grades, A, B, C, and D, of which A is highest and D lowest. In addition there are the following nonpassing grades: F (failure), and I (incomplete). For rules governing the nonpassing grades see the booklet, College Guide.

Honor points are awarded on the following basis: each credit hour with a grade of A counts three honor points; each credit hour with a grade of B counts two honor points; and each credit hour with a grade of C counts one honor point. A grade of D counts no honor points. To determine honor point ratio, count honor points and divide by total credits passed plus credits of unremoved and removed failure. Disregard grades of incomplete.

## DEGREES OFFERED

This college offers three groups of curricula with corresponding degrees as follows:

- A. Four-year and five-year curricula leading to the degree of bachelor of science or other Bachelor's degree.
- B. Five-year curriculum leading to the professional Master's degree in Home Economics Education.
- C. Fifth year leading to professional degrees in Agricultural Education, Forestry, and Agricultural Technology.
- D. Two-year preprofessional and four-year professional curriculum leading to the professional degree of doctor of medicine.

## REQUIREMENTS FOR GRADUATION

**A. Bachelor's degrees.**

Candidates will be recommended for graduation after completion of the following requirements:

1. The prescribed curriculum including all the required amount and quality of work and the required amount of elective work to make the total number of credits given below.
2. One honor point per credit (i.e., the cumulative honor point average must be 1.0 or more). For additional quality requirements, see statements of prescribed curricula.
3. The English requirement for graduation (Rhetoric 51 or equivalent—see page 9).

\* Not listed in *General Information Bulletin* of the University.



4. A total of not less than 18 credits (inclusive of courses required in the various curricula) in social science courses included in the following departments—Agricultural Economics, Anthropology, Economics, Geography, History, Humanities, Philosophy, Political Science, Psychology, and Sociology. (A minimum of 20 credits is required in order to receive approval for a vocational home economics teaching certificate.)

The number of elective credits required for graduation will be decreased by one for each five honor points in excess of those required to reach an honor point ratio of 1.7.

Course of Study	Credit Requirement	Degree Conferred
Agricultural Business Administration .....	192	Bachelor of agricultural business administration
Agricultural Education .....	204	Bachelor of science
*Agricultural Engineering (Professional course).....	207	Bachelor of agricultural engineering
*Agricultural Engineering Business Administration (five-year course) .....	254	Bachelor of agricultural engineering and bachelor of business administration
Agricultural Extension .....	192	Bachelor of science
*Agricultural Journalism .....	180	Bachelor of arts
Food Technology .....	204	Bachelor of science
Forestry .....	204	Bachelor of science
Home Economics .....	185	Bachelor of science
*Rural Education .....	183-185	Bachelor of science
Science Specialization .....	192	Bachelor of science
Technical Agriculture .....	192	Bachelor of science
Wildlife Management .....	198	Bachelor of science

#### ENGLISH REQUIREMENT

Students upon entering the college are registered in Rhetoric 1, 2, or 3 according to their tests in proficiency in English. Every student before graduation must demonstrate an acceptable proficiency in English composition. This is comparable or equivalent to the completion of Rhetoric 51. Unless the student is eligible to take the exemption examination provided by the Rhetoric Department, and succeeds in passing the examination satisfactorily, Rhetoric 51, three credits, must be completed in the junior or senior year.

#### MATHEMATICS REQUIREMENT

The mathematics requirement in all curricula requiring only five credits of mathematics (e.g., Technical Agriculture and Agricultural Education) may be satisfied by completing Math. 1, Higher Algebra, 5 credits, or Ag.En. 11, Applied Mathematics, 5 credits, or one full year of high school credit in advanced algebra. Students presenting only one-half year of high school credit in advanced algebra must complete five credits of mathematics in college.

In curricula requiring mathematics through trigonometry those students presenting either one-half year or a full year of high school credits in advanced algebra but not trigonometry will be permitted to register for trigonometry. Students presenting both advanced algebra and trigonometry for admission with a grade of B or better in trigonometry will not be required to take higher algebra and trigonometry, but may be permitted to repeat trigonometry for credit if they wish. Students presenting high school trigonometry with a grade of less than B will be held for the trigonometry requirement.

#### PUBLIC HEALTH REQUIREMENT

The requirement of Public Health 3, Personal Health, 2 credits, may be met by passing an exemption examination which will be administered by the University Counseling Bureau each quarter at a time designated by the college office.

\* Combined curricula with other colleges to which the general requirements 3 and 4 and the last paragraph above do not apply.

## SCHOLARSHIP AND CLASS REQUIREMENTS

1. Students must present for graduation at least one honor point for each credit; i.e., the cumulative honor point average must be 1.0 or more.

2. Freshman students with an honor point average of less than 0.50 obtained in two or three quarters of work in this college and sophomore students with an honor point average of less than 0.75 obtained in six quarters in this college or in five quarters if entering in the winter quarter, shall be dropped for one year unless continued by special permission of the Students' Work Committee.

3. Classified students who have completed 90 credits with an honor point average of less than 1.0 but more than 0.75 may be permitted to take additional courses to attain the required honor point ratio of 1.0 but shall not be permitted to register for junior-senior courses without the approval of the adviser and the Students' Work Committee. In no case, however, will permission be granted for such students to register in courses numbered 100 or above and for which graduate school credit is given.

4. A student who has completed 90 credits with an honor point ratio of at least 1.0 will be classified as a junior and will be admitted to candidacy for the Bachelor's degree from this college.

Students (except transfers with junior class standing) shall not be given classification in the junior class unless all required work of the freshman-sophomore years has been completed or postponement thereof covered by appropriate and approved petitions.

**Degree with distinction**—The degree of bachelor of science with distinction is granted to graduates of this college who have attained excellence in scholarship as evidenced by an average grade of two honor points per credit for the entire four-year curriculum. Transfer students with less than two years of work in this college shall not be eligible. Recommendations to the faculty for the degree with distinction shall be made through the Students' Work Committee on the basis of scholarship and other evidence of satisfactory achievement and advancement in the course pursued.

**Degree with high distinction**—The degree of bachelor of science with high distinction is granted to graduates of this college who have attained special excellence in scholarship as evidenced by an average of two and one-half honor points per credit for the entire curriculum. The same conditions for residence and recommendation apply as for the degree with distinction.

**B. Professional advanced degrees.**

Course of Study	Four-Year Credit Requirement (B.S. degree)	Fifth-Year Credit Requirement	Degree Conferred
Agricultural Technology .....	192-204	45	Agricultural technologist
Forestry .....	204	52	Master of forestry
Agricultural Education .....	204	45	Master of education
Home Economics Education .....	185	45	Master of education
Veterinary Medicine			
Two-year preprofessional and four-year professional curriculum .....			Doctor of veterinary medicine

## COURSES IN THE GENERAL EXTENSION DIVISION

A student enrolled in the College of Agriculture, Forestry, and Home Economics may take courses in the General Extension Division with permission of the Students' Work Committee. Credits so received in General Extension classes or in Correspondence Study courses will be counted as credits towards graduation in this college. Credits and grades received will be transferred to the student's record in this college. See also statement in the *General Information Bulletin* of the University concerning the General Extension Division.

## CREDIT IN THE GRADUATE SCHOOL

A student lacking not more than nine credits towards graduation may, upon petition, carry a limited amount of graduate work (approved courses numbered above 99) for graduate course credit. Courses taken for graduate credit will not carry credit toward the Bachelor's degree. No graduate credit will be given unless the student has made previous arrangements with the Graduate School.

With permission of the dean of the college, undergraduates lacking not more than six quarter credits may be permitted to register in the Graduate School.

## BOARD AND ROOM

**Sanford Hall**—A dormitory for freshman girls is located near the Minneapolis campus. It accommodates 275 women and provides both single and double rooms. Reservations should be made well in advance. Applications should be sent to the Director of Sanford Hall, University of Minnesota, Minneapolis 14, Minnesota.

**Ada Comstock Hall**—The University's newest dormitory for women is situated on the Minneapolis campus. It overlooks the Mississippi River near the Coffman Memorial Union. It houses 375 women, upper classmen only. Applications should be sent to the Director of Comstock Hall, University of Minnesota, Minneapolis 14, Minnesota.

**Co-operative Cottages**—Thirteen co-operative cottages, each in charge of a counselor, offer comfortable homes for 140 women. In these units the student assists with the work of the house and thereby is able to reduce living expenses. Applications should be sent to the Director of Cooperative Houses, 212 12th Avenue S.E., Minneapolis 14, Minnesota.

**Meredith Hall, University Farm**—A dormitory residence, located on the Agricultural Campus, is available for approximately 47 freshman women students registered in the College of Agriculture, Forestry, and Home Economics. First priority is given to beginning freshmen, second priority to second and third quarter freshmen, and third priority to sophomores. Applications for residence must be for the entire school year. The dormitory is closed during vacations. The number of single rooms is limited. Necessary bedding is provided and the bed linen laundered. Girls should provide their own couch covers. Applications for rooms should be made early. A deposit of \$5 is made when the room is engaged and is held during the entire period of residence.

Residents of Meredith Hall may take their meals at the Agricultural Campus cafeteria. Preparation of food in dormitory rooms is prohibited.

Room rent will be paid for by the quarter, in advance. The charge per quarter is \$42 for a single room and \$36 per student for a double room. Inquiries regarding Meredith Hall should be addressed to School of Agriculture Office, 205 Administration Building, University Farm, St. Paul 1, Minnesota.

**Private houses**—For information concerning approved boarding and rooming houses, address the Housing Bureau, 230 Northrop, University of Minnesota, Minneapolis 14, Minnesota.

## AGRICULTURAL BOOKSTORE

The University operates the Agricultural Bookstore at University Farm for the convenience and accommodation of students and faculty of the College of Agriculture, Forestry, and Home Economics.

## EXPLANATION OF TERMS AND COURSE NUMBERS

All undergraduate courses are numbered from 1 through 99; 1 through 49 open to freshmen and sophomores; 50 through 99 open to juniors and seniors.

Numbers following the descriptive name of a course indicate the number of credit hours.

Course numbers in parentheses, following the number of credit hours, indicate prerequisite courses.

Descriptions of the courses listed in the following outline of the curricula, together with those of additional courses offered as electives, will be found on pages 72-120. The program of classes is printed in the *Combined Class Schedule*. The divisional statements are arranged alphabetically according to the names of the divisions.

One *credit hour* is equivalent to (1) one lecture or recitation period requiring two hours of preparation, (2) two periods of laboratory work requiring one hour of preparation, or (3) three periods of laboratory work with no preparation, each week for one quarter.

*Honor points*—See page 8 for definition.

A *major* is a series of courses equivalent to from 24 to 36 credit hours chosen from one of the elective groups.

A *minor* is a series of courses equivalent to 18 credit hours (12 credit hours in Science Specialization Curriculum) chosen from one of the elective groups.

A *required* course is a course required of all students for graduation irrespective of their major sequence.

A *limited elective* course is an elective which may not be chosen from the same group as the major or minor.

A *free elective* course may be chosen from any courses offered in the University for which the student has completed the prerequisites.

## CURRICULA

Registration and continuance in certain of the curricula of this college are conditional upon maintenance of scholarship higher than the general average. This includes such curricula as Science Specialization, Food Technology, Wildlife Management, Preveterinary Medicine, Wood Technology, and Agricultural Education. Initial registration in such curricula for students entering directly from the high school is therefore conditional upon the freshman orientation tests given to entering freshmen in Freshman Week or at other times during the year. However, students who are not permitted to register in these curricula at entrance upon the basis of these tests may later in the freshman year transfer to the desired curriculum if their scholastic achievement justifies such transfer.

Transfer students may, upon entrance, be registered in these special curricula, but continuance in these curricula is conditional upon the maintenance of the required scholastic average.

### ALL-COLLEGE

#### FOUR-YEAR CURRICULA

(See pages 18-24)

**I. Science Specialization**—This curriculum provides for more intense specialization, particularly in the sciences basic to many fields of agriculture. Only that amount of technical training in practical agriculture is required which deals with the special science or field selected. Selection of the Science Specialization Curriculum should, in practically all cases, be followed by graduate study to at least the Master's degree. Students who do not have a high school record considerably above average should not attempt the Science Specialization Curriculum. For special scholarship requirements of this curriculum, see page 18.

**II. Food Technology**—Food technology embraces the application of science and engineering to the handling, processing, manufacture, storage, distribution, and utilization of foods. The various food industries require highly trained personnel to select raw materials; to control manufacturing operations; to solve technical problems related to the palatability, nutritive value, public health safety, and keeping quality of the foods; and to develop new products and processes.

In addition to the various food industries concerned with the processing and distribution of cereals, fruits and vegetables, dairy products, meats, and other perishables, employment opportunities exist in the organic chemical industry, in control and research laboratories (state and federal), in private research institutions, and in teaching.

**III. Fish and Wildlife Management**—The curriculum has been designed to prepare students in basic biology and in related fields essential to the fish or wildlife technician. Further college work specializing in either fish or wildlife management is urged for qualified students.

Employment possibilities in this field are largely with public conservation agencies either state or federal and have a wide variety of specific specializations all dependent on basic technical knowledge. Among such specializations may be listed game fish, bird, or mammal management in relation to other land uses on public or private lands; research in ecological or economic phases of such management; teaching or extension programs in colleges or schools; and opportunities in improving hunting or fishing on privately owned areas. (See also Forestry Wildlife Curriculum, page 44.)

## AGRICULTURE

## FOUR-YEAR CURRICULA

(See pages 25-40)

**I. Technical Agriculture**—This curriculum is arranged for students who plan to follow one or more of the technical or applied fields of agriculture immediately upon graduation. Students may, however, continue in graduate work for further specialization. Training is offered for all types of farming in this area, for county agents and extension work, and for technical agricultural work in agricultural industries in dairy and animal husbandry, agronomy and plant industries, horticulture, agricultural engineering, landscape gardening, farm management, agricultural economics, and business.

For special training for teaching agriculture in high schools and for agricultural extension and county agent work, see Agricultural Education Curriculum and Agricultural Extension Curriculum.

For Pretheological "Major" in Agriculture accepted by the Conference on Cooperation between Colleges of Agriculture and Theological Seminaries for entrance to many theological seminaries in training for rural church work, see page 29.

For training in Rural Education, see page 37.

**II. Agricultural Education**—Designed especially for those who plan to teach agriculture in the public schools. This curriculum (given jointly with the College of Education) follows in general the technical agriculture groups and permits emphasis on special technical agriculture fields, such as dairying, horticulture, farm management, etc. In addition, it offers special training in education and leads to certificates for teaching agriculture and sciences in the schools of the state. By completing a fifth year in the combined five-year curriculum with the College of Education, students may receive the degree of master of education.

**III. Agricultural Extension**—Designed for training for agricultural county agents, extension specialists, boys' and girls' club leadership, and other specialties in agricultural extension. No single curriculum is prescribed because of the numerous variations which are possible and desirable. In general, the student is advised to select a curricular pattern in Technical Agriculture or in Agricultural Education. Around the selected pattern the student, with the help of his adviser, may build the curriculum best suited to his needs. A wide range of valuable subject matter is available in this and other colleges of the University. For a more complete discussion, see page 31.

**IV. Agricultural Business Administration**—Offered jointly with the School of Business Administration. Designed for those who wish to prepare for some branch of agricultural business, such as marketing, finance, farm real estate, merchandising, and so forth. More opportunity is offered for business and economic courses than in the Technical Agriculture Curricula, where greater stress is on the agricultural subjects. In the first two years students register in the College of Agriculture, Forestry, and Home Economics; in the last two years in this college and in the School of Business Administration. Students completing this curriculum will receive the degree of bachelor of agricultural business administration.

**V. Agricultural Journalism**—Offered jointly with the School of Journalism of the College of Science, Literature, and the Arts. Designed for those who wish to prepare especially for some field of journalism relating to agriculture. The student is offered general courses in technical agriculture, but the major part of the time is occupied with special preparation for technical journalism. Particular stress is also laid on economic and business courses, related to agriculture.

Students definitely interested in agricultural journalism should register in the School of Journalism of the College of Science, Literature, and the Arts, but should con-

sult both the dean of the College of Agriculture, Forestry, and Home Economics and the director of the School of Journalism, College of Science, Literature, and the Arts.

**VI. Agricultural Engineering (Professional)**—Offered jointly with the Institute of Technology. This is a professional engineering course leading to the degree of bachelor of agricultural engineering. The first year is spent in work in the Institute of Technology and the remainder in work in both colleges. High school mathematical preparation required for all engineering curricula is also required here. The Agricultural Engineering (Professional) Curriculum is designed to train specialists in various types of engineering fundamental to agricultural practices and industries.

Students desiring a major in agricultural engineering with special reference to the technical application and without the professional engineering training should register for the Technical Agriculture Curriculum in the College of Agriculture, Forestry, and Home Economics.

**VII. Rural Education**—Offered jointly with the College of Education in connection with the elementary education curricula. For university, college, and teachers college students who will spend the first two years largely or entirely in academic or pre-education junior college work and who wish to qualify for rural teaching and supervision. Students will register in the College of Education.

#### PREPROFESSIONAL CURRICULUM

**1. Preveterinary Medicine**—At least two years of college training are required for admission to the School of Veterinary Medicine at the University. Certain of the other schools of veterinary medicine require one year of college training for admission. (See page 38 for preveterinary requirements at the University of Minnesota.)

#### FIVE-YEAR CURRICULUM

**I. Agricultural Engineering Business Administration**—Offered jointly with the Institute of Technology and the School of Business Administration. This is a five-year technical engineering and business curriculum with emphasis in the field of agriculture. The preliminary requirements are similar to those of the Professional Course in Agricultural Engineering. In addition to the required professional work in engineering a complete sequence of business courses is required together with a sequence of agricultural courses. Students completing this curriculum will receive the degrees both of bachelor of agricultural engineering and bachelor of business administration.

Students interested in this course should consult the head of the Division of Agricultural Engineering, University Farm, St. Paul 1, Minnesota.

#### FIFTH YEAR LEADING TO A PROFESSIONAL DEGREE

**I. Agricultural Technology**—A fifth year leading to the degree of Agricultural Technologist, is set up as a general formula to allow students in any of the fields of agriculture, such as animal or dairy husbandry, agricultural economics, agricultural extension, agronomy, and horticulture to plan special curricula to provide professional training in these special technical fields. While the degree will be considered equivalent to a Master's degree, it is a professional degree rather than a degree for work done towards a research career where the degree of master of science is given. The fifth year is also open to students graduating with the bachelor of science from an undergraduate basis of technical agriculture. Offered to those who plan to engage in occupations in the broad field of agricultural technology and who need an additional year of study (a) to extend their knowledge in their major field; (b) to obtain additional training in other general and special fields of agricultural technology; and (c) to obtain training in other fields such as social science, business, engineering, and the applied sciences.

**II. Agricultural Education**—A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics. The master of education degree will be granted to students who satisfactorily complete a fifth year of work in Agricultural Education at the graduate level and who meet all of the regulations for the professional degree.

### FORESTRY

(See pages 41-49)

Three forestry and two technological curricula are offered in forestry.

#### FORESTRY CURRICULA

**I. Forestry-Forest Management**—Preparation for technical work in forest management on municipal, state, federal, and private forests; for work in state and federal forest experiment stations; for work with soil conservation, extension, and farm forestry organizations.

**II. Forestry-Range Management**—Preparation for technical work in public and private forest range management.

**III. Forestry-Wildlife Management**—Preparation for technical work in public and private forest and game management. (See also Fish and Wildlife Management Curriculum, pages 22-24.)

#### TECHNOLOGICAL CURRICULA

**IV. Lumber Merchandising and Construction**—Preparation for work in lumberyard management and in light building construction.

**V. Wood Technology**—Preparation for technical and research work in the pulp and paper and other wood-using industries and in wood preservation.

#### FIFTH YEAR LEADING TO THE PROFESSIONAL MASTER OF FORESTRY DEGREE

A fifth year of work in Forestry-Forest Management, Forestry-Range Management, and Forestry-Wildlife Management leading to the master of forestry degree has been designed to meet the increasingly rigid requirements for the practice of professional work in the several technical fields of forestry. Keener competition in the future can be successfully met only by more adequate and better professional training.

### HOME ECONOMICS

(See pages 50-71)

#### FOUR-YEAR CURRICULA

**I. General Home Economics**—A four-year program of home economics and general education courses designed for those who do not wish to fit themselves for any specialized field in home economics but are interested chiefly in preparation for home-making.

**II. Dietetics**—For persons expecting to become hospital dietitians or nutritionists.

**III. Home Economics Education**—Offered jointly with the College of Education. For those who wish to teach home economics in the high schools and obtain a teacher's certificate. Students should have a high school record better than average. A high scholastic average is required for college work. A five-year curriculum is also offered and leads to a master of education degree at the end of the fifth year.



**IV. Home Economics in Business**—For students who wish to use their training in business where a knowledge of home economics is essential. Given with the cooperation of other colleges.

**V. Institution Management**—Preparation for management of such institutions as tearooms, cafeterias, dormitories, and institutional homes, etc.

**VI. Home Economics and Nursery School Education**—Offered jointly with the Institute of Child Welfare. Designed for those who have ability and interest in the two fields. Opportunities for placement are limited for those with only the Bachelor's degree.

**VII. Home Economics Extension**—Offered jointly with the College of Education. This curriculum is for students interested in preparation for home economics positions in the Agricultural Extension Service, such as home demonstration agent, 4-H Club agent or homemaking specialist.

**VIII. Preparation for Research in (a) Experimental Foods, (b) Nutrition, (c) Textiles and Clothing**—An undergraduate preparation for graduate work as a basis for more intense specialization in fields of home economics research. For those who plan a scientific research career in home economics. Students who do not have a high school record or a college freshman record considerably above the average should not attempt this course. Graduate work to at least the Master's degree is assumed.

(See also All-College curricula, page 18, and Rural Education curriculum, page 37.)

#### FIVE-YEAR CURRICULUM

**I. Home Economics Education**—A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics leading to the degree of master of education. A five-year program in Home Economics Education will be provided for those who wish to make additional preparation prior to their entrance into teaching and for those who wish to continue their professional work following the completion of the requirements for a Bachelor's degree. The five-year curriculum will qualify a person for high school teaching and for some college positions. The attainment of added training should facilitate professional promotion. For detailed statement, see the *College of Education Bulletin*.

#### VETERINARY MEDICINE

##### CURRICULUM IN VETERINARY MEDICINE LEADING TO THE DEGREE OF DOCTOR OF VETERINARY MEDICINE

A school of veterinary medicine is being organized at the University to provide a four-year professional curriculum leading to the degree of doctor of veterinary medicine. The student is advised that completion of the four-year curriculum is contingent upon the provision of clinical facilities for the clinical training of the last two years.

The various fields open to graduate veterinarians include: (1) practice; (2) veterinarian and junior veterinarians in the United States Bureau of Animal Industry; (3) research and teaching in agricultural and veterinary colleges; (4) veterinarians in the United States Army; (5) positions with livestock sanitary boards and municipal health boards; and (6) commercial positions.

See page 71 for the tentative first year of the professional veterinary curriculum.

# ALL-COLLEGE CURRICULA

## FOUR-YEAR CURRICULA

- I. Science Specialization
- II. Food Technology
- III. Fish and Wildlife Management

### I. SCIENCE SPECIALIZATION

This curriculum is designed as a preparation for teaching in colleges and universities, for research and experimental work in experiment stations, for regulatory, experimental, and extension service in the state and federal departments of agriculture, forestry and home economics, and in the industries related to these fields. For opportunities offered in the various fields the student is advised to consult with the various divisions and with the dean of the college.

Only those students who have a high school record considerably above the average and who are capable of maintaining a high scholarship record and who desire to delve deeply into specialized science fields should attempt to follow this curriculum. In general it is assumed that students who complete this undergraduate curriculum subsequently will spend one or more years in graduate study. Success in graduate study usually is predicated upon an undergraduate scholarship record which is distinctly above the average. In order to qualify for possible graduate fellowships or assistantships it is essential that the student on completing this curriculum should have maintained an honor point average approximating 2.0 or better.

The attention of the student is called to the modern language requirement for graduate students. In most divisions either German or French is required for the Master's degree. In all divisions *both* German and French are required for the degree of doctor of philosophy. Proficiency in at least one modern language (preferably German) should be acquired during the undergraduate years. Beginning German may be taken in either the 1-2-3 (15 credits) or 24a-25a-26a (12 credits) sequences.

The modern trend in the physical sciences is more and more toward a mathematical interpretation. Higher mathematics including calculus has proved a very potent scientific tool in many fields. Those students who plan to major in either biochemistry or forestry should ordinarily plan to secure more mathematics than is represented in the required list of subjects, and students specializing in these fields will also be expected to include a number of physics courses in their study program.

### REQUIREMENTS

All-college requirements for students in this college. See page 8.

This curriculum requires 192 credit hours for graduation and is made up of (1) freshman-sophomore required courses with such options as are indicated in the freshman and sophomore years, and (2) a major, a minor, and electives in the junior and senior years in accord with the schedule given below.

In the freshman and sophomore years a grade of C must be earned in Mathematics 1, 6, 7, Chemistry 1-2, 11 (or 4-5, 11), Zoology 1-2-3 (or 14-15) and 3 additional credits of zoology or physiology or economic entomology and zoology, in Botany 1-2-3 (or 4-5), Bacteriology 53, Agricultural Biochemistry 1, 5 (or 6).

In the junior and senior years the major and minor sequence must be completed with an average honor point ratio of 1.5.

Special attention of every student is called to the faculty requirements for classification in the junior class, page 10.

## FRESHMAN YEAR

**General courses**—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Bot. 1-2-3 † General Botany, 10, or Bot. 4-5, General Botany, 10

In. Ch. 1-2, General Inorganic Chemistry, 8; and In. Ch. 11, Semimicro Qualitative Analysis, 4. Students presenting a year of high school chemistry may omit this course and register for In. Ch. 4-5 and 11

In. Ch. 4-5. General Inorganic Chemistry, 8; and In. Ch. 11, Semimicro Qualitative Analysis, 4. Those required to take In. Ch. 1-2 and 11 may omit this course

Math. 1\*§ Higher Algebra, 5; Math. 6, Trigonometry, 5 (Math. 1 or equiv.); and Math. 7, College Algebra, 5 (Math. 6)

Modern language,§†† 15 cred. or special sequence of 12

Orie. 1, College Orientation Lectures, 1

P. H. 3,¶ Personal Health, 2

Rhet., Communications requirement

Zool. 1-2-3,† General Zoology, 10 or Zool. 14-15, General Zoology, 6; and 3 additional credits of zoology or physiology or economic entomology and zoology. Ent. 5, 5 cred., suggested.

## SOPHOMORE YEAR

**General courses**—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Ag. Bi. 1, Elementary Organic Chemistry, 5 (In. Ch. 8 cred.)

Ag. Bi. 3, Introduction to Biochemistry, 3(1 or equiv.)

Ag. Bi. 5, Plant Biochemistry, 5 (Ag. Bi. 3, Soils 4); or Ag. Bi. 6, Animal Biochemistry, 3 (Ag. Bi. 3, Soils 4 advised)

Ag. Ec. 1, Principles of Economics I, 3

Ag. Ec. 2, Principles of Economics II, 5 (Ag. Ec. 1)

Bact. 53, General Bacteriology, 5 (chem., bot. or zool.)

Bot. 1-2-3,† General Botany, 10, or Bot. 4-5, General Botany, 10

Math. 1,\* Higher Algebra, 5; Math. 6, Trigonometry, 5 (Math. 1 or equiv.); Math. 7, College Algebra, 5 (Math. 6) if not taken in freshman year

Modern language, 15 cred. or special sequence of 12, if not taken in the freshman year

Rhet. 22. Public Speaking, 3 (Rhet. Communications requirement)

Soil 4, Soil, 3, (Chem. 1-2 or 4-5)

Zool. 1-2-3,† General Zoology, 10 or Zool. 14-15, General Zoology, 6; and 3 additional credits of zoology or physiology or economic entomology and zoology. Ent. 5, 5 cred., suggested.

## JUNIOR AND SENIOR YEARS

1. Rhet. 51, Exposition, 3 (Rhet. Communications requirement).

2. A major sequence of 24 to 36 credits in one of the following fields or divisions:

- |                                    |                         |
|------------------------------------|-------------------------|
| 1. Agricultural Biochemistry       | 8. Forestry             |
| 2. Agricultural Economics          | 9. Home Economics       |
| 3. Agronomy and Plant Genetics     | 10. Horticulture        |
| 4. Animal Husbandry                | 11. Plant Pathology     |
| 5. Animal Nutrition                | 12. Poultry Husbandry   |
| 6. Dairy Husbandry                 | 13. Soils               |
| 7. Entomology and Economic Zoology | 14. Veterinary Medicine |

3. A minor sequence of 12 credits to be chosen in some division (see major), department, or field of work outside of the major.

\* See Mathematics requirement, page 9.

† One of these two, botany or zoology, must be taken in the freshman year, and the other in the sophomore year.

§ One of these two, mathematics or modern language, must be taken in the freshman year and the other in the sophomore year.

¶ Not required of students with military service records.

†† In general, "modern language" will be interpreted to mean either German or French unless some other language is recommended by the student's major adviser.

Subject-matter courses from one division or from departments of other colleges of the University may be applied as major or minor credits in another division if they are clearly related or fundamental to the field of the major or minor specialization.

4. Electives sufficient to make a total of 192 credit hours for the four years of work.

## II. FOOD TECHNOLOGY

Food technology embraces the application of science and engineering to the handling, processing, manufacture, storage, distribution, and utilization of foods. The various food industries require highly trained personnel to select raw materials; to control manufacturing operations; to solve technical problems related to the palatability, nutritive value, public health safety, and keeping quality of the foods; and to develop new products and processes.

In addition to the various food industries concerned with the processing and distribution of cereals, fruits and vegetables, dairy products, meats, and other perishables, employment opportunities exist in the organic chemical industry, in control and research laboratories (state and federal), in private research institutions, and in teaching.

The undergraduate curriculum in food technology is designed to provide students with an adequate foundation in the basic sciences of mathematics, physics, chemistry, biology and in chemical engineering. Some opportunity is also provided through electives for a student to acquire additional training in chemical engineering; in microbiology, biochemistry or other special biological fields in the technology of fruits and vegetables, meat and dairy products; or in economics and business. The electives chosen will depend on the professional goal of the student and must be selected in consultation with the special faculty advisory committee for this curriculum. Since a thoro background is required in so many branches of pure and applied science, it is impossible to acquire a sufficiently detailed and extensive training in a four-year curriculum for the more specialized positions in the various branches of food technology, and postgraduate work is strongly recommended. Only those students who have a high school record considerably above the average with a keen interest in pure and applied science and who are capable of maintaining a high scholarship record should attempt to follow this curriculum. Students who do not enter with credit in higher algebra will find it difficult to complete the required courses in chemical engineering in four years.

### REQUIREMENTS

The Food Technology Curriculum requires 204 credit hours for graduation.

In the freshman and sophomore courses a grade of C or better must be earned in all courses except Orientation 1 and Public Health 3.

In the junior and senior years, a grade of C or better must be earned in all courses, except the electives in social science; and the average honor point ratio, exclusive of the electives in social science, must be 1.5 or better.

All-college requirements for students in this college. See page 8.

### FRESHMAN-SOPHOMORE YEARS (105 credits)

Ag. Bi. 2, Quantitative Methods, 5 (In. Ch. 1 and 2 or 4 and 5)

Ag. En. 3, Mechanical Drawing, 3

Ch. En. 80, Chemical Engineering Materials, 1

Germ. 24a-25a-26a, Chemical German, 12

In. Ch. 1-2, General Inorganic Chemistry, 8 (for students presenting less than a year of high school chemistry) or In. Ch. 4-5, General Inorganic Chemistry, 8 (for students presenting a year of high school chemistry)

In. Ch. 11, Semimicro Qualitative Analysis, 4 (In. Ch. 2 or 5)

**Mathematics:**

- Math. 6,\* Trigonometry, 5 (Math. 1)  
 Math. 7, College Algebra, 5 (Math. 6)  
 Math. 30, Analytic Geometry, 5 (Math. 6 and 7)  
 Math. 50, Differential Calculus, 5 (Math. 30)  
 Math. 51, Integral Calculus, (Math. 50) or  
 M. & M. 11, College Algebra, 5 (M. & M. 9 or equiv.)  
 M. & M. 12, Trigonometry, 5 (M. & M. 11)  
 M. & M. 13, Analytic Geometry, 5 (M. & M. 11 and 12)  
 M. & M. 24, Calculus I: Differential, 5 (M. & M. 13)  
 M. & M. 25, Calculus II: Integral, 5 (M. & M. 24)  
 Na. Sc. 7-8-9, General Biology, 10  
 Or. Ch. 54-55, Elementary Organic Chemistry, 6  
 Or. Ch. 57-58, Elementary Organic Chemistry, Laboratory, 4 (Or. Ch. 54-55 or parallel)  
 Ori. 1, College Orientation Lectures, 1  
 Phys. 7, General Physics (Mechanics and Heat), 5 (M. & M. 24 or parallel)  
 Phys. 8, General Physics (Electricity), 5 (Physics 7)  
 Phys. 9, General Physics (Sound and Light), 5 (Physics 7)  
 P. H. 3,† Personal Health, 2  
 Rhetoric Communications requirement

**JUNIOR-SENIOR YEARS (97-99 credits)**

- Ag. Bi. 3, Introduction to Biochemistry, 3 (Ag. Bi. 1 or equiv.)  
 Ag. Bi. 5, Plant Biochemistry, 3 (Ag. Bi. 3, Soil. 4 advised)  
 Ag. Bi. 6, Animal Biochemistry, 3 (Ag. Bi. 3, Soil. 4 advised)  
 Bact. 53, General Bacteriology, 5 (10 cred. in Chem. and 4 cred. in Bot. or Zool.)  
 Ch. En. 101, Unit Operations, 3 (Ch. En. 80 and An. Ch. 1-2)  
 Ch. En. 102, Unit Operations, 5 (Ch. En. 101)  
 Ch. En. 103, Unit Operations, 5 (Ch. En. 102)  
 Ch. En. 111, Unit Operations Laboratory, 1 (Ch. En. 101)  
 Ch. En. 112, Unit Operations Laboratory, 1 (Ch. En. 102)  
**Economics:**  
 Ag. Ec. 1, Principles of Economics I, 3  
 Ag. Ec. 2, Principles of Economics II, 5 or  
 Econ. 6-7, Principles of Economics, 10  
 Food 51-52, Food Analysis, 4 (Ag. Bi. 2 and 3)  
 Food 101-102, Food Technology, 6 (Ag. Bi. 3 and Food 52, Bact. 53, and a course in Physics)  
 Ph. Ch. 101-102-103, Physical Chemistry, 9 (two years college chemistry, one year college physics, and mathematics through differential and integral calculus)  
 Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement)  
 Rhet. 51, Exposition, 3 (Rhet. Communications requirement)  
 Social Science electives (see all-college requirements, page 8). (8 credits)  
 Electives, selected from list below, or from other courses and departments approved by Subcommittee on Food Technology (27-29 credits)

**SUGGESTED ELECTIVE COURSES FOR FOOD TECHNOLOGY***College of Agriculture, Forestry, and Home Economics*

- Agricultural Biochemistry**—119, Colloids; 129, Colloids Laboratory; 120, Proteins; 130, Proteins Laboratory; 121, Carbohydrates; 131, Carbohydrates Laboratory; 122, Lipides; 132, Lipides Laboratory; 123, Enzymes; 133, Enzymes Laboratory; 124, Vitamins; 103, Dairy Chemistry; 108, Chemistry of Wheat and Wheat Products; 110, Flour Laboratory Methods; 116, Advanced Animal Nutrition; 117, Animal Nutrition Laboratory.  
**Agricultural Economics**—25, Principles of Accounting; 40, Principles of Marketing Organization; 90, Agricultural Statistics; 141, 142, 143, Marketing Organization.  
**Agricultural Engineering**—70, Dairy Engineering.  
**Agronomy and Plant Genetics**—21, Grain Crops; 22, Grain and Hay Grading; 31, Principles of Genetics.  
**Animal Husbandry**—50, Meat Selection; 52, Meats; 53, Advanced Meats.  
**Dairy Husbandry**—2, Dairy Bacteriology; 3, Testing Dairy Products; 4, Dairy Products Practice; 110, 111, 112, Dairy Products; 113, Technical Control; 114, Milk By-Products; 115, Advanced Dairy Bacteriology.

\* See Mathematics requirement, page 9.

† Not required of students with military service records.

**Entomology and Economic Zoology**—5, Economic Entomology; 51, Introductory Parasitology; 128, 129, Insect Physiology; 175, Insecticides.

**Home Economics**—31, Introduction to Nutrition; 33, Nutrition I, Nutrition II; 40, Food Preparation; 41, Food Management and Marketing; 45, Quantity Cookery; 64, Institution Buying; 142, Experimental Cookery; 146, Special Food Problems; 170, Nutrition of the Family.

**Food Technology**—104, Frozen Food Processing and Storage.

**Horticulture**—138, 139, Vegetable Crops

**Plant Pathology**—1, Plant Pathology; 105-106-107, Mycology; 160, Plant Histo-chemistry; 161, Technology of Fruits and Vegetables (may include refrigeration); 163, Applied Plant Physiology.

**Poultry Husbandry**—52, Poultry Judging; 153, Poultry Feeding; 154, Poultry Products.

#### *Other Colleges*

**Bacteriology**—104, Sanitary Bacteriology; 114, Molds, Yeasts, and Actinomycetes; 120, Diseases of Animals Transmissible to Man; 121-122, Physiology of Bacteria; 123, Applied Bacteriology.

**Analytical Chemistry**—101, 102, Quantitative Analysis; 105, Polarizing Microscope; 127, Optical Methods; 131, Application of Indicators in Neutralization Reactions and pH Determinations; 132, Electrometric Measurements; 133, Voltammetry and Amperometric Titrations; 140, Water Analysis.

**Organic Chemistry**—156, Elementary Organic Chemistry; 105, 106, 107, Advanced Organic Chemistry; 110, Qualitative Organic Analysis; 130, Organic Quantitative Analysis; 142, 143, The Chemistry of Natural Products.

**Physical Chemistry**—104, 105, 106, Physical Chemistry Laboratory; 128, 129, 130, Colloid Chemistry; 131, 132, 133, Colloid Chemistry Laboratory.

**Chemical Engineering**—105, Fuels and Combustion; 117, 118, Chemical Engineering Equipment Design; 121, Chemical Engineering Economics.

**Economics**—3, Elements of Money and Banking; 22, Principles of Accounting; 28, Business Law; 161, Labor Problems and Trade Unionism.

**Mechanical Engineering**—180, Refrigeration; 189, Refrigeration Laboratory.

**Physics**—114-116-118, Elementary Physical Investigation; 133, Physical Optics; 134, Experimental Optics; 135, Spectroscopy; 144, Electricity Measurements.

**Physiology**—4, Human Physiology; 100, 101, Physiological Chemistry.

**Political Science**—1-2-3, American Government and Politics.

**Psychology**—1-2, General Psychology.

**Public Health**—53, Elements of Preventive Medicine and Public Health; 102, Environmental Sanitation I; 110, Biometric Principles; 111, Biostatistics Laboratory.

**Zoology**—21, Histology; 51, Introductory Animal Parasitology; 144-145-146, Animal Parasites and Parasitism.

### III. FISH AND WILDLIFE MANAGEMENT

(See also Forestry-Wildlife Management Curriculum, page 44)

Fish and Wildlife Management has developed into an established profession requiring a college training for both research and administrative positions. The work may involve a wide range of activities including the management of upland game, big game, waterfowl, wilderness species, game fish and commercial fish on public or private lands or waters in agricultural or forested areas. It also includes the artificial propagation of game fish or fur animals and the control of injurious or undesirable species. In most cases men working in any of these fields find that they must integrate their special interests with other forms of land use—commercial, forestry, recreational, or agricultural. Thus it is necessary to include a wide variety of college course work for the essential basic training. Within the colleges of the University many courses are available which contribute valuable information and basic principles to students in this curriculum.

The following curriculum is designed to provide the student with the essential basic training in biology and other sciences which make up the broad background necessary for work in this field. The qualified student is advised to continue his training in the graduate school specializing either in fish or wildlife management. Fish and Wildlife Management has important relations to the following government and private enterprises: U. S. Fish and Wildlife Service, State Conservation Departments, U.S. and State Forest Services, National and State Park Services, Soil Conservation Programs, research and teaching and private wildlife management.

## REQUIREMENTS

All-college requirements for students in this college. See page 8.

This curriculum requires 198 credit hours for graduation which includes 8 credits at the Biological Station, Itasca Park.

All students must complete certain basic courses before graduation. The order, listed below, may represent more than 17 credit hours per quarter in some years. In such cases courses not scheduled during the year required must be taken at the first opportunity available.

## FRESHMAN YEAR

**General courses**—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Ag. En. 3, Mechanical Drawing, 3

Bot. 1-2, General Botany, 6

In. Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may elect instead In. Ch. 4-5.

In. Ch. 4-5, General Inorganic Chemistry, 8(one year of high school chemistry). Those required to take In. Ch. 1-2 may omit this course.

Math. 1,\* Higher Algebra, 5.

Math. 6,\* Trigonometry, 5 (Math. 1 or equiv.).

Orie. 1, College Orientation Lectures, 1.

P. H. 3,† Personal Health, 2.

Rhet. Communications requirement.

Zool. 1-2-3, General Zoology, 10

## SOPHOMORE YEAR

1. Freshman courses not completed.

2. General courses

Ag. Bi. 1, Elementary Organic Chemistry, 5 (In. Ch. 1 and 2 or 4 and 5)

Ag. Bi. 3, Introduction to Biochemistry, 3 (Ag. Bi. 1 or equiv.)

Ag. Bi. 6, Animal Biochemistry, 3 (Ag. Bi. 3).

Ag. Ec. 1, 2, Principles of Economics, 8.

Ag. En. 19-20, Surveying, 6 (Ag. En. 3, Math. 6).

Ag. En. 24-25, Physics, 8 (Math. 6).

Bot. 50, General Plant Ecology, 3 (Bot. 1-2).

Geol. 8, Introductory Geology, 5.

Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).

Soil. 4, Soils, 3 (In. Ch. 1-2 or 4-5).

## JUNIOR YEAR

1. Freshman and Sophomore courses not completed.

2. General courses

Bot. 113-115, Flora of Minnesota, 6 (Bot. 1-2).

Ent. 52, Introductory Entomology, 5 (Zool. 14-15).

Po. Sc. 5, American Government, 5.

Rhet. 51, Exposition, 3 (Rhet. Communications requirement).

Zool. 22, Comparative Anatomy, 5 (Zool. 1-2-3).

Zool. 50, Introduction to Comparative Physiology, 5 (Zool. 1-2-3).

Zool. 51, Introductory Animal Parasitology, 5 (Zool. 1-2-3).

Zool. 83, Introduction to Genetics and Eugenics, 3 (Zool. 1-2-3).

3. Biological Station at Itasca State Park (Summer Session). Courses there should include at least one of:

Bot. 112su, Aquatic Flowering Plants, 4.

Bot. 116su, Summer Flora of Minnesota, 4.

Bot. 176su, Freshwater Algae, 4.

4. Electives selected according to the individual needs of the student.

\* See Mathematics requirement, page 9.

† Not required of students with military service records.

## SENIOR YEAR

1. German or Russian 15 or special sequence of 12 credits.
2. General courses
  - Ag. Ec. 90, Agricultural Statistics, 5, or Biom. 110-111, Statistics, 5.
  - Ent. 63, Mammalogy, 4 (Zool. 22).
  - Ent. 64, Economic Zoology, 3 (Zool. 1-2-3).
  - Zool. 46-47, Ornithology, 6 (Zool. 1-2-3).
  - Zool. 53, Faunistic Zoology, 5 (Zool. 1-2-3).
  - Zool. 121, Ichthyology, 3 (Zool. 22).

*Recommended Electives***Junior Year**

- Pl. Pa. 53, Game Food Plants, 3 (Bot. 1-2).
- Ag. Bi. 2, Quantitative Methods, 5 (In. Ch. 1-2 or 4-5).

**Senior Year**

- Bot. 131, Field Ecology, 5 (Bot. 50).
- For. 20, Grazing, 3.
- For. 126, Silvics, 3.
- For. 131, Forest Policy and Administration, 3.
- For. 155, Forest Protection, 3.
- Phys. 29, Introduction to Meteorology, 3.
- Soil. 103, Principles of Soil Erosion, 3.
- Zool. 117, Animal Ecology, 3 (Zool. 1-2-3).
- Zool. 119, Animal Ecology (Limnology), 3 (Zool. 117).



# CURRICULA IN AGRICULTURE

## FOUR-YEAR CURRICULA

- I. Technical Agriculture, page 25.
- II. Agricultural Education, page 29.
- III. Agricultural Extension, page 31.
- IV. Agricultural Business Administration, page 33.
- V. Agricultural Journalism, page 34.
- VI. Agricultural Engineering (professional), page 35.
- VII. Rural Education, page 37.

## PREPROFESSIONAL CURRICULUM

- I. Preveterinary Medicine, page 38.

## FIVE-YEAR CURRICULUM

- I. Agricultural Engineering Business Administration, page 39.

## FIFTH YEAR LEADING TO PROFESSIONAL DEGREES

- I. Agricultural Technology, page 39.
- II. Agricultural Education, page 39.

## FOUR-YEAR CURRICULA

### I. TECHNICAL AGRICULTURE

The possibilities in this group are numerous and varied. Each student in this group arranges his curriculum with the aid of his adviser and in conformity with regulations given below to fit his vocational objective. Specialization begins normally in the junior year but may also extend into the sophomore year. Every subject-matter division of the college (see pages 70-120) offers one or more vocational or professional fields of specialization. Some divisions offer a fairly large number of such fields. Freshman and sophomore students should therefore consult carefully with the staff of the division in which they plan to major.

The vocational opportunities are too varied to permit complete enumeration. In general, technical agriculture includes all those vocations in which a technical knowledge of at least some fields of agriculture is required and put to immediate and practical use. Where more intense specialization is desired through graduate study or in highly specialized fields, the other curricula in agriculture (pages 18-24) should be considered and discussed with major divisions concerned.

The Technical Agriculture Curriculum offers training for: general farming and many kinds of specialized farming; industrial and commercial enterprises dealing with agricultural products such as creamery, meat packing, milling, canning, feed products, seeds and plant nursery, and many others; industrial and commercial companies dealing with products sold chiefly to farms such as agricultural machinery, dairy, and creamery supplies, feeds, etc.; business concerns that deal in many ways largely with rural people such as co-operatives, banks, insurance companies, marketing organizations, railroads, etc.; a great variety of federal, state, and other governmental agencies and bureaus such as soil conservation, agricultural adjustment, inspection services of many kinds, etc.; and, finally, a considerable variety of special technical jobs such as park and golf course supervision, technicians in manufacture and distribution of farm products, control of insect and plant pests, seed production and improvement, etc. For training for teaching agriculture in

high schools, see Agricultural Education, page 29. For preparation for rural church work, see Pretheological Major, page 29, which is now accepted for admission to a large number of theological seminaries. For training in Rural Education, see page 37.

Every prospective student in this curriculum is urged to obtain, before entering college, at least six months' practical experience on a farm. Entering students whose farm experience credentials are not satisfactory will be examined as to their familiarity with farm practices, and farm experience will be required during the college course in accordance with the results of these examinations. For students who major in dairy husbandry, at least three of the six months of approved farm experience must be on an accredited dairy farm or in a well-organized dairy manufacturing plant.

#### REQUIREMENTS

All-college requirements for students in this college. See page 8.

These curricula require 192 credit hours for graduation, including:

- A. Freshman-sophomore years—Required of all students registered in Technical Agriculture, pages 26-27. See also required courses in the junior year.
- B. Junior-senior years—see pages 27-28.

Special attention of every student is called to faculty regulations for classification in the junior class, page 10.

#### A. FRESHMAN-SOPHOMORE YEARS—REQUIRED COURSES

These courses are required of every student before graduation. They constitute approximately half of the curriculum and are considered fundamental and necessary to any training in technical agriculture. Every student must complete these courses, if possible, before the end of the sophomore year. Modifications in the requirements may be permitted upon approval by the Students' Work Committee where students have a very definite objective in their college curriculum in which substitutions for certain of the listed freshman and sophomore required courses may profitably be made. Approval of the adviser by special letter must be presented with the petitions to the Students' Work Committee.

For some students the outline of the first two years, given below, represents more than the regular amount of work of 16 credit hours per quarter. In such cases those subjects which cannot be taken in the freshman and sophomore years must take precedence the following year. Nine credits in English are also required in the junior year. Phys. Ed. 1-2-3, Physical Education, 3 credits, and Military Science and Tactics or Naval Science and Tactics may be taken in addition to the regular schedule if desired. Care should be taken in registration to give precedence to courses offered only one quarter.

#### *Freshman Year*

General courses—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Agron. 1\*†, General Farm Crops, 3.

An. Hu. 1,\*† Livestock Production, 4.

Bot. 1-2, General Botany, 6.

Dy. Hu. 1,\*† Elements of Dairying, 3.

Hort. 1,\*‡ General Horticulture, 3, or Hort. 6, Fruit Growing, 3, or Hort. 32, Vegetable Growing, 3.  
(Hort. 6 required of Agricultural Education students)

\* Graduates of the university schools of agriculture or students presenting high school work in any of these courses may, upon approval of their adviser and the head of the division in which the course is taught, substitute elective courses.

† Students who expect to major in a special horticultural field may substitute for these courses 6 credits approved by the chief of the Division of Horticulture.

‡ Students who expect to major in Dairy Products may substitute for these courses other credits approved by their adviser.

- In. Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may omit this course and register for In. Ch. 4-5.
- In. Ch. 4-5, General Inorganic Chemistry, 8 (one yr. of high school chem). Those required to take In. Ch. 1-2 may omit this course.
- Math. 1, § Higher Algebra, 5 cred., or Ag. En. 11, Applied Mathematics, 5\*\*.
- Orie. 1, College Orientation Lectures, 1.
- P.H. 3, ¶ Personal Health, 2.
- Rhet. Communications requirement.

### *Sophomore Year*

1. Freshman courses which were not completed during the freshman year.
2. General courses—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.
  - Ag. Bi. 1, Elementary Organic Chemistry, 5 (In. Ch. 8 cred.).
  - Ag. Bi. 3, Introduction to Biochemistry, 3 (1 or equiv.).
  - Ag. Bi. 5, Plant Biochemistry, 3 (Ag. Bi. 4, Soils 4); or Ag. Bi. 6, Animal Biochemistry, 3 (Ag. Bi. 4, Soils 4).
  - Ag. Ec. 1, Principles of Economics I, 3.
  - Ag. Ec. 2, Principles of Economics II, 5 (Ag. Ec. 1).
  - Ag. En. 3 credits selected from the following: 3, Mechanical Drawing, 3; 12, Agricultural Machinery, 3; 13, Gas Engines and Tractors, 3; 31, Principles of Drainage, 3; 37, Rural Sanitation and Water Supply, 3. One or more of these courses are required in the junior and senior years of several of the outlined curricula. If completed in meeting this requirement some other of the above courses must be substituted in the junior or senior year.
  - Ag. En. 23,\* General Physics, 5. Those presenting a year of high school physics may omit this course and substitute 5 credits elective later in their curriculum.
  - Bact. 53, General Bacteriology, 5 (chem., zool.).
  - Ent. 5, Economic Entomology, 5 (Zool. 14-15 or equiv.).
  - For. 10, §§ Farm Forestry, 3.
  - Soil. 4, Soils, 3 (Inorg. Chem. 1-2 or 4-5).
  - Zool. 14-15, General Zoology, 6.

## B. JUNIOR-SENIOR YEARS

### *Required Courses*

The following courses should be taken in the junior year if not taken previously:

- Rhet. 24, Advanced Public Speaking, 3 (Rhet. 22) or Rhet. 31, Survey of English Literature I, 5 (Rhet. Communications requirement) or Rhet. 32, Survey of English Literature II, 3 (Rhet. Communications requirement) or Rhet. 60, Contemporary Literature, 3 (Rhet. Communications requirement) or Rhet. 33, American Life in American Literature, 3 (Rhet. Communications requirement) or Rhet. 12, Debate and Discussion, 3 (Rhet. Communications requirement, 22 recommended).
- Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).
- Rhet. 51, Exposition, 3 (Rhet. Communications requirement). Cannot be taken earlier than junior year.

### *Elective Courses*

Every student is required to file in the Office of Admissions and Records by the end of his sophomore year a statement of the major, minor, and limited electives, approved by his adviser, which he plans to take during his junior and senior years. Such statements from each student will make it possible to provide a workable program of subject courses. Students will not be given classification in the junior class until their specialization card is filed in the Office of Admissions and Records. A change from one curriculum to another after the close of the sophomore year is permitted only on approval and does not exempt the student from any of the requirements of the curriculum which he finally selects. Such changes usually involve inconvenience and sometime loss of credit to the student. Special

\* Not open for credit to students offering one unit of high school physics for entrance.

§ See Mathematics requirement, page 9.

¶ Not required of students with military service records.

\*\* Credit permitted for only one of these courses.

§§ Students who expect to major in Dairy Products may substitute for this course other credits approved by their adviser.

attention of the student is called to the faculty requirements for classification in the junior class. (See page 10.) All students are invited to consult with the dean of the college concerning the selection of curricula.

The student, with the approval of his adviser, may select any curriculum which complies with the following requirements:

1. A major of from 24 to 36 credit hours, to be selected from one of the main groups or subgroups listed below.
2. A minor of 18 credit hours, to be selected from a different main group from that of his major or in a related department in some other college of the University. A student may select a second minor to be made up of credits listed in limited electives and free electives in one field of work. Such a minor will be clearly outside of the field of the major and the first minor and must be approved by the division of the second minor as to sequence of courses.

Subject-matter courses from any group or subgroup or from departments of other colleges of the University may be applied as major or minor credits in any group or subgroup if they are clearly related or fundamental to the group or subgroup of the major or minor specialization.

3. Limited electives, 18 credit hours, which must be selected outside of the groups from which the major and minor have been chosen, in order to broaden the educational base.
4. A total of not less than 18 credits in social science courses. (See page 9.)
5. Free electives sufficient to meet the number of credit hours required for graduation chosen from any of the courses offered in the University and approved by the adviser.

#### *Elective Groups and Subgroups*

	Page		Page
Agricultural Biochemistry* .....	72	Dairy Husbandry .....	87
Agricultural Economics (See also Agricultural Business Administration, p. 33).....	74	a. Dairy Production	
Agricultural Education (Minor only, on approval of Department of Agricultural Education. See special curriculum).....	76	b. Dairy Products	
Agricultural Engineering (See also Professional Curriculum, page 35).....	77	Entomology and Economic Zoology.....	90
Agronomy and Plant Genetics.....	80	a. Entomology*	
a. Agronomy		b. Wildlife Management (for minor only. See special curriculum, page 22)	
b. Plant Genetics*		Forestry. (For minor only. See Forestry Curricula, page 41).....	93
Animal and Poultry Husbandry.....	81	Horticulture .....	101
a. Animal Husbandry		a. General Horticulture	
b. Poultry husbandry		b. Landscape Gardening	
		Plant Pathology and Botany*.....	111
		Soils .....	118

#### *Special Majors and Minors*

**Agricultural Journalism** (minor). See page 34. The minor program must have the approval of the School of Journalism in the College of Science, Literature, and the Arts.

**Animal Industry** (major or minor)—Requirements as above except that courses may be selected from any of the following divisions: Animal and Poultry Husbandry, Dairy Husbandry, Veterinary Medicine, Agricultural Biochemistry, Economic Zoology.

**Plant Industry** (major or minor)—Requirements as above except that courses may be selected from any of the following divisions: Agronomy, Horticulture, Plant Pathology, Entomology, Soils, Agricultural Biochemistry.

\* As a major in Technical Agriculture approval of division is required. A major in this group will usually be selected under the Science Specialization Curriculum, page 18.

**Rural Social Science (major)**—Requirements as above except:

**Freshman-sophomore years**

With approval of adviser, certain General College courses in the basic sciences may be substituted for those listed, and elementary courses in sociology and rural sociology may be begun in the sophomore year.

**Junior-senior years**

Major: 36 credits in rural social science, to be distributed as follows: Agricultural Economics, 18 credits; Rural Sociology, and Sociology, 18 credits.

Minor: 18 credits in one of the following technical agriculture divisions or groups: Agricultural Engineering, Agronomy, Animal and Poultry Husbandry, Dairy Husbandry, Horticulture, Soils, Animal Industry, Plant Industry.

**Pretheological "Major" in Agriculture**—This major, as defined by the Conference on Co-operation Between Colleges of Agriculture and Theological Seminaries, requires, in addition to the college requirements for graduation in Technical Agriculture, the following:

At least one basic course in each of the following fields: Agricultural Economics, Economics, English Literature, History and Government, Philosophy, Public Speaking, Psychology, Rural Sociology, Sociology.

In addition, the student must fulfill the minimum requirements of the college of agriculture which include English Composition and Science (usually botany and chemistry).

These subjects may be scheduled by any student with a normal major in Technical Agriculture or Agricultural Education under minor or limited or free electives. Most of these subjects will also count toward the college social science requirement for graduation. Any student who desires to enroll in this "major" should consult the office of the dean of the college and should plan carefully with his adviser his entire curriculum in order to meet the college and pretheological "major" requirements involved.

II. AGRICULTURAL EDUCATION

Students who have completed the required work of the freshman and sophomore years of the Agricultural Education Curriculum of the College of Agriculture, Forestry, and Home Economics, or equivalent, from other agricultural curricula, may prepare to teach agriculture in the public schools by completing the junior and senior years in a combined curriculum of the College of Education and the College of Agriculture, Forestry, and Home Economics leading to the degree of bachelor of science. (By completing a fifth year in the combined five-year curriculum with the College of Education, they may receive the degree of master of education. See page 39.

For all-college requirements for students in this college, see page 8. This curriculum requires 204 credit hours for graduation including a distribution of minimum credits as follows:

REQUIREMENTS

Subject	Credits	Subject	Credits
Agricultural Biochemistry .....	5	Entomology .....	5
Agricultural Economics .....	17	Horticulture .....	6
Agricultural Education .....	22	Mathematics .....	5
Agricultural Engineering .....	18	Orientation .....	1
Agronomy .....	15	Plant Pathology .....	8
Animal and Poultry Husbandry.....	20	Public Health .....	2
Bacteriology .....	5	Rhetoric .....	15
Botany .....	6	Rural Sociology .....	3
Chemistry .....	8	Soils .....	6
Dairy Husbandry .....	8	Veterinary Medicine .....	3
Education .....	3	Zoology .....	6

An average honor point ratio of 1.5 is required for graduation in 18 courses out of those listed below and out of the designated number of elective courses recommended on page 31.

Agricultural Economics 102, 103, and one elected course.  
 Agricultural Engineering 6, 14, 15, 33, 38, 41.  
 Agronomy 21, 23, 31.  
 Animal Husbandry 56, 57 or Dairy Husbandry 103, 112 or 113  
 Dairy Husbandry 1 and 5 elected credits.  
 Entomology 5.  
 Horticulture 6 and one elected course.  
 Plant Pathology 1, 3.  
 Poultry Husbandry 1.  
 Soils 4, 5.  
 Veterinary Medicine 52.

Certification requirements for teaching vocational agriculture in Minnesota include a provision that applicants must have lived on a farm until the age of sixteen or have had two full years of farm experience after the age of sixteen.

#### FRESHMAN-SOPHOMORE YEARS—REQUIRED COURSES

##### *Freshman Year*

Ag. Ed. 1, Introduction to Agricultural Education, 1.  
 Ag. En. 6, Farm Buildings, 4.  
 Ag. En. 23, General Physics, 5. Not required of students who present a year of high school physics.  
 Ag. En. 38, Farm Water Supply and Sewage Disposal, 2.  
 Agro. 1,\* General Farm Crops, 3.  
 An. Hu. 1,\* Livestock Production, 4.  
 Bot. 1-2, General Botany, 6.  
 Dy. Hu. 1,\* Elements of Dairying, 3.  
 Hort. 6, Fruit Growing, 3.  
 In. Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may omit this course and register for In. Ch. 4-5.  
 In. Ch. 4-5, General Inorganic Chemistry, 8 (one year of high school chemistry). Those required to take In. Ch. 1-2 may omit this course.  
 Math. 1,† Higher Algebra, 5 cred., or Ag. En. 11, Applied Mathematics, 5‡.  
 Orie. 1, College Orientation Lectures, 1.  
 Pl. Pa. 3, Weeds, 3.  
 Rhet. Communications requirement.

##### *Sophomore Year*

Ag. Bi. 1, Elementary Organic Chemistry, 5.  
 Ag. Ec. 1, Principles of Economics I, 3.  
 Ag. Ec. 2, Principles of Economics II, 5.  
 Ag. En. 41, Metal Work, 3.  
 Agro. 31, Principles of Genetics, 4.  
 Bact. 53, General Bacteriology, 5.  
 Ent. 5, Economic Entomology, 5.  
 Po. Hu. 1, Poultry Production, 4.  
 P.H. 3,§ Personal Health, 2.  
 Soil. 4, Soils, 3.  
 Soil. 5, Soil Management, 3.  
 Zool. 14-15, General Zoology, 6.

#### JUNIOR-SENIOR YEARS

Students in Agricultural Education will be registered, beginning with the junior year, in both the College of Education and the College of Agriculture, Forestry, and Home Economics.

\* May be omitted by students who took vocational agriculture in high school, provided suitable substitutions will be taken.

† See Mathematics requirement, page 9.

‡ Credit permitted for only one of these courses.

§ Not required of students with military service records.

Special attention of every student is called to faculty regulations for classification in the junior class.

It is recommended that the student keep in mind the possible completion of majors or minors in some agricultural groups.

#### *Junior Year*

1. Freshman-sophomore courses which were not completed. See page 10 for requirements for classification in the junior class.
2. Rhet. 51, Exposition, 3.
3. Social science requirements. See page 9.
4. Education courses
  - Ed. 51A, Introduction to Secondary School Teaching, 3.
  - Ag. Ed. 54, Rural Education and Community Leadership, 2.
  - Ag. Ed. 81, Teaching Agriculture, 3.
5. Agricultural courses
  - Ag. Ec. 102, Farm Organization, 3.
  - Ag. Ec. 103, Farm Operation, 3.
  - Ag. En. 15, Electricity in Agriculture, 2.
  - Agro. 21, Grain Crops, 4.
  - An. Hu. 56, Livestock Feeding, 3 or Dy. Hu. 103, Dairy Stock Feeding, 3.
  - An. Hu. 57, Livestock Feeding, 3.
  - Pl. Pa. 1, Plant Pathology, 5.
  - Pl. Pa. 3, Weeds, 3.
  - Rhet. 22, Public Speaking, 3.
  - Ve. Me. 52, Anatomy, Physiology, and Hygiene of Domestic Animals, 3.

#### *Senior Year*

1. Education courses
  - Ag. Ed. 82, Methods in Teaching Agriculture, 3.
  - Ag. Ed. 91, Supervised Teaching Experience, 5.
  - Ag. Ed. 101, Adult Education in Agriculture, 3.
  - Ag. Ed. 103, Facilities and Materials, 3.
  - Ag. Ed. 104, Planning Programs, 2.
2. Agricultural courses
  - Ag. En. 14, Farm Power and Machinery, 4.
  - Ag. En. 33, Introduction to Soil and Water Control, 3.
  - Agro. 23, Forage Crops, 4.
  - An. Hu. 112, Animal Breeding, 3 or An. Hu. 113, Livestock Management, 3.
  - Rhet. 51, Exposition, 3.
  - Soc. 14, Rural Sociology, 3.

#### *Electives Recommended To Meet Area Requirements for Graduation*

- Agricultural Economics, 3 credits. Suggested courses—8, 40, 50, 80, 144.  
 Animal and Poultry Husbandry, 3 credits. Suggested courses—Po. Hu. 153, An. Hu. 3, 4, 51.  
 Dairy Husbandry, 5 credits. Suggested courses—9, 101, 103, 104.  
 Horticulture, 3 credits. Suggested courses—1, 21, 22, 32, 135.

#### *Additional Electives Recommended*

Agricultural Biochemistry 5 or 6	Forestry 10
Agricultural Education 56	Agricultural Journalism 53
Agronomy 22, 132	Rhetoric 12
Education 120, 133	Veterinary Medicine 50, 51

### III. AGRICULTURAL EXTENSION

Experience has shown that it is not wise or feasible, because of the wide range of possible major and minor specialization, to set up a formal curriculum for training in agricultural extension. The college does, however, offer special opportunities for an adequate training in many branches of this educational field. Any student desiring such training has the privilege as well as the responsibility of formulating his own curriculum under the general curricular requirements of Technical Agriculture or Agricultural Education.

Students planning to enter some field of agricultural extension can best prepare for this by selecting some major field and by arranging for their special extension training in the selection of their minor groups or in the selection of electives with the co-operation of advisers. The major field may be agricultural education or one of the technical divisions in the field of agriculture, such as animal husbandry, dairy husbandry, agronomy, or horticulture. Other majors are also possible. The selection of a major should be determined by the type of extension work which the student plans to follow and by the plans which the student may have as to a continuation of his study and professional development after he has become engaged in extension work.

Since agricultural extension work involves educational and other methods of presenting and promoting agricultural information and practices, it must be founded primarily on a thoro knowledge of some field of technical agriculture and a general knowledge of the whole field. The extension methods must vary with different extension jobs and must be built up on a wide range of sociological subject matter. The methods are secondary to the subject matter and for most types of extension work an attempt to formulate a major in extension is not advised altho a considerable proportion of the subject matter, of course, should be selected from courses that will have a distinct bearing on extension methods. A major adviser should be selected in the major subject-matter field of the student. It may also be advisable for such students to select a second adviser either from the extension staff or from some member of the resident teaching staff who is familiar with extension problems.

Since there is no single subject-matter course which can prepare the student for all of the intricate problems involved in extension methods and procedures, it becomes necessary for the student, with the help of his adviser, to select carefully subject-matter courses from various divisions in this college and from departments in the University which will give him a background of knowledge which can be utilized in his extension work. Many of these courses will fall in the social science groups altho some may deal with subject matter in technical agriculture. The number of technical agricultural and social science courses which would be useful are probably too numerous to be included in any one program so that the student will have to make careful selection with the aid of his advisers. For the benefit of such students and for the convenience of advisers a list of suggested courses is given below. Other courses may be advisable, or, in some cases, preferable. The list is merely suggestive.

It is generally recognized that "personality" is an important factor in the selection of extension workers and in the success of their subsequent vocational service. A judicious participation in student and community activities which give opportunities for the development of leadership is recommended. Students should also avail themselves of those numerous social and cultural opportunities of the University which contribute to a better understanding of how to meet and work with people. While the college offers no subject-matter courses in "personality," valuable criticism and advice may be secured from many faculty advisers.

#### REQUIREMENTS

All-college requirements for students in this college. See page 8.

#### SUGGESTED COURSES FOR AGRICULTURAL EXTENSION

Available as electives or required work in a curriculum especially suitable for those training for agricultural extension work:

#### *College of Agriculture, Forestry, and Home Economics*

**Agricultural Economics:** As many of these courses as would be feasible

**Agricultural Education:** Ed. 51A, Educational Psychology, or equivalent; 54, Rural Education and Community Leadership.



**Agricultural Engineering:** Numerous courses from which to select  
**Agricultural Journalism:** 53, Publicity. Possibly other courses from the School of Journalism of the College of Science, Literature, and the Arts.  
**Rhetoric:** 22, Public Speaking; 54, Advanced Public Speaking; 28, Play Production; 59, Advanced Play Production.  
**Subject-matter departments** such as Horticulture, Agronomy, Animal Husbandry, Dairy Husbandry, Veterinary Medicine, etc. Subjects to be selected in accordance with objectives.

*College of Science, Literature, and the Arts*

**Political Science:** 1-2-3, American Government and Politics; 9-10, Fundamentals of Government and Politics. Other possible courses for selection.  
**Psychology:** 1-2, General Psychology; 3, Psychology Applied to Daily Life  
**Sociology and Social Work:** 14, Rural Sociology; 110, Rural Community Organization; 112, Problems in Rural Social Research; 114, Rural Social Institutions.  
**Business Administration:** 51-52-53, Business Law

The above is not a complete list of all of the possible electives that would be useful in a major curriculum in agricultural extension but includes a wide range and is suggestive of the additional possibilities.

#### IV. AGRICULTURAL BUSINESS ADMINISTRATION

This curriculum offers an opportunity for those who wish to prepare specifically for some branch of agricultural business, such as the marketing of farm products, farm finance, farm implements, farm real estate, country merchandising, and the like. The first two years are prescribed and include introductory courses in agriculture, economics, and the fundamental sciences necessary for further work in agriculture and economics. During the freshman and sophomore years the student will register in the College of Agriculture, Forestry, and Home Economics. In the junior and senior years he will register in both the School of Business Administration and the College of Agriculture, Forestry, and Home Economics. At least 90 credits and honor points equal to the number of credits are required for admission to the junior class. For definition of "honor points" see page 8. Approximately one-third of the last two years is elective and may include approved courses in any college as well as advanced courses in agriculture and economics. The fees for the first two years are those of the College of Agriculture, Forestry, and Home Economics. For the last two years the fees are those of the School of Business Administration. Students completing this curriculum will receive the degree of bachelor of agricultural business administration.

#### REQUIREMENTS

All-college requirements for students in this college. See page 8.

#### FRESHMAN YEAR

The freshman year consists of the regular freshman courses outlined in Technical Agriculture curriculum on page 25, except that students are advised to take Math. 8 rather than Ag. En. 11; or Math. 1 if they do not have the prerequisites for Math. 8. If any course of the freshman year is deferred to the sophomore year it should be An. Hu. 1.

#### SOPHOMORE YEAR

The following courses should be scheduled for the quarter as indicated:

1. Freshman courses which were not completed during the freshman year.
2. General courses
  - Ag. Ec. 1, Principles of Economics I, 3.
  - Ag. Ec. 2, Principles of Economics II, 5 (Ag. Ec. 1).
  - Ag. Ec. 8, Rural Economics, 3 (Ag. Ec. 2 or 3).
  - Ag. Ec. 50, Farm Finance, 5 (Ag. Ec. 2).

- Econ. 22-23, Principles of Accounting, 8.  
 Ent. 5, Economic Entomology, 5 (Zool. 14-15 or equiv.).  
 Psy. 1-2, General Psychology, 6.  
 Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).  
 Zool. 14-15, General Zoology, 6.

3. Electives—Enough elective credits should be selected to make with the required work of the freshman and sophomore years a total of 101 credit hours.

#### JUNIOR YEAR

##### 1. General requirements

- Bu. Ad. 51-52-53, Business Law, 9 (10 cred. in econ. incl. Ag. Ec. 1 and 2).  
 Bu. Ad. 142, Advanced Money and Banking, 3 (Ag. Ec. 2 and 50).

##### 2. Special requirements

- Ag. Ec. 30, Agricultural Prices, 3 (Ag. Ec. 2).  
 Ag. Ec. 40, Principles of Marketing Organization, 3 (Ag. Ec. 2).  
 Ag. Ec. 90, Agricultural Statistics, 5.  
 Ag. Ec. 110, Economics of Agricultural Production, 3 (Ag. Ec. 2).  
 Ag. Ec. 131, Market Prices, 3 (Ag. Ec. 30, 40).  
 Ag. Ec. 141, Marketing Organization: Dairy and Poultry Products, 3 (Ag. Ec. 40).  
 Rhet. 51, Exposition, 3 (Rhet. Communications requirement).

#### SENIOR YEAR

##### 1. General requirements

- Bu. Ad. 58, Elements of Public Finance, 3 (Ag. Ec. 2).  
 Bu. Ad. 71, Transportation: Services and Charges I, 3 (Ag. Ec. 2).  
 Bu. Ad. 101-102, Advanced General Economics, 6 (Ag. Ec. 2).  
 Bu. Ad. 139† Advanced General Accounting, 3 (Econ. 22-23).  
 Econ. 149, Business Cycles, 3 (Econ. 141 or Bu. Ad. 142).

##### 2. Special requirements

- Ag. Ec. 135, Methods of Price Analysis, 3 (Ag. Ec. 30, 191).  
 Ag. Ec. 150, Advanced Farm Finance, 3 (Ag. Ec. 50 or equiv.).  
 Ag. Ec. 170, Land Economics, 3 (Ag. Ec. 110).  
 Ag. Ec. 191, Advanced Agricultural Statistics, 3 (Ag. Ec. 90).

### V. AGRICULTURAL JOURNALISM

This curriculum, which is offered jointly with the School of Journalism of the College of Science, Literature, and the Arts, is intended for those who wish to prepare for some branch of journalism which relates to agriculture: such as staff positions on agricultural magazines, editing country newspapers, writing on agricultural questions, editing of bulletins for state and federal departments of agriculture and experiment stations, editing of special farm pages or departments for newspapers, and editing of publications for farm organizations. This curriculum, requiring 180 credits for graduation, leads to the bachelor of arts degree.

#### MAJOR IN AGRICULTURAL JOURNALISM

Students intending to major in agricultural journalism are advised to register in journalism in the College of Science, Literature, and the Arts. Such students must have their programs of agricultural subjects approved in the office of the dean of the College of Agriculture, Forestry, and Home Economics.

#### *Requirements for Combined Curriculum in Agriculture and Journalism*

##### FRESHMAN YEAR

- Comp. 4-5-6, Freshman Composition, 9 (placement test).  
 G.C. 11A, Basic Wealth: Natural Resources—Their Economic Utilization and Conservation, 3.  
 G.C. 11B, Basic Wealth: The Economic Utilization and Conservation of Plant Life, 3.  
 G.C. 11C, Basic Wealth: The Economic Utilization and Conservation of Animal Life, 3.  
 Nat. Sci. 1-2-3, Orientation in the Natural Sciences, 15.  
 Electives, Social Sciences, 9-15.

† Ag. Ec. 47, Marketing Accounting, may be substituted upon approval by adviser.

## SOPHOMORE YEAR

- Ag. Ec. 1, Principles of Economics I, 3.  
 Ag. Ec. 2, Principles of Economics II, 5 (Ag. Ec. 1).  
 Comp. 27-28, Advanced Writing, 6 (Comp. A-B-C or 4-5-6 or exemption from requirement).  
 Jour. 13, Introduction to Reporting, 3 (C av., Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement).  
 Jour. 14-15, Newspaper Reporting, 6 (for 14, C av. in 13 and in all work, or consent of instructor, and Comp. 27-28; for 15, C av. in 13-14 or 12 and in all work, or consent of instructor, and Comp. 27-28).  
 Soc. 1, Introduction to Sociology, 5.  
 Soc. 14, Rural Sociology, 3 (Soc. 1).  
 Electives, 11-18.

## JUNIOR YEAR

- Ag. Ec. 8, Rural Economics, 3 (Ag. Ec. 2 or 3).  
 Jour. 51-52, News Editing, 6 (Jour. 15).  
 Jour. 55, Advertising and Newspaper Typography, 3 (Jour. 15, or 13 and 41).  
 Jour. 69, Newspaper and Magazine Articles, 3 (Jour. 15 or 41).  
 Jour. 110, History of Journalism, 3 (Jour. 15).  
 Electives, 27.

## SENIOR YEAR

- Jour. 93, Weekly Editorial Administration, 3 (Jour. 51 or concurrent registration in 51).  
 Jour. 94, Newspaper Advertising, 3 (Jour. 51).  
 Jour. 112, Current Newspaper Problems, 3 (Jour. 140 and 141).  
 Jour. 140-141, Interpretation of Contemporary Affairs, 6 (Jour. 109-110 and 20 cred. in the social studies or consent of major adviser in Journalism).  
 Ag. Jo. 55, Agricultural Journalism Outlets, 3 (Jour. 13-14-15, 51-52 or permission of instructor).  
 Electives, Jour., 3.  
 Electives, 24.

## SUGGESTED ELECTIVES

- Journalism: 65, 68, 78, 95, 130-131.  
 Agriculture, Forestry, or Home Economics:  
 Ag. Ec. 104, 110-111, 170.  
 Ag. Jo. 54.  
 Agro. 1, 31.  
 For. 1, 10, 136.  
 Ho. Ec. 1, 20, 24, 30, 31.  
 Hort. 6, 10, 24, 32.  
 An. Hu. 1, 56-57.  
 Dy. Hu. 1.

## Other:

- So. Sc. 1-2-3.  
 Hist. 1-2-3, 20-21-22.  
 Hum. 1, 2, 3.  
 Po. Sc. 1-2-3, 7, 25.  
 Psy. 1-2, 4-5, 56.  
 Soc. 2, 45, 100, 110, 114.

## MINOR IN JOURNALISM

Students majoring in some field of the Technical Agriculture Curriculum or in Agricultural Extension may select a minor in Journalism. The minor program must have the approval of the School of Journalism in the College of Science, Literature, and the Arts.

Minors in Journalism in other agricultural curricula should have the approval of the dean of the College of Agriculture, Forestry, and Home Economics.

## VI. AGRICULTURAL ENGINEERING (PROFESSIONAL)

This curriculum leads to the degree of bachelor of agricultural engineering and is offered jointly by the College of Agriculture, Forestry, and Home Economics, and the Institute of Technology. Four distinct lines of specialization are provided, namely Farm

Structures, Rural Electrification, Farm Power and Machinery, and Soil and Moisture Control.

Non-veterans will be required to take, in addition to the requirements listed, 39 to 45 credits in the College of Science, Literature, and the Arts. These courses may be chosen chosen on the basis of certain limitations prescribed by the Institute of Technology. The curriculum will thus require five years to complete. Further information may be obtained from the Division of Agricultural Engineering.

#### FRESHMAN YEAR

During the freshman year those following this curriculum will register in the Institute of Technology and follow the work of the freshman year as outlined in the *Bulletin of the Institute of Technology*.

The following courses should be scheduled for the quarter as indicated below. For the last three years of the curriculum students are registrants both in the College of Agriculture, Forestry, and Home Economics and the Institute of Technology.

#### SOPHOMORE YEAR

##### General courses

- Ag. En. 5, Farm Structures Laboratory, 3.
- Ag. En. 18, Agricultural Automotives, 4 (Phys. 7).
- Ag. En. 21, Elements of Surveying, 5 (Draw. 3, M.&M. 12).
- Ag. En. 43, Mechanical Laboratory, 3 (No prereq.).
- Econ. 8, General Economics, 3.
- Econ. 9, General Economics, 3 (Econ. 8).
- M.&M. 24, Differential Calculus, 5 (M.&M. 13).
- M.&M. 25, Integral Calculus, 5 (M.&M. 24).
- M.&M. 26, Technical Mechanics: Statics, 5 (M.&M. 25).
- Phys. 7, General Engineering Physics, 5 (M.&M. 12 or equiv.).
- Phys. 8, General Engineering Physics, 5 (Phys. 7).
- Phys. 9, General Engineering Physics, 5 (Phys. 8).
- Soil. 4, Soils, 3 (Chem. 1-2 or 4-5).

#### JUNIOR YEAR

- Ag. En. 37, Rural Sanitation and Water Supply, 3 (M.&M. 129).
- Ag. En. 51, Soil Moisture Relations, 5 (Soil 4, M.&M. 129).
- Ag. En. 52, Elements of Farm Machinery, 3 (M.&M. 26).
- Ag. En. 53, Farm Structures, 3 (Ag. En. 5, Draw. 3 or equiv.).
- Ag. En. 72, Applied Electricity, 3 (Phys. 9).
- Ag. Ec. 102, Farm Organization, 3 (Ag. Ec. 2).
- Agro. 1, General Farm Crops, 3.
- C.E. 37, Structural Engineering, 3 (M.&M. 26).
- Geol. 5, Engineering Geology, 3.
- M.&M. 127, Technical Mechanics: Dynamics, 5 (M.&M. 26).
- M.&M. 128, Strength of Materials, 5 (M.&M. 26).
- M.&M. 129, Hydraulics, 4 (M.&M. 26).
- M.&M. 143, Hydraulics Laboratory, 1 (M.&M. 129).
- M.E. 26, Mechanism and Kinematics, 3 (M.&M. 24).
- M.E. 27, Machine Design, 3 (M.&M. 128).
- M.E. 131, Thermodynamics, 3 (M.&M. 25, Phys. 9).
- Rhet. 22, Public Speaking, 3 (Rhetoric Communications required or Engl. 6).

#### SENIOR YEAR

- Ag. En. 67, Advanced Farm Structures Design, 3 (Ag. En. 53, M.&M. 128).
  - Ag. En. 71, Design and Economics of Agricultural Machinery, 3 (Ag. En. 18, 52, M.E. 27).
  - Ag. En. 73, Steam Boilers and Heat Engines, 3 (Ag. En. 18, M.E. 131).
  - An. Hu. 1, Livestock Production, 4.
  - C. E. 146, Plain Concrete, 3 (M.&M. 128).
  - Dy. Hu. 1, Elements of Dairying, 3 (Entrance cred. in chem. or In. Ch. 1 or 4).
  - G. E. 101, Contracts and Specifications, 3.
  - Soil. 108, Physical Properties of Soil, 3 (Soil. 4).
- Electives to complete program.

VII. RURAL EDUCATION

A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics. Students will register in the College of Education.

For university, college, and teachers college students who will spend the first two years largely or entirely in academic or pre-education junior college work and who wish to qualify for rural teaching and supervision.

FRESHMAN AND SOPHOMORE YEARS

For details, see Elementary Education Curricula I-A and I-B, page 37, *College of Education Bulletin*.

JUNIOR AND SENIOR YEARS

A. Subject matter and academic courses for rural education.

Major specialization in rural life.

Course No.	Title	Credits
Ag.Ec. 3	Principles of Economics (Home Economics) .....	5
Ag.Ec. 8	Rural Economics .....	3
Ag.Ed. 54	Rural Education and Community Leadership (2 cred.)	} 2 or 3
or Ag.Ed. 56	Rural Youth Leadership (3 cred.) .....	
Agro. 1	General Farm Crops .....	3
An.Hu. 1	Livestock Production .....	4
Dy.Hu. 1	Elements of Dairying .....	3
Hort. 6	Fruit Growing (3 cred.)	} Select one 3
Hort. 56	Plant Propagation (3 cred.)	
Hort. 32	Vegetable Growing (3 cred.)	
Soc. 14	Rural Sociology .....	3

A minimum of 14 credits chosen from the following:

H.Ec. 1	Choice and Care of Clothing (4 cred.)	} 3 or 4
G.C. 15A	Clothing Selection, Purchase and Care (3 cred.)	
H.Ec. 31	Introduction to Nutrition (3 cred.)	} 2 or 3
H.Ec. 30	Introduction to Nutrition (2 cred., Main campus)	
G.C. 14A	Food Selection and Purchase (3 cred.)	} 3-5
H.Ec. 20	Introduction to Related Arts (4 cred.)	
H.Ec. 24	Problems in Home Planning and Furnishing (5 cred.)	} 3-5
G.C. 16A	Selecting and Maintaining a Home (3 cred.)	
H.Ec. 50	Textiles (3 cred.)	} 3
H.Ec. 2	Introduction to Textiles (3 cred.)	
G.C. 17B	Individual and Household Buying .....	3
Total .....		40-45

B. General and Elementary Education. A major of 46 or 47 credits.

1. Required of all—39 or 40 credits.

Ed.71A,B,C	Introduction to Elementary School Teaching.....	15
Art.Ed. 84	Teaching of Art in the Elementary Grades.....	3
Mu.Ed. 50B	Intermediate Methods .....	2
Ed.C.I. 60	The Teaching of Reading in the Elementary School .....	3
Ed.C.I. 61	The Teaching of Social Studies in the Elementary School .....	3
Ed.C.I. 62	The Teaching of Arithmetic in the Elementary School .....	3
Ed.C.I. 63	Children's Literature .....	2
Ed.C.I. 64	The Teaching of English in the Elementary School .....	3
Ed.C.I. 65	The Teaching of Science in the Elementary School .....	2
Ed.C.I. 117	Rural Education for Administrators and Teachers.....	3
Ed.T. 54A-B	Directed Teaching in the Elementary School.....	8
or Ed.T. 54A-C	Rural School Management and Practice Teaching .....	8
Total .....		44 or 45

2. Additional courses recommended to complete total of 90 credits for the junior and senior years.

Soc. 110	Rural Community Organizations .....	3
Soc. 114	Rural Social Institutions .....	3
For. 10	Farm Forestry .....	3

Additional courses in home economics selected from grouping listed for I-D Curriculum.

The C+ average is based on the 46 to 47 credits in elementary education.

Excess quality credits earned in all courses will reduce the general elective credits in academic subjects but cannot be used to meet any specific requirement of the curriculum.

## PREPROFESSIONAL CURRICULUM

### I. PREVETERINARY MEDICINE

#### (A) REQUIREMENTS FOR ADMISSION TO THE PREVETERINARY CURRICULUM

The student must fulfill the general requirements of admission to the undergraduate colleges of the University and specifically, the requirements for admission to the curricula in agriculture of the College of Agriculture, Forestry, and Home Economics with the exception that admission to the preveterinary curriculum requires the presentation of a major in group A, English, and a major in group D, mathematics. A minor is recommended in either group B, foreign languages, or group E, natural sciences.

#### (B) PREVETERINARY REQUIREMENTS

A minimum of 90 quarter credit hours of work on the college level is required of all students prior to entrance upon the four years' professional veterinary curriculum. These shall include the following:

- (1) English or Rhetoric and Public Speaking—12 credits.
- (2) Chemistry—25 credits including general inorganic chemistry, qualitative and quantitative analysis and organic chemistry
- (3) Mathematics—10 credits
- (4) Zoology and Botany—13 credits
- (5) Physics—8 credits including laboratory
- (6) Animal, Poultry and Dairy Husbandry—14 credits

It is recommended that elective courses over and above the required courses be taken in the fields of agricultural economics, political science, psychology, and sociology.

### SUGGESTED PREVETERINARY CURRICULUM AT THE UNIVERSITY OF MINNESOTA

#### *First Year Preveterinary*

	Credits
Animal and Poultry Husbandry 1 (Livestock Production), 8 (Breeds).....	7
Botany 1 (General Botany) .....	3
Chemistry 4, 5 (Inorganic Chemistry), 11 (Qual. Anal.) .....	12
Dairy Husbandry 1 (Elements of Dairying), 9 (Dairy Cattle Judging) .....	4
Mathematics 15, 16 (Elementary Mathematical Analysis) .....	10
Orientation .....	1
Rhetoric (Communications Requirement) .....	9
Electives .....	3-5
<b>Total</b> .....	<b>49-51</b>

*Second Year Preveterinary*

Ag. Bi. 2 (Quantitative Methods) .....	5
Ag. Ec. 1 (Principles of Economics).....	3
Ag. En. 24, 25 (Agricultural Physics).....	8
Animal and Poultry Husbandry 1 (Poultry Production) .....	4
Chem. 1, 2 (Elementary Organic Chemistry).....	8
Rhetoric 22 (Public Speaking) .....	3
Sociology 1 (Introduction to Sociology), 14 (Rural Sociology).....	6
Zoology 1, 2, 3 (General Zoology) .....	10
<hr/>	<hr/>
Total .....	47

FIVE-YEAR CURRICULUM

I. AGRICULTURAL ENGINEERING BUSINESS ADMINISTRATION

A curriculum offered jointly with the Institute of Technology and the School of Business Administration, leading to the degrees both of bachelor of agricultural engineering and bachelor of business administration. Students will register in the Institute of Technology. See statement in the *Bulletin of the Institute of Technology*.

FIFTH YEAR LEADING TO PROFESSIONAL DEGREES

I. AGRICULTURAL TECHNOLOGY

A fifth year in agricultural technology leading to the degree of agricultural technologist.

Open to students graduating with the bachelor of science from an undergraduate basis of technical agriculture. Offered to those who plan to engage in occupations in the broad field of agricultural technology and who need an additional year of study (a) to extend their knowledge in their major field; (b) to obtain additional training in other general and special fields of agricultural technology; (c) to obtain training in other fields such as social science, business, engineering, and the applied sciences.

*Requirements for Fifth Year*

1. At least 45 additional credits with an average of B, of which 15 credits in the major and 15 of the remaining credits must be in courses numbered 100 or above.
2. A major of at least 15 credits in an agricultural division or group of allied divisions or departments.
3. A minor of not less than 15 credits in a field other than that of the major.
4. The remaining 15 credits may be chosen from any division or department of the University of Minnesota.
5. Examinations required:
  - a. A final written examination in the major.
  - b. A final oral examination by a committee of at least three.
  - c. A standing committee of the faculty shall be appointed by the dean of the college to approve student programs, to make committee appointments, and to administer these regulations.

II. AGRICULTURAL EDUCATION

A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics leading to the degree of master of education.

The College of Education and the College of Agriculture will award the master of education degree (M.Ed.) to students who satisfactorily complete a fifth year of work in Agricultural Education at the graduate level and who meet all of the regulations for the

professional degree. The specific requirements for the M.Ed. degree as applied to Agricultural Education are as follows:

1. A total of 249 credits or 45 credits beyond the requirement for a Bachelor's degree in agricultural education.
2. In addition to the period of observation and practice teaching required for graduates in the four-year curriculum, a period of internship will be required for which a maximum of 8 credits will be given.
3. In the courses comprising the fifth year of the curriculum, a "B" average (2 honor points per credit) is required.
4. Satisfactory completion of the requirements for the professional degree as defined in the *Bulletin of the College of Education*.
5. A satisfactory report on a health examination within one year prior to obtaining the M.Ed degree will be required.
6. The distribution of credits for the fifth year will include:
  - a. Agricultural Education: 12-15 credits of which not more than 6 credits may be in problems courses.
  - b. Education other than Agricultural Education: 11-15 credits.
  - c. Technical Agriculture and areas other than those listed above: 15-22 credits.

NOTE—Undergraduate students in Agricultural Education who expect to qualify for the M.Ed. degree should confer with their advisers by beginning of the junior year in order that the work of the junior, senior, and fifth years may be co-ordinated to the best advantage.



# CURRICULA IN FORESTRY AND FORESTRY TECHNOLOGY

## FOUR-YEAR CURRICULA

Three four-year forestry and two four-year technological curricula are available. These are:

### FORESTRY CURRICULA

- I. Forestry-Forest Management, pages 42 and 43.
- II. Forestry-Range Management, pages 43 and 44.
- III. Forestry-Wildlife Management, pages 44 and 45.

### TECHNOLOGICAL CURRICULA

- IV. Lumber Merchandising and Construction, page 45.
- V. Wood Technology, page 46.

The Forestry Curricula lead to the bachelor of science (B.S). The B.S. degree is awarded students on the completion of four years of satisfactory work consisting of basic courses in the physical and biological sciences, social sciences, rhetoric, etc., and including about 90 quarter credits in forestry and closely related courses. Satisfactory completion of the work for the B.S. degree equips the student with sufficient training for some types of forestry positions in state, federal, and private employment. However, keen competition for positions in the future can be anticipated and can be successfully met only by more adequate and better professional training.

The four-year curricula in Lumber Merchandising and Construction and in Wood Technology are designed to train men for special commercial and technological positions dealing with forest products. These curricula are not regarded as training for the professional practice of forestry. On completion of either of these curricula, requiring 204 credits, the student receives the degree of bachelor of science (B.S.).

### FORESTRY CURRICULA

#### GENERAL REQUIREMENTS

All-college requirements for students in this college. See page 8.

All students, irrespective of the curricula which they may select, are required to complete certain general courses before graduation. These are considered fundamental and necessary to any curriculum in Forestry. For some students the outline for the first two years, given below, represents more than the regular amount of work of 17 credits per quarter. In such cases those subjects which cannot be taken in the freshman and sophomore years must take precedence the following year. Phys. Ed. 1-2-3, Physical Education, 3 credits, and Military Science and Tactics or Naval Science and Tactics may be taken in addition to the regular schedule, if desired. Care should be taken in registration to give precedence to courses offered in only one quarter.

During the first two years, the work in all the forestry curricula is similar and is devoted to the study of general courses. Preferably at the beginning of the sophomore year, and not later than the junior year, each student must decide upon the professional curriculum he wishes to follow. Special attention of every student is called to the faculty requirements for classification in the junior class, page 10.

## FRESHMAN YEAR

## 1. Required general courses

Ag. En. 3, Mechanical Drawing, 3.

Bot. 1-2-3, General Botany, 10.

For. 1, General Forestry, 3.

For. 3, Dendrology, 3.

For. 4, Dendrology, 4.

In. Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may omit this course and register for In. Ch. 4-5.

In. Ch. 4-5, General Inorganic Chemistry, 8. Those required to take In. Ch. 1-2 may omit this course.

Math. 1, Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 credits elective.

Math. 6,\* Trigonometry, 5 (Math. 1 or equiv.).

Orie. 1, College Orientation Lectures, 1.

Rhet. Communications requirement.

*First Summer Session at the Itasca Forestry and Biological Station, Itasca Park\*\**

All students in the professional curricula, with the exception of students who transfer to the University or college with junior standing, are required to attend this session at Itasca State Park. Transfer students who enter the University as juniors may substitute electives for this requirement, but attendance is strongly recommended because this field work provides a basis for many of the later professional courses. All others must complete the Itasca Park work before the beginning of the sophomore year unless given permission on petition to defer it one year. A satisfactory scholastic average must be maintained during the preceding year. In no case will such students be permitted to register for junior work before completing the summer camp requirement.

Students must register for all of the following courses:

Bot. 6su, Field Botany, 1½.

Ent. 13su, Field Zoology, 1½.

For. 5su, Field Silviculture, 1½.

For. 6su, Field Mensuration, 1½.

For. 11su, Camp Management, 1.

Total credits at Itasca, 7.

Total credits for freshman year, 58.

\* See Mathematics requirement, page 9.

\*\* See page 8 for special fees.

## SOPHOMORE YEAR

## 1. Freshman courses not completed.

## 2. Required general courses

Ag. Bi. 1, Elementary Organic Chemistry, 5 (In. Ch. 8 cred.).

Ag. Bi. 3, Introduction to Biochemistry, 3.

Ag. Bi. 5,\* Plant Biochemistry, 3.

Ag. Ec. 1, Principles of Economics I, 3.

Ag. Ec. 2, Principles of Economics II, 5 (Ag. Ec. 1).

Ag. En. 19-20,† Elementary Surveying, 6 (Ag. En. 3, 11 or Trig.).

For. 7-8-9, Forest Mensuration, 9 (For. 6).

Pl. Pa. 10, Forest Pathology, 5 (Bot. 6 cred.).

Geol. 1, General Geology, 3, and Geol. A, General Geology Laboratory, 2; or Geol. 8, Earth Features and Their Meaning, 5.

Soc. 1,† Introduction to Sociology, 3.

Zool. 1-2-3,§ General Zoology, 10.

P.H. 3,¶ Personal Health, 2.

Total credits for sophomore year, 49 or 53.

\* Wildlife and Range Management students register for Ag.Bi.6, Animal Biochemistry, 3.

† Scheduled in junior year for Wildlife and Range Management students.

§ Zool.14-15 scheduled in junior year for Forest Management students.

¶ Not required of students with military service records.

## I. FORESTRY-Forest Management

Suggested for those who are preparing for general technical forest work involving the growth, management, and harvesting of forest crops (such as positions in the federal or state services, or foresters for paper companies, lumber companies, or other large tim-

ber owners). In addition to the general undergraduate requirements, the course of study for the first four years must include the following courses in the junior and senior years:

#### JUNIOR YEAR

1. Freshman and sophomore courses not completed.
  2. Required courses
    - Ag. En. 24-25, Agricultural Physics, 8.
    - Bot. 115, Spring Flora of Minnesota, 3.
    - Econ. 22, Principles of Accounting, 4 or Ag. Ec. 25, Principles of Accounting, 4.
    - Econ. 28, Business Law, 3.
    - For. 20, Grazing, 3.
    - For. 53-54, Wood Structure and Identification, 6.
    - For. 56, Forest Products, 3.
    - For. 151, Logging, 3.
    - Po. Sc. 25, World Politics, 3, or equivalent.
    - Rhet. 22, Public Speaking, 3.
    - Soil. 4, Soils, 3.
    - Zool. 14-15, General Zoology, 6.
- Total credits for junior year, 48.

#### SENIOR YEAR

1. Freshman, sophomore, and junior courses not completed.
2. Required courses
  - Bot. 51, General Plant Physiology, 3.
  - Ent. 56, Forest Entomology, 5.
  - Ent. 64, Economic Vertebrate Zoology, 3.
  - For. 126, Silvics, 3.
  - For. 131, Forest Policy, 3.
  - For. 136, Forest Economics, 3.
  - For. 137, Seeding and Planting, 3.
  - For. 155, Forest Protection, 3.
  - Rhet. 51, Exposition, 3.

*Spring Quarter of Senior Year at the Cloquet Forest Experiment Station\**

(All students in the professional curricula go to Cloquet.)

Students must register for all of the following courses:

- Ent. 167, Techniques in Forest Wildlife Management, 3.
  - For. 128, Silviculture Laboratory, 6.
  - For. 132, Forest Management Laboratory, 6.
  - For. 180, Applied Forest Protection, 1.
- Total credits Cloquet, 16.  
Total credits for senior year, 45.

## II. FORESTRY-RANGE MANAGEMENT

Suggested for those who wish to prepare for range management work. It is important that these men be well prepared in plant physiology, systematic botany, and plant ecology, as well as in the fundamental principles of forestry. They should have some knowledge of the feeding and breeding of livestock. In addition to the general undergraduate requirements, the course of study for the first four years must include the following courses in the junior and senior years:

#### JUNIOR YEAR

1. Freshman and sophomore courses not completed.
2. Required courses
  - Ag. Ec. 25, Accounting Principles, 4, or Econ. 22, Principles of Accounting, 4.
  - Ag. En. 20, Advanced Surveying, 3.
  - An. Hu. 1, Livestock Production, 4.

\* Located 4 miles from Cloquet and managed by the Division of Forestry. See page 8 for special fees.

- Bot. 51, General Plant Physiology, 3.  
 Econ. 28, Business Law, 3, or other social science course.  
 Ent. 56, Forest Entomology, 5.  
 For. 20, Grazing, 3.  
 For. 53, Wood Structure and Identification, 3.  
 For. 151, Logging, 3.  
 Geol. 8, Earth Features and Their Meaning, 5; or Geol. 1, General Geology, 3, and Geol. A, General Geology Laboratory, 2.  
 Pl. Pa. 3, Weeds, 3.  
 Pl. Pa. 4, Grasses and Sedges, 3.  
 Soc. 1, Introduction to Sociology, 3.  
 Soil. 4, Soils, 3.  
 Zool. 83, Introduction to Genetics and Eugenics, 3, or Agron. 31, Principles of Genetics, 4.  
 Total credits for the junior year 50-52.

#### SENIOR YEAR

1. Freshman, sophomore, and junior courses not completed.
2. Required courses
  - Ag. En. 24-25, Agricultural Physics, 8.
  - For. 56, Forest Products, 3.
  - For. 126, Silvics, 3.
  - For. 131, Forest Policy, 3.
  - For. 136, Forest Economics, 3.
  - For. 155, Forest Protection, 3.
  - Rhet. 22, Public Speaking, 3.
  - Rhet. 51, Exposition, 3.
  - † Total credits, 29.

#### *Spring Quarter of Senior Year at the Cloquet Forest Experiment Station\**

(All students in the professional curricula go to Cloquet.)

Students must register for all of the following courses:

- Ent. 167, Techniques in Forest Wildlife Management, 3.
- For. 128, Silvicultural Laboratory, 6.
- For. 132, Forest Management Laboratory, 6.
- For. 180, Applied Forest Protection, 1.
- Total credits Cloquet, 16.
- Total credits for senior year, 48.

### III. FORESTRY-WILDLIFE MANAGEMENT

(See also Fish and Wildlife Management Curriculum, page 22)

Suggested for those who wish to prepare for a combination of forestry and wildlife management work. It is important that these men be acquainted with general forestry practices and have a thoro knowledge of biology. In addition to the general requirements, the course of study for the first four years must include the following courses in the junior and senior years:

#### JUNIOR YEAR

1. Freshman and sophomore courses not completed.
2. Required courses
  - Ag. En. 20, Advanced Surveying, 3.
  - Econ. 22, Principles of Accounting, 4, or Ag. Ec. 25, Principles of Accounting, 4.
  - Econ. 28, Business Law, 3, or other social science course.
  - Ent. 56, Forest Entomology, 5.
  - Ent. 63, Mammalogy, 4.
  - Ent. 64, Economic Vertebrate Zoology, 3.
  - For. 56, Forest Products, 3.
  - Geol. 1, General Geology, 3, and Geol. A, General Geology Laboratory, 2; or Geol. 8, Earth Features and Their Meaning, 5.

† If student registers for Econ. 22 and Zool. 83, two additional credits selected in consultation with and approval of adviser to make a total of 204 credits.

\* Located 4 miles from Cloquet and managed by the Division of Forestry. See page 8 for special fees.

Rhet. 22, Public Speaking, 3.  
 Soc. 1, Introduction to Sociology, 3.  
 Soil. 4, Soils, 3.  
 Zool. 22, Comparative Anatomy, 5.  
 Zool. 51, Introductory Animal Parasitology, 5.

## SENIOR YEAR

Ag. En. 24-25, Agricultural Physics, 8.  
 Bot. 51, General Plant Physiology, 3.  
 For. 20, Grazing, 3.  
 For. 53, Wood Structure and Identification, 3.  
 For. 126, Silvics, 3.  
 For. 131, Forest Policy, 3.  
 For. 136, Forest Economics, 3.  
 For. 155, Forest Protection, 3.  
 Rhet. 51, Exposition, 3.

Two additional credits to be selected in consultation with, and with the approval of, adviser to make a total of 204 credits.

*Spring Quarter of Senior Year at the Cloquet Forest Experiment Station\**

(All students in the professional curricula go to Cloquet.)

Students must register for all of the following courses:

Ent. 167, Techniques in Forest Wildlife Management, 3.  
 For. 128, Silviculture, 6.  
 For. 132, Forest Management Laboratory, 6.  
 For. 180, Applied Forest Protection, 1.  
 Total credits Cloquet, 16.  
 Total credits for senior year, 48.

## TECHNOLOGICAL CURRICULA

## IV. LUMBER MERCHANDISING AND CONSTRUCTION§

Suggested for those who wish to enter the lumber business or the light building construction field. Includes fundamental courses in business, economics, light building construction, and training in the structure, properties, and uses of wood.

## FRESHMAN YEAR

## 1. Required courses

Ag. En. 3, Mechanical Drawing, 3.  
 For. 3, Dendrology, 3.  
 For. 4, Dendrology, 4.  
 In. Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may omit this course and register for In. Ch. 4-5.  
 In. Ch. 4-5, General Inorganic Chemistry, 8 (one year of high school chemistry). Those required to take In. Ch. 1-2 are exempt.  
 Math. 1, Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 elective credits.  
 Math. 6,† Trigonometry, 5 (Math. 1 or equiv.).  
 Math. 7, College Algebra, 5 (Math. 6).  
 Ori. 1, College Orientation Lectures, 1.  
 Rhet. Communications requirement.  
 Zool. 14-15, General Zoology, 6.  
 Total credits for the freshman year, 52.

\* Located 4 miles from Cloquet and managed by the Division of Forestry. See page 8 for special fees.

§ This curriculum replaces the curriculum in Commercial Lumbering. Students registered in the Commercial Lumbering Curriculum previous to the fall quarter, 1942-43 may complete that curriculum as outlined in the bulletin for the years 1940-42.

† See Mathematics requirement, page 9.

## SOPHOMORE YEAR

## 1. Freshman courses not completed

## 2. Required courses

- Ag. Bi. 1, Elementary Organic Chemistry, 5 (In. Ch. 8 cred.).  
 Ag. En. 24-25, Agricultural Physics, 8.  
 Ag. En. 44, Advanced Drawing, 2 (Ag. En. 3 or equiv.).  
 Bot. 1-2, General Botany, 6.  
 Econ. 3, Elements of Money and Banking, 5.  
 Econ. 6-7, Principles of Economics, 10.  
 Econ. 22-23, Principles of Accounting, 8 (Econ. 20).  
 Econ. 28, Business Law, 3.  
 For. 7, Forest Mensuration, 3 (Math. 6).  
 Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).  
 Total credits for the sophomore year, 51.

## JUNIOR YEAR

## 1. Sophomore courses not completed

## 2. Required courses

- Arch. 57, 58, 59, Building Materials and Methods, 6.  
 Bu. Ad. 77, Survey in Marketing, 3.  
 Bu. Ad. 89, Production Management, 3.  
 Bu. Ad. 142, Advanced Money and Banking, 3 (Econ. 3 and 6-7).  
 Econ. 5, Elements of Statistics, 5.  
 Econ. 161, Labor Problems and Trade Unionism, 3 (Econ. 6-7).  
 Econ. 175, Government Regulation of Business, 3 (20 cred. in soc. sci. including Econ. 6-7).  
 For. 53-54, Wood Structure and Identification, 6 (For. 3-4).  
 P.H. 3, Personal Health, 2.\*  
 Total credits for the Junior year, 40.

## SENIOR YEAR

## 1. Junior courses not completed.

## 2. Required courses

- Bu. Ad. 68, Sales Management, 3 (Bu. Ad. 77).  
 Bu. Ad. 101-102, Advanced General Economics, 6 (Sr. grad.; prereq. Econ. 6-7).  
 For. 56, Forest Products, 3.  
 For. 57, Wood Utilization, 3 (For. 53-54).  
 For. 58, Lumber Merchandising and Grading, 3 (For. 53-54).  
 For. 114-115-116, Mechanical and Physical Properties of Wood, 9 (Math. 7 and For. 53-54).  
 For. 120, Estimating, 3.  
 For. 125, Wood Preservation, 3 (For. 53-54).  
 For. 152, Wood Seasoning, 3 (For. 53-54).  
 Pl. Pa. 10, Forest Pathology, 5 (Bot. 6 cred.).  
 Rhet. 51, Exposition, 3 (Rhet. Communications requirement).  
 Total credits for the senior year, 44.

A sufficient number of courses to be selected in consultation with, and with the approval of, the adviser to make a total of 204 credits.

## V. WOOD TECHNOLOGY

Suggested for those who wish to enter the field of pulp and paper manufacture, wood preservation, or other industries using wood as a raw material. Includes a series of courses in chemistry and mathematics and a thoro training in the structure and properties of wood. The course of study must include the following courses:

## FRESHMAN YEAR

## Required courses

- Bot. 1-2, General Botany, 6.  
 For. 3, Dendrology, 3.  
 For. 4, Dendrology, 4.  
 In. Ch. 1-2, General Inorganic Chemistry, 8 (Students presenting a year of high school chemistry may omit this course and register for In. Ch. 4-5).

\* Not required of students with military service records.

- In. Ch. 4-5, General Inorganic Chemistry, 8 (One year of high school chemistry.) Those required to take In. Ch. 1-2 are exempt.
- In. Ch. 11, Semimicro Qualitative Analysis, 4.
- Math. 1, Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 elective credits.
- Math. 6,\* Trigonometry, 5 (Math. 1 or equivalent).
- Math. 7, College Algebra, 5 (Math. 6).
- Orie. 1, College Orientation Lectures, 1.
- Soc. 1, Introduction to Sociology, 3.
- Total credits for the freshman year, 44.

## SOPHOMORE YEAR

1. Freshman courses not completed
  2. Required courses
    - Ag. Bi. 2, Quantitative Methods, 5 (Gen. Inorg. Chem. 8 cred.)
    - Ag. Ec. 90, Agricultural Statistics, 5.
    - Ag. En. 3, Mechanical Drawing, 3.
    - Math. 30, Analytic Geometry, 5 (Math. 7).
    - Math. 50, Differential Calculus, 5 (Math. 30).
    - Math. 51, Integral Calculus, 5 (Math. 50).
    - Pl. Pa. 10, Forest Pathology, 5 (Bot. 6 cred.).
    - Rhet. Communications requirement.
- Total credits for the sophomore year, 42.

## JUNIOR YEAR

1. Sophomore courses not completed
  2. Required courses
    - Econ. 6-7, Principles of Economics, 10.
    - For. 53-54, Wood Structure and Identification, 6 (For. 3-4).
    - Or. Ch. 54-55-156, Elementary Organic Chemistry, 9 (15 cred. in college chem.).
    - Or. Ch. 57-58-159, Elementary Organic Chemistry Laboratory, 6 (Accompanied or preceded by corresponding quarter of Organic Chemistry 54-55-156).
    - P.H. 3,† Personal Health, 2.
    - Phys. 7-8-9, General Physics, 15 (Math. 15-16 or equiv.).
- Total credits for the junior year, 48.

## SENIOR YEAR

1. Junior courses not completed
  2. Required courses
    - Ag. Bi. 119, Colloids, 3 (Or. Ch. 4 or 8 cred., Phys. 9 advised).
    - Ag. Bi. 121, Carbohydrates, 3 (Ag. Bi. 119).
    - Bact. 53, General Bacteriology, 5 (Chem. 10 credits, 4 cred. in botany or zoology).
    - For. 56, Forest Products, 3.
    - For. 57, Wood Utilization, 3 (For. 53-54).
    - For. 113, Wood Pulp and Paper, 3.
    - For. 114-115-116, Mechanical and Physical Properties of Wood, 9 (For. 53-54, Math. 7).
    - For. 119, Advanced Wood Structure, 4 (For. 53-54).
    - For. 125, Wood Preservation, 3 (For. 53-54).
    - For. 142, Wood Chemistry, 3 (Or. Ch. 156, 159).
    - For. 152, Wood Seasoning, 3 (For. 53-54).
    - Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).
    - Rhet. 51, Exposition, 3 (Rhet. Communications requirement).
- Total credits for the senior year, 51.

A sufficient number of courses to be selected in consultation with, and with the approval of, the adviser to make a total of 204 credits.

## FIFTH YEAR LEADING TO THE MASTER OF FORESTRY DEGREE

A fifth year of work in the various fields of forestry (Forest Management, Range Management, Wildlife Management) is provided to meet the increasingly rigid requirements for the practice of professional work. Applicants for admission to the fifth year

\* See Mathematics requirement, page 9.

† Not required of students with military service records.

leading to the professional master of forestry degree must have completed all the requirements for the B.S. degree in the corresponding curriculum and must have maintained an acceptable honor point average. The professional degree, master of forestry (M.F.), is awarded only after the satisfactory completion of 52 credits of prescribed and elective courses, a major report, and comprehensive written and oral examinations, and the maintenance of an honor point average of at least 1.5.

All inquiries concerning admission to fifth year programs in forestry should be addressed to the College Office, College of Agriculture, Forestry, and Home Economics, University Farm, St. Paul 1, Minnesota. Applications for admission must be accompanied by an official transcript of undergraduate and of any graduate work that may have been taken.

Students desiring to enter the Graduate School for higher degrees may apply to do so after completion of the technological curricula and also after completion of the first four years of any of the forestry curricula, provided they meet the Graduate School requirements. In such cases the student will presumably seek training for research in some special subject-matter field within or underlying the field of forestry and will register for the master of science under Plan A or Doctor's degree in the Graduate School. Although the professional courses are clearly designed to terminate with the master of forestry (M.F.) degree, graduates of these courses may continue in graduate study, provided they meet the requirements of the Graduate School.

## FIFTH YEAR PROGRAM LEADING TO THE MASTER OF FORESTRY DEGREE

### I. FORESTRY-FOREST MANAGEMENT

#### Required courses

- Bot. 131, Field Ecology, 5.
- For. 111, Advanced Forest Mensuration, 3.
- For. 127, Silviculture, 3.
- For. 130, Forest Valuation, 5.
- For. 140, Forest Management Plans, 5.
- For. 141, Principles of Silvics, 3.
- For. 143, Forest Recreation, 3.
- For. 156-157, Major Report, 4.
- For. 158-159, Forestry Seminar, 2.
- Soil. 103, Soil Erosion, 3.
- Soil. 108, Physical Properties of Soils, 3.
- Electives, 13.

Total credits for the fifth year, 52.

### II. FORESTRY-RANGE MANAGEMENT

#### Required courses

- Bot. 115, Spring Flora of Minnesota, 3.
- Bot. 131, Field Ecology, 5.
- For. 111, Advanced Forest Mensuration, 3.
- For. 127, Silviculture, 3.
- For. 130, Forest Valuation, 5.
- For. 140, Forest Management Plans, 5.
- For. 143, Forest Recreation, 3.
- For. 144, Forage and Browse Plants, 3.
- For. 156-157, Major Report, 4.
- For. 158-159, Forestry Seminar, 2.
- Soil. 103, Principles of Soil Erosion, 3.
- Soil. 108, Physical Properties of Soils, 3.
- Electives, 10.

Total credits for the fifth year, 52.



## III. FORESTRY-WILDLIFE MANAGEMENT

## Required courses

- Bot. 115, Spring Flora of Minnesota, 3.
- Bot. 131, Field Ecology, 5.
- Ent. 165, Wildlife Management, 3.
- For. 111, Advanced Forest Mensuration, 3.
- For. 127, Silviculture, 3.
- For. 130, Forest Valuation, 5.
- For. 156-157, Major Report, 4.
- For. 158-159, Forestry Seminar, 2.
- Soil. 103, Soil Erosion, 3.
- Soil. 108, Physical Properties of Soils, 3.
- Zool. 53, Faunistic Zoology, 5.
- Electives, 13.

Total credits for the fifth year, 52.

# CURRICULA IN HOME ECONOMICS

## FOUR-YEAR CURRICULA

- I. General Home Economics, page 50.
- II. Dietetics, page 52.
- III. Home Economics Education, page 54.
- IV. Home Economics in Business, page 58.
- V. Institution Management, page 64.
- VI. Home Economics and Nursery School Education, page 66.
- VII. Home Economics Extension, page 67.
- VIII. Preparation for Research (page 68) in (a) Experimental Foods, page 69,  
(b) Nutrition, page 69, (c) Textiles and Clothing, page 70.

## FIVE-YEAR CURRICULUM

- I. Home Economics Education, page 54.

## FOUR-YEAR CURRICULA

Home Economics students on entering are assigned a program adviser who will explain the requirements of the curriculum in which the student is interested, the opportunity the University provides for counseling, orientation, and general education as a part of a home economics program.

Specialization in any of the fields of home economics involves two types of training for each student. Throughout the training period there is a core of courses required for homemaking purposes and, in addition, courses are required depending upon the student's vocational interest and choice. The four-year period includes a study of the physical, biological, and social sciences, English, and art, with opportunities for electives in other fields. The requirements for each field of specialization will be found under appropriate headings, e.g., those interested in preparing for teaching home economics, see page 54; those interested in other curricula see the appropriate pages listed above for each field.

Electives of general interest, or those which seem particularly suitable for the major sequence, should be chosen to complete the student's program. These must include enough courses in the field of social science to meet the all-college requirement of 18 credits (see page 9). Before the junior year each student must sign a specialization card for that phase of home economics in which she is most interested. Such cards are signed after conference with (a) the student's adviser and (b) the head of the section involved.

All students majoring in home economics will be required to take at least three credits in physical education. The courses chosen must be approved by the major adviser in the Department of Physical Education for Women.

Special attention is called to the faculty requirement for classification in the junior class (see page 10).

A total of at least 185 credits is required for the B.S. degree. See also requirements for *all* students in the college, page 8.

## I. GENERAL HOME ECONOMICS

This curriculum is designed to satisfy the needs and interests of those persons who wish to prepare themselves for a broad general background in home economics. Opportunity is offered also for a rather wide choice of electives. This curriculum leads to no special payroll job as other curricula are designed to do.

REQUIREMENTS

All-college requirements for students in this college. See page 8.

COURSES OPEN TO FRESHMEN

Required Course No.	Title	Credits	Prerequisites
Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None
H. Ec. 3	Clothing Construction A .....	3	H.Ec. 1; 3rd qtr. fr.
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	None, fr. only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art .....	4	None
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cr. chem.
Rhet.	Communications requirement .....		None
Soc. 1	Introduction to Sociology.....	3	None
Ph. Ed.	Physical Education .....	3	May be completed any time during four years of residence
Psy. A	Elementary Psychology .....	5	3rd qtr. fr.; C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr.; C average

Take Group I or II

<b>Group I</b>			
G.C. 10A-B	Human Biology .....	6	None
Dy. Hu. 20 or Bact. 53	Household Microbiology .....	4	3rd qtr. fr.; permission of instructor (See sophomore list)
<b>Group II</b>			
Zool. 14-15	General Zoology .....	6	None
Physiol. 4	Human Physiology .....	4	1 qtr. zool., 1 qtr. chem.
Dy. Hu. 20 or Bact. 53	Household Microbiology .....	4	3rd qtr. fr.; approval of adviser and permission of instructor (See sophomore list)

Take Group I or II

<b>Group I</b>			
G.C. 37B	The Nature of Chemistry .....	5	None
G.C. 37C	Sound, Astronomy, Technology .....	5	None
G.C. 37A*	Physical Science .....	5	None
or Agr. Eng. 35*	Household Physics .....	5	None
<b>Group II</b>			
Chem. 1-2	General Inorganic Chemistry .....	8	None
or Chem. 4-5	General Inorganic Chemistry .....	8	Entrance cred. in chemistry
or Chem. 6-7	General Inorganic Chemistry .....	10	None
or Chem. 9-10	General Inorganic Chemistry .....	10	Entrance cred. in chemistry
G.C. 37A*	Physical Science .....	5	None
or Ag. En. 35*	Household Physics .....	5	None
Ag. Bi. 1	(See sophomore list)		

COURSES OPEN TO SOPHOMORES

H. Ec. 4	Clothing Construction B .....	3	H.Ec. 3
H. Ec. 24	Problems in Home Planning and Furnishing (to be followed by H.E. 120) .....	5	H.Ec. 20
or 21	Color and Design I .....	3	H.Ec. 20
22	Color and Design II .....	3	H.Ec. 1 and 20 (To be followed by 27, 180)
H. Ec. 27	Related Art Problems .....	3	H.Ec. 21; soph.
H. Ec. 34 or 170 and 171	Nutrition Problems .....	4	3rd qtr. soph.; H.Ec. 31, 40, physiol. or human biol. (See junior list)

\* Students who have had one year of high school physics may be exempt from Ag.En. 35 or G.C. 37A.

Required Course No.	Title	Credits	Prerequisites
H. Ec. 41	Food Management and Marketing .....	5	H.Ec. 31, 40
Rhet. 22	Public Speaking .....	3	Rhet. Communications require- ment
Rhet. 31	Survey of English Literature .....	5	Rhet. Communications require- ment
or 32	Survey of English Literature II .....	3	Rhet. Communications require- ment
or 33	American Life in American Literature	3	Rhet. Communications require- ment
or 60	(See junior list)		
Bact. 53	General Bacteriology .....	5	8 cred. in chem. and 4 cred. in bot. or zool.; soph. with C average in prereq. courses
or Dy. Hu. 20	(See freshman list)		
Ag. Bi. 1	Introduction to Organic Chemistry .....	5	In. Ch. 8-10 cred.
Ag. Ec. 3	Principles of Economics .....	5	None
Soc. 2	Individual and Minority Group Ad- justment .....	5	Soc. 1
or 14	Rural Sociology .....	3	Soc. 1
or 49	Social Pathology .....	3	3rd qtr. soph., 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.
	(See also other junior-senior choices)		

## COURSES OPEN TO JUNIORS AND SENIORS

H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 85	Home Management, lectures .....	4	H. Ec. 40, 41 advised
H. Ec. 86	Home Management, laboratory .....	4	H. Ec. 85, or parallel, 40, 41 advised, P.H. 52
H. Ec. 120	Art History and Appreciation .....	3	None, must be Sr. College or grad. student
	(See sophomore sequence 20, 24)		
H. Ec. 170	Nutrition of the Family .....	3	H. Ec. 31, 40, Ag. Bi. 1, and 3 cred. in physiol.
and			
H. Ec. 171	Child Nutrition .....	3	H. Ec. 170, H.E. Ed. 90
or H. Ec. 34	(See sophomore list)		
H. Ec. 18C	Home Planning and Furnishing .....	5	H. Ec. 27, 120 recommended
	(See sophomore sequence 21, 22)		
Rhet. 51	Exposition .....	3	Rhet. Communications require- ment
Rhet. 60	Contemporary Literature .....	3	Rhet. Communications require- ment
	(See sophomore sequence 31, 32)		
P.H. 52a	Health Care of the Family, lectures .....	2	Bact. 53 or Dy. Hu. 20; Physiol. 4
P.H. 52b	Health Care of the Family, laboratory	1	Bact. 53 or Dy. Hu. 20; Physiol. 4
Soc. 119	The Family .....	3	Soc. 1 and 15 cred. in soc. sci., child welfare, education, phi- losophy, or psychology, or con- sent of instructor
or Soc. 2	(See sophomore list)		
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1, 2 or parallel 2

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

## II. DIETETICS\*

This curriculum is planned for those particularly interested in becoming hospital dietitians. Following graduation the student should plan to complete a dietetic internship in a hospital. Eventually, graduates with this training may be employed as administrative or therapeutic dietitians, as nutritionists in a public health agency, or as dietitians in a food clinic.

\* For the Dietetics Specialization a grade of at least C is required for the following courses: Ag.Bi. 1; H.Ec. 40, 41, 45, 46, 65, 170, 171; Physiol. 4. C average is required for the following group of courses: H.Ec. 33, 79, 173, 35, and 178.

REQUIREMENTS

All-college requirements for students in this college. See page 8.

COURSES OPEN TO FRESHMEN

Required Course No.	Title	Credits	Prerequisites
Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	Fr. only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art .....	4	None
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. chem.
Rhet.	Communications requirement .....		None
Rhet. 34	Books and Reading .....	1	None
Zool. 14, 15	General Zoology .....	6	None
Chem. 1-2	General Inorganic Chemistry .....	8	None
or 4-5	General Inorganic Chemistry .....	8	Entrance credits in chemistry
or 9-10	General Inorganic Chemistry .....	10	Entrance credits in chemistry
or 6-7	General Inorganic Chemistry .....	10	None
Physiol. 4	Human Physiology .....	4	1 qtr. chem., 1 qtr. Zool.
Ag. En. 35†	Household Physics .....	5	None
Soc. 1	Introduction to Sociology .....	3	None
Econ. 22	Principles of Accounting .....	3	3rd qtr. freshmen
or Ag. Ec. 25	(See sophomore list)		
Ph. Ed.	Physical Education .....	3	May be completed any time during four years of residence
Psy. A	Elementary Psychology .....	5	3rd qtr. fr. with C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr. with C average

COURSES OPEN TO SOPHOMORES

H. Ec. 24	Problems in Home Planning and Furnishing .....	5	H. Ec. 20
H. Ec. 33	Nutrition I .....	4	Ag. Bi. 1, Physiol. 4
H. Ec. 35	Nutrition II .....	4	H. Ec. 33
H. Ec. 41	Food Management and Marketing .....	5	H. Ec. 31, 40
H. Ec. 45	Quantity Cookery .....	6	H. Ec. 40, 41
H. Ec. 46	Cafeteria Experience .....	3	None
Rhet. 22	Public Speaking .....	3	Rhet. Communications requirement
Rhet. 31	Survey of English Literature I .....	5	Rhet. Communications requirement
or 32	Survey of English Literature II .....	3	Rhet. Communications requirement
or 33	American Life in American Literature (See junior list)	3	Rhet. Communications requirement
or 60			
Bact. 53	General Bacteriology .....	5	8 cred. in chem. and 4 cred. in bot. or zool.; soph. with C average in prereq. courses
Ag. Bi. 1	Introduction to Organic Chemistry .....	5	8 cred. in in. ch.
Ag. Bi. 2	Quantitative Methods .....	5	8 cred. in in. ch.
Ag. Ec. 3	Principles of Economics .....	5	None
Ag. Ec. 25	Principles of Accounting .....	4	None
or Econ. 22	(See freshman list)		

COURSES OPEN TO JUNIORS AND SENIORS

H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 64	Institution Buying .....	4	H. Ec. 45 or parallel; 46 or parallel—one of these required
H. Ec. 65	Institution Management Problems .....	3	H. Ec. 45, 46, 64
H. Ec. 79	Selected Problems for Dietitians .....	3	H. Ec. 170 or equiv.

† Students who have had one year of high school physics may be exempt from Ag.En. 35.

Required Course No.	Title	Credits	Prerequisites
H. Ec. 85	Home Management Lectures .....	4	H. Ec. 40, 41 advised
H. Ec. 86	Home Management Laboratory .....	4	85 or parallel, 40, 41 advised P.H. 52a and 52b
H. Ec. 142	Experimental Cookery .....	3	H. Ec. 40, Ag. Bi. 1
H. Ec. 170	Nutrition of the Family .....	3	H. Ec. 31, 40, Ag. Bi. 1 Physiol. 3 cred.
H. Ec. 171	Child Nutrition .....	3	H. Ec. 170, H.E. Ed. 90
H. Ec. 173	Nutrition in Disease .....	4	H. Ec. 170, 35 also advised
H. Ec. 176 or 177	Advanced Nutrition .....	4	H. Ec. 35 or parallel, Ag. Bi. 2
	Digestion and Metabolism .....	3	H. Ec. 35
H. Ec. 178	Clinical Problems in Nutrition .....	2	H. Ec. 170, 35 or parallel
H. Ec. 179	Readings in Nutrition .....	2	H. Ec. 170
Rhet. 51	Exposition .....	3	Rhet. Communications require- ment
Rhet. 60 or 31 or 32 or 33	Contemporary Literature .....	3	Rhet. Communications require- ment (See sophomore list)
P.H. 52a	Health Care of the Family, lectures .....	2	Bact. 53, Physiol. 4
P.H. 52b	Health Care of the Family, laboratory .....	1	Bact. 53 or Dy. Hu. 20; Physiol. 4
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1-2 or parallel 2

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

### III. HOME ECONOMICS EDUCATION

The College of Agriculture, Forestry, and Home Economics and the College of Education co-operate in the preparation of teachers of home economics. Satisfactory completion of the following curricula will lead to the B.S. degree and will provide the necessary training for qualification for the Minnesota "high school standard special certificate" for teaching home economics in secondary schools. Completion of this curriculum qualifies for teaching in federally-aided home economics departments.

When the student has acquired a minimum of 90 credits and at least one honor point per credit (junior classification) and indicated her specialization as the teachers' or the extension curriculum, she becomes a registrant also in the College of Education. At the beginning of the junior year, the student is required to take the psychological and other examinations given in the College of Education.

Prior to registration for Supervised Teaching, the student must have completed the following requirements:

1. The College of Education examinations.
2. Home experience in clothing, foods, and other phases of home economics.
3. Certain home economics courses with at least a grade of C.\*
4. Home economics courses required in the teaching curriculum with an honor point ratio of 1.5.

In order to be recommended for graduation from the teaching specialization, the student must have (1) 1½ honor points per credit in 40 credits of home economics work required in the curriculum for General Home Economics Teaching; (2) an average of 1 honor point per credit in all other courses pursued during the junior and senior years.

By a proper selection of courses, students qualifying for the degree of bachelor of science may qualify for teaching in more than one field. This is desirable since most beginning teachers in public schools are often expected to teach another subject in addition to home economics.

\* For the General Home Economics Teaching Specialization a grade of at least C is required for the following courses: H.Ec. 3, 4, 21, 22, 27, 34 (or 170), 40, 41.

FOUR-YEAR CURRICULUM IN HOME ECONOMICS EDUCATION  
LEADING TO THE B.S. DEGREE

General Home Economics Teaching

The following courses are required for those preparing for teaching general home economics:

All-college requirements for students in this college. See page 8.

COURSES OPEN TO FRESHMEN

Required Course No.	Title	Credits	Prerequisites
Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None
H. Ec. 3	Clothing Construction A .....	3	H. Ec. 1; 3rd qtr. fr.
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	None; fr. only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art .....	4	None
H. Ec. 21	Color and Design I .....	3	H. Ec. 20
H. Ec. 22	Color and Design II .....	3	H. Ec. 1 and 20
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. chem.
Rhet.	Communications requirement .....		None
Soc. 1	Introduction to Sociology .....	3 (or 5)	None
Ph. Ed.	Physical Education .....	3	May be completed any time during four years of residence
Psy. 1-2	General Psychology .....	6	3rd qtr. fr. with C average

Take Group I or II

<b>Group I</b>			
Zool. 14-15	General Zoology .....	6	None
Physiol. 4	Human Physiology .....	4	1 qtr. zool., 1 qtr. chem.
Dy. Hu. 20 or Bact. 53	Household Microbiology .....	4	3rd qtr. fr., permission of instructor (See sophomore list)
<b>Group II</b>			
G.C. 10A-B	Human Biology .....	6	None
Dy. Hu. 20 or Bact. 53	Household Microbiology .....	4	3rd qtr. fr., permission of instructor (See sophomore list)

Take Group I or II

<b>Group I</b>			
Chem. 1-2 or 4-5 or 9-10 or 6-7	General Inorganic Chemistry .....	8	None
	General Inorganic Chemistry .....	8	Entrance credit in chemistry
	General Inorganic Chemistry .....	10	Entrance credit in chemistry
	General Inorganic Chemistry .....	10	None
G.C. 37A or Ag. En. 35	Energy and Matter .....	5	None
	Household Physics .....	5	None
<b>Group II</b>			
G.C. 37B	The Nature of Chemistry .....	5	None
G.C. 37A	Energy and Matter .....	5	None
	General Physics .....	5	None
or Ag. En. 35	Household Physics .....	5	None

COURSES OPEN TO SOPHOMORES

H. Ec. 4	Clothing Construction B .....	3	H. Ec. 3, 20
H. Ec. 27	Related Art Problems .....	3	H. Ec. 21
H. Ec. 34 or 170, 171	Nutrition Problems .....	4	3rd qtr. soph., H.E. 31, 40, physiol. or human biol.
H. Ec. 41	Food Management and Marketing .....	5	H. Ec. 31, 40

Required Course No.	Title	Credits	Prerequisites
Rhet. 22	Public Speaking .....	3	Rhet. Communications require- ment
Rhet. 31	Survey of English Literature I .....	5	Rhet. Communications require- ment
or 32	Survey of English Literature II .....	3	Rhet. Communications require- ment
or 33	American Life in American Literature .....	3	Rhet. Communications require- ment
or 60	(See junior-senior list)		
Bact. 53	General Bacteriology .....	5	10 cred. in chem. and 4 cred. in bot. or zool.
or Dy. Hu. 20	(See freshman list)		
Ag. Bi. 1	Introduction to Organic Chemistry.....	5	In. Ch. 8 cred.
Ag. Ec. 3	Principles of Economics .....	5	None
<b>COURSES OPEN TO JUNIORS AND SENIORS</b>			
H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 53	Advanced Clothing .....	3	H. Ec. 4, 50
H. Ec. 85	Home Management Lectures.....	4	H. Ec. 40, 41 advised
H. Ec. 86	Home Management Laboratory.....	4	H. Ec. 85, or parallel, H. Ec. 40, 41 advised; P.H. 52a and 52b
H. Ec. 170	Nutrition of the Family.....	3	H. Ec. 31, 40, Ag. Bi. 1, Physiol. 4 cred.
and 171 or 34	Child Nutrition .....	3	H. Ec. 170, H.E. Ed. 90 (See sophomore list)
H. Ec. 180	Home Planning and Furnishing.....	5	H. Ec. 27, 120 recommended
P.H. 52a	Health Care of the Family, lectures.....	2	Bact. 53 or Dy. Hu. 20; Physiol. 4, or permission of instructor
P.H. 52b	Health Care of the Family, laboratory .....	1	Bact. 53 or Dy. Hu. 20, Physiol. 4
P.H. 59	Health of the School Child.....	3	P.H. 3 and 4, or 3 and 51, or G.C. 10C and P.H. 4, or G.C. 10C and 51, or 50, or 52, or 53
Rhet. 51*	Exposition .....	3	Rhet. Communications require- ment
Rhet. 60 or 31 or 32 or 33	Contemporary Literature .....	3	Rhet. Communications require- ment (See sophomore list)
Ed. 51A-C	Introduction to Secondary School Teaching .....	6	6 cred. in psy. and a C average
Ag. Ec. 126	Economics of Consumption.....	3	Ag. Ec. 3
H. Ed. 180	The School and the Social Order.....	3	6 cred. in soc. sci.
H.E. Ed. 90	Child Training .....	3	Psy. 1-2 or parallel 2
H.E. Ed. 91	Observation, Materials, Teaching in Home Economics .....	5	H. Ec. 4, 21, 22, 41, Psy. 1-2, Ed. 51A, 51C, parallel H.E. Ed. 93
H.E. Ed. 92	Teaching Problems in Home Eco- nomics .....	2	H.E. Ed. 91, 93, 94 or parallel, and 192
H.E. Ed. 93,** 94**	Supervised Teaching in Home Eco- nomics .....	6	H. Ec. 4, 21, 22, 41, Psy. 1-2, Ed. 51A, 51C, parallel H.E. Ed. 91, H.E. Ed. 192; home experience
H.E. Ed. 192	Evaluation in Home Economics Edu- cation .....	2	Ed. 51A, H.E. Ed. 91 or parallel

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

\* Unless exempt by examination.

\*\* Students must sign up in the Office of Admissions and Records at University Farm at least 2 quarters prior to registration in this course.



Those whose interests lead them into further specialization in the teaching field may choose one of the following groups. The student should plan her program early in her college course to be certain that she has the necessary prerequisites.

### Teaching Textiles and Clothing

To the requirements in general teaching add:

Required Course No.	Title	Credits	Prerequisites
H. Ec. 54	Problems in Clothing Construction.....	3	Jr., sr.; H. Ec. 53 or permission of instructor
H. Ec. 102	Advanced Textiles .....	3	Jr., sr.; H. Ec. 50, Ag. Bi. 1, Ag. Ec. 3 or parallel
H. Ec. 115	Clothing Economics .....	3	Jr., sr.; H. Ec. 50, Ag. Ec. 3
H. Ec. 120	Art History and Appreciation .....	3	Senior College and grad. students only
Bot. 4	General Botany .....	5	None

### Teaching Foods

To the requirements in general teaching add:

H. Ec. 45	Quantity Cookery .....	6	Jr., sr.; H. Ec. 40, 41
H. Ec. 142	Experimental Cookery .....	3	Jr., sr.; H. Ec. 40, Ag. Bi. 1
H. Ec. 146	Special Food Problems.....	3	Sr.; H. Ec. 142
Ag. Bi. 2	Quantitative Methods .....	5	Soph. jr., sr.; In. Ch. 8 cred.

### Teaching Nutrition

Omit from the requirements in general teaching the following courses: H. Ec. 3, 4, 21, 22, 27, 34, 53, 180, G.C. 37A-B, 10A-B and Ag. Ec. 126.

To the requirements in general teaching add:

H. Ec. 24	Problems in Home Planning and Furnishing .....	5	Soph.; H. Ec. 20
H. Ec. 142	Experimental Cookery .....	3	Jr., sr.; H. Ec. 40, Ag. Bi. 1
H. Ec. 173	Nutrition in Disease.....	3	Jr., sr.; H. Ec. 170, 175 also advised
H. Ec. 179	Readings in Nutrition.....	2	Jr., sr.; H. Ec. 170

### Teaching Related Art

Those interested in teaching Related Art should:

- Select the minimum credit requirement in science when there is an option.
- Omit Ag. Ec. 126.
- Add the following:

H. Ec. 23	Advanced Design .....	3	Soph., jr.; H. Ec. 21 or 22
H. Ec. 25	Design Applied to Crafts.....	3	Soph., H. Ec. 21 or 22
H. Ec. 120	Art History and Appreciation .....	3	Open to Senior College and grad. students only
H. Ec. 122	Advanced Interior Design.....	3	Jr., sr.; H. Ec. 27, 120 or permission of instructor
or 125	Advanced Costume Design .....	3	Jr., sr.; H. Ec. 3, or permission of instructor, H. Ec. 22, 25 recommended
H.E. Ed. 197	Organization and Methods for Related Art Teaching .....	1-3	Sr.; H.E. Ed. 91, H. Ec. 180 or parallel

Six credits from the following in Art Education or Architectural Drawing:

Art Ed. 4, 6, 8	Basic Drawing .....	2	a qtr. None
or Arch. DP-I	Drawing and Painting.....	2	a qtr. None

## IV. HOME ECONOMICS IN BUSINESS

Students planning to use home economics training in business may choose one of the following fields in which to specialize.

## Foods and Nutrition\*

While the Division of Home Economics has no organized plan for practical experience in foods in business, such experience is valuable to students majoring in this field. This experience might take the form of a summer or part-time position in a public utility company, experimental kitchen, food industry, department store demonstration, or similar enterprise. The student's ability to get this experience will depend on her own initiative and success in the work she undertakes. The ability to use a typewriter is important. For those interested in radio work, participation in the Radio Guild is suggested.

An organized plan for home experience is a requirement for this curriculum. The project is to be chosen in consultation with a member of the faculty of the foods section after the completion of H.Ec. 41.

All-college requirements for students in this college. See page 8.

## COURSES OPEN TO FRESHMEN

Required Course No.	Title	Credits	Prerequisites
Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	Freshmen only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art .....	4	None
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. in chem.
Zool. 14-15	General Zoology .....	6	None
Physiol. 4	Human Physiology .....	4	1 qtr. zool., 1 qtr. chem.
Ch. 1-2	General Inorganic Chemistry .....	8	None
or 4-5	General Inorganic Chemistry .....	8	Entrance cred. in chem.
or 6-7	General Inorganic Chemistry .....	10	None
or 9-10	General Inorganic Chemistry .....	10	Entrance cred. in chem.
Ag. En. 35†	Household Physics .....	5	None
Soc. 1	Introduction to Sociology .....	3(or 5)	None
Ph. Ed.	Physical Education .....	3	May be completed at any time during four years' residence
Psy. A	Elementary Psychology .....	5	3rd qtr. fr.; C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr.; C average

Any two of the following:

G.C. 26A	Photography .....	3	None
Jour. 41	(See junior-senior list)		
Jour. 69	(See junior-senior list)		
An. Hu. 50	(See junior-senior list)		

## COURSES OPEN TO SOPHOMORES

See courses listed for freshmen.

H. Ec. 24	Problems in Home Planning and Furnishing .....	5	H. Ec. 20
H. Ec. 41	Food Management and Marketing .....	5	H. Ec. 31, 40
H. Ec. 45	Quantity Cookery .....	6	H. Ec. 40, 41
H. Ec. 46	Cafeteria Experience .....	3	None

\* For the Foods and Nutrition in Business Specialization a grade of at least C is required for the following courses: H.Ec. 40, 41, 142, 170; Rhet. 22; Jour. 69 or 70.

† Students who have had one year of high school physics may be exempt from Ag.En. 35.

Required Course No.	Title	Credits	Prerequisites
Rhet. 22	Public Speaking .....	3	Rhet. Comm. req.
Rhet. 24	Advanced Public Speaking .....	3	Rhet. 22 or 23
Rhet. 31	Survey of English Literature I .....	5	Rhet. Comm. req.
or 32	Survey of English Literature II .....	3	Rhet. Comm. req.
or 33	American Life in American Literature .....	3	Rhet. Comm. req.
or 60	(See junior-senior list)		
Ag. Bi. 1	Introduction to Organic Chemistry.....	5	In. Ch. 8 credits
Ag. Ec. 3	Principles of Economics .....	5	None
Bact. 53	General Bacteriology .....	5	10 cred. in chem.; 4 cred. in bot. or zool.
Jour. 13	Introduction to Reporting .....	3	Soph., jr., sr., with C average; Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement

COURSES OPEN TO JUNIORS AND SENIORS\*

H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 70	Advanced Food Preparation .....	3	Ag. Bi. 1, H. Ec. 41
H. Ec. 71	Demonstrations .....	1	Open only to 3rd qtr. jr., sr.
H. Ec. 85	Home Management Lectures .....	4	H. Ec. 40, 41 advised
H. Ec. 86	Home Management Laboratory .....	4	H. Ec. 85 or parallel, 40, 41 advised, P.H. 52a and 52b
H. Ec. 120	Art History and Appreciation.....	3	None; Senior College and grad. only
H. Ec. 142	Experimental Cookery .....	3	H. Ec. 40, Ag. Bi. 1
H. Ec. 146	Special Food Problems .....	3	H. Ec. 142, open to sr. only
H. Ec. 170	Nutrition of the Family.....	3	H. Ec. 31, 40, Ag. Bi. 1 Physiol. 3 cred.
H. Ec. 171	Child Nutrition .....	3	H. Ec. 170, H.E. Ed. 90
H. Ec. 179	Readings in Nutrition .....	2	H. Ec. 170
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1-2 or parallel 2
Psy. 56	Psychology of Advertising .....	3	Psy. 1-2, Ag. Ec. 3
P.H. 52a	Health Care of the Family, lectures....	2	Bact. 53, Physiol. 4
P.H. 52b	Health Care of the Family, laboratory	1	Bact. 53, Physiol. 4
Bu. Ad. 88	Advertising .....	3	Ag. Ec. 126 or B.A. 77, and Psy. 56
Ag. Ec. 126	Economics of Consumption .....	3	Ag. Ec. 2 or 3
or Econ. 185	Economics of Marketing .....	3	Econ. 6-7 or 83
or Bu. Ad. 167	Personnel Administration .....	3	Econ. 161
or Econ. 161	Labor Problems and Trade Unions .....	3	Econ. 6-7 or 83
Rhet. 51	Exposition .....	3	Rhet. Comm. req.
Rhet. 60	Contemporary Literature .....	3	Rhet. Comm. req.
or 31 or 32 or 33	(See sophomore list)		

Any two of the following :

Jour. 41	Editing for Nonmajors .....	3	Jour. 12 or 13
Jour. 69	Newspaper and Magazine Articles.....	3	Jour. 15 or 41
An. Hu. 50	Meat Selection and Utilization .....	3	None
G.C. 26A	(See Freshman list)		
Rhet. 54	Advanced Public Speaking .....	3	Rhet. 22

Additional social science credits should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

Related Art†

The curriculum in Related Art and Business is planned to give students a background of knowledge and experience in the applications of color and design, leading primarily to work in department stores, interior furnishing studios, and dress and specialty shops.

† For Related Art in Business Specialization a grade of at least C is required for the following courses: H.Ec. 21, 22, 27, 122, 125, 180. It is recommended that each home economics student interested in business learn to use a typewriter.

The curriculum listed here constitutes a basic preparation in the general field of related art with a major emphasis upon interior furnishings and dress design.

For those students who wish to specialize in Costume Design or in Related Art and Journalism, certain courses in the basic curriculum may be omitted and others added.

All-college requirements for students in this college. See page 8.

#### COURSES OPEN TO FRESHMEN

Required Course No.	Title	Credits	Prerequisites
Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing.....	4	None
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	Fr. only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art.....	4	None
H. Ec. 21	Color and Design I.....	3	H. Ec. 20
H. Ec. 22	Color and Design II.....	3	H. Ec. 1, 20
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. chem.; honor point ratio 1.00 or above
Rhet.	Communications requirement .....	3	None
Rhet. 34	Books and Reading.....	1	None
G.C. 10A	Human Biology I .....	3	None
G.C. 10B	Human Biology II .....	3	G.C. 10A
P.H. 3§	Personal Health .....	2	None
P.H. 4§	Health Problems of Adult Life.....	2	P.H. 3
G.C. 37A	Energy and Matter.....	5	None
or Ag. En. 35*	Household Physics .....	5	None
G.C. 37B	The Nature of Chemistry.....	5	None
Soc. 1	Introduction to Sociology.....	3	None
Hist. 1-2	Civilization of the Modern World.....	6	None
or 17	Modern Economic and Social Problems .....	5	3rd qtr. fr.
Psy. A	Elementary Psychology .....	5	3rd qtr. fr. with C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr. with C average
Ph. Ed.	Physical Education .....	3	May be completed at any time during four years of residence
Ar. Ed. 4, 6, 8	Basic Drawing .....	2 a qtr.	None
or Arch. DP-I	Drawing and Painting.....	2 a qtr.	None
	(6 credits to be selected from any of the preceding courses)		
Fine Arts	Any course .....	3	

#### COURSES OPEN TO SOPHOMORES

H. Ec. 23	Advanced Design .....	3	H. Ec. 21 or 22
or 25	Design Applied to Crafts.....	3	H. Ec. 21 or 22
or 26	Decorative Needlework and Other Crafts .....	3	H. Ec. 21
H. Ec. 27	Related Art Problems.....	3	H. Ec. 21
H. Ec. 34	Nutrition Problems .....	4	3rd qtr. soph.; H. Ec. 31, 40; Physiol. or Human Biology
Rhet. 22	Public Speaking .....	3	Rhet. Comm. req.
Rhet. 31	Survey of English Literature I.....	5	Rhet. Comm. req.
or 32	Survey of English Literature II.....	3	Rhet. Comm. req.
or 33	American Life in American Literature (See junior list)	3	Rhet. Comm. req.
Comp. 27-28	Advanced Writing .....	6	Eng. A-B-C or 4-5-6 or exemption
or Rhet. 26	Original Writing .....	3	Rhet. Comm. req.
or Jour. 12	Newspaper Reporting .....	5	None; Comp. 27-28 advised
or 13	Introduction to Reporting.....	3	Eng. A-B-C or exemption
or 41	(See junior list)		
or 5 or 6	additional credits in English literature.		

\* Students who have had one year of high school physics may be exempt from Ag.En. 35 or G.C. 37A.

§ P.H. 3, 4 are not accepted for teaching. Take instead G.C. 10A, B; Dy. Hu. 20 and P.H. 52a and 52b.

Required Course No.	Title	Credits	Prerequisites
Ag. Ec. 3	Principles of Economics .....	5	None
or Econ. 6-7	Principles of Economics .....	10	None

COURSES OPEN TO JUNIORS AND SENIORS

H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 85	Home Management Lectures .....	4	H. Ec. 40, H.E. Ed. 90 or parallel
H. Ec. 86	Home Management Laboratory .....	4	H. Ec. 85 or parallel, 40, H.E. Ed. 90, P.H. 52a and 52b
H. Ec. 120	Art History and Appreciation .....	3	Senior College and grad. students only
H. Ec. 121	Textile Design .....	3	H. Ec. 50, 27
H. Ec. 122	Advanced Interior Design .....	3	H. Ec. 27, 120, or permission of instructor
H. Ec. 125*	Advanced Costume Design .....	3	H. Ec. 3, 4, or permission of instructor, H.E. 22, 25 recommended
H. Ec. 180	Home Planning and Furnishing .....	5	H. Ec. 27, 120 recommended
Rhet. 51	Exposition .....	3	Rhet. Comm. req.
Rhet. 60	Contemporary Literature .....	3	Rhet. Comm. req.
or 31 or 32 or 33	(See sophomore list)		
Ag. Ec. 126	Economics of Consumption .....	3	Ag. Ec. 2 or 3
Psy. 56	Psychology of Advertising .....	3	Psy. 1-2 and Ag. Ec. 3
or Bu. Ad. 88	Advertising .....	3	Permission of instructor
Jour. 41	Editing for Nonmajors .....	3	Jour. 12 or 13
or Comp. 27-28	(See sophomore list)		
or 5 or 6	additional credits in English Literature.		
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1-2 or parallel 2
Bu. Ad. 69	Retail Store Management .....	3	Ag. Ec. 3

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

Costume Design

To the general courses listed under Related Art add:

H. Ec. 3	Clothing Construction A .....	3	3rd qtr. fr. with honor point ratio of 1.00, H. Ec. 1
H. Ec. 4	Clothing Construction B .....	3	Soph.; H. Ec. 3, 20
H. Ec. 115	Social and Economic Aspects of Clothing .....	3	Jr.; H. Ec. 50, or parallel, Ag. Ec. 3

OMIT

H. Ec. 122	Advanced Interior Design .....	3	H. Ec. 27, 120, or permission of instructor
Arch. DP-I	Drawing and Painting .....	2 a qtr.	None

Journalism†

To the general courses listed under Related Art add:

Comp. 27-28	Advanced Writing .....	6	Eng. A-B-C or 4-5-6 or exemption
Jour. 13	Introduction to Reporting (for minors) .....	3	Soph.; Eng. A-B-C or Comp. 4-5-6 or English exemption
or 12	Newspaper Reporting .....	5	Soph., permission of chairman of department
or 14-15	Newspaper Reporting .....	5	Soph.; Comp. 27-28, Jour. 13 or 12 or permission of instructor
Jour. 41	Editing for Nonmajors .....	3	Jr.; Jour. 12 or 13

\* This course may be omitted for those who are specializing in Interior Furnishing.

† For the specialization in Related Art and Journalism a grade of C is required in courses in English and Journalism in addition to the C grade requirements in Related Art.

Required Course No.	Title	Credits	Prerequisites
Jour. 69	Newspaper and Magazine Articles.....	3	Jr.; Jour. 15 or 41
or 73-74	Newspaper and Magazine Articles.....	6	Jr.; Jour. 15
OMIT			
Art Ed. 4, 6, 8	Basic Drawing .....	2 a qtr.	None
Arch. DP-I	Drawing and Painting .....	2 a qtr.	None

Eighteen credits are required in Composition 27-28 and Journalism courses.

### Textiles and Clothing†

For those who wish to specialize in the general field of Textiles and Clothing in Business the following courses are required.

All-college requirements for students in this college. See page 8.

#### COURSES OPEN TO FRESHMEN

Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None (Not open to students having had G.C. 15A)
H. Ec. 3	Clothing Construction A .....	3	H. Ec. 1
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	None; fr. only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art .....	4	None
H. Ec. 21	Color and Design I .....	3	H. Ec. 20
H. Ec. 22	Color and Design II .....	3	H. Ec. 1 and 20
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. in chem.
Rhet.	Communications requirement .....		None
Rhet. 34	Books and Reading .....	1	None
Ag. En. 35§	Household Physics .....	5	None
or G.C. 37A	Energy and Matter .....	5	None
Ph. Ed.	Physical Education .....	3	May be taken at any time during four years of residence
Soc. 1	Introduction to Sociology .....	3	None
Psy. A	Elementary Psychology .....	5	3rd qtr. fr.; C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr.; C average

#### Take Group I or II

<b>Group I</b>			
Zool. 14-15	General Zoology .....	6	None
Physiol. 4	Human Physiology .....	4	1 qtr. zool., 1 qtr. chem.
Dy. Hu. 20	Household Microbiology .....	4	3rd qtr. fr., permission of instructor
or Bact. 53	(See sophomore list)		
<b>Group II</b>			
G.C. 10A-B	Human Biology .....	6	None
Dy. Hu. 20	Household Microbiology .....	4	3rd qtr. fr., permission of instructor
or Bact. 53	(See sophomore list)		
Chem. 1-2	General Inorganic Chemistry .....	8	None
or 4-5	General Inorganic Chemistry .....	8	Entrance cred. in chem.
or 6-7	General Inorganic Chemistry .....	10	None
or 9-10	General Inorganic Chemistry .....	10	Entrance cred. in chem.
or G.C. 37B	Nature of Chemistry (Omit for textile testing) .....	5	None

#### COURSES OPEN TO SOPHOMORES

H. Ec. 4	Clothing Construction B .....	3	H. Ec. 3
H. Ec. 27	Related Art Problems .....	3	H. Ec. 21

† For Textiles and Clothing in Business a grade of at least C is required in the following courses: H.Ec. 3, 4, 21, 22, 50, 102, 107, 115. It is recommended that the home economics student interested in business learn to use a typewriter.

§ Students who have had one year of high school physics may be exempt from Ag.En. 35 or G.C. 37A.

Required Course No.	Title	Credits	Prerequisites
H. Ec. 34 or 170, 171	Nutrition Problems ..... (See junior list)	4	3rd qtr. soph., 31, 40, physiol. or human biol.
Rhet. 22	Public Speaking .....	3	Rhet. Comm. req.
Rhet. 31	Survey of English Literature I.....	5	Rhet. Comm. req.
or 32	Survey of English Literature II.....	3	Rhet. Comm. req.
or 33	American Life in American Literature	3	Rhet. Comm. req.
or 60	(See junior courses)		
Bact. 53 or Dy. Hu. 20	General Bacteriology .....	5	Chem. 10 cred., Zool. or Bot. 4 cred.
Ag. Bi. 1	Introduction to Organic Chemistry.....	5	In. Ch. 8 cred. or G.C. 37B
Ag. Ec. 3	Principles of Economics .....	5	None
or Econ. 6-7	Principles of Economics .....	10	None
Ag. Ec. 25	Principles of Accounting.....	4	None
or Econ. 22	Principles of Accounting.....	3	None

COURSES OPEN TO JUNIORS AND SENIORS

H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 85	Home Management Lectures .....	4	H. Ec. 40, 41 advised
H. Ec. 86	Home Management Laboratory .....	4	H. Ec. 85 or parallel, H. Ec. 40, 41 advised; P.H. 52a and 52b
H. Ec. 102	Advanced Textiles .....	3	H. Ec. 50, Ag. Bi. 1, Ag. Ec. 3 or Econ. 6-7 or parallel
H. Ec. 115	Economic and Social Aspects of Cloth- ing .....	3	H. Ec. 50, Ag. Ec. 3
H. Ec. 120	Art History and Appreciation .....	3	Jr., sr., and grad. only
H. Ec. 170	Nutrition of the Family .....	3	H. Ec. 31, 40; Ag. Bi. 1, Physiol. 4 or G.C. 10A, B
and H. Ec. 171 or 34	Child Nutrition .....	3	H. Ec. 170, H.E. Ed. 90 (See sophomore list)
H. Ec. 180	Home Planning and Furnishing .....	5	H. Ec. 27, 120 recommended
Rhet. 51	Exposition .....	3	Rhet. Comm. req.
Rhet. 60	Contemporary Literature .....	3	Rhet. Comm. req.
or 31 or 32 or 33	(See sophomore list)		
P.H. 52a	Health Care of the Family, lectures .....	2	Bact. 53 or Dy. Hu. 20, Physiol. 4
P.H. 52b	Health Care of the Family, laboratory .....	1	Bact. 53 or Dy. Hu. 20, Physiol. 4
Ag. Ec. 126	Economics of Consumption .....	3	Ag. Ec. 2 or 3, or Econ. 6-7
Bu. Ad. 69	Retail Store Management.....	3	B.A. 77
Bu. Ad. 77	Survey of Marketing .....	3	Econ. 6-7 or Ag. Ec. 3
Bu. Ad. 88	Advertising .....	3	B.A. 77 and Psy. 56
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1-2 or parallel 2
Psy. 56	Psychology of Advertising.....	3	Psy. A or Psy. 1-2 and Princi- ples of Economics

In addition, the student will choose the phase of Textiles and Clothing in Business in which she is interested and for which special requirements are listed.

Store or Other Commercial Enterprises

H. Ec. 53	Advanced Clothing .....	3	Jr.; H. Ec. 4, 50 or parallel
French	One year high school French		
or 1	Beginning French .....	5	Fr.; none

## Journalism

Required Course No.	Title	Credits	Prerequisites
Comp. 27-28	Advanced Writing .....	6	Eng. A-B-C or 4-5-6 or exemption
H. Ec. 53	Advanced Clothing .....	3	Jr.; H. Ec. 4, 22, 50
Jour. 13	Introduction to Reporting (for journalism minors) .....	3	Soph. with C average; Eng. A-B-C or Comp. 4-5-6 or exemption
or 12	Newspaper Reporting .....	5	Soph., jr., sr. with average of C; Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement and consent of instructor
Jour. 41	Editing for Nonmajors .....	3	Jr.; Jour. 12 or 13
Jour. 69	Newspaper and Magazine Articles .....	3	Jr.; Jour. 15 or 41

## Textile Testing

H. Ec. 107	Textile Analysis .....	3	Jr., sr., grad.; H. Ec. 50, Ag. Bi. 1 and 2
Bot. 4	General Botany .....	5	Fr.; none
P.H. 110	Biometric Principles .....	3	18 cred. biol. sci. or math. through anal. geom.; to be taken with 111
and P.H. 111	Biostatistics Laboratory .....	2	To be taken with 110
or Ag. Ec. 90	Agricultural Statistics .....	5	Jr.
Ag. Bi. 2	Quantitative Methods .....	5	Soph.; 8-10 cred. in inorg. chem.
Ag. Bi. 1	Introduction to Organic Chemistry .....	5	Soph.; 8-10 cred. in inorg. chem.

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

## V. INSTITUTION MANAGEMENT\*

The curriculum in Institution Management is planned to provide background and initial experience for those students who are interested in food service of a commercial nature, such as that in restaurants, cafeterias, school lunchrooms, and tearooms. Those persons considering this field of training must bear in mind that practical experience before graduation is very important. This experience may be gained in vacation periods by securing minor positions at camps, hotels, restaurants, or tearooms where food is prepared and served in large quantities.

It is highly recommended that the student who wishes to progress in the field of Institution Management plan to take an internship, upon graduation, either in the commercial field or in a college. These internships are planned to give enough experience in a variety of situations to enable the graduate to qualify for good positions upon completion of the course. Consult your adviser about internships.

We recommend that each student who wishes to secure a position of responsibility (1) use vacation periods to get a well-rounded work experience, (2) plan on a fifth year in an apprentice training course, and (3) learn how to use a typewriter.

All-college requirements for students in this college. See page 8.

## COURSES OPEN TO FRESHMEN

Required Course No.	Title	Credits	Prerequisites
Orie. 1	College Orientation Lectures .....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None
H. Ec. 6	Institution Experience .....	3	None
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	None; 1st qtr. fr. only

\* For the Institution Management Specialization a grade of at least C is required for the following courses: H. Ec. 40, 41, 45, 46, 64, 65, 170.



Required Course No.	Title	Credits	Prerequisites
H. Ec. 17	Personal and Family Living.....	3	None
H. Ec. 20	Introduction to Related Art.....	4	None
H. Ec. 31	Introduction to Nutrition.....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. chem.; honor point ratio 1.00 or above
Rhet.	Communications requirement.		

Take Group I or II

<b>Group I</b>			
Zool. 14, 15	General Zoology .....	6	None
Physiol. 4	Human Physiology .....	4	1 qtr. chem. and 1 qtr. zool.
Dy. Hu. 20	Household Microbiology .....	4	3rd qtr. fr.; permission of instructor
or			
Bact. 53	(See sophomore list)		
<b>Group II</b>			
G.C. 10A, B	Human Biology .....	6	None
Dy. Hu. 20	Household Microbiology .....	4	3rd qtr. fr.; or permission of instructor
or			
Bact. 53	(See sophomore list)		
Chem. 1-2	General Inorganic Chemistry.....	8	None
or 4-5	General Inorganic Chemistry.....	8	Entrance cred. in chem.
or 9-10	General Inorganic Chemistry.....	10	Entrance cred. in chem.
or 6-7	General Inorganic Chemistry.....	10	None
Ag. En. 35†	Household Physics .....	5	None
or G.C. 37A	Energy and Matter .....	5	None
Soc. 1	Introduction to Sociology.....	3	None
Econ. 22	Principles of Accounting.....	3	3rd qtr. fr.
or Ag. Ec. 25	(See sophomore list)		
Ph. Ed.	Physical Education .....	3	May be taken at any time during four years in residence
Psy. A	Elementary Psychology .....	5	3rd qtr. fr.; C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr.; C average

COURSES OPEN TO SOPHOMORES

H. Ec. 24	Problems in Home Planning and Furnishing .....	5	H. Ec. 20
H. Ec. 41	Food Management and Marketing.....	5	H. Ec. 31, 40
H. Ec. 45*	Quantity Cookery .....	6	H. Ec. 40, 41
H. Ec. 46*	Cafeteria Experience .....	3	None
Rhet. 22	Public Speaking .....	3	Rhet. Comm. req.
Rhet. 31	Survey of English Literature I.....	5	Rhet. Comm. req.
or 32	Survey of English Literature II.....	3	Rhet. Comm. req.
or 33	American Life in American Literature (See junior list)	3	Rhet. Comm. req.
or 60			
Bact. 53	General Bacteriology .....	5	10 cred. in chem., 4 cred. in bot. or zool.
or Dy. Hu. 20	(See freshman list)		
Ag. Bi. 4	Introduction to Organic and Biochemistry .....	5	In. Ch. 1-2 or 4-5
Ag. Ec. 3	Principles of Economics.....	5	None
or Econ. 6, 7	Principles of Economics.....	10	None
Ag. Ec. 25	Principles of Accounting.....	4	None
or Econ. 22	(See freshman list)		
Soc. 2	Individual Minority Group Adjustments .....	3	Soc. 1
or 14	Rural Sociology .....	3	Soc. 1

† Students who have had one year of high school physics are exempt from Ag.En. 35 or G.C. 37A.

\* Open only to Home Economics students registered in the College of Agriculture, Forestry and Home Economics.

## COURSES OPEN TO JUNIORS AND SENIORS

Required Course No.	Title	Credits	Prerequisites
H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 64	Institution Buying .....	4	H. Ec. 45 or parallel, 46 or parallel—one of these required
H. Ec. 65	Institution Management Problems .....	3	H. Ec. 45, 46, 64
H. Ec. 173	Nutrition in Disease .....	4	H. Ec. 170, 35 also advised
H. Ec. 85	Home Management Lectures .....	4	H. Ec. 40, H.E. Ed. 90 or parallel
H. Ec. 86	Home Management Laboratory .....	4	H. Ec. 85 or parallel, 40, H.E. Ed. 90, P.H. 52a and 52b
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1-2 or parallel 2
H. Ec. 142	Experimental Cookery .....	3	H. Ec. 40, Ag. Bi. 1
H. Ec. 146	Special Food Problems .....	3	H. Ec. 142
H. Ec. 170	Nutrition of the Family .....	3	H. Ec. 31, 40, Ag. Bi. 1, Physiol. 3 cred.
H. Ec. 171	Child Nutrition .....	3	H. Ec. 170, H.E. Ed. 90
Rhet. 51	Exposition .....	3	Rhet. Comm. Req.
Rhet. 60	Contemporary Literature .....	3	Rhet. Comm. Req.
or 31 or 32 or 33	(See sophomore list)		
P.H. 52a	Health Care of the Family, lectures .....	2	Bact. 53 or Dy. Hu. 20, Physiol. 4
P.H. 52b	Health Care of the Family, laboratory .....	1	Bact. 53 or Dy. Hu. 20, Physiol. 4
P.H. 100	Elements of Preventive Medicine and Public Health .....	5	P.H. 3 or 50 or equiv. and a course in Bact.
or			
P.H. 102	Environmental Sanitation I .....	3	Sr., grad.; P.H. 50 or 51 or 53 or 100 or parallel, or permission of instructor
Ag. Ec. 126	Economics of Consumption .....	3	Ag. Ec. 2 or 3
Bu. Ad. 77	Survey in Marketing .....	3	None; Ag. Ec. 3 desirable
Bu. Ad. 167	Personnel Administration .....	3	Permission of department
or Econ. 161	Labor Problems .....	3	Econ. 6-7
or Psy. 160	Psychology in Personnel Work .....	3	Psy. 1-2, Econ. 6-7.
or Psy. 56	Psychology of Advertising .....	3	Jr., Sr.; Psy. A or 1, 2 and Princ. of Econ.
An. Hu. 50	Meat Selection and Utilization .....	3	None; H. Ec. 40, 41 desirable

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

## VI. HOME ECONOMICS AND NURSERY SCHOOL EDUCATION

All-college requirements for students in this college. See page 8.

A few promising students can be encouraged to pursue this combination. The student and her program must be approved by the director of the Nursery School and the chief of the Division of Home Economics. In addition to the General Home Economics program the following courses, offered by the Institute of Child Welfare, will be required. These courses are open to juniors and are offered by the Institute of Child Welfare. They are listed under Methods and Directed Teaching in the *Bulletin of the College of Education*.

## JUNIOR-SENIOR COURSES

Ed. T. 55	Principles of Early Childhood Education .....	3	C.W. 80 or parallel
C.W. 80	Child Psychology .....	3	Psy. 1, 2
Ed. T. 57	Nursery School-Kindergarten Laboratory in Art, Literature, and Social Studies .....	5	Ed. T. 55

Required Course No.	Title	Credits	Prerequisites
Ed. T. 58	Nursery School-Kindergarten Laboratory in Permanent Play Materials, Music, and Science.....	5	Ed. T. 55, 57
Ed. 77A	Directed Teaching in the Nursery School .....	4	Ed. T. 55, 57, 58

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, humanities, political science, philosophy, psychology, or sociology to total 18 credits.

### VII. HOME ECONOMICS EXTENSION

A combined curriculum with the College of Education. See all-college requirements for students in the College of Agriculture, Forestry, and Home Economics, page 8.

Some students will be interested in preparation for home economics positions in the Agricultural Extension Service, such as home demonstration agent, 4-H Club agent, or homemaking specialists.

The student following this curriculum should be one who has a real interest in rural life and rural people and has ability to get along with them. A sense of humor, good health, a high degree of initiative, good standards for personal appearance, good judgment and ideals for rural family living are important qualities for the extension worker. Organization ability and clear expression of ideas, written and oral, are necessary. She should be a person alert to social situations and the need and willingness for continuous learning on a job. Residence in rural areas and some contact with extension work before coming to college is desirable in order that the student shall have an understanding of farm conditions.

This curriculum is planned to give the future extension worker understandings and skills in homemaking activities, an understanding of physical and social science as it relates to rural areas, use of oral and written materials, ability for administration and organization of adult and youth programs, an understanding of educational principles and techniques suitable for rural groups.

An organized program of home experience is required to be completed before the end of the junior year. This should be planned and approved by the member of the Home Economics Education section responsible for teacher training of adults.

Students following this curriculum will receive guidance from a committee of the Home Demonstration staff of the Extension Service and the Home Economics Education faculty. Qualified students will be recommended for a period of supervised pre-extension field experience to be arranged during the summer following the junior year. Approval for this field service must be secured from the director of the Agricultural Extension Service.

Those in this curriculum should:

Omit from the requirements in general home economics teaching the following courses: H.Ec. 43, Ag.Bi. 4, Rhet. 34, 51, Ed. 51C, H.E. Ed. 92, 94, 192, Ag. Ec. 126.

Add to the requirements in general home economics teaching:\*

Soc. 2	Individual and Group Adjustment .....	5	Soc. 1
or Soc. 14	Rural Sociology .....	3	Soc. 1
or Soc. 91	Case Methods Applied to the Study of Human Problems .....	3	Jr., sr., Soc. 50 or 51 or consent of major adviser
or Soc. 95	Introduction to Public Welfare .....	3	Jr., sr., Soc. 50 or 51 or consent of major adviser
or Soc. 101	Social Organization .....	3	Jr., sr., grad.; Soc. 1 and 15 cred. in social sci., child welfare, education, philosophy, or psychology, or consent of instructor

\* The required 3 credits in Physical Education are to be chosen from the Dance (country, folk, modern, or social) and recreational games.

Required Course No.	Title	Credits	Prerequisites
Pub. 53	Publicity .....	3	Jr., sr., Rhet. Comm. req.
H.E. Ed. 95	Field Experience for Home Demonstration Agents .....	6	Completion of jr. year, consent of head of Home Econ. Educ., and Director of Extension
H.E. Ed. 194A	Adult Education in Home Economics	3	Jr., sr., grad.; H.E. Ed. 91, 93 or parallel
or H.E. Ed. 194B	Adult Education in Home Economics	3	Jr., sr., grad.; H.E. Ed. 91, 93 or parallel
Ag. Ec. 8	Rural Economics .....	3	Jr., sr., Ag. Ec. 2 or 3
or Ag. Ec. 126	Economics of Consumption .....	3	Jr., sr., Ag. Ec. 2 or 3

### VIII. PREPARATION FOR RESEARCH

- A. Major in Experimental Foods
- B. Major in Nutrition
- C. Major in Textiles and Clothing

These curricula are planned for superior students who wish to be prepared to pursue graduate work, with the expectation of filling a teaching and research position after receiving an advanced degree. The options and electives offered should be selected in consultation with a major adviser of the Graduate School faculty. An average honor point rate of 1.5 must be maintained. The following courses are required for all students taking these curricula.

All-college requirements for students in this college. See page 8.

#### COURSES OPEN TO FRESHMEN

Orie. 1	College Orientation Lectures.....	1	None
H. Ec. 1	Choice and Care of Clothing .....	4	None
H. Ec. 10	Vocational Opportunities in Home Economics .....	2	None; fr. only
H. Ec. 17	Personal and Family Living .....	3	None
H. Ec. 20	Introduction to Related Art .....	4	None
H. Ec. 31	Introduction to Nutrition .....	3	None
H. Ec. 40	Food Preparation .....	5	8 cred. in chem.
Rhet.	Communications requirement .....		
Rhet. 34	Books and Reading .....	1	None
Zool. 14, 15	General Zoology .....	6	None
Dy. Hu. 20 or Bact. 53	Household Microbiology .....	4	3rd qtr. fr.; permission of instructor (See sophomore list)
Physiol. 4	Human Physiology .....	4	1 qtr. chem. 1 qtr. zool.
Chem. 1-2	General Inorganic Chemistry.....	8	None
or 4-5	General Inorganic Chemistry.....	8	Entrance credits in chemistry
or 6-7	General Inorganic Chemistry.....	10	None
or 9-10	General Inorganic Chemistry.....	10	Entrance credits in chemistry
Ag. En. 35	Household Physics .....	5	
or Phys. 1, 2, 3	Introduction to Physical Science.....	9	H.S. alg. and plane geom.
or 1a, 2a, 3a	Introduction to Physical Science.....	12	H.S. alg. and plane geom.
or 4, 5, 6	General Physics .....	15	Math. 15-16 or Math. 6, 7, 8
or 7, 8, 9	General Physics .....	15	Math. 15-16 or equiv.
Soc. 1	Introduction to Sociology.....	3	None
Ph. Ed.	Physical Education .....	3	May be taken at any time during four years in residence
Math.	Mathematics .....	10	
Lang.	Modern Languages .....	10	
Psy. A	Elementary Psychology .....	5	3rd qtr. fr.; C average
or Psy. 1-2	General Psychology .....	6	3rd qtr. fr.; C average

## COURSES OPEN TO SOPHOMORES

Required Course No.	Title	Credits	Prerequisites
H. Ec. 24	Problems in Home Planning and Furnishing .....	5	H. Ec. 20
or 180	(See junior list)		
Rhet. 22	Public Speaking .....	3	Rhet. Comm. req.
Rhet. 31	Survey of English Literature I .....	5	Rhet. Comm. req.
or 32	Survey of English Literature II .....	3	Rhet. Comm. req.
or 33	American Life in American Literature .....	3	Rhet. Comm. req.
or 60	(See junior list)		
Bact. 53	General Bacteriology .....	5	8 cred. in chem.; 4 cred. in bot. or zool.; soph. with C average in prereq. courses
or Dy. Hu. 20	(See freshman list)		
Ag. Bi. 2	Quantitative Methods .....	5	8 cred. in inorg. chem.
or An. Ch. 1-2	Quantitative Analysis .....	10	Chem. 12-13
or An. Ch. 7	Quantitative Analysis .....	4	Any course in qual. chem.
Ag. Bi. 1	Introduction to Organic Chemistry .....	5	10 cred. in inorg. chem.
or Or. Ch. 1-2	Elementary Organic Chemistry .....	8	Inorg. Chem. 11 or equiv.
or Or. Ch. 54-55	Elementary Organic Chemistry, lecture and	6	15 cred. in chem.
Or. Ch. 57-58	Elementary Organic Chemistry, laboratory .....	4	Org. Chem. 54, 55 or parallel
Ag. Ec. 3	Principles of Economics .....	5	None
or Econ. 6-7	Principles of Economics .....	10	None

## COURSES OPEN TO JUNIORS AND SENIORS

H. Ec. 50	Textiles .....	3	H. Ec. 1
H. Ec. 85	Home Management Lectures .....	4	H. Ec. 40, 41 advised
H. Ec. 86	Home Management Laboratory .....	4	H. Ec. 40, 85 or parallel, 41 advised; P.H. 52a and 52b
H. Ec. 170	Nutrition of the Family .....	3	H. Ec. 31, 40; Ag. Bi. 1
H. Ec. 180	Home Planning and Furnishing .....	5	H. Ec. 21, 27
or 24	(See sophomore list)		
Rhet. 51	Exposition .....	3	Rhet. Comm. req.
Rhet. 60	Contemporary Literature .....	3	Rhet. Comm. req.
or 31 or 32 or 33	(See sophomore list)		
P.H. 52a	Health Care of the Family, lectures .....	2	Bact. 53 or Dy. Hu. 20, Physiol. 4
P.H. 52b	Health Care of the Family, laboratory .....	1	Bact. 53 or Dy. Hu. 20, Physiol. 4
H.E. Ed. 90	Child Training .....	3	Psy. A or Psy. 1-2 or parallel 2

Additional social science courses should be chosen from anthropology, economics, geography, history, humanities, philosophy, political science, psychology, or sociology to total 18 credits.

## A. MAJOR IN EXPERIMENTAL FOODS

A major sequence in experimental foods must include in addition to the foregoing courses, H. Ec. 41, Food Management and Marketing (5 cred.; soph.; prereq. H. Ec. 31 and 40) and H. Ec. 142, Experimental Cookery (3 cred.; jr.; prereq. H. Ec. 40 and Or. Ch.).

## B. MAJOR IN NUTRITION

A major sequence in nutrition, which may include courses clearly related or fundamental thereto, and to make a total of 24 to 36 credits which must include in addition to the required courses listed above, H. Ec. 41, Food Management and Marketing (5 cred.; soph.; prereq. H. Ec. 31, 40), H. Ec. 142, Experimental Cookery (3 cred.; jr.; prereq. H. Ec. 40, Or. Ch.), H. Ec. 33, Nutrition I (4 cred., soph., jr., sr.; Ag. Bi. 1, Physiol. 4 or parallel), H. Ec. 171 (3 cred.; jr., sr., H. Ec. 170, H.E. Ed. 90).

A minor sequence of 10 to 12 credits to be chosen outside the field of nutrition, e.g., bacteriology, biochemistry, economics, physics, physiology, sociology, or statistics, and not include any of the courses required for all.

### C. MAJOR IN TEXTILES AND CLOTHING

A major sequence in textiles and clothing which may include courses clearly related or fundamental thereto, to make a total of 24 to 36 credits and which must include, in addition to the required courses listed above, H. Ec. 3, Clothing Construction A (3 cred.; fr.; prereq. H. Ec. 1) and H. Ec. 102, Advanced Textiles (3 cred.; jr.; prereq. 50, Or. Ch., Prin. of Econ.).

A minor sequence of 10 to 12 credits to be chosen outside the field of textiles and clothing, e.g., biochemistry, botany, economics, physics or statistics, and not to include any of the courses required for all.

See also All-College curricula, page 8, and Rural Education curriculum, page 37.

## FIVE-YEAR CURRICULUM

### I. HOME ECONOMICS EDUCATION

A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics leading to the degree of master of education.

A five-year program in Home Economics Education, leading to the M.Ed. degree, will be provided for those who wish to make additional preparation prior to their entrance into teaching and for those who wish to continue their professional work following the completion of the requirements for a Bachelor's degree. The five-year curriculum will qualify a person for high school teaching and for some college positions. The attainment of added training should facilitate professional promotion.

#### Special requirements

1. A total of 230 credits including at least 45 (courses numbered above 100) in the fifth year.
2. An average of B in courses in the fifth year.
3. A satisfactory report on a health examination within one year prior to obtaining the M.Ed. degree.
4. Satisfactory performance in requirements prescribed by the College of Education for professional degrees:
  - a. 90 quarter credits in academic fields.
  - b. A teaching minor or concentration in an academic field (18 credits).
  - c. Broad major field specialization (approximately 90 credits).
  - d. 35 quarter credits in education including one quarter internship (optional—8 credits allowed for 1 quarter).

The best results may be anticipated when plans for the extended training are made during the student's junior year in residence so that the fifth year may be integrated with the four-year program. The student should plan her program under the direction of a member of the graduate faculty in Home Economics Education.

Satisfaction of part of the education requirement may be made through internship in a home economics department in a secondary school. The internship will include full-time work for one quarter in a home economics department in a secondary school off the campus. The intern will work under the supervision of her adviser at the University and will return to the campus regularly for Saturday morning conferences which will deal with classroom, extra-curricular, and community problems met during the internship.

#### REQUIREMENTS FOR A FIFTH YEAR LEADING TO THE M.ED. DEGREE\*

Requirements	Credits
1. Additional academic courses .....	8-24
2. Home Economics .....	17-25
3. General Education .....	4-9
4. Home Economics Education .....	5-9
Total .....	45

\* See *College of Education Bulletin* for specific course suggestions.

Satisfactory completion of the fifth year work will be determined by:

1. A written comprehensive examination covering home economics materials.
2. A written examination in education courses.
3. Certification of competence in teaching in the major field.
4. An oral examination by the graduate committee of the College of Education and a representative of the Division of Home Economics.

Students with a Bachelor's degree and a major in home economics education from other accredited institutions, upon fulfilling the requirements of the five-year curriculum or their equivalents, will receive the M. Ed. degree with a major in home economics education.

## CURRICULUM IN VETERINARY MEDICINE

### LEADING TO THE DEGREE OF DOCTOR OF VETERINARY MEDICINE

Training in veterinary medicine is based upon two years of college level preveterinary studies (see page 38) and four years of professional work, or a total of six years.

#### REGISTRATION

Application for admission should be filed near completion of the preveterinary studies and not later than May 1. Students who have taken their preveterinary work at schools other than the University of Minnesota must submit to the Office of Admissions and Records, University Farm, at the time at which application is made, a transcript of all work taken up to that time.

To receive consideration a candidate's record must show a total number of honor points equal to 1.5 times the total number of credits in all subjects taken collectively in the preveterinary subjects. This is equivalent midway between a "C" and a "B" average in the usual marking systems.

The selection of veterinary students in the professional curriculum will be based upon their scholastic standing in the preveterinary studies, upon their interest, character and personal fitness for the practice of veterinary medicine as disclosed by personal interviews and letters of recommendation, and upon their scores in any preliminary tests prepared by the University Testing Bureau.

Selections for admission will be made as early as possible and the applicants notified promptly thereafter.

Accepted applicants will receive a statement for the preliminary fee of \$10 to be applied on the tuition for the first quarter. This must be paid within ten days and will not be returned if the students fail to matriculate.

#### FIRST YEAR PROFESSIONAL CURRICULA

	Credits
Agro. 31 (Principles of Genetics) .....	4
An. and Po. Hu. 112 (Animal Breeding) .....	3
Bac. 53 (General Bacteriology) .....	5
Phys. Chem. ....	12
Vet. An. 101, 102, 103 (Gross and Comparative Anatomy) .....	14
Vet. Hi. 111, 112, 113 (Veterinary Histology and Embalming) .....	13
Total .....	51

As a School of Veterinary Medicine at the University of Minnesota is in a formative period, the student is advised that the completion of the four years' professional training is contingent upon the provision of clinical facilities for the clinical training of the last two years.

## DESCRIPTION OF COURSES

### AGRICULTURAL BIOCHEMISTRY

#### *Freshman and Sophomore Courses*

This division offers two types of training: courses designed to train students for research or instruction in biochemistry, and courses for students whose major studies are in those other divisions which require some training in biochemistry.

Students planning to specialize in agricultural biochemistry in the Science Specialization Curriculum should secure in their junior-senior years a broad fundamental foundation of courses in chemistry, biology, physics, and mathematics.

The following courses are suggested as providing the essential basic training for the junior-senior years and for the first year of postgraduate work:

Organic Chemistry 54, 55, 156, 57, 58, 159 (15 credits); Physics 4-5-6 or 7-8-9 (15 credits); Mathematics through Integral Calculus: Physical Chemistry 101-102-103 (9 credits); Agronomy and Plant Genetics 31 (4 credits); Agricultural Biochemistry 2, 119, 120, 121, 122, 123, 129, 130, 131, 132, 133, and either 116 and 103 or 108-110, depending on whether the student's interest lies in animal or plant biochemistry.

For those students who plan to specialize later in the animal phases of biochemistry, certain courses in animal husbandry, dairy husbandry, zoology, bacteriology or physiology should be included in the junior-senior years. Similarly for those desiring to specialize in the plant phases of biochemistry, courses in botany, plant genetics, plant pathology, forestry, plant physiology, and bacteriology are desirable adjuncts. These supporting subjects should be selected in consultation with the student's major adviser.

1. Introduction to Organic Chemistry. An introduction to the chemistry of carbon compounds directed toward an understanding of the principles underlying the classification, structure, and general properties of those which are of biological importance. (5 cred.; soph., jr., sr.; prereq. In. Ch. 8 cred.\*)
- 2.‡ Quantitative Methods. Principles of quantitative analysis, including stoichiometric problems, practice in the use of the balance and in typical gravimetric and volumetric manipulation. (5 cred.; soph., jr., sr.; prereq. In. Ch. 8 cred.)
3. Introduction to Biochemistry. A discussion of the fundamentals of biochemistry, chemistry of carbohydrates, proteins and fats, enzymes, colloids, hydrogen ion concentration and other subject matter essential to an understanding of biochemistry. (3 cred.; soph., jr., sr.; prereq. 1 or equiv.)
5. Plant Biochemistry. An introduction to the chemistry, metabolism, and nutrition of plants based on the organic and inorganic compounds which are characteristic of plants and plant products, and their reactions and interactions. (3 cred.; soph., jr., sr.; prereq. 3, Soil. 4 advised.)
6. Animal Biochemistry. An introduction to the chemistry, metabolism, and nutrition of animals based on the organic and inorganic compounds which are characteristic of animals and animal products, and their reactions and interactions. (3 cred.; soph., jr., sr.; prereq. 3, Soil. 4 advised.)

\* By special permission of the student's adviser, General College Courses 37A and 37B will be acceptable as prerequisites for home economics students.

‡ A laboratory fee of \$2 is required for this course. A \$5 card (from which the \$2 fee will be deducted) is to be purchased from the cashier's office, University Farm, before a laboratory desk will be assigned.



- 103.‡ Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, the chemistry of the various constituents of milk and of the processes involved in the manufacture of dairy products. (6 cred.; jr., sr.; prereq. 2, 6)
105. Same as 5 except that a term paper is required.
106. Same as 6 except that a term paper is required.
108. Chemistry of Wheat and Wheat Products. A lecture course, with collateral library reference work, on the chemical technology of the production and milling of wheat and the conversion of its products into human food. (3 cred.; jr., sr.; prereq. 5)
- 110.‡ Flour Laboratory Methods. A laboratory course in methods of analysis of wheat and its products; milling tests of wheat, baking, and special tests of flour. Designed to train students for research and control work in the cereal industry. (3 to 5 cred.; jr., sr.; prereq. 2 and parallel 108, or equiv.)
116. Advanced Animal Nutrition. Lectures and reading on the biochemistry of animal nutrition. (3 cred.; jr., sr.; prereq. 3 and 6)
- 117.‡ Laboratory Problems in Animal Nutrition. A laboratory course on methods used in nutrition studies. (3 cred.; jr., sr.; prereq. 116, instructor's permission)
- 118.‡ Laboratory Problems in Biochemistry. Special laboratory work in the preparation and isolation of pure compounds which occur in living cells, the study of biochemical reactions, and special methods of identification or determination of biochemical products. (3 to 5 cred.; sr., grad.; permission of instructor)
119. Colloids. Lectures and assigned readings dealing with the colloidal state of matter, the preparation and properties of colloidal systems, and the relation of these to biochemical processes. (3 cred.; sr.; prereq. Zool or Bot. 10 cred., 5 or 6, or 8 credits in Or. Ch., Physics 9 advised)
120. Proteins. Lectures and assigned readings on composition, structure, chemical and physical properties, and the functions of proteins and amino acids. (3 cred.; sr.; prereq. 119 or permission of instructor)
121. Carbohydrates. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. (3 cred.; sr.; prereq. 119 or permission of instructor)
122. Lipides. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the fats and fat-like compounds. (3 cred.; sr.; prereq. 119 or permission of instructor)
123. Enzymes. Lectures and assigned readings on enzyme action, including the methods of preparation and investigation of enzymes and their function in biological and industrial processes. (3 cred.; sr.; prereq. 119 or permission of instructor)
124. Vitamins. Lectures and reading on the biochemistry of vitamins and their physiological action. (3 cred.; jr., sr., grad.; prereq. 3 and 6)
- 129.‡ Colloids Laboratory. Methods for the preparation and purification of and study of the physico-chemical properties of inorganic and biocolloid systems. (2 cred.; jr., sr., grad.; prereq. 2, parallel 119)
- 130.‡ Proteins Laboratory. Qualitative and quantitative biochemical methods for the preparation, identification, and analysis of proteins and their hydrolytic products. (2 cred.; jr., sr., grad.; prereq. 2, parallel 120)
- 131.‡ Carbohydrate Laboratory. Qualitative and quantitative biochemical methods for the preparation, identification, and analysis of sugars and polysaccharides. (2 cred.; jr., sr., grad.; prereq. 2, parallel 121)

‡ A laboratory fee of \$5 is required for each quarter of this course. The \$5 card purchased from the cashier's office, University Farm, must be presented before laboratory space will be assigned. A \$5 breakage card against which breakage can be charged must be purchased also.

- 132.‡ Lipides Laboratory. Qualitative and quantitative biochemical methods for the preparation, identification and analysis of the lipides. (2 cred.; jr., sr., grad.; prereq. 2, parallel 122)
- 133.‡ Enzymes Laboratory. Qualitative and quantitative biochemical methods for the preparation of enzymes and for the study of their properties. (2 cred.; jr., sr., grad.; prereq. 2, parallel 123)

### AGRICULTURAL ECONOMICS

Students desiring to major in agricultural economics will work out a program suited to their needs in consultation with an adviser in the division. Opportunities for specialization in various fields such as farm management, marketing, agricultural prices, farm finance, and the like are available. Among the courses recommended for majors are Ag. Ec. 8, 25, 30, 40, 50, 80, and 90.

#### *Freshman and Sophomore Courses*

1. Principles of Economics I. For students in agriculture and forestry. (3 cred.; soph., jr., sr.; no prereq.)
2. Principles of Economics II. For students in agriculture and forestry. (5 cred.; soph., jr., sr.; prereq. 1)
3. Principles of Economics. For students in home economics. (5 cred.; soph., jr., sr.; no prereq.)
8. Rural Economics. An analysis of a number of the important economic problems of agriculture, including organization of the agricultural industry, tenancy, farm incomes, rural population and standards of living, tariff, taxation, and agricultural policy. (3 cred.; soph., jr., sr.; prereq. 2 or 3)
25. Principles of Accounting. (4 cred.; soph., jr., sr. in agr., for., and home econ. only)
30. Agricultural Prices. Factors determining prices and trends in prices of agricultural commodities. Adjustment of production to price changes. Foreign competition. Price stabilization. Price policies. (3 cred.; soph., jr., sr.; prereq. 2)
40. Principles of Marketing Organization. The principles of the organization of the market and of marketing enterprises, both proprietary and co-operative. (3 cred.; soph., jr., sr.; prereq. 2)
47. Marketing Accounting. Interpretations of accounts, statement preparation, and analysis. Accounting methods and statements of agricultural marketing organizations including co-operative associations. Utilization of accounting data and statements by the management. (4 cred.; soph., jr., sr.; prereq. 25)

#### *Junior and Senior Courses*

- 50.\* Farm Finance. The mechanism of exchange with special reference to the financing of the production and marketing of farm products. (5 cred.; jr., sr. in agr. or for. only; prereq. 2)
- 80.\* Farm Accounting. Kinds and uses of farm records; calculation of measures of farm earnings; accounting analysis of farm business. Discussion and practice. (3 cred.; jr., sr.)
- 90.\*† Agricultural Statistics. Statistical method applied to the analysis of agricultural data; collection, tabulation, and graphical presentation; averages; measures of dispersion; time series, and simple correlation. (5 cred.; jr., sr.)

\* Open to sophomores on petition.

† Graduate students may take Ag.Ec.190, listed in *Graduate School Bulletin*.

‡ A laboratory fee of \$5 is required for each quarter of this course. The \$5 card purchased from the cashier's office, University Farm, must be presented before laboratory space will be assigned. A \$5 breakage card against which breakage can be charged must be purchased also.

102. Farm Organization. Characteristics of farming as a business; factors determining type of farming; farm tenure and farm selection; farm layout and farm improvements; factors affecting the selection of crops and livestock for a particular farm. (3 cred.; jr., sr., grad.; prereq. 2)
103. Farm Operation. Farm budgeting; personal and business factors affecting farm financial success; utilization of labor, power, and equipment; farm management research methods and farm management services. Special problem in farm planning. Field visit to well-managed farms. (3 cred.; jr., sr., grad.; prereq. 102)
104. Types of Farming. A study of factors affecting the geographic distribution of agricultural production by type-of-farming areas and of crop and livestock systems and practices within these areas. (3 cred.; jr., sr.; prereq. 2)
107. Farm Work Simplification. A study of principles and methods of accomplishing farm work in less time and with less effort. Methods of analyzing jobs, principles of motion economy, efficient working methods for different farm enterprises. Practice in planning improved working methods. (3 cred.; jr., sr., grad.; prereq. 2)
110. Economics of Agricultural Production. The principles of production economics applied to agriculture, special emphasis being placed upon profitable combinations of factors of production, comparative advantage, and localization of production. (3 cred.; jr., sr., grad.; prereq. 2)
126. Economics of Consumption. Nature of human wants; standards of living; costs of living; income, administration of income; nature of demand; demand and price; relation of consumption to the population problem. (3 cred.; jr., sr., grad.; prereq. 2 or 3)
131. Market Prices. Manner in which prices are determined in the market place. Local, wholesale, and retail prices. Price fluctuation and speculation. Prices and market grades. Market quotations. (3 cred.; jr., sr., grad.; prereq. 30, 40)
135. Methods of Price Analysis. Statistical methods for the study of the forces determining prices, forecasting price changes, and determining "established prices." Survey of research work in the field. (3 cred.; sr., grad.; prereq. 30, 191)
140. Marketing Organization: Staples. Principles of production economics applied to the organization of markets and marketing organizations for the grains, tobacco, cotton, and wool. Special attention to grain marketing. (3 cred.; jr., sr., grad.; prereq. 40)
141. Marketing Organization: Dairy and Poultry Products. (3 cred., jr., sr., grad.; prereq. 40)
142. Marketing Organization: Fruits and Vegetables. (2 cred.; jr., sr., grad.; prereq. 40)
143. Marketing Organization: Livestock and Meats. (3 cred.; jr., sr., grad.; prereq. 40)
144. Co-operative Organization. Development of co-operation in agriculture in the United States and foreign countries. Analysis of economic problems peculiar to co-operative organization, especially of marketing agencies. (3 cred.; jr., sr., grad.; prereq. 40)
150. Advanced Farm Finance. A consideration of credit problems of farmers with special attention to institutions financing farmers. (3 cred.; jr., sr., grad.; prereq. 50 or equiv.)
170. Land Economics. Land as a factor of production; rural and urban utilization; rents and land values; land classification; land exchange. (3 cred.; jr., sr., grad.; prereq. 110)
172. Economics of World Agriculture. Distribution, quality, and utilization of agricultural resources; variations in population densities and characteristics; internal organization and techniques; comparative advantage; world trade in agricultural products; national and international policies relating to agriculture; future trends and prospects. (3 cred.; jr., sr., grad.; prereq. Ag. Ec. 2 and 110 or consent of instructor)

191. Advanced Agricultural Statistics. Analysis of agricultural data by methods of correlation, partial and multiple correlation, analysis variance and significance of results. (3 cred.; jr., sr., grad.; prereq. 90)

See also courses in Economics and Business Administration.

### AGRICULTURAL EDUCATION

#### *Courses for Undergraduate Students*

1. Introduction to Agricultural Education. An orientation course for students who are interested in exploring the opportunities for employment and service as teachers of agriculture. Qualifications of teachers and a survey of preparatory offerings. (1 cred.; fr.; no prereq.)
54. Rural Education and Community Leadership. The rural school as a community center, and ways and means of organizing educational and recreational activities, such as clubs, festivals, fairs, and other features of rural community life. (2 cred.; jr., sr.; prereq. Ed. 51A)
56. Rural Youth Leadership. A lecture, demonstration, and laboratory course in co-operation with leaders and specialists in the various fields and problems of rural youth leadership with emphasis on 4-H clubs, Future Farmers of America, and extension activities. (3 cred.; jr., sr.; no prereq.)
81. Teaching Agriculture. Organization and administration of the program for teaching agriculture in the secondary school. Relationships to other rural programs, planning farm practice activities, guidance for rural youth, and the use of the home, farm, and community in teaching agriculture. (3 cred.; jr., sr.; prereq. Ed. 51A)
- 82.‡ Methods in Teaching Agriculture. Fundamentals of method in teaching as related to teaching agriculture in high school. Organizing subject matter of daily work; selection and manipulation of devices. Classroom and laboratory method. Specific plans for teaching secondary school agriculture. (3 cred.; sr.; prereq. 81)
- 91.‡ Supervised Teaching Experience. Preparation of lesson plans and actual teaching of classes under careful supervision in recitation and laboratory; criticism and discussion of plans, methods, and results of student teaching. (6 cred.; sr.; prereq. 82 and a C+ average in major)

#### *Courses for Undergraduate and Graduate Students*

101. Adult Education in Agriculture. Instructional programs for rural young men not regularly enrolled in school. Analysis of rural youth situations and placement problems. (3 cred.; sr.; prereq. 81)
103. Facilities and Materials. A study of the resources for departments of vocational agriculture. Building facilities, room fixtures, references, equipment, visual aids, illustrative materials. (3 cred.; sr.; prereq. 82)
104. Planning Programs. Long-time and annual plans for departments of vocational agriculture. Schedule of activities, analyzing results. (2 cred.; sr.; prereq. 82)
121. Enterprise Analysis. Experience in analyzing enterprises in agriculture as a basis for identifying problems and distributing them in the horizontal set-up for the course of study in agriculture. (2 cred.; prereq. Ed. 51A)
141. Supervised Practice in Vocational Agriculture. A special course dealing with the selection, planning, supervising, and summarizing of the practical work in agriculture. Special emphasis on the use of the farm and community for teaching purposes. (3 cred.; prereq. 10 cred. in ed.)

‡ A fee of \$1.50 per credit is charged for this course.

145. The Integrated Course of Study in Agriculture. A presentation of the problems of organization, administration, and teaching in departments of agriculture in the secondary schools. Special emphasis on planning programs for individual students. (2 cred.; sr., grad.; prereq. 10 cred. in ed.)

### AGRICULTURAL ENGINEERING

Students in Technical Agriculture may take their major or minor in the field of agricultural engineering. The field embraces the practical phases of technology as applied to agriculture, including farm machinery and power, farm structures, drainage and irrigation, soil erosion control, farm home conveniences, and rural electrification. Because of the broad scope of the field, those majoring therein are advised to consult with the division for assistance in outlining a program of study.

A Professional Course in Agricultural Engineering is offered jointly with the Institute of Technology. This is designed to train engineers in the various phases of technology as applied to agricultural practices and industries. Details concerning the professional curriculum are given on page 35.

#### *Freshman and Sophomore Courses*

3. Mechanical Drawing. Materials, instruments and their uses. Lettering, scale reading, conventional symbols, and blue printing. Orthographic projection, pictorial drawing, and farm buildings (Agriculture); or records and plats of surveys, contour, profile, and map tracing (Forestry). (3 cred.; no prereq.)
- 5.‡ Farm Structures Laboratory. Laboratory practice and study of farm building construction with different types of materials. (3 cred.; prof. agr. eng. only; no prereq.)
- 6.‡ Farm Buildings. Arrangement, planning and construction of farm buildings. Selection and use of building materials, tools and equipment. Laboratory practice in drawing, woodworking and carpentry. (4 cred.; no prereq.)
11. Applied Mathematics. Combination higher algebra and trigonometry. Includes graphing, logarithms, series, proportions, variations, and investments. Rules of practical mathematics with special attention to formulas and problems directly related to agricultural and forestry work. (5 cred.; prereq. high school elementary algebra and plane geometry or their qualitative equivalent)
12. Agricultural Machinery. Machinery as a factor in agricultural production; development, construction, and operation. (3 cred.; prereq. 23 or equiv.)
- 13.‡ Gas Engines and Tractors. Lecture and laboratory dealing with the theory, operation, adjustment, and use of internal combustion engines in agriculture. (3 cred.; no prereq.)
- 14.‡ Farm Power and Machinery. Farm power and machinery as factors in agricultural production. Theory, management, and use of internal combustion engines, tractors, and farm machines. (4 cred.; prereq. 41 and 23 or equiv.)
15. Electricity in Agriculture. Elementary theory of electrical circuits and instruments. A study of the application of electrical energy to agricultural processes. Selection and maintenance of equipment. (2 cred.; prereq. 23 or equiv.)
18. Agricultural Automotives. Principles of internal combustion engines and tractors including ignition, lubrication, carburetion, cooling, real gas cycles, transmission systems, and drive members. (3 cred.; prof. agr. eng. only; prereq. Phys. 7)
- 19.‡ Elementary Surveying. Use of tape, level, transit, and traverse board in agricultural and forestry field problems, e.g., mensuration surveys, traverses, differential and profile leveling; plotting and mapping. Care and adjustment of instruments. (3 cred.; prereq. 3, 11 or trigonometry)

‡ A fee of \$1 is charged for this course.

- 20.‡ Advanced Surveying. Topographic surveys by stadia and other methods, running simple curves, cross sectioning, plotting the survey, profile building, grade determination, and figuring of quantities in earthwork. (3 cred.; prereq. 19)
- 21.‡ Elements of Surveying. Use of tape, level, transit, traverse board in differential and profile leveling, cross sectioning, running tangents, and simple curves, topographic and agricultural surveys. Mapping, calculation of earthwork, and adjustments of instruments. (5 cred.; prof. agr. eng. only; prereq. Dr. 3, M.&M. 12)
- 23.‡ General Physics. The elements of physics for those who have not had physics in high school. Mechanics, heat, light, and electricity with laboratory work. (5 cred.; no prereq.)
- 24.‡ Agricultural Physics I. An applied course involving lectures and laboratory work in mechanics and heat. (4 cred.; prereq. Math. 6 or equiv.)
- 25.‡ Agricultural Physics II. A practical lecture, recitation, and laboratory course on electricity and light. (4 cred.; prereq. 24)
31. Principles of Drainage. Elementary principles and practice of soil erosion control and of farm drainage in relation to plant growth, crop and land values, and farm operation and development. (3 cred.; no prereq.)
32. Elements of Supplemental Irrigation. A study of the place and purpose of supplemental irrigation in humid regions. Systems and methods, plans of layouts, costs and return therefrom. (2 cred.; no prereq.)
- 33.‡ Introduction to Soil and Water Control. Use of engineer's level and tape. General information relative to the subdivision of land. General principles and practices of farm drainage and soil erosion control practices. (3 cred.; prereq. 11 or equiv. and Soils 5)
- 35.‡ Household Physics. Lectures, laboratory exercises, and experimental demonstrations of selected principles in physics, with special attention to those involved in household appliances and processes. (5 cred.; no prereq.)
37. Rural Sanitation and Water Supply. Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. (3 cred.; no prereq. for agr. section; M.&M. 129 for eng. section)
38. Farm Water Supply and Sewage Disposal. Principles of domestic sewage disposal and farm water supply and distribution. (2 cred.; no prereq.)
- 40.‡ Mechanical Training. Instruction and laboratory practice in rope work, belts and lacings, cement work, soldering, sheet metal projects, electric wiring. (3 cred.; no prereq.)
- 41.‡‡ Metal Work. Instruction and laboratory practice in pipe fitting, drilling, use of taps and dies, riveting, oxyacetylene welding, brazing, cutting, and electric arc welding. (3 cred.; no prereq.)
- 42.‡‡‡ Art Metal Work. Working in mild steel, copper, brass, aluminum, and pewter. Making trays, plates, bowls, candlesticks, bracelets, etc. Use of jeweler's saw; soft soldering; making wooden hammers. (3 cred.; no prereq.)
- 43.‡‡ Mechanical Laboratory. Instruction and laboratory practice in mechanical work embracing rope work, belt lacing and pulleys, soldering, welding, pipe fitting, and electric wiring. (3 cred.; prof. agr. eng. only; no prereq.)
44. Advanced Drawing. Plans and pictorial drawings, including perspective, charts, graphs, and co-ordinate plotting on various scales. Mapping. Illustrations for publication. (2 cred.; prereq. 3 or equiv.)

‡ A fee of \$1 is charged for this course.

‡‡ A fee of \$6 is charged for this course.

‡‡‡ A fee of \$3 is charged for this course.

*Junior and Senior Courses*

51. Soil Moisture Relations. Soil erosion control. Principles and practices of irrigation and land drainage in relation to plant growth, farm operation, land development, and community interest. (5 cred.; jr. and sr. prof. agr. eng. only; prereq. 21 or parallel, Soils 4, M.&M. 129)
52. Elements of Farm Machinery. Principles of development; construction, and use of agricultural machines. (3 cred.; prof. agr. eng. only; prereq. M.&M. 26)
53. Farm Structures. Planning and economics of farm structures. (3 cred.; prof. agr. eng. only; prereq. 5, Dr. 3 or equiv.)
67. Advanced Farm Structures Design. Planning, estimating, and designing of farm structures. Study of materials, and equipment commonly used. (3 cred.; prof. agr. eng. only; prereq. 5, 53, M.&M. 128, C.E. 37)
70. Dairy Engineering. A study of refrigeration equipment, steam boilers, heat transfer, insulating materials, and fluid flow as applied to the dairy processing plant. (3 cred.; jr. and sr.; prereq. Ag. En. 23 or equiv.)
- 72.† Applied Electricity. Lectures and laboratory work on topics important in the application of electric power to agriculture, including circuit theory, instruments, farmstead wiring, lighting, motors and controls, and storage batteries. (3 cred.; prof. agr. eng. only; prereq. Phys. 9)
73. Steam Boilers and Heat Engines. Steam boilers and heat engines in their applications to agriculture. (3 cred.; prof. agr. eng. only; prereq. 18 and M.E. 31)
- 101,102,103. Advanced Problems in Soil Moisture Regulation. Special problems in surface run-off, soil permeability, relation of soil and crop type to soil moisture, shape and regulation of water table in relation to root growth, etc. (2 to 6 cred. per qtr.; sr.; prereq. 51)
104. The Soil Moisture Relation in Agriculture. The scientific basis of soil moisture regulation and conservation in such phases as irrigation, drainage, and soil erosion. Lectures and special problems. (3 cred.; not open to engineers; prereq. 9 cred. in ag. en. including phys.)
105. Advanced Soil and Water Conservation. Advanced studies of the principles and practices of land drainage, soil erosion control, and irrigation. (3 cred.; sr., grad.; prereq. 51 or equiv.)
- 111,112,113. Farm Building Problems. Investigations in building materials; special designs; methods of construction, costs, and efficiency of farm buildings. (2 to 6 cred. per qtr.; sr.; prereq. 67)
114. Buildings, Equipment, Materials, and Methods of Construction. The relation of structures and building equipment to agriculture. Lectures and special problems. (3 cred.; not open to engineers; prereq. 9 cred. in ag. en. including 3 and 6 or equiv.)
- 121,122,123. Farm Power and Machinery Problems. Studies of mechanical and electrical power and machinery for the farm, including tests, design, and adaptation to various farm conditions. (2 to 6 cred. per qtr.; sr.; prereq. 71 or 72)
124. Agricultural Machinery and Mechanical Power Management. Machinery and power management and use and its cost as a factor of agricultural production. Lectures and special problems. (3 cred.; not open to engineers; prereq. 9 cred. in ag. en. including phys. and Ag. En. 12)
125. Topics in Agricultural Physics. An advanced study of the essential physical principles involved in the utilization of electricity in agriculture. (3 cred.; sr., grad.; prereq. 72 or Calculus and 24, 25, or equiv.)

† A fee of \$1 is charged for this course.

126. Selection and Management of Agricultural Machinery. Special problems in economical power and machine combinations and their application to the farm. (3 cred.; jr., sr.; prereq. 18, 71, Ag. Ec. 102)

#### AGRICULTURAL JOURNALISM

53. Publicity. For students planning careers in agriculture or some allied industry, in which the co-operation of the press will be needed. (3 cred.; jr., sr.; prereq. Rhet. Comm. req.)
54. Editing Agricultural Bulletins. Intended for students who may wish to enter agricultural journalism as a profession. (3 cred.; jr., sr.; prereq. Jour. 13-14-15; 51-52; 69 or 73, or permission of instructor)
55. Agricultural Journalism Outlets. Intended for students who may wish to enter agricultural journalism as a profession. (3 cred.; jr., sr.; prereq. Jour. 13-14-15; 51-52; 69 or 73, or permission of instructor)

For additional courses see the School of Journalism in the *Bulletin of the College of Science, Literature, and the Arts*.

#### AGRONOMY AND PLANT GENETICS

Students may major in either agronomy or plant genetics. Students in Technical Agriculture may prepare for returning to the farm, farm operators, county agents, seedsmen, or grain dealers. Students in Science Specialization may enter (usually after one or more year's graduate work) the fields of research in agronomy or plant genetics in experiment stations, enter federal service, go into teaching in colleges and universities, or may engage in agronomic or plant breeding research with seed companies.

Recommended courses for major in:

1. **Technical Agriculture:** Agro. 21, 22, 23, 31, 132, 133, 134; Pl. Pa. 3, 4; from 3 to 6 credits in other plant science courses may be added with the approval of the adviser.
2. **Science Specialization:** A major sequence in either agronomy or plant genetics may be arranged in consultation with the major adviser. The courses will be selected in relation to the major interest of the student and may include any courses fundamental to basic training in plant science.

Minor sequence:

Minors should be chosen in consultation with the major adviser. Those in Technical Agriculture usually should choose a minor in another field of technical agriculture most likely to prepare for the vocational objective.

Students in Science Specialization should choose a minor in a science field related to the interests of the student.

#### *Freshman and Sophomore Courses*

1. General Farm Crops. A study of the important field crops of the United States. (3 cred.; no prereq.)
21. Grain Crops. Structure, function, culture, improvement, and uses of corn, wheat, oats, barley, rye, flax, and buckwheat. (4 cred.; soph., jr., sr.; prereq. 1)
22. Grain and Hay Grading. Development of grades, study of grading methods, and actual practice in grading grain and hay samples according to federal standards, Training in judging grain and hay on quality basis. (3 cred.; soph., jr., sr.; prereq. 1)
23. Forage Crops. Methods of obtaining stands, stage or maturity of cutting or grazing in relation to continued productivity, yields and quality of product. Hay and silage makings and storage. (4 cred.; soph., jr., sr.; prereq. 1)
31. Principles of Genetics. Fundamental principles of breeding, heredity, variation, biometry, and evolution. (4 cred.; soph., jr., sr.)



*Junior and Senior Courses*

126. Crop Judging. Identification of crops, weeds, and diseases in relation to judging and grading farm crops. (4 cred.; jr., sr., grad.; prereq. 22)
132. Farm Crops Plant Breeding. Applied genetics. Methods of breeding each of the important agricultural crops. (4 cred.; jr., sr., grad.; prereq. 31)
133. Pasture Crops and Management. Characteristics, economic value, and distribution of pasture plants. Methods of obtaining stands. Management of temporary and permanent pastures to maintain and improve production. (4 cred.; jr., sr., grad.; prereq. 23)
134. Seminar in Agronomy. Critical studies of problems in agronomy. (2 cred.; sr., grad.; prereq. agro. 9 cred.)
135. Weed Control. Agronomic methods of weed control including cultural methods, use of herbicides and related problems. (3 cred.; jr., sr.; grad.; prereq. P1. Pa. 3)

## ANALYTICAL CHEMISTRY

INSTITUTE OF TECHNOLOGY  
SCHOOL OF CHEMISTRY*Freshman and Sophomore Courses*

- 1‡-2‡ Quantitative Analysis. (10 cred.; soph., jr., sr.; prereq. In. Ch. 13)

For additional courses and course descriptions see the *Bulletin of the Institute of Technology*.

## ANIMAL AND POULTRY HUSBANDRY

Major specialization in this division is elected by students who are chiefly interested in the production, marketing, processing, or distribution of livestock and its products. Vocational opportunities cover a wide range from the raising of livestock and poultry on farms to the distribution of products through retail channels. There are opportunities for graduates in the education field, such as county agricultural agent positions, teachers and research workers in colleges and experiment stations and with business firms. Majors are offered in either animal husbandry or poultry husbandry.

Recommended courses for majors in:

**A. Animal Husbandry**

1. **Technical Agriculture:** An. Hu. 5, 8, 51, 52, 53, 56-57, 58, 101, 112, 113; Vet. 50, 51, 52; Agro. 23, 31, 133; Ag. Bi. 6; Ag. Ec. 40, 143.
2. **Science Specialization:** Consult adviser.

**B. Poultry Husbandry**

1. **Technical Agriculture:** Po. Hu. 1, 51, 52, 102, 153, 154; An. Hu. 108, 112; Vet. 109; Ag. Bi. 6; Ag. Ec. 25, 40; Agro. 31.
2. **Science Specialization:** Consult adviser.

## ANIMAL HUSBANDRY

*Freshman and Sophomore Courses*

1. **Livestock Production.** Opportunities and problems in livestock production. A survey of practices followed in the production of beef cattle, sheep, swine, and horses. Lectures and laboratory practice in classifying and appraising livestock. (4 cred.; no prereq.)

‡ A fee of \$2 per quarter is charged for this course. The student should purchase a \$5 chemistry deposit card from the bursar, in the Administration Building. No student will be assigned a desk in the laboratories until he presents this card. The \$2 course fee, laboratory material, and breakage will be charged against this deposit.

5. Livestock Judging. Practice in judging beef and dual-purpose cattle, sheep, hogs, and horses. (3 cred.; soph., jr., sr.; prereq. 8)
8. Breeds of Livestock. The origin, history, characteristics, and economic importance of the breeds of livestock. Factors for consideration in the selecting of breeding animals. (3 cred.; soph., jr., sr.; prereq. 1)

*Junior and Senior Courses*

50. Meat Selection and Utilization. A study of the different cuts of pork, beef, veal, mutton and lamb, with reference to prices, relative economy, uses, nutritive value, chemical composition, ripening, curing and palatability. (3 cred.; jr., sr., agriculture and home economics students; no prereq.)
52. Meats. Slaughter of animals and the cutting of carcasses. Lectures, demonstrations, and laboratory; meat judging practice. (3 cred.; jr., sr., prereq. 1)
53. Advanced Meats. The relation of animal form to carcass yield. The commercial wholesale and retail meat cuts. Factors affecting the quality of meat. Meat products. (3 cred.; jr., sr.; prereq. 52)
- 56-57. Livestock Feeding. A study of the nutritional requirements of farm animals and the composition and characteristics of livestock feeds. The value of individual feeds and of combinations of feeds for beef cattle, sheep, swine, and horses. (6 cred.; jr., sr.; prereq. 1)
58. Market Classes and Grades of Livestock and Livestock Products. A study of the market classes and grades of livestock and livestock products. Marketing methods; transportation problems; stockyards management; sanitary regulations; buying and selling animals for breeding use; visits to the South St. Paul livestock market and wool warehouses. (3 cred.; jr., sr.; prereq. 1)
101. Livestock Selection. Competitive selection of all types and breeds of livestock. Evaluation of pedigrees, performance records, and other factors as aids to observation in selecting breeding animals. Visits to stock farms. (3 cred.; jr., sr., grad.; prereq. 5)
107. Meat Problems. The wholesale cuts and grades of meat; the processing industry and the utilization of by-products. Special problems and visits to processing and merchandising establishments. (3 cred.; jr., sr., grad.; prereq. 53)
108. Seminar, Animal or Poultry Husbandry. Special problems and preparation of reports on research investigations pertaining to the livestock or poultry industry. (3 cred.; jr., sr., grad.; prereq. 56-57, 112 or Poultry 102 or 153 or 154)
112. Animal Breeding. The application of the physiology of reproduction and genetics to the breeding of farm animals. (3 cred.; jr., sr., grad.; prereq. Agro. 31)
113. Livestock Management. A study of the management principles involved and the problems of care in each of the several types of specialization in livestock production. A general course covering beef cattle, sheep, hogs, and horses. (3 cred.; jr., sr., grad.; prereq. 56-57, 112)
114. Artificial Insemination. Lectures and laboratory on the fundamentals and technics involved in artificial insemination. Problems and procedures in managing artificial breeding associations. (5 cred.; jr., sr., grad.; prereq. 112 and approval of instructor)
116. Prenatal Development of Farm Animals. Textbook, lectures, and demonstration dealing with prenatal development in farm animals. (3 cred.; jr., sr., grad.; prereq. 112 or equiv. and approval of instructor)

POULTRY HUSBANDRY

*Freshman and Sophomore Courses*

1. Poultry Production. An introduction to the poultry industry and the principles underlying farm flock management. (4 cred.; no prereq.)

*Junior and Senior Courses*

51. Hatchery Management. Principles of incubation, study of commercial incubators and problems of hatchery operation and flock improvement. (3 cred.; jr., sr.; prereq. 1, Zool. 14-15)
52. Poultry Judging. Practice in selection for standard and production qualities of poultry. (3 cred.; jr., sr.; prereq. 1)
102. Poultry Breeding. The application of the principles of genetics and physiology of reproduction to the breeding of poultry. (3 cred.; jr., sr., grad.; prereq. 1, Agro. 31)
153. Poultry Feeding. The nutritive requirements of poultry and how they are met by the various feeds and systems of feeding. (3 cred.; jr., sr., grad.; prereq. 1, Ag. Bi. 1)
154. Poultry Products. A study of grades and classes of market poultry and eggs, methods of processing and storage, and problems in produce plant operation. (4 cred.; jr., sr.; prereq. 1)

## ANTHROPOLOGY

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

*Freshman and Sophomore Courses*

40. Introduction to Anthropology. (5 cred.; soph., jr., sr.; no prereq.)
41. Introduction to Anthropology. (5 cred.; soph., jr., sr.; no prereq.)
42. The Growth of Cultures. (5 cred.; fr., soph., jr., sr.; no prereq.)

*Junior and Senior Courses*

54. Social Organization. (3 cred.; jr., sr.; no prereq.)
56. Primitive Science. (3 cred.; jr., sr.; no prereq.)
80. The American Indian. (3 cred.; jr., sr.; no prereq.)
81. Archeology of North America. (3 cred.; jr., sr.; no prereq.)
106. European Prehistory. (3 cred.; jr., sr., grad.; no prereq.)
109. General Linguistics (3 cred.; jr., sr., grad.; no prereq.)
110. Physical Anthropology. (3 cred.; jr., sr., grad.; no prereq.)
118. Indian Civilizations of Mexico and Peru. (3 cred.; jr., sr., grad.; no prereq.)
119. The Contact of Cultures. (3 cred.; jr., sr., grad.; no prereq.)
- 122-123-124. Problems in Anthropology. (Cred. ar.; jr., sr., grad.; prereq. permission of instructor)
- 130-131-132. Races and Cultures of Arabia, Egypt, and North Africa. (9 cred.; jr., sr., grad.; no prereq.)
- 133-134. Races and Cultures of the Far East. (6 cred.; jr., sr., grad.; no prereq.)
140. Field Trip in Archeology. (1-8 cred.; jr., sr., grad.; no prereq.)
161. Primitive Religion. (3 cred.; jr., sr., grad.; no prereq.)
162. Peoples of Negro Africa. (3 cred.; jr., sr., grad.; no prereq.)
163. Ethnology of India. (3 cred.; jr., sr., grad.; no prereq.)
166. History of Anthropological Theory and Method. (3 cred.; jr., sr., grad.; no prereq.)
167. Primitive Mythology. (3 cred.; jr., sr., grad.; no prereq.)
170. Primitive Art. (3 cred.; jr., sr., grad.; no prereq.)

## ARCHITECTURE

## INSTITUTE OF TECHNOLOGY

## COLLEGE OF ENGINEERING AND ARCHITECTURE

In addition to the prerequisites listed below, enrollment in these courses is subject to specific approval by the School of Architecture, and to limitation by the work space and instructional facilities available.

*Junior and Senior Courses*

40. Graphic Representation. Projection, shades and shadows, perspective, etc. (6 cred.; 3rd qtr. soph.; prereq. solid geometry)
- 51-52-53. History of Architecture. (The same as Fine Arts 51-52-53) (9 cred.; jr., sr.)
57. Building Materials and Methods, Part I (4 cred.; jr., sr.; no prereq.)
- 58-59. Building Materials and Methods, Part II (8 cred.; prereq. 57)
- 61-62-63. Tutorial Work in History of Architecture. (The same as Fine Arts 61, 62, 63) (6 cred.; jr., sr.; prereq. 53)
- DP-I.‡ Drawing and Painting, Grade I. (6 cred.; all; soph.; no prereq.)
- DP-II.‡ Drawing and Painting, Grade II. (6 cred.; jr., sr.; prereq. DP-I)
- DP-III.‡ Drawing and Painting, Grade III. (6 cred.; jr., sr.; prereq. DP-II)
- AD-I.‡‡ Architectural Design, Grade I. (10 cred.; jr., sr.; prereq. 40)
- AD-II.‡‡ Architectural Design, Grade II. (15 cred.; jr., sr.; prereq. AD-I)
- SD-I. Stage Design (4 cred.; jr., sr.; no prereq.)

## ART EDUCATION

## COLLEGE OF EDUCATION

*Freshman and Sophomore Courses*

- 1-2-3. General Design. A discriminating awareness of organic design in the temporary environment is developed through analysis of the structural basis of pictorial, decorative, and industrial design simultaneously with individual creative and practical problems. (9 cred.; all; prereq. high school art or 17-18-19)
- 4-6-8.‡ Basic Drawing, Art Ed. 4, introduction to materials and techniques (2 cred.; no prereq.); 6, introduction to still life and figure (2 cred.; prereq. 4 or equiv., or consent of instructor); 8, introduction to landscapes and figure (2 cred.; prereq. 4 or equiv., or consent of instructor)
- 24A-B-C.‡ Water Color Painting. (6 cred.; prereq. 6, 8, or equiv., or permission of instructor)
- 26A-B-C.‡ Oil Painting. (6 cred.; prereq. 6, 8, or equiv., or permission of instructor)
- 28A-B-C.‡ Advanced Drawing Techniques. (6 cred.; prereq. 6, 8, or equiv., or permission of instructor)

*Senior College Courses*

- 50A-B-C. Introduction to Commercial Design. (9 cred.; prereq. 6 cred. General Design and 2 cred. Basic Drawing or equiv. or permission of instructor)
- 52A-B. Interior Design. (6 cred.; prereq. 6 cred. General Design and 2 cred. Basic Drawing or equiv., or permission of instructor)
- 66A-B.‡ Fashion Illustration. (4 cred.; prereq. 4 cred. in Basic Drawing)
- 67A-B-C.‡ Illustration for Advertising and Other Purposes. (6 cred.; prereq. 12 cred. drawing or painting, or permission of instructor)
- 70A-B-C.‡‡‡ Wood Sculpture and Carving. (9 cred.; prereq. permission of instructor)
- 73A-B-C.‡‡‡ Ceramics. (9 cred.; prereq. 6 cred. General Design or permission of instructor)
153. Home Design in Society and Education. (3 cred.; prereq. permission of instructor)
157. Art Movements of Twentieth Century Scandinavia. (3 cred.; prereq. permission of instructor)

‡ A fee of \$1 per quarter is charged for this course.

‡‡ A fee of \$2 per quarter is charged for this course.

‡‡‡ A fee of \$1.50 per quarter is charged for this course.

- 170E.‡ Advanced Wood Sculpture and Carving. (3 to 9 cred.; grad.; prereq. permission of instructor)  
 173E.‡ Advanced Ceramics. (9 cred.; grad.; prereq. permission of instructor)

For additional courses and course descriptions see the *Bulletin of the College of Education*.

## BACTERIOLOGY AND IMMUNOLOGY

### MEDICAL SCHOOL

#### *Freshman and Sophomore Courses*

- 53.‡‡‡ General Bacteriology. (5 cred.; soph. with a C average in the prerequisite courses, jr., sr.; prereq. 10 cred. in chem. and 4 cred. in bot. or zool.)

#### *Junior and Senior Courses*

103. Soil Microbiology. Studies of the microscopic inhabitants of the soil, their inter-relationships and role in the transformations of soil constituents with particular emphasis on the cycles of carbon, nitrogen, and sulphur in nature. (5 cred.; jr., sr., grad.; prereq. 53, and 15 cred. in chem.)  
 104. Sanitary Bacteriology. (4 cred.; jr., sr., grad.; prereq. 9 cred. in bact. and 15 cred. in chem.)  
 114. Molds, Yeasts, and Actinomycetes. (4 cred.; jr., sr., grad.; prereq. 9 cred. in bact. or 5 cred. in bact. and 4 cred. in pl.pa.)  
 121-122.† Physiology of Bacteria. (6 cred.; jr., sr., grad.; prereq. 53 and 8 cred. in or. ch. or biochem.)  
 123. Applied Bacteriology. (3 cred.; jr., sr., grad.; prereq. 121-122)

## BOTANY

### COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

#### *Freshman and Sophomore Courses*

- 1‡-2‡-3.‡ General Botany. (10 cred.; all; no prereq.)  
 4‡‡-5.‡‡ General Botany (10 cred.; all; no prereq.)  
 10. Minnesota Plant Life. (3 cred.; all; no prereq.)  
 12. Plants Useful to Man. (3 cred.; all; no prereq.)

#### *Junior and Senior Courses*

- 50.‡ General Plant Ecology. (3 cred.; soph. with grade of C in 1-2-3 or 4-5; jr., sr.; prereq. 1-2-3 or 4-5)  
 51.‡ General Plant Physiology (3 cred.; soph. with grade of C in 1-2-3 or 4-5; jr., sr.; prereq. 1-2-3 or 4-5 and one qtr. of general chemistry or consent of instructor)  
 52.‡ Elementary Taxonomy. (3 cred.; soph. with grade of C in 1-2-3 or 4-5; jr., sr.; prereq. 1-2-3 or 4-5)  
 53.‡ Morphology of Thallophytes and Bryophytes. (3 cred.; soph. with grade of C in 1-2-3 or 4-5; jr., sr.; prereq. 1-2-3 or 4-5)  
 54.‡ Morphology of Pteridophytes and Spermatophytes. (3 cred.; soph. with grade of C in 1-2-3 or 4-5; jr., sr.; prereq. 1-2-3 or 4-5)

\* In registering consult Art Education advisers.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1.50 per quarter is charged for this course.

‡‡ A fee of \$2.25 is charged for this course.

‡‡‡ Microscope required. Use of microscope may be obtained by purchasing \$3 microscope cards from bursar, Main campus.

56. Introduction to Mycology. (3 cred.; soph. with grade of C in prereq.; jr., sr.; prereq. 9 cred. in bot. or permission of instructor)
108. Pteridophytes. (5 cred.; sr., grad.; prereq. 54)
110. Gymnosperms. (5 cred.; sr., grad.; prereq. 54)
- 113.‡ Flora of Minnesota. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 or consent of instructor)
- 114.‡ Phyletic Taxonomy of Angiosperms. (3 cred.; jr., sr., grad.; prereq. 52 or consent of instructor)
- 115.‡ Spring Flora of Minnesota. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 or consent of instructor)
- 118.‡ Extranuclear Cytology. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5)
- 119.‡ Nuclear Cytology. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and an elementary course in genetics)
- 120.‡‡‡ Research Methods in Cytology. (3 to 5 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and consent of instructor)
- 121.‡ Morphogenesis. (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and consent of instructor)
- 123.‡‡‡ Research Methods in Histology. (3 to 5 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and consent of instructor)
- 127.‡ Anatomy of Vascular Plants. (5 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5)
131. Field Ecology. (5 cred.; jr., sr., grad.; prereq. 50 or For. 2, 3, 4)
- 132.‡ Morphological Ecology. (5 cred.; jr., sr., grad.; prereq. 50 or For. 2, 3, 4)
133. Ecological Plant Geography. (5 cred.; jr., sr., grad.; prereq. 50 or For. 2, 3, 4)
- 134.‡ Research Methods in Ecology. (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 50)
- 137.‡ Experimental Ecology. (5 cred.; jr., sr., grad.; prereq. 18 cred. in plant science incl. 50, 51)
140. Advanced Survey of Plant Physiology. (3 cred.; jr., sr., grad.; prereq. 51 or equiv. and elem. in. ch.)
141. Physiochemical Principles and Measurements in Plant Physiology. (3 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem. or consent of instructor; for laboratory see 146)
142. Photosynthesis and Other Effects of Radiation. (3 cred.; jr., sr., grad.; prereq. same as for 141; for laboratory see 147)
143. Plant Metabolism. (3 cred.; jr., sr., grad.; prereq. same as for 141; for laboratory see 148)
- 146.‡‡‡ 147.‡‡‡ 148.‡‡‡ Advanced Physiology Laboratory. (2 cred. per qtr.; jr., sr., grad.; to be taken with or after 141, 142, 143 respectively)
- 154.‡‡‡ Spectroscopy and Photochemistry Applied to Biology. (3 to 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem. or consent of instructor)
- 165.‡ Introduction to Pollen Analysis. (3 cred.; jr., sr., grad.; prereq. consent of instructor)
- 197‡-198‡-199‡ Problems. (1 to 5 cred.; jr., sr., grad.; prereq. consent of instructor)

## CHILD WELFARE

*Freshman and Sophomore Courses*

10. Introduction to Child Study. Survey of the child development nursery school, parent education, and mental hygiene approaches to child study. (2 cred.; 3rd qtr. fr., soph.; no prereq.)

‡ A fee of \$1.50 is charged for this course.

‡‡‡ A fee of \$3 is charged for this course.

*Junior and Senior Courses*

80. Child Psychology. Principles, scientific results, and applications to practical problems in education. (3 cred.; jr., sr.; prereq. Psy. 1-2)
90. Home, School, and Family Relations. Adjustment within and outside the family; relation of adults and children; family problems in discipline, recreation, marital adjustment, community relations, etc. (2 cred.; jr., sr.; prereq. 80)
130. Motor, Linguistic, and Intellectual Development of the Child. Lectures, readings, and reports. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)
131. Personality, Emotional, and Social Development of the Child. Lectures, readings, and reports. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)
132. Later Childhood and Adolescence. Growth, social adjustment, emotional, mental, and personality development. (3 cred.; prereq. 12 cred. in psy. or equiv.)
- 133-134-135. Research Methods. Methods used in the study of children. Laboratory exercises and problems. (2, 4, or 6 cred.; sr., grad.; prereq. 10 cred. in psy. or ed. psy., and 3 cred. in statistics and permission of instructor)
140. Behavior Problems in Younger Children. Nature and origin of behavior difficulties in younger children with special reference to the relation between early behavior and later maladjustment. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)
141. Behavior Problems in Older Children. Nature and origin of behavior difficulties in older children, with particular reference to readjustment at time of adolescence. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)
142. Psychology of Atypical Children. Survey of scientific literature on children with mental and physical handicaps. (3 cred.; prereq. 10 cred. in psy. or equiv.)
- 150-151-152. Childhood Education. Lectures and readings on philosophy, organization, administration, materials and methods. (2, 4, or 6 cred.; prereq. 12 cred. in educ. or equiv.)
160. Physical Growth and Development. The growth of the human body and its systems from early fetal life to maturity. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)
166. Maturity and Aging, Development Changes and Adjustment. Survey of scientific literature of changes in ability and learning that accompany maturity and senescence. (3 cred.; sr., grad.; prereq. 15 cred. in psy., educ. or soc.)
170. Parent Education. History and survey of programs, materials, methods. Administration and organization. Lectures, discussions, and reports. (3 cred.; sr., grad.; prereq. 15 cred. in child welfare or ho. ec., or ed., or psy., or soc., or pub. health)
185. Children in a Changing World. The effects of social change and social stress upon children. Some emphasis upon war, depressions, and catastrophes. (3 cred.; sr., grad.; prereq. 12 cred. in psy., educ. or soc.)
190. Principles of Mental Measurement of Young Children. Survey of mental testing from the point of view of those who interpret test results, the teacher, social worker, etc. Lectures, demonstrations, readings, and reports. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)

## DAIRY HUSBANDRY

The Dairy Production Curriculum is suggested for those students interested in dairy cattle in preparation for (1) dairy farming, (2) technical and extension work pertaining to dairy cattle or dairy farming, and (3) additional graduate study in this field.

The Dairy Products Curriculum is suggested for students interested in the manufacture or distribution of dairy products, either (1) as a plant operator, (2) in technical

or extension work in this field, (3) for graduate study in some phase relating to the dairy industry.

**1. Technical Agriculture:** Recommended courses for majors in:

- Dairy Production: Ag. Bi. 116; Ag. Ec. 40, 80, 102, 103, 104; Agro. 21, 23, 31; An. Hu. 56, 112, 113, 114; Dy. Hu. 2, 9, 51, 101, 103, 104, 105, 106, 116, 117; Pl. Pa. 1; Po. Hu. 1; Soc. 114; Vet. 50-51-52.
- Dairy Products: Ag. Bi. 6, 101, 103, 119, 120, 121, 122, 123, 129; Ag. Ec. 25, 40, 50, 131, 140, 141; Ag. En. 24, 25, 40, 41, 70; Dy. Hu. 2, 3, 4, 10, 51, 101, 105, 106, 110, 111, 112, 113, 114, 115; Econ. 25, 40, 50, 90, 141; Po. Hu. 1, 51, 154.

**2. Science Specialization:** Consult adviser.

*Freshman and Sophomore Courses*

1. Elements of Dairying. Lectures and demonstrations with opportunity for laboratory practice. The history and development of the dairy industry. The origin and classification of domesticated cattle. History and characteristics of the dairy breeds of cattle. Milk, its composition, food value, chemical and physical properties with relation to the handling of milk, sanitary milk production and the manufacture of milk products. Dairy arithmetic. (3 cred.; prereq. entrance cred. in chem. or In. Ch. 1 or 4)
2. Dairy Bacteriology. Lectures and laboratory exercises. Types of milk organisms; the contamination of milk and how prevented; relation of milk to the public health; the bacteriology of dairy products. (3 or 5 cred.; 3 cred. for lect., 2 cred. for lab.; soph., jr., sr.; prereq. Bact. 53) (Lecture taken separately only on permission of instructor)
3. Testing Dairy Products. The use of the Babcock test and other tests common to dairy products plants. (2 cred.; prereq. 1)
4. Dairy Products Practice. A study of factory methods. Includes a minimum of two months' practical experience in a plant handling dairy products in a factory way. Reports and records of work done required. (3 cred.; soph., jr., sr.; prereq. 1)
9. Dairy Cattle Judging. An analysis of the anatomy, physiology and genetics of dairy animals on the basis of score card interpretation. (1 cred.; soph., jr., sr.; no prereq.)
10. Dairy Products Judging. Laboratory practice in the grading of milk and milk products including cream, ice cream, cheese and butter. (1 cred.; soph., jr., sr.; prereq. 1)
20. Household Microbiology. (Especially for students in Home Economics). The fundamental principles of microbiology, characteristics of bacteria, yeasts, molds, and other micro-organisms, their importance in the preparation and preservation of foods, relation to health and well-being of the individual and the family, and sanitation in the home and the community. (4 cred.; 3rd qtr. fresh., soph., jr., sr.; prereq. approval of adviser and permission of instructor)

*Junior and Senior Courses*

51. Market Milk. Lectures and laboratory work. Classes of market milk; transportation and distribution; sanitary inspection; equipment and operation of plants; problems of public control. (3 cred.; jr., sr.; prereq. 1, 2)
101. Milk Production. Problems of the dairy farmer, such as characteristics and adaptation of dairy breeds; selection and management of dairy herd and sires; calf raising, dairy barns. (5 cred.; jr., sr., grad.; prereq. 1)
103. Dairy Stock Feeding. Application of principles of nutrition to feeding dairy animals. Feeding standards; characteristics of various feeding stuffs; formulation of rations. (3 cred.; sr., grad.; prereq. 101, An. Hu. 56)
104. Dairy Stock Selection. An evaluation of inherited characters in dairy cattle from an economic standpoint. (2 cred.; jr., sr., grad.; prereq. 9, 101 or parallel)



105. Seminar I. Special investigation and study of selected topics. Study of dairy literature. Preparation of bibliographies. Each student presents papers and reports on assigned subjects and reviews recent scientific investigations in dairy husbandry. (1 cred.; sr., grad.; prereq. 3 courses in dairy husbandry)
106. Seminar II. Continuation of 105. (1 cred.; sr., grad.; prereq. 105)
110. Dairy Products: Ice Cream and Frozen Desserts. The manufacture of ice cream with special reference to the chemical and physical processes involved. Organization, construction, equipment, and operation of such factories. Laboratory exercises and lectures. (3 cred.; jr., sr., grad.; prereq. 1, 3)
111. Dairy Products: Butter. The manufacture of butter with special reference to the chemical and bacteriological processes involved. Organization, construction, equipment, and operation in such factories. Laboratory exercises to illustrate these processes. (3 cred.; jr., sr., grad.; prereq. 1, 2, 3)
112. Dairy Products: Cheese. The manufacture of cheese, with special reference to the chemical, bacteriological, and physical processes involved. Organization, construction, equipment, operation of such factories. Laboratory exercises and lectures. (3 cred.; jr., sr., grad.; prereq. 1, 2, 3)
113. Technical Control. Lectures and laboratory. Chemical and bacteriological laboratory methods used in technical control of milk and its products. Use of Monjonner tester, cryoscope, and bacteriological control methods. (3 cred., sr., grad.; prereq. 2, 111 or 112)
114. Milk By-Products. The manufacture of condensed milk, dry milk, and other milk by-products with special reference to the physical processes involved. Laboratory exercises and lectures. (3 cred.; jr., sr., grad.; prereq. 1, 3)
115. Advanced Dairy Bacteriology. Investigations of specific problems on the bacteriology and mycology of milk and dairy products. (3 cred.; sr., grad.; prereq. 2, 111 or 112)
116. Milk Secretion. Lecture assignments covering the anatomy and physiology of milk secretion and factors influencing the quality and quantity of milk. (3 cred.; sr. grad.; prereq. Physiol. 9 cred. and Ag. Bi. 103)
117. Dairy Cattle Breeding. Application of the principles of genetics to the improvement of dairy cattle. Evaluation of breeding animals and formulation of breeding plans. (3 cred.; jr., sr., grad.; prereq. 101, 104, Agro. 31)
- (For courses in Dairy Chemistry see Agricultural Biochemistry 103, page 73.)

## ECONOMICS

### SCHOOL OF BUSINESS ADMINISTRATION

For courses and course descriptions see the *Bulletin of the School of Business Administration*.

See also courses in Agricultural Economics.

## EDUCATIONAL ADMINISTRATION AND SUPERVISION

### COLLEGE OF EDUCATION

For courses and course descriptions see the *Bulletin of the College of Education*.

## EDUCATIONAL PSYCHOLOGY

### COLLEGE OF EDUCATION

For courses and course descriptions see the *Bulletin of the College of Education*.

## ENGLISH

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

*Freshman and Sophomore Courses*

- 21-22-23.\* Introduction to Literature. 21: Marlowe, Spenser, Bacon, Browne, Milton and Bunyan; 22: Dryden, Pope, Swift, Addison and Steele, Johnson, Boswell, Fielding, and Sheridan; 23: Wordsworth, Byron, Shelley, Keats, Lamb, Carlyle, Browning, and Arnold.
- 37-38-39.\* Twentieth-Century Literature. Readings in British and American literature since the 1890's, arranged by types of discourse. 37: The literature of opinion, biography, travel, etc., with some reading in the short story; 38w: poetry and drama; 39: the novel since Thomas Hardy. This course as a general introduction to the intelligent reading of literature, is intended for students in all colleges, and not particularly for those meaning to specialize in English. (9 cred.; soph., jr., sr.; pre-req. Rhet. Comm. req.)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

## ENTOMOLOGY AND ECONOMIC ZOOLOGY

Courses in this department are closely correlated with those offered in the Department of Zoology of the College of Science, Literature, and the Arts.

**Recommended for majors in entomology:** Ent. 5, 21, 51, 52, 55, 64; Pl. Pa. 1; Zool. 21, 53, 83.

**Recommended minors:** agronomy, biochemistry, horticulture, plant pathology.

Whether the chosen curriculum is that of Technical Agriculture or of Science Specialization, major students in entomology are required to take 15 credits in either German or French prior to graduation.

Students wishing to major in economic zoology should consult the special curricula in Fish and Wildlife Management (page 22).

*Freshman and Sophomore Courses*

5. Economic Entomology. The life histories, habits, and methods of control of the insect pests of livestock, orchard, field, and garden. Laboratory work in the determination of the more important forms. (5 cred.; soph., jr., sr.; pre-req. Zool. 14-15 or equiv.)
13. Field Zoology. For forestry freshmen at Itasca Park. (1½ cred.; no pre-req.)
21. Principles of Beekeeping. Life history, morphology and physiology of the honeybee. Colony development. History of beekeeping. Equipment and apiary management. Chemistry and food value of honey. Pollination. Diseases of bees and their control. Economics of beekeeping. Practical laboratory and apiary work. (3 or 5 cred.; no pre-req.)

*Junior and Senior Courses*

- 51.\*†† Introductory Parasitology. An elementary course dealing with parasitic protozoa, worms, and arthropods and their relation to diseases of man and animals. (5 cred.; jr., sr.; pre-req. Zool. 14-15 or equiv.)
- 52.\*†† Introductory Entomology. General morphology, life histories, habits, and classification of insects. (5 cred.; jr., sr.; pre-req. Zool. 14-15 or equiv.)

\* Offered on the Minneapolis campus.

† Open to sophomores on petition.

‡ A fee of \$1.50 per quarter is charged for this course.

55. Entomological Techniques. Practical laboratory instruction in mounting, preservation of insect larvae; preparation of microscopic mounts of minute insects; labeling, classifying, and cataloguing specimens of insects for scientific study. (9 hrs. lab., 3 cred.; jr., sr.)
56. Forest Entomology. Lectures and laboratory work dealing with the principles of controlling insects that attack trees and forest products, together with a consideration of the life history and habits of important representative species. (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)
63. Mammalogy. Distinguishing characteristics and life histories of the various mammal groups, particularly those represented in the state. Consideration is given to the possibilities of fur farming in case of certain species. (4 cred.; jr., sr.; prereq. Zool. 22)
64. Economic Vertebrate Zoology. Survey of the utilization of wild animals and discussion of principles of managing wildlife resources in the United States. Lectures and library work. (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv.)
114. Apiculture. Problems of bee management, disease control, wintering, bee breeding, processing, and marketing bee products. Lectures, laboratory, and field practice. (3 cred.; jr., sr., grad.; prereq. 9 cred. in ent.)
- 117.\*‡ Animal Ecology. General ecology stressing ecological principles and land communities. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 118.‡§ Animal Ecology. Experimental approach to the study of environmental factors affecting animal populations. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 119.\*‡ Animal Ecology. A study of the conditions for life in the water and distribution of aquatic animals. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
120. General Ecology of Insects. Ecology with special reference to insects, their dispersal, distribution, abundance, natural control, and related problems. Lectures, laboratory, and field work. (3 cred.; jr., sr., grad.; alternative to 119, or both may be taken; prereq. 117-118)
- 121.\*‡ Ichthyology. A study of the taxonomy and habits of the fresh-water fishes of northern North America. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 125‡-126‡-127\*‡ Advanced General Entomology. Morphology, biology, and classification of insects. Lectures and laboratory. Frequent field trips in 127. (9 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 128-129. Insect Physiology. General and comparative physiology of insects, a survey of the organ systems and their functioning in various insects. Special emphasis is placed on research methods and evaluation of data. Lectures, laboratory, and reading. (8 cred.; sr., grad.; prereq. 15 cred. in zool. or ent. and permission of instructor. Zool. 50 or equiv. recommended)
140. Histology and Embryology of Insects. Primarily histology and histochemistry, but with a brief resume of the special features of insect embryology. (4 cred.; sr., grad.; prereq. 125, 126, 127, or equiv.)
- 141-142. Insects in Relation to Plant Diseases. A study of the principal insect vectors and their habits, types of insect injuries affecting health of plants, modes of insect transmission and dissemination of plant diseases, the methods of rearing and handling the carriers. Of interest to students in entomology, plant pathology, horticulture, forestry, and agronomy. (6 cred.; jr., sr., grad.; prereq. 8 cred. in ent. or pl. pa.)

\* Offered on the Minneapolis campus.

‡ A fee of \$1.50 per quarter is charged for this course.

§ Note that in the winter quarter this course is offered at the University Farm.

- 144.\*‡ Medical Entomology. A study of the principal arthropods obnoxious to man and animals. Special emphasis is placed on those arthropods which serve as vectors or pathogenic organisms of man and animals. Lectures and laboratory. (3 cred.; jr., sr., grad.; prereq. 9 cred. in zool. or ent.)
- 145‡-146.\*‡ Animal Parasites and Parasitism. Origin and biological significance of parasitism; the structure, life history, and economic relations of representative parasites. Lectures and laboratory. (6 cred.; jr., sr., grad.; prereq. 9 cred. in zool.)
150. Introduction to Aphidology. The biology and taxonomy of Aphididae. (3 cred.; jr., sr., grad.; prereq. Ent. 52 or equiv. or permission of instructor)
- 164-165-166. Wildlife Management. Detailed study of the life histories, ecology, and management of North American game animals including field studies of research and management techniques at appropriate times during the year. Lectures, library, laboratory, and field work. (9 cred.; jr., sr., grad.; prereq. Ent. 63, 64, Zool. 46-47, Bot. 50, and Pl. Pa. 53)
167. Techniques in Forest Wildlife Management. Largely field work; use of censuses applicable to the major local forms of forest wildlife; preparation of a wildlife management plan for a small forested area. (3 cred.; grad.; prereq. Ent. 64. Given at Cloquet)
- 168-169. Fishery Biology and Management. Methods and theory of fishery biology; age and rate of growth, condition factor, populations, mortality and harvest, indices of productivity, lake and stream survey methods and planning, lake and stream improvement, fish pond management. Lectures and laboratory. (6 cred.; jr., sr., grad.; prereq. Zool. 53, 117, 118, 119, and 121. Bot. 57 or equiv., Ag. Ec. 90 or equiv., or permission of instructor)
170. Fisheries Resources. Fisheries resources of the United States; fisheries products; methods and description of commercial fisheries; state, federal, and international administration of fisheries; significant laws and current legislation controlling United States fisheries. Organization of fishery programs. (3 cred.; jr., sr., grad.; prereq. Ent. 168, 169, or permission of instructor)
175. Principles of Economic Entomology. Methods and principles of insect control. Lectures and demonstration laboratory. (4 cred.; jr., sr., grad.; prereq. 15 cred. in ent. including Ent. 5 or equiv., or permission of instructor)
176. Legal and Regulatory Aspects of Pest Control. Principles of quarantine and administration of control campaigns. Lectures, discussions, and demonstrations. (3 cred.; jr., sr., grad.; prereq. 15 cred. in entomology including Ent. 5 or equiv., or permission of instructor)
177. Insecticides and Their Action. Chemistry, physiological action, toxicology and laboratory testing of insecticides. Lectures and laboratory. (4 cred.; sr., grad.; prereq. 15 cred. in ent. including Ent. 5 or equiv., or consent of instructor; inorganic and organic chemistry)
179. Recent Advances in Entomology. Lectures in special fields of entomological research given by a visiting professor. (Cred. and hrs. ar.; sr., grad.; no prereq.)
197. Introduction to Research. Preparation for investigational work in lines of entomology, parasitology, ecology, economic zoology, or beekeeping. Advanced laboratory, field, and library work; training in preparation of bibliographies and manuscripts; special problems. Summer work should be planned when possible. (5 or more cred.; sr., grad.; prereq. work as prescribed by the division)

\* Offered on the Minneapolis campus.

‡ A fee of \$1.50 per quarter is charged for this course.

## FOOD TECHNOLOGY

- 51-52. Food Analysis. Physical and chemical, and microbiological methods of analysis of foods including proximate analyses; proteins; fats; carbohydrates; vitamins; pigments; coloring matter, chemical and microscopic detection of adulteration. (2 cred. per qtr.; jr., sr.; prereq. Ag. Bi. 2 and 3)
- 101-102. Food Technology. The application of biochemistry and biology to food manufacturing, including effect of processing on chemical composition and nutritive value, methods of food preservation, food bacteriology, molds and fungi, insect and rodent control, food acceptance, chemical engineering operations in the food industries, food packaging. (3 cred. per qtr.; jr., sr., grad.; prereq. Ag. Bi. 3 and 52, Bact. 53, and a course in physics)
104. Principles of Frozen Food Processing and Storage. A comprehensive study of all types of frozen foods. History and development of the frozen food industry; standards for frozen foods; laws and regulations; quality in relation to temperature, rate and method of freezing; control of quality from time of harvest to packaging; packaging and wrapping; processing methods; storage, transportation and handling. (3 cred.; jr., sr., grad.; prereq. Bact. 53, Ag. Bi. 5 or 6)

## FORESTRY

*Freshman and Sophomore Courses*

1. General Forestry. A brief history of the development of forestry in Europe and America; its bearing on the forestry problems of the United States; description of the United States forests. Lectures and collateral reading. (3 cred.; no prereq.)
- 3-4. Dendrology. The forest trees of the United States; their classification, characteristics, and range. Lectures, assigned reading, laboratory. (Course 3, 3 cred. and Course 4, 4 cred.; no prereq.)
5. Field Silviculture. Largely field work designed to give the student a working knowledge of the forest. Includes silvicultural study of the types found in the north woods and the general principles underlying silvicultural reconnaissance. (1½ cred.; no prereq. Given at Itasca Park)
6. Field Mensuration. Largely field work. Includes use of compass, pacing and mapping; and elementary work in tree measurements, timber cruising including the elementary use of aerial photographs, and growth determination. (1½ cred.; no prereq. Given at Itasca Park)
- 7-8-9. Forest Mensuration. The basic principles underlying the determination of the volume of forest products, and trees, stands, and forests including the elementary theory and use of aerial photographs; the growth and yield of trees; stands, and forests; and elementary methods of compiling and analyzing numerical data. (9 cred.; all; prereq. 6, Math. 1 and 6)
10. Farm Forestry. The place of forestry in land-use planning. The economic status of the farm woodlot. The establishment and care of woodlots and windbreaks. Forest influences with special reference to soil erosion control. The use of wood on the farm. (3 cred.; not open to students majoring in forestry; no prereq.)
11. Camp Management. Experience in camp management. Each student will be placed in charge of the summer camp under faculty supervision for a short period of time. (1 cred.; no prereq. Given at Itasca Park)
20. Grazing. History of grazing in the West. Kind of stock used. Forage plants. Regulations and methods of handling stock on the national forests. Range management and protection. Lectures and reading. (3 cred.; soph., jr., sr.; no prereq.)

49. **House and Furniture Woods.** The woods used in house construction and interior finish and furniture. Their identification and properties. Lectures and laboratory. (2 cred.; soph., jr., sr.; not open to students majoring in forestry; no prereq.)

*Junior and Senior Courses*

- 53-54. **Wood Structure and Identification.** Structure, classification, and identification of the domestic commercial woods. Lectures, reading, laboratory. (6 cred.; jr., sr.; prereq. 3-4)
56. **Forest Products.** An introductory survey of forest products; lumber, naval stores, tannins, wood pulp, paper, etc. Lectures, reading, reports. (3 cred.; jr., sr.; no prereq.)
57. **Wood Utilization.** Production, distribution, qualities, amounts, manufacture and prices of wood products. Lectures, reading, reports. (3 cred.; sr.; prereq. 53-54)
58. **Lumber Merchandising and Grading.** A study of the lumber industry, lumber associations, lumber grades, lumber prices, and lumber distribution. (3 cred.; sr.; prereq. 53-54)
101. **Advanced Dendrology.** A continuation of Course 3-4 with special studies in classification and distribution of some important timber species of the world. (3 cred.; jr., sr., grad.; prereq. 3-4)
- 111-112. **Advanced Forest Mensuration.** Continuation of Course 9 with special emphasis on the application of statistical methods in forest mensuration. (6 cred.; grad.; prereq. 9 or consent of instructor)
113. **Wood Pulp and Paper.** A detailed study of production of wood pulp and paper products. Lectures, reading, reports. (3 cred.; jr., sr., grad.)
114. **Mechanical and Physical Properties of Wood.** Derivation and application of the formulas used in determining stresses in wood. Lectures, reading, and class problems. (3 cred.; jr., sr., grad.; prereq. 53-54, Math. 7)
- 115-116. **Mechanical and Physical Properties of Wood.** Laboratory methods in timber testing. The use of timber connectors in heavy construction. Laboratory, reading, and reports. (6 cred.; jr., sr., grad.; prereq. 114)
119. **Advanced Wood Structure.** The microtechnique of woody tissues. Lectures, reading, and laboratory work. (4 cred.; sr., grad.; prereq. 53-54)
120. **Estimating.** A general course in building cost estimating. (3 cred.; sr., grad.; no prereq.)
125. **Wood Preservation.** Lectures and collateral reading of the history, development, and methods of wood preservation. Different systems now in use and preservatives used. (3 cred.; jr., sr., grad.; prereq. 53-54)
126. **Silvics.** A study of the life history and general characteristics of forest trees and stands, with special emphasis on the effect of environmental factors, such as climate and soil, on the growth and inherent characteristics of trees. (3 cred.; sr., grad.; no prereq.)
127. **Silviculture.** A study of the different methods of establishing, maintaining, thinning, improving and producing tree crops in America. An analysis of European methods as ideals for the guidance of American practice. (3 cred.; grad.; prereq. 126)
128. **Silviculture Laboratory.** Nursery practice and field planting. Involves the actual thinning of one small tract of young timber and the making of a silvicultural plan for another tract. (6 cred.; sr., grad. Given at the Cloquet Forest Experiment Station)
130. **Forest Valuation.** The business and financial aspects of forest management. A study of the different factors entering into the valuation of forest property. (5 cred.; grad.)
131. **Forest Policy.** Policy of the United States and the states toward the utilization of the public forest resources. Policy of other owners toward forest resources controlled by them. Administration of the national and state forests. (3 cred.; sr., grad.)

132. Forest Management Laboratory. Field work. Collection of data necessary for a forest management plan. Includes timber estimating, growth studies, and maps necessary for a forest management plan. Application of aerial photographs in forest surveys. (6 cred.; sr., grad. Given at the Cloquet Forest Experiment Station)
136. Forest Economics. The place of the forest in the productive utilization of land; past and present markets and source of supply of timber and timber products, particularly with reference to the present situation in North America. (3 cred.; jr., sr., grad.; prereq. Ag. Ec. 2)
137. Seeding and Planting. Principles of seeding and planting and the nursery practices used in the different forest regions of the United States. (3 cred., jr., sr., grad.)
140. Forest Management. Methods of regulating and allotting the cut from a forest under management. Preparation of a forest management plan. Lectures and reports. (5 cred.; postgrad.; prereq. 128, 132)
141. Principles of Silvics. Principles underlying the silvical characteristics of trees and the reactions of trees to their environments. (3 cred.; grad.; prereq. 126, 127)
142. Wood Chemistry. Wood composition, the constitution of wood components, the reactions of wood components and derivatives, and the analysis and chemical technology of wood and wood products. (3 cred.; jr., sr., grad.; prereq. Or. Ch. 156, For. 53-54)
143. Forest Recreation. The recreational use of the forest from an economic, sociological, and technical point of view. Administrative and technical problems arising from recreational use. (3 cred.; grad.; no prereq.)
144. Forage and Browse Plants. The important forage and browse plants of the United States; their identification, nutritive value, palatability, growth habits, and distribution. Includes a general study of forage types, the classes of forage, carrying capacities, and methods of ecological investigation. (3 cred.; jr., sr., grad.; prereq. Bot. 113 and Pl. Pa. 4)
151. Logging. The principles and general methods of logging in the different forest regions of the United States, and the modifications required by forest management. (3 cred.; jr., sr., grad.; no prereq.)
152. Wood Seasoning. Theory and practice of air seasoning and kiln drying of wood. (3 cred.; jr., sr., grad.; prereq. 53-54)
155. Forest Protection. The protection of forests from fire—fire prevention and fire suppression. The causes of forest fires and their elimination, climate and fires, fire fighting and fire legislation. (3 cred.; jr., sr., grad.; no prereq.)
- 156-157. Major Report. Independent study and the preparation of a comprehensive report on some phase of general forestry, range management, or wildlife management. (2 cred. per qtr.; grad.)
- 158-159. Forestry Seminar. Assigned topics with special reference to current forestry problems. Critical and historical review of current forestry literature. (1 cred. per qtr.; grad.)

## GENERAL COLLEGE

5. Problems of Contemporary Society. (5 cred.)
- 6A-6B-6C. Current History. (2 cred. per qtr.)
- 10A†-10B-10C. Human Biology. (3 cred. per qtr.)
- 30A,30B,30C,30D. Literature Today. (3 cred.)
- 37A-37B-37C. Physical Science Studies. (5 cred. per qtr.)
41. Practical Applications of Psychology. (5 cred.)
- 45A. The United States in World Civilization (5 cred.)
- 46A. The American Citizen and His Government. (3 cred.)
- 46B. The Functions and Problems of Government. (3 cred.)
- 46C. International Relations. (3 cred.)

† A fee of \$1 per quarter is charged for this course.

## GEOLOGY AND MINERALOGY

## COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

*Freshman and Sophomore Courses*

- 1-2.† General Geology (Dynamic and Historical). (6 cred.; all; no prereq.)  
 A†-B† General Geology Laboratory (Dynamic and Historical). (4 cred.; all; with or after 1-2)
- 8.§ Earth Features and Their Meaning. An Introductory Course. (5 cred.; all; no prereq.)
- 23‡-24‡ Elements of Mineralogy. (10 cred.; soph., jr., sr.; prereq. a course in chem.)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature and the Arts*.

## GERMAN

## COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

*Freshman and Sophomore Courses*

1. Beginning German A. (5 cred.; all; no prereq.)
2. Beginning German B. (5 cred.; all; prereq. 1 or one year of high school German)
3. Beginning German C. (5 cred.; all; prereq. 2 or two years of high school German)
4. Intermediate German. (5 cred.; all; prereq. 3 or three years of high school German)
- 24a-25a-26a.† Chemical German. (12 cred.; no prereq.)
33. Medical German. (5 cred.; prereq. 3)

Two options are permitted for requirements in Science Specialization Curriculum: 1-2-3 (15 cred.) or 24a-25a-26a (12 cred.)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

## HISTORY AND PHILOSOPHY OF EDUCATION

## COLLEGE OF EDUCATION

For courses and course descriptions see the *Bulletin of the College of Education*.

## HOME ECONOMICS

*Freshman and Sophomore Courses*

1. Choice and Care of Clothing. A consideration of the problems involved in the selection, buying, and maintenance of clothing. A study will be made of the characteristics of certain textile materials, and their suitability for various uses. (4 cred.; fr.; no open to seniors or students who have had Gen. Col. 15A; no prereq.)
2. Introduction to Textiles. A study of textiles fibers and their properties as related to fabric properties; yarn and fabric structure and design; problems in the selection of textile materials for clothing and household furnishings. Laboratory work with representative fabrics. (3 cred.; for S.L.A., Bu. Ad., and Art Ed.; no prereq. Written permission must be obtained from the Junior College office, 106 Folwell Hall)
3. Clothing Construction A. Laboratory practice in planning, cutting, fittings, and applying the suitable techniques in making garments of cotton and rayon fabrics; care and use of sewing machines; interpretation and adaptation of commercial patterns; alteration of garments. (3 cred.; fr.; soph.; prereq. 1)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1 per quarter is charged for this course.

§ Not open to students who have had Course 1. Does not satisfy the Junior College requirement for science. Cannot be followed by Course 1 for credit. May be followed by Course 2 with instructor's permission.



4. Clothing Construction B. Laboratory practice in costume modeling; preparation of dress form; application of tailored technique to rayon or wood fabrics; garments constructed will include a remodeling problem; problems in renovation and repair. (3 cred.; soph., jr.; prereq. 3)
6. Institution Experience. Practical work in all the departments of the cafeteria. Each student works independently under the supervision of the instructor. The course is intended to help the student decide upon her specialization. (3 cred.; fr.; no prereq.; each section limited to 3. For Institution Management majors, consent of instructor)
10. Vocational opportunities in Home Economics. Discussion of personal and educational qualifications for employment in the field of home economics. (2 cred.; fr. only; no prereq.)
17. Personal and Family Living. The relationships involved in personal and family living, including adjustments for the individual as a student or family member; living in a democratic family, and various specific current problems—situations in the family in preparation for successful marriage and family living. (3 cred.; fr., soph., jr., sr.; no prereq.)
20. Introduction to Related Art. A study of the art problems which are involved in the everyday life of the student. (4 cred.; fr., not open to seniors; no prereq.)
- 21,22. Color and Design, I, II. The principles of color and design related to such problems as selecting and designing costumes and selecting, arranging, and designing house furnishings. (3 cred. for each course; prereq. 20 for 21, and 1 and 20 for 22)
23. Advanced Design. An intensive study of design and its applications. The aim is facility in designing. (3 cred.; soph., jr.; prereq. 21 or 22)
24. Problems in Home Planning and Furnishing. Exteriors and interiors studied for their design and suitability. An analysis of typical floor plans. Problems in selecting, arranging, and conserving household furnishings. (5 cred.; soph.; prereq. 20)
25. Design Applied to Crafts. Principles of design and color harmony applied in various crafts. Articles are planned to relate to definite dress and home furnishing problems. (3 cred.; prereq. 21 or 22)
27. Related Art Problems. Problems worked out relating to costume and house furnishing design. (3 cred.; jr., sr.; prereq. 21)
- 30.\*§ Introduction to Nutrition. A course designed for students wishing a discussion of the application of the principles of nutrition to the selection of food. (2 cred.; not open to home econ. students; no prereq.)
31. Introduction to Nutrition. The application of nutrition principles to food selection of college students. Includes typical student problems such as buying meals, and the relation of food to the promotion and maintenance of health. (3 cred.; fr., not open to seniors; no prereq.)
33. Nutrition I. (1) The nature and properties of groups of compounds occurring in the cell and in food. (2) digestion, and (3) absorption. (4 cred.; soph., jr., sr.; prereq. Ag.Bi. 1, Physiol. 4 or parallel)
34. Nutrition Problems. A consideration of the nutrition problems most commonly met by adults and children in typical families. (4 cred.; 3rd qtr. soph., jr., sr.; prereq. 31, 40, physiol., or hu. bi.)
35. Nutrition II. A study of tissues and tissue metabolism as well as work on blood, milk, and urine. (4 cred.; soph., jr., sr.; prereq. 33)
40. Food Preparation. The development of technique and the application of fundamental science principles to cookery processes and preservation. The establishment of good standards for food products. (5 cred.; fr.; prereq. 2 qtrs. chem.)

\* Offered on the Minneapolis campus.

§ Intended for students in Science, Literature, and the Arts. Open to students in Home Economics only by special permission of chief of division.

41. Food Management and Marketing. Determination and study of the management factors involved in the food problems of the homemaker and consumer. A study of the quality, cost, and conservation of foods. Laboratory. (5 cred.; soph., jr., sr.; prereq. 31, 40)
- 45.¶ Quantity Cookery. Application of the principles of cookery to large quantity preparation; planning of meals for dining hall, cafeteria, and tearoom; a study of standardized formulae and production costs. (6 cred.; jr., sr.; prereq. 40, 41)
- 46.¶ Cafeteria Experience. Experience in the minor problems of cafeteria, dining hall, and tearoom administration. (3 cred.; soph., jr., sr.; no prereq.)

*Junior and Senior Courses*

50. Textiles. A study of textile materials from the standpoint of the consumer; the characteristics of commonly-used fibers and fabrics; textile information as a tool in the selection and maintenance of textile products used for clothing and home furnishing. Laboratory study of selected fabrics. (3 cred.; jr., sr.; prereq. 1)
53. Advanced Clothing. A laboratory course with special emphasis on designing, fitting, and tailoring of a wool costume, including millinery; draping or pattern modification and fitting of a plaid, stripe, or figured fabric. (3 cred.; jr., sr.; prereq. 4, 50 or parallel)
54. Problems in Clothing Construction. A laboratory course to broaden the background of experience in management, construction, and costume design through such problems as illustrative material, draping, fitting, pattern modification, garment alterations; evaluation of construction techniques in clothing made at home or ready-to-wear. (3 cred.; jr., sr.; prereq. 53 or permission of instructor)
- 56A-56B. Applications of Color and Design. The principles of design and color applied to the selection, cost, and arrangement in the fields of costume, dress and household fabrics, and household furnishings. (3 cred. each; not open to home economics students; no prereq.; courses must be taken in the sequence indicated. Written permission must be obtained from the Junior College office, 106 Folwell Hall)
64. Institution Buying. Problems involved in the purchasing and use of foods and equipment for the institution. (4 cred.; jr., sr.; prereq. 45 and 46—may parallel one or the other)
65. Institution Management Problems. Problems affecting the efficient administration of the institution; departmental organization, operation, maintenance; employment problems; business policies. Field trips to various types of institutions. (3 cred.; jr., sr.; prereq. 45, 46, 64)
70. Advanced Food Preparation. This course involves an intensive study (with laboratory work) of one or more food problems such as the following: cooking meat or fish and poultry; preservation of fruits and vegetables or meats and poultry; cakes; bread. (3 cred.; prereq. Ag. Bi. 1, H. Ec. 40)
71. Demonstrations. The aim shall be to familiarize the student with the purposes and techniques of demonstrations in the various fields of home economics with special reference to their application in the field of business. (1 cred.; open to 3rd qtr. jr. and sr.; prereq. 41)
- 76.\* Nutrition. The application of the principles of nutrition as applied to special groups. (3 cred.; not open to home econ. students; for nursing students only; prereq. permission of instructor)

\* Offered on the Minneapolis campus.

¶ Open only to Home Economics students registered in the College of Agriculture, Forestry, and Home Economics.

79. § Selected Problems for Dietitians. A selected group of problems related to the work of the dietitian involving discussions, assigned readings, and field trips. (3 cred.; jr., sr.; prereq. 170 or equiv.)
85. Home Management: Operation and Maintenance, Lectures. Discussion of the managerial aspects of homemaking with special emphasis upon problems involved in the use of time, energy, and money. (4 cred.; jr., sr.; prereq. 40, 41 advised)
86. Home Management: Operation and Maintenance, Laboratory. Residence for one-half quarter in a home management house with direct experience in managing the various activities and responsibilities involved in their group-living. (4 cred.; jr., sr.; prereq. 85 or parallel, 40, 41 advised; P.H. 52a, b)
98. Home Economics Extension. Study of the objectives, organization, and functioning of home economics extension service in Minnesota and elsewhere. Observation of work in the Twin Cities. Discussion and conferences. (3 cred.; sr., prereq. H. E. Ed. 91 or parallel)
102. Advanced Textiles. An intensive study of textile materials with special reference to the following: nature of the raw materials; economic, chemical, and physical applications involved in their manufacture and use; methods and significance of physical testing. (3 cred.; jr., sr.; prereq. 50, Ag. Bi. 1, Ag. Ec. 3 or parallel)
107. Textile Analysis. Problems and application of quantitative methods in textile analysis with special reference to informative labeling and to statements concerning fiber composition of fabrics. (3 cred.; jr., sr., grad.; prereq. 50, Ag. Bi. 1, 2)
115. Economic and Social Aspects of Clothing. Trends in clothing consumption, clothing expenditure patterns, clothing budgets for low-income and dependent groups, motivation in dress, the sociological and economic aspects of fashion in dress, the ready-to-wear industry. (3 cred.; jr., sr.; prereq. 50, Ag. Ec. 3)
116. Family Clothing Problems. The buying of clothing, governmental controls of clothing productions; the simplification of clothing, the labeling and standardization of clothing, the sizing of garments and patterns, recent developments in the choice of clothing for specific uses such as work clothing and clothing for infants and children. (3 cred.; jr., sr., prereq. 3, 50)
120. Art History and Appreciation. The historical development of painting, sculpture, architecture, decoration, furniture, and costumes, studied with special emphasis on design and influence upon modern styles. (3 cred.; Senior College and grad. only)
121. Textile Design. A study of historic and modern textile designs with special reference to the technique and materials employed in their production and to their adaptations for present-day use in the home and in dress. (3 cred.; jr., sr.; prereq. 27, 50)
122. Advanced Interior Design. Special problems of small house interiors involving execution of elevation drawings. Studies and reports on topics of practical and historical interest. Actual materials will be used as far as possible. (3 cred.; jr., sr.; prereq. 27, 120 or permission of instructor)
125. Advanced Costume Design. Relation of color and texture to dress design. Study of figure construction. Studies and reports on assigned topics. Laboratory work with fabrics. Designs in pencil and water colors. (3 cred.; jr., sr.; prereq. 3, or permission of instructor; 22 recommended)
140. New Developments in Food Preparation. Demonstrations, discussions, and some laboratory work illustrating recent trends in food preparation. Such topics as the following will be included: The use of pressure saucepans, the theory and practice of freezing foods, and comparisons of recently proposed quick methods of preparing cakes and yeast breads with conventional methods. (3 cred.; jr., sr., grad.; prereq. H. Ec. 40 or equiv.)

§ Open only to Home Economics students registered in the College of Agriculture, Forestry, and Home Economics.

- 142.§ Experimental Cookery. An intensive study of problems in foods and food preparation with individual laboratory problems. (3 cred.; jr., sr.; prereq. 40, Ag. Bi. 1)
- 146.§ Special Food Problems. Class problems in foods and food preparation. (3 cred.; sr.; prereq. 142)
170. Nutrition of the Family. The fundamental principles of human nutrition and their application in the promotion and maintenance of optimal health of the family. (3 cred.; jr., sr.; prereq. 31, 40, Ag. Bi. 1, physiol. 3 cred.)
171. Child Nutrition. Lectures, discussions, and field work dealing with the principles of child nutrition and with the formation of desirable food habits. (3 cred.; jr., sr.; prereq. 170, H.E. Ed. 90)
- 173.§ Nutrition in Disease. A study of the fundamental principles involved in using diet in the treatment of certain diseases. (4 cred.; jr., sr.; prereq. 170; 35 also advised)
176. Advanced Nutrition. Selected quantitative methods applicable to investigation relating to digestion and metabolism. (4 cred.; jr., sr.; prereq. 35 or parallel, Ag. Bi. 2)
177. Digestion and Metabolism. An intensive study of problems relating to digestion and metabolism involving lectures, readings, and laboratory work. (3 cred.; jr., sr.; prereq. 35)
- 178.§ Clinical Problems in Nutrition. The application of nutrition information to problems in health and disease involving assigned readings, discussions, and experience in a clinic. (2 cred.; jr., sr.; prereq. 170, 35 or parallel)
179. Readings in Nutrition. A course designed to give intensive experience in the use of nutrition books and periodicals, involving assigned readings, oral and written reports. 2 cred.; jr., sr.; prereq. 170)
180. Home Planning and Furnishings. Problems in selecting a home and prolonging the life of the house and its furnishings. Stresses intelligent planning and furnishing of the home on the basis of family living. 5 cred.; jr., sr.; prereq. 27; 120 recommended)
185. Family Relationships. A study of the factors that promote satisfaction within the immediate family and for the family in relation to the community. (2 cred.; jr., sr., grad.; prereq. 86 or parallel, H.E.Ed. 90)
186. Problems in Income Management. An intensive study of problems relating to individual and family budgets. Readings, discussions, and field work. (3 cred.; prereq. 85 or parallel, 86 or parallel, 34 or equiv.)

## HOME ECONOMICS EDUCATION

### COLLEGE OF EDUCATION

#### *Junior and Senior Courses*

90. Child Training. A brief study of the physical and mental development of the child is followed by a discussion of the problems of training small children. Emphasis is placed on the preschool child. Lectures, observations in the Nursery School, and reports. (3 cred.; soph., jr., sr.; prereq. Psy. 1-2)
- 91.‡ Observation, Materials, Teaching in Home Economics. The psychological bases for teaching; investigation and collection of facts on teaching situations through observation and participation in school activities; study of teaching materials and method. 5 cred.; jr., sr.; prereq. H.Ec. 4, 41; Psy. 1-2; Ed. 51A, 51C; parallel H.E.Ed. 93 and 192, home experience\*)

\* Plans for the home experience prerequisite for H.E. Ed. 91 and 93 will be made in conferences for first quarter juniors on Tuesdays IV hour, in Room 114 Home Economics.

‡ A fee of \$1.50 per credit is charged for this course.

§ Open only to Home Economics students registered in the College of Agriculture, Forestry, and Home Economics.

92. Teaching Problems in Home Economics. Reports, discussion, conferences on the planning of units, teaching procedures, illustrative materials, and equipment. (2 cred.; sr.; prereq. H.E.Ed. 91, 93 parallel; H.E.Ed. 94 and 192)
- 93§-94.‡§ Supervised Teaching in Home Economics. Observation, participation, and actual teaching experience under supervision in different home economics situations and on different age levels. (6 cred.; jr., sr.; prereq. H.E. 4, 41; Psy. 1-2; Ed. 51A, 51C; parallel H.E.Ed. 91. Students must have received a grade of C or higher in H.E. 3, 4, 21, 22, 40, 41, and must have completed home experience\* in foods, clothing, and other phases of home economics)
95. Field Experience for Home Demonstration Agents. Observation, participation, and actual experience under supervision in the agricultural extension program. This experience includes a study of the program at University Farm and participation in a selected county program with a home demonstration agent. A written report summarizing the experience will be required. (6 cred.; permission of the head of Home Economics Education and the director of Agricultural Extension is required for registration.)
192. Evaluation in Home Economics Education. Evaluation as a means of measuring progress toward important goals in different areas of home economics; study of available tests and other evaluation materials; construction and refinement of various evaluation instruments. Study of elemental statistical techniques useful to home economics teachers. (3 cred.; sr., grad.; prereq. Ed. 51A, H.E.Ed. 90 or parallel)
- 193A. Home Economics Curriculum (secondary level). A study of the contribution of home economics at elementary and secondary levels; evaluation of curriculum practices and techniques employed in curriculum planning and reconstruction. (3 cred.; sr., grad.; prereq. H.E.Ed. 94 or parallel or permission of instructor)
- 193B. Home Economics Curriculum (college level). The place of home economics in higher education; problems facing home economics in small colleges; curriculum offerings; teaching schedules and load; appropriate reference materials. (3 cred.; sr., grad.; prereq. consent of instructor)
- 194A. Adult Education in Home Economics. An analysis and study of the problems affecting community and family living; methods and techniques used in helping men and women and out-of-school youth meet present situations. Course is planned for teachers and supervisors of adult classes, extension and farm security workers. (3 cred.; sr., grad.; prereq. H.E.Ed. 91, 93, or parallel)
- 194B. Adult Education in Home Economics. Objectives of adult education to meet present needs; planning a community program; teaching procedures, discussion of special problems. Course is planned for teachers and supervisors of adult classes. (3 cred.; sr.; prereq. H.E.Ed. 91, 93, or parallel)
- 197.‡ Organization and Methods of Related Art Teaching. Organization of a related art course and methods of teaching art as applied to familiar objects and processes. The course is planned on an individual problem basis. (1 to 3 cred.; sr.; prereq. H.E.Ed. 91, H.E. 180 or parallel; permission of instructor)
- 199E.‡ Internship. Directed teaching and practice work at the graduate level for candidates for the master of education degree. (Cred. ar.; grad.)

\* Plans for the home experience prerequisite for H.E.Ed. 91 and 93 will be made in conferences for the first quarter juniors on Tuesdays IV hour, in Room 114 Home Economics.

‡ A fee of \$1.50 per credit is charged for this course.

§ Students must sign up in the Office of Admissions and Records at University Farm at least 2 quarters prior to registration in this course.

## HORTICULTURE

There are four distinct fields in horticulture: vegetable growing, fruit growing, landscape gardening, and floriculture. In some cases students may find it advisable to include more than one field in their major. Those who contemplate entering into some horticultural industry such as fruit growing, market gardening, truck growing, nursery business, greenhouse business, florist work, or landscape gardening, should follow the Curriculum in Technical Agriculture. Students who plan on taking postgraduate work in preparation for research or college teaching are advised to follow the Science Specialization Curriculum.

1. **Technical Agriculture**—The courses listed below are recommended for students majoring in horticulture in the indicated fields:

- a. Vegetable Growing: Hort. 32, 110, 135, 136, 138, 139; Agro. 31.
- b. Fruit Growing: Hort. 6, 40, 56, 107, 110, 111, 121; Agro. 31.
- c. Landscape Gardening: Hort. 6, 11, 21, 22, 24, 25, 40, 51, 56, 176; Ag. En. 3, Draw. and Des. Geom. 41, 42, 43.
- d. Floriculture: Hort. 12, 14, 51, 56, 110, 153; Agro. 31.

Additional courses in such supporting fields as botany, plant pathology, entomology, soils, etc., may be added to fit the needs of individual students. Minor sequences should be arranged in consultation with the adviser.

2. **Science Specialization**—For subjects recommended for a major in some field of horticulture, consult adviser.

*Freshman and Sophomore Courses*

1. General Horticulture. A study of fruit, vegetable and ornamental plants, including factors which influence their culture, value and importance in Minnesota. Lectures and recitations. (3 cred.; no prereq.)
6. Fruit Growing. The fundamental principles of fruit growing. Sites, soils, nursery stock, planting and planting plans, tillage, fertilization, cover crops, pollination, frost avoidance, pruning and thinning. Lectures and references. (3 cred.; no prereq.)
10. Home Floriculture. Designed for the student who does not take any other courses in floriculture. Gives the student a working knowledge of the propagation, culture, and uses of common garden flowers and house plants. Lectures, reference reading, and laboratory. (3 cred.; 2 cred. only if Hort. 56 has been taken; no prereq.)
12. Commercial Floriculture, Fall Crops. A study of the culture of the principal florist crops with major emphasis on chrysanthemums, carnations, and cut flowers and potted plants especially adapted to Christmas sales. Lectures, reference reading, laboratory, and field trips to greenhouses and flower stores. (3 cred.; prereq. Bo. 6 cred. or equiv.)
14. Commercial Floriculture, Spring Crops. A study of the culture of the principal florist crops with major emphasis on roses, bulbous plants, the minor cut flower crops, and bedding plants. Lectures, reference reading, laboratory, and field trips to greenhouses and flower store. (3 cred.; prereq. Bo. 6 cred. or equiv.)
21. Plant Materials, Fall and Winter Aspects. A study of the trees, shrubs and evergreens used in landscape planting, with special emphasis on their fall and winter characters, their identification and uses in landscape design. Lectures, outdoor and indoor laboratories, field trips. (3 cred.; prereq. Bo. 9 cred. or equiv.)
22. Plant Materials, Spring and Summer Aspects. A study of trees, shrubs, and evergreens used in landscape planting, with special emphasis on their spring and summer characters, particularly that of blooming habit. Lectures, outdoor and indoor laboratories, field trips. (3 cred.; prereq. Bo. 9 cred. or equiv.)

24. Principles of Landscape Design. A study of the principles of landscape design with special reference to their practical application in the planning of residential landscapes. The relationships of landscape design, architectural design, and interior decoration. Landscape plans, landscape drafting techniques, and methods of presentation. Lectures, drawings, and practical problems in solving home landscape and garden projects. (3 cred.; prereq. 21 or 22 or instructor's permission)
25. Principles of Planting Composition. A study of the principles of planting arrangement and a study of the esthetic qualities of plants, their value and uses in all kinds of landscapes and gardens; special reference to home landscapes and gardens. Lectures and problems in planting compositions. (3 cred.; prereq. 21 or 22 or instructor's permission)
32. Vegetable Growing. The fundamental principles of vegetable growing. Scope of the industry and its place in agriculture. Varieties, seed production, regional adaptation, soils, fertilizers, equipment, storage, systems of production and marketing. (3 cred.; prereq. Bo. 6 cred.)
40. Horticulture Laboratory. Lectures and practice on operations used in orchard and berry fields. Planning, planting, pruning, grafting, etc. (2 cred.; soph., jr., sr.; prereq. 6 or instructor's permission)

*Junior and Senior Courses*

51. Garden Flowers. A study of the common annuals, biennials, and perennial flowers, with special emphasis on their uses in landscape planting. Lectures, reference reading, laboratory, and field trips. (3 cred.; jr., sr.; prereq. Bo. 9 cred. or equiv., instructor's permission)
56. Plant Propagation. Methods of propagating plants by seed, cuttings, layers, and grafting. Practical work in management of nursery stock, bulbs, and plants. Lectures, reference reading, and field trips. (3 cred. [2 cred. if Course 10 has been taken]; jr., sr.; prereq. Bo. 6 cred. or equiv.)
101. Principles of Frozen Food Processing and Storage. A comprehensive study of all types of frozen foods. History and development of the frozen food industry; standards for frozen foods; laws and regulations; quality in relation to temperature, rate and methods of freezing; control of quality from time of harvest to packaging, packaging and wrapping, processing methods; storage, transportation and handling. (3 cred.; jr., sr., grad.)
107. Orchard Management. A detailed study of the various operations in orchards and berry fields. Operating costs and profits. Lectures, laboratory, and individual problems. (3 cred.; jr., sr., grad.; prereq. 6. Limited to major or minor students in horticulture or instructor's permission)
110. Horticultural Crop Breeding. The principles of plant improvement, their special application to horticultural plants, and the breeding methods used with each of the important horticultural crops. (3 cred.; jr., sr., grad.; prereq. Agro. 31)
111. Systematic Pomology. Fruit varieties. Classification, description, identification, and elements of judging. Lectures, laboratory, and a survey of the literature. (3 cred.; jr., sr., grad.; prereq. 6, Bo. 9 or equiv. Limited to major or minor students in horticulture or instructor's permission)
121. Small Fruit Culture. Cultural practices for each of the small fruits. Brief consideration is given to their botanical relationships and the history of their commercial development. Lectures, problems, and survey of literature. (3 cred.; jr., sr.; prereq. 6 or 32, Bo. 9 cred. or equiv. Limited to major or minor students in horticulture or instructor's permission)
135. Potatoes. Culture, handling, storage, seed maintenance, varieties, improvement, and physiology of the potato plant. (3 cred.; jr., sr.; prereq. 32, Bo. 9 cred. or equiv.)

136. Adaptation and Maintenance of Vegetable Varieties. The origin and development of leading varieties and their adaptation to different vegetable producing areas. Methods of seed production and maintaining of varieties. Activities of plant breeding organizations toward further improvement of varieties for future use of growers. (3 cred.; jr., sr., grad.; prereq. 32, Bo. 9 cred. or equiv.)
138. Vegetable Crops I. Lectures and assigned reading on the relation of light, temperature, moisture, nutrients, and other factors to the growth and culture of vegetable crops. (3 cred.; jr., sr., grad.; prereq. 32, Bo. 9 cred. or equiv.)
139. Vegetable Crops II. A continuation of Course 138. (3 cred.; jr., sr., grad.; prereq. 32, Bo. 9 cred. or equiv.)
153. Conservatory Plants and Florists' Flowers. A systematic study of the plants adapted to growing in conservatories and homes, and also of florists' cut flowers and potted plants. Lectures, laboratory, and field trips to greenhouses. (3 cred.; jr., sr., grad.; prereq. Bo. 9 cred. or equiv.)
176. Landscape Construction and Maintenance. A survey of garden and landscape construction, materials, grading, planting, and maintenance, including plans, specifications, and computation of costs. Materials and construction of walks, walls, fences, steps, pools, terraces, lawns, planting areas, flower beds, etc. Lectures, field trips, reports, and construction problems. (3 cred.; jr., sr., grad.; prereq. 24 or 25 or instructor's permission)
- 190-191-192. Special Problems. Problems based upon the work given in the preceding courses. (2 to 4 cred. per qtr.; jr., sr., grad.; prereq. instructor's permission)
- 193-194. Horticultural Seminar. Reports and discussions of problems and investigational work. (1 cred. per qtr.; sr., grad.; prereq. Ho. 9 cred.)

## INORGANIC CHEMISTRY

### INSTITUTE OF TECHNOLOGY SCHOOL OF CHEMISTRY

#### *Freshman and Sophomore Courses*

- 1‡-2‡ General Inorganic Chemistry. Study of the general laws of chemistry and of the nonmetals and metals and their compounds. (8 cred.; no prereq.)
- 4‡-5‡ General Inorganic Chemistry. Study of the general laws of chemistry and of the nonmetals and metals and their compounds. More intensive than Course 1-2. (8 cred.; prereq. high school chemistry)
- 11.‡‡ Semimicro Qualitative Analysis. Laboratory work in systematic qualitative analysis of the cations with lectures on solutions, ionization, chemical and physical equilibria, oxidation, reduction, etc. (4 cred.; prereq. 2, 5, 7, or 10)

## MATHEMATICS

### COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

**Placement tests**—In each of Courses 1 and 6, a placement test will be given during the first two weeks of the quarter. Students who fail in this test will be advised to take a more elementary course. In particular, any student who offers not more than one-half year of high school advanced algebra as a substitute for Course 1 and who fails to pass the placement test in Course 6, will be required to take Course 1 before taking more

‡ A fee of \$2 per quarter is charged for this course.

‡‡ A fee of \$2.40 per quarter is charged for this course. Non-veterans must purchase a \$5 chemistry blue purchase card from the bursar in the Administration Building (Minneapolis Campus) before he will be assigned a desk in the laboratory. Veterans will receive information from the instructor concerning purchase card and checking into the laboratory. The course fee, laboratory material, and breakage will be punched out of the purchase card.



advanced mathematics. A student who has had a complete year of elementary algebra and a corresponding course in advanced high school algebra for one-half year, should be able to pass the placement test in Course 6. The first class meeting in each course is of particular importance.

#### *Freshman and Sophomore Courses*

1. Higher Algebra. (5 cred.; all; prereq. one yr. elementary algebra; open for credit to any student offering not more than one-half year of high school higher algebra for entrance)
6. Trigonometry. (5 cred.; all; prereq. plane geometry and either Course 1 or high school higher algebra; open for credit even to students offering high school trigonometry for entrance)
7. College Algebra. (5 cred.; all; prereq. 6, or high school trigonometry if approved by department chairman)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

#### MILITARY SCIENCE AND TACTICS

The University of Minnesota is one of the many colleges and universities of the nation maintaining senior division units of the Reserve Officers Training Corps (ROTC). Courses offered in military science and tactics are designed to qualify the student for commission as an officer in the Officers Reserve Corps, a reserve component of the Army of the United States. The program is derived from the most recent developments in military doctrine and tactics and offers the student a wide choice of specialized studies closely related to the various academic professional courses. The objective of the national ROTC program, begun in all major schools following World War I, is to provide the nation with an adequate reserve of trained officers available for leadership and direction in any future national emergency. The value of the program to the individual and the national security was forcibly demonstrated in World War II, when sixty per cent of all Army officers in the initial stages of mobilization and training came from the Officers Reserve Corps.

For students with no prior military training, the program comprises a four-year course; ex-servicemen are exempted from the first two years. The first two years, known as the Elementary Course, consists of studies in basic military problems common to all branches of the Army. Students who have completed 6 months' service in the armed forces (Army, Navy, Coast Guard, or Marine Corps) receive credit for the first year, and those who have completed one year of service may receive credit for both years of the Elementary Course. The Elementary Course carries 1 credit per quarter for 3 class hours per week. No expense is attached to this course, uniforms and textbooks being furnished by the Army.

\* Army Air Forces, Anti-Aircraft Artillery, Signal Corps, Transportation Corps, Quartermaster Corps, and Medical Corps. Students elect one of the foregoing branches at the time of entrance to the Advanced Course, and will be commissioned in that branch following completion of the course. Material presented in these courses serves as a valuable supplement to specific academic courses (i.e.—Quartermaster Corps and Business Administration). The Advanced Course includes a summer camp of 6-8 weeks' duration between the two years, consisting of practical application of the class studies. The course carries 3 credits per quarter for 5 class hours per week. A liberal monthly monetary al-

\* Following additional branches may be established prior to school year 1947-48: Corps of Engineers, Chemical Corps, Ordnance Department, and Dental Corps.

lowance† for the two school years summer camp is paid each enrolled student. No expense is attached to the course. Students in the Advanced Course are selected on the basis of demonstrated leadership ability and scholastic standing.

Students accepted in either the Elementary or Advanced Courses must be citizens of the United States, physically qualified, meet age limitations, and have the time remaining in school required to complete each course.

All classes are conducted in the Armory, Main Campus, and follow the normal academic class schedules. ROTC is a university elective and students register for the courses at the same point and time designated by the University for academic courses registration.

1,2,3. First Year Elementary Course ROTC. Military Organization, World Military Situation, Leadership, First Aid, Maps and Aerial Photographs, Individual Weapons and Marksmanship, National Defense Act. (1 cred. per qtr.; 3 hrs. per week)

4,5,6. Second Year Elementary Course ROTC. Evolution of Warfare, Military Administration, World Military Situation, Military Law, Leadership, Physical Development Methods, Maps and Aerial Photographs. (1 cred. per qtr.; 3 hrs. per week; prereq. 1,2,3 or 6 months of military service or completion of Junior ROTC).

151,152,153. First Year Advanced Course ROTC. Tactics and technique of one of the following: Army Air Forces, Anti-Aircraft Artillery, Signal Corps, Transportation Corps, Medical Corps, Quartermaster Corps, Military Problems of the U. S., Occupied Territories, Military Law and Boards, Leadership, Military Psychology and Personnel Management are also included. (3 cred. per qtr., 5 hrs. per week; prereq. Elementary Course or one year military service—Signal Corps limited to electrical engineers, electronics engineers, mechanical engineers; Medical Corps limited to medical students)

154,155,156. Second Year Advanced Course ROTC. Tactics and technique of one of the branches listed above, and Command and Staff, Military Teaching Methods, Psychological Warfare, Geographical Foundations of National Power, Combined and Joint Operations, Mobilization and Demobilization, Leadership and Exercise of Command. (3 cred. per qtr., 5 hrs. per week; prereq. 151,152,153)

Additional information may be procured from the Professor of Military Science and Tactics, Room 106, Armory, Main Campus.

## MUSIC

### COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Credit is offered to students in the College of Agriculture, Forestry, and Home Economics who may wish to elect work in the Department of Music.

#### *Freshman and Sophomore Courses*

1. Ear Training. (2 cred.; for non-music majors; no prereq.; all. Registration is limited; written permission from the Junior College Office, 106 Folwell Hall, is necessary for admission)

1T-2T-3T. Music Theory. A correlated course including Ear Training, Sight Singing, Melodic and Harmonic Dictation, Keyboard and Written Harmony. (9 cred.; primarily for music majors and minors. Students must make arrangements for a placement test in the office of the Department of Music)

4T-5T-6T. Music Theory. Continuation of Music Theory 1T-2T-3T. (12 cred.; prereq. 3T)

† Monetary allowances may be increased prior to school year 1947-48 depending on action by congress. New allowances would provide pay of approximately \$20 per month to Elementary Course students and \$57 per month to Advanced Course students.

31-32-33.¶ Music Appreciation. Cultivation of better understanding of music heard today.

The course is designed for students with a general interest in music rather than for those majoring in music. (6 cred.; no prereq.)

11.‡ Piano.

12.‡ Voice.

13.‡ Violin.

14-26.‡ Other Orchestral Instruments.

27.‡ Organ.

40-41-42. Orchestra. (6 cred.; all; prereq. consent of director)

43-44-45. University Chorus. (3 cred.; all; prereq. consent of director)

The following course is offered only for students in the College of Agriculture, Forestry, and Home Economics:

43UF,44UF,45UF. University Farm Music Ensembles—Vocal and Instrumental. Special reference to music used in extension, farm, home, school, and recreational activities and situations. (1 cred. per qtr.; all; prereq. consent of director)

46-47-48. Concert Band. (3 cred.; all; prereq. consent of director)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts* and the *Bulletin of the College of Education*.

## NAVAL SCIENCE

Naval Science is a four-year course consisting of one hour of class three times per week, two hours of drill and requiring certain basic subjects to be included in the civilian curriculum of the student. Instead of supplying a pool of trained civilians available to serve their country in war, the present purpose is, in addition, to train career officers for the regular Navy. The present Navy is too large to draw all of its officer personnel from the Naval Academy. It is hoped that half of the regular naval officers can be obtained from these NROTC units.

However, in pursuing this training, the student is given the maximum freedom of action in the academic field that is possible and still prepare him for duties as a naval officer. He is required to carry a minimum of one naval science course a quarter and to complete a one-year course in college physics and mathematics through trigonometry by the end of his sophomore year. Beyond these requirements he may select his course to suit himself and proceed toward a degree of his own choice. In so doing he will find naval science courses as acceptable elective courses in almost any field of academic endeavor.

The NROTC student, unlike the wartime navy trainees, goes to college as a civilian and is not subject to the rigors of naval discipline except during naval science classes and drills. He may vary his naval science training to a limited extent and become eligible for a commission in the U.S. Marine Corps.

Students accepted in the NROTC Unit must be citizens of the United States, unmarried, physically and morally qualified, and meet age limitations.

As an enrollee in the NROTC, a student is given a four-year college education at Navy expense. This includes tuition, books, fees, and a living allowance at the rate of \$600 a year. Upon graduation he will be commissioned an officer in the United States Navy or Marine Corps and will serve on active duty for two years. Following this duty, he may elect to remain on active duty as a career officer, or accept a commission in the Organized Reserve and return to civilian life.

A nation-wide competitive examination is given in January of each year to select the candidates for entrance in the next fall quarter.

‡ Fees for Music 11 to 27 inclusive:

1. One individual lesson per week, 2 credits, \$30.

2. Two individual lessons per week, 4 credits, \$60.

¶ Students may enter any quarter.

A student who is selected to participate in the NROTC program and who desires to receive the benefits accorded by this plan must agree to obligate himself to attend three cruises or summer training periods of from six to eight weeks; to accept a commission as ensign, USN, or second lieutenant, USMC, and to serve a minimum of 15 months on active duty after being commissioned.

Students may also elect to enroll under the Pre-War NROTC Plan. Under this plan students are not obligated to go on active duty after graduation but must agree to make one summer practice cruise of approximately three weeks in length and to accept a commission in the Naval or the Marine Corps Reserve on graduation. They may, if they so desire and if vacancies exist, be commissioned after graduation as ensign, USN or second lieutenant USMC, and serve for not less than 15 months on active duty. They must pay their tuition and all other expenses the same as any other university student but will be issued textbooks for the naval science courses, and uniforms which will be worn only on special occasions. Juniors and seniors who have completed two years in the NROTC will be allowed commuted rations not to exceed the value prescribed by law for the Navy (currently 65 cents per day). Many individual students, however, will be entitled to financial support under the G.I. Bill.

Naval Science Curriculum is as follows:

First Year	NS111	Introduction to Naval Science	
	NS112	Seamanship and Communication	
	NS113	Communications and Tactics	
Second Year	NS211	Ordnance	
	NS212	Fire Control	
	NS213	Electronics	
Third Year	NS311	Piloting	
	NS312	Navigation	
	NS313	Ship Handling	
	(Marine Corps Alternate)	NS312M	Military History
	(Marine Corps Alternate)	NS313M	Principles of War and Basic Military Training
Fourth Year	NS411	Naval Engineering	
	NS412	Advanced Naval Engineering	
	NS413	Ship Construction and Stability	
	(Marine Corps Alternate)	NS411M	Marine Tactics
	(Marine Corps Alternate)	NS412M	Combat Technique
	(Marine Corps Alternate)	NS413M	Amphibious Operations
	(Supply Corps Additional)	NS411S	Navy Supply
	(Supply Corps Additional)	NS412S	Navy Supply
(Supply Corps Additional)	NS413S	Navy Supply	

Four years of physical training must be taken by every student and each student must qualify as first class swimmer in accordance with navy requirements.

ORGANIC CHEMISTRY  
INSTITUTE OF TECHNOLOGY  
SCHOOL OF CHEMISTRY

61-62.†† Elementary Organic Chemistry. Lectures and laboratory work. (8 cred.; jr., sr.; prereq. 15 cred. in college chem.)

63. Elementary Organic Chemistry. Lectures. (3 cred.; jr., sr.; prereq. 62)

64.‡ Elementary Organic Chemistry Laboratory. (3 cred.; jr., sr.; prereq. 62. Must be preceded or accompanied by 63)

For additional courses and course descriptions see the *Bulletin of the Institute of Technology*.

† No credit is given unless both quarters of the course are completed.

‡ A fee of \$2 per quarter is charged for this course. The student should purchase a \$5 deposit card from the bursar, in the Administration Building (Minneapolis Campus). No student will be assigned a desk in the laboratory until he presents this card. The \$2 course fee, laboratory material, and breakage will be charged against the deposit.

## ORIENTATION

1f,w,s. College Orientation Lectures. Required of all students entering the college except those who have had one year or more work in another college. Students must register for this course in their first quarter in college. (1 cred.)

## PHYSICAL CHEMISTRY

## INSTITUTE OF TECHNOLOGY

## SCHOOL OF CHEMISTRY

101-102-103. Physical Chemistry. (3 cred. per qtr.; jr., sr., grad.; prereq. two yrs. college chem., one yr. college phys., differential and integral calculus)

104-105-106.†† Physical Chemistry Laboratory. (1 to 2 cred. per qtr.) To accompany or follow 101-102-103.

For additional courses and course descriptions see the *Bulletin of the Institute of Technology*.

## PHYSICAL EDUCATION FOR MEN

The Physical Education Department offers men the opportunity to elect instruction in sports of a recreational nature in which men can participate during their college career and in later life.

Not more than nine credits in courses in physical activities may be counted toward graduation.

1A. Sports Education. (1 cred. per qtr.; all; no prereq.)

- (a) Touchball, volleyball, boxing, badminton or
- (b) Beginning swimming or
- (c) Adapted activities (by permission of instructor only)

1B. Sports Education. (1 cred. per qtr.; all; no prereq.)

- (a) Wrestling, handball, squash, basketball or
- (b) Beginning swimming or
- (c) Adapted Activities (by permission of instructor only)

1C. Sports Education. (1 cred. per qtr.; all; no prereq.)

- (a) Swimming, track, softball, tennis or
- (b) Beginning swimming or
- (c) Adapted Activities (by permission of instructor only)

2A. Sports Education. (1 cred.; all; prereq. 1A,B,C or permission of instructor)

Sections in the following sports: (1) bowling, (2) intermediate swimming, (3) advanced swimming, (4) wrestling, (5) boxing, (6) weight lifting.

2B. Sports Education. (1 cred.; all; prereq. 1A,B,C or permission of instructor)

Sections in the following sports: (1) bowling, (2) intermediate swimming, (3) advanced swimming, (4) badminton, (5) wrestling, (6) weight lifting, (7) fencing.

2C. Sports Education. (1 cred.; all; prereq. 1A,B,C or permission of instructor)

Sections in the following sports: (1) archery, (2) life saving, (3) track, (4) tennis, (5) golf, (6) softball, (7) boxing, (8) handball and squash.

For schedule of hours and rooms see the *Combined Class Schedule*.

†† A fee of \$2 per quarter is charged for this course. The student should purchase a \$5 chemistry deposit card from the bursar, in the Administration Building (Minneapolis Campus). No student will be assigned a desk in the laboratory until he presents this card. The \$2 course fee, laboratory material, and breakage will be charged against the deposit.

A towel and locker fee of \$1.25 per quarter is charged all students using physical education facilities for activity. Uniforms for class work or recreational activity are \$1 per quarter.

For additional courses and course descriptions and for the special four- and five-year professional course for physical education majors see the *Bulletin of the College of Education*.

### PHYSICAL EDUCATION FOR WOMEN

The General Course in Physical Education offered by the Department of Physical Education for Women provides a wide program of sports and other activities to meet the varying interests and needs of all the women students. The program offers an opportunity to take courses in body building and conditioning and for the acquisition of personal and recreational skills.

All women students will be required to take at least 3 credits in physical education. The course chosen must be approved by the Department of Physical Education for Women.

Nine credits is the maximum number that can be gained toward the degree by taking courses in physical education activities.

For professional courses designed to prepare graduates for the responsible direction of physical education activities see the *Bulletin of the College of Education*.

*Statement of fees*—A physical education fee of \$1.75 per quarter is charged for all courses except Horseback Riding and Rifle Marksmanship. Maximum fee per student, \$3.50 per quarter.

Phys.Ed. 1-2-3-4-5-6-8. (1½ cred. per qtr. for classes meeting three times per week, 1 cred. per qtr. for classes meeting two times per week.

#### GROUP I. AQUATICS

Canoe Paddling	Diving
Swimming, Beginning	Lifesaving
Swimming, Advanced Beginning	Synchronized Swimming
Swimming, Intermediate	Water Safety Instructors' Course
Swimming, Advanced	

#### GROUP II. THE DANCE

National Dances	Ballroom Dance, Elementary
Modern Dance, Elementary	Country Dance
Modern Dance, Intermediary and Advanced	Social Games and Mixers

#### GROUP III. INDIVIDUAL SPORTS AND ACTIVITIES

Archery, Elementary	Horseback Riding
Archery, Intermediate	Rifle Marksmanship
Badminton, Elementary	Skating
Badminton, Intermediate	Skiing, Elementary
Bowling	Tennis, Elementary‡
Golf, Elementary	Tennis, Intermediate‡
Golf, Intermediate	Tennis, Advanced‡

#### GROUP IV. TEAM SPORTS AND ACTIVITIES

Softball	Speed Ball and Field Ball
Basketball	Volleyball

#### GROUP V. BODY BUILDING

Individual Body Building	Posture and Conditioning
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‡ Students taking tennis must pay 50 cents for a tennis court permit.

## PHYSICS

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

*Freshman and Sophomore Courses*

- 1-2†-3. Introduction to Physical Science. (9 cred.; all; prereq. high school algebra and plane geometry)
- 1a‡‡-2a‡‡-3a‡‡. Introduction to Physical Science. Laboratory included. (12 cred.; all; prereq. high school algebra and plane geometry)
- 7‡‡-8‡‡-9‡‡. General Physics. Laboratory work an integral part of the course. (For students majoring in physics, mathematics, and chemistry and for students in the Institute of Technology.) (15 cred.; all; prereq. Math. 15-16 or equivalent or registration in differential calculus)

## PHYSIOLOGY

## MEDICAL SCHOOL

*Freshman and Sophomore Courses*

4. Human Physiology. For academic, home economics, pharmacy, and other students. Lectures, recitations, and demonstrations. (4 cred.; all; prereq. 1 qtr. zool., 1 qtr. chem.)

*Junior and Senior Courses*

58. Human Physiology. (5 cred.; primarily for dental students\*; jr., sr.; prereq. zool. and Physiol. 56, 57)
59. Human Physiology. (5 cred.; sr.; prereq. 58 or equiv.)
60. Human Physiology. For Medical Technology students and others. (6 cred.; prereq. Physiol. 100-101 or equiv.)
103. Physiology of Circulation, Respiration, etc. (9 cred.; jr., sr.; prereq. zool. and or. ch.)
104. Physiology of Endocrines, Nervous System, etc. (6 cred.; lect. only, 4 cred.; jr., sr.; prereq. 103 or or. ch. and neurology)

For additional courses and course descriptions see the *Bulletin of the Medical School*.

## PLANT PATHOLOGY AND BOTANY

Training in this field may lead to state and Federal Government service, college teaching and experiment station work, and employment in a variety of commercial fields.

Two fields of specialization are available in the division: (a) plant pathology and (b) agricultural botany and applied plant physiology.

**A. Plant pathology**—Students interested in plant pathology will ordinarily register in the Science Specialization Curriculum with a view to taking graduate work. A major in plant pathology in the Technical Agriculture Curriculum must have approval of the division.

Recommended for major in plant pathology:

1. **Science Specialization:** Pl. Pa. 1 or 10; 105-106-107; 111 or 112 or 114; 119, 143.

2. **Technical Agriculture**—Consult adviser in Plant Pathology.

\* Others may be admitted by special permission.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡‡ A fee of \$2 per quarter is charged for this course.

**B. Agricultural botany and applied plant physiology**—A major in agricultural botany and applied plant physiology should include basic courses in the Department of Botany in the College of Science, Literature, and the Arts. Since the student may wish to apply his botanical training to one of the several fields of horticulture, agronomy, soils, forestry, and entomology and economic zoology, subjects from these divisions should also be included in either the major or minor.

A major in agricultural botany and applied plant physiology in the Technical Agriculture Curriculum must have approval of the division. A major in Science Specialization assumes continuation in graduate work. For courses recommended for major in both the Technical Agriculture and Science Specialization Curricula, consult divisional adviser.

*Freshman and Sophomore Courses*

1. Plant Pathology. An introductory course in plant diseases. Lectures, laboratory, and reference. (5 cred.; soph., jr., sr.; not open to those who have completed Course 10; prereq. 9 cred. in plant sciences of which at least 6 shall be in botany)
3. Weeds. A study of the identification, structures, and habits of weed plants in relation to methods of controlling them. (3 cred.; fr., soph., jr., sr.; prereq. Bot. 6 cred.)
4. Grasses and Sedges. A study of the grasses and a few of the sedges of this area relative to their identification, anatomy, ecology, and economic value. (3 cred.; soph., jr., sr.; prereq. Bot. 9 cred. or equiv.)
9. Seed Technology and Testing. Testing, including germination, identification, purity, seed storage; processing and preparation of seed for trade, seed legislation. (3 cred.; soph., jr., sr.; prereq. Bot. 9 cred. or equiv.)
10. Forest Pathology. Diseases of forest and shade trees, and the rotting of timber. Symptoms, etiology, and control. Lectures, laboratory, and reference work. (5 cred.; soph., jr., sr.; not open to those who have completed Course 1; prereq. Bot. 6 cred.)
51. Special Problems in Forest Pathology. Collection, identification, and cultural studies of tree pathogens and wood rotting fungi. (2 to 5 cred.; jr., sr.; prereq. 10)
53. Food Plants of Game Animals. A study of food plants, uses, habits, reproduction, and identification. (3 cred.; jr., sr.; prereq. one yr. of bot. and one yr. of zool., or equiv.)
56. Introduction to the Study of Fungi. The structure, development and identification of fungi, especially those of economic importance. (3 cred.; jr., sr.; prereq. Bot. 9 cred. or instructor's permission)
101. Special Agricultural Botany. Botanical characters, environmental relations, and utilization of important groups of plants, especially those of the tropics and subtropics. (3 or 5 cred.; jr., sr., grad.; prereq. Bot. 9 cred. or equiv.)
102. Physiology of Seeds. Physiology of development, ripening, storage, dormancy, viability, and germination; processing and seed treatment in relation to viability. (3 cred.; jr., sr., grad.; prereq. Bot. 51 or equiv.)
104. Industrial Mycology. Fungi in relation to industrial processes and products. (3 cred.; jr., sr., grad.; prereq. 56 or 1 or 10)
- 105-106-107. Mycology. Morphology and taxonomy of fungi. Lectures, laboratory, and field work. (3 or 5 cred. per qtr.; jr., sr., grad.; prereq. 1 or 10 or equiv.)
110. Principles of Pathology. A systematic consideration of the basic factors governing the development of plant diseases. (5 cred.; jr., sr.; prereq. 1 or 10, Bact. 53)
111. Diseases of Field Crops. Detailed study of diseases of field crops, including symptomatology, etiology, and practical methods of control. (4 cred.; jr., sr.; prereq. 1 or 10)
112. Diseases of Fruit and Vegetable Crops. Special study of diseases of fruit and vegetable crops, especially those important in Minnesota. Laboratory, lectures, and field work. (3 cred.; jr., sr., grad.; prereq. 1 or 10)



114. Advanced Forest Pathology. A detailed study of wood rots, including a study of the deterioration of wood products caused by fungi. Lectures and laboratory work. (3 cred.; jr., sr., grad.; prereq. 1 or 10)
117. Virus Diseases of Plants. The nature of plant viruses and types of diseases they cause; particular emphasis on methods for studying virus diseases. (3 cred.; jr., sr., grad.; prereq. 1 or 10. Given in alternate years; not offered in 1948-49)
118. Bacterial Diseases of Plants. Bacteria as plant pathogens; representative types with particular reference to technique used in studying bacterial diseases of plants. (3 cred.; jr., sr., grad.; prereq. 1 or 10)
119. Principles of Plant Disease Control. A general consideration of principles and practices in controlling plant diseases. (3 cred.; jr., sr., grad.; prereq. 1 or 10)
120. Advanced Plant Pathology. A course in general plant pathology, including lectures, laboratory, and greenhouse work and special problems. (3 cred.; jr., sr., grad.; prereq. 1 or 10 or equiv.)
135. Weed Control. Cultural and chemical methods of weed control; weed and seed laws pertaining to dissemination and control. Lectures, laboratory, and field work. (3 cred.; jr., sr., grad.; prereq. Agro. 1 and Pl. Pa. 3)
- 141-142. Insects in Relation to Plant Disease. A study of the principal insect vectors and their habits; types of insect injuries affecting health of plants; modes of insect transmission, and dissemination of plant disease; methods of rearing and handling insect vectors. (6 cred.; jr., sr., grad.; prereq. 8 cred. in ent. or plant path.)
143. Methods. Theoretical and practical consideration of methods used in pathological and mycological research. (3 cred.; jr., sr., grad.; prereq. 1 or 10)
160. Plant Histochemistry. The localization, identification, and function of plant constituents. Lectures, demonstrations, and laboratory. (3 cred.; sr., grad.; prereq. Bot. 51 or equiv.)
161. Technology of Fruits and Vegetables. The effects of temperature, respiration, packing, etc., on storage life. (3 cred.; sr., grad.; prereq. Bot. 51 or equiv.)
162. Physiological Relations of Crop Plants to Temperature. An advanced study of general temperature effects and especially of the relation of plants to low temperatures. Lectures, readings, and translations. (3 cred.; sr., grad.; prereq. Bot. 51 or equiv.)
163. Applied Plant Physiology. A general discussion of plant physiology as applied to the food industries and to agriculture and forestry. Lectures and demonstrations. 3 cred.; jr., sr., grad.; prereq. Pl. Ph., Bo. 51 or equiv.)

## POLITICAL SCIENCE

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

*Freshman and Sophomore Courses*

- 1-2†-3. American Government and Politics—Parts 1-2. National, state, and local. Constitutions and fundamental laws; governmental organization; division and separation of powers; legislative, executive, and judicial procedure and problems. Part 3, Principal functions and services of government, defense, law enforcement, regulation of business, public works, and social services. (9 cred.; all; no prereq.)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

## PSYCHOLOGY

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

*Freshman and Sophomore Courses*

- A. Elementary Psychology. An introduction to psychology with special attention to its applications. (5 cred.; fr.\* soph.; no prereq)
- 1-2.† General Psychology. A general introduction to the study of human behavior with emphasis on the development of the individual. (6 cred.; soph., jr., sr.; no prereq.)
3. Psychology Applied to Daily Life. (3 cred.; soph., jr., sr.; prereq. 1-2)
- 4-5.‡ Introductory Laboratory Psychology. (4 cred.; soph., jr., sr.; may be taken with or after 1-2)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

## PUBLIC HEALTH

## MEDICAL SCHOOL

*Freshman and Sophomore Courses*

3. Personal Health. Elementary principles of normal body function; predisposing and actual causes of disease; ways in which disease may be avoided. (2 cred.; fr., soph.; no prereq.; not open to students who have taken Hu. Biol. 10C in the General College)
4. Health Problems of Adult Life. Personal health and prevention of disease in the family; relation to community health and disease control; important diseases and their prevention. (2 cred.; all; prereq. 3)

*Junior and Senior Courses*

50. Public and Personal Health. Causes of diseases and of physical defects; fundamental principles and working methods of health conservation and disease prevention. Lectures, discussions, and directed readings. (3 cred.; open to jr. and sr. who have not taken Courses 3, 4, 52, 53, or 100; no prereq.)
51. Community Hygiene. Elementary concepts of development, spread, and prevention of preventable diseases; community programs for their control. (3 cred.; jr., sr.; prereq. 3 or 50; not open to students who have taken 4, 50, 52, 53, or 100)
- 52a,b.§ Health Care of the Family. Factors affecting the health of the family as a unit; environmental factors, including elementary sanitation; prevention of accidents; communicable diseases, their transmission and prevention; prenatal and infant hygiene; principal problems in preschool and school hygiene; care of the sick room; observation and care of the patient; elementary symptomatology. For students of home economics. (3 cred.; soph., jr., sr.; prereq. Bact. 53, Physiol. 4; not open to students who have taken 50, 51, or Hu. Biol. 10C in the General College)
57. Health of Infant and Preschool Child. Maternal and child health in public health program, problems of infant and maternal mortality, growth and development of infant and young child, care and feeding of normal infant; prevention and correction of physical defects. (2 cred.; jr., sr.; prereq. 4 or 50 or 51 or 52 or 53 or 100)
59. Health of the School Child. Mental and physical growth; prevention and control of diseases common to the school-age child; health appraisal; correction of physical defects; emotional problems; care of the handicapped; the school environment and

\* This course is open to a limited number of first and second quarter freshmen with the approval of their advisers and to third quarter freshman with a C average.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1 per quarter is charged for this course.

§ Lectures given fall and spring quarters only; laboratory sections given fall, winter, and spring quarters.

- its effect on child health; accident prevention and emergency care; practical problems of health supervision and administration. (3 cred.; jr., sr., prereq. 3 and 4 or 3 and 51 or G.C. 10C and 4 or G.C. 10C and 51, or 50 or 53 or 100; will be waived for teachers and school nurses, but cred. granted only after completion of prereq.)
60. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States; early diagnosis and sanatorium treatment; tuberculosis in children; psychology of tuberculosis; supervision of returned sanatoria patients; state program for the eradication of tuberculosis; legislation. (2 cred.; jr., sr.; prereq. 4, or 50, or 51, or 52 or 53, or 100 and 62 which may be taken concurrently)
95. Principles of Human Nutrition (with particular reference to public health). The role of nutrients, nutritional composition of foods, food requirements, nutritional aspects of food production and processing, laws and regulations, food habits. (3 cred.; prereq. 8 cred. in chem. and 10 cred. in biol.)
102. Environmental Sanitation I. Methods for promoting man's health and comfort by controlling his environment; water supply sanitation, food sanitation, pollution abatement; sewage, excreta, and waste disposal; bathing place sanitation, air hygiene, illumination, housing control of insect and animal vectors of disease, industrial hygiene and sanitation. (3 cred.; sr., grad.; prereq. 50 or 51 or 53 or 100 or by permission or may be taken concurrently with any of these)

For additional courses see the *Bulletin of the School of Public Health*.

### RHETORIC

All freshmen in the College of Agriculture, Forestry, and Home Economics must satisfy certain requirements in four communication skills, and should report to Green Hall Auditorium the first period each day for the first week of every quarter. After a week of diagnosis they will be sectioned according to their needs and abilities. All sections will then continue to meet during the first period, but for only three days a week.

Students with a good scholastic record in their freshman communication courses are eligible to try the Rhetoric 51 exemption examination which, if passed, exempts them from the Rhetoric 51 requirement.

#### *Freshman and Sophomore Courses*

- 1.‡ Communications I. Diagnostic tests in listening, reading, speaking, writing. Sectioning and specialized training according to individual needs. Core assignments integrating the use of all four skills. Progress tests. Re-examination to determine what further training in communication is needed for attainment of the level of proficiency required of our college freshmen. (3 cred.; all; no prereq.)
2. Communications II. Expository communication. Balanced training in adapting the four communication skills to the presentation and assimilation of oral and written materials of expository nature. Note-taking, outlining, written papers, oral reports. (3 cred.; all; prereq. placement test.)
3. Communications III. Persuasive communication. Balanced training in adapting the four communication skills to the presentation and critical analysis of oral and written materials of a persuasive nature. Argument, evidence, and the techniques of documentation. Brief-writing and persuasive speaking. (3 cred.; all; prereq. placement test)
- 12.‡ Debate and Discussion. Classroom and intercollegiate debating; briefing, methods of public discussion, the elements of persuasion. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
- 22.‡ Public Speaking. A practical course in the fundamentals of speech making. Particular emphasis upon organizing the speech and projecting it to the audience. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)

‡ A fee of \$1 per quarter is charged for this course.

26. Original Writing. Intended for students interested in writing popular articles or creative materials including the essay, the short story, poetry, the one-act play. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
- 28.† Play Production. History of the theater, theories of acting, staging, etc. A survey of the problems confronting the producer of amateur plays. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
31. Survey of English Literature I. Survey of English literature of the sixteenth, seventeenth, and eighteenth centuries. (5 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
32. Survey of English Literature II. Survey of English literature of the nineteenth century. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
33. American Life in American Literature. A careful examination of the works and influence of ten pre-eminent contributors to our national literature. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
34. Books and Reading. The selection of books and periodicals for the home library. (1 cred.; no prereq.)

*Junior and Senior Courses*

51. Exposition. Essays and articles; technical writing; application letters; review of English usage. (3 cred.; jr., sr.; prereq. Rhet. Comm. requirement)
- 54.† Advanced Public Speaking. Training for specific speech situations most likely to be encountered professionally soon after graduation from college. Aids in informational speaking. Psychology of persuasion. (3 cred.; jr., sr.; prereq. 22)
- 59.‡ Advanced Play Production. Continuation of Course 28. Problems of directing, staging, and make-up. Study of representative one-act plays. Each student is required to produce a one-act play. A practical course for teachers. (3 cred.; jr., sr.; prereq. 28 or permission of instructor)
60. Contemporary Literature. Reading and analysis of important books of the current period. (3 cred.; jr., sr.; prereq. Rhet. Comm. requirement)

ROMANCE LANGUAGES

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

FRENCH

*Junior College Courses*

- 1-2. Beginning French. (10 cred.; all; no prereq.)
- 3-4. Intermediate French. (10 cred.; all; prereq. 1-2, or two years of high school French. Students who have had three years of high school French may omit Course 3 and take Course 4)
20. Oral and Written French. (5 cred.; all; prereq. 4 or four§ years high school French)

*Senior College Courses*

53. French Composition. (3 cred.; jr., sr.; prereq. 3-4)
- 54-55. French Conversation. (6 cred.; jr., sr.; prereq. 53 or 20)
- 70-71-72. Survey of French Literature. (9 cred.; jr., sr.; prereq. 3-4)
- 73-74. Survey of French Literature. (10 cred.; jr., sr.; prereq. 3-4)

† A fee of \$1 per quarter is charged for this course.

§ Students who have had three years of high school French may be admitted to Course 20 with the consent of the department.

## SPANISH

*Junior College Courses*

- 1-2. Beginning Spanish. (10 cred.; all; no prereq.)  
 3-4. Intermediate Spanish. 10 cred.; all, prereq. 1-2, or two years of high school Spanish. Students who have had three years of high school Spanish may omit Course 3 and take Course 4)  
 20. Oral and Written Spanish. (5 cred.; all; prereq. 4 or four½ years of high school Spanish)

*Senior College Courses*

53. Spanish Composition. (3 cred.; jr., sr.; prereq. 3-4)  
 54-55. Spanish Conversation. (6 cred.; jr., sr.; prereq. 53 or 20)  
 65-66-67. Survey of Spanish Literature. (9 cred.; jr., sr.; prereq. 3-4)  
 68-69. Survey of Spanish Literature. (10 cred.; jr., sr.; prereq. 3-4)  
 74-75-76.† Survey of Spanish-American Literature. Contemporary Prose and Poetry. (9 cred.; jr., sr.; prereq. 3-4)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts.*

## SOCIOLOGY AND SOCIAL WORK

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

*Freshman and Sophomore Courses*

1. Introduction to Sociology. (5 cred.; no prereq.)  
 2. Individual and Minority Group Adjustment. (5 cred.; soph., jr., sr.; prereq. 1)  
 14. Rural Sociology. (3 cred.; soph., jr., sr.; prereq. 1)  
 45. Social Statistics. (5 cred.; soph., jr., sr.; prereq. 1. Not open to students who have received credit in Econ. 5)  
 48. Social Control and Criminal Behavior. (3 cred.; prereq. 1)  
 49. Social Problems. (3 cred.; 3rd qtr. soph., jr., sr.; prereq. Soc. 1)

*Junior and Senior Courses*

- 50-51. Areas of Social Work. (10 cred.; jr., sr.; prereq. 49)  
 100. Social Psychology. (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 6, or Psy. 1-2 and 9 cred. in soc. sci., ed., phil., or psy.)  
 110. Rural Community Organization. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., child welfare, ed., phil., or psy., or consent of instructor)  
 112. Problems in Rural Social Research. (2 cred.; sr., grad.\*; prereq. same as for 110)  
 113. Rural Community Analysis. (3 cred.; jr., sr., grad.; prereq. same as for 110 and consent of instructor)  
 114. Rural Social Institutions. (3 cred.; jr., sr., grad.; prereq. same as for 110)  
 119. The Family. (3 cred.; jr., sr., grad.; prereq. same as for 110)  
 120. Social Life and Cultural Change. (3 cred.; jr., sr., grad.; prereq. same as for 110)  
 160. Population Trends and Policies. (3 cred.; jr., sr., grad.; prereq. same as for 110)

\* Primarily for graduates, but mature students who are not graduates may be admitted with the consent of the adviser and the instructor.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ Students who have had three years of high school Spanish may be admitted to Course 20 with the consent of the department.

161. Social Aspects of Housing and Standards of Living. (3 cred.; sr., grad.; prereq. same as for 110)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

### SOILS

Soils majors in either Technical Agriculture or Science Specialization are expected to take Courses 5, 51, 109, and 108. Technical Agriculture majors should select, with the help of the adviser, a sufficient number of related elective courses in other plant sciences to complete the major sequence. In the Science Specialization Curriculum majors will be expected to select a combination of courses from those offered in botany, chemistry, geology, mathematics, and physics. In either case the subjects selected will be somewhat dependent upon the objective of the course of study being pursued.

#### *Freshman and Sophomore Courses*

4. Soils. Origin, formation and classification of soils. The soil profile and its development; physical and chemical properties of soils; organic matter and biological relationships; forms and movement of soil water; erosion control. (3 cred.; soph., jr., sr.; prereq. In. Ch. 1-2 or 4-5)
5. Soil Management. Nutrient requirements of crops; fertilizers and fertilizer materials; fertilizer practices; use of lime; farm manures, their composition, value and use; green manuring; soil management and fertility maintenance. (3 cred.; soph., jr., sr.; prereq. Soil. 4)

#### *Junior and Senior Courses*

51. Field and Laboratory Studies of Soils. Field and laboratory studies of soil profiles, soil texture, and moisture relationships. Laboratory tests for soil reaction, plant nutrient deficiencies, and of liming and fertilizer materials. Soil maps and their interpretation. (2 cred.; jr., sr.; prereq. Soil 4)
103. Principles of Soil Erosion. Causes and types of erosion; relation of erosion to soil types; control of erosion by tillage, contour-cultivation, strip farming, terracing, and crops; control of moisture and conservation of plant nutrients; relation of forests to erosion control. (3 cred.; jr., sr., grad.; prereq. Soil 4)
104. § Soil Mapping. Field experience in soil surveying. Students will be assigned to areas where soil surveys are in progress. Arrangements must be made in advance. (3 cred.; jr., sr., grad.; prereq. 108 and 109)
107. Fertilizers. Commercial fertilizers and their uses; long-time fertility, experiments; effect of fertilizer materials upon soils, yield, and composition of crops. Fertilizer experiments and fertility problems in Minnesota. (3 cred.; jr., sr., grad.; prereq. Soil. 5)
108. Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. Lectures and laboratory. (3 cred.; jr., sr., grad.; prereq. Soil. 4)
109. Soil Genesis and Classification. Genesis, nature, and distribution of the soil types of Minnesota; development of soils as influenced by climatic, topographic, geologic, and vegetative factors and their classification; productivity ratings of Minnesota soils. (3 cred.; jr., sr., grad.; prereq. Soil. 4 and 108)

§ Arrangements must be made in advance of registration.

## THEORY AND PRACTICE OF TEACHING

## COLLEGE OF EDUCATION

For courses and course descriptions see the *Bulletin of the College of Education*.

## VETERINARY MEDICINE

Those contemplating matriculation in Veterinary Medicine are referred to the curriculum on page 71, and to advisers in this division.

*Junior and Senior Courses*

- 50-51-52. Anatomy, Physiology, and Hygiene of Domestic Animals. Fundamentals of structure, function, and reproduction of domestic animals. The principles of animal hygiene, including the etiology and means of control of the more important communicable diseases. (9 cred.; jr., sr.)
103. Advanced Anatomy of Domestic Animals. Regional systematic, topographic study and dissections of the dairy cow and other food producing animals. (4 cred.; sr., grad.; prereq. Anat. 50-51-52) (Limited to 9 with a minimum of 6)
109. Anatomy, Physiology, and Hygiene of Poultry. This course will be confined to the general anatomy of the fowl, the physiology of digestion and reproduction, and the prevention and control of the more important diseases affecting chickens and turkeys. (3 cred.; jr., sr.; prereq. Zool. 14-15, P.H. 1)

## ZOOLOGY

## COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Courses in this department are closely correlated with those offered by the Division of Entomology and Economic Zoology of the College of Agriculture, Forestry, and Home Economics. For courses of that division, see page 90.

Credit is given for acceptable work done at any approved seaside or freshwater laboratory.

*Freshman and Sophomore Courses*

- 1‡-2‡-3.\*‡‡ General Zoology. (10 cred.; all; no prereq.)
- 14‡-15.‡‡ General Zoology. Structure, physiology, embryology, classification, and evolution of animals. (6 cred.; all; no prereq.) (Limited to 174)
- 21.‡§ Histology. (5 cred.; soph., jr., sr.; prereq. 1-2-3)
- 22.‡‡§ Comparative Anatomy. (5 cred.; soph., jr., sr.; prereq. 1-2-3)
- 46-47.† Ornithology. (6 cred.; soph., jr., sr.; prereq. 1-2-3 and permission of instructor)

*Junior and Senior Courses*

- 50.‡ Introduction to Comparative Physiology. (5 cred.; soph., jr., sr.; prereq. 1-2-3 or 15 cred. in bot., and 10 cred. in chem. or permission of instructor)
- 51.‡§ Introductory Animal Parasitology. (5 cred.; jr., sr.; prereq. 1-2-3)
- 52.‡¶ Introductory Entomology. (5 cred.; jr., sr.; prereq. 1-2-3)

\* Lectures may be elected without laboratory with the consent of the chairman of the department. Laboratory must be taken with the lectures, however, if zoology is offered as the required laboratory science. Students should elect lecture sections in which they can continue throughout the three quarters.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of \$1.50 per quarter is charged for this course.

‡‡ A fee of \$7.00 is charged for this course.

§ Sections are limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall.

¶ Sections limited to 20 each.

- 53.‡§ Faunistic Zoology. (5 cred.; jr., sr.; prereq. 1-2-3)  
 80. Invertebrate Zoology. (3 cred.; jr., sr.; prereq. 1-2-3)  
 82. Organic Evolution. (3 cred.; jr., sr.; prereq. 1-2-3 or Bot. 1, 7, 21)  
 83. Introduction to Genetics and Eugenics. (3 cred.; jr., sr.; prereq. 1-2-3 or 10 cred. in bot.)  
 107‡-108‡ Protozoology. (6 cred.; jr., sr., grad.; prereq. 15 cred.)  
 109‡-110‡-111‡ General Physiology of Animal Reactions. (9 cred.; jr., sr., grad.; prereq. 15 cred.)  
 112‡-113‡ Advanced Comparative Physiology. (6 cred.; jr., sr., grad.; prereq. 15 cred. with consent of instructor)  
 117‡-118-119‡ Animal Ecology. (9 cred.; jr., sr., grad.; prereq. 15 cred.)  
 120. General Ecology of Insects. (3 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)  
 121‡ Ichthyology. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool.)  
 125‡-126‡-127‡ Advanced Entomology. (9 cred.; jr., sr., grad.; prereq. 15 cred.)  
 128‡-129‡ Insect Physiology. (8 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent. and consent of instructor. Zool. 50 or equiv. recommended)  
 133‡ Genetics of Development. (3 cred.; jr., sr., grad.; prereq. proper preparation in advanced genetics and consent of instructor)  
 144‡-145‡-146‡ Animal Parasites and Parasitism. (6 or 9 cred.; jr., sr., grad.; prereq. 15 cred.)  
 149‡-150‡ Histology and Organology. (6 cred.; jr., sr., grad.; prereq. 15 cred. in zool. Permission of instructor necessary)  
 155‡ Physiology in Relation to Physics. (3 cred.; jr., sr., grad.; prereq. 15 cred. in bi. sc. and consent of instructor. Physics recommended)  
 160‡-161‡ Cytology. (6 cred.; jr., sr., grad.; prereq. 15 cred. with consent of instructor)  
 170‡-171‡ Advanced Genetics. (6 cred.; jr., sr., grad.; prereq. 15 cred. including Course 83 or consent of instructor)  
 180‡ Comparative Embryology. (3 cred.; jr., sr., grad.; prereq. 15 cred. including Course 21 or equiv.)  
 181. Endocrines and Reproduction. (3 cred.; jr., sr., grad.; prereq. 15 cred. including Course 21 or equiv.)  
 182. Experimental Embryology. (3 cred.; jr., sr., grad.; 15 cred. including Course 21 or equiv.)

For additional courses and course descriptions see the *Bulletin of the College of Science, Literature, and the Arts*.

‡ A fee of \$1.50 per quarter is charged for this course.

§ Sections are limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall.



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