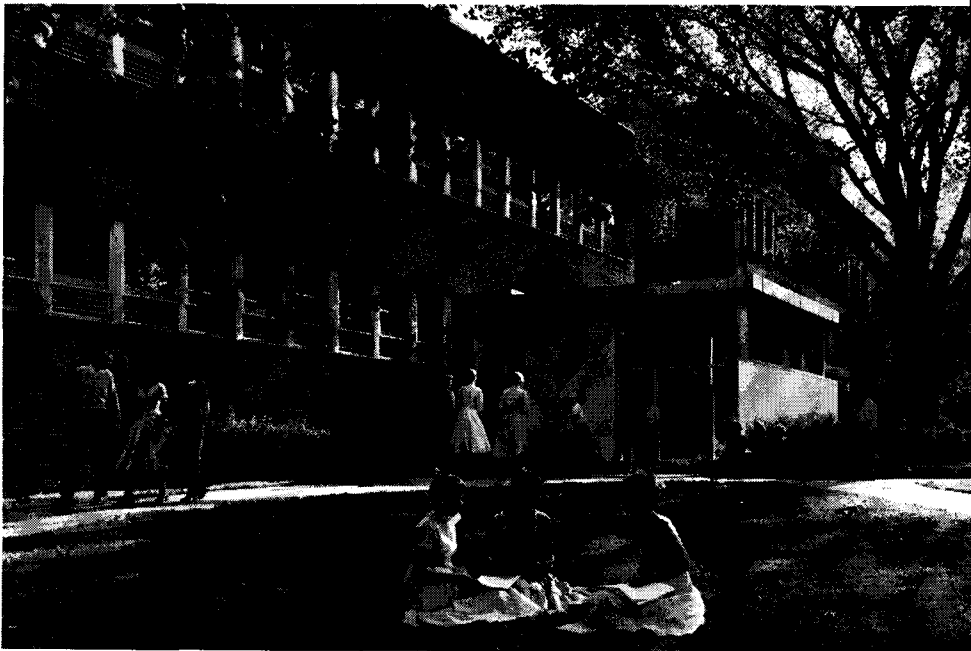


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Bulletin of the
UNIVERSITY OF MINNESOTA



*College of Agriculture, Forestry,
and Home Economics
School of Veterinary Medicine
1955-1957*

D. S. ...

How to Use This Bulletin

This bulletin is the basic source of information about the College of Agriculture, Forestry, and Home Economics and the School of Veterinary Medicine. You should keep it at hand for ready reference. The Index in the back of the bulletin will refer you to information on specific points.

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General Introduction, Admission Requirements, Registration and Class Attendance, Evaluation of Work, Student Personnel Services, Student Government, Student Activities, Student Housing, Scholarships and Awards, Reserve Officers Training Corps.

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Degrees offered and Graduation Requirements, Scholarship Requirements, Classification of Students, Special Requirements and Exemptions, Junior-Senior Programs, Curricula in Agriculture, Curricula in Forestry, Curricula in Home Economics, Description of Courses in Agriculture, Forestry, and Home Economics.

Part III. School of Veterinary Medicine Page 87
Career Opportunities, Facilities, Admission and Curricula (Preveterinary courses and professional curriculum), Description of Courses.

In addition to this bulletin and any other you may need for program planning, you will be supplied at the time of registration with a copy of the *Class Schedule*. This is published just prior to each quarter and lists courses offered during the quarter, with time and place of class meetings.

Explanation of Symbols

You will find on page 56 the meaning of the asterisks, daggers, triangles, etc., and the numbers that are given to freshman, sophomore, junior, and senior courses used in the description of courses in Parts II and III.

University of Minnesota

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College of Agriculture, Forestry, and Home Economics

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Agricultural Biochemistry

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 Austin A. Dowell, Ph.D.
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 George A. Pond, Ph.D.
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Reynold P. Dahl, Ph.D.

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Instructor

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Evan R. Allred, M.S. (Ag.E.)
 Clarence H. Christopherson, M.A.
 John Strait, M.S. (Ag.E.)

Assistant Professor

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 Curtis L. Larson, M.S. (C.E.)

Instructor

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 Harold A. Cloud, M.S. (Ag.E.)
 J. Grant Dent
 Robert V. Keppel, M.S. (Ag.E.)
 Jesse H. Pomroy, M.S. (Ag.E.)

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 Ray S. Dunham, M.S.
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 Alois R. Schmid, Ph.D.
 Horace L. Thomas, Ph.D.

Assistant Professor

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 Alfred L. Harvey, Ph.D.
 Laurence M. Winters, Ph.D.

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 William E. Rempel, Ph.D.

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 Robert M. Jordan, Ph.D.

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 Willes B. Combs, M.A.
 Samuel T. Coulter, Ph.D.
 Thor W. Gullickson, Ph.D.
 Harold Macy, Ph.D.
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 Howard A. Morris, Ph.D.
 Joseph C. Olson, Ph.D.
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 A. Glenn Richards, Ph.D.

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 Mykola H. Haydak, Ph.D.
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Edwin F. Cook, Ph.D.

Forestry*Professor*

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Randolph M. Brown, M.F.
Louis W. Rees, Ph.D.
Thorvald Schantz-Hansen, Ph.D.
A. E. Schneider, Ph.D.

Associate Professor

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Otis F. Hall, Ph.D.
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Ralph L. Hossfeld, Ph.D.
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Instructor

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Merle P. Meyer, M.F.
Walter B. Wallin, M.S.

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Isabel Noble, Ph.D.

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Gertrude Esteros, M.A.
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Charlotte Wolff, M.A.

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Marion Everson, M.S.
Ethel Gorham, M.A.
Annette Gormican, M.S.
Kathleen Jeary, M.A.
Mary Ann Morris, Ph.D.
Juliette Myren, M.S.
Lucile Streater, M.A.
Esther Trammell, M.S.

Instructor

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Mary Andrews, M.S.
Mercein Benzie, B.S.
Jeanne Claypoole, M.S.
Evelyn M. Franklin, M.A.
Lois Lund, M.S.

Home Economics Education*Professor*

Louise A. Stedman, Ph.D.**
Roxana Ford, Ph.D.
Ella J. Rose, Ph.D.

Assistant Professor

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Helmi Koivisto, Ph.D.
Bethel E. Rust, M.S.

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Theodore Weir, M.S.
James D. Winter, M.S.

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Albert A. Piringer, Ph.D.

Instructor

Shirley K. Trantanella, B.S.
Richard E. Widmer, M.S.

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Jonas J. Christensen, Ph.D.**
Clyde M. Christensen, Ph.D.
Carl J. Eide, Ph.D.
Helen Hart, Ph.D.

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Thomas H. King, Ph.D.

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Louise Dossdall, Ph.D.
David W. French, Ph.D.
Thor Kommedahl, Ph.D.
Raymond H. Landon, Ph.D.

Instructor

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Paul E. Waibel, Ph.D.

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James I. Brown, Ph.D.

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Donald Woods, Ph.D.

Assistant Professor

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Instructor

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Paul Seymour, M.A.
Eugene S. Wright, M.A.

Soils*Professor*

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Paul M. Burson, M.S.
Alfred C. Caldwell, Ph.D.

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John M. MacGregor, Ph.D.
E. L. Schmidt, Ph.D.

Assistant Professor

Harold F. Arneman, Ph.D.

School of Veterinary Medicine

William T. S. Thorp, D.V.M., M.S., Assistant Dean, Director, School of Veterinary Medicine

Henry J. Griffiths, D.V.M., Ph.D., Assistant Director, School of Veterinary Medicine

Veterinary Anatomy*Professor*

Ralph L. Kitchell, D.V.M., Ph.D.**
Alvin F. Weber, D.V.M., Ph.D.

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John T. Bell, D.V.M.
Melvin W. Stromberg, D.V.M.

Veterinary Bacteriology and Public Health*Professor*

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Ph.D.**
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Assistant Professor

Robert K. Lindorfer, Ph.D.

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Henry J. Griffiths, D.V.M., Ph.D.
Howard C. H. Kernkamp, D.V.M.,
M.S.
William T. S. Thorp, D.V.M., M.S.

Instructor

Everett D. Besch, D.V.M.
Donald R. Knauff, D.V.M.
Carl E. Rehfeld, D.V.M.
Donald A. Willigan, D.V.M., M.S.

Veterinary Physiology and Pharmacology*Professor*

Alvin F. Sellers, V.M.D., Ph.D.**

Associate Professor

Clarence M. Stowe, D.V.M., Ph.D.

Instructor

Emmett N. Bergman, D.V.M., M.S.
Archie L. Good, V.M.D., M.S.
Paul B. Hammond, D.V.M.

Veterinary Medicine and Clinics*Professor*

Harvey H. Hoyt, D.V.M., Ph.D.**
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George W. Mather, D.V.M., Ph.D.

Associate Professor

Robert A. Merrill, D.V.M.
Dale K. Sorensen, D.V.M., Ph.D.

Instructor

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Donald G. Low, D.V.M.
Frank Sauer, D.V.M.
Robert M. Schwartzman, V.M.D.

Veterinary Surgery and Radiology*Instructor*

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Donald H. Clifford, D.V.M.
Francis A. Spurrell, D.V.M.
Edward A. Usenik, D.V.M.
Griselda Wolf, D.V.M.

Veterinary Obstetrics*Instructor*

Raimunds Zemjanis, D.V.M.**
Lester L. Larson, D.V.M., M.S.

Veterinary Diagnostic Laboratories*Professor*

Reuel Fenstermacher, D.V.M.**

Instructor

Donald M. Barnes, D.V.M.
Charles Gale, D.V.M.

** Responsible for administration of department or division.

College of Agriculture, Forestry, and Home Economics, and the School of Veterinary Medicine

Part I. General Information

The St. Paul Campus of the University of Minnesota is situated just outside the city limits of St. Paul in the area east of Cleveland and north of Como Avenues. An intercampus bus runs between the St. Paul Campus and the Minneapolis Campus. Students carrying work on the St. Paul and Minneapolis Campuses are given a free pass for use on this bus. Most St. Paul Campus students have course work on the Minneapolis Campus as an integral part of their chosen curriculum.

All of the University's work in the fields of agriculture, forestry, home economics, and veterinary medicine is centered in the Institute of Agriculture. Major units of the Institute include Resident Instruction, the Agricultural Experiment Station, and the Agricultural Extension Service. The dean of the Institute of Agriculture has his administrative offices in 201 Coffey Hall.

Resident Instruction is under a director who is also the assistant dean for the College of Agriculture, Forestry, and Home Economics. The College includes the Schools of Forestry and Home Economics and the academic departments. The office of Agricultural Short Courses, headed by a director, is a unit under Resident Instruction.

The teaching program of the College of Agriculture, Forestry, and Home Economics involves both general and professional education, and at the completion of the various undergraduate programs the bachelor of science degree is awarded. Students may then seek professional employment, enter farming or homemaking or other programs of their own, or begin graduate study. Information on the College program other than that contained in this bulletin may be obtained from the Assistant Dean for the College of Agriculture, Forestry, and Home Economics, Institute of Agriculture, University of Minnesota, St. Paul 1.

The School of Veterinary Medicine is a separate unit directly responsible to the dean of the Institute. An assistant dean is in charge of the School, which offers professional training leading to the degree of doctor of veterinary medicine. Additional information may be obtained from the Assistant Dean, School of Veterinary Medicine, Institute of Agriculture, University of Minnesota, St. Paul 1.

The information following relates to the students enrolled in the College of Agriculture, Forestry, and Home Economics and to those in the School of Veterinary Medicine.

Admission Requirements

To be admitted to the College of Agriculture, Forestry, and Home Economics, or to the School of Veterinary Medicine you must make application to the Office of Admissions and Records, Institute of Agriculture, University of Minnesota, St. Paul 1. Listed below are requirements for admission to the programs in agriculture, forestry, home economics, and preveterinary medicine. Other requirements and procedures having to do with nonresident admission, admission with advanced standing, adult special admission, and admission by examination appear in the *Bulletin of General Information*. Admission to the professional program of the School of Veterinary Medicine is discussed on page 90.

High School Graduates—If you graduated in the upper 75 per cent of your class and meet the necessary unit requirements, you are eligible for admission.

If you graduated in the upper 25 per cent of your class, you will be considered for admission without regard to your pattern of high school courses completed. However, if you plan to do work in agriculture or forestry, it is suggested that you complete minors in mathematics and science.

High school graduates entering programs in the areas listed below are requested to present 12 units in grades 10-12. Nine of these should be in English, social studies and history, mathematics, natural sciences, and foreign languages. Distribution of these units with respect to the major areas included in the college program should be as follows:

Agriculture—3 units in English, 1 unit in elementary algebra (plus 1 unit in plane geometry if the student enters in any program other than agricultural education, technical agriculture, or agricultural business administration), and 1 or more units in natural science or agriculture.

Forestry—3 units in English, 2 units in mathematics (elementary algebra and plane geometry), and 1 unit in natural science.

Home Economics—3 units in English. One unit in home economics may be included in the 9 basic units.

Pre-Veterinary Medicine—3 units in English, 2 units in mathematics (elementary algebra and plane geometry), and 1 or more units in natural science or agriculture. Students wishing to prepare for the School of Veterinary Medicine should apply for admis-

sion to the College of Agriculture, Forestry, and Home Economics.

Graduates of the Schools of Agriculture—Graduates of the School of Agriculture, St. Paul, will be considered on an individual basis. If you are a graduate of one of the other Schools of Agriculture and have completed the four-year program and three summers of supervised project work or the equivalent, and if you were in the upper 75 per cent of your class, you will be admitted to this College.

Adult Special Students—You may be admitted as a special student if you are a mature person (24 years of age or older) and wish to register for particular courses to meet special needs. Normally, an adult special student will not be in residence for an extended period of time, but only so long as is necessary to secure the information that is specifically desired.

Non-High School Graduates—Write to the Office of Admissions and Records for information about entering the University by examination. Also, see *Bulletin of General Information*, page 7.

Admission with Advanced Standing—Credits from other accredited colleges and universities and from other colleges of the University of Minnesota which are appropriate for a student's course of study can be transferred to the College of Agriculture, Forestry, and Home Economics. These will be evaluated by the Office of Admissions and Records and will be designated as either required or elective credit. A course that is applied toward required credit is considered the equivalent of a specific course required in a curriculum here. Experience has shown that transfer credits for courses taken in agriculture, forestry, and home economics are frequently not applicable to courses offered in the junior and senior years, i.e., to courses numbered 50 or over, in the College of Agriculture, Forestry, and Home Economics. Transfer credit in agriculture from non-land-grant institutions will be examined critically and in some cases examinations in the areas presented may be required. You will be expected to complete all required courses here and all area requirements regardless of the number of excess elective credits you may have.

Therefore it is important, in transferring to the College of Agriculture, Forestry, and Home Economics, to have planned your earlier programs carefully in order that your credits may apply with the greatest efficiency to the particular curriculum you desire to enter. If you are beginning your work in an institution other than the College of Agriculture, Forestry, and Home Economics, and plan to transfer at a later date, refer to Part II or Part III of this bulletin. There you will find descriptions of the curricula and a listing of the required courses for each. You should note especially the requirements for the freshman and sophomore years. Your college adviser will help you select courses that will meet specific curricular requirements, and if you need further help you may write directly to the Office of Admissions and Records, Institute of Agriculture, University of Minnesota, St. Paul 1.

Admission to Curricula with Special Scholarship Requirements—Certain curricula require higher scholastic aptitudes and achievement than others. Admission to the College does not mean, therefore, that you will necessarily be admitted to any curriculum you may select. When you first enter the University, whether you will be permitted to register in a curriculum having special scholarship requirements will depend upon your previous academic record and in part upon the battery of examinations taken at time of entrance. If you are denied admission to a curriculum at first, you can transfer to it later if your scholastic record justifies it. Continuance in the curriculum will depend upon your

maintaining the required scholastic average.

Transfer students may, upon entrance, be permitted to register in one of these special curricula, but continuance in it will depend upon the maintenance of the required scholastic average.

The special scholarship requirements are included in the information on curricula in Part II.

Examinations upon Entrance—If you are a new student you will be required to take a college aptitude examination provided you did not take it in high school. Other examinations given at entrance will test your aptitude and achievement in science, mathematics, and English. Your admission to the University will not depend upon the results of these examinations if you are otherwise qualified.

Exemption Examinations in Introductory Courses—The College of Agriculture, Forestry, and Home Economics desires to correlate the courses taught here, so far as possible, with the technical courses taught elsewhere. If you have previously taken considerable work in technical courses, it may be unnecessary for you to repeat all or even part of it. Satisfactory performance on exemption examinations in selected introductory courses will permit you to substitute elective credit for these courses. Students wishing to take exemption examinations or to secure more information concerning them should contact the College Office, 202 Coffey Hall.

For information about taking special examinations for credit, see page 21.

Registration and Class Attendance

Fees—For information about fees, see the *Bulletin of General Information*.

Registration—The Office of Admissions and Records announces the registration dates for each quarter. If you are accepted for admission, the dates for registering and detailed instructions will be included in the information that is sent to you. Students in residence are informed through the Official Daily Bulletin of the registration dates for each quarter. Faculty advisers will assist you in developing your quarterly program.

Courses Taken on the Minneapolis Campus—Students who are enrolled on the St. Paul Campus register for courses, both required and elective, on the Minneapolis Campus. The courses from other colleges of the University that are required in particular curricula in this College are listed in Part II. The many other courses that are available as electives are not listed.

For a complete listing and brief descriptions of courses on the Minneapolis Campus it will be necessary for you to consult the bulletin of the particular college offering the course. The bulletin

tins that will be of the most importance to you, depending upon your curriculum, will be the *Bulletin of the College of Science, Literature, and the Arts*, the *Bulletin of the Institute of Technology*, and the *Bulletin of the General College*. Your adviser will have a copy of these bulletins, and they will be available also at the Office of Admissions and Records and the Agriculture Library.

Quantity of Work—The normal load of work for each quarter is 14 to 18 credit hours. A credit hour requires on the average three hours each week. These may be distributed as follows: one hour of lecture or recitation requiring two hours of preparation; two laboratory periods requiring one hour of preparation; or three laboratory periods requiring no outside preparation. Student programs in the College of Agriculture, Forestry, and Home Economics may vary in load according to the student's ability or circumstance. To carry more than 18 hours of credit, you must have a C average (that is, a total honor point ratio of not less than 1.0). To carry more than 21 hours, you must have a B average in work of the previous quarter and must secure permission from the Committee on Student Scholastic Standing.

The programs of students in the School of Veterinary Medicine are outlined in advance. All students progress at a uniform rate.

Auditors—The approval of the Committee on Student Scholastic Standing, your adviser, and the instructor is necessary if you wish to register for a course as an auditor. An auditor must enroll officially for a course and must pay the same fee that is charged for regular membership in the class. He does not take the final examination and is not given a grade or credit for the course.

Changes in Registration—To change your registration, you must obtain cancel-add forms from the Office of Admissions and Records. Changes should be made only when necessary or highly desirable and they should be made as early as possible in a quarter.

During the first six weeks you may cancel a course without grade and with only your adviser's approval. After the sixth calendar week you are required to have the approval of your adviser, the instructor, and the Committee on Student Scholastic Standing. The instructor must indicate your grade at the time of cancellation. If the grade

is passing, you will be permitted to cancel with W on your report, or without grade. If it is failing, this is indicated by a grade of Z. A student who is doing failing work and discontinues attending class after the sixth week but does not officially cancel will also receive a grade of Z.

During the first week of the quarter you may add a course with the approval of your adviser only. After the first week you must have the approval of your adviser, the instructor, and the Committee on Student Scholastic Standing.

Cancellation of Entire Registration—If you leave college before the end of the quarter, you should cancel your registration at the time you discontinue attending class. Cancellation within the first six weeks entitles you to a refund proportional to the amount of time you attended class. If you do not attend classes at all, you are entitled to a full refund.

Class Attendance—On the St. Paul Campus attendance is compulsory for certain classes only, because of the nature of such classes. If you miss class for good reasons beyond your control, you have the privilege of requesting the instructor's assistance in making up the class work you miss. The instructor is under no obligation, however, to give assistance if you willfully or deliberately absent yourself from class, although there are situations in which he may properly wish to do so.

The following situations will be accepted by instructors as reasons that would justify absence from class and a request for assistance in making up work: (1) illness certified by the Health Service or by the family physician; (2) emergencies caused by a death or serious illness in the immediate family; (3) emergencies approved by the Committee on Student Scholastic Standing; and (4) participation in University-approved, noncurricular activities. (Certification that a student was absent from class because he was engaged in such activities will be made by the dean of students.)

If you wish to make up work, you should confer directly with the instructor in regard to the justification for your absence and the possibility and ways of making up the class work. The Committee on Student Scholastic Standing will enter into the situation only when special emergencies (item 3 above) are involved and as an appeal agency.

Evaluation of Work

Grades—If you do passing work in a course, you will be given one of four passing grades: A, B, C, or D. The grade of C indicates that your work was of average quality; B and A indicate higher levels of achievement; D denotes work of inferior quality. The grade F (failure) is given for work which in the opinion of the instructor does not deserve college credit.

The grade of I (incomplete) is a temporary grade indicating that you had a satisfactory record in work completed but, for reasons satisfactory to the instructor, did not complete the work of the course. If you are given this grade, you must complete the work during the first thirty days of your next quarter in residence. When this is not done, the I is changed to canceled without grade. Prior to the end of the thirty-day period an extension of time may be granted for the removal of the incomplete if this is recommended by the instructor and approved by the Committee on Student Scholastic Standing. Should you wish to reinstate an incomplete which has been changed to canceled without grade, you may do so by petition approved by your adviser, the instructor, and the Committee on Student Scholastic Standing. A fee of \$5 (in the

nature of a special examination) will be charged for such a reinstatement.

Four other letters may be used to report your performance in a course. The letter W reports cancellation without grade. The letter X signifies that work in a continuation course is satisfactory and that a grade will be assigned when the entire course is completed. The notation Y will be used: (1) if you do not attend class at all; (2) if you discontinue before the end of the sixth calendar week of classes but do not cancel; or (3) if you discontinue after the sixth calendar week but were not failing. The letter Z will be reported: (1) if you cancel after the sixth calendar week of classes with a failing grade, or (2) if you discontinue after the sixth week and are failing.

Honor Points—To measure quality of work, honor points are assigned to grades as follows: each credit of A, 3 points; each credit of B, 2 points; each credit of C, 1 point. The grades of D, F, and Z do not carry honor points. To compute your honor point ratio, add the total number of honor points earned and divide by the total number of credits passed plus credits of F and Z, plus credits of F and Z in courses that have been repeated. Disregard grades I and Y.

Student Personnel Services

Faculty Advisers—In choosing your curriculum from the many different offerings in this College, you will be assisted by a member of the faculty who will become your adviser. Your adviser will interpret the program to you, will guide you in program planning, and will be concerned with your general progress. When you have problems and need special attention, your adviser may refer you to other faculty members, to the College Office, or to a specialized personnel agency.

Committees on Student Scholastic Standing—Almost every student has occasion from time to time to make use of the Committee on Student Scholastic Standing in the College of Agriculture, Forestry, and Home Economics or in the School of Veterinary Medicine. This is a committee of the faculty which has authority to interpret and enforce faculty regulations.

It also has the power to make exceptions to regulations when they work to the educational disadvantage of a particular student, provided the basic spirit of the regulation is maintained. If you have any questions concerning the interpretation of faculty regulations, you should consult with your adviser or with the assistant dean for the college or the school who represents the respective Committee on Student Scholastic Standing. By means of petition, the forms for which are procured in the Office of Admissions and Records, you may request adjustments of your program where departure from normal procedures appears to be justified. These requests, after they have been approved by your adviser, are turned in to the College Office or the School Office.

Advanced Standing and Enrollment Committee—If you transfer from an-

other institution to the College of Agriculture, Forestry, and Home Economics, your transfer credits are evaluated in the Office of Admissions and Records. You should see the Admissions and Records supervisor if you have any questions about the use of transfer credits. If necessary, you will be referred to members of the Advanced Standing and Enrollment Committee which makes final decisions in evaluating transfer credits in terms of this College and the requirements of the various curricula.

Orientation Programs—The College of Agriculture, Forestry, and Home Economics and the School of Veterinary Medicine join with other divisions of the University in helping new students, whether freshmen or those with advanced standing, to get acquainted with one another and with the college program. Usually this involves two days of testing, counseling, and group activities.

College Placement Services—The College and School will offer some assistance in helping you secure a job upon graduation. Many departments are aware of opportunities, and you should ask their help. The college offices will bring to your attention such job opportunities as are known to them. Specialized placement services are available to students in agricultural education and home economics education.

All-University Personnel Services—The personnel agencies listed below are available to you at any time. You may consult them with or without referral from your faculty adviser.

For professional help on a personal problem or vocational choice, go to the Student

Counseling Bureau, 101 Eddy Hall, Minneapolis Campus, or to the representative on the St. Paul Campus, 215 Coffey Hall.

To learn about student activities, visit the Student Activities Bureau in the First Temporary South of Mines, Minneapolis Campus, or go to the St. Paul Campus branch office in 215 Coffey Hall. The director and the program consultant of the St. Paul Campus Union, and the Student Union program consultants in 229 Coffman Union, Minneapolis Campus, are good sources of information and assistance to students wishing to participate in University activities.

If you need financial help, apply at the Bureau of Student Loans and Scholarships, 201 Eddy Hall, Minneapolis Campus.

For help in finding a room or apartment, consult the Student Housing Bureau, 209 Eddy Hall, or the representative in 215 Coffey Hall, St. Paul Campus.

For a part-time job on or off campus, apply to the various heads of departments or to the Student Employment Office, 153 Temporary South of Folwell building, Minneapolis Campus.

For help in improving your reading or other study skills, consult the Rhetoric Department, 310 Agricultural Engineering building, St. Paul Campus, or the Educational Skills Clinic, 101 Eddy Hall, Minneapolis Campus.

For aid with speech difficulties, consult the Rhetoric Department, or the Speech and Hearing Clinic, 205 Shevlin Hall, Minneapolis Campus.

If you have any questions about veterans' benefits, go to 114 Administration building, Minneapolis Campus.

Foreign students should keep in contact with the Adviser for Foreign Students, 302 Eddy Hall, Minneapolis Campus.

For help with health problems, go to the Student Health Service on either the St. Paul or Minneapolis Campus.

The office of the Co-ordinator of Religious Activities is in 211 Eddy Hall, Minneapolis Campus.

Student Government

Student Council—The Student Council directs and co-ordinates student activities and encourages student leadership throughout the St. Paul Campus. Its membership is drawn from all major areas of the College and also from the School of Veterinary Medicine.

The council co-operates with the All-University Congress and the Senate Committee on Student Affairs. It brings questions from the student body to the administration of the College

and School and discusses and reaches decisions on matters of general interest.

Honor System—Under the provisions of the Student Self-Government Honor System, the students on the St. Paul Campus, rather than the faculty, conduct examinations and quizzes. The honor system is operated on the assumption that honesty prevails among a large majority of students. Students place themselves on their honor not to give or receive aid during examinations. The responsibility of honesty is

between student and student; the faculty does not place the student on his honor. Under the honor system the faculty permits students to conduct the examinations.

If you should observe dishonesty during an examination period, you may take some appropriate step at the time to halt the dishonest act, or may report the incident later to the Honor Case Commission. The Honor Case Commission, comprised of students from the various areas, considers confidentially the various aspects of the situations reported. If it is clear that scholastic dishonesty has occurred, the commission concerned recommends to the appropriate Committee on Student Scholastic Standing of the faculty an appropriate penalty to be levied on the offending student.

The honor system is essentially a preventive, rather than a punitive, system and provides for great freedom of

action on the part of students on this campus. New students are urged to discuss the honor system with students previously registered in the College and School. The membership of the Honor Case Commission is posted in the post office, Coffey Hall, together with a notice as to how members may be contacted for information or assistance.

Student-Faculty Intermediary Board

—When you have questions or encounter situations with respect to your class work which in your opinion need attention or clarification, you are urged to bring your problem to the attention of the Student-Faculty Intermediary Board. This is a joint committee of students and faculty who are interested in maintaining helpful relationships between members of the student body and the faculty. The membership of this board is also posted in the St. Paul Campus post office.

Student Activities

The St. Paul Campus offers you a varied program of activities from which you may choose those that suit your individual interests and needs.

Social life is centered largely in the St. Paul Campus Union. Many all-campus events are sponsored by the St. Paul Campus Union Board of Governors. This student board formulates policy for operation of the Union building and establishes its budget. The Union provides for a varied recreational program in which you are encouraged to participate.

Professional clubs and organizations will contribute to your knowledge of your special field and acquaint you with other students in your own and closely related fields.

Special interest groups enable you to improve in a skill or follow a hobby.

Punchinello, a dramatics organization, and the Toastmasters and Toastmistresses clubs, which give experience in public speaking, are typical of these organizations.

The churches near the campus have student programs with counselors or directors. The YMCA and YWCA on the Minneapolis Campus are interdenominational and open to all men and women on the campus. The Student Council of Religions helps to coordinate the efforts of the various religious organizations on the campus.

St. Paul Campus students are entitled to use the facilities of the Coffman Memorial Union on the Minneapolis Campus. They participate in such activities on the Minneapolis Campus as they choose and of course take part in all-University activities.

Student Housing

Housing—A limited number of women students are accommodated in Brewster Hall Dormitory, St. Paul Campus. First priority is given to freshmen, then to sophomores and transfer students. A limited number of men students are accommodated at the Dining Hall Dormitory. Inquiries

about these dormitories should be directed to 205 Coffey Hall, Institute of Agriculture, University of Minnesota, St. Paul 1.

Rooming and boarding accommodations in approved houses are available near the campus. For information, write to the Student Housing Bureau,

215 Coffey Hall, Institute of Agriculture, University of Minnesota, St. Paul 1.

Students from the St. Paul Campus may also apply for accommodations in the dormitories and co-operative houses

on the Minneapolis Campus. For information about housing facilities there, see the *Bulletin of General Information* and write to the Student Housing Bureau, 204 Eddy Hall, University of Minnesota, Minneapolis 14.

Scholarships and Awards

Certain scholarships are available to students entering as freshmen in the College of Agriculture, Forestry, and Home Economics. Information concerning these scholarships is sent to all Minnesota high schools in January of each year. Further information may be obtained from the assistant dean for the College of Agriculture, Forestry, and Home Economics, St. Paul Campus, University of Minnesota, St. Paul 1.

Students entering as freshmen in the College of Agriculture, Forestry, and Home Economics may apply for the All-University Freshman Scholarships as well. Students should consult with their high school principals concerning these scholarships, or write to the Director, Bureau of Student Loans and Scholarships, University of Minnesota, Minneapolis 14.

Other scholarships or awards are distributed periodically to students in residence on the basis of specified criteria. The scholarships and awards specific to students in the College of Agriculture, Forestry, and Home Economics and the School of Veterinary Medicine are described below.

Agricultural Faculty Women's Club Scholarships—Awarded to juniors or seniors in home economics on basis of character, scholarship, achievement, and financial need. Number and size of scholarships depend on funds and candidates available.

Alpha Zeta Scholarship—Annual scholarship of \$300 to male student on basis of scholarship, character, leadership, and promise of future service in agriculture or forestry. Recipient must have completed three quarters of work in this College and preferably not more than six.

Alpha Zeta Traveling Scholarship—Annual gift of \$150 to assist students of high scholarship and strong professional interests to attend a meeting of an appropriate professional, scientific, or technical society or association. Candidates must be upperclassmen and are nominated by heads of departments. Awards are from \$25 to \$100.

Borden Agricultural Scholarship Award—Annual award of \$300 to student entering his senior year in agriculture who has achieved the highest average grade of all similarly classified students in agriculture in all preceding college work. Recipient must have

included in his curriculum two or more dairy subjects.

Borden Home Economics Scholarship Award—Similar award for senior student in home economics. The recipient must have included in her curriculum two or more courses in food and nutrition.

Mary L. Bull Scholarship—A fund of \$500 established by the Alpha Alumnae Chapter of Phi Upsilon Omicron, the interest to be used for special grants or scholarships to needy and worthy students enrolled in the courses in home economics.

Burpee Award in Horticulture—Annual award of \$100 to student, preferably a junior, in the regular four-year course in agriculture with a major in horticulture or its related fields. Award based on scholastic ability, practical experience, interest in flower and vegetable growing, promise of leadership, and character.

Caleb Dorr Scholarships and Medals—Awarded to students for the highest scholastic records, one for men and one for women, in each class: freshman, \$50; sophomore, \$100; junior, \$100; senior, gold medals.

Caleb Dorr Special Scholarships and Prizes—Books, pictures, and other suitable awards are presented to students who have had two or more quarters of work in the College and who have an honor point ratio of 2.5 or better.

Dean E. M. Freeman Scholarship Fund—Gift of the Alumni Association of the College, the income to be used for special achievement scholarships of not less than \$25 each to students who have made commendable progress in scholarship or student leadership and a significant achievement in self-support in the face of unusual financial or other obstacles.

Fribourg Foundation Scholarships—Two scholarships of \$500 each established by the Fribourg Foundation, Inc., New York, open to juniors and seniors in the College of Agriculture, Forestry, and Home Economics and in other colleges of the University pursuing study in areas pertinent to the marketing, distribution, or processing of grain.

Samuel B. Green Scholarship Medal—Awarded each year to the student in forestry having the best scholastic record at the end of the fall quarter of the senior year.

Home Economics Association Scholarship—Contribution of \$50 each year for a scholarship to a student member of the Home Economics Association to be awarded on the following basis: spirit of service, financial

need, professional attitude, character, honor point ratio of 1.5 or above, and ideals and standards consistent with those set up by the School of Home Economics.

Homelite Forestry Scholarship—Gift of \$500 from the Homelite Corporation, Port Chester, New York, for two scholarships of \$250 each to be awarded to a junior or senior in the School of Forestry on basis of academic achievement, leadership, vocational promise, character, and financial need.

Hoo Hoo Immortals Memorial Scholarship—Contribution from the Twin Cities Hoo Hoo Club No. 12 for an annual \$100 scholarship to be awarded to a junior in forestry on the basis of character, leadership, scholarship, and need. The cash award is accompanied by a scroll to memorialize the names of the Hoo Hoo Immortals in whose honor the scholarship was established.

Oscar L. Mather Award—Interest from memorial fund is used to purchase a book each year to be awarded to the student in forestry displaying outstanding scholarship, leadership, and character.

Minneapolis Gas Company Service Scholarship—Gift of \$500 annually for a service scholarship to aid a qualified third-quarter sophomore or junior in foods and business in home economics. Recipient must express willingness to consider employment later in the Home Service Department of the company for six months at a mutually agreed upon salary.

Minnesota Dairy Industry Scholarships—A number of \$300 annual scholarships established by various dairy processing companies interested in encouraging capable young men and women to prepare themselves for careers in the dairy industry. Open to entering freshmen and qualified undergraduates in the dairy industry curriculum. Awards based on academic and professional aptitude, character, and financial need.

Minnesota Garden Flower Society Scholarship in Memory of Roger S. Mackintosh—Gift of \$100 annually as an aid to a qualified student in the regular four-year course in agriculture with a major or minor in horticulture, preferably floriculture. Award based on scholastic ability, interest in floriculture, promise of leadership, and character.

F. H. Peavey and Company, Van Dusen-Harrington Company Undergraduate Scholarship—Annual \$300 scholarship to aid a junior or senior qualified as follows: be a graduate of a Minnesota high school; be a College major in agronomy, plant pathology, or soils; must have demonstrated a continuing interest in cereal crops in Minnesota; and must have a satisfactory College record; and must be in need of financial aid to complete his college education.

Phi Upsilon Omicron Alumnae Scholarship—A \$100 scholarship annually from the Twin City Chapter to a student in home economics, preferably a freshman or sophomore. Awarded on basis of scholarship, personality, and public service.

Ralston Purina Scholarship—Annual award of \$500 to a student in this College who will

be an incoming senior in the fall quarter and who is majoring in a field closely associated with the feed industry. Award based on scholarship, leadership, character, good citizenship record, purpose, and financial need.

Richards Treat, Inc., Scholarship—Gift of \$250 for a scholarship to be awarded to a worthy student in home economics, on basis of scholarship and need, preferably someone interested in institution management.

Henry Schmitz Student Leadership Fund—Establishment through funds contributed by alumni of the School of Forestry of an annual \$100 award to be given to a junior or senior in the School of Forestry who has demonstrated outstanding leadership, who possesses above-average scholarship qualifications, and who has been active in College of Agriculture, Forestry, and Home Economics activities as well as in those in the School of Forestry.

Sears Roebuck Foundation Agricultural Scholarships—(1) *Freshman Scholarships*: \$200 each to Minnesota farm boys who enroll as beginning freshmen in the agricultural course in this College. Basis of the award: promise of success in college, leadership, and financial need. (2) *Sophomore Scholarship*: \$250 to the outstanding student in the group of Sears Roebuck freshman scholars of the previous year. (3) *Junior Scholarship*: A sophomore selected from the Sears Roebuck freshman scholars of the previous year will compete at the end of his sophomore year with candidates from other agricultural colleges of the United States for a junior scholarship.

Sears Roebuck Foundation Home Economics Freshman Scholarships—Gift of \$600 yearly to provide three scholarships of \$200 each for rural girls in home economics. Basis of the award shall be need, scholastic aptitude, potentialities for leadership, and an expressed interest in home economics as a career, particularly in home economics education or home demonstration work.

Smith-Douglass Company, Incorporated, Scholarships—Two annual awards of \$1,000 each for the years 1955-56, 1956-57, and 1957-58, open to entering freshmen in agriculture with special emphasis on students interested in the Department of Soils. Awards based on academic aptitude, vocational promise, personal attributes, leadership, and financial need. Each recipient will receive \$400 during his freshman year and \$200 in each of his sophomore, junior, and senior years. For a scholarship recipient to remain eligible beyond the first year, his scholastic record must be in the upper one-third of the students in his class in agriculture.

VanDale Farm Machines Scholarship—Annual scholarship of \$250 to aid a worthy farm boy entering upon a college program in agriculture. Recipient is selected from applicants (Minnesota high school seniors or equivalent at the time of application) on the basis of (1) excellence of an original essay of 1,000 words or less on the general subject of barn mechanization, (2) high school or other preparatory school scholastic record, (3) demonstrated qualities of leadership and evi-

dence of participation in school and community affairs.

Florence Munson Wilson Fund—A trust fund has been established as a memorial to Mrs. Wilson by her husband, H. K. Wilson, formerly a professor of agronomy on this campus. The income is used to provide annual scholarships for men and women pursuing work in this College who have demonstrated a high quality of scholarship, personal character and integrity, and exceptional promise in his or her chosen field.

Minnesota State Veterinary Medical Society Award—An annual award of \$25 to the outstanding senior student in clinical veterinary medicine in the School of Veterinary Medicine.

Women's Auxiliary to the American Veterinary Medical Association Award—An

award of \$25 annually to the outstanding senior in the School of Veterinary Medicine on the basis of leadership, scholarship, and personal qualifications.

Women's Auxiliary to the Minnesota State Veterinary Medical Society Award—An annual award of \$25 to a junior in the School of Veterinary Medicine on the basis of scholastic standing and financial need.

XI Sigma Pi Freshman Scholarship Recognition—The freshman in forestry with the highest scholastic rating has his name engraved on a permanent honor plaque in the School of Forestry office.

All-University Scholarships—A number of scholarships open to all students of the University are administered by the Bureau of Student Loans and Scholarships, Minneapolis Campus.

Other Awards

Caleb Dorr Special Achievement Awards—Extempore Speaking Contest, prizes of \$15, \$10, and \$5.

Dean E. M. Freeman Medal for Student Leadership—Award of a bronze medal to that senior student who has made the greatest contribution to student life during his or her period of residence on the campus.

Charles Lathrop Paek Prizes in Forestry—Prizes of \$30, \$20, and \$10 each year to regularly enrolled undergraduate forestry students writing the best essays of a popular nature on forestry.

Ruedlinger Memorial Fund—Contribution from the Twin City Nurserymen's Association, the income to be used for a prize to the undergraduate presenting the best paper on some horticultural subject.

A. D. Wilson Prize—Income from memorial funds used for prizes in essay competition open to all regularly enrolled students on subjects usually in the field of agricultural co-operation.

Collegiate Crops Judging Team Fund—Contribution of \$1,000 from the F. H. Peavey and Company Agricultural Department, Minneapolis, for the purpose of supporting the

Collegiate Crops Judging Team on its annual trip.

Minnesota Dairy Technology Society—Contribution of \$565 from the Minnesota Dairy Technology Society for use by the Department of Dairy Husbandry in financing the expenses of student judging teams (dairy cattle and dairy products) when competing in national contests.

Flower Judging Team Fund—Contributions from interested organizations, such as florist associations, to help defray expenses of the Flower Judging Team in competitive judging contests.

Vegetable Judging Team Fund—Contributions from interested organizations, such as seed companies, to help defray expenses of the Vegetable Judging Team in competitive judging contests.

O. A. Storvick Memorial Fund—Fund of \$2,000 from the National Creamery Butter-makers Association, the income and a stipulated fraction of the principal to be used: (1) for the presentation of medals to members of the Dairy Products Judging Team, and (2) for paying not to exceed one-half the expense of sending a Dairy Products Judging Team to the Annual Dairy Products Judging Contest.

Student Loans

The Bureau of Student Loans and Scholarships, 201 Eddy Hall, Minneapolis Campus, administers loan funds that have been set up to help students who are making normal progress

toward an educational objective. Usually a student must have finished two quarters at the University before a loan will be granted, but emergency needs get special consideration.

Reserve Officers Training Corps

The University of Minnesota is a land-grant institution which offers instruction in military science and tactics in accordance with the provisions of the Morrill Act of 1862. Through co-operation with the Army, Navy, and Air Force, it is possible for men students to qualify for a commission as a reserve officer at the same time that they complete their technical and professional training. Other students who may not wish to complete one of the training programs may register for part of the training and earn elective credits.

If you are a citizen of the United States and physically qualified, you should investigate thoroughly the opportunities that are offered in these programs. All of the programs comprise a four-year course of instruction and some summer training. If you are a veteran, you may be given credit in the Army and Air program for all or part of the first two years of basic instruction. If you are a nonveteran, you should register for a program as early as possible in your freshman year so that you will have time to complete it before you graduate.

Elective credit is given for all of the courses in the training programs. During the first two years of the Army and Air programs 1 credit per quarter is given for three class hours of instruction a week; in the last two years 3 credits are given for five class hours. In the Naval Science program 3 credits per quarter are given for three class hours each week during the four years.

In the Army and Air programs you are furnished with uniforms and text-

books. If you are accepted for advanced training, you will be given a monthly monetary allowance and will be paid for summer training in addition.

The Naval Science program provides for two kinds of students, Regular and Contract. Regular students are selected on the basis of nationwide competitive examinations. The Navy provides tuition, fees, textbooks, uniforms, and a \$600-a-year living allowance. If you are selected for this program, you are expected to complete it and, when you graduate, to accept a commission as ensign in the USN or second lieutenant in the USMC. You will also be required to serve on active duty for three years unless released earlier.

Contract students are civilians who enter into a contract with the Navy. If you wish to enter this program, you must make a formal application for admission into it. If accepted, you will be provided with uniforms and textbooks during the first two years; during your junior and senior years you will be paid a subsistence allowance. Upon completing the program, you will be granted a commission as ensign in the USNR or as second lieutenant in the USMCR. If you desire, you may apply for a commission in the regular Navy or Marine Corps.

For more detailed information about these programs, you should consult the *Bulletin of the Army-Navy-Air ROTC*. Also you may make inquiries personally or by letter at the following offices in the University Armory: Military Science and Tactics, Room 106; Naval Science, Room 203; Air Science, Room 5.

Part II. College of Agriculture, Forestry, and Home Economics

The College of Agriculture, Forestry, and Home Economics offers professional training leading to a wide variety of occupational outlets in the areas of agriculture, forestry, home economics, and related fields. Preprofessional preparation for veterinary medicine is also secured in the College program.

In this section of the bulletin you will find information relating to the total college program, followed in order by the various curricula in agriculture, forestry, and home economics, and the description of course offerings in each area.

DEGREES OFFERED AND GRADUATION REQUIREMENTS

Degrees Offered—This College offers two groups of curricula with degrees granted as follows: (1) Four-year and five-year curricula leading to the degree of bachelor of science or other Bachelor's degree. (2) Fifth-year curricula leading to the professional Master's degree in agricultural education and home economics education.

Requirements for Bachelor's Degrees in Agriculture, Forestry, and Home Economics—Candidates will be recommended for graduation after completing the following requirements: (1) The prescribed curriculum, including required and elective credits to make the total number of credits given in the following table. (2) An average of 1 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—i.e., Rhet. 51, Exposition, or passing the exemption examination (see page 21). (4) A total of not less than 18 credits in social science courses (see page 21). (5) The residence and other general University requirements for graduation (see *Bulletin of General Information*).

Students who are in certain of the combined curricula administered in other colleges need not complete numbers 3 and 4 stated in the preceding paragraph. These combined curricula are as follows: (1) agricultural engineering (professional five-year course); (2) agricultural engineering-business administration (five-year course); (3) agricultural journalism; and (4) journalism

with home economics major. Also, students in these curricula are not permitted to use excess honor points for credits. Requirements for these degrees will be found in the bulletins of the colleges in which the curriculums are administered.

Summary of Credit Requirements—(See Tables 1 and 2.)

Graduation with Honors—Undergraduate degrees may be awarded "with distinction" or "with high distinction." If you should fail to meet in full the requirements stated below, your case will be referred to the Committee on Student Scholastic Standing for individual consideration.

The degree is granted "with distinction" if you attain a minimum honor point average of 2.0 for the entire curriculum. If you are a transfer student with less than two years of work in this College you will not be eligible for graduation with distinction. However, if you complete one-half the number of credits required for graduation in any curriculum, you will satisfy the two-year residence requirements. Recommendations to the faculty for the degree with distinction are made through the Committee on Student Scholastic Standing on the basis of scholarship and other evidence of satisfactory achievement and advancement in the course pursued.

Your degree will be granted "with high distinction" if you attain a minimum honor point average of 2.5 for the entire curriculum. The same conditions for residence and recommendation apply as for the degree with distinction.

If you are completing the curriculum in agricultural education or home eco-

Table 1. Requirements for Bachelor's Degrees

<i>Course of Study</i>	<i>Credit Requirement</i>	<i>Degree Conferred</i>
Agricultural Business Administration	192	Bachelor of Agricultural Business Administration
Agricultural Education	204	Bachelor of Science
Agricultural Engineering (professional five-year course)	250	Bachelor of Agricultural Engineering
Agricultural Engineering—Business Administration	250	Bachelor of Agricultural Engineering and Bachelor of Business Administration
Agricultural Journalism	180	Bachelor of Arts
Dairy Industry	198	Bachelor of Science
Fishery and Wildlife Management	198	Bachelor of Science
Food Technology	204	Bachelor of Science
Forestry	204	Bachelor of Science
Home Economics	185	Bachelor of Science
Journalism—Home Economics (major)	180	Bachelor of Arts
Landscaping	192	Bachelor of Science
Science Specialization	192	Bachelor of Science
Technical Agriculture	192	Bachelor of Science

Table 2. Requirements for Professional Advanced Degrees

<i>Course of Study</i>	<i>Four-year Credit Requirement</i>	<i>Fifth-year Credit Requirement</i>	<i>Degree Conferred</i>
	<i>(B.S. degree)</i>		
Agricultural Education	204	45	Master of Education
Home Economics Education	185	45	Master of Education

nomics education, you will be checked for your standing in student teaching as well as for the requirements stated above.

SCHOLARSHIP REQUIREMENTS

Satisfactory Progress—As a student in this College you are expected to make satisfactory progress in the curriculum you have selected. This is interpreted to mean a C average. The cases of students who are not reaching this standard are considered by the Committee on Student Scholastic Standing. It is always best for a student to see his class instructor or his faculty adviser as soon as he feels himself in difficulty rather than to wait until he has already received a poor grade.

In some curricula, as indicated in the curricular descriptions following, a higher honor point average is required.

Scholastic Probation—If a student's scholastic work should be considerably below a satisfactory level of performance, he will be placed on probation and his program or work will be re-

stricted as seems advisable to the Committee on Student Scholastic Standing.

A student will be placed on probation if, at the end of three quarters of work or earlier, he has not attained an honor point average of .75. At the end of six quarters or earlier he will be placed on probation if he has not attained an honor point average of 0.9.

Exclusion from College—Students may be excluded from the College under one of the following headings:

(1) *Dropped for low scholarship*—When it becomes apparent that a student's work is of a quality that will not lead to graduation, he will be dropped and usually will not be permitted to apply for readmission until nine months later.

A freshman is dropped when his honor point ratio is less than 0.5 after two or three quarters of work in this college. A sophomore is dropped if his average is less than .75 after six quarters (or five quarters if he began his freshman work in the winter or spring quarter). When the factors which contributed to the unsatisfactory work have been removed or satisfactorily corrected, a student may petition for

permission to return. Otherwise, he is encouraged to make other plans.

(2) *Hold for committee clearance*—Sometimes a student's scholastic difficulty indicates that he should not continue for the time being even though the record hardly requires official drop action. In such case his later return must be approved by the Committee on Student Scholastic Standing.

(3) *Discontinued*—If a student is pursuing an appropriate course but is handicapped by conditions he cannot control (ill health, necessary outside work, etc.) he may be required to discontinue his registration until these conditions have improved. When discontinuance takes place at any time other than the end of the quarter, the courses for which he is registered may be recorded as canceled without grade.

Readmission—If a student is dropped, he may not return without the permission of the Committee on Student Scholastic Standing. Credits earned at other institutions during the period of suspension will not apply toward graduation from this College unless permission to earn such credits was given in advance by the Committee on Student Scholastic Standing. If he is permitted to return, he will be placed on probation and may be dropped again at any time when his work is unsatisfactory.

CLASSIFICATION OF STUDENTS

Sophomore—If you are within 18 credits of the number usually earned in your curriculum for the first year and if you have completed three quarters of college work, you will be classified as a sophomore. The three quarters may include time spent at another institution of collegiate rank. A sophomore who lacks 12 credits of being a junior and who has a B average may be permitted to register for courses in the 100 group. Students who have not attained junior classification and who are below a C average will not be permitted to register for courses numbered 100 or above for which graduate credit is given.

Junior—A total of 90 credits with an honor point average of at least 1.0 and completion of the rhetoric communications requirement is required for junior classification.

Senior—To be classified as a senior, you must not be more than 9 credits short of the number required for the first three years in your curriculum.

Transfer Students—If you transfer from a college outside the University and enter this College as a junior, you should have an honor point average of not less than 1.0 at the end of your first year. If you do not have this average, you will be classified as a sophomore.

SPECIAL REQUIREMENTS AND EXEMPTIONS

Orientation—During your first quarter on this campus you are required to attend orientation lectures, unless you are a transfer with a year or more of work in another college.

Communications—If you are a beginning student or a transfer with less than 9 hours of credit in Freshman English (or Communications) from another college, you are required during the first week of the quarter to take tests of your proficiency in the four communication skills of listening, reading, speaking, and writing. Your assignment to a communications course and possible exemption from some of the freshman work will depend upon the results of these tests. Information as to the time and place for the tests will be included in the instructions you receive when you register, and inquiries can also be made in the Department of Rhetoric, 309 Agricultural Engineering building. It is important to report promptly for all of these tests so that you can be programmed for a specific course by the second week of the quarter.

You will be permitted to earn 9 hours of credit for work in communications and will be given no credit for additional necessary hours spent in the program to bring yourself up to the required levels of proficiency.

Mathematics Requirement—In curricula where only 5 credits of mathematics are required (i.e., technical agriculture and agricultural education), you may meet the requirement by presenting one full year of high school credit in advanced algebra or by completing one of the following courses: Math. 1, Higher Algebra (5 cred.); or Ag.En. 11, Applied Mathematics (5 cred.). If you present only one-half year of high school credit in advanced algebra, you must complete 5 credits in college. Math. 1 is open for credit to any student offering not more than one-half year of high school higher algebra for entrance and to other students who obtain permission

from the Department of Mathematics.

In a curriculum requiring mathematics through trigonometry, you will be permitted to register for trigonometry if you present either one-half or one full year of high school credit in advanced algebra but not in trigonometry. If you present for admission both advanced algebra and trigonometry, with a grade of B or better in trigonometry, you will not be required to take higher algebra and trigonometry, but may repeat trigonometry for credit if you wish. If you received a grade of less than B in high school trigonometry, you must register for the course.

Pub.H. 3. Personal Health—Men students on this campus are required to take Pub.H. 3 or pass the exemption examination. This examination must be taken, however, during your first quarter in college. The date on which it is given is published each quarter in the *Official Daily Bulletin*.

The public health courses required of women students in home economics vary somewhat with the different curricula and are listed there. Women registered in curricula in agriculture and forestry which include Pub.H. 3 must meet the requirement as stated in the preceding paragraph.

Social Science Requirement—For graduation from this College you must complete a total of not less than 18 credits in social science courses. These credits include those specifically required in your curriculum. Courses must be selected from at least three of the following departments: Agricultural Economics, Anthropology, Economics, Geography, History, Humanities, Philosophy, Political Science, Psychology, Social Science (under General Studies, S.L.A.), and Sociology. Other courses approved by the Curriculum Committee may also be used to meet this requirement. Technical courses such as accounting or statistics, psychology of learning, and physical geography may not be applied toward this requirement.

Rhet. 51. Exposition—Before you graduate from this College you must demonstrate proficiency in written composition. Most students satisfy this requirement by taking Rhet. 51 during their junior or senior year. If your Freshman English (or Communications) was above average, however, you may take an exemption examination which is given once a quarter at a time specified by the Department of Rhetoric. A course in advanced com-

position taken in some other college cannot be used to satisfy this requirement.

Physical Education—Men students on this campus are not required to take courses in physical education. Students registered in home economics are required to take a total of 3 credits in physical education. A woman student registered in agriculture (including preveterinary medicine) or forestry need not meet this requirement.

Credit Without Class Attendance—If you wish to secure full credit for a course for which you have adequate training and preparation, you may apply for permission to take a *special examination*. It may be taken during the first six weeks of residence without fee; after that time a fee of \$5 is required.

You may register for a course as a *reading course* (individual work) during the quarter in which the course is regularly offered, with the approval of your adviser, the instructor in the course, and the Committee on Student Scholastic Standing, under the following conditions:

1. When a course normally offered is canceled because of inadequate registration.
2. When, because of conflicts, the student finds it impossible to schedule the course at the time it is offered.

It is assumed that you will complete the work of the course during the quarter in which you are registered for it and take the final examination at the regularly scheduled time.

Quality Credits—The number of free elective credits required for graduation may be decreased by one for each 5 honor points in excess of those required to reach an average of 1.7. Free electives are those you may choose without regard to curricular or all-College requirements. Not more than one-twelfth of the total number of credits required for graduation may be gained through excess honor points.

JUNIOR-SENIOR PROGRAM

Specialization—In your sophomore year, after you have completed the equivalent of five quarters of residence, you are required to submit to the Office of Admissions and Records a specialization card which has been approved and signed by your adviser. On this card you indicate your choice

of a major and minor group or one of the outlined curricula. If this specialization card is not filed at the designated time, your registration may be withheld.

A *major* is a series of courses totaling from 24 to 36 credits chosen from one of the specializations offered. A *minor* is a series totaling at least 18 credits (12 in the science specialization curriculum) chosen also from one of the available groups. Major and minor sequences cannot include courses which are specifically required in a curriculum.

The major or minor sequences or the outlined curriculum, as indicated on your specialization card, becomes your curriculum required for graduation. Copies of the approved curriculum are sent to you, to your adviser, and to the Committee on Student Scholastic Standing. In case the major is changed to a different field of work, a new adviser must be selected and your major and minor series re-outlined.

Electives—You should consult with your adviser as to your choice of electives.

You may omit elective courses with grades of D from the courses offered for graduation if this is approved by the Committee on Student Scholastic Standing.

A maximum of 9 credits in music may be used as elective credits toward graduation, with not more than 6 of these in Mu. 43, 44, 45, or in Concert Band.

Not more than 9 credits in physical education may be counted toward graduation in curricula other than home economics.

Credit in the Graduate School—Credits for advanced courses earned while you are an undergraduate, even though in excess of those required for the baccalaureate degree, can be transferred to the Graduate School only under the following conditions: (1) If you lack not more than 9 credits of undergraduate work, taking into account required and sequence courses, you may carry a limited amount of graduate work (approved courses numbered above 99) for graduate credit, such courses not to be applied toward an undergraduate degree. The conditions as stated apply to the beginning of the quarter in which you are taking the courses for graduate credit. The transfer of credit must be arranged by petition to the Graduate School. (2) If you lack not more than 6 credits for graduation, taking into account required and sequence courses, you may register in the Graduate School.

Curricula

This section of the bulletin describes the curricula offered in this College, lists required courses, and gives information about electives. Description of all courses offered by the College follow the curriculum outlines.

CURRICULA IN THE COLLEGE OF AGRICULTURE

The curricula in agriculture provide collegiate training for a great variety of technical and professional positions. The requirements for each curriculum, the vocational possibilities offered by each, and the course of study are described in the material given below. The curricula are as follows: I. Technical Agriculture; II. Agricultural Education; III. Agricultural Business Administration; IV. Agricultural Journalism; V. Agricultural Engineering; VI. Agricultural Engineering Business Administration; VII. Dairy Industry; VIII. Fishery and Wildlife Management; IX. Food Technology; X. Landscaping; XI. Science Specialization; XII. Pre-veterinary Medicine.

I. Technical Agriculture) 12 class roman

The technical agriculture curriculum offers general preparation leading to a variety of possible specializations. Normally more students are enrolled in this curriculum than in any of the other curricula in agriculture.

Students entering technical agriculture spend most of their first two years securing the background of information in science and agriculture and the skills in communication that are needed for advanced study.

After two years, though sometimes earlier, the student chooses a field in agriculture with which he wishes to become particularly well acquainted. He calls this field his major, and plans to earn at least 24 credits in courses specific to the major field or in very closely related courses. Normally a major field of specialization will be concentrated within one subject matter department. He also selects a minor field, which is usually related to the major or supplementary to it, and plans to earn at least 18 credits in this field. The greater part of his last two years is spent in completing the requirements for his major and minor specializations within the technical agriculture curriculum.

A complete listing of the areas from which the student in technical agriculture may choose his major and minor fields is given on page 25. When a freshman entering the College knows the area in which he wishes to specialize at a future date, he may choose his faculty adviser from the faculty in the department concerned.

Vocational Opportunities—The vocational opportunities for graduates from this curriculum are too varied to permit listing. They may differ from one area of specialization to another. 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. If a student wishes to enter graduate study or work in a highly specialized field, he may wish to consider other curricula in agriculture and should discuss his plans with the department concerned.

Among the vocations for which technical agriculture offers training are the following:

1. General farming and many kinds of specialized farming.

2. Industrial and commercial enterprises dealing with agricultural products such as creameries, meat packing plants, flour mills, canneries, feed products enterprises, and seed and plant nurseries.

3. Industrial and commercial enterprises dealing with products sold chiefly on farms, such as agricultural machinery, dairy and creamery supplies, feeds, insecticides, herbicides, and seeds.

4. Business concerns that deal largely with rural people, such as co-operatives, banks, insurance companies, marketing organizations, and railroads.

5. A great variety of federal, state, and other governmental agencies and bureaus, such as soil conservation, agricultural adjustment, inspection services, and extension programs.

6. A considerable variety of special jobs such as park and golf course supervisors, technicians in the manufacture and distribution of farm products, control of insect and plant pests, and seed production and improvement.

These are illustrative of the opportunities. Students interested in preparing to teach agriculture in the high schools should enroll in the agricultural education curricula. The pretheological major in agriculture prepares for rural church work. Students interested in rural education are referred to the *Bulletin of the College of Education*.

Students in technical agriculture anticipating employment in agricultural extension are urged to discuss the development of their program with a member of the extension staff, as well as with their faculty adviser. This contact should be established prior to or at the beginning of the senior year, since extension activity may suggest completion of special area requirements not usually included in technical agriculture programs.

Farm Experience—All students in technical agriculture should have at least six months' practical experience on a farm. When possible, this should be secured before a student enters the college program. If the farm experience of an entering student is not satisfactory, he will be required to obtain farm experience during his college

course. Students who major in dairy husbandry must have at least three of the six months of approved farm experience on an accredited dairy farm or in a well organized dairy manufacturing plant. Students in horticulture should obtain this experience by working in commercial enterprises in the field of their specialization.

GENERAL REQUIREMENTS

To graduate in technical agriculture the student must complete the all-college requirements for students in this college including the social science requirement of 18 credits. (See page 21.) In addition, the farm experience requirement must be satisfied, and 192 credit hours must be earned.

COURSE REQUIREMENTS

The courses listed below as required are considered fundamental and necessary to any training in technical agriculture and should, if possible, be completed before the end of the sophomore year. Some modification in the requirements may be permitted when the student has a definite objective for which substitutes for certain required courses appear desirable. To secure approval for substitutions, the student submits a petition to the Committee on Student Scholastic Standing accompanied by a recommendation from his adviser requesting the change.

If any of these courses are not completed in the first two years, they must be given precedence over other courses in the junior year. A student should plan his program well in advance so that time conflicts between courses will be eliminated. Since some courses are offered only one quarter each year, careful planning is necessary. In addition to the requirements listed, the student may be scheduled for the programs offered in the Army, Navy, or Air ROTC.

REQUIRED COURSES

Students may wish to take exemption examinations or special examinations for credit in certain of the following listed required courses. (See page 21.)

FRESHMAN YEAR

Agro.1—Introduction to Agronomy (3)
An.Hu.1—Livestock Production (4) (students who expect to major in a special horticultural field may substitute elective credit approved by the head of the Department of Horticulture)

Bot.1-2—General Botany (6)

Dy.Hu.1—Elements of Dairying (3) (students who expect to major in a special horticultural field may substitute elective credit approved by the head of the Department of Horticulture)

Hort.1—General Horticulture (3) or Hort.6—Fruit Growing (3) or Hort.32—Vegetable Growing (3)

In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)

Math.1—Higher Algebra (5) or Ag.En.11—Applied Mathematics (5) (see math. req., page 20; credit permitted for only one of these courses)

Orie.1—College Orientation Lectures (1)
Pub.H.3—Personal Health (2) (see page 21)
Rhetoric, Communications requirement

SOPHOMORE YEAR

1. Freshman courses not completed

2. The following courses may be taken any quarter they are offered except that the proper sequence of continuation courses and prerequisites must be observed:

Ag.Bi.1—Introduction to Organic Chemistry (5)

Ag.Bi.3—Introduction to Biochemistry (3)

Ag.Bi.5—Plant Biochemistry (3) or Ag.Bi.6—Animal Biochemistry (3)

Ag.Ec.1-2—Principles of Economics I and II (8)

Agricultural Engineering, 3 cred. selected from the following: 3—Mechanical Drawing (3); 6—Farm Buildings (3); 12—Agricultural Machinery (3); 13—Gas Engines and Tractors (3); 31—Mechanics of Drainage and Erosion Control (3); 67—Rural Sanitation and Water Supply (3)

Ag.En.23—General Physics (5) (students with a year of high school physics may omit this course)

Bact.53—General Bacteriology (5)

Ent.5—Economic Entomology (5)

For.10—Farm Forestry (3)

Soil.2—Soils (4)

Zool.14-15—General Zoology (6)

JUNIOR-SENIOR YEARS

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

Rhet.22—Public Speaking (3)

Rhetoric, 3 cred. selected from the following: 12—Discussion Methods (3); 54—Advanced Public Speaking (3); 31—Poetry and Drama (3); 32—Novel and Short Story (3); 33—American Life in American Literature (3); 60—Contemporary Life and Literature (3)

Rhet.51—Exposition (3) (cannot be taken earlier than the junior year)

ADDITIONAL REQUIREMENTS

In addition to the general and specific requirements listed previously,

students will complete a major, a minor, and 18 credit hours of limited electives.

A major consists of from 24 to 36 credit hours, to be selected from one of the groups or subgroups listed below.

A minor consists of a minimum of 18 credit hours, to be selected from a different main group from that of the major or in a related department in some other college of the University.

Limited electives are courses selected from outside the groups from which the major or minor have been chosen, in order to broaden the educational base.

A student may select a second minor from a field of work differing from that of the major and first minor. This minor must be approved by the department concerned. Courses listed in limited electives may apply toward the second minor.

Courses from departments other than those offering the specialization or from other colleges of the University may be applied as major or minor credits if they are clearly related or fundamental to the major or minor specialization. Those courses listed as specific requirements in the technical agriculture curriculum may not be applied to the major or minor sequences or as limited electives.

By the end of his sophomore year every student is required to file in the Office of Admissions and Records a specialization card. This card lists the courses he proposes to take to complete his major and minor, as well as limited electives, and must be approved by his adviser. Changes from one curriculum to another after the sophomore year must be approved by the Committee on Student Scholastic Standing. Since the student is held responsible for all requirements of the curriculum he finally selects, late changes usually involve inconvenience and may perhaps add to the time required to achieve graduation. In the same way, changes in choice of major or minor or of courses listed in these fields on the specialization card which has been submitted must be approved by the student's adviser and the Committee on Student Scholastic Standing.

SPECIALIZATIONS OFFERED

The following areas of specialization are available as major or minor fields in the technical agriculture curriculum. Certain exceptions are noted below.

- **Agricultural Biochemistry
- Agricultural Economics (see also Agricultural Business Administration)
- Agricultural Education (minor only, on approval of the Department of Agricultural Education)
- Agronomy and Plant Genetics
 - a. Agronomy
 - b. **Plant Genetics
- Animal Husbandry
- Dairy Husbandry
 - a. Dairy Husbandry
 - b. Dairy Industry (minor only)
- Entomology and Economic Zoology
 - a. **Entomology
 - b. Wildlife Management (minor only)
- Forestry (minor only)
- Horticulture
 - a. General Horticulture
 - b. Landscaping
- Mechanized Farming (courses offered in the Department of Agricultural Engineering)
- **Plant Pathology and Botany
- Poultry Husbandry
- Soils

SPECIAL MAJORS AND MINORS

Agricultural Journalism (minor)—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 departments: Animal Husbandry, Dairy Husbandry, Poultry Husbandry, Veterinary Medicine, Agricultural Biochemistry, Entomology and Economic Zoology.

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

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

FRESHMAN-SOPHOMORE YEARS

With approval of adviser, certain General College courses may be substituted for

** This specialization is usually selected under the science specialization curriculum. Students wishing to major in this field under technical agriculture must secure approval for entrance by petition at the time the specialization card is submitted.

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: agricultural engineering, agronomy, animal husbandry, dairy husbandry, horticulture, poultry husbandry, soils, animal industry, plant industry. Students interested in a minor in home economics must secure approval of courses for such a minor from the director of the School of Home Economics.

Pretheological Major in Agriculture

—This major, as defined by the Conference on Co-operation between Colleges of Agriculture and Theological Seminaries, must include at least one basic course in each of the following: agricultural economics, English literature, history and government, philosophy, public speaking, psychology, rural sociology, and sociology. These subjects may be scheduled by any student with a normal major in technical agriculture under minor or limited or free electives. Most of these subjects will also count toward the College social science requirement. Any student who desires to enroll in this major should plan carefully with his adviser in order to meet both the College and the pretheological requirements.

Soil and Water Conservation (major and minor)—This program is designed for students who desire to prepare themselves for work as soil and water conservation specialists in public agencies or in individual or commercial enterprises. Because of the diversity of

training, this program will be considered as a combined major and minor. Requirements for freshman and sophomore years are as above. For junior and senior years, the following courses are required:

JUNIOR YEAR

Ag.En.67—Rural Sanitation and Water Supply (3)
 Ag.En.19—Elementary Surveying (3)
 Ag.Ec.102—Farm Organization (3)
 Agro.21—Grain Crops (4)
 An.Hu.56—Livestock Feeding I (3)
 An.Hu.57—Livestock Feeding II (3) (this course is not required if Dy.Hu. 103, Dairy Stock Feeding, is to be taken)
 Ag.Jo.53—Publicity (3)
 Pl.Pa.3—Weeds and Seeds (3)
 Rhet.51—Exposition (3)
 Rhet.22—Public Speaking (3)
 Soil.5—Soil Management (3)
 Soil.122—Soil Conservation (3)

SENIOR YEAR

Ag.En.31—Mechanics of Drainage and Erosion Control (3)
 Ag.En.104—The Soil Moisture Relation in Agriculture (4)
 Ag.Ec.110—Economics of Agricultural Production (3)
 Ag.Ec.170—Land Economics (3)
 Agro.23—Forage Crops (4)
 Agro.31—Principles of Genetics (4)
 Agro.133—Pasture Crops and Management (4)
 Dy.Hu.103—Dairy Stock Feeding (3) (this course not required if An.Hu. 57, Livestock Feeding II, has been taken)
 Pl.Pa.1—Plant Pathology (5)
 Rhet.12—Discussion Methods (3) or Rhet.54—Advanced Public Speaking (3)

In addition to the required courses, For. 104, Forest Influences, is recommended for students taking this major and minor.

II. Agricultural Education

This curriculum, offered jointly with the College of Education, is designed for students who plan to teach agriculture in the public schools and communities of Minnesota. It is also adapted to the needs of agricultural extension workers and others preparing to farm or to work in rural areas. It provides broad training in technical agriculture and permits emphasis upon such fields as dairying, agronomy, agricultural economics, horticulture, animal husbandry, soils, and mechanized farming. In addition, it offers the special

training in education needed to qualify students for certification as agriculture instructors in public high schools.

During the first two years the student completes required work in the agricultural education curriculum or the equivalent in other agricultural curricula. In his junior and senior years he completes a combined curriculum of the College of Education and the College of Agriculture, Forestry, and Home Economics, leading to a bachelor of science degree.

For all-College requirements for students on this campus see page 18. Students wishing to major in agricultural education must:

1. Have lived on a farm until the age of 16 or have had two full years of farming experience after that age.
2. Devote a minimum of six weeks to observation and supervised teaching.
3. Have an honor point ratio of 1.5 or above in twenty courses selected from the following:

- Ag.Ec. 80, 102, 103
- Ag.En. 7, 12, 13, 40, 41, 55, 60, 67
- Agro. 21, 23, 31, 133
- An.Hu. 8, 9, 52, 56, 57, 112, 113
- Dy.Hu. 1, 2, 9, 10, 101, 103, 117, 119
- Ent. 5
- For. 10
- Hort. 1, 6, 32, 40
- Pl.Pa. 1, 3

- Po.Hu. 1, 51, 52, 153, 154
- Soil. 2, 5, 121
- V.M.C. 52

4. Earn a minimum of 204 credits for graduation.

RURAL EDUCATION

A curriculum in rural education designed to prepare students for teaching in rural schools is administered by the College of Education. For detailed information about this curriculum see the *Bulletin of the College of Education*.

FIFTH YEAR LEADING TO PROFESSIONAL DEGREE

The College of Education and the College of Agriculture, Forestry, and Home Economics will award the master of education (M.Ed.) degree to students

Table 3. Distribution of Courses for Students Majoring in Agricultural Education

Department	Minimum required credits	Specified courses **	Courses recommended to complete requirements
Agricultural Biochemistry	1
Agricultural Economics	17	1, 2, 80, 102, 103	8, 40
Agricultural Education	27	1, 54, 56, 81, 82, 91, 104, 106	
Agricultural Engineering (Mechanized Farming)	15	40, 41	7, 12, 13, 55, 60, 67
Agronomy	15	1, 31	21, 23, 133
Animal Husbandry	10	1, 56, 57 or Dy.Hu. 103	8, 9, 52, 112, 113
Bacteriology	5	53	
Botany	6	1, 2 ††	
Chemistry, Inorganic	8	1, 2 or 4, 5	
Dairy Husbandry	9	1, 103 or An.Hu. 57	2, 9, 10, 101, 117, 119
Education	5	55A or 55B	
Entomology and Economic Zoology	5	5	
Forestry	3	10	1A
Horticulture	5	1, 40	6, 32
Journalism	3	Ag.Jo. 53, or Jour. 11	
Mathematics	5	Math. 1 or Ag.En. 11 ††	
Orientation	1	1	
Physics	5	1-2, or Ag.En. 23 or 24-25 or G.C. 7A ††	
Plant Pathology	8	1, 3	
Poultry Husbandry	7	1	51, 52, 153, 154
Psychology	6	1-2	
Public Health	2	3	
Rhetoric	15	1, 2, 3, 22, 51, or equiv.	47, 54
Sociology	3	14A	
Soils	7	2, 5	121
Veterinary Medicine	5	52	
Zoology	6	14, 15 ††	

** Transfer students or those who have had vocational agriculture or who are graduates of the schools of agriculture may take examinations for exemption or credit in those courses in which they are adequately prepared. (See page 9.)

†† Students presenting equivalent high school credit are exempt from this course.

†† Student may elect N.Sci. 7-8-9 in place of Bot. 1-2 and Zool. 14-15.

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.

Undergraduates who expect to qualify for the M.Ed. degree should confer with their advisers by the beginning

of the junior year so that the work of the junior, senior, and fifth years may be co-ordinated to best advantage.

The requirements that must be completed for the professional degree are stated in the *Bulletin of the College of Education*.

III. Agricultural Business Administration

This curriculum is offered jointly with the School of Business Administration. It is designed for those who wish to prepare for some branch of agricultural business such as the marketing of farm products, finance, implements, farm real estate, and country merchandising. More opportunity is offered for business and economics courses than in the technical agriculture curriculum, where greater stress is on the agricultural subjects. Students completing the curriculum will receive the degree of bachelor of agricultural business administration.

In the first two years students register and pay fees in this college. In the last two years they register in this college and in the School of Business Administration and pay the fees of the latter.

The first two years of the curriculum are prescribed and include introductory courses in agriculture, economics, and fundamental sciences. At least 90 credits and an honor point average of 1.0 are required for admission to the junior class. 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.

Students must meet the all-College requirements for graduation from this College. (See page 18.)

FRESHMAN YEAR

Students take the regular freshman courses outlined in the technical agriculture curriculum, except that they are advised to register for Math. 8 rather than Ag.En. 11; or Math. 1 if they do not have the prerequisites for Math. 8. If any course is deferred until the sophomore year it should be An. Hu. 1.

SOPHOMORE YEAR

1. Freshman courses not completed
2. General courses required
 - Ag.Ec.1-2—Principles of Economics I and II (8)
 - Ag.Ec.8—Rural Economics (3)
 - Ag.Ec.40—Principles of Marketing Organization (2)
 - Econ.24-25-26—Principles of Accounting (9)
 - Ent.5—Economic Entomology (5)
 - Psy.1-2—General Psychology (6)
 - Rhet.22—Public Speaking (3)
 - Zool.14-15—General Zoology (6)
3. Electives—Enough elective cred. to bring the total to 101 cred. hrs.

JUNIOR YEAR

1. General requirements
 - B.A.51, and 52 or 53—Business Law (8)
 - B.A.71—Transportation: Services and Charges I (3)
2. Special requirements
 - Ag.Ec.30—Agricultural Prices (3)
 - Ag.Ec.50—Farm Finance (5)
 - Ag.Ec.90—Agricultural Statistics (5)
 - Ag.Ec.110—Economics of Agricultural Production (3)
 - Ag.Ec.140—Marketing Organization: Staples (3); or Ag.Ec.141—Marketing Organization: Dairy and Poultry Products (3); or Ag.Ec.143—Marketing Organization: Livestock and Meats (3)
 - Ag.Ec.191—Advanced Agricultural Statistics (3)
 - Rhet.51—Exposition (3)

SENIOR YEAR

1. General requirements
 - B.A.58—Elements of Public Finance (3)
 - Econ.64—Economics of Money and Banking (3)
 - Econ.80-81—Intermediate Economic Analysis (6)
 - B.A.65—Analysis of Financial Statements (3), or Ag.Ec.147—Marketing Accounting (4)
 - Econ.149—Business Cycles (3)
2. Special requirements
 - Ag.Ec.131—Market Prices (3)
 - Ag.Ec.150—Advanced Farm Finance (3)
 - Ag.Ec.170—Land Economics (3)

IV. Agricultural Journalism

This curriculum is offered jointly by the College of Agriculture, Forestry, and Home Economics, and the School of Journalism of the College of Science, Literature, and the Arts. It is intended for those who wish to prepare for some branch of journalism that relates to agriculture, such as staff positions on agricultural magazines, editing country newspapers or special farm pages for newspapers, or editing bulletins for state and federal departments of agriculture and for experiment stations.

The student takes general courses in technical agriculture, but the emphasis is upon preparation for technical journalism. Stress is laid also upon economic and business courses related to agriculture.

Students majoring in agricultural journalism should register in the School of Journalism and have their programs of agricultural subjects approved in the office of the dean of this college.

The curriculum requires 180 credits for graduation and leads to the degree of bachelor of arts. Courses required in the curriculum are listed below.

FRESHMAN YEAR

Comp.4-5-6—Freshman Composition (9)
 N.Sci.1-2-3—Orientation in the Natural Sciences (15)
 Electives, social sciences (9-15) and natural sciences (10)

SOPHOMORE YEAR

Ag.Ec.1-2—Principles of Economics I and II (8)
 Comp.27-28—Advanced Writing (6)
 Jour.13—Introduction to Reporting (3)
 Jour.14-15—Newspaper Reporting (6)
 Soc.1—Introduction to Sociology (3)
 Soc.14—Rural Sociology (3)
 Electives (11-18)

JUNIOR YEAR

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

SENIOR YEAR

Jour.93—Weekly Editorial Administration (3)
 Jour.94—Newspaper Advertising (3)
 Jour.112—Current Newspaper Problems (3)
 Jour.140-141—Interpretation of Contemporary Affairs (6)
 Ag.Jo.54—Editing Agricultural Bulletins (3)
 Electives—Journalism (3)
 Electives (24)

SUGGESTED ELECTIVES

Journalism: 65, 68, 78, 95, 130-131
 Agriculture or Forestry:
 Agricultural Economics: 104, 110, 170
 Agricultural Journalism: 53, 55
 Agronomy: 1, 31
 Forestry: 1, 10, 136
 Horticulture: 6, 10, 32, 60
 Animal Husbandry: 1, 56-57
 Dairy Husbandry: 1
 Poultry Husbandry: 1
 Other:
 Social Science: 1-2-3
 History: 1-2-3, 20-21-22
 Humanities: 1, 2, 3
 Political Science: 1-2-3, 7, 25
 Psychology: 1-2, 4-5, 56
 Sociology: 2, 45, 100, 110, 114

MINOR IN JOURNALISM

Students majoring in some field of the technical agriculture curriculum may select a minor in journalism. The minor program must be approved by the School of Journalism.

A minor in journalism should include Jour. 11, 41, 69, and Ag.Jo. 53, and 6 additional credits selected from Jour. 78, 110, 111, 121, and 130, or from Ag.Jo. 54 and 55.

V. Agricultural Engineering

PROFESSIONAL FIVE-YEAR CURRICULUM

A professional curriculum in agricultural engineering is offered jointly with the Institute of Technology. It has the

same requirements in basic mathematics, mechanics, and physics as other engineering curricula. It is a five-year curriculum leading to the degree of bachelor of agricultural engineering.

This curriculum is designed to train students for engineering work in fields fundamental to agricultural practices and industries. Four specializations are provided: rural electrification, farm structures, farm power and machinery, and soil and water conservation.

For further information consult the Department of Agricultural Engineering, St. Paul Campus. Course and curriculum details are given in the *Bulletin of the Institute of Technology*. Students register in the Institute of Technology.

VI. Agricultural Engineering Business Administration

PROFESSIONAL FIVE-YEAR CURRICULUM

This curriculum is offered jointly with the Institute of Technology and the School of Business Administration. It is a five-year engineering and business curriculum with emphasis in the field of agriculture. The course requirements in engineering and agriculture are the same as those for the profes-

sional curriculum in agricultural engineering. In addition, a sequence of business courses is required. Students completing this curriculum will receive the degrees both of bachelor of agricultural engineering and bachelor of business administration.

Students interested in this curriculum should see the *Bulletin of the Institute of Technology* or consult the Department of Agricultural Engineering, St. Paul Campus.

VII. Dairy Industry

Dairy Industry is the application of science to the processing and handling of milk and its products. The curriculum for this course is designed to prepare students to become dairy plant superintendents, managers and business administrators, equipment and supply technicians, dairy products graders, inspectors and sanitarians, extension men, research and technical workers, and teachers in the field. In addition to the basic requirements for dairy industry, complementary courses of study are outlined for each of three areas of emphasis: bacteriology, agricultural biochemistry, and plant management. Courses in other areas can be arranged depending upon the interests of the student, i.e., dairy engineering.

The curriculum for the freshman and sophomore years is designed to give the student a thorough background of basic courses essential to a fundamental understanding of milk, its products, and the manufacture of these products. While some specialization may start as early as the sophomore year, work with dairy products and in the areas of emphasis is generally reserved for the junior and senior years. An average

load of 16 credits per quarter for four years and two summers of practical experience in an approved dairy plant, or a total of 198 credits, is required for graduation.

BASIC REQUIREMENTS

FRESHMAN YEAR

- Dy.Hu.1—Elements of Dairying (3)
- Dy.Hu.2—Elements of Dairying Laboratory (2)
- In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
- In.Ch.11—Semimicro Qualitative Analysis (4)
- Math.15-16—Elementary Mathematical Analysis (10) [Ag.En.11—Applied Mathematics (5) may be substituted on approval of the adviser]
- N.Sci.7-8-9—General Biology (10)
- Orie.1—College Orientation Lectures (1)
- Pub.H.3—Personal Health (2) (see page 21)
- Rhetoric, Communications requirement

SOPHOMORE YEAR

- Ag.Bi.1—Introduction to Organic Chemistry (5) or Or.Ch.61-62—Elementary Organic Chemistry (8)
- Ag.Bi.2—Quantitative Methods (5)
- Ag.Bi.3—Introduction to Biochemistry (3)

Ag.Bi.10—Dairy Chemistry (5)
 Ag.Ec.1-2—Principles of Economics (8)
 Ag.En.24-25—Agricultural Physics (8) or
 Phys.4-5—General Physics (10)
 Bact.53—General Bacteriology (5)
 Dy.Hu.4(A)—Dairy Products Practice I (3)
 Dy.Hu.10—Judging Dairy Products (1)
 Dy.Hu.50—Dairy Bacteriology (5)

JUNIOR AND SENIOR YEARS

1. Freshman-sophomore courses not completed
2. Rhetoric courses
 Rhet.22—Public Speaking (3)
 Rhetoric, 3 cred. selected from the following: 12—Discussion Methods (3); 54—Advanced Public Speaking (3); 31—Poetry and Drama (3); 32—Novel and Short Story (3); 33—American Life in American Literature (3); 60—Contemporary Life and Literature (3)
 Rhet.51—Exposition (3) (cannot be taken earlier than the junior year)
3. Complete social science requirements
4. Ag.Ec.40—Principles of Marketing Organization (3)
 Ag.Ec.141—Marketing Organization: Dairy, Poultry Products (3)
 Ag.En.70—Dairy Engineering (3)
5. Dairy courses
 Dy.Hu.4(B)—Dairy Products Practice II (3)
 Dy.Hu.105—Dairy Literature Seminar (2)
 Dy.Hu.107—Condensed Milk Products (3)
 Dy.Hu.108—Dry Milk Products (3)
 Dy.Hu.109—Market Milk (3)
 Dy.Hu.110—Ice Cream and Frozen Dairy Foods (3)
 Dy.Hu.111—Butter (3)
 Dy.Hu.112—Cheese (3)
 Dy.Hu.113—Technical Control of Dairy Products (3)
 Dy.Hu.130—Advanced Dairy Products Judging (1)

AREAS OF EMPHASIS

In addition to the basic requirements for dairy industry, the student must select one of the following areas as well as sufficient electives to meet the requirements for graduation.

1. Bacteriology

In this area, the attention of the student is directed to the theory and application of the microbiological sciences in their relation to dairy products.

To the courses listed under basic requirements add:

Dy.Hu.151—Advanced Dairy Bacteriology (3)
 Bact.102—Medical Bacteriology (5)

Bact.103—Soil Bacteriology (4) or Bact.104—Sanitary Bacteriology (4)
 Bact.121—Physiology of Bacteria (3)

2. Agricultural Biochemistry

This area of emphasis is designed for the student seeking a more basic and fundamental approach to the chemistry of milk and its products.

To the courses listed under basic requirements add:

Ag.Bi.6—Animal Biochemistry (3)
 Ag.Bi.103—Advanced Dairy Chemistry (5)
 Ag.Bi.119—Physical Biochemistry (3)
 Ag.Bi.120—Proteins (3)
 G.E.70—The Slide Rule (1)
 Or.Ch.61-62—Elementary Organic Chemistry (8)
 Physl.4—Human Physiology (4)
 Soil.2—Soils (4)

3. Plant Management

Students selecting this area are offered the background to meet the problems of the business and economic phases of the dairy industry.

To the courses listed under basic requirements add:

Ag.Ec.30—Agricultural Prices (3)
 Ag.Ec.47—Marketing Accounting (4)
 Ag.Ec.50—Farm Finance (5)
 Ag.Ec.90—Agricultural Statistics (4)
 Econ.24-25—Principles of Accounting (6)
 Econ.28—Business Law (3) (B.A. 51-52 or 53 may be substituted)

4. Other Areas of Emphasis

The courses presented for the three areas above may not satisfy the needs of every student. With the aid of his adviser, a student may set up a course of study designed to meet specific requirements in another area of emphasis.

SUGGESTED ELECTIVES

(To supplement Basic and Area Requirements)

Ag.Bi. 121, 122, 123, 124
 Ag.Ec. 144, 191
 Ag.Ed. 54, 56
 Ag.En. 3
 Ag.Jo. 53
 Bact. 114, 120, 123, 124
 B.A. 51, 52, 53, 89, 113, 167
 Dy.Hu. 101
 Econ. 73, 85
 Food 101, 102, 104
 Jour. 18
 Po.Hu. 1, 154
 Psy. 1-2, 156

VIII. Fishery and Wildlife Management

This curriculum prepares students in basic biology and in related fields essential to the fishery and wildlife technician. Qualified students are advised to continue their training in the Graduate School where a wide variety of specializations, all dependent upon basic technical knowledge, is possible. Among them are fishery, bird and mammal management in relation to other land uses on public and private lands, research in the ecological or economic phases of such management, teaching or extension programs in colleges or schools, and improvement of hunting or fishing on public or privately owned areas.

Fishery 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, and soil conservation programs.

The curriculum requires 198 credit hours for graduation which include 8 credits at the Biological Station, Itasca State Park.

Students must meet the all-College requirements for graduation from this College. (See page 18.)

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

FRESHMAN YEAR

- Ag.En.3—Mechanical Drawing (3)
- Bot.1-2—General Botany (6)
- In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
- Math.1—Higher Algebra (5); Math.6—Trigonometry (5); Math.7—College Algebra (5) (see math. req., page 20)
- Orie.1—College Orientation Lectures (1)
- Pub.H.3—Personal Health (2) (see page 21)
- Rhetoric, Communications requirement
- Zool.1-2-3—General Zoology (10)

SOPHOMORE YEAR

- Ag.Bi.2—Quantitative Methods (5)
- Ag.En.19—Elementary Surveying (3)
- Ag.En.24-25—Agricultural Physics (8)

- Bot.52—Elementary Taxonomy (3)
- Math.30—Analytical Geometry (5)
- Or.Ch.61-62—Elementary Organic Chemistry (8)
- Soil.2—Soils (4)
- Zool.22—Comparative Anatomy (5)

JUNIOR YEAR

1. Freshman and sophomore courses not completed
2. General courses
 - Bot.50—General Plant Ecology (3)
 - Ent.52—Introductory Entomology (5)
 - Ent.63—Mammalogy (4)
 - For.4—Dendrology (4)
 - Pol.5—American Government and Politics (5)
 - Rhet.22—Public Speaking (3)
 - Rhet.51—Exposition (3)
 - Zool.50—Introduction to General Physiology (5)
 - Zool.83—Introduction to Genetics and Eugenics (3)
3. Biological Station at Itasca State Park (Summer Session) is required. Two of the following courses must be taken:
 - Bot.112—Aquatic Flowering Plants (4)
 - Bot.176—Freshwater Algae (4)
 - Ent.162—Ecology of Terrestrial Vertebrates (4)
 - Zool.119—Limnology (4)

SENIOR YEAR

General courses

- Ag.Ec.1-2—Principles of Economics I and II (8)
- Ent.64—Introduction to Fishery and Wildlife Management (5)
- Geol.8—Earth Features and Their Meaning (5)
- Pub.H.110-111—Biometric Principles (5)
- Zool.53—Faunistic Zoology (5)
- Zool.57—Introductory Ornithology (3)
- Zool.58—Introductory Ornithology (3) or Bact.53—General Bacteriology (5)
- Zool.121—Ichthyology (3)

RECOMMENDED ELECTIVES

- Agricultural Biochemistry: 3, 6
- Agricultural Engineering: 50
- Agricultural Journalism: 53
- Classics: 24
- Forestry: 10, 48, 59, 126
- German or Russian: 15 cred.
- Mathematics: 50-51
- Plant Pathology: 53
- Rhetoric: 54
- Zoology: 51, 59

IX. 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 methods 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 state and federal control and research laboratories, in private research institutions, and in teaching.

The undergraduate curriculum 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. 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.

Since a thorough background is required in so many branches of pure and applied science, it is impossible for a student to acquire a sufficiently detailed and intensive training in a four-year curriculum for the more specialized positions in the various branches of food technology, and post-graduate work is strongly recommended.

Only those students who have a high school record considerably above the average, who are capable of maintaining a high scholastic record in college, and who have a keen interest in pure and applied science should attempt to follow this curriculum.

The food technology curriculum requires 204 credit hours for completion.

Students must meet the all-College requirements for graduation from this College. (See page 18.)

In the freshman and sophomore years a grade of C or better must be earned in all courses except Ori. 1 and Pub.H. 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 honor point ratio, exclusive of the courses in social science, must be 1.5 or better.

FRESHMAN-SOPHOMORE YEARS

(97 credits)

- Ag.Bi.2—Quantitative Methods (5)
- Ag.En.3—Mechanical Drawing (3)
- Ch.En.80—Chemical Engineering Materials (1)
- In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
- In.Ch.11—Semimicro Qualitative Analysis (4)
- Mathematics (or I.T.M. listed below):
 - Math.6—Trigonometry (5) (see math. req., page 20)
 - Math.7—College Algebra (5)
 - Math.30—Analytic Geometry (5)
 - Math.50-51—Calculus I and II (10)
- Mathematics (Inst. Tech.):
 - I.T.M.11—College Algebra (5)
 - I.T.M.12—Trigonometry (5)
 - I.T.M.13—Analytic Geometry (5)
 - I.T.M.24-25—Calculus I and II (10)
- N.Sci.7-8-9—General Biology (10)
- Or.Ch.61-62-63—Elementary Organic Chemistry (11)
- Or.Ch.64—Elementary Organic Chemistry Lab. (3)
- Orie.1—College Orientation Lectures (1)
- Phys.7-8-9—General Physics (15)
- Pub.H.3—Personal Health (2) (see page 21)
- Rhetoric, Communications requirement

JUNIOR-SENIOR YEARS

(97-99 credits)

- Ag.Bi.3—Introduction to Biochemistry (3)
- Ag.Bi.5—Plant Biochemistry (3)
- Ag.Bi.6—Animal Biochemistry (3)
- Ag.Ec.1-2—Principles of Economics (8) or Econ.6-7—Principles of Economics (10)
- Bact.53—General Bacteriology (5)
- Ch.En.101-102-103—Unit Operations (13)
- Ch.En.111-112—Unit Operations Lab. (2)
- Food 51-52—Food Analysis (4)
- Food 101-102—Food Technology (6)
- P.Ch.101-102-103—Physical Chemistry (9)
- Rhet.22—Public Speaking (3)
- Rhet.51—Exposition (3)
- Social science electives (8)
- Electives, selected from following list, or from other courses and departments approved by Subcommittee on Food Technology, 27-29 cred.

SUGGESTED ELECTIVE COURSES

Agricultural Biochemistry: 103, 108, 110, 116, 117, 119, 120, 121, 122, 123, 124, 129, 130, 131, 132, 133
 Agricultural Economics: 25, 40, 90, 126, 127, 141, 142, 143
 Agricultural Engineering: 70
 Agronomy and Plant Genetics: 21, 22, 31
 Animal Husbandry: 50, 52, 53
 Dairy Husbandry: 3, 4, 50, 110, 111, 112, 113, 114, 151
 Entomology and Economic Zoology: 5, 51, 128, 129, 177
 Food Technology: 104, 105
 Home Economics: 31, 33, 35, 40, 41, 63, 64, 142, 146, 170
 Horticulture: 138, 139
 Plant Pathology: 1, 103, 105, 106, 107, 161
 Poultry Husbandry: 52, 153, 154

Other Colleges

Analytical Chemistry: 101, 102, 105, 127, 131, 132, 133, 140
 Bacteriology: 104, 113, 114, 121, 122, 123
 Chemical Engineering: 105, 117, 118, 121
 Economics: 3, 23, 24, 25, 28, 161
 German: 24, 25, 26
 Mechanical Engineering: 180, 189
 Organic Chemistry: 105, 106, 107, 110, 130, 142, 143
 Physical Chemistry: 104, 105, 106, 128, 129
 Physics: 114, 116, 118, 131, 134, 144
 Physiology: 4
 Political Science: 1, 2, 3
 Psychology: 1, 2
 Public Health: 100, 102, 110, 111
 Zoology: 21, 51, 145, 146

X. Landscaping

This curriculum is intended for students who plan to make landscaping a lifetime career. It is designed to give the student a broad background in the basic arts and sciences and to give him the courses that will prepare him best for his chosen career. Emphasis in this curriculum is placed on home landscaping.

Students must meet the all-College requirement for graduation from this College. (See page 18.) All students must have six months' practical experience in a landscape nursery. A total of 192 credits will be required for graduation.

FRESHMAN YEAR

Ag.En.3—Mechanical Drawing (3)
 Ag.En.11—Applied Mathematics (5)
 Art 1—Principles (4)
 Bot.1—General Botany (6)
 Hort.1—General Horticulture (3) or Hort.6—Fruit Growing (3) or Hort.32—Vegetable Growing (3)
 In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
 Orie.1—College Orient. Lectures (1)
 Pub.H.3—Personal Health (2)
 Rhetoric, Communications requirement

SOPHOMORE YEAR

Ag.Bi.1—Introduction to Organic Chemistry (5)
 Ag.En.19—Elementary Surveying (3)
 Ag.En.23—General Physics (5) (students with a year of high school physics may omit this course)
 Ent.5—Economic Entomology (5)
 Hort.10—Home Floriculture (3)
 Hort.21-22—Plant Materials (6)
 Soil.2—Soils (4)
 Zool.14-15—General Zoology (6)

JUNIOR YEAR

Ag.Ec.1-2—Principles of Economics I and II (8)
 Ag.En.31—Mechanics of Drainage and Erosion Control (3)
 Bot.50—Plant Ecology (3)
 Hort.36—Plant Propagation (3)
 Hort.40—Horticulture Laboratory (2)
 Hort.51—Garden Flowers (3)
 Hort.60—Principles of Landscape Design (3)
 Hort.51—Principles of Planting Composition (3)
 Rhet.22—Public Speaking
 Rhet.51—Exposition (3)

SENIOR YEAR

Hort.62—Special Problems in Landscape Design and Composition (6-12)
 Pl.Pa.10—Forest Pathology (5)
 Soc.106—City Planning (3)

RECOMMENDED ELECTIVES

Ag.En.7—Farm Building Construction (3)
 Ag.En.50—Advanced Surveying (3)
 Art 10—Photography (3)
 Art 20—Drawing (2)
 Art 23—Drawing and Design I (3)
 B.A.51—Business Law (3)
 B.A.54—Accounting (4)
 Bot.10—Minnesota Plant Life (3)
 Bot.131—Field Ecology (5)
 Ent.56—Forest Entomology (5)
 Geol.8—Earth Features, Their Meaning (5)
 Pl.Pa.141—Insects in Relation to Plant Diseases (3)
 Rhet.54—Advanced Public Speaking (3)

OTHER REQUIREMENTS

Social Science—18 credits (see page 21)
 Minor—18 credits (recommended in one of the following: art, botany, entomology, plant pathology, plant industry)

XI. Science Specialization

This curriculum provides for intense specialization 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.

The 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 departments and with the assistant dean for the College.

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

Attention is called to the modern language requirement for graduate students. In most divisions one foreign language is required for the Master's degree and two foreign languages for the degree of doctor of philosophy. Proficiency in at least one language, preferably German, should be acquired during the undergraduate years. The modern language requirement is interpreted to mean either German or French unless some other language is recommended by the student's major adviser.

The curricula 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) major, minor, and electives in the junior and senior years in

accordance with the schedule given below.

Students who have not earned an honor point ratio of 1.5 in the freshman and sophomore years should not plan to continue in science specialization and will be permitted to do so only upon the written recommendation of the adviser and with the approval of the faculty committee on science specialization.

For the all-College requirements for graduation from this College, see page 18.)

FRESHMAN YEAR

A student should register for either botany or zoology in the freshman year, the other in the sophomore year. Either mathematics or a modern language should be taken in the freshman year, the other in the sophomore year.

Bot.1-2-3 or 4-5—General Botany (10)

In.Ch.1-2 or 4-5—General Inorganic Chemistry (8) and In.Ch.11—Semimicro Qualitative Analysis (4)

Math.1—Higher Algebra (5); Math.6—Trigonometry (5); and Math.7—College Algebra (5) (see math. req., page 20)

Modern language, 9 or 10 cred. If German is selected, the requirement will be German 24-25-26—Chemical German (9) or German 1-2-3—Beginning Course (15). (Students taking German 24-25-26 are advised to also take German 41-42, Readings from German Chemical Periodicals (2 per qtr.)

Orie.1—College Orientation Lectures (1)

Pub.H.3—Personal Health (2) (see page 21)

Rhetoric, Communications requirement

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

SOPHOMORE YEAR

Ag.Bi.1—Elementary Organic Chemistry (5)

Ag.Bi.3—Introduction to Biochemistry (3)

Ag.Bi.5—Plant Biochemistry (5) or Ag.Bi.6—Animal Biochemistry (3)

Ag.Ec.1-2—Principles of Economics I and II (8)

Bact.53—General Bacteriology (5)

Botany, if not taken in freshman year

Mathematics, if not taken in freshman year

Modern language, if not taken in freshman year

Rhet.22—Public Speaking (3)

Soil.2—Soils (4)

Zoology, if not taken in freshman year

JUNIOR AND SENIOR YEARS

1. Rhet.51—Exposition (3)
2. A major sequence of 24 to 36 credits in one of the following fields:
 - Agricultural Biochemistry
 - Agricultural Economics
 - Agronomy and Plant Genetics
 - Animal Husbandry
 - Animal Nutrition
 - Dairy Husbandry
 - Entomology and Economic Zoology
 - Forestry
 - Home Economics
 - Horticulture
3. A minor sequence of 12 credits is chosen in some department or field of work outside of the major.
4. Those courses listed as specific requirements in this curriculum may not be applied toward a major or a minor.
5. Subject-matter courses from one department or from departments of other colleges of the University may be applied as major or minor credits in another department if they are clearly related or fundamental to the field of the major or minor specialization.

XII. Preveterinary Medicine

Training in veterinary medicine includes two years of college-level preveterinary studies and four years of professional study in the School of Veterinary Medicine, or a total of six

years. Detailed information about the preveterinary and professional curriculums is given in Part III, pages 87 to 95.

CURRICULA IN THE SCHOOL OF FORESTRY

Forestry courses were given by the University of Minnesota as early as 1886, but professional work leading to the bachelor of science degree was not offered until 1903 when the present School of Forestry had its formal beginning. Since that time more than 1,300 foresters have been granted undergraduate and graduate degrees.

The bachelor of science degree is granted upon completion of 204 quarter credits of required and elective courses in one of the following fields of specialization: I, Forest Management; II, Forestry-Wildlife Management; III, Building-Products Merchandising and Light Construction; IV, Wood Technology.

Graduate work leading to the professional degree of master of forestry (M.F.) is offered in co-operation with the Graduate School to selected students holding the B.S. degree who wish to further prepare themselves for professional work in forestry. (See page 42)

Graduate work leading to the master of science (M.S.) and doctor of philosophy (Ph.D.) degrees is offered in co-operation with the Graduate School to those qualified students desiring to prepare themselves for research in some field of forestry and forest products industries. (See page 42)

The School of Forestry is fully accredited by the Society of American Foresters, the national accrediting agency for U.S. forestry schools.

FACILITIES

The School of Forestry possesses excellent facilities for training foresters.

Located on the St. Paul Campus of the University and housed in a modern building, Green Hall, it draws on many departments on both the St. Paul and

the Minneapolis campuses for instruction in courses basic to the training of foresters. Also housed in Green Hall is the Lake States Forest Experiment Station of the U. S. Forest Service, and a branch office of the U. S. Fish and Wildlife Service.

For students interested in forest management and forestry-wildlife management, the following field laboratories are available.

The Lake Vadnais Plantations of over 300 acres, located within 10 miles of the campus, are available for the field laboratory work during the regular school year. However, most of the field training for students specializing in these fields is concentrated at the Itasca Forestry and Biological Station and the Cloquet Experimental Forest.

The Itasca Forestry and Biological Station is located on Lake Itasca, the source of the Mississippi River, in Itasca State Park. It provides an excellent field laboratory for forest management and forestry-wildlife management majors. Here in a six-week summer session, from about August 1 to September 15, students have an opportunity to study forest botany, soils, ecology, zoology, and measurements on a 30,000 acre tract of virgin and second-growth forest, including practically all forest types found in Minnesota. Good housing, dining hall, and laboratory facilities are available. Students operate their own mess at cost.

The Cloquet Experimental Forest is located near the forest products manufacturing center of Cloquet in northeastern Minnesota and comprises a tract of over 3,700 acres of virgin and second-growth timber. The entire spring quarter of the senior year is spent at Cloquet. Training in all phases of field forestry, nursery operations, planting, thinning, preparation of management plans, utilization, forest surveys, and aerial photographic interpretation is included. Housing, dining hall facilities, and laboratories are available.

Available in Green Hall for training students interested in employment in the forest-products industries and for building-products merchandising are several well-equipped laboratories: woodworking, wood chemistry, timber testing, and wood preservation. Local furniture plants and building-products merchandising and wood preservation concerns provide added opportunity for training students in the several wood-utilization fields.

THE WORK OF FORESTERS

The work of foresters is diverse. Forest management and forestry-wildlife management graduates are concerned primarily with the scientific management and protection of the forest, wildlife, recreation, grazing, and water resources on the approximately one-third of the land area of the United States which is classified as forest land. The majority of these graduates work largely with the management of forest lands for production of timber crops. Until recently public forest land managing agencies—federal, state, county, and municipal—employed most of the graduates in these fields. Within the past 10 years, however, there has been increasing employment of Forestry School graduates by private owners of forest lands—lumber, pulp and paper, plywood, and other wood-processing companies.

Graduates trained in the several utilization fields—building products merchandising and wood technology—find employment in the development, production, and merchandising of forest products.

Prospective students interested in obtaining further information on the various fields of forestry employment, employment opportunities, salaries of graduate foresters, etc., are urged to obtain copies of *Handbook of Information on Entering Positions in Forestry* which may be obtained from the Society of American Foresters, 425 Mills Building, 17th Street and Pennsylvania Ave. N.W., Washington 6, D.C. (cost 15 cents) and *Careers in Forestry*, U.S. Department of Agriculture Miscellaneous Publication No. 249 which may be obtained from the Government Printing Office, Washington, D.C. (free).

GENERAL INFORMATION

The first two years of work in all forestry curricula are devoted primarily to basic courses such as chemistry, botany, mathematics, rhetoric, geology, economics, sociology, government, and surveying. In addition to these basic courses common to most curricula, usually one 3-credit professional forestry course per quarter is included. Because the first two years of basic work are somewhat similar in all curricula, students may transfer between curricula at the completion of their sophomore year with little loss of credit.

The six-week Summer Session term at the Itasca Forestry and Biological Station at Itasca State Park is required of all forest management and forestry-wildlife management majors, including transfer students. This requirement must be completed prior to the junior year unless special permission for postponement is given.

The spring quarter of the senior year of forest management and forestry-wildlife management is spent at the Cloquet Experimental Forest and is required of all majors in these fields.

The growing complexity of the duties performed by foresters in the management of natural resources affecting practically every phase of our society, demands that they have knowledge and training in economics, sociology, government, and other fields of social science. This need is met through the college requirement of 18 credits in social sciences.

Students registered in preforestry curricula at junior colleges, teachers' colleges, and other schools should complete the basic course requirements included in the School of Forestry curricula if they are to receive full credit on transfer for work completed. In addition, students registered in preforestry curricula at other institutions should plan to transfer at least by the end of their second year if they expect to complete the professional course requirements of the School of Forestry in two years.

Preforestry students at other institutions may complete the six-week Summer Session requirement at the Itasca Forestry and Biological Station at the end of their freshman year and return to their school for sophomore work if they choose. However, completion of this Summer Session requirement should not be delayed beyond the sophomore year.

Students are encouraged to obtain practical experience in forestry or the forest products industries during the summer vacations. Although work experience is not required for graduation, students find that the possession of such experience is an excellent recommendation when seeking employment. The School of Forestry assists students in obtaining summer employment with such federal agencies as the U. S. Forest Service, various state agencies, and with private companies.

With one exception, the all-College entrance requirements apply to high school graduates planning to register

for forestry. For entrance to the School of Forestry, students must have had at least two units of mathematics, including elementary algebra and plane geometry.

FORESTRY CURRICULA

Work leading to the bachelor of science degree on the completion of four years of satisfactory work is offered in the following specializations:

I. Forest Management—Preparation for technical work in forest management on public and private forest lands; for work in state and federal forest experiment stations; for work with soil conservation, extension, and farm-forestry organizations, and for timber procurement and logging.

II. Forestry-Wildlife Management—Preparation for work in the same fields as covered by forest management but with added emphasis on wildlife, and intended for those forest management students with a special interest in forest wildlife. Students interested primarily in fishery and wildlife management should register in the fishery and wildlife management curriculum given under agriculture.

III. Building-Products Merchandising and Light Construction—Preparation for work in lumber-yard management, building-products merchandising, and light construction.

IV. Wood Technology—Preparation for technical work in the fields of pulp and paper, wood preservation, plywood manufacture, wood seasoning, and other wood-processing industries.

CURRICULA REQUIREMENTS

During the first two years, the work in all forestry curricula is similar and is devoted largely to a study of general courses. Required course work for the four years has been held to approximately 160 credits in most curricula. In addition to completion of the required courses, students must complete sufficient elective courses to make a total of at least 204 credits.

Students interested in soil conservation work should consider elective credit in soils, agricultural engineering, animal husbandry, and agronomy. Students interested in wildlife management should consider elective credit in entomology and economic zoology, zoology, and botany.

Credit earned in ROTC can be applied towards graduation in the elective group.

The attention of all students is called to the social science requirement, page 21.

Fees for Field Training Sessions

(Not listed in the *Bulletin of General Information of the University*)

The following fees and expenses are paid during the field-training sessions at Cloquet and Itasca.

Cloquet Session (Seniors in forestry curricula—spring quarter)	
Tuition: Residents of Minnesota	\$ 46.00
Nonresidents	135.00
Health fee	3.25

In addition, \$10 is charged each student for the use of the dormitory and dining hall and will be collected by the student treasurer and paid to the professor in charge of the Cloquet Experimental Forest during the first week of the spring quarter.

Itasca Forestry and Biological Station (Freshmen in forestry curricula—second term of Summer Session)	
Tuition (prorated on basis of regular quarter tuition per quarter of 12 weeks):	
Residents of Minnesota	\$23.00
Nonresidents	67.50
Health fee	3.25

In addition, \$5 is charged each student for use of the dormitory and dining hall, etc., and will be collected by the student treasurer and paid to the professor in charge of the forestry session before the first week of the term.

I. Forest Management

FRESHMAN YEAR

- Ag.En.3—Mechanical Drawing (3) (students who have had mechanical drawing in high school may omit this course)
- Bot.1-2—General Botany (6)
- In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
- Math.6—Trigonometry (5) (see math. req., page 20)
- Rhetoric, Communications requirement (9)
- Orie.1—College Orientation Lectures (1)
- For.1A—Conservation of Natural Resources (3)
- For.1—Introduction to Forestry (1)
- For.4—Dendrology (4)
- Total required credits (40)

*Itasca Forestry and Biological Station
Summer Session for Foresters (6 weeks)*

Required of all forest management and forestry-wildlife management students:

- For.2—Important Forest Plants (2)
- For.5—Field Forest Ecology (2)
- For.6—Field Measurements (2)
- Ent.13—Field Zoology (2)
- Soil.3A—Field Forest Soils (1)
- Total credits (9)

SOPHOMORE YEAR

- Ag.Bi.1—Introduction to Organic Chemistry (5)
- Ag.Ec.1-2—Principles of Economics I and II (8)
- Ag.En.19—Elementary Surveying (3)
- Ag.En.50—Advanced Surveying (3)
- Geol.1—General Geology (3) [students are encouraged to take Geol.A—Geology Laboratory (2) as an elective. Geol.8—Earth Features and Their Meaning (5) may be taken in place of 1 and A]
- Pub.H.3—Personal Health (2) (see page 21)
- Rhet.22—Public Speaking (3)
- Pl.Pa.10—Forest Pathology (5)
- Soil.3—Forest Soils (3)
- For.7-8—Forest Measurements (6)
- For.9—Introduction to Forest Surveys and Statistics (3)
- Total required credits (44)

JUNIOR YEAR

- Ag.En.24-25—Agricultural Physics (8)
- Zool.14-15—General Zoology (6)
- For.48—Range Management (3)
- For.51—Logging (3)
- For.53-54—Wood Structure and Identification (6)
- For.55—Forest Protection (3)

For.56—Forest Products (3)
 For.126—Forest Ecology (3)
 For.127—Introduction to Silviculture (3)
 Total required credits (38)

SENIOR YEAR

Ent.64—Introduction to Fishery and Wildlife Management (5)
 Ent.56—Forest Entomology (5)
 Rhet.51—Exposition (3)
 For.123—Introduction to Forest Economics and Finance (3)
 For.124—Introduction to Forest Management (3)

Cloquet Experimental Forest

Requirements: An accumulative honor point ratio of at least 1.0 at the end of the fall quarter of the senior year, which must be maintained through the winter quarter;

also completion of the majority of required courses 100 or over.
 Ent.167—Techniques of Wildlife Management (3)
 For.128-129—Field Silviculture I-II (6)
 For.133—Forest Management and Utilization (4)
 For.134—Forest Inventory and Photographic Interpretation (4)
 Total required credits (36)

SUGGESTED ELECTIVES

ROTC courses
 Social Science courses
 Agricultural Economics: 25
 Agricultural Engineering: 104
 Botany: 50, 51, 113 or 115
 Economics: 28
 Forestry: 52, 59, 104, 111, 125, 130, 131, 136, 137, 140, 143
 Plant Pathology: 53
 Soils: 122

II. Forestry-Wildlife Management

FRESHMAN YEAR

Same as freshman year in forest management
 Total required credits (40)
 Itasca Summer Session required credits (9)

SOPHOMORE YEAR

With the exception of the following, the requirements are the same as those in forest management.

Zool.14-15 should be taken in the sophomore year
 For.7-8-9 should be taken in the junior year
 Total required credits (41)

JUNIOR YEAR

Ag.En.24-25—Agricultural Physics (8)
 For.7-8—Forest Measurements (6)
 For.9—Introduction to Forest Surveys and Statistics (3)
 For.48—Range Management (3)
 For.53—Wood Structure and Identification (3)
 For.55—Forest Protection (3)

For.56—Forest Products (3)
 For.126—Forest Ecology (3)
 For.127—Introduction to Silviculture (3)
 Zool.22—Comparative Anatomy (5)
 Total required credits (40)

SENIOR YEAR

Ent.56—Forest Entomology (5)
 Ent.63—Mammalogy (4)
 Ent.64—Introduction to Fishery and Wildlife Management (5)
 Rhet.51—Exposition (3)
 For.123—Introduction to Forest Economics and Finance (3)
 For.124—Introduction to Forest Management (3)
 Spring session at Cloquet Experimental Forest (see courses listed under forest management curriculum)
 Total required credits (40)

SUGGESTED ELECTIVES

(See forest management curriculum for list of courses.)

III. Building-Products Merchandising and Light Construction

This curriculum is suggested for those who wish to enter the lumber and other building-products merchandising and construction fields. It in-

cludes fundamental courses in business, economics, light building construction, and training in the structure, properties, and uses of wood.

FRESHMAN YEAR

- Ag.En.3—Mechanical Drawing (3) (students are encouraged to take Draw. 1-2, Engineering Drawing, as a substitute for this course)
- Bot.1-2—General Botany (6)
- In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
- Math.6—Trigonometry (5) and Math.7—College Algebra (5) (see math. req., page 20)
- Math.8—Commerce Algebra (5) may be taken as a substitute for Math.7
- Orie.1—College Orientation Lectures (1)
- Rhetoric, Communications requirement (9)
- For.1A—Conservation of Natural Resources (3)
- For.1—Introduction to Forestry (1)
- For.4—Dendrology (4)
- Total required credits (45)

SOPHOMORE YEAR

- Ag.Bi.1—Elementary Organic Chemistry (5)
- Ag.En.24-25—Agricultural Physics (8)
- Ag.Ec.1-2—Principles of Economics I and II (8)
- Econ.28—Business Law (3)
- Rhet.22—Public Speaking (3)
- Pub.H.3—Personal Health (2) (see page 21)
- Soc.1—Introduction to Sociology (3)
- Zool.14-15—General Zoology (6)
- For.7—Forest Measurements (3)
- Total required credits (41)

IV. Wood Technology

This curriculum is suggested for those who wish to enter the field of pulp and paper manufacture, wood preservation, plywood, wood fiber products, or other industries using wood as a raw material.

FRESHMAN YEAR

- Bot.1-2—General Botany (6)
- In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
- In.Ch.11—Semimicro Qualitative Analysis (4)
- Math.6—Trigonometry (5) and Math.7—College Algebra (5) (see math. req., page 20)
- Orie.1—College Orientation Lectures (1)
- Rhetoric, Communications requirement (9)
- For.1A—Conservation of Natural Resources (3)
- For.1—Introduction to Forestry (1)
- For.4—Dendrology (4)
- Total required credits (46)

JUNIOR YEAR

- Arch.57-58—Building Materials and Methods (8)
- B.A.54-55—Elementary Accounting (8)
- B.A.77—Survey in Marketing (3)
- B.A.89—Production Management (3)
- Econ.3—Elements of Money and Banking (5)
- Econ.5—Elements of Statistics (5)
- For.53-54—Wood Structure and Identification (6)
- For.121—Wood Finishing (3)
- Total required credits (41)

SENIOR YEAR

- Rhet.51—Exposition (3)
- For.52—Wood Seasoning (3)
- For.56—Forest Products (3)
- For.57—Wood Utilization (3)
- For.58—Lumber Merchandising and Grading (3)
- For.114-115—Mechanical and Physical Properties of Wood (6)
- For.116—Fabrication and Properties of Wood Products (3)
- For.120—Building-Cost Estimating (3)
- For.125—Wood Preservation (3)
- Total required credits (30)

ELECTIVES

Sufficient electives are to be selected in consultation with the adviser so that the required and elective credits total 204.

SOPHOMORE YEAR

- Ag.Bi.2—Quantitative Methods (5)
- Ag.Ec.90—Agricultural Statistics (5)
- Ag.En.3—Mechanical Drawing (3)
- Math.30—Analytical Geometry (5)
- Math.50-51—Calculus I and II (10)
- Pl.Pa.10—Forest Pathology (5)
- Rhet.22—Public Speaking (3)
- Soc.1—Introduction to Sociology (3)
- Total required credits (39)

JUNIOR YEAR

- Ag.Ec.1-2—Principles of Economics I and II (8)
- Or.Ch.61-62—Elementary Organic Chemistry (8)
- Ag.En.24-25—Agricultural Physics (8)
- Pol.25—World Politics (3)
- Pub.H.3—Personal Health (2) (see page 21)
- For.53-54—Wood Structure and Identification (6)
- Total required credits (35)

SENIOR YEAR

Ag.Bi.119—Physical Biochemistry (3)
 Ag.Bi.121—Carbohydrates (3)
 Bact.53—General Bacteriology (5)
 Rhet.51—Exposition (3)
 For.52—Wood Seasoning (3)
 For.56—Forest Products (3)
 For.57—Wood Utilization (3)
 For.113—Wood Pulp and Paper (3)
 For.114-115—Mechanical and Physical Properties of Wood (6)

For.116—Fabrication and Properties of Wood Products (3)
 For.119—Advanced Wood Structure (4)
 For.125—Wood Preservation (3)
 For.142—Wood Chemistry (3)
 Total required credits (45)

ELECTIVES

(See note under building products curriculum.)

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GRADUATE STUDY IN FORESTRY

Graduate study leading to the master of science (M.S.), doctor of philosophy (Ph.D.), and the professional degree, master of forestry (M.F.), is offered through the Graduate School in cooperation with the School of Forestry.

Master of Science and
 Ph.D. Programs

Graduate study leading to these degrees is intended for qualified students interested primarily in training for research and teaching in the several recognized forestry specializations: silviculture, management, economics, measurements, and wood technology. Forestry graduates interested in these programs should consult the *Bulletin of the Graduate School* for details, and requests for information and admission should be directed to the Graduate School, University of Minnesota, Minneapolis 14.

Master of science work in forestry is limited to Plan A of the Graduate School.

Master of Forestry Program

The master of forestry program is designed to meet the need for added professional study by qualified forestry school graduates primarily interested in administrative and technical work in forest management.

Students registered for master of forestry work will fulfill the requirements listed under the master of science (Plan B) program of the Graduate School. Reading knowledge of a foreign language is not required for the master of forestry degree.

Graduates of forestry schools interested in the master of forestry program should consult the *Bulletin of the Graduate School* (master of science—Plan B) for details of requirements and should make application for admission with the Graduate School, University of Minnesota, Minneapolis 14.

CURRICULA IN THE SCHOOL OF HOME ECONOMICS

The School of Home Economics provides opportunities for the student to prepare for homemaking and a variety of professions such as teaching, dietetics, research, business, and extension work.

The bachelor of science degree is granted upon the satisfactory completion of 185 credits of required and elective course work in a chosen curriculum. The average student completes work for this degree in four years. Upon the completion of a fifth year, students in home economics education may obtain a master of education degree.

Opportunities are provided for advanced study in the Graduate School leading to the Master's and Doctor's degrees.

FACILITIES

The School of Home Economics, with its recently completed East Wing, has fine facilities for the education of home economists in a wide variety of professional fields. Modern laboratories and classrooms provide opportunities for stimulating educational experiences. Students have available to them not only the facilities in the School of Home Economics but offerings in other departments on the St. Paul and Minneapolis campuses. The metropolitan area of the Twin Cities provides rich resources which are frequently used to supplement University facilities.

Two home management houses, located at the edge of the St. Paul Campus, enable students to gain experience in the responsibilities of family living. Students live in the houses for a half-quarter under the supervision of a member of the home economics faculty.

OPPORTUNITIES AVAILABLE TO HOME ECONOMICS GRADUATES

A major in home economics has the advantage of combining preparation for homemaking with education for a wage-earning profession. Opportunities for work are more numerous than qualified home economics graduates. Majors in home economics education can look to high school or extension teaching. Dietitians are needed for hospitals as nutritionists. Women who have majored in subject matter allied with business may find openings in magazine or newspaper writing; in advertising; in radio or TV work; in retail selling of clothing, home furnishings, or home equipment; in educational or home service work for business. Food and textile technologists find specialized work in a variety of laboratories. Institution management majors can serve as directors of food services in schools, dormitories, business establishments, tea-rooms, restaurants. Opportunities for women with advanced degrees include administrative work, college teaching, and research for educational, governmental, or industrial agencies. In short, home economics offers inviting opportunities for capable students.

FOUR-YEAR CURRICULA

I. General Home Economics—Home economics courses, and courses that

contribute to general education designed for those who are chiefly interested in preparation for homemaking. This curriculum does not prepare for any other specific profession. (See page 44.)

II. Dietetics—For students who wish to become dietitians in hospitals or nutritionists in institutions or community agencies. (See page 45.)

III. Home Economics Education—*Home Economics Teaching*—Offered jointly with the College of Education for those who wish to obtain a state teacher's certificate to teach home economics in high schools. (See page 46.)

Home Economics Extension—Offered jointly with the College of Education for students interested in preparation for positions in the Agricultural Extension Service, such as home agent, 4-H Club agent, or home economics specialist. A six-week period is spent in supervised field work in the Extension Service. (See page 48.)

IV. Home Economics in Business—For students who wish to work in business establishments dealing with foods, clothing, textiles, and art materials. (See page 49.)

V. Institution Management—For students who are interested in preparing for the management of food enterprises such as restaurants, cafeterias, dormitories, school lunchrooms, and tea-rooms. (See page 52.)

VI. Home Economics and Nursery School Education—Offered jointly with the Institute of Child Welfare for selected individuals. (See page 54.)

VII. Preparation for Research in (a) Experimental Foods, (b) Nutrition, and (c) Textiles and Clothing. For students who plan a research career in home economics. This curriculum prepares for graduate work as a basis for more intense specialization in fields of home economics research. Graduate work to at least the Master's degree is assumed. Students should have a high school record or a college freshman record considerably above the average to enter this curriculum. (See page 54.)

VIII. Journalism—Home Economics (major)—This is a joint curriculum with the School of Journalism for students who wish to enter fields of journalism requiring a knowledge of home economics. (See requirements for journalism in the *Bulletin of the College of Science, Literature, and the Arts.*)

FIVE-YEAR CURRICULUM

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. This 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 *Bulletin of the College of Education*.

GENERAL INFORMATION

Each student entering the School of Home Economics works with a faculty adviser who explains the requirements of the curriculum in which the student is interested and the opportunities provided by the University for counseling, orientation, and general education. The student plans her program with the help of the adviser.

Before the junior year the student must decide upon the field in which she wishes to specialize and must file a specialization card in the Office of Admissions and Records. This card must be approved and signed by the student's adviser and the head of the section in which the student expects to major.

Specialization in any of the fields of home economics involves two types of preparation for each student: (a) a core of courses to prepare for homemaking, and (b) the courses required to prepare for a chosen profession.

All students majoring in home economics are required to take at least 3 credits in physical education. The courses chosen must be approved by an adviser in the Department of Physical Education for Women.

All students are also required to meet the all-College requirement of 18 credits in social science.

H.E. 86, Home Management Laboratory, is required of all students majoring in home economics. A \$10 deposit payable at the home economics office is required the quarter preceding residence in the house.

New opportunities for persons with home economics training are opening up, so that careful attention should be given to the choice of electives. Home economists are needed with more training in economics, accounting, statistics, psychology, science, and sociology than are included in the curricula listed. Those interested in such courses should consult their advisers to find the fields where such training is wanted. Electives of general interest, or those which seem particularly suitable for the major sequence, should be chosen to complete the student's program.

The School of Home Economics will give assistance to graduates in placement in hospital internships, teaching positions, and other positions whenever possible.

The prospective transfer student should study the course requirements as given for the curriculum in which she is especially interested and should plan her courses in the Junior College insofar as possible so as to 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, and social sciences; psychology; and certain home economics courses. Credits for courses in other areas and for work beyond the requirements in the areas will be given elective credit.

I. General Home Economics

This curriculum is designed for those who expect to enter homemaking promptly. It provides for more free electives than any other curriculum since it is not planned to meet the requirements for any particular job.

The following courses, with the options indicated, are required of all students in the curriculum. Students must also meet the all-College requirements for graduation. (See page 18.)

FRESHMAN YEAR

- Orie.1—College Orientation Lectures (1)
- H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
- H.E.3—Clothing Construction A (3)
- H.E.10—Introduction to Home Economics (1)
- H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
- H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
- H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)

H.E.40—Food Preparation (5)
 Rhetoric, Communications requirement (9)
 Soc.1A or Soc.1—Introduction to Sociology (3)
 P.E.—Physical Education (3) (may be completed any time during 4 yrs.)
 Pub.H.3b—Personal and Public Health (2) or Pub.H.50 (see jr.-sr. list)
 One of the following: Hum.21—American Life I (3); Hum.22—American Life II (3); Hum.23—American Life III (3); Pol.25—World Politics (3); Pol.1-2—American Government and Politics (6)

Take Group I or II

Group I

G.C.10A-B—Human Biology (6)
 Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)

Group II

Zool.14-15—General Zoology (6)
 Phsl.4—Human Physiology (4)
 Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)

Take Group I or II

Group I

G.C.7C—Elements of Chemistry (5)
 G.C.7A—Elements of Physics (5) or Ag.En. 35—Household Physics (5) (students with one year of high school physics may be exempt from this requirement)

Group II

One of the following: In.Ch. 1-2, 4-5, 6-7, 9-10, General Inorganic Chemistry (8 or 10)
 G.C.7A—Elements of Physics (5) or Ag.En. 35—Household Physics (5) (students with one year of high school physics may be exempt from this requirement)

SOPHOMORE YEAR

H.E.4—Clothing Construction B (3)
 H.E.24—Problems in Home Planning and Furnishing (5); or the following sequence:

H.E.21-22—Color and Design I and II (6);
 H.E.27—Related Art Problems (3); and
 H.E.180 (see jr.-sr. list)
 H.E.34—Nutrition Problems (4) or H.E.76 (see jr.-sr. list) or H.E.170-171 (see jr.-sr. list)
 H.E.41—Food Management and Marketing (5)
 H.E.49—Household Equipment (3)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and Drama (3); Rhet.32—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); Rhet.60 (see jr.-sr. list)
 Bact.53—General Bacteriology (5) or Dy.Hu. 20 (see fr. list)
 Ag.Bi.1—Introduction to Organic Chemistry (5)
 Ag.Ec.3—Principles of Economics (5)
 One of the following: Soc.2—Intermediate Sociology (5); Soc.14—Rural Sociology (3); Soc.49—Social Problems (3); Soc.120, 140, 141, 161 (see jr.-sr. list)
 Psy.1-2—General Psychology (6)

JUNIOR AND SENIOR YEARS

Pub.H.52b—Home Nursing and Family Care (1) and either Pub.H.50—Personal and Community Health (3) or Pub.H.3b (see fr. list)
 H.E.50—Textiles (3)
 H.E.76—Nutrition (4); or H.E.170—Nutrition of the Family (3) and H.E. 171—Child Nutrition (3); or H.E.34 (see soph. list)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.120—Art History (3); or the following sequence: H.E.21-22, 27, 180
 H.E.180—Home Planning and Furnishing (5); or H.E.24 (see soph. list) and H.E.120 (see jr.-sr. list)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)
 One of the following: Soc.141—The Family (3); Soc. 2, 14, 49 (see soph. list); Soc.120—Social Psychology (3); Soc.140—Social Organization (3); Soc.161—Rural Community Analysis (3)
 H.E.Ed.90—Child Training (3)
 Additional social science to total 18 cred. (see page 21)

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 after which she can expect employment in a hospital as administrative or therapeutic dietitian. Other employment possible is nutritionist in a public health agency or dietitian in a food clinic.

The courses listed below are required in the curriculum. A grade of at least a C is required in the following courses:

H.E. 40, 41, 63, 170, and 171. Also, a C average is required for the following group of courses: H.E. 33, 65, 79, and 173.

Students must meet the all-College requirements for graduation. (See page 18.)

FRESHMAN YEAR

Orie.1—College Orientation Lectures (1)
 H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
 H.E.10—Introduction to Home Economics (1)

- H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
 H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
 H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
 H.E.40—Food Preparation (5)
 Rhetoric, Communications requirement (9)
 Zool.14-15—General Zoology (6)
 In.Ch.1-2, 4-5, 6-7, or 9-10—General Inorganic Chemistry, 8 or 10 cred.
 Phsl.4—Human Physiology (4)
 Ag.En.35—Household Physics (5) (students with one year of high school physics may be exempt from this requirement)
 Pub.H.3b—Personal and Public Health (2) or Pub.H.50 (see jr.-sr. list)
 Soc.1A or Soc.1—Introduction to Sociology (3)
 P.E.—Physical Education (3) (may be completed any time during 4 yrs.)

SOPHOMORE YEAR

- H.E.24—Problems in Home Planning and Furnishing (5)
 H.E.33—Nutrition I (4)
 H.E.35—Nutrition II (4)
 H.E.41—Food Management and Marketing (5)
 H.E.46—Food Service Job Studies (3)
 H.E.49—Household Equipment (3)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and Drama (3); Rhet.32—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); Rhet.60 (see jr. list)
 Bact.53—General Bacteriology (5)
 Ag.Bi.1—Introduction to Organic Chemistry (5)
 Ag.Bi.2—Quantitative Methods (5)
 Ag.Ec.3—Principles of Economics (5)
 Ag.Ec.25—Principles of Accounting (4) or Econ.24-25—Principles of Accounting (6)
 Psy.1-2—General Psychology (6)

JUNIOR AND SENIOR YEARS

- Pub.H.52b—Home Nursing and Family Care (1) and either Pub.H.50—Personal and Community Health (3) or Pub.H.3b (see fr. list)
 H.E.50—Textiles (3)
 H.E.63—Quantity Food Production (6)
 H.E.64—Purchasing for Institutions (4)
 H.E.65—Institution Management Problems (3)
 H.E.79—Selected Problems for Dietitians (3)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.142—Experimental Cookery (3)
 H.E.170—Nutrition of the Family (3)
 H.E.171—Child Nutrition (3)
 H.E.173—Diet Therapy (4)
 H.E.176—Advanced Nutrition (4) or H.E.177—Digestion and Metabolism (3)
 H.E.178—Clinical Problems in Nutrition (2)
 H.E.179—Readings in Nutrition (2)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)
 H.E.Ed.90—Child Training (3)
 Additional social science to total 18 credits (see page 21)

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 a certificate for teaching home economics in secondary schools in Minnesota. Completion of this curriculum qualifies for teaching in federally aided home economics departments.

During the first two years the student is registered in the College of Agriculture, Forestry, and Home Economics. When the student has earned a minimum of 90 credits and at least 1 honor point per credit (junior classification) and has indicated her specialization as the teachers' or 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 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 those areas of home economics in which the student feels a need for additional experience.
3. Certain home economics courses with a grade of at least 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 (a) 1.5 honor points per credit in 40 credits of home economics work in the curriculum for general home economics teaching, (b) an average of 1 honor point per credit in all other courses pursued during the junior and senior years.

By 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 some beginning teachers in public schools are expected to teach another subject in addition to home economics.

GENERAL HOME ECONOMICS TEACHING

Courses required in the curriculum are listed below. A grade of at least C is required for the following courses: 3, 4, 21, 22, 27, 34 (or 76), 40, 41.

Students must meet the all-College requirements for graduation from this college. (See page 18.)

FRESHMAN YEAR

- Orie.1—College Orientation Lectures (1)
- H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
- H.E.3—Clothing Construction A (3)
- H.E.10—Introduction to Home Economics (1)
- H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
- H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
- H.E.21-22—Color and Design I and II (6)
- H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
- H.E.40—Food Preparation (5)
- Pub.H.3b—Personal and Public Health (2) or Pub.H.50 (see jr.-sr. list)
- Rhetoric, Communications requirement (9)
- Soc.1A or Soc.1—Introduction to Sociology (3)
- P.E.—Physical Education (3) (may be completed any time during 4 yrs.)

Take Group I or II

Group I

- Zool.14-15—General Zoology (6)
- Phsl.4—Human Physiology (4)
- Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)

Group II

- G.C.10A-B—Human Biology (6)
- Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)

Take Group I or II

Group I

- One of the following: In.Ch. 1-2, 4-5, 6-7, 9-10, General Inorganic Chemistry (8 or 10)
- G.C.7A—Elements of Physics (5) or Ag.En. 35—Household Physics (5)

Group II

- G.C.7C—Elements of Chemistry (5)
- G.C.7A—Elements of Physics (5) or Ag.En. 35—Household Physics (5)

SOPHOMORE YEAR

- H.E.4—Clothing Construction B (3)
- H.E.27—Related Art Problems (3)

H.E.34—Nutrition Problems (4) or H.E.76 (see jr.-sr. list; not open to students having cred. for H.E.34), or 170-171 (see jr.-sr. list)

H.E.41—Food Management and Marketing (5)
H.E.49—Household Equipment (3)

Rhet.22—Public Speaking (3)

One of the following: Rhet.31—Poetry and Drama (3); Rhet.32—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); Rhet.60 (see jr.-sr. list)

Bact.53—General Bacteriology (5) or Dy.Hu. 20—Household Microbiology (4)

Ag.Bi.1—Introduction to Organic Chemistry (5)

Ag.Ec.3—Principles of Economics (5) or Econ.6-7—Principles of Economics (10)

Psy.1-2—General Psychology (6)

JUNIOR AND SENIOR YEARS

Pub.H.52b—Home Nursing and Family Care (1) and either Pub.H.50—Personal and Community Health (3) or Pub.H.3b (see fr. list)

Ag.Ec.126—Economics of Consumption (3) or Econ.178—Economics of Consumption (3)

H.E.50—Textiles (3)

H.E.53—Advanced Clothing (3)
H.E.76—Nutrition (4) or H.E.170—Nutrition of the Family (3) and H.E.171—Child Nutrition (3); or H.E.34—Nutrition Problems (4) (see soph. list)

H.E.85—Home Management Principles (3)

H.E.86—Home Management Laboratory (4)

H.E.170—Nutrition of the Family (3) and 171—Child Nutrition (3) or H.E.34 (see soph. list) or H.E. 76

H.E.180—Home Planning and Furnishing (5)

Pub.H.59—Health of the School Child (3)

Rhet.51—Exposition (3)

Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)

Ed.55A-B—Introduction to Secondary School Teaching (10)

H.Ed.180—The School and the Social Order (3)

H.E.Ed.90—Child Training (3)

H.E.Ed.91—Observation, Materials, Teaching in Home Economics (5) (plans for home experience prerequisite for H.E.Ed. 91 and 93 should be made early in the junior year with an adviser in home economics education; take this course parallel with H.E.Ed. 93)

H.E.Ed.92—Teaching Problems in Home Economics (2) (take parallel with H.E.Ed. 94)

H.E.Ed.93-94—Supervised Teaching in Home Economics (9) (students must sign up in the Office of Admissions and Records, St. Paul Campus, at least 2 qtrs. prior to registration in this course; plans for home experience prerequisite should be made with adviser)

H.E.Ed.192—Evaluation in Home Economics (2) (take parallel with H.E.Ed. 94)

H.E.Ed.194A—Adult Education in Home Economics (3) (take parallel with H.E.Ed. 94) Additional social science to total 18 cred. (see page 21)

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:

- H.E.54—Problems in Clothing Construction (3)
- H.E.102—Advanced Textiles (3)
- H.E.115—Economic and Social Aspects of Clothing (3)
- H.E.120—Art History (3)
- Bot.1—General Botany (4)

TEACHING FOODS

To the requirements in general teaching add:

- H.E.63—Quantity Food Production (6)
- H.E.70—Advanced Food Preparation (3)
- H.E.142—Experimental Cookery (3)
- Ag.Bi.2—Quantitative Methods (5)

TEACHING NUTRITION

Omit from the requirements in general home economics teaching the following courses:

- H.E. 3, 4, 21, 22, 27, 34, 53, 76, 180, G.C. 7A-C, 10A-B, and Ag.Ec. 126, or Econ. 178

To the requirements in general teaching add:

- H.E.24—Problems in Home Planning and Furnishing (5)
- H.E.142—Experimental Cookery (3)
- H.E.173—Diet Therapy (4)
- H.E.179—Readings in Nutrition (2)

TEACHING RELATED ART

Those interested in teaching related art should: (a) select the minimum requirement in science when there is an option; (b) omit Ag.Ec. 126 or Econ. 178; (c) add the following courses:

- H.E.23—Advanced Design (3)
 - H.E.25—Design Applied to Crafts (3)
 - H.E.120—Art History (3)
 - H.E.122—Advanced Interior Design (3) or H.E.125—Advanced Costume Design (3)
 - H.E.Ed.197—Organization and Methods for Related Art Teaching (1-3)
- Six cred. from the following: Art 1—Introduction to Art (4); Art 20—Drawing (2) or Art 23—Drawing and Design I (3); Art 24—Drawing and Design II (3)

HOME ECONOMICS EXTENSION

A combined curriculum with the College of Education. See all-College

requirements for students in this college, page 18.

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

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 to organize and administer adult and youth programs, and 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 a 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 economics 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 following the junior year. Approval for this field service must be secured from the director of the Agricultural Extension Service.

Those preparing for home economics extension should modify the general home economics teaching curriculum as follows:

Omit the following from the required courses:

- H.E. 53, Ag.Bi. 1, Rhet. 51, H.E.Ed. 92, 94, 192, Ag.Ec. 126 or Econ. 178

Add the following to the required courses:

- Ag.Jo.53—Publicity (3)
- One of the following: Soc.2—Intermediate Sociology (3); Soc.14—Rural Sociology (3); Soc.91—Case Methods Applied to the Study of Human Problems (3); Soc.95—Introduction to Public Welfare (3); Soc.140—Social Organization (3)
- H.E.Ed.95—Field Experience for Home Agents (6)
- H.E.Ed.194A—Adult Education in Home Economics (3)
- Ag.Ec.8—Rural Economics (3) or Ag.Ec.126—Economics of Consumption (3) or Econ.178—Economics of Consumption (3)

The required 3 credits in physical education are to be chosen from the dance (country, folk, modern, or social) and recreational games.

PROFESSIONAL FIVE-YEAR CURRICULUM

This is 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 (M.Ed.)

Special Requirements

1. A total of 230 credits including at least 45 (in 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 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 credits in education including one quarter internship (optional)—8 credits allowed for one quarter)

The best results may be anticipated when plans for the extended training are made during the student's junior year 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 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:

1. Additional academic courses	8 to 24 credits
2. Home Economics	17 to 25 credits
3. General Education	4 to 9 credits
4. Home Economics Education	5 to 9 credits

45

Satisfactory completion of the fifth year of 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 major field
4. An oral examination by the graduate committee of the College of Education and a representative of the School 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.

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 School 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 demonstra-

tion, 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.

The courses required in the curriculum are listed below. For this specialization a grade of at least C is required for the following courses: H.E. 40, 41, 142, 170, Rhet. 22.

Students must meet the all-College requirements for graduation. (See page 18.)

FRESHMAN YEAR

- Orie.1—College Orientation Lectures (1)
 Rhetoric, Communications requirement (9)
 H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
 H.E.10—Introduction to Home Economics (1)
 H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
 H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
 H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
 H.E.40—Food Preparation (5)
 Zool.14-15—General Zoology (6)
 Phsl.4—Human Physiology (4)
 One of the following: In.Ch. 1-2, 4-5, 6-7, 9-10, General Inorganic Chemistry (8 or 10)
 Pub.H.3b—Personal and Public Health (2) or Pub.H.50 (see jr.-sr. list)
 Ag.En.35—Household Physics (5) (students with one year of high school physics may be exempt from this requirement)
 Soc.1A or Soc.1—Introduction to Sociology (3)
 P.E.—Physical Education (3) (may be completed at any time during 4 yrs.)

SOPHOMORE YEAR

- H.E.24—Problems in Home Planning and Furnishing (5)
 H.E.41—Food Management and Marketing (5)
 H.E.49—Household Equipment (3)
 Psy.1-2—General Psychology (6)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and Drama (3); Rhet.32—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); or Rhet.60 (see jr.-sr. list)
 Ag.Bi.1—Introduction to Organic Chemistry (5)
 Ag.Ec.3—Principles of Economics (5)
 Bact.53—General Bacteriology (5)
 Jour.11—Introduction to Reporting (3)
 Jour.18—Principles of Advertising (3) or B.A.188 (see jr.-sr. list)

JUNIOR AND SENIOR YEARS

- Pub.H.52b—Home Nursing and Family Care (1) and either Pub.H.50—Personal and Community Health or Pub.H.3b (see fr. list)
 H.E.50—Textiles (3)
 H.E.63—Quantity Food Production (6)
 H.E.70—Advanced Food Preparation (3)
 H.E.71—Demonstrations (1)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.120—Art History (3)
 H.E.140—New Developments in Food Preparation (3)
 H.E.141—Current Literature in Foods (3)
 H.E.142—Experimental Cookery (3)
 H.E.146—Special Food Problems (3)
 H.E.170—Nutrition of the Family (3)
 H.E.171—Child Nutrition (3)
 H.E.179—Readings in Nutrition (2)
 H.E.Ed.90—Child Training (3)
 Psy.156—Psychology of Advertising (3)
 B.A.188—Advertising (3) or Jour.18 (see soph. list)

- Ag.Ec.126—Economics of Consumption (3) or Econ.178—Economics of Consumption (3)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)
 Any two of the following: G.C.26a—Photography (3) or Jour.10—Photography (3); Jour.41—Editing for Nonmajors (3); Jour. 69—Newspaper and Magazine Articles (3); An.Hu.50—Meat Selection and Utilization (3); Rhet.54—Advanced Public Speaking (3); H.E.46—Food Service Job Studies (3)

RELATED ART

The curriculum in related art and business is planned to give students a background in the applications of color and design leading primarily to work in department stores, interior design studios, and dress and specialty shops. In addition to the required basic courses listed below, it is highly desirable to have practical retailing experience before graduation. This may be obtained through vacation-time work.

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.

For this specialization a grade of at least C is required for the following courses: H.E. 21, 22, 27, 122, 125, 180. It is recommended that each student learn to use a typewriter.

Students must meet the all-College requirements for graduation. (See page 18.)

FRESHMAN YEAR

- Orie.1—College Orientation Lectures (1)
 H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
 H.E.10—Introduction to Home Economics (1)
 H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
 H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
 H.E.21-22—Color and Design I and II (6)
 H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
 H.E.40—Food Preparation (5)
 Rhetoric, Communications requirement (9)
 G.C.10A,B—Human Biology I and II (6)
 Pub.H.3—Personal Health (2) and Pub.H.4—Health Problems of Adult Life (2) (these courses are not accepted for teaching; take instead G.C. 10A, B, Dy.Hu. 20, and Pub.H. 52b—Home Nursing and Family Care (1), and either Pub.H.3b—Personal and Public Health (2) or Pub.H.50—Personal and Community Health (3)
 Ag.En.35—Household Physics (5) or G.C.7A—Elements of Physics (5) (those with one yr. of high school physics may be exempt from this requirement)
 G.C.7C—Elements of Chemistry (5)

Soc.1A or Soc.1—Introduction to Sociology (3)
 Hist.1-2—Civilization of the Modern World (6) or Hist.17—Modern Economics and Social Problems (5)
 P.E.—Physical Education (3) (may be completed any time during 4 yrs.)
 Art 1—Introduction to Art (4)
 Art 20—Drawing (2) or Art 23—Drawing and Design I (3)
 Art 24—Drawing and Design II (3)

SOPHOMORE YEAR

H.E.23—Advanced Design (3)
 H.E.25—Design Applied to Crafts (3)
 H.E.27—Related Art Problems (3)
 H.E.34—Nutrition Problems (4) or H.E.76 (see jr.-sr. list)
 H.E.41—Food Management and Marketing (5)
 H.E.49—Household Equipment (3)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and Drama (3); Rhet.32—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); or Rhet.60 (see jr.-sr. list)
 One of the following: Comp.27-28—Advanced Writing (6); Comp.7—Composition Review (3); Rhet.26—Original Writing (3); Jour. 11—Introduction to Reporting (3); Jour. 41—Editing for Nonmajors (3); or 5 or 6 additional cred. in English literature
 Ag.Ec.3—Principles of Economics (5) or Econ.6-7—Principles of Economics (10)
 Psy.1-2—General Psychology (6)
 Jour.18—Principles of Advertising (3) or Psy.156 or B.A.188 (see jr.-sr. list)

JUNIOR AND SENIOR YEARS

H.E.50—Textiles (3)
 H.E.76—Nutrition (4) or H.E.34 (see soph. list)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.120—Art History (3)
 H.E.121—Textile Design (3)
 H.E.122—Advanced Interior Design (3)
 H.E.125—Advanced Costume Design (3) (this course may be omitted for those who are specializing in interior furnishing)
 H.E.180—Home Planning and Furnishing (5)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)
 Ag.Ec.126—Economics of Consumption (3) or Econ.178—Economics of Consumption (3)
 Psy.156—Psychology of Advertising (3) or B.A.188—Advertising (3) or Jour.18 (see soph. list)
 One of the following: Jour.41—Editing for Nonmajors (3); Comp.27-28, Jour.11, Rhet. 26 (see soph. list); or 5 or 6 additional cred. in English literature
 H.E.Ed.90—Child Training (3)
 B.A.114—Retail Store Management (3) or H.E.58—Supervised Retail Training (4)

Costume Design

To the general courses listed under related art add:

H.E.3-4—Clothing Construction A and B (6)

H.E.115—Social and Economic Aspects of Clothing (3)

Omit:

H.E.122—Advanced Interior Design (3)

Journalism

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. A total of 18 credits is required in Comp. 27-28 and journalism courses.

To the required courses listed under related art add:

Comp.27-28—Advanced Writing (6)
 Jour.11—Introduction to Reporting (3)
 Jour.41—Editing for Nonmajors (3)
 Jour.65—Graphic Arts: Processes (3)
 Jour.69—Newspaper and Magazine Articles (3)

Omit:

Art 20—Drawing (2) or Art 23—Drawing and Design I (3)

Art 24—Drawing and Design II (3)

TEXTILES AND CLOTHING

The textiles and clothing in business curriculum is planned to give students who wish to specialize in this field a background of fundamental knowledge concerning textile materials and clothing construction processes which is essential for selling fabrics and garments in department stores, for positions in journalism, for work in a textiles laboratory, or for other jobs where such information is needed. Experience in retail selling before graduation is desirable.

The courses required in the curriculum are listed below. For this specialization a grade of at least C is required in the following courses: H.E. 3, 4, 21, 22, 50, 102, 107, 115.

Students must meet the all-College requirements for graduation. (See page 18.)

FRESHMAN YEAR

Orie.1—College Orientation Lectures (1)
 H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
 H.E.3—Clothing Construction A (3)
 H.E.10—Introduction to Home Economics (1)
 H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
 H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
 H.E.21-22—Color and Design I and II (6)
 H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
 H.E.40—Food Preparation (5)

Rhetoric, Communications requirement (9)
 Ag.En.35—Household Physics (5) or G.C.7A—
 Elements of Physics (5) (students with
 one year of high school physics may be
 exempt from this requirement)
 P.E.—Physical Education (3) (may be taken
 at any time during the four yrs.)
 Pub.H.3b—Personal and Public Health (2) or
 Pub.H.50 (see jr.-sr. list)
 Soc.1A or Soc.1—Introduction to Sociology
 (3)
 Bot.1—General Botany (3)
 One of the following: In.Ch. 1-2, 4-5, 6-7,
 9-10, General Inorganic Chemistry (8 or 10)
 or G.C. 7C, Elements of Chemistry (5)
 (omit G.C. chemistry for textile testing)

Take Group I or II

Group I

Zool.14-15—General Zoology (6)
 Phsl.4—Human Physiology (4)
 Dy.Hu.20—Household Microbiology (4) or
 Bact.53 (see soph. list)

Group II

G.C.10A-B—Human Biology (6)
 Dy.Hu.20—Household Microbiology (4) or
 Bact.53 (see soph. list)

SOPHOMORE YEAR

H.E.4—Clothing Construction B (3)
 H.E.27—Related Art Problems (3)
 H.E.34—Nutrition Problems (4) or H.E.76, or
 H.E.170-171 (see jr.-sr. list)
 H.E.49—Household Equipment (3)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and
 Drama (3); Rhet.32—Novel and Short Story
 (3); Rhet.33—American Life in American
 Literature (3); Rhet.60 (see jr.-sr. list)
 Bact.53—General Bacteriology (5) or Dy.Hu.
 20 (see fr. list)
 Ag.Bi.1—Introduction to Organic Chemistry
 (5)
 Ag.Ec.3—Principles of Economics (5) or
 Econ.6-7—Principles of Economics (10)
 Ag.Ec.25—Principles of Accounting (4) or
 Econ.24—Principles of Accounting (3)
 Psy.1-2—General Psychology (6)

JUNIOR AND SENIOR YEARS

Pub.H.52b—Home Nursing and Family Care
 (1) and either Pub.H.50—Personal and Com-
 munity Health (3) or Pub.H.3b (see fr. list)

H.E.50—Textiles (3)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.102—Advanced Textiles (3)
 H.E.115—Economic and Social Aspects of
 Clothing (3)
 H.E.120—Art History (3)
 H.E.76—Nutrition (4); or H.E.170—Nutrition
 of the Family (3) and H.E.171—Child Nu-
 trition (3); or H.E.34 (see soph. list)
 H.E.180—Home Planning and Furnishing (5)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature
 (3) or Rhet. 31, 32, 33 (see soph. list)
 Ag.Ec.126—Economics of Consumption (3)
 or Econ.178—Economics of Consumption (3)
 B.A.77—Survey of Marketing (3)
 B.A.114—Retail Store Management (3)
 B.A.188—Advertising (3)
 H.E.Ed.90—Child Training (3)
 Psy.156—Psychology of Advertising (3)

In addition, the student will choose
 the phase of textiles and clothing in
 business in which she is interested and
 for which the special requirements are
 listed below.

Store and Other Commercial Enterprises

H.E.53—Advanced Clothing (3)
 Fren.1—Beginning French (5) (or one yr. of
 high school French)

Journalism

Comp.27-28—Advanced Writing (6)
 H.E.53—Advanced Clothing (3)
 Jour.11—Introduction to Reporting (3)
 Jour.41—Editing for Nonmajors (3)
 Jour.69—Newspaper and Magazine Articles
 (3)

Textiles Testing

H.E.107—Textile Analysis (3)
 Pub.H.110—Biometric Principles (3) and
 Pub.H.111—Biostatistics Laboratory (2) or
 Ag.Ec. 90—Agricultural Statistics (5)
 Ag.Bi.2—Quantitative Methods (5)
 Additional social science to total 18 cred.
 (see page 21)

V. Institution Management

The curriculum in institution man-
 agement is planned to provide back-
 ground and initial experience for those
 students who are interested in food
 service of a commercial nature or mass
 feeding in general. Opportunities for
 trained people in this field are found in
 restaurants, cafeterias, school lunch
 rooms, industrial plants, colleges and
 other types of institutions.

Students get actual experience ana-
 lyzing and handling a variety of prob-
 lems in large quantity food production,
 service, and management.

It is recommended that each student
 who wishes to secure positions of re-
 sponsibility use vacation periods to get
 well rounded work-experience. Such
 experience may be gained by securing

minor positions in camps, restaurants, hotels, and clubs.

It is highly desirable that candidates learn to use the typewriter.

There is a trend in this profession toward advanced work following the completion of requirements for a degree in Home Economics. There are a number of internships available, in various parts of the country, offering approximately a year of training. These internships are planned to give broad experience in a variety of situations. Such preparation is desirable for those who wish to progress in this field. Consult your adviser about internships.

Courses required in the curriculum are listed below. A grade of at least C is required in the following courses: H.E. 40, 41, 46, 63, 64, 65, 170.

Students must meet the all-College requirements for graduation. (See page 18.)

FRESHMAN YEAR

- Orie.1—College Orientation Lectures (1)
 H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
 H.E.6—Introduction to Food Production, Distribution and Control (3) (not open to non-majors)
 H.E.10—Introduction to Home Economics (1)
 H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
 H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
 H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
 H.E.40—Food Preparation (5)
 Pub.H.3b—Personal and Public Health (2) or Pub.H.50 (see jr.-sr. list)
 Rhetoric, Communications requirement (9)
 One of the following: In.Ch. 1-2, 4-5, 6-7, 9-10, General Inorganic Chemistry (8 or 10)
 Ag.En.35—Household Physics (5) or G.C.7A—Elements of Physics (5) (students who have had one year of high school physics are exempt from this requirement)
 Soc.1A or Soc.1—Introduction to Sociology (3)
 Physical Education (3) (may be taken any time during the four years)

Take Group I or II

Group I

- Zool.14-15—General Zoology (6)
 Phsl.4—Human Physiology (4)
 Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)

Group II

- G.C.10A-B—Human Biology (6)
 Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)

SOPHOMORE YEAR

- H.E.24—Problems in Home Planning and Furnishing (5)
 H.E.41—Food Management and Marketing (5)
 H.E.46—Food Service Job Studies (3) (open only to home economics students registered in this college)
 H.E.49—Household Equipment (3)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and Drama (3); Rhet.22—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); or Rhet.60 (see jr.-sr. list)
 Bact.53—General Bacteriology (5) or Dy.Hu.20 (see fr. list)
 Ag.B.1—Introduction to Organic Chemistry (5)
 Ag.Ec.3—Principles of Economics (5) or Econ.6-7—Principles of Economics (10)
 Ag.Ec.25—Principles of Accounting (4) or Econ.24-25—Principles of Accounting (6)
 Soc.2—Intermediate Sociology (3) or Soc.14—Rural Sociology (3)
 Psy.1-2—General Psychology (6)

JUNIOR AND SENIOR YEARS

- Pub.H.52b—Home Nursing and Family Care (1) and either Pub.H.50—Personal and Community Health (3) or Pub.H.3b (see fr. list)
 H.E.50—Textiles (3)
 H.E.63—Quantity Food Production (6) (open to home economics students registered in this college)
 H.E.64—Purchasing for Institutions (4)
 H.E.65—Institution Management Problems (3)
 H.E.70—Advanced Food Preparation (3)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.142—Experimental Cookery (3)
 H.E.170—Nutrition of the Family (3)
 H.E.171—Child Nutrition (3)
 H.E.173—Diet Therapy (4)
 H.E.Ed.90—Child Training (3)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)
 Pub.H.100—Elements of Preventive Medicine and Public Health (5) or Pub.H.102—Environmental Sanitation I (3)
 Ag.Ec.126—Economics of Consumption (3) or Econ.178—Economics of Consumption (3)
 B.A.77—Survey of Marketing (3) or Ag.Ec.40—Principles of Marketing Organization (3)
 One of the following: B.A.167—Introduction to Industrial Relations (3); Econ. 161—Labor Problems (3); Psy.160—Psychology in Personnel Work (3); or Psy.156—Psychology of Advertising (3)
 An.Hu.50—Meat Selection and Utilization (3)
 Recommend H.E.146—Special Food Problems, as an elective
 Additional social science to total 18 credits (see page 21)

VI. Home Economics and Nursery School Education

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 director of the School 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 listed under Methods and Directed Teaching in the *Bulletin of the College of Education*.

Students must meet the all-College requirements for graduation. (See page 18.)

JUNIOR AND SENIOR COURSES

- Ed.T.55—Principles of Early Childhood Education (3)
 C.W.80—Child Psychology (3)
 Ed.T.57—Nursery School-Kindergarten Laboratory in Art, Literature, and Social Studies (5)
 Ed.T.58—Nursery School-Kindergarten Laboratory in Permanent Play Materials, Music, and Science (5)
 Ed.T.77—Student Teaching in the Nursery School (5)
 Additional social science to total 18 credits (see page 21)

VII. 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 or 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 ratio of 1.5 must be maintained. The courses listed below are required for all students taking these curricula.

Students must also meet the all-College requirements for graduation. (See page 18.)

- 5-6—General Physics (15); Phys.7-8-9—General Physics (15)
 Soc.1A or Soc.1—Introduction to Sociology (3)
 Physical Education (3) (may be taken at any time during the four yrs.)
 Mathematics (10)

SOPHOMORE YEAR

- H.E.24—Problems in Home Planning and Furnishing (5) or H.E.180 (see jr.-sr. list)
 H.E.49—Household Equipment (3)
 Rhet.22—Public Speaking (3)
 One of the following: Rhet.31—Poetry and Drama (3); Rhet.32—Novel and Short Story (3); Rhet.33—American Life in American Literature (3); or Rhet.60 (see jr.-sr. list)
 Bact.53—General Bacteriology (5) or Dy.Hu.20 (see fr. list)
 Ag.Bi.1—Introduction to Organic Chemistry (5) or Or.Ch.61-62—Elementary Organic Chemistry (8)
 Ag.Bi.2—Quantitative Methods (5) or An.Ch.1-2—Quantitative Analysis (10) or An.Ch.7—Quantitative Analysis (4)
 Ag.Ec.3—Principles of Economics (5) or Econ. 6-7—Principles of Economics (10)
 Psy.1-2—General Psychology (6)

JUNIOR AND SENIOR YEARS

FRESHMAN YEAR

- Orie.1—College Orientation Lectures (1)
 H.E.1—Choice and Care of Clothing (4) (not open to H.E. srs.)
 H.E.10—Introduction to Home Economics (1)
 H.E.17—Personal and Family Living (3) (not open to H.E. srs.)
 H.E.20—Introduction to Related Art (4) (not open to H.E. srs.)
 H.E.31—Introduction to Nutrition (3) (not open to H.E. srs.)
 H.E.40—Food Preparation (5)
 Rhetoric, Communications requirement (9)
 Zool.14-15—General Zoology (6)
 Dy.Hu.20—Household Microbiology (4) or Bact.53 (see soph. list)
 Phsl.4—Human Physiology (4)
 One of the following: In.Ch. 1-2, 4-5, 6-7, 9-10. General Inorganic Chemistry (8 or 10)
 One of the following: Ag.En.35—Household Physics (5); Phys.1-2-3—Introduction to Physical Science (9); Phys.1a-2a-3a—Introduction to Physical Science (12); Phys.4-

- Pub.H.52b—Home Nursing and Family Care (1) and either Pub.H.3b—Personal and Public Health (2) or Pub.H.50—Personal and Community Health (3)
 H.E.50—Textiles (3)
 H.E.85—Home Management Principles (3)
 H.E.86—Home Management Laboratory (4)
 H.E.170—Nutrition of the Family (3)
 H.E.180—Home Planning and Furnishing (5) or H.E.24 (see soph. list)
 Rhet.51—Exposition (3)
 Rhet.60—Contemporary Life and Literature (3) or Rhet. 31, 32, 33 (see soph. list)
 H.E.Ed.90—Child Training (3)
 Additional social science to total 18 cred. (see page 21)

A. MAJOR IN EXPERIMENTAL FOODS

In addition to the foregoing courses, a major sequence in experimental foods must include the following:

H.E.41—Food Management and Marketing (5) and H.E.70—Advanced Food Preparation (3)

B. MAJOR IN NUTRITION

A major sequence in nutrition, which may include courses clearly related or fundamental thereto, requires a total of 24 to 36 credits which must include, in addition to the required courses listed above, the following courses:

H.E.41—Food Management and Marketing (5), H.E.142—Experimental Cookery (3) H.E.33—Nutrition I (4) and H.E.171—Child Nutrition (3)

A minor sequence requires 10 to 12 credits to be chosen outside the field of nutrition, e.g., bacteriology, biochemistry, economics, physics, physiology, sociology, or statistics. It must not in-

clude any of the courses that are required of all students in the curriculum.

Modern language, 9 credits

C. MAJOR IN TEXTILES AND CLOTHING

A major sequence in textiles and clothing, which may include courses clearly related or fundamental thereto, requires a total of 24 to 36 credits which must include, in addition to the required courses listed above, the following courses:

H.E.3—Clothing Construction A (3) and H.E.102—Advanced Textiles (3)

A minor sequence requires 10 to 12 credits to be chosen outside the field of textiles and clothing, e.g., biochemistry, botany, economics, physics, or statistics. It must not include any of the courses that are required of all students in the curriculum.

Modern language, 9 credits

VIII. Journalism-Home Economics (Major)

This curriculum prepares students for professional work in areas of newspaper, magazine, advertising, radio, public relations, and other journalistic activity in which proficiency in home economics subject matter is necessary. The curriculum offers a major journalism sequence combined with general home economics background and specialization in selected home economics

fields. Its flexibility makes it possible to suit requirements to the individual needs of each student. Students electing the curriculum register in the College of Science, Literature, and the Arts. They design their programs in consultation with major advisers in both the School of Journalism and the School of Home Economics.

Description of Courses

The courses offered in the College of Agriculture, Forestry, and Home Economics are described below. They are grouped by departmental offerings, and listed in numerical sequence within departments. Courses in the School of Veterinary Medicine available to students in Agriculture are described on page 95. Description of courses offered by other colleges of the University but taken by students enrolled in Agriculture, Forestry, or Home Economics will be found in the bulletin of the college offering the course.

Courses primarily for freshmen and sophomores are numbered 1 through 49; for juniors and seniors, 50 through 99; for juniors, seniors, and graduate students, 100 through 199; and for graduate students only, 200 and over.

The following symbols are used throughout this bulletin:

* An asterisk after the number indicates courses through which it is possible for graduate students to prepare required Plan B papers.

† A dagger after a course number indicates that all quarters of the course preceding the dagger must be completed before credit will be granted for any quarter. (In 1-2†-3, the first two quarters must be completed, while the third is optional.)

‡ A double dagger following a sequence course number indicates that students may enter any quarter.

§ A section mark means that credit will not be given for the course if the equivalent course listed after the section mark has been taken for credit.

¶ A paragraph mark preceding a course number means "concurrent registration," or that the course so indicated may be taken simultaneously.

‡ A sharp mark means "consent of the instructor."

△ A triangle mark means "consent of the division, department, or school involved." (To be obtained at the appropriate office.)

AGRICULTURAL BIOCHEMISTRY (Ag.Bi.)

This department offers two types of training: (1) courses designed to train students for research or instruction in biochemistry, and (2) courses for students whose main studies are in those other departments 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 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; Or.Ch. 61, 62, 63, 64 (14 cred.); Phys. 4-5-6 or 7-8-9 (15 cred.); mathematics through integral calculus; P.Ch. 101-102-103 (9 cred.); Agro. 31 (4 cred.); Ag.Bi. 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.

FRESHMAN AND SOPHOMORE COURSES

- 1. Introduction to Organic Chemistry.** An introduction to the chemistry of carbon compounds. The principles underlying the classification, structure, uses, and general properties of the various types of compounds with emphasis on those that are of biological importance. (5 cred.; prereq. 8 cred. in inorganic chemistry; by special permission of adviser, G.C. 7A and 7C will be acceptable as prereq. for H.E. students)
- 2. Quantitative Methods.** Principles of quantitative analysis, including stoichiometric problems, practice in use of the balance, and in typical gravimetric and volumetric manipulation. (5 cred.; prereq. 8 cred. in inorganic chemistry)

3. **Introduction to Biochemistry.** A discussion of the fundamentals of biochemistry, chemistry of carbohydrates, proteins and fats, enzymes, colloids, hydrogen ion concentration, and other essential subject matter. (3 cred.; 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.; prereq. Ag.Bi. 3 or equiv.)
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.; prereq. Ag.Bi. 3 or equiv.)
10. **Dairy Chemistry.** Lectures and laboratory work on the physical and chemical properties of milk and dairy products. (5 cred.; prereq. 1, 3)

JUNIOR AND SENIOR COURSES

103. **Advanced Dairy Chemistry.** Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products. (5 cred.; prereq. 10)
105. **Plant Biochemistry.** Same as 5 except that a term paper is required.
106. **Animal Biochemistry.** Same as 6 except that a term paper is required.
108. **Chemistry of Wheat and Wheat Products.** Lecture course, with collateral library reference work, on the chemical technology of the production and milling of wheat and its conversion into food. (3 cred.; prereq. 5)
110. **Flour Laboratory Methods.** A laboratory course. Analysis of wheat and its products. Designed to train students for research in the cereal industry. (3 to 5 cred.; prereq. 2 or equiv., 108 or ¶108)
116. **Advanced Animal Nutrition.** Biochemistry of animal nutrition. (3 cred.; prereq. 6 or equiv., 120 advised)
117. **Laboratory Problems in Animal Nutrition.** A laboratory course on methods used in nutrition studies. (3 cred.; prereq. 116, #)
118. **Laboratory Problems in Biochemistry.** Laboratory work in preparation and isolation of pure compounds, and special methods of identification or determination of biochemical products. (3 to 5 cred.; #)
119. **Physical Biochemistry.** Lectures and assigned readings on colloid chemistry, surface chemistry, molecular kinetics and their application to biochemical materials and processes. (3 cred.; prereq. 3, or 8 cred. in organic chemistry, Phys. 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.; prereq. 119 or #)
121. **Carbohydrates.** Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. (3 cred.; prereq. 119 or #)
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.; prereq. 119 or #)
123. **Enzymes.** Lectures and assigned reading on the nature and function of enzymes. (3 cred.; prereq. 120 or ¶120 or #)
124. **Vitamins.** Lectures and reading on the biochemistry of vitamins and their physiological action. (3 cred.; prereq. 6, 119, 123 advised, or equiv.)
129. **Physical Biochemistry Laboratory.** Preparation, purification, and the study of physico-chemical properties of inorganic and biocolloid systems. (2 cred.; prereq. 2 or equiv., ¶119)
130. **Proteins Laboratory.** Preparation, identification, and analysis of proteins and their hydrolytic products. (2 cred.; prereq. 2 or equiv., ¶120)

- 131. Carbohydrate Laboratory.** Preparation, identification, and analysis of sugars and polysaccharides. (2 cred.; prereq. 2 or equiv., ¶121)
- 132. Lipides Laboratory.** Preparation, identification, and analysis of the lipides. (2 cred.; prereq. 2 or equiv., ¶122)
- 133. Enzymes Laboratory.** Preparation and measurement of enzymes and study of their properties. (2 cred.; prereq. 2 or equiv., ¶123)

AGRICULTURAL ECONOMICS (Ag.Ec.)

Students majoring in agricultural economics work out a program suited to their needs in consultation with an adviser in the department. Opportunities are available for specialization in various fields such as farm management, marketing, agricultural prices, and farm finance. 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, forestry, and veterinary medicine. (3 cred.; prereq. soph.; 1 and 2†)
- 2. Principles of Economics II.** For students in agriculture, forestry, and veterinary medicine. (5 cred.; prereq. soph., 1)
- 3. Principles of Economics.** For students in home economics. (5 cred.; prereq. soph.)
- 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.; prereq. soph., 2 or 3)
- 25. Principles of Accounting.** (4 cred., prereq. soph.; for students in this college 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.; prereq. soph., 2)
- 40. Principles of Marketing Organization.** Principles of the organization of the market and of marketing enterprises, both proprietary and co-operative. (3 cred.; prereq. soph., 2)

JUNIOR AND SENIOR COURSES

- 50. Farm Finance.** The mechanism of exchange, with special reference to financing the production and marketing of farm products. (5 cred.; for students in agriculture and forestry only; # for soph.; 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.; # for soph.)
- 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.; # for soph.; grad. students may take Ag.Ec. 190)
- 102. Farm Organization.** Characteristics of farming as a business; factors determining types of farming; tenure and selection; layout and improvements; factors affecting the selection of crops and livestock for a particular farm. (3 cred.; prereq. 2, or Econ. 9 for Institute of Technology students)
- 103. Farm Operation.** Farm budgeting; personal and business factors affecting financial success; utilization of labor, power, and equipment; management research methods and management services. Special problem in farm planning. Field visit to well-managed farms. (3 cred.; 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.; 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.; 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.; prereq. 2)
- 126. Economics of Consumption.** Nature of human wants; standards of living; theory of consumer behavior; nature of demand; demand and price; income and consumption; relation of consumption to the population problem. (3 cred.; prereq. 2 or 3)
- 127. Economics of Food and Nutrition.** A review of consumption trends; the relation of food consumption to price, income and other variables, the economic implications of nutrition, the consumption-production balance, food consumption problems, food policy. (3 cred.; prereq. 126 or #)
- 131. Market Prices.** The nature of demand for farm products; supply considerations; price formulation and the structure of markets; price variation and instability; dynamic analysis. (3 cred.; prereq. 30)
- 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.; prereq. 40)
- 141. Marketing Organization: Dairy and Poultry Products.** (3 cred.; prereq. 40)
- 142. Marketing Organization: Fruits and Vegetables.** (2 cred.; prereq. 40)
- 143. Marketing Organization: Livestock and Meats.** (3 cred.; 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 organizations, especially of marketing agencies. (3 cred.; prereq. 40)
- 147. Marketing Accounting.** (Formerly 47) 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.; prereq. 25 or equiv.)
- 150. Advanced Farm Finance.** Consideration of credit problems of farmers with special attention to credit principles, policies, and financial institutions. (3 cred.; 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.; prereq. 110 or #)
- 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.; prereq. 110 or #)
- 176. Economic Problems of Beginning Farmers.** Availability of farming opportunities, alternative methods of acquiring a farm, evaluation of various forms of operating agreements and inheritance arrangements, use of credit, comparative rates of capital accumulation, interrelations between the problems of beginning farmers and the structure of land ownership and tenure. (3 cred.; prereq. 170 or #)
- 190. Agriculture Statistics.** (See 90) (3 cred.; grad.)
- 191. Advanced Agricultural Statistics.** Analysis of agricultural data by methods of correlation, partial and multiple correlation, analysis of variance and significance of results. (3 cred.; prereq. 90)

AGRICULTURAL EDUCATION (Ag.Ed.)**COURSES FOR UNDERGRADUATE STUDENTS**

1. **Introduction to Agricultural Education.** Orientation to employment and service in agricultural education. Qualifications of teachers, survey of preparatory offerings, and an overview of the program of agricultural education in Minnesota. (1 cred.)
54. **Rural Education and Community Leadership.** An appraisal of community educational agencies; the process of and responsibilities for community leadership; the role of the school in the rural community; co-ordination of the school with nonschool educational agencies. (3 cred.; open to soph.)
56. **Rural Education Through Extension Methods.** Role of the Extension Service in rural education; methods and techniques of instruction in nonschool educational programs. (3 cred.; open to soph.)
- 81-82. **Teaching Agriculture in the Secondary School.** Fundamentals of teaching agriculture to high school students; use of the home, farm and community in structuring courses of study; the Future Farmers of America, the Vo-Ag Planning and Record Book; organization and management of the farm and school shop; building and utilizing teaching units. (4 cred. per qtr.; prereq. Ed. 55B)
91. **Supervised Teaching Experience.** Supervised experience in work of agriculture instructor. Includes instruction in development of individual farming programs, contacting parents, program analysis of community needs, conducting classes, community activities, Future Farmers, and case studies. (6 cred.; prereq. sr., 82 and §)
104. **Planning Programs.** Developing a program of agricultural education in a community school. Integration with total school program. Administrative relationships and professional improvement. (2 cred.; prereq. last qtr. undergraduate registration or §)
106. **Young Farmer and Adult Education in Agriculture.** The organization, objectives, and techniques for conducting continuing programs for out-of-school farm youth and adult farm people; occupational opportunities and establishment in farming; analysis of farm businesses as a basis for balanced programs of instruction. (4 cred.; prereq. Ag.Ed. 81)
121. **Enterprise Analysis.** Analyzing the farm business as a basis for identifying problems. Planning learning experiences to improve farm management at the high school, young farmer, and adult levels. (3 cred.; prereq. sr., or §)
141. **Supervised Farm Practice in Vocational Agriculture.** The selection, planning, supervising, and summarizing of the individual farming programs. Adaptation to meet needs of high school F.F.A. students, young farmers, and adults. (3 cred. per qtr., total 9 cred.; prereq. grad. or §, 10 cred. in education or §)
145. **The Integrated Course of Study in Agriculture.** The philosophy, organization, and administration of instruction in agriculture departments in the secondary schools. (3 cred.; prereq. sr., 10 cred. in education)
- 154.* **Rural Education and Community Leadership.** Same as Ag.Ed. 54, with additional reading and special problem required. (3 cred.; prereq. grad. or §)
- 156.* **Rural Education Through Extension Methods.** Same as Ag.Ed. 56, with additional reading and special problem required. (3 cred.; prereq. grad. or §)

AGRICULTURAL ENGINEERING (Ag.En.)

Students in technical agriculture may take their major or minor in the field of mechanized farming. The field embraces the practical phases of technology as applied to agriculture, including farm machinery and power, farm buildings, drainage and irrigation, soil erosion control, farm home conveniences, and rural electrification. Because of the broad scope of the field, students majoring in it are advised to consult with the department for assistance in outlining a program of study.

A professional five-year course in agricultural engineering is offered jointly with the Institute of Technology. Information on this curriculum is given in this bulletin.

Mechanized Farming

FRESHMAN AND SOPHOMORE COURSES

3. **Mechanical Drawing.** Drafting instruments and their uses. Lettering, scale reading, conventional symbols, tracings, and reproductions. Multiview drawings, pictorial drawings, plats of surveys, and contour maps. (3 cred.)
6. **Farm Buildings.** Arrangement, planning, and economics of farm buildings. Requirements of animal shelters, crop and machine storage buildings, and farm homes. (3 cred.)
7. **Farm Building Construction.** Use of carpentry tools and machines in the construction of farm buildings and farmstead equipment. Building materials and construction details. (3 cred.)
11. **Applied Mathematics.** Combination of 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 work. (5 cred.; prereq. high school elementary algebra or equiv.)
12. **Agricultural Machinery.** Machinery as a factor in agricultural production; development and use. (3 cred.; prereq. 23 or equiv.)
13. **Engines and Tractors.** Elementary principles of internal combustion engines and tractors. (3 cred.; prereq. 23 or equiv.)
19. **Elementary Surveying.** Use of steel tape, engineers level, hand level, and transit in basic agricultural and forestry field problems, e.g., measurement of distance, elevation, slope, horizontal angles, and directions. Contour mapping. (3 cred.; prereq. 3, and 11 or trigonometry)
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.; prereq. 11 or equiv.)
24. **Agricultural Physics I.** An applied course involving lectures and laboratory work in mechanics and heat. (4 cred.; prereq. Math. 6 or equiv. or Ag.En. 11)
25. **Agricultural Physics II.** A practical lecture, recitation, and laboratory course on electricity and light. (4 cred.; prereq. 24)
31. **Mechanics of Drainage and Erosion Control.** Engineering phases of soil and water conservation, including farm drainage, terracing, and other soil conservation practices. Precipitation, runoff, and water problems, local and national. (3 cred.; prereq. Soil. 2)
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. (3 cred.; prereq. Soil. 2)
35. **Household Physics.** Lectures, laboratory, and experimental demonstrations of selected principles in physics, with special attention to those involved in household appliances and processes. (5 cred.)
40. **Mechanical Training.** Instruction and laboratory practice in rope work, cement work, soldering, hand tools, electric wiring. (3 cred.)
41. **Metal Work.** Instruction and laboratory practice in pipe fitting, drilling, use of taps and dies, oxyacetylene welding, brazing, cutting, and electric arc welding. (3 cred.)
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.; offered 1956-57 and alternate years)

JUNIOR AND SENIOR COURSES

- 50. Advanced Surveying.** Topographic surveys with transit and with plane table, including stadia and traversing methods. Route survey including curve layout, cross-sectioning, and earthwork computations. Calculation of land areas, public land surveys. (3 cred.; prereq. 19)
- 55. Electricity in Agriculture.** Elementary theory of electricity circuits and instruments. Study of the application of electrical energy to agriculture. Selection and maintenance of equipment. Electrical safety. (2 cred.; prereq. 11 or equiv., and 23 or equiv.)
- 60. Soil and Water Control.** Use of engineer's level and tape. Subdivision of land. General principles and practices of farm drainage and soil erosion control. (3 cred.; prereq. 11 or equiv., and 23 or equiv., and Soil. 2)
- 67. Rural Sanitation and Water Supply.** Wells, pumps, and water supply. Sanitary water supply and sewage disposal systems for the farmstead. (3 cred.; open also to soph.; prereq. 11 or equiv., and 23 or equiv. and Soil. 2)
- 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.; prereq. 23 or equiv.; offered in 1955-56 and alternate years)
- 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. (4 cred.; prereq. Soil. 2)
- 114. Buildings, Equipment, Materials, and Methods of Construction.** The relation of structures and building equipment to agriculture. Lectures and special problems. (3 cred.; prereq. 6 and 7, and 3 or equiv.)
- 124. Agricultural Machinery and Mechanical Power Management.** Machinery and power management and use and its costs as a factor in agricultural production. Lectures and special problems. (3 cred.; prereq. 9 cred. in agricultural engineering, including 12 and physics)
- 125. Topics in Agricultural Physics.** Advanced study of the essential physical principles involved in the utilization of electricity in agriculture. (3 cred.; prereq. 117, or integral calculus and 25 or equiv.)

Engineering

The following courses are offered in the Institute of Technology and are open only to students in the professional five-year curriculum. For descriptions of courses see the *Bulletin of the Institute of Technology*.

- 8. Laboratory.** Engineering units and measurements. (1 cred.; no prereq.; 2 lab. hrs. per wk.)
- 9. Laboratory.** Engineering materials, their characteristics and use. (1 cred.; no prereq.; 2 lab. hrs. per wk.)
- 10. Laboratory.** Introduction to agricultural engineering applications. (1 cred.; no prereq.; 3 lab. hrs. per wk.)
- 18. Agricultural Automotives.** (3 cred.; prereq. M.E. 131; 2 lect. and 3 lab. hrs. per wk.)
- 21. Elements of Surveying.** (5 cred.; prereq. Draw. 6, I.T.M. 12; 1 lect. and 12 lab. hrs. per wk.)
- 36. Rural Sanitation and Water Supply.** (3 cred.; prereq. Hydr. 102, 3 lect. hrs. per wk.; offered 1956-57 and alternate years)
- 51. Soil and Water Conservation.** (3 cred.; prereq. 21, Soil. 2, Hydr. 102 or Hydr. 102; 3 lect. hrs. per wk.)
- 52. Elements of Farm Machinery.** (3 cred.; prereq. M.E. 24; 1 lect., 1 rec., and 3 lab. hrs. per wk.)
- 53. Farm Structures.** (3 cred.; prereq. C.E. 32, Econ. 9; 1 lect., 1 rec., and 3 lab. hrs. per wk.)

- 61. Irrigation.** (3 cred.; prereq. 51; 3 lect. hrs. per wk.)
- 63. Farm Structures Laboratory.** (3 cred.; prereq. 53, M.&M. 141; 6 lab. hrs. per wk.)
- 73. Steam Boilers and Heat Engines.** (3 cred.; prereq. 18 and M.E. 131; 2 lect. and 4 lab. hrs. per wk.; offered 1956-57 and alternate years)
- 101-102. Summer Employment I and II.** (2 cred. per qtr.; prereq. completion of third year work or #)
- 106. Agricultural Hydrology.** (3 cred.; prereq. 51 or #51; 3 lect. hrs. per wk.; offered 1955-56 and alternate years)
- 107. Drainage, Irrigation, and Soil Erosion Control Design.** (4 cred.; prereq. 61, or #61 and 106; 2 lect. and 6 lab. hrs. per wk.; offered 1955-56 and alternate years)
- 111,112,113. Problems in Agricultural Engineering.** (2 to 6 cred. per qtr.; prereq. #)
- 117. Applied Electricity.** (Formerly 172) (3 cred.; prereq. E.E. 37; 2 lect. and 4 lab. hrs. per wk.)
- 125. Topics in Agricultural Physics.** (3 cred.; prereq. sr., grad., 117 or integral calculus and 25 or equiv.)
- 126. Management of Agricultural Machinery.** (3 cred.; prereq. 52 and Ag.Ec. 102; 2 lect. and 3 lab. hrs. per wk.)
- 150. Inspection Trip.** (1 cred.; no prereq.; required of senior agricultural engineers)
- 167. Advanced Farm Structures.** (3 cred.; prereq. 63; 1 lect., 1 rec., and 3 lab. hrs. per wk.; offered 1956-57 and alternate years)
- 171. Design of Agricultural Machinery.** (3 cred.; prereq. 52 and M.E. 121; 1 lect. and 6 lab. hrs. per wk.)

AGRICULTURAL JOURNALISM (Ag.Jo.)

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

AGRONOMY AND PLANT GENETICS (Agro.)

Students may major in either agronomy or plant genetics. Students in technical agriculture may prepare for a farming vocation or for positions in the fields of agricultural extension, federal and state regulatory work, and sales. Students in science specialization, usually after one or more years of graduate work, may enter the fields of research in agronomy or plant genetics in experiment stations, may be employed in federal service, may go into teaching in colleges or universities, or may engage in agronomic or plant breeding research with agricultural industries.

Major in Technical Agriculture—Recommended courses for a major in technical agriculture are the following: 21, 22, 23, 31, 77, 132, 133, 135, 136; Pl.Pa. 1, 3, 111; Soil. 5. From 3 to 6 credits in other plant science courses may be added with the approval of the adviser.

Major in 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 training in plant science.

Minor Sequence—Minor should be chosen in consultation with the major adviser. Students in technical agriculture usually should choose a minor in another field of technical agriculture which is most likely to prepare them for their vocational objective. Students in science specialization should choose a minor in a science field related to their interests.

FRESHMAN AND SOPHOMORE COURSES

1. **Introduction to Agronomy.** A survey of the adaptation, distribution, and uses of major groups of economic plants and the factors and hazards of their production. (3 cred.)
21. **Grain Crops.** Production, improvement, and uses of corn, small grains, and oil-seed crops. Lect. and lab. (4 cred.; prereq. soph., 1; graduate students may take Agro. 121)
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. Lect. and lab. (3 cred.; prereq. soph., 1; graduate students may take Agro. 122)
23. **Forage Crops.** Distribution, characteristics, production, preservation, and uses of forage crops. Lect. and lab. (4 cred.; prereq. soph., 1; graduate students may take Agro. 123)
24. **Identification and Judging.** Laboratory practice in judging crops and identification of crops, weeds, and diseases. (1 cred.; prereq. soph., 1)
31. **Principles of Genetics.** Fundamental principles of heredity and variation and their relationships to evolution, breeding, and eugenics. Lect. and lab. (4 cred.; prereq. soph., 6 cred. in botany or zoology; graduate students may take Agro. 131)

JUNIOR AND SENIOR COURSES

77. **Seminar in Agronomy.** (Formerly 134) Critical studies of problems in agronomy. (2 cred.; prereq. sr., 9 cred. in agronomy)
121. **Grain Crops.** (See 21 above) (4 cred.; prereq. 1)
122. **Grain and Hay Grading.** (See 22 above) (3 cred.; prereq. 1)
123. **Forage Crops.** (See 23 above) (4 cred.; prereq. 1)
126. **Crop Judging.** Laboratory practice in identification of crops, weeds, and diseases in relation to judging and grading farm crops. (4 cred.; prereq. 22, 24)
131. **Principles of Genetics.** (See 31 above) (4 cred.)
132. **Farm Crops Plant Breeding.** Applied genetics. Methods of breeding each of the important agricultural crops. Lect. and lab. problems. (4 cred.; prereq. 31)
133. **Pasture Crops and Management.** Characteristics, distribution, establishment, renovation, and management of crops for temporary and permanent pastures. Lect., lab., and field work. (4 cred.; prereq. 23)
135. **Weed Control.** Survey of the organization and functions of public and private research and extension agencies for weed control and federal and state regulatory bodies; discussions of preventive, cultural, and chemical methods of weed control; study of equipment and techniques for weed control research. (3 cred.; prereq. 1 and Pl.Pa. 3)
136. **Introduction to Applied Statistics.** Probability, mean, normal distribution, variance, standard error, "t" test, X^2 test, correlation, and analysis of variance. Emphasis on how to do the required computing and interpretation of results in terms of biology rather than of the mathematical background. (3 cred.)

ANIMAL HUSBANDRY (An.Hu.)

A major in animal husbandry is particularly suited for students in technical agriculture who are interested in the production, processing, or distribution of livestock and livestock products. The vocational opportunities include the operation of farms, positions as county agents, employment in business such as feed manufacturing, meat packing, and the livestock markets. If graduate work is completed, positions are available as teachers and research workers in colleges and experiment stations.

Recommended courses for majors:

1. *Technical Agriculture*—An.Hu. 8, 9, 51, 52, 53, 56, 57, 58, 101, 112, 113, 116; Ag.Ec. 40, 102, 103, 143; For. 48; V.M.C. 52; Agro. 23, 31, 133; Ag.Bi. 6.
2. *Science Specialization*—Consult adviser.

FRESHMAN AND SOPHOMORE COURSES

1. **Livestock Production.** Opportunities and problems in livestock production. Survey of methods followed in the raising of livestock. Lectures and laboratory practice in selecting, classifying, and appraising beef and dual-purpose cattle, sheep, and swine. (4 cred.)
2. **Breeds of Livestock.** Origin, development, characteristics, adaptations, and economic importance of the common breeds of beef and dual-purpose cattle, sheep, and swine. Judging practice in selection of breeding animals. (4 cred.; prereq. soph., 1)
3. **Livestock Judging.** Lectures and practice in judging beef and dual-purpose cattle, sheep, and hogs. (3 cred.; prereq. soph., 8)

JUNIOR AND SENIOR COURSES

4. **Meat Selection and Utilization.** 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.; prereq. # for soph.; Ag. and H.E. students only)
5. **Meats and Meat Products.** Wholesale and retail meat cuts and meat products with special reference to physical and chemical properties and preservation during storage. Prices and relative economy of the various cuts. (3 cred., \$50; prereq. # for soph., 1; Ag. students only)
6. **Meats.** Slaughter of animals and cutting of carcasses. Lectures, demonstrations, and laboratory; meat judging practice. (3 cred.; prereq. # for soph., 1, and 50 or 51)
7. **Advanced Meats.** Commercial meat cuts in wholesale and retail trade. Factors affecting the quality and market grades of meat. The classification, grading and judging of carcasses and cuts of meat. (3 cred.; prereq. 52)
8. **Livestock Feeding I.** Nutritional requirements of farm animals and composition and characteristics of livestock feeds. Differences in utilization of feeds by ruminants and nonruminants. (3 cred.; prereq. 1)
9. **Livestock Feeding II.** Values of individual feeds and of combinations of feeds for beef cattle, sheep, swine, and horses. Feeding of farm livestock for most economical production of livestock products. (3 cred.; prereq. 56)
10. **Market Classes and Grades of Livestock.** Marketing methods; stockyards operation; government standards; market reporting; sanitary regulations; transportation problems. Practice in classifying, grading, and evaluating market cattle, sheep, and swine. Visits to the South St. Paul livestock market. (3 cred.; prereq. 1)

- 101. Livestock Selection.** Selection of several types and breeds of livestock. Evaluation of ancestry, performance records, and other factors as aids to observation in selecting breeding animals. Visits to stock farms. (3 cred.; prereq. 9)
- 107. Meat Problems.** The wholesale cuts and grades of meat; the processing industry and utilization of by-products. Special problems, and visits to processing and merchandising establishments. (3 cred.; prereq. 53)
- 112. Animal Breeding.** Applications of the physiology of reproduction and of genetics to breeding of farm animals. (3 cred.; prereq. Agro. 31)
- 113. Livestock Management.** Management principles involved and problems of care in the several types of specialization in livestock production. A practical course covering beef cattle, sheep, and swine. (5 cred.; prereq. 56-57, 112)
- 114. Artificial Insemination.** Lectures and laboratory on the fundamentals and the techniques involved. Problems and procedures in managing artificial breeding associations. (4 cred.; prereq. 112 and #)
- 116. Prenatal Development of Farm Animals.** Lectures and laboratory demonstrations. (4 cred.)

DAIRY HUSBANDRY (Dy.Hu.)

The dairy husbandry 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 industry curriculum is suggested for students interested in the manufacture or distribution of dairy products, either (1) as a plant operator, or (2) in technical or extension work, and (3) for graduate study in some phase relating to the dairy industry.

1. *Technical Agriculture*—Recommended 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, 116, 117, 119; Pl.Pa. 1; Po.Hu. 1; Soc. 114; V.M.C. 52.
2. *Science Specialization*—Consult adviser.
3. *Dairy Industry*—See page 30 of this bulletin.

FRESHMAN AND SOPHOMORE COURSES

1. **Elements of Dairying.** A description of the dairy industry, including an introduction to dairy farming. Milk, its composition, food value, and chemical and physical properties in relation to sanitary milk production, handling, and the processing of milk products. Lectures and demonstrations. (3 cred.)
2. **Elements of Dairying Laboratory.** (Formerly 3) Use of the Babcock test and other tests common to dairy products plants. (2 cred.; prereq. 1)
- 4A. **Dairy Products Practice I.** (Formerly 4) 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.; prereq. soph.)
- 4B. **Dairy Products Practice II.** (Continuation of 4A) (3 cred.; prereq. soph., 4A)
5. **Dairy Husbandry Practice.** A study of dairy husbandry practices and methods. Includes two months of work on an approved farm, or in a testing or breeding organization. Reports required of work done. (3 cred.; prereq. soph., consent of adviser in dairy department)
9. **Dairy Cattle Judging.** An analysis of the anatomy, physiology, and genetics of dairy animals on the basis of score card interpretations. Trips made to one or more dairy herds in the area. (1 cred.; prereq. soph.)
10. **Dairy Products Judging.** Laboratory practice in grading of milk and milk products including cream, ice cream, cheese, and butter. (1 cred.; prereq. soph.)

- 20. Household Microbiology.** (Especially for students in home economics.) The fundamental principles of microbiology, characteristics of bacteria, yeasts, molds, and other microorganisms, 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 community. (4 cred.; prereq. 3rd qtr. fr., approval of adviser and \$)
- 49. Dairy Cattle Breeding I.** A laboratory course in the physiology of dairy cattle breeding which also includes exercises in sire management and the operational problems of artificial breeding. (3 cred.; prereq. 1; enrollment limited to 20)

JUNIOR AND SENIOR COURSES

- 50. Dairy Bacteriology.** Lectures and laboratory. Types of milk organisms; contamination of milk and how prevented; relation of milk to public health; bacteriology of dairy products. (3 or 5 cred.; 3 cred. for lect., 2 cred. for lab.; open also to soph.; prereq. Bact. 53; lect. taken separately only with #; graduate students may take D.H. 150)
- 101. Milk Production.** Problems of the dairy farmer, such as adaptation of dairy breeds; selection and management of dairy herd and sires; calf raising, dairy barns. (3 cred.; 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.; prereq. sr., 101, An.Hu. 56)
- 104. Dairy Stock Selection.** An evaluation of inherited characters in dairy cattle from an economic standpoint. (3 cred.; prereq. sr., 9 or 19, 117)
- 105. Dairy Literature Seminar.** 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 scientific investigations in dairy husbandry. (2 cred.; prereq. sr., three courses in dairy husbandry)
- 107. Condensed Milk Products.** Manufacture of condensed milk products, with special reference to the physical and chemical processes and engineering problems involved. Lectures and laboratory. (3 cred.; \$114; prereq. 1, 2, 50, Ag.Bi. 10)
- 108. Dry Milk Products.** Manufacture of dry milk products, with special reference to the physical and chemical processes and engineering problems involved. Lectures and laboratory. (3 cred.; prereq. 107)
- 109. Market Milk.** (Formerly 51) Processing and distribution of market milk and related products, with emphasis on the physical, chemical, and bacteriological problems involved; organization, design, equipment, and operation of milk plants; problems of public control. Lectures and laboratory. (3 cred.; prereq. 1, 2, 50, Ag.Bi. 10)
- 110. Ice Cream and Frozen Dairy Foods.** Manufacture of ice cream, with special reference to chemical and physical processes involved. Organization, construction, equipment, and operation of such factories. Lectures and laboratory exercises. (3 cred.; prereq. 1, 2, 50, Ag.Bi. 10)
- 111. Butter.** Manufacture of butter with special reference to chemical and bacteriological processes involved. Organization, construction, equipment, and operation of such factories. Laboratory exercises. (3 cred.; prereq. 1, 2, 50, Ag.Bi. 10)
- 112. Cheese.** Manufacture of cheese, with special reference to the chemical, bacteriological, and physical processes involved. Organization, construction, equipment, and operation of such factories. Lectures and laboratory exercises. (3 cred.; prereq. 1, 2, 50, Ag.Bi. 10)
- 113. Technical Control of Dairy Products.** Chemical and bacteriological laboratory methods used in technical control of milk and its products. Lectures and laboratory. (3 cred.; prereq. sr., 50, 111, or 112, Ag.Bi. 10)
- 116. Milk Secretion.** Lecture assignments covering the anatomy, biochemistry, and physiology of milk secretion and factors influencing the quality and quantity of milk. (3 cred.; prereq. sr., 9 cred. in physiology and Ag.Bi. 103)

- 117. Dairy Cattle Breeding II.** Application of the principles of genetics to the improvement of dairy cattle. Evaluation of breeding animals and formulation of breeding plans. (3 cred.; prereq. Agro. 31)
- 118. Milk Production and Secretion.** Lectures dealing with management and nutritional problems of interest to veterinary students, with special emphasis on the physiology and biochemistry of lactation. (3 cred.; prereq. sr. Vet. Med.)
- 119. Dairy Herd Management.** (Formerly 52) Demonstration of management practices with dairy cattle. One or more trips to specialized dairy farms. (2 cred.; prereq. 101, 103)
- 130. Advanced Dairy Products Judging.** Basic principles of organoleptic examination and their application to judging the market quality of dairy products. Laboratory practice in methods of scoring dairy products. (1 cred.; prereq. 10)
- 150. Dairy Bacteriology.** (See 50) (3 cred.; prereq. grad., Bact. 53)
- 151. Advanced Dairy Bacteriology.** (Formerly 115) Investigations of specific problems on the bacteriology and mycology of milk and dairy products. (3 cred.; prereq. sr., 50 or equiv., 111 or 112)

ENTOMOLOGY AND ECONOMIC ZOOLOGY (Ent.)

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, 65; Pl.Pa. 1; Zool. 21, 50, 53, 82, 83.

Recommended Minors—Agronomy, biochemistry, horticulture, plant pathology.

Whether the chosen curriculum is that of technical agriculture or of science specialization, students majoring 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 fishery and wildlife management.

FRESHMAN AND SOPHOMORE COURSES

- 5. Economic Entomology.** The life histories, habits, and methods of control of the insect pests of livestock, orchard, fields, and garden. Laboratory work in the determination of the more important forms. (5 cred.; prereq. soph., Zool. 14-15 or equiv.)
- 13. Field Zoology.** For forestry freshmen at Lake Itasca Forestry and Biological Station. Field and laboratory work on insect life and the natural history of common animals in the Itasca Park area. (2 cred.)
- 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 to 5 cred.)

JUNIOR AND SENIOR COURSES

- 51. Introductory Animal Parasitology.** Elementary course dealing with parasitic protozoa, worms, and arthropods and their relation to diseases of man and animals. (5 cred.; prereq. # for soph., Zool. 14-15 or equiv.)
- 52. Introductory Entomology.** General morphology, life histories, habits, and classification of insects. (5 cred.; prereq. # for soph., Zool. 1-2-3 or 14-15, or N.Sci. 7-8-9)
- 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. (1-3 cred.; prereq. 15 cred. in zoology or entomology)
- 56. Forest Entomology.** Lectures and laboratory dealing with the principles of controlling insects that attack trees and forest products; life history and habits of important representative species. (5 cred.; prereq. Zool. 14-15 or equiv.)
- 63. Mammalogy.** Distinguishing characteristics and life histories of the various mammal groups, particularly those represented in the state. (4 cred.; prereq. Zool. 22)
- 64. Introduction to Fishery and Wildlife Management.** Survey of management of fishery and wildlife resources, with discussion of principles and administration. Lectures and library work. (5 cred.; prereq. Zool. 1-2-3 or equiv., Bot. 50, or For. 48)
- 114. Apiculture.** Problems of bee management, disease control, wintering, bee breeding, processing and marketing of bee products. Lectures, laboratory, and field practice. (3 cred.; prereq. 9 cred. in entomology)
- 117. Animal Ecology.** General ecology stressing ecological principles and land communities. (3 cred.; prereq. 15 cred. in zoology including 1-2-3 or N.Sci. 7-8-9, or entomology)
- 118. Animal Ecology.** Experimental approach to study of environmental factors affecting animal populations. (3 cred.; prereq. 15 cred. in zoology including 1-2-3 or N.Sci. 7-8-9, or entomology; #)
- 119. Limnology.** Conditions for life in the water and distribution of aquatic animals. (3 cred.; prereq. 15 cred. in zoology including 1-2-3 or N.Sci. 7-8-9, or entomology; given at Lake Itasca Forestry and Biological Station)
- 120. General Ecology of Insects.** Dispersal, distribution, abundance, natural control, and related problems. Lectures, laboratory, and field work. (3 cred.; prereq. 118; offered 1956-57 and alternate years)
- 121. Ichthyology.** Taxonomy and habits of North American fishes, with special reference to those of upper Mississippi drainage. (3 cred.; prereq. 15 cred. in zoology including 1-2-3 or Nat.Sci. 7-8-9; lect., lab.)
- 125-126-127. Advanced General Entomology.** Morphology, biology, and classification of insects. Lectures and laboratory. Frequent field trips in 127. (9 cred.; prereq. 15 cred. in entomology including 52 or equiv., or #)
- 128-129. Insect Physiology.** General and comparative physiology. Survey of the organ systems and their functioning. Emphasis on research methods and evaluation of data. Lectures, laboratory, and reading. (8 cred.; prereq. sr., 15 cred. in zoology or entomology and #; Zool. 50 or equiv. recommended)
- 140. Biological Microscopy.** Necessary elements of optics, use and limitations of the various types of microscopes, interpretation of microscopical data. Laboratory: demonstration plus project in field of student's interest. (4 cred.; prereq. sr., 15 cred. in zoology, entomology or botany and #; offered 1955-56 and alternate years)
- 141-142. Insects in Relation to Plant Diseases.** (Same as Pl.Pa. 141-142) 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.; prereq. 8 cred. in entomology or plant pathology)
- 144. Medical Entomology.** Principal arthropods noxious to man and animals. Emphasis on those that serve as vectors of pathogenic organisms of man and animals. Lectures and laboratory. (3 cred.; prereq. 15 cred. in zoology or entomology including 52 or equiv. and #)
- 145. Parasitic Protozoa.** Structure, life histories, and economic relations of protozoal parasites of man and animals. Lectures, laboratory diagnosis. (3 cred.; prereq. 15 cred. in zoology including 1-2-3 or N.Sci. 7-8-9, and #)
- 146. Helminthology.** Worm parasites of man and animals, their structure, life histories, and biological relationships. Lectures and laboratory. (3 cred.; prereq. 15 cred. in zoology including 1-2-3 or N.Sci. 7-8-9, and #)

- 150. Introduction to Aphidology.** Biology and taxonomy of aphididae. (3 cred.; prereq. 52 or equiv. or #)
- 164-165-166. Wildlife Management.** 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, laboratory, library, and field work. (9 cred.; prereq. 63, 64, 118, Zool. 58, Bot. 131, and Pl.Pa. 53)
- 167. Techniques of Forest Wildlife Management.** Largely field work; use of censuses applicable to major local forms of forest wildlife; preparation of a wildlife management plan for a small forested area. (3 cred.; prereq. 64; given at Cloquet)
- 168-169. Fishery Biology and Management.** Methods and theory of fishery biology; age and rate of growth, populations, mortality and harvest, indices of productivity, lake and stream survey methods and planning, stream improvement, fish pond management. Lectures and laboratory. (10 cred.; prereq. 64, Zool. 53, 117, 118, 119, 121, Bot. 131 or equiv., P.H. 110, 111, or equiv., or #)
- 170. Fisheries Resources.** Fisheries resources of the U. S.; fisheries; products; methods and description of commercial fisheries; state, federal, and international administration and regulation of fisheries; significant laws and current legislation controlling U. S. fisheries. Organization of fishery programs. (3 cred.; prereq. 168, 169, or #)
- 175. Principles of Economic Entomology.** Methods and principles of insect control. Lectures and laboratory demonstration. (4 cred.; prereq. 15 cred. in entomology including 5 or equiv., or #; offered 1956-57 and alternate years)
- 176. Legal and Regulatory Aspects of Pest Control.** Principles of quarantine and administration of control campaigns. Lectures, discussions, and demonstrations. (3 cred.; prereq. 15 cred. in entomology including 5 or equiv., or #)
- 177. Insecticides and Their Action.** Chemistry, physiological action, toxicology, and laboratory testing of insecticides. Lectures and laboratory. (5 cred.; prereq. sr., 15 cred. in entomology including 5 or equiv. or #, inorganic and organic chemistry; offered 1955-56 and alternate years)
- 179. Recent Advances in Entomology.** Lectures in special fields of entomological research given by visiting professor. (Cred. and hrs. ar.; prereq. sr.)
- 197. Introduction to Research.** Special problems involving library and laboratory research in various lines of entomology and economic zoology. (1 or more cred.; prereq. sr., Δ)

FOOD TECHNOLOGY (Food)

- 51-52.† Food Analysis.** Chemical and physical methods of analysis of foods and food products. (2 cred. per qtr.; prereq. Ag.Bi. 2 and 3; offered when demand warrants)
- 101-102.† Food Technology.** 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. Lectures supplemented by visits to local food-processing industries. (3 cred. per qtr.; prereq. Ag.Bi. 3, 5 and 6 or #, Bact. 53, and a course in physics; offered when demand warrants)
- 104. Frozen Food Processing and Storage.** A comprehensive study of all types of frozen foods. History and development of the industry, standards, 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.; prereq. Ag.Bi. 5 or 6, Bact. 53 or #)
- 105. Frozen Food Problems.** Special problems based upon work given in 104. (2-4 cred. per qtr. with 6-12 cred. total; prereq. 104)

FORESTRY (For.)

FRESHMAN AND SOPHOMORE COURSES

- 1A. **Conservation of Natural Resources.** The natural resources of the U. S. and the world; their utilization, interrelationship and management treated from an economic standpoint and related to their importance to society and our responsibility for their conservation. Lectures, reports, and assigned reading. (3 cred.)
1. **Introduction to Forestry.** Brief survey of the various fields of forestry and the forest situation in the U. S. and the world. Lectures, reports, and reading. (1 cred.)
2. **Important Forest Plants.** Identification and classification of the important forest plants of Itasca State Park, with emphasis on forest site and type, plant indicators. (2 cred.; given at Lake Itasca Forestry and Biological Station)
4. **Dendrology.** Forest trees of the U. S.; their classification, characteristics, and range. Lectures, laboratory and assigned reading. (4 cred.)
5. **Field Forest Ecology.** Forest laboratory exercises designed to give the student basic information on forest types, ecological succession, tolerance, reproduction factors, and relative growth and longevity of the important native forest tree species. (2 cred.; given at Lake Itasca Forestry and Biological Station)
6. **Field Measurements.** Largely field work. Includes use of compass, pacing and mapping; elementary work in tree measurements; timber cruising, including the elementary use of aerial photographs; growth determination. (2 cred.; given at Lake Itasca Forestry and Biological Station)
- 7-8. **Forest Measurements.** Principles underlying the determination of the volume of forest products; measurement of heights; construction of volume tables; elementary methods of compiling and analyzing numerical data. (6 cred.; prereq. Math. 1 and 6)
9. **Introduction to Forest Surveys and Statistics.** Forest surveys, prediction of growth and application of elementary statistical methods. (3 cred.; prereq. 7 and 8)
10. **Farm Forestry.** Place of forestry in land-use planning. Economic status of farm woodlots. Establishment and care of woodlots and windbreaks. Forest influences with special reference to soil erosion control. Use of wood on the farm. Lectures and laboratory. (3 cred.; not open to students majoring in forestry)
48. **Range Management.** History, regulation, and relationship of livestock grazing to forest management. Principal grazing regions, forage plants, kind of livestock, and principles of range management. (3 cred.; prereq. soph., Bot. 1, 2)
49. **Identification of Commercial Woods.** Structure, classification, and identification of domestic woods important to the woodworking industries. Lectures and laboratory. (2 cred.; prereq. soph.; not open to forestry students)

JUNIOR AND SENIOR COURSES

51. **Logging.** Principles and general methods of logging in the different forest regions of the United States, and the modifications required by forest management. (3 cred.)
52. **Wood Seasoning.** Theory and practice of air seasoning, kiln drying, and new developments in the drying of wood. (3 cred.; prereq. 53-54)
- 53-54. **Wood Structure and Identification.** Structure, classification, and identification of domestic commercial woods. Lectures, laboratory, and reading. (6 cred.; prereq. 4)
55. **Forest Protection.** Prevention, presuppression and suppression phases of protecting forests from wildfire, and the use of controlled burns for beneficial purposes. Lectures, reading, reports. (3 cred.)
56. **Forest Products.** Introductory survey of forest products; lumber, naval stores, tannins, wood pulp, paper, etc. Lectures, reading, reports. (3 cred.)

- 57. Wood Utilization.** Production, distribution, qualities, amounts, manufacture, and prices of wood products. Lectures, reading, and reports. (3 cred.; 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.; prereq. 53-54)
- 59. Introduction to Forest Aerial Photogrammetry.** Use of aerial photographs, preparation of planimetric and vegetative type maps. Photo interpretation. Application to forest resource inventory and management. (3 cred.; prereq. 9 or #)
- 101. Advanced Dendrology.** Continuation of 4 with special studies in classification and distribution of some important timber species of the world. (3 cred.; prereq. 4)
- 104. Forest Influences.** Influence of woody vegetation upon micro-climate, soil water, runoff, stream flow, and erosion. (3 cred.; prereq. 126 or #; offered in 1956-57 and alternate years)
- 111-112. Advanced Forest Measurements.** Continuation of 9 with special emphasis on the application of statistical methods in forest measurements. (6 cred.; prereq. sr., 9 or #)
- 113. Wood Pulp and Paper.** Detailed study of production of wood pulp and paper products. Lectures, reading, and reports. (3 cred.; prereq. 53-54 and organic chemistry)
- 114-115. Mechanical and Physical Properties of Wood.** Derivation and application of formulas used in determining stresses in wood. Laboratory methods in timber testing. Lectures, laboratory, reading, class problems, and reports. (6 cred.; prereq. 53-54, Math. 7)
- 116. Fabrication and Properties of Wood Products.** Use of timber connectors in construction. Physical and mechanical properties of plywood and various fiber boards. Principles of glued-wood construction. Lectures, laboratory, and reports. (3 cred.; prereq. 114)
- 119. Advanced Wood Structure.** The microtechnique of wood tissue and structure, identification and classification of tropical woods. Lectures, laboratory, and reading. (4 cred.; prereq. sr., 53-54)
- 120. Building Cost Estimating.** A general course in building cost estimating. (3 cred.)
- 121. Wood Finishing.** Painting and natural finishing of wood, including chemical and physical principles involved in the formulation and application of finishes, preparation of surfaces, etc. (3 cred.; prereq. organic chemistry)
- 123. Introduction to Forest Economics and Finance.** The economic approach to forestry; supply and demand for forest products; economic problems in private forestry practice; principles underlying the appraisal of forest values. (3 cred.; prereq. Ag.Ec. 2)
- 124. Introduction to Forest Management.** Organization and administration of forest lands. Determination of cut. (3 cred.; prereq. 123)
- 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.; prereq. 53-54)
- 126. Forest Ecology.** Study of the life history and environmental relationships of forest trees and stands, with special emphasis on the effect of such ecological factors as soil, water, temperature, and light on the growth of trees. (3 cred.; prereq. 4 or equiv.)
- 127. Introduction to Silviculture.** Study of the different methods of making intermediate and final cuttings in the forest. Analysis of European methods as they apply to American forest types and conditions. (3 cred.; prereq. 126)
- 128-129. Field Silviculture I and II.** Laboratory and field work in seeding and planting, plantation surveys and maintenance, cutover-area studies, thinning and partial cutting, phenological observations, applied forest pathology and

- entomology. Study of established experiments on Cloquet Experimental Forest. (6 cred.; prereq. 126 and 127; given at Cloquet)
130. **Forest Finance.** Business and financial aspects of forest management. A study of the different factors entering into the valuation of forest property. (3 cred.; prereq. sr., 123)
131. **Forest Policy.** Policy of the federal government, states, and private owners toward administration and utilization of forest resources. Policies of foreign countries. Current policy problems. Lectures, reading, reports. (3 cred.; prereq. sr.)
133. **Forest Management and Utilization.** Collection of data necessary for a forest management plan, making of growth studies and preparation of maps required for such plans; study of utilization plants and production of forest products. (4 cred.; given at Cloquet)
134. **Forest Inventory and Photographic Interpretation.** Planning and conducting forest surveys; use of aerial photographs in timber estimating; forest type and contour mapping. (4 cred.; prereq. 9; given at Cloquet)
136. **Forest Economics.** Use of economic analysis in the solution of forestry problems; analysis of cyclical and other variations in timber prices; critical analyses of suggested solutions to such private forestry problems as taxation, finance, insurance, and development of markets. (3 cred.; prereq. sr., 123)
137. **Seeding and Planting.** Principles of seeding and planting in the establishment of forest-tree plantations. Forest nursery practices. Storage, pretreatment, and germination of forest tree seeds. Lectures and laboratory. (3 cred.)
140. **Forest Management.** Advanced economic, administrative, and biologic problems of forest land management. Current techniques. Problems of increasing intensity of management. Lectures and reports. (3 cred.; prereq. sr., For. 124 or equiv.)
141. **Principles of Silvics.** Principles underlying the silvical characteristics of trees and reactions of trees to their environments. A review of silvical literature of special significance. (3 cred.; prereq. sr., 126, 127, or #)
142. **Wood Chemistry.** Clinical composition, reaction, and analyses of wood components and derivatives. Chemical technology of wood and wood products. (3 cred.; prereq. organic chemistry, For. 53-54)
143. **Forest Recreation.** Recreational use of the forest from an economic, sociological, and technical point of view. Administrative and technical problems arising from recreational use. (3 cred.; prereq. sr.)
145. **Advanced Silviculture.** Recommended American silvicultural practices as determined by recent research studies. Recent published information on advances in silvicultural practices. (3 cred.; prereq. sr., 127, 129)
146. **Advanced Forest Aerial Photogrammetry.** Advanced photo interpretation, field problems, preparation of contour maps. (3 cred.; prereq. sr., 59 or #)
147. **Forest Inventory.** Volume, growth, sampling, and inventory design. (3 cred.; prereq. sr., 9, 134 or #; offered 1956-57 and alternate years)
156. **Research Methods.** Scientific method, bibliography, instrumentation, reduction of data, report writing, publication procedure. (3 cred.; prereq. sr.)

HOME ECONOMICS (H.E.)

FRESHMAN AND SOPHOMORE COURSES

1. **Choice and Care of Clothing.** Principles of planning, selecting, and caring for the wardrobe. Design and color as they relate to dress and personal appearance. Some textile knowledge of help to the consumer. (4 cred.; §G.C. 15; not open to srs. or men)
3. **Clothing Construction A.** Cutting, fitting, pressing, and construction of selected garments, using a variety of fabrics; commercial pattern interpretation and fitting, garment alteration, and sewing machine maintenance. (3 cred.; prereq. 3rd qtr. fr., 1)

4. **4. Clothing Construction B.** Fitting dress and sleeve-form linings; construction of a dress in which various techniques of pattern fitting, pattern redesigning, and garment fitting are applied; design and construction of a second garment. (3 cred.; prereq. soph., 3; not open to srs.)
6. **6. Introduction to Food Production, Distribution and Control.** Practical work in the cafeteria in various departments, involving receiving, storage, inventory, and preparation of food; record keeping. Individual work. (3 cred.; prereq. #)
10. **10. Introduction to Home Economics.** Orientation of beginning students in the field of home economics. (1 cred.; fr. only)
17. **17. Personal and Family Living.** Democratic family living; characteristics of different age-levels; the development of personality and of family unity; the conditioning effects of family living. Discussion of problem situations of the individual and the family. (3 cred.; not open to srs.)
20. **20. Introduction to Related Art.** The development of an appreciation of the art involved in the everyday life of the student; the cultivation of a discriminating taste in varied fields such as house furnishings and dress. Arts and crafts of various countries studied briefly for their contribution to the student's breadth of view, enjoyment, and understanding of other cultures. (4 cred., \$56; not open to srs.)
21. **21. Color and Design I.** Laboratory experiences in the selection and arrangement of home furnishings, selection and framing of pictures, lettering, poster making, block printing, and stenciling. (3 cred.; prereq. 20)
22. **22. Color and Design II.** Opportunity to plan suitable and becoming wardrobes for different personality and figure types. Craft problems related to costume. (3 cred.; prereq. 1 and 20)
23. **23. Advanced Design.** Experience in creative designing, with emphasis on the relation of the design to the materials, techniques and their uses. Aim: facility in designing. (3 cred.; prereq. 21)
24. **24. Problems in Home Planning and Furnishing.** Exteriors and interiors of houses studied for their design and suitability to family and locality. Problems in planning and furnishing a home worked out on the basis of family living. Class work in combining fabrics, furniture, and accessories in rooms. Field trips. (5 cred., §G.C. 16, F.L. 15, H.E. 57 or 180, not open to majors in textiles and clothing in business, related art, and home economics education; prereq. soph., 20, 49 recommended)
25. **25. Design Applied to Crafts.** Emphasis upon well designed and suitable articles for use in dress and in the home which can be made with the equipment available in the typical home, such as weaving, simple metal work, leather tooling, etc. (3 cred.; prereq. 20; 21 recommended)
27. **27. Related Art Problems.** Emphasis on home furnishings. Using house furnishing materials, the student learns good treatment and combinations of colors, forms, and textures; studies the relationship of design to materials, techniques; the needs of people and suitability to use. Some craft problems included. (3 cred.; prereq. soph., 21)
28. **28. Construction and Refinishing of Home Furnishings.** Laboratory problems in refinishing and reupholstering furniture and making of slip covers and draperies. Emphasis on design. Techniques suitable for homemakers, extension workers, and home making teachers. Students need to furnish own materials. (3 cred.; prereq. #)
30. **30. Introduction to Nutrition.** For students wishing a discussion of the application of the principles of nutrition to the selection of food. (2 cred., §G.C. 14 or H.E. 31; intended for students majoring in fields other than home economics: open to students in H.E. only by special permission of instructor; given on Minneapolis Campus)
31. **31. Introduction to Nutrition.** Application of nutrition principles to the food selection of college students. Includes information on the relation of food to the promotion and maintenance of health. (3 cred., §G.C. 14 or H.E. 30; not open to srs. in H.E.)

- 33. Nutrition I.** (1) The nature and properties of groups of compounds occurring in the body and in food, including a study of proteins, carbohydrates, lipids, and enzymes; (2) digestion; and (3) absorption. (4 cred.; prereq. soph., Ag.Bi. 1, Phsl. 4 or ¶4)
- 34. Nutrition Problems.** A consideration of the problems commonly met by adults and children in typical families. (4 cred., §H.E. 76, or 170 and 171; prereq. 3rd qtr. soph., 31, 40, physiology, or human biology)
- 35. Nutrition II.** Tissues and tissue metabolism; blood, milk, and urine. (4 cred.; prereq. soph., 33)
- 40. Food Preparation.** The development of technique and the application of fundamental science principles to cookery processes and preservation. Establishment of good standards for food products. (5 cred.; not open to srs.; prereq. 3rd qtr. fr., 2 qtrs. chemistry)
- 41. Food Management and Marketing.** Determination and study of the management factors in the food problems of the homemaker and consumer. Quality, cost, and conservation of foods. Meal planning, preparation, and service. (5 cred.; prereq. soph., 31, 40)
- 46. Food Service Job Studies.** Study of staff responsibilities for handling prepared food. Practical work in counter organization and operation; dining-room arrangements and waitress service; cashiering and customer contacts; sanitation procedures and standards. (3 cred.; prereq. soph.; open only to H.E. students)
- 49. Household Equipment.** The principles that should guide in the selection, operation, care, and convenient arrangement of equipment in the home. (3 cred.; prereq. soph., Ag.En. 35 or #)

JUNIOR AND SENIOR COURSES

- 50. Textiles.** Consumer textile problems; the characteristics of fibers, fabrics, and finishes; the selection, maintenance, and serviceability of fabrics for clothing and home furnishing; laboratory study of selected fabrics. (3 cred.; prereq. 1)
- 52. Introduction to Textiles.** Factors which influence the quality and value of fabrics used in men's and women's wearing apparel and household furnishings. Designed primarily for students in merchandising. (3 cred.; for S.L.A., B.A., U.C., and Art Ed.)
- 53. Advanced Clothing.** Problems in designing and tailoring a fitted, lined wool jacket; use of a plaid or striped fabric in the designing and construction of a garment; social and economic problems involved in children's clothing. (3 cred.; prereq. 4, 50 or ¶50)
- 54. Problems in Clothing Construction.** Major emphasis on construction techniques, designing, or fitting; problems in pattern modification, draping, and the construction and evaluation of clothing illustrative material. (3 cred.; prereq. 53 or #)
- 56. Applications of Color and Design I.** The needs of individual students determine largely the specific content of the course. It is devoted to a general study of color and design applications in various areas, including problems relating to dress. Brief study of some of the arts and crafts of other countries to give background of appreciation and standards for judging quality. Experiences in the arrangement of display cases. (3 cred., §H.E. 20; not open to H.E. students)
- 57. Applications of Color and Design II.** Continuation of 56, with emphasis upon house planning and furnishing problems. Arrangement of rooms and display cases. (3 cred., §H.E. 24, 180 or F.L. 15; not open to H.E. students; prereq. 20 or 56, or #)
- 58. Supervised Retail Training.** Combines experience in several departments of a store or shop on Saturdays and planned discussions during two class periods each week. Supervision and evaluation of student work by both store personnel and instructor. (4 cred.; prereq. 21, 22, 50 or ¶50, Psy. 1-2, #)
- 63. Quantity Food Production.** (Formerly 45) Application of the principles of cookery to large quantity preparation; development of skills and techniques in

- the organization of large-scale food production for cafeteria and special meal service; study of standardized formulas and production costs. (6 cred.; open only to H.E. students; prereq. 40, 41)
- 64. Purchasing for Institutions.** Problems in the selection and care of equipment; selection and storage of food and planning facilities for their use. (4 cred.; prereq. 46, 63 or ¶)
- 65. Institution Management Problems.** Problems affecting the efficient administration of the institution; departmental organization, operation, maintenance; employment problems; business policies. (3 cred.; prereq. 46, 63, 64)
- 70. Advanced Food Preparation.** (Continuation of 40) Emphasizes the scientific principles that underlie cookery processes and food preservation. (3 cred.; prereq. 40, Ag.Bi. 1)
- 71. Demonstrations.** Purposes and techniques of food demonstrations with special reference to their application in business. (1 cred.; prereq. 3rd qtr. jr., 41)
- 76. Nutrition.** Application of the principles of nutrition to the problems of food selection most commonly met in everyday living. (4 cred., \$H.E. 34, or 170 and 171; prereq. 30 or 31 and 40)
- 79. Selected Problems for Dietitians.** Problems related to the work of the dietitian, involving discussions, readings, and fields trips. (3 cred.; open only to H.E. students; prereq. 170 or equiv.)
- 85. Home Management Principles.** Managerial aspects of homemaking; work simplification of household activities; financial records and budget-making for the individual and the family. (3 cred.; prereq. 40, 41 recommended)
- 86. Home Management Laboratory.** Residence for one-half quarter in one of the two home management houses, with direct experience in managing and sharing activities and responsibilities. (4 cred.; prereq. 85 or 185, 40, 41 recommended; deposit of \$10 required)
- 89. Special Problems in Household Equipment.** An intensive study of various phases of household equipment by means of individual laboratory problems. (3 cred.; prereq. 49, Ag.En. 35, #)
- 98. Home Economics Extension.** 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.; prereq. sr., H.E.Ed. 91 or ¶H.E.Ed. 91)
- 102. Advanced Textiles.** The nature of textile raw materials; economic, chemical, and physical problems involved in their manufacture and use; measurement and significance of physical characteristics of yarns and fabrics. (3 cred.; prereq. 50, Ag.Bi. 1, Ag.Ec. 3 or ¶Ag.Ec. 3)
- 107. Textile Analysis.** Application of quantitative methods in the analysis of textile materials, with special reference to fiber composition and finishes. (3 cred.; 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; sociological and economic aspects of fashion in dress; ready-to-wear industry. (3 cred.; prereq. 50, Ag.Ec. 3)
- 116. Family Clothing Problems.** Buying, simplification, labeling, and standardization of clothing; sizing of garments and patterns; recent developments in choice of clothing for specific uses. (3 cred.; prereq. 3, 50)
- 120. Art History.** A general view of the history of art from the Egyptian period to the present. The painting, sculpture, architecture, furniture, and costume of the past studied for their present influences and contributions and their significance to contemporary houses and furnishings and to dress. Field trips. (3 cred.)
- 121. Textile Design.** Historic and modern textile designs and designers. Original designs applied to textiles by means of silk screen, batik, and block print techniques. (3 cred.; prereq. 23, 27, 50, or #)

- 122. Advanced Interior Design.** Small-house interiors designed and elevation drawings rendered in color. Studies and reports on modern trends, designers and their work, and other topics of practical and historic interest. Actual materials used as far as possible. Field trips to shops and homes. (3 cred.; prereq. 27, 120, or #)
- 125. Advanced Costume Design.** Modern and historic costume. Studies and reports on selected topics. Problems in draping and sketching designs. Pencil, crayon, and watercolor techniques. (3 cred.; prereq. 3, 22, or #)
- 140. New Developments in Food Preparation.** Survey of recent trends in food preparation. (3 cred.; prereq. sr., 40, 70 recommended)
- 141. Current Literature in Foods.** Lectures and discussion of recent literature dealing with food products and preparation. (3 cred.; prereq. sr., 40 or equiv.)
- 142. Experimental Cookery.** An intensive study of problems in foods and food preparation by means of individual laboratory problems. (3 cred.; prereq. 40, Ag.Bi. 1)
- 146. Special Food Problems.** Class problems in foods and food preparation. (3 cred.; prereq. sr., 142)
- 170. Nutrition of the Family.** Fundamental principles of human nutrition and their application in the promotion and maintenance of optimal health of the family. (3 cred.; prereq. 31, 40, Ag.Bi. 1, Phsl. 4)
- 171. Child Nutrition.** Lectures and discussions dealing with the principles of child nutrition and with the formation of desirable food habits. Observation of children at mealtime is included. (3 cred.; prereq. 170, H.E.Ed. 90)
- 173. Diet Therapy.** The fundamental principles involved in using diet in the treatment of certain diseases. (4 cred.; prereq. 170; 35 recommended)
- 176. Advanced Nutrition.** Selected quantitative methods applicable to investigation relating to digestion and metabolism. (4 cred.; prereq. 35 or ¶35, Ag.Bi. 2)
- 177. Digestion and Metabolism.** Selected problems relating to digestion and metabolism; lectures, readings, and laboratory. (3 cred.; prereq. 35)
- 178. Clinical Problems in Nutrition.** Application of nutrition information to problems in health and disease involving assigned readings, discussions, and experience in a clinic. (2 cred.; prereq. 170, 35 or ¶35)
- 179. Readings in Nutrition.** Experience in use of nutrition books and periodicals, involving readings and oral and written reports. (2 cred.; prereq. 170)
- 180. Home Planning and Furnishing.** Problems in planning and furnishing a home to meet family needs. Aesthetic, economic, social, and managerial aspects are considered. Each student develops a plan for a house and its furnishings based on family living. Field trips. (5 cred., §G.C. 16, F.L. 15, H.E. 24 or 57; prereq. 27, 49, 120 recommended)
- 181. Housing Problems of the Family.** Plans for both urban and rural homes, with evaluation of the economic, art, and social aspects. Discussions, field trips, and classroom analyses. (3 cred.; prereq. 24 or 27)
- 185. Family Relationships.** Factors that promote satisfaction in family living, and interrelationships of the family and the community. (3 cred.; prereq. 17, 86, H.E.Ed. 90 or #)
- 186. Problems in Income Management.** Specific aspects of financial management for the individual and for the family. Readings, discussions, and field work. (3 cred.; prereq. 86, 34 or equiv., or #)

HOME ECONOMICS EDUCATION (H.E.Ed.)

(College of Education)

JUNIOR AND SENIOR COURSES

- 90. Child Training.** Growth and development of children and problems in training. Emphasis on the preschool child. Observations of children. (3 cred.; open also to soph.; prereq. Psy. 1-2)

- 91. Observation, Materials, Teaching in Home Economics.** Philosophy of the home economics program; students' needs and interests; teaching materials, curriculum guides and unit construction; development of home economics in the school program. (5 cred.; prereq. H.E. 4, 21, 22, 41, Ed. 55A-B, home experience, 193)
- 92. Teaching Problems in Home Economics.** Study of teaching procedures; management of homemaking department, space and equipment; relationship of teacher to school, community, and profession. (2 cred.; prereq. sr., 91, 93, 194, 192, and 194A)
- 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. In the second quarter the student spends a month in a selected school in the state. (9 cred.; prereq. H.E. 4, 21, 22, 41, Ed. 55A-B, completion of home experience work in home economics)
- 95. Field Experience for Home Agents.** Observation, participation, and actual experience under supervision in the agricultural extension program. Study of the program on the St. Paul Campus and participation in a selected county program with a home agent. A written report summarizing the experience will be required. (6 cred.; prereq. 91, 93, permission of head of Home Economics Education and the director of Agricultural Extension)
- 192. Evaluation in Home Economics.** Measuring progress toward important goals in different areas of home economics; available tests and other evaluation materials; construction and refinement of various evaluation instruments. Elementary statistical techniques useful to home economics teachers. (2 or 3 cred.; prereq. sr., 91, 93, Ed. 55A-B)
- 193A. Home Economics Curriculum (secondary level).** Contributions of home economics at elementary and secondary levels; techniques employed in curriculum planning and reconstruction. (3 cred.; prereq. 94 or #)
- 193B. Home Economics Curriculum (college level).** The place of home economics in higher education and problems which are acute today; curriculum offerings; teaching schedules and load; appropriate reference materials. (3 cred.; prereq. #)
- 194A. Adult Education in Home Economics.** Objectives of adult education in homemaking; problems affecting community and family life; methods of helping adults and out-of-school youth in solving problems in home living. (3 cred.; prereq. 91, 93 or equiv.)
- 194B. Adult Education in Home Economics.** Planning a community program; teaching procedures; special problems. Planned for teachers and supervisors of adult education. (3 cred.; prereq. sr., 91, 93, 194A)
- 195. Space Equipment, Furnishings, and Materials for Home Economics Departments.** Study of remodeling old and planning new departments, and equipping and furnishing them. Review of research; investigation of special problems. Designed for graduate students and adult specials, but open to seniors by #. (3 cred.; prereq. 91, 93, H.E. 49)
- 197. Organization and Methods of Related Art Teaching.** Development of a working philosophy of related art. Courses planned and methods studied to relate art and home economics subject-matter in various aspects of home and community life. (1 to 3 cred.; prereq. sr., 91, H.E. 180 or equiv.)
- 199E. Internship.** Directed teaching and practice work at the graduate level for candidates for the master of education degree. (Cred. ar.; prereq. #)

HORTICULTURE (Hort.)

There are four distinct fields in horticulture: vegetable growing, fruit growing, landscaping, and floriculture. In some cases students may find it advisable to include more than one field in their major. Those who plan to enter some horticultural industry such as fruit growing, market gardening, truck growing, nursery business, greenhouse business, florist work, or land-

scape gardening should follow the curriculum in technical agriculture. Students who plan to take 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. 1, 32, 110, 135, 136, 138, 139; Agro. 31
- b. Fruit Growing: Hort. 1, 6, 36, 40, 107, 110, 111, 121; Agro. 31
- c. Ornamental Horticulture and Floriculture: Hort. 1, 16, 21, 22, 36, 51, 52, 54, 110; Agro. 31; Pl.Pa. 1 or 10

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.

Students in ornamental horticulture and floriculture will be required to get six months of practical experience in their respective professions before graduation. This will satisfy the farm experience requirement.

2. *Landscaping*—See Landscaping Curriculum, page 34.

3. *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. (3 cred.)
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.; prereq. 1 or Bot. 1)
10. **Home Floriculture.** For the student who does not take any other courses in floriculture. Working knowledge of the propagation, culture, and uses of the common garden flowers and house plants. Lectures, laboratory, and reference reading. (3 cred.)
16. **Greenhouse Management.** The fundamentals of greenhouse construction and management, soils, fertilizers, watering, ventilating, heating, lighting, shading. (3 cred.; prereq. 6 cred. in botany or equiv.)
21. **Plant Materials, Fall and Winter Aspects.** A study of the trees, shrubs, and evergreens used in landscape planting, with emphasis on their fall and winter characters, their identification and uses in landscape design. Lectures, laboratory (outdoor and indoor), and field trips. (3 cred.; prereq. 6 cred. in botany or equiv.)
22. **Plant Materials, Spring and Summer Aspects.** A study of trees, shrubs, and evergreens used in landscape planting, with emphasis on their spring and summer characters, particularly that of blooming habit. Lectures, laboratory (outdoor and indoor), and field trips. (3 cred.; prereq. 6 cred. in botany or equiv.)
32. **Vegetable Growing.** 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. 6 cred. in botany)
36. **Plant Propagation.** Methods of propagating plants by seed, cuttings, layers, divisions, and grafting. Practical work in management of nursery stock, bulbs, and plants. Lectures, reference reading, and field trips. (3 cred.; prereq. soph., 6 cred. in botany or equiv.)
38. **Retail Floriculture.** Students registering for this course must enroll in the University Extension course of the same name. Lectures, demonstrations, and practice sessions dealing with retail store management and floral designing.

A final examination and comprehensive term paper will be required. (2 cred.; prereq. soph., major in ornamental horticulture; offered 1956-57 and alternate years)

- 40. Horticulture Laboratory.** Lectures and practice on operations used in orchard and berry fields. Planning, planting, pruning, grafting, etc. (2 cred.; prereq. soph., 6 or #)

JUNIOR AND SENIOR COURSES

- 51. Garden Flowers.** The common annuals, biennials, and perennial flowers, with emphasis on their uses in landscape planting. Lectures, laboratory, reference reading, and field trips. (3 cred.; prereq. 9 cred. in botany or equiv., #; offered 1955-56 and alternate years)
- 52. Commercial Floriculture, Fall Crops.** The culture of the principal florist crops and tropical plants of economic importance. Major emphasis on foliage plants, chrysanthemums, carnations, cut flowers, and potted plants especially adapted to Christmas sales. Lectures, reference reading, and field trips to greenhouses, wholesalers, and retail flower stores. (3 cred.; prereq. 16 and 6 cred. in botany or equiv.)
- 54. Commercial Floriculture, Spring Crops.** Principal florist crops and tropical plants of economic importance. Major emphasis on orchids, roses, bulbous plants, and material adapted to spring sales. Lectures, reference reading, and field trips to greenhouses, wholesalers, and retail flower stores. (3 cred.; prereq. 16 and 6 cred. in botany or equiv.)
- 60. Principles of Landscape Design.** (Formerly 24) Principles of landscape design with special reference to their practical application in planning of residential landscapes. Relationships of landscape design, architectural design, and interior decoration. Landscape plans, landscape drafting techniques, and methods of presentation. Lectures, drawings, and practical problems. (3 cred.; prereq. 21, 22 or #)
- 61. Principles of Planting Composition.** (Formerly 25) Principles of planting arrangement and a study of the aesthetic qualities of plants, their value and uses in all kinds of landscapes and gardens; special reference to home landscapes and gardens. Lectures and problems. (3 cred.; prereq. 60 or #)
- 62. Special Problems in Landscape Design and Composition.** Problems based upon the work given in the preceding landscape gardening courses. (2 to 4 cred. per qtr.; total 6-12 cred.; prereq. sr., 61)
- 76. Landscape Construction and Maintenance.** Survey of garden and landscape construction, materials, grading, planting, and maintenance, including plans, specification, 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.; prereq. 60 or 61 or #; offered 1956-57 and alternate years)
- 107. Orchard Management.** Detailed study of the various operations in orchards and berry fields. Operating costs and profits. Lectures, laboratory, and individual problems. (3 cred.; limited to major or minor students in horticulture or #; prereq. 6; offered in 1956-57 and alternate years)
- 110. Horticultural Crop Breeding.** Principles of plant improvement, their special application to horticultural plants, and the breeding methods used with vegetables, fruits, and ornamentals. (3 cred.; 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.; limited to major or minor students in horticulture or #; prereq. 6, and 9 cred. in botany or equiv.; offered 1955-56 and alternate years)
- 121. Small Fruit Culture.** Cultural practices for each of the small fruits. Brief consideration of their botanical relationships and the history of their commercial development. Lectures, problems, and survey of literature. (3 cred.; limited to major or minor students in horticulture or #; prereq. 6 or 32, 9 cred. in botany or equiv.)

- 135. Potatoes.** Culture, handling, storage, seed maintenance, varieties, improvement, and physiology of the potato plant. (3 cred.; prereq. 32, 9 cred. in botany or equiv.)
- 136. Adaptation and Maintenance of Vegetable Varieties.** 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. (3 cred.; prereq. 32, 9 cred. in botany or equiv.; offered 1955-56 and alternate years)
- 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.; prereq. 32, 9 cred. in botany or equiv.; offered 1956-57 and alternate years)
- 139. Vegetable Crops II.** (Continuation of 138) (3 cred.; prereq. 32, 9 cred. in botany or equiv.; offered in 1955-56 and alternate years)
- 150. Principles of Quality Control.** Factors influencing the texture, flavor, and quality of fruits and vegetables after harvest. Study of objective methods for determining texture and maturity. Quality control equipment and methods used in commercial processing operations and for fresh market outlets. Pre-packaging materials and methods. (2 cred.; limited to major or minor students in horticulture or food technology, or #)
- 190-191-192.‡ Special Problems.** Problems based upon the work given in the preceding courses. (2 to 4 cred. per qtr.; prereq. ‡)
- 193-194.‡ Horticultural Seminar.** Reports and discussions of problems and investigational work. (1 cred. per qtr.; prereq. sr., 9 cred. in horticulture)

ORIENTATION (Orie.)

- 1. College Orientation Lectures.** Required of all students entering the college except those who have had one year or more of work in another college. Students must register for course in their first quarter in college. Discusses Land-Grant institution development and program of the college. Gives limited attention to principles of learning and individual differences, study habits and skills. Outlines student personnel program of college and university. (1 cred.)

PLANT PATHOLOGY AND BOTANY (Pl.Pa.)

Training in this field may lead to state and federal service, college teaching and experiment station work, and employment in a variety of commercial fields.

Two fields of specialization are available in the department: (a) plant pathology, and (b) agricultural botany.

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 the approval of the department.

Recommended for major in plant pathology:

- 1. Science Specialization**—Pl.Pa. 1 or 10, 56 or 156 or 105-106-107; 111 or 114, 115 or 116;
- 2. Technical Agriculture**—Consult adviser in Plant Pathology.

B. Agricultural Botany. A major 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 several fields of horticulture, agronomy, soils, forestry, and entomology and economic zoology, subjects from these departments should also be included in either the major or minor.

A major in agricultural botany in the technical agriculture curriculum must have approval of the department. A major in science specialization assumes continuation in graduate work. For courses recommended for major in both technical agriculture and science specialization curricula, consult departmental adviser.

Plant Pathology

FRESHMAN AND SOPHOMORE COURSES

1. **Plant Pathology.** An introductory course in plant diseases. Lectures, laboratory, and special problems. (5 cred., \$10; prereq. soph., 9 cred. in plant sciences with at least 6 cred. in botany)
10. **Forest Pathology.** Diseases of forest and shade trees, and wood decay. Symptoms, etiology, and control. Lectures, laboratory, and field work. (5 cred., \$1; prereq. soph., 6 cred. in botany)

JUNIOR AND SENIOR COURSES

56. **Introduction to the Study of Fungi.** Structure, development, and identification of fungi, especially those of economic importance. (3 cred.; prereq. 9 cred. in botany or #)
104. **Industrial Mycology.** Fungi in relation to industrial processes and products. (3 cred.; prereq. 1 or 10 or 56; offered 1956-57 and alternate years)
- 105-106-107.‡ **Mycology.** Morphology and taxonomy of fungi. Lectures, laboratory, and field work. (3 cred. per qtr.; prereq. 1 or 10 or 56 or equiv.)
111. **Diseases of Field Crops.** Detailed study of diseases of field crops including symptomatology, etiology, and practical methods of control. (4 cred.; prereq. 1 or 10 or 120)
114. **Advanced Forest Pathology.** A detailed study of wood rots, including a study of the deterioration of wood products. Lectures and laboratory. (3 cred.; prereq. 1 or 10)
115. **Diseases of Vegetable Crops.** Detailed study of vegetable diseases, especially those important in Minnesota. Lectures, laboratory, field and greenhouse work. (3 cred.; prereq. 1 or 10 or 120; offered 1955-56 and alternate years)
116. **Diseases of Fruit Crops.** Detailed study of fruit diseases, especially those important in Minnesota. Lectures, laboratory, field, and greenhouse work. (3 cred.; prereq. 1 or 10 or 120; offered 1956-57 and alternate years)
117. **Virus Diseases of Plants.** Nature of plant viruses and types of diseases they cause; emphasis on methods for studying virus diseases. (3 cred.; prereq. 1 or 10 or 120; offered 1955-56 and alternate years)
118. **Bacterial Diseases of Plants.** Bacteria as plant pathogens; representative types with particular reference to techniques used in studying bacterial diseases of plants. (3 cred.; prereq. 1 or 10 or 120; offered 1956-57 and alternate years)
119. **Principles of Plant Disease Control.** A general consideration of principles and practices in controlling plant diseases. (3 cred.; prereq. 1 or 10 or 120)
120. **Plant Pathology for Advanced Students.** General plant pathology. Lectures, laboratory, greenhouse work, and special problems. (3 cred.; \$1 or 10; prereq. 14 cred. in plant sciences or #)
- 141-142.‡ **Insects in Relation to Plant Disease.** (Same as Ent. 141-142) 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; methods of rearing and handling insect vectors. (6 cred.; prereq. 8 cred. in entomology or plant pathology)
143. **Methods.** Theoretical and practical consideration of methods used in mycological, pathological, and physiological research. (3 cred.; prereq. 1 or 10)
156. **Study of Fungi for Advanced Students.** General characters of fungi, especially those used in identification; cultural and taxonomic procedures and practices. (3 cred., \$56, 105, 106, 107; prereq. 9 cred. in botany or #)

Agricultural Botany

FRESHMAN AND SOPHOMORE COURSES

3. **Weeds and Seeds.** Identification of weed seeds and seedlings, the life history and habits of weeds in relation to their control and weed laws. (3 cred.; prereq. 6 cred. in botany)
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.; prereq. soph., 9 cred. in botany or equiv.; offered 1955-56 and alternate years)

JUNIOR AND SENIOR COURSES

53. **Food Plants of Game Animals.** A study of food plants; uses, habits, reproduction, and identification. (3 cred.; prereq. one yr. of botany and one yr. of zoology 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.; prereq. 15 cred. in plant sciences or ‡; offered 1956-57 and alternate years)
103. **Physiology of Economic Plants.** A study of the applications of plant physiological principles to agriculture, horticulture, and forestry. Lect. and lab. (3 cred.; prereq. Bot. 51 or 140)
136. **Physiology and Ecology of Weeds.** Factors affecting growth and distribution of weeds; chemical nature of herbicides and their effects; importance of weeds as a reservoir of insects and plant pathogens; ecological relationships of weeds. Lectures, laboratory, and greenhouse work. (3 cred.; prereq. 3 or equiv.)
161. **Technology of Fruits and Vegetables.** A study of the methods used in transporting, storing, and ripening of fruits and vegetables and the chemical and physiological changes that occur during storage and ripening in tissues of economic plants. Lect. and lab. (3 cred.; prereq. 15 cred. in plant sciences or ‡; offered 1955-56 and alternate years)
162. **Temperature Relations of Crop Plants.** A study of general temperature effects, with special emphasis on low temperatures and the prevention of low temperature injury. Lectures and laboratory. (3 cred.; prereq. 15 cred. in plant sciences or ‡; offered 1956-57 and alternate years)

POULTRY HUSBANDRY (Po.Hu.)

Students whose major interests lie in the fields of poultry production, processing, and distribution, and in education should follow the curriculum in technical agriculture. Those interested in research or postgraduate work should follow a specified curriculum in science specialization. Vocational opportunities appear in such areas as (1) private business, (2) extension, teaching, and research in state colleges and experiment stations and the federal government, (3) supervisory and regulatory work, and (4) service work or research in industry.

Recommended courses for majors in:

1. *Technical Agriculture*—Po.Hu. 1, 51, 52, 102, 153, 154; An.Hu. 112; V.Bac. 129; Ag.Bi. 6; Ag.Ec. 25, 40; Agro. 31.
2. *Science Specialization*—Consult adviser.

FRESHMAN AND SOPHOMORE COURSES

1. **Poultry Production.** An introduction to the poultry industry and to the principles underlying poultry flock management. (4 cred.)

JUNIOR AND SENIOR COURSES

51. **Hatchery Management.** Principles of incubation, study of commercial incubators and factors affecting hatchability; practice in chick, poult, and goose sexing; problems in hatchery operation. (3 cred.; prereq. 1, Zool. 14-15)
52. **Poultry Selection.** Practice in selection for standard and production qualities of poultry. (3 cred.; prereq. 1)
55. **Special Problems.** Special individual assignments in poultry husbandry. (1-3 cred.; prereq. 6 cr. in poultry husbandry and 8)
102. **Poultry Breeding.** Application of the principles of genetics and physiology of reproduction to the breeding of poultry. (4 cred.; prereq. 1, Agro. 31)
153. **Poultry Nutrition and Feeding.** A study of the nutrients required by poultry and how these nutrients are supplied under practical feeding conditions. Feeding methods and ration formulation are considered. (3 cred.; prereq. 1, Ag.Bi. 1)
154. **Poultry Products.** A study of the technology involved in the grading, processing, packaging, storage, and merchandising of poultry meats and eggs. Lecture, laboratory, and field work. (5 cred.; prereq. 1)

RHETORIC (Rhet.)

All students in the College of Agriculture, Forestry, and Home Economics are required to take the following basic courses in Rhetoric: Freshman Communications (see page 20); Public Speaking (Rhetoric 22); and Exposition (Rhetoric 51) (see page 21). Additional requirements as to number of hours and specific courses depend upon the particular curriculum for which the student is registered.

Besides teaching basic skills, the Rhetoric Department offers opportunities for elective courses in literature, original writing, speech, and dramatics.

FRESHMAN AND SOPHOMORE COURSES

1. **Communications I.** Diagnostic tests in listening, reading, speaking, and 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.)
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.; 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 documentation. Brief-writing and persuasive speaking. (3 cred.; prereq. placement test)
12. **Discussion Methods.** Study of and practice in structured and unstructured discussion. Emphasis on group dynamics and the psychology of leadership. Practice in leading meetings, debating, planning radio programs, organizing in-service training programs, evaluating group progress. (3 cred.; prereq. Rhet. Comm. req.)
22. **Public Speaking.** A practical course in the fundamentals of speech making. Emphasis upon organizing the speech and projecting it to the audience. (3 cred.; prereq. Rhet. Comm. req., or English 6 for Institute of Technology students)
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.; prereq. Rhet. Comm. req.)

- 28. Play Production.** Practice in acting. Techniques of directing both traditional and arena style plays. Each student plans and carries out a practical play production problem. (3 cred.; prereq. Rhet. Comm. req.)
- 31. Poetry and Drama.** Reading for understanding and enjoyment. Selections drawn from English and American literature. Records and visual aids supplement lecture and discussion. (3 cred.; prereq. Rhet. Comm. req.)
- 32. Novel and Short Story.** Careful reading and analysis of selected English and American fiction. Emphasis on increasing comprehension and enjoyment of literature. (3 cred.; prereq. Rhet. Comm. req.)
- 33. American Life in American Literature.** Analysis of philosophical and social concepts that have shaped American culture, as reflected in literature. (3 cred.; prereq. Rhet. Comm. req.)
- 47. Efficient Reading.** Designed to increase reading rate, comprehension, and vocabulary. Open to all students, including graduate students, who score above the 30th percentile rank on a standard test. For persons of average or above-average reading ability who wish to achieve or maintain superior scholastic status. Not a remedial course. (3 cred.)

JUNIOR AND SENIOR COURSES

- 51. Exposition.** Essays; semitechnical and technical articles; application letters. Review of usage and study of style. Required of all students unless exempted through examination given by department. (3 cred.; prereq. Rhet. Comm. req.)
- 54. Advanced Public Speaking.** Training for specific speech situations most likely to be encountered professionally soon after graduation. Psychology of communication especially as related to use of visual aids, demonstration, performance method, and radio. (3 cred.; prereq. 22)
- 59. Advanced Play Production.** (Continuation of 28) Problems of directing, staging, and makeup. Study of representative plays. Each student is required to produce a play in central staging. A practical course for teachers and extension workers. (3 cred.; prereq. 28 or #)
- 60. Contemporary Life and Literature.** Reading and analysis of important books of current period. (3 cred.; prereq. Rhet. Comm. req.)
- 91. American Speech for Foreign Students.** Primarily for graduate students who wish to improve their command of oral English. Individual attention; laboratory procedure. Audio-visual equipment used to expedite work in vocabulary, enunciation, and pronunciation. (No cred.; 3 hrs. per week)

SOILS (Soil.)

Soils majors in either technical agriculture or science specialization are expected to take a minimum of 15 credits in Soils and Ag.Bi. 2 or its equivalent. Technical agriculture majors should select, with the help of the adviser, a sufficient number of elective courses in related sciences to complete the major sequence. In the science specialization curriculum majors will be expected to take Math. 15 and 16 or its equivalent as well as a combination of courses from those offered in botany, chemistry, geology, and physics. In either case the subjects will be somewhat dependent upon the objective of the course of study being pursued.

FRESHMAN AND SOPHOMORE COURSES

- 2. Soils.** (Formerly 4) Origin, formation, and classification of soils; physical and chemical properties of soils; elements essential for plant growth; organic matter; pH; soil water; soil organisms; fertilizers; rotations; erosion control. Lecture, laboratory. (4 cred.; prereq. In.Ch. 1-2 or 4-5)

- 3. Forest Soils.** Origin and classification of forest soils; factors of soil formation; forest soil organisms; the forest floor; physical and chemical properties; soil water and erosion control; management of forest nursery soils. (3 cred.; prereq. soph., In.Ch. 1-2 or 4-5)
- 3A. Field Forest Soils.** Soil texture, structure, consistence, reaction, and color. Field study and description of soil profiles. Use of soil maps in forestry. Given at Lake Itasca Forestry and Biological Station. (1 cred.)
- 5. Soil Management.** Principles of soil fertility and conservation; use of farm manure, green manure, lime, and fertilizers in fertility maintenance; relation of fertilizer materials to crop sequences and rotations. (3 cred.; prereq. soph., 2 or 3)

JUNIOR AND SENIOR COURSES

- 52. Soil Seminar.** Assigned reading, reports, and discussions on soil topics. (1 cred.; prereq. 2 or 3)
- 121. Soils of Minnesota.** Characteristics and location of major soils of Minnesota; soil survey; aerial photo interpretation; use and interpretation of soil maps. Lecture, laboratory. Field trips at student expense. (3 cred.; prereq. 2 or 3)
- 122. Soil Conservation.** (Formerly 103) Causes and types of soil erosion; relation of erosion to climate, vegetation, slope, soil type, and soil management; soil-erosion control practices; organizations dealing with soil-erosion control; farm planning. Field trips required. (3 cred.; prereq. 2 or 3)
- 123. Fertilizers and Soil Fertility.** Production, properties and use of commercial fertilizers; soil deficiencies, nutrient needs of plants and methods of investigation, new advancements in fertilizer use. (3 cred.; prereq. 2 or 3, or #)
- 124. Soil-Forming Minerals and Rocks.** Morphological, physical, and chemical characteristics of common soil-forming minerals; classification, structure, and properties of clay minerals; common soil-forming rocks and their weathering products. Lectures and laboratory. (3 cred.; prereq. 2 or 3; offered in 1956-57 and alternate years)
- 125. Soil Genesis and Classification.** (Formerly 109) Soil profile characteristics, factors of soil formation, systems of soil classification, world distribution of major soil groups. (3 cred.; prereq. 2 or 3; 121 recommended)
- 126. Soil Physics.** (Formerly 108) A study of the physical characteristics of soils, with consideration given to mechanical composition, consistence, structure, soil-water relationships, soil air, and soil temperature. Lectures and laboratory. (4 cred.; prereq. 2 or 3)
- 127. Soil Microbiology.** (Same as Bact. 103) Studies of the bacteria, fungi, and actinomycetes of the soil, with emphasis on the biochemical activities of the soil microflora. (4 cred.; prereq. Bact. 53, 8 cred. in organic chemistry and #)
- 128. Soil Chemistry.** (Formerly 110) Chemical composition of soils; organic matter; mineral matter; ionic exchange; plant nutrients and factors affecting their availability. (3 cred.; prereq. 2 or 3, 124 recommended, or #)
- 129. Chemical Analysis of Soils.** Methods of chemical analysis in soils. Lectures and laboratory. (3 cred.; prereq. analytical chemistry or #)
- 130. Special Problems in Soils.** Research, readings, instruction. (2-4 cred.; prereq. 2 or 3 or #)

Part III. School of Veterinary Medicine

Supervised instruction for a career in veterinary medicine requires two years of study in a preprofessional curriculum and four years in the professional curriculum. The University of Minnesota provides opportunities for completion of the entire course of study. The two-year course of preparation for the professional curriculum is offered in the College of Agriculture, Forestry, and Home Economics. The preveterinary studies may be completed at any other accredited college that offers the required courses. (For admission requirements, School of Veterinary Medicine, see page 89, this bulletin.)

VETERINARY MEDICINE AS A CAREER

Veterinary medicine is that science and art of medicine which deals with all aspects of health, disease, and reproduction of domestic animals and wild animals in captivity. Veterinary medicine is concerned with the prevention, cure, alleviation, and eradication of animal diseases. The science of veterinary medicine is based on the knowledge gained from planned research and study. The art of veterinary medicine is the use of that knowledge.

The veterinarian may choose one or more fields of work available to him upon completion of his training, graduation, registration, and accreditation. Many veterinarians are engaged in private practice. A private practice may be a general one, meaning that all types of animals are cared for, or it may be specialized and deal with only one to two species of animals. In the latter category, veterinary work may consist primarily of small animal practice, dairy cattle practice, poultry practice, sheep and range cattle practice, swine practice, horse practice, and reproduction management practice.

Regardless of whether the veterinarian is for the most part engaged in general or specialized practice, his work is divided into four categories: (1) prevention of animal disease by the use of vaccines or by helping the animal owners to improve sanitary conditions, feeding standards, and management; (2) medical and surgical treatment of ailments and injuries; (3) protection and improvement of the nation's supply of food derived from animals, such as meat, dairy products, poultry, and eggs; and (4) protection of the public from diseases which may be transmitted from animals to man, such as brucellosis and rabies.

Other fields open to graduate veterinarians include: (1) professional endeavor in the Agriculture Research Service; (2) research and teaching in veterinary colleges and institutions; (3) veterinary officers in the United States Armed Forces and the United States Public Health Service; (4) positions with state livestock sanitary boards and federal, state, and municipal health departments; and (5) positions with commercial firms engaged in research and production of pharmaceuticals, vaccines, and sera.

Figures compiled by the American Veterinary Medical Association in 1954 indicated that there are 16,665 veterinarians in the United States and its territories. It is estimated that the numbers of veterinarians will increase by approximately 500 each year until a total of 20,000 to 25,000 is reached. The steadily growing need for veterinary service may best be indicated by the fact that animal losses in this country from various diseases total approximately one billion dollars per year, despite our advancing knowledge of livestock diseases. It will be many years before this situation is improved.

HISTORICAL SUMMARY OF SCHOOLS OF VETERINARY MEDICINE

It has been said that veterinary medicine developed contemporaneously with the domestication of animals. There is historical evidence that ancient peoples practiced this science and art. Only in comparatively recent years has veterinary medicine become established as a profession. Records of formal education in veterinary medicine go back to 1740, when a privately owned academy in France included instruction in equine medicine. The first veterinary

college was established in England late in the eighteenth century. In 1852 the first veterinary school in North America, the Veterinary College of Philadelphia, was granted a charter. Since 1852, schools had been organized throughout the United States until they numbered 25 in 1916. Most of the schools prior to 1916 were privately owned and financed. Since 1916, many of the privately owned schools have become nonexistent because of the lack of financial support. Most of the present-day schools are state supported.

The School of Veterinary Medicine at the University of Minnesota came into existence as a result of a combination of several factors. For a number of years the livestock industry of the State of Minnesota had expressed the opinion that a school of veterinary medicine was needed in this region. In 1945 a large number of students from this state were interested in obtaining an education in veterinary medicine. These students were unable to gain admission to the ten schools of veterinary medicine in existence at that time. A combination of student demand for veterinary medical education and the need of the livestock industry for increased veterinary services and research in animal diseases led to the appropriation of funds by the 1947 Minnesota State Legislature for the establishment of the School of Veterinary Medicine on the St. Paul Campus of the University. The Board of Regents promptly established the School as a unit of the College of Agriculture, Forestry, and Home Economics. The Board of Regents further stipulated that a freshman class be accepted in the fall of 1947.

The School of Veterinary Medicine of the University of Minnesota graduated its first class in 1951.

In 1954, the School of Veterinary Medicine became a separate unit in the Institute of Agriculture of the University of Minnesota.

FACILITIES

The facilities of the School of Veterinary Medicine, University of Minnesota, are housed in four major buildings and a number of minor ones. Most of the formal classes are taught in the former; research equipment and research animals are housed in the latter. The School is well equipped in respect to facilities, scientific instruments, and teaching aids which are available for

student instruction. Some of the buildings and facilities will be briefly discussed in the following paragraphs.

Anatomy of the domestic animals is taught in the Veterinary Anatomy building. This structure contains one lecture room, dissecting rooms for gross anatomy, locker room, and rooms for teaching histology, embryology, and neuroanatomy. In addition, there are offices and graduate laboratories for the staff.

Physiology and pharmacology of domestic animals are taught in a large temporary building adjacent to the Veterinary Clinic. The laboratory, preparation rooms, and animal quarters are on the first and second floors. The lecture room, offices, and graduate laboratories are on the third floor. Some physiological and pharmacological work and demonstrations are performed in other buildings and on the Minneapolis Campus.

Veterinary bacteriology is taught in the Veterinary Science building, which is the latest addition to the veterinary group. The lecture room is on the first floor. Modern, well-equipped laboratories are located on the second floor. Numerous offices, small laboratories, and facilities for preparing media and specimens also are located on the second floor.

Veterinary pathology is taught on the first floor of the Veterinary Science building, as well as in the Veterinary Clinic. Basic principles of pathology are taught in the laboratory, specimen room, and lecture room located in the Veterinary Science building. Post-mortem studies and laboratory application and more advanced classes are taught in the Veterinary Clinic.

Veterinary parasitology shares facilities with pathology in regard to lecture rooms, laboratories, and clinic facilities. Offices, office-laboratories, and preparation rooms for pathological and parasitological specimens also are to be found on first floor of the Veterinary Science building.

The third and fourth years of professional study are devoted primarily to the practical application of veterinary science in various aspects of clinical study. Medicine, surgery, obstetrics, radiology, and ambulatory practice are all closely integrated in the clinical studies. One area of the clinic contains reception rooms, consultation rooms, pharmacy, treatment area, surgery, radiological facilities, wards, and feed preparation rooms for the treatment and care of dogs, cats, and other small

animals. Another larger area provides similar facilities for cattle, horses, and other large animals.

The ambulatory service has office and laboratory space, together with equipment and automobiles, designed to provide veterinary service for clients who cannot conveniently enter their animals in the veterinary clinic for treatment there.

The teaching of obstetrics is carried on in the clinic and to a considerable extent at farms and dairies convenient to the St. Paul Campus.

Other facilities which are of obvious advantage and deserve mention are located on or near the St. Paul Campus. The veterinary library, located in the Veterinary Anatomy building, contains all recent veterinary literature in Eng-

lish and many pertinent periodicals. The Veterinary Diagnosis Laboratory adjacent to the clinic provides fourth-year students with the opportunity to observe the large number of specimens that are presented to the laboratory for examination and diagnosis. The facilities of the meat-packing establishments in St. Paul are utilized for instruction in meat inspection and hygiene. Students are able to acquaint themselves with the functions of the State Livestock Sanitary Board through occasional contacts with its representatives located in St. Paul.

At the present time the School of Veterinary Medicine has facilities to provide students with an excellent professional education for a career in veterinary medicine.

Admission and Curricula

Training in veterinary medicine includes two years of college-level study in a preveterinary curriculum and four years of professional study in the School of Veterinary Medicine. The preveterinary curriculum may be completed at the College of Agriculture, Forestry, and Home Economics of the University of Minnesota or at another institution that offers the required courses. (See admission requirements, School of Veterinary Medicine, page 90, this bulletin.)

PREVETERINARY ADMISSION REQUIREMENTS

1. The student must fulfill the general requirements for admission to the College of Agriculture, Forestry, and Home Economics as listed on page 8 of this bulletin.
2. High school units as follows must be presented for admission: 3 units in English, 2 units in mathematics (elementary algebra and plane geometry), and 1 or more units in natural science or agriculture.
3. Farm Experience—Every prospective student in this curriculum is urged to obtain, before entering college, at least six months of practical experience on a farm. Entering students whose farm 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.

SUGGESTED PREVETERINARY CURRICULUM

The following curriculum is suggested so that students registered in the preveterinary curriculum at this University might satisfy the preveterinary course requirements for admission to the School of Veterinary Medicine. (See admission requirements, page 90).

FIRST YEAR

An.Hu.1—Livestock Production (4)
 An.Hu.8—Breeds of Livestock (4)
 In.Ch.1-2 or 4-5—General Inorganic Chemistry (8)
 In.Ch.11—Semimicro Qualitative Analysis (4)
 Ag.En.11—Applied Mathematics (5)
 Dy.Hu.1—Elements of Dairying (3)
 Ori.e.1—College Orientation (1)
 Rhetoric, Communications requirement (9)
 Electives (7-9)
 Total (45-47)

SECOND YEAR

Ag.Bi.2—Quantitative Methods (5)
 Ag.En.24,25—Agricultural Physics (8)
 Po.Hu.1—Poultry Production (4)
 Or.Ch.61,62—Elementary Organic Chemistry (8)
 Rhet.22—Public Speaking (3)
 Zool.1,2,3—General Zoology (10)
 Electives (7-10)
 Total (45-48)

Inasmuch as students seeking admission to the School of Veterinary Medicine must present a cumulative honor point average in excess of C+ (1.5), it is recommended that preveterinary students completing their first year of study with a ratio of 1.2 or below give consideration to extending their preparation for professional study over three years rather than two. An alternative objective should be introduced at this point, together with a coadviser from the alternative field. Certain substitutes can then be considered in the suggested preveterinary curriculum. By following this procedure students not admitted to the School of Veterinary Medicine at the completion of preveterinary requirements may advance toward a degree in the alternative field with greater efficiency than might otherwise be the case.

PROFESSIONAL CURRICULUM ADMISSION INFORMATION

Enrollment in the professional curriculum of the School of Veterinary Medicine is limited. Thus, admission requirements (see below) must be satisfied before or during the academic year in which the student makes application. Application forms should be obtained from the Office of Admissions and Records, Institute of Agriculture, at the beginning of the fall quarter of the second year of the preveterinary program.

The completed application form for admission should be returned to the Office of Admissions and Records as soon as possible but definitely not later than January 1.

Students who have taken their preveterinary work at schools other than the University of Minnesota must submit, or have forwarded, to the Office of Admissions and Records transcripts which include all preveterinary work taken through the fall quarter (or semester) of the second year of their preveterinary program. A \$5 fee is charged for evaluation of preveterinary credits submitted by nonresidents of Minnesota. A complete transcript of all preveterinary work should be forwarded to the Office of Admissions and Records when the preveterinary program is completed. Students are selected for admission to the first year of the professional curriculum on the basis of their scholastic standing in the required preveterinary studies, their scores in the veterinary aptitude

tests, and their interest, character, and personal fitness for the practice of veterinary medicine. First choice is given to residents of Minnesota, second choice to residents of adjoining states which do not have veterinary medical schools, third choice to residents of other states. Nonresidents are accepted only if their scholarship has been excellent and other qualifications indicate they have unusual promise for the study of veterinary medicine or a career in science. Selections will be made as rapidly as possible following receipt of the application, transcripts, references, and test scores. If preveterinary courses are in progress, admission will be provisional, dependent upon their satisfactory completion. In some instances no decision will be made until a complete transcript of all preveterinary course work has been received and evaluated. All applicants will be informed as to the status of their application on or about May 15. All inquiries or material relative to any application or to the admission requirements of the School of Veterinary Medicine should be sent, in writing, to the Office of Admissions and Records, Institute of Agriculture, St. Paul 1. Accepted applicants will receive a statement for a 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 applicant fails to matriculate.

PROFESSIONAL CURRICULUM ADMISSION REQUIREMENTS

Required Preveterinary Courses—A minimum of 90 quarter credit hours of work on the college level is required of all students prior to entrance into the professional veterinary curriculum. These must include the following:

- English or Rhetoric (Communications) and Public Speaking—12 credits
- Chemistry—25 credits (general inorganic and qualitative, 12 credits, quantitative, 5 credits, and organic, 8 credits)
- Mathematics—Minimum of 5 credits and a minimum of trigonometry equivalent to high school or college trigonometry
- Biology (zoology or zoology and botany)—10 credits
- Animal, Poultry, and Dairy Husbandry—15 credits
- Physics—8 credits including laboratory
- Electives—14-18 credits. Not less than 14 of these credits must be in social science courses from at least three of the following departments: Agricultural Economics,

Anthropology, Economics, Geography, History, Humanities, Philosophy, Political Science, Psychology, Social Science, and Sociology

Scholarship Requirement—To receive consideration, a candidate's record must present an honor point ratio of 1.5. For a discussion of grades and determining honor points see page 11 of this bulletin.

Veterinary Admissions Tests—All candidates are required to take the following admissions tests during the early part of the second year of their preveterinary program.

1. Minnesota Multiphasic
2. Strong Vocational Interest Inventory
3. Veterinary Aptitude Test

Each candidate will receive detailed information relative to the scheduling of the tests from the Office of Admissions and Records shortly after he has filed his completed application form with that office. The results of these tests will be forwarded to the Office of Admissions and Records, Institute of Agriculture, St. Paul 1.

Farm Experience—Every candidate is urged to obtain, before entering college or during his preveterinary program, at least six months of practical experience on a farm or with livestock.

PROFESSIONAL CURRICULUM

Registration—The Office of Admissions and Records announces the registration dates for each quarter. If you are accepted for admission, the dates of registering and detailed instructions will be included in the information that is sent to you. New students who do not register within twenty-four hours of the announced deadline for registration will be dropped from the admission list and forfeit their \$10 preliminary deposit fee.

Faculty Advisers—A faculty member will be designated as your faculty adviser. He will interpret the program to you and will be concerned with your general progress. When you have problems and need special attention, your adviser may refer you to other faculty members, to your college office, or to a specialized personnel agency.

Class Attendance—In general, class attendance requirements are the same as those for the St. Paul Campus as outlined on page 10 of this bulletin. In certain courses, because of the nature of the course, attendance is required.

Grades—Quarterly grades will be given on the same basis as outlined on page 11 of this bulletin.

Scholarship Requirements

1. A student shall obtain an honor point average of 0.50 or higher for any one quarter. Students failing to obtain an honor point average above 0.50 or receiving a grade of "failure" shall automatically be dropped from the professional curriculum. Those having an honor point average between 0.5 and 1.0 shall be placed on probation.
2. An honor point average of 1.0 must be maintained for each year to continue in the succeeding year of the professional curriculum.
3. The Committee on Admissions and Scholastic Standing may grant permission for repeating one to three quarters of work. Permission will not be given for repeating more than one year in the four-year curriculum. An honor point average of 1.5 or higher is required for each quarter of work repeated. If a single course is repeated, the grade earned must be above the median C. An honor point average of 1.0 must be maintained in nonrepeat courses that are taken. Substitute courses will be considered as repeat courses and will not be permitted without prior approval of the Committee on Admissions and Scholastic Standing.

Readmission—If a student is dropped, he may not be reinstated without the permission of the Committee on Admissions and Scholastic Standing. Credits earned at other institutions during the period of suspension will not apply toward graduation from this School unless permission was given in advance by the Committee on Admissions and Scholastic Standing. If permitted to return, the student will be placed on probation and may be dropped again at any time when his work is unsatisfactory.

Degrees Offered and Requirements—The School of Veterinary Medicine will recommend students for the following degrees:

1. Bachelor of science (B.S.) degree, without designation, following completion of the first two years of veterinary studies with an honor point average of 1.0 or above and a minimum of 192 credit hours of work.
2. Doctor of veterinary medicine (D.V.M.), following satisfactory

completion of the four years of the professional curriculum with an honor point average of 1.0 or above and a minimum of 232 credit hours of work.

REQUIRED COURSES

The courses listed below are required in the professional curriculum of the School of Veterinary Medicine:

FIRST YEAR

- Agro.31—Principles of Genetics (4)
 V.Ana.101—Anatomy of the Dog (7)
 V.Ana.102-103—Veterinary Comparative Anatomy (8)
 V.Ana.130—Veterinary Neuroanatomy (3)
 V.Ana.151-152-153—Veterinary Microscopic Anatomy and Embryology (15)
 V.Bac.101—General Veterinary Bacteriology and Immunology (5)
 Ph.Ch.102-103—Physiological Chemistry (12)

SECOND YEAR

- V.Bac.102—Pathogenic Bacteria and Fungi (6)
 V.Bac.103—Veterinary Virology (4)
 V.P.P.105-108—Animal Physiology (15)
 V.Pa.P.151—General Veterinary Pathology (4)
 V.Pa.P.152—Special Veterinary Pathology (5)
 V.Pa.P.153—Special Veterinary Pathology and Pathology of Infectious Diseases of Animals (6)
 V.Pa.P.101-102—Veterinary Parasitology (10)
 V.M.C.101—Veterinary Physical Diagnosis (4)
 V.P.P.151—Introduction to Pharmacology (2)
 Po.Hu.153—Poultry Nutrition and Feeding (3)

THIRD YEAR

- V.P.P.152—General and Experimental Pharmacology (6)
 V.Ana.106—Veterinary Surgical Anatomy (1)
 V.P.P.153—Veterinary Clinical Pharmacology (3)
 V.Pa.P.154—Veterinary Clinical Pathology (2)
 V.M.C.117a-117b-117c—Clinical Conference (1)
 V.S.R.101—Principles of Veterinary Surgery (5)
 V.S.R.102-103—Special Veterinary Surgery (10)
 V.M.C.102-103-104—Large Animal Medicine (15)
 V.M.C.121—Small Animal Medicine (4)
 V.M.C.111-112-113—Clinical and Laboratory Practice (15)
 V.Obs.101—Veterinary Obstetrics (3)
 An.Hu.57—Livestock Feeding (3)

FOURTH YEAR

- V.Bac.125—Poultry Diseases (4)
 V.Bac.126—Dairy Hygiene (4)
 V.Bac.127—Veterinary Public Health (2)
 V.Bac.124—Meat Hygiene (3)
 V.Pa.P.156—Diseases of Fur-Bearing Animals (2)
 V.M.C.119—Veterinary Jurisprudence and Business Methods (2)
 V.M.C.118a-118b-118c—Clinical Conference (1)
 V.M.C.131-132—Infectious Diseases of Large Animals (10)
 V.M.C.122—Small Animal Medicine (4)
 V.M.C.114-115-116—Clinical and Laboratory Practice (15)
 V.Obs.102—Animal Reproduction (5)
 V.S.R.121—Veterinary Radiology (3)
 V.M.C.141—Animal Diseases and Poisonous Plants (3)
 Dy.Hu.118—Milk Production and Secretion (3)

Description of Courses

For an explanation of the symbols used in describing the courses which follow, see page 56.

I. Courses for Students in the School of Veterinary Medicine

DIVISION OF VETERINARY ANATOMY (V.Ana.)

- 101. Anatomy of the Dog.** A detailed study of gross anatomical structures and their functions. (7 cred.; prereq. #)
102. Veterinary Comparative Anatomy. A comparative gross anatomical study of the domestic animals, including poultry. (4 cred.; prereq. 101)
103. Veterinary Comparative Anatomy. (4 cred.; prereq. 102)
106. Veterinary Surgical Anatomy. Topographical anatomy of the domestic animals as applied to surgery and the practice of veterinary medicine. (1 cred.; prereq. 103, V.M.C. 101, #)

- 130. Veterinary Neuroanatomy.** A functional study of the gross and microscopic anatomy of the central nervous system and special sense organs of domestic animals. (3 cred.; prereq. 101, 151, #)
- 151-152-153. Veterinary Microscopic Anatomy and Embryology.** Microscopic studies of the various tissues and organs of domestic animals, including embryology of domestic animals. (6 cred. for 151; 5 cred. for 152; 4 cred. for 153; prereq. #)
- 154. Morphology of Animal Cells and Intercellular Substances.** A detailed study of the components of the basic tissues of the animal body. (3 cred.; prereq. 151, #; offered even-numbered years)
- 160. Histological and Microscopic Techniques.** Principles and practices in preparing and observing animal tissues. (3 cred.; prereq. 151, #)
- 190. Seminar in Veterinary Anatomy.** (1 cred.; prereq. 101, 151, #)
- 191. Special Studies in Veterinary Anatomy.** Individual problems for further study in gross anatomy, histology, embryology, neurology, hematology, and histological techniques. (1-5 cred. per qtr.; reg. for more than one qtr. permitted; prereq. 151 or equiv., #)

DIVISION OF VETERINARY BACTERIOLOGY AND PUBLIC HEALTH (V.Bac.)

- 101. General Veterinary Bacteriology and Immunology.** The morphology, physiology, and classification of bacteria. Basic principles of infection and immunity. (5 cred.; prereq. 10 cred. in zoology, 13 cred. in chemistry, #)
- 102. Pathogenic Bacteria and Fungi.** Studies of bacteria, actinomycetes, fungi, and spirochetes which cause animal diseases. (6 cred.; prereq. 101 or equiv.)
- 103. Veterinary Virology.** Studies of the basic techniques of virology and of those viral and rickettsial agents which cause animal diseases. (4 cred.; prereq. 102 or equiv.)
- 124. Meat Hygiene.** Lectures and field trip studies of meat inspection procedures and regulations, with consideration given to the various infectious and degenerative disease processes affecting meat. (3 cred.; V.Pa.P. 153, #)
- 125. Poultry Diseases.** Lectures dealing with the diseases of poultry. (4 cred.; prereq. 103, V.Pa.P. 153 or equiv., #)
- 126. Dairy Hygiene.** Study of the effect of bovine diseases and sanitation on the quality and safety of milk and milk products. (4 cred.; prereq. 103, #)
- 127. Veterinary Public Health.** Study of the functions of veterinary public health agencies and of epizootiologic methods in the study of animal diseases. (2 cred.; prereq. 103, #)
- 128. Problems in Veterinary Bacteriology and Public Health.** (Cred. ar.; prereq. 103 or equiv., #)

DIVISION OF VETERINARY MEDICINE AND CLINICS (V.M.C.)

- 101. Veterinary Physical Diagnosis.** Fundamentals of clinical veterinary medicine, procedures in physical diagnosis and restraint of animals. (4 cred.; prereq. #)
- 102-103-104. Large Animal Medicine.** A study of the diseases of large animals, including diseases of the systems, metabolic diseases, nutritional deficiencies and diseases caused by toxic agents. (5 cred. per qtr.; prereq. #)
- 111-112-113. Clinics.** Medical, radiological, obstetrical, surgical and ambulatory clinics and laboratory examinations, in diseases of animals. (5 cred. per qtr.; prereq. 101, #)
- 114-115-116. Clinics.** Medical, radiological, obstetrical, surgical, and ambulatory clinics and laboratory examinations, in diseases of animals. (5 cred. per qtr.; prereq. 113, #)

- 117a-117b-117c. (Third yr. vet. med.) 118a-118b-118c. (Fourth yr. vet. med.)† **Clinical Conference.** Group discussion of clinical cases. (1 cred. per yr.; prereq. #)
119. **Veterinary Jurisprudence and Business Methods.** Required course designed to acquaint the student with the fundamentals of the legal responsibilities of a veterinarian, public relations, jurisprudence, veterinary ethics, and regulatory procedures. (2 cred.; prereq. #)
121. **Small Animal Medicine.** A study of the medical diseases of small animals. (4 cred.; prereq. #)
122. **Small Animal Medicine.** (Continuation of 121) (4 cred.; prereq. #)
- 131-132. **Infectious Diseases of Large Animals.** Principles of the host-parasite relationship, including mechanisms of resistance, epizootiology, and preventive medicine. Discussions of the bacterial, mycotic, viral, rickettsial, and protozoan diseases of large animals, emphasizing the pathogenesis, symptomatology, differential diagnosis, treatment, prevention, and control procedures. (5 cred. per qtr.; prereq. #)
141. **Animal Diseases and Poisonous Plants.** A systematic study of important plants poisonous to animals. Special emphasis is placed on identification, toxicology, diagnosis, and treatment. (3 cred.; prereq. #)

DIVISION OF VETERINARY OBSTETRICS (V.Obs.)

101. **Veterinary Obstetrics.** Lectures covering physiology and pathology of pregnancy, obstetrics and diseases of new born. (3 cred.; prereq. V.M.C. 101, #)
102. **Animal Reproduction.** Lectures covering physiology and pathology of reproduction, artificial insemination, and breeding management. Laboratory practices in manipulative obstetrics and semen evaluation. (5 cred.; prereq. 101, V.M.C. 113, #)

DIVISION OF VETERINARY PATHOLOGY AND PARASITOLOGY (V.Pa.P.)

101. **Veterinary Parasitology.** A systematic and biological study of the protozoan and arthropod parasites of animals. Emphasis is placed on their relationships to disease and the principles of parasite control. (4 cred.; prereq. V.Ana. 103, V.Ana. 153 or equiv., #)
102. **Veterinary Parasitology.** Study of the helminth parasites and parasitic diseases of animals with emphasis on principles of control. (6 cred.; prereq. #)
151. **General Veterinary Pathology.** Descriptions, discussions, and gross and microscopic demonstrations of tissue reactions, including retrogressive and inflammatory changes, neoplasms, and reparative processes. (4 cred.; prereq. V.Ana. 103, V.Bac. 101, #)
152. **Special Veterinary Pathology.** A systematic study of the diseases of the respiratory cardiovascular, digestive, hemopoietic, urinary, genital, endocrine, nervous, locomotor systems. (5 cred.; prereq. 151, #)
153. **Special Veterinary Pathology and Pathology of Infectious Diseases of Animals.** (6 cred.; prereq. 152, or equiv., #)
154. **Veterinary Clinical Pathology.** Application and interpretation of laboratory tests used in clinical diagnosis in domestic animals. (2 cred.; prereq. 153, #)
156. **Diseases of Fur-Bearing Animals.** Etiology, symptomatology and treatment of diseases of fur-bearing animals. (2 cred.; prereq. 153, V.M.C. 122, #)
157. **Veterinary Post-Mortem Pathology.** Autopsies, techniques, examinations of tissue sections, preparation of records, and diagnosis. (1-3 cred. per qtr.; prereq. 153, #)
158. **Veterinary Surgical Pathology.** Study of neoplasms, surgical biopsies, post-mortem material, together with a review of the pertinent literature. (1-3 cred.; prereq. 153, #)

**DIVISION OF VETERINARY PHYSIOLOGY
AND PHARMACOLOGY (V.P.P.)**

- 105-106-107-108. Animal Physiology.** The physiology of circulation, respiration, digestion, kidney function, endocrine function, reproduction, nervous system and special senses in the domestic animals. (6 cred. for 105, lect.; 2 cred. for 106, lab.; 5 cred. for 107, lect.; 2 cred. for 108, lab.; prereq. V.Ana. 103, V.Ana. 153, Ph.Ch. 103, #)
- 120. Seminar in Animal Physiology.** (2 cred.; prereq. 106, #)
- 130. Problems in Animal Physiology.** (Cred. ar.; prereq. 105, 106, or Phsl. 106, 107, #)
- 151. Introduction to Pharmacology.** Lecture material concerned with local and general anesthetics, analgesics, and antipyretics. (2 cred.; prereq. 108 or equiv., #; offered in the Department of Pharmacology, Medical School)
- 152. General and Experimental Pharmacology.** A detailed lecture and laboratory study of important drugs. (6 cred.; prereq. 151 or equiv., #; offered in the Department of Pharmacology, Medical School)
- 153. Veterinary Clinical Pharmacology.** Continuation of general pharmacology with emphasis on the clinical aspects in domestic animals. (3 cred.; prereq. 152 or equiv., #)

**DIVISION OF VETERINARY SURGERY
AND RADIOLOGY (V.S.R.)**

- 101. Principles of Veterinary Surgery.** General fundamentals of surgery as applied to the systems of the body; discussion of inflammation with relationship to tissue repair; principles of anesthesia, pre-operative evaluation and post-operative care as applied to domestic animals. (5 cred.; prereq. V.M.C. 101, #)
- 102. Special Veterinary Surgery.** Lectures in surgical procedures of small animals; laboratory exercises covering selected small animal operations. (5 cred.; prereq. 101, #)
- 103. Special Veterinary Surgery.** Lectures in surgical procedures of large animals; laboratory exercises covering selected large animal operations. (5 cred.; prereq. 101, #)
- 121. Veterinary Radiology.** Preparation and interpretation of radiographs and fluoroscopic examinations in veterinary medicine, consideration of radiant energy as a therapeutic agent and discussion of protective measures against radiation hazards. (3 cred.; prereq. 113, #)

II. Courses Primarily for Students in Agriculture

- V.Ana.143. Avian Gross and Microscopic Anatomy.** Gross and microscopic anatomy of the chicken and certain significant anatomical areas of other fowl. (5 cred.; offered in even-numbered academic years)
- V.Bac.129. Poultry Hygiene.** The general anatomy of the fowl, the physiology of digestion and reproduction, and prevention and control of the more important diseases affecting poultry. (3 cred.; prereq. Zool. 14-15, Po.Hu. 1, Bact. 53; offered in even-numbered academic years)
- V.M.C.52. Animal Hygiene.** Principles of animal health and disease, with emphasis on prevention, control, and eradication. (5 cred.)

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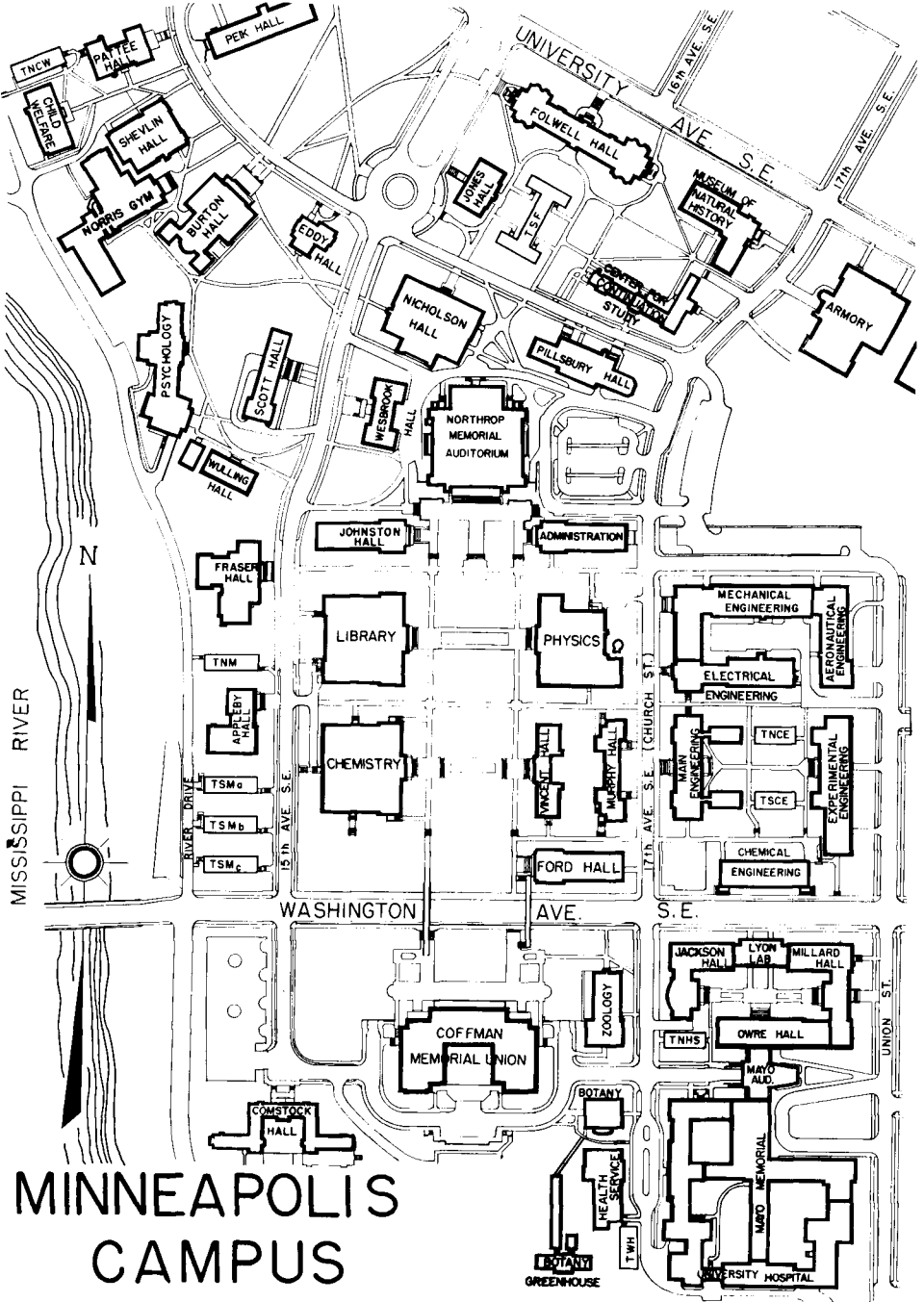
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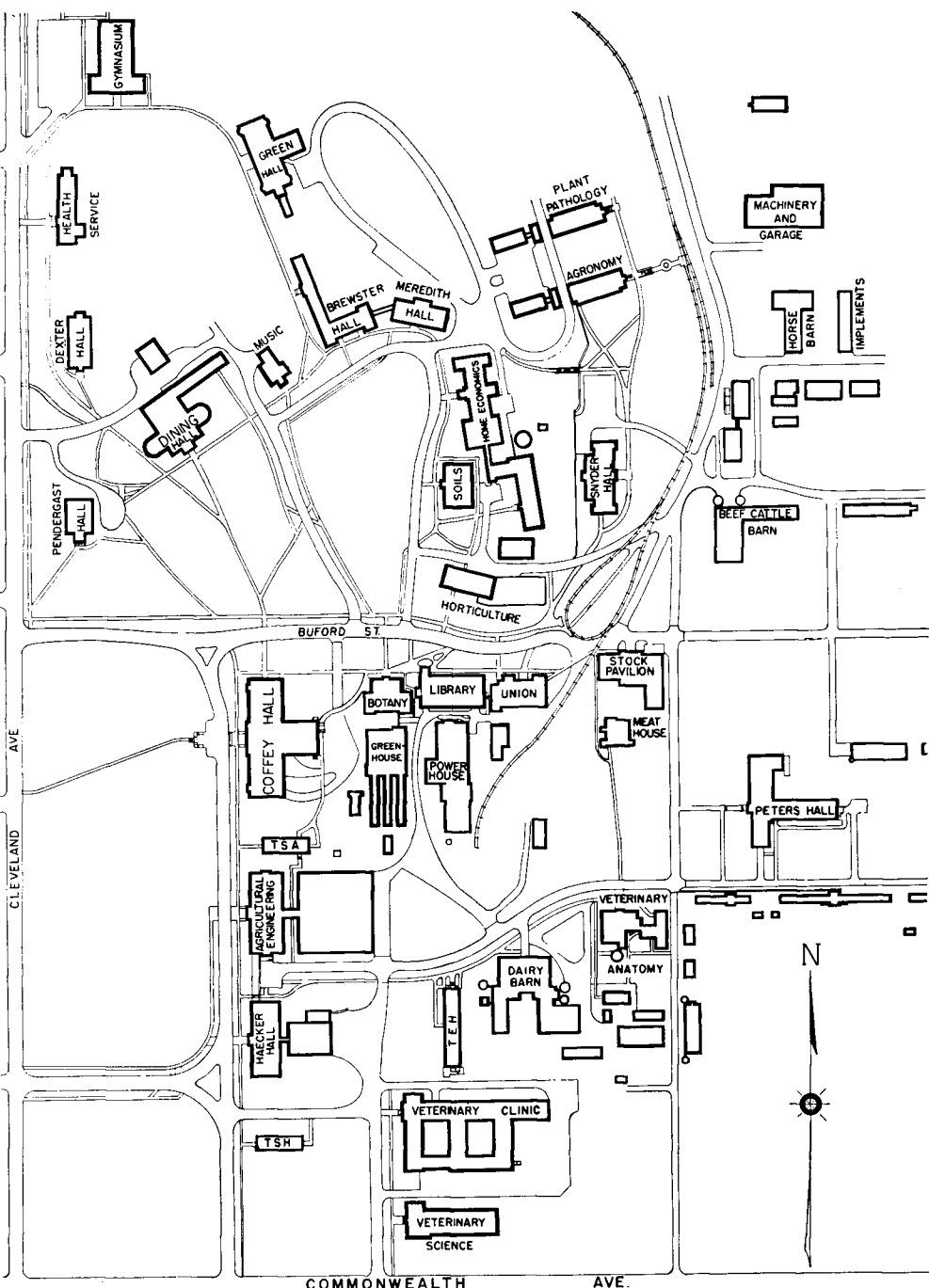
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MINNEAPOLIS CAMPUS



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