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College of Agriculture, Forestry,
and Home Economics
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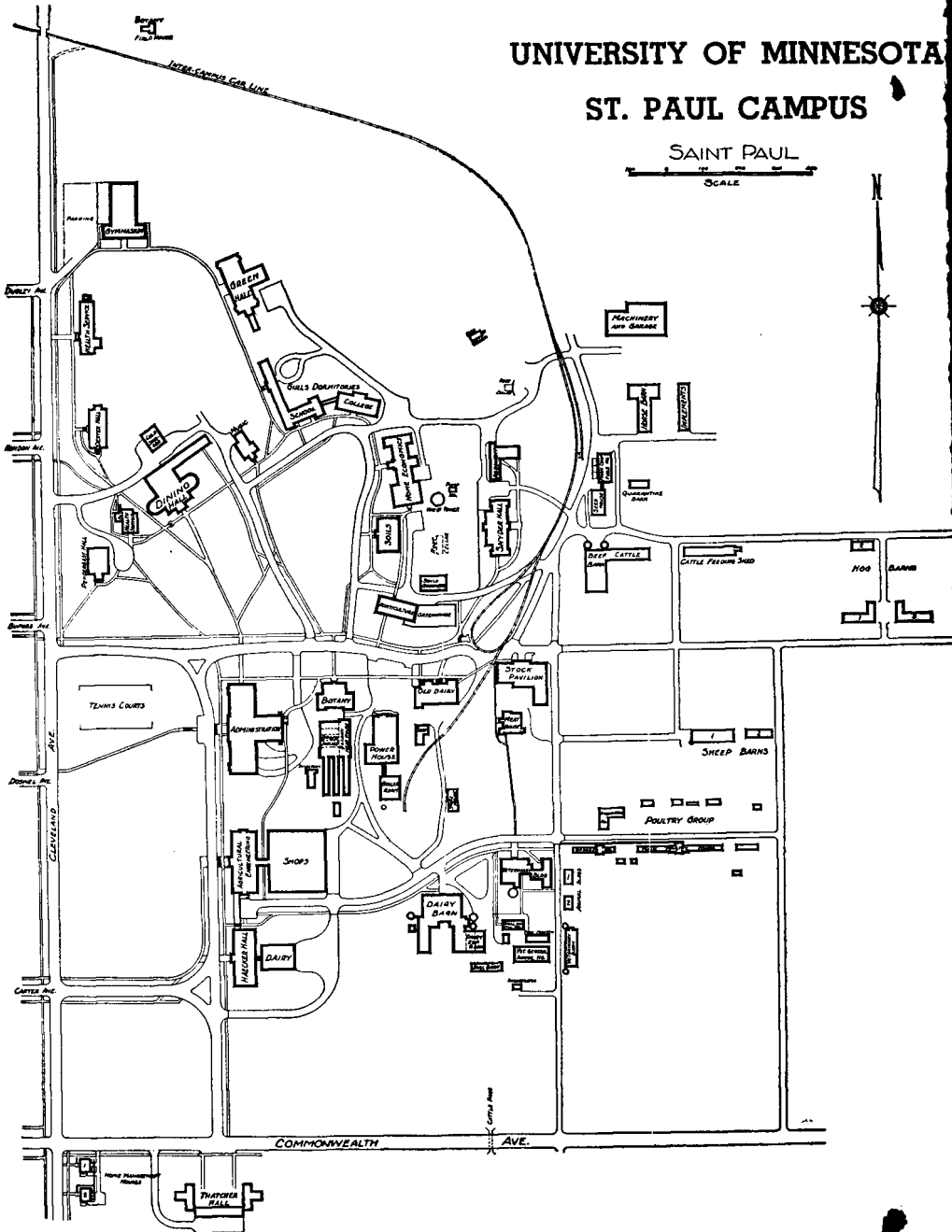
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UNIVERSITY OF MINNESOTA ST. PAUL CAMPUS

SAINT PAUL

SCALE



Labels on the map include:
- GREEN HALL
- PILLSBURY COLLEGE
- MACHINERY and GARAGE
- STOCK BAY
- DEEP CATTLE BARN
- CATTLE FEEDING SHED
- HOG BARN
- SHEEP BARN
- POULTRY GROUP
- DAIRY BARN
- DAIY
- WALKER HALL
- SHOP
- ADMINISTRATION
- BOTANY
- PIG BARN
- STOCK BAY
- POWER HOUSE
- HALL OF AGRICULTURE
- TEAMS COURTS
- THATCHER BARN
- HALL OF MANUFACTURES
- UNIVERSITY AVENUE
- COMMONWEALTH AVE.
- CLEVELAND AVE.
- UNIVERSITY AVENUE
- GREEN HALL
- PILLSBURY COLLEGE
- MACHINERY and GARAGE
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- DEEP CATTLE BARN
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COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

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Horticulture

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Orientation

Instructor Keith N. McFarland, B.S.

Plant Pathology and Botany

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Poultry Husbandry

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

Rhetoric

Professor Ralph G. Nichols, Ph.D.; Associate Professor James I. Brown, M.A.; Assistant Professor Marjorie H. Thurston, Ph.D.; Instructors Francis E. Drake, M.A., Paul S. Hagen, B.A., Gotthilf Jorgensen, B.A., Richard F. Korn, B.J., Arnold Nelson, M.A., William R. Rosegrant, M.A., Alvar B. Sandquist, B.A., Walter W. Seidenkranz, M.A., David W. Shepard, M.A., Donald Woods, M.A., Eugene S. Wright, B.S.

Soils

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

Veterinary Medicine

Professors Willard L. Boyd, D.V.S., John N. Campbell, D.V.S., Reuel Fenstermacher, D.V.M., Allan Hemingway, Ph.D., Howard C. H. Kernkamp, D.V.M., Benjamin S. Pomeroy, D.V.M., Martin H. Roepke, Ph.D.; Associate Professors Henry J. Griffiths, D.V.M., Jay H. Sautter, D.V.M., Alvin F. Weber, D.V.M., Ph.D.; Instructors David E. Bartlett, D.V.M., Clyde M. Bemis, D.V.M., Jules Cass, D.V.M., Thomas M. Christison, M.A., Gabel A. Conner, D.V.M., William J. Hadlow, D.V.M., Harvey H. Hoyt, D.V.M., Ralph L. Kitchell, D.V.M., Winston A. Malmquist, D.V.M., George W. Mather, D.V.M., Jack E. Moulton, D.V.M., Alvin F. Sellers, D.V.M., Francis A. Spurrell, D.V.M.

GENERAL INFORMATION

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

Graduates of the schools of agriculture of the University of Minnesota who have completed the two summers of supervised work offered in the school course, one additional school year, and one additional summer's work, or the equivalent thereof, and who graduate in the upper 75 per cent of their class will be admitted to the College of Agriculture, Forestry, and Home Economics.

Preagriculture and Preforestry Courses in Junior Colleges

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

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

Required courses:

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

Electives: Sufficient to bring total credits to 90.

The following is a general list of electives applicable in one or more of the specialization fields: sociology, psychology, economics, physics, history, advanced mathematics, technical business, agriculture and engineering subjects, advanced English, public speaking, mechanical drawing, freehand drawing, surveying, qualitative, quantitative, and organic chemistry, advanced courses in zoology and botany, bacteriology, modern language (especially French and German). These subjects are, of course, not equally applicable in all fields. For prospective forestry students, sociology, physics, mechanical drawing, higher algebra, trigonometry, and surveying are especially recommended. A five-week field course (7 credits of work) at the Lake Itasca Forestry and Biological Station is required of all forestry students including those with advanced standing.

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

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

Home Economics Courses in Junior Colleges

In planning a program of studies in the Junior College the prospective transfer student should study the course requirements as given for each Home Economics specialization in this bulletin (pages 56-75) and take courses in the Junior College insofar as possible which will be equivalent to those in the freshman and sophomore years at the University.

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

Registration

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

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

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

Examinations Upon Entrance

All new students are required to take a college aptitude examination in high school or on entrance to the University as a part of the matriculation procedure. An additional battery of diagnostic examinations will be given to new students at time of entrance. Admission for students otherwise qualified, however, does not depend upon the results of these examinations.

Examinations for Exemption or Credit

The college desires to bring about the best correlation possible between the technical courses in the fields of agriculture, forestry, and home economics, as taught in the schools of agriculture, in the high schools, and in other institutions. Where students have taken considerable work in these technical courses, it may be desirable for them not to be required to repeat a part or all of this work in the elementary courses in the college.

Satisfactory performance on exemption examinations in selected introductory courses in agriculture will permit the student to substitute elective credits for these courses. Such exemption examinations must be taken during the first six weeks of residence.

Students wishing to secure credit for subjects in which they have adequate training and preparation may take special examinations for full credit. These examinations may be taken during the first six weeks of residence without fee. After that time, a fee of \$5 is required.

Fees*

Cloquet Session (Seniors in Forestry curricula—spring quarter)	
Tuition: Residents of Minnesota	\$30.00
Nonresidents	75.00
Health fee	2.50

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.

Lake Itasca Forestry and Biological Station (Freshmen in Forestry curricula—Summer Session)

Tuition (prorated on basis of regular quarter tuition per quarter of 12 weeks:	
Residents of Minnesota	\$15.00
Nonresidents	37.50
Health fee	2.50

In addition, \$5 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 director of the Itasca Forestry and Biological Station during the first week of the session.

Faculty Regulations

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

Grading System and Honor Points

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

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

Degrees Offered

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

- A. Four-year and five-year curricula leading to the degree of bachelor of science or other Bachelor's degree.
- B. Five-year curriculum leading to the professional master's degree in home economics education.
- C. Fifth year leading to professional degrees in Agricultural Education and Forestry.
- D. Two-year preprofessional and four-year professional curriculum leading to the professional degree of doctor of veterinary medicine.

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

Requirements for Graduation

A. Bachelor's Degrees

Candidates in Agriculture, Forestry, and Home Economics will be recommended for graduation after completion of the following requirements:

1. The prescribed curriculum including all the required amount and quality of work and the required amount of elective work to make the total number of credits given below.
2. One honor point per credit (i.e., the cumulative honor point average must be 1.0 or more). For additional quality requirements, see statements of prescribed curricula.
3. The English requirement for graduation (Rhetoric 51 or equivalent—see page 10).
4. A total of not less than 18 credits (inclusive of courses required in the various curricula) in social science courses included in the following departments—Agricultural Economics, Anthropology, Economics, Geography, History, Humanities, Philosophy, Political Science, Psychology, and Sociology.

Candidates in the School of Veterinary Medicine will be recommended for the bachelor of science degree, without designation, on completion of the following requirements:

1. Admission to the School of Veterinary Medicine.
2. Completion of the first two years of veterinary studies with a grade point average of 1.0 or above and a total cumulative average of 1.0 or above and a minimum of 192 credit hours of work.
3. Fulfillment of the all-college requirement of 18 credits of social science.
4. Completion of a minimum of 9 credit hours in rhetoric, including Rhet. 22, Public Speaking.

Course of Study	Credit Requirement	Degree Conferred
Agricultural Business Administration	192	Bachelor of agricultural business administration
Agricultural Education	204	Bachelor of science
*Agricultural Engineering (Professional five-year course)	255	Bachelor of agricultural engineering
*Agricultural Engineering Business Administration (five-year course)	254	Bachelor of agricultural engineering and bachelor of business administration
Agricultural Extension	192	Bachelor of science
*Agricultural Journalism	180	Bachelor of arts
Fish 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
*Rural Education	183-185	Bachelor of science
Science Specialization	192	Bachelor of science
Technical Agriculture	192	Bachelor of science
Veterinary Medicine	192	Bachelor of science

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

* Combined curricula with other colleges to which the general requirements 3 and 4 for Agriculture, Forestry, and Home Economics and the use of excess honor points for credits do not apply.

† See *Bulletin of the College of Science, Literature, and the Arts.*

English Requirement

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

Mathematics Requirement

The mathematics requirement in all curricula requiring only five credits of mathematics (e.g., Technical Agriculture and Agricultural Education) may be satisfied by completing Math. 1, Higher Algebra, 5 credits, or Ag.En. 11, Applied Mathematics, 5 credits, or one full year of high school credit in advanced algebra. Students presenting only one-half year of high school credit in advanced algebra must complete five credits of mathematics in college. Math. 1, Higher Algebra, is not open for credit to students offering more than one-half year of high school higher algebra for entrance.

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

Public Health Requirement

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

Scholarship and Class Requirements

1. Students must present for graduation at least one honor point for each credit; i.e., the cumulative honor point average must be 1.0 or more.
2. Freshman students with an honor point average of less than 0.50 obtained in two or three quarters of work in this college and sophomore students with an honor point average of less than 0.75 obtained in six quarters in this college or in five quarters if entering in the winter quarter, shall be dropped for one year unless continued by special permission of the Students' Work Committee.
3. Classified students who have completed 90 credits with an honor point average of less than 1.0 but more than 0.75 may be permitted to take additional courses to attain the required honor point ratio of 1.0 but shall not be permitted to register for junior-senior courses without the approval of the adviser and the Students' Work Committee. In no case, however, will permission be granted for such students to register in courses numbered 100 or above and for which graduate school credit is given. Students who lack 12 credits of the 90 required for junior classification and who have a B average may be permitted to register for courses in the 100 group on approval of the Students' Work Committee.

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

Scholarship requirements specific to the professional curriculum in Veterinary Medicine:

A student shall obtain an honor point average of 0.50 or higher for any one quarter and an honor point average of 1.0 or higher, accumulative as well as for each one of the four years of work.

A student receiving a grade of "failure" shall automatically be dropped from the professional curriculum in Veterinary Medicine.

Permission for repeating one to three quarters of work will not be given for more than one year of the four-year curriculum. An honor point average of 1.5 or higher is required for one or more quarters' work repeated.

Graduation Honors

The undergraduate degrees offered by this college may be awarded "with distinction" or "with high distinction" under the conditions given below.

The case of any student who does not meet the general requirements in full or the other specific requirements for graduation with distinction or with high distinction shall be referred to the Students' Work Committee for individual consideration.

In addition to the requirements given below for graduation with distinction or high distinction, students in Agricultural Education and Home Economics Education Curricula must be checked by their respective departments concerning their standing in student teaching.

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

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

B. Professional Advanced Degrees

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

Courses in the General Extension Division

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

Credit in the Graduate School

Credits for advanced courses earned while the student is registered in an undergraduate college, even though in excess of the credits required for the baccalaureate degree, can be transferred to the Graduate School only under the following conditions:

1. If not more than 9 quarter credits of undergraduate credit are lacking (taking into account required and sequence courses), a limited amount of graduate work may be carried (approved courses numbered above 99) for graduate course credit, such courses not to be applied toward an undergraduate degree. The conditions as stated apply to the beginning of the quarter in which the courses for graduate credit are carried. The transfer of credit must be arranged by petition to the Graduate School.

2. Undergraduates lacking not more than 6 quarter credits (taking into account required and sequence courses) may register in the Graduate School.

Board and Room

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

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

Winchell Village—Thirteen cottages comprise Winchell Village located on the Minneapolis Campus. These cottages, each in charge of a graduate counselor, offer comfortable homes for 140 women who desire group cooperative experience. The dining room and kitchen are operated on a cooperative basis and can thereby offer lowered living costs. Further information and application forms may be secured by writing to the Director of Winchell Village, 212 Twelfth Avenue Southeast, Minneapolis 14, Minnesota.

Meredith Hall, St. Paul Campus—A dormitory residence, located on the St. Paul Campus, is available for approximately 47 freshman women students registered in the College of Agriculture, Forestry, and Home Economics. First priority is given to beginning freshmen, second priority to second and third quarter freshmen, and third priority to sophomores. Applications for residence must be for the entire school year. The dormitory is closed during vacations. The number of single rooms is limited. Necessary bedding is provided and the bed linen laundered. Girls should provide their own couch covers. Applications for rooms should be

made early. A deposit of \$5 is made when the room is engaged and is held during the entire period of residence.

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

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

Private houses—For information concerning approved boarding and rooming houses, address the Housing Bureau, Coffey Hall, University Farm, St. Paul 1, Minnesota.

Agricultural Bookstore

The University operates the Agricultural Bookstore on the St. Paul Campus for the convenience and accommodation of students and faculty of the College of Agriculture, Forestry, and Home Economics.

Explanation of Terms and Course Numbers

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

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

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

Descriptions of the courses listed in the following outline of the curricula, together with those of additional courses offered as electives, will be found on pages 80-137. The program of classes is printed in the *Class Schedule*. The divisional statements are arranged alphabetically according to the names of the divisions.

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

Honor points—See page 8 for definition.

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

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

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

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

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

COLLEGE SCHOLARSHIPS, PRIZES, AND AWARDS

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—Scholarship of \$50 awarded annually by the LaGrange Chapter of Alpha Zeta Fraternity to that male student who, through his qualities of high scholarship, leadership, and fine moral character, shows high promise of service to the fields of agriculture or forestry, and who has completed at least three and preferably not more than six quarters in this college. Scholarship granted with the understanding that the recipient will continue to pursue his work in agriculture or forestry in this college.

Alpha Zeta Traveling Scholarships—Gift of \$150 yearly from the LaGrange Chapter of Alpha Zeta Fraternity for the establishment of Alpha Zeta Traveling Scholarships of \$25 to \$100 to assist students of high scholarship and strong professional interests to attend a meeting of an appropriate professional, scientific, or technical society or association. To be eligible for this scholarship, the candidates, who will be nominated by the chiefs of the various divisions of the College, must have achieved junior or senior standing in the Agriculture, Forestry, or Veterinary Medicine curricula of the college.

Borden Agricultural Scholarship Award—Grants of \$1,500 from the Borden Company Foundation, Inc., New York, to cover a five-year period, for annual award of \$300 to that eligible student in Agriculture who upon entering his senior year of study has achieved the highest average grade of all other similarly eligible students in all preceding college work and who has included in his curriculum two or more dairy subjects.

Borden Home Economics Scholarship Award—Grants of \$1,500 from the Borden Company Foundation, Inc., New York, to cover a five-year period, for an annual award of \$300 to that eligible student majoring in Home Economics who has achieved the highest average grade of all other similarly eligible students in all college work preceding the senior year and who has 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 from which is used for special grants or scholarships to needy and worthy students enrolled in the courses in Home Economics.

Burpee Award in Horticulture—Gift of \$100 annually from the W. Atlee Burpee Company, Philadelphia, Pennsylvania, for a scholarship as an aid and stimulus to a qualified student, preferably in the junior class, who is registered in the regular four-year course in Agriculture with a major in horticulture or its related fields. Awards are based on scholastic ability, practical experience, interest in flower and vegetable growing, promise of leadership, and character.

Caleb Dorr Fund—Donated by Caleb Dorr of Minneapolis.

Caleb Dorr College 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 Scholarship Prizes (books, pictures, etc.): Awarded to all 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.

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

Alice M. Child Memorial Scholarship—Gift of \$100 from Mrs. Mariane Graham McPheeters of Los Angeles, California, a graduate in Home Economics in 1936, for the establishment of a scholarship in memory of Miss Alice Child, a former associate professor in the School of Home Economics. Gift is to be used

for four scholarships of \$25 each, one to be awarded in each of the fall quarters of 1947, 1948, 1949, and 1950 to a Home Economics student whose honor point ratio is C or above, who possesses qualities of leadership, excellent character, and ambition; preference given to juniors and seniors majoring in foods and business or dietetics.

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 on the St. Paul Campus. This leadership medal was founded in recognition of the interest of Dean Emeritus E. M. Freeman in student leadership and self-development.

Dean E. M. Freeman Scholarship Fund—Gift from the Board of Directors of the Alumni Association of the College, representing donations from alumni, the income from which is to be used for (1) 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, and (2) the purchase of Dean E. M. Freeman Leadership Medals in case funds are not available from other sources.

Harriet and Vetta Goldstein Scholarship—Gift of \$50 from Mrs. Mariane Graham McPheeters of Los Angeles, California, a graduate in Home Economics, for the establishment of a scholarship in honor of Miss Harriet Goldstein, professor emeritus, and Miss Vetta Goldstein, assistant professor, formerly of the School of Home Economics. Two scholarships of \$25 each will be offered—one in the fall quarter of 1949 and one in the fall quarter of 1950, to a Home Economics student who has completed the junior year in the related art curriculum at the University of Minnesota. Recipient must have an above average scholastic record and have demonstrated superior ability in the field of her major. In addition, she must have fine personal qualities. A faculty committee in Home Economics will recommend to the Scholarship Committee the students to be selected for the awards.

Samuel B. Green Scholarship Medal—Fund of \$1,000 established by Mrs. S. B. Green, widow of Professor S. B. Green, first professor of forestry and horticulture in the University of Minnesota, in memory of her husband. The interest from this fund will be used for purchase of a medal to be awarded each year to the student in the Forestry course 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 from the Home Economics Association of the College for a scholarship to a student in Home Economics, 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.

Oscar L. Mather Award—Gift of \$250 from the Minnesota Federation of Women's Clubs, presented to them by Mrs. Oscar L. Mather, of Madison Lake, Minnesota, in memory of her late husband's interest in conservation. The interest from this sum is to be used to purchase a book each year to be awarded to the student in Forestry displaying outstanding scholarship, leadership, and character.

Minneapolis Gas Light Company Service Scholarship—Gift of \$500 from the Minneapolis Gas Light Company of Minneapolis, Minnesota, for the support of a service scholarship to aid a qualified third quarter sophomore or junior student majoring in Foods and Business in Home Economics. Recipient must express willingness later to consider employment in the Home Service Department of the

Minneapolis Gas Light Company for six months at a mutually agreed upon salary. Three months of this in-service training may be completed during the summer and the remaining three months during the fall or spring quarters.

Charles Lathrop Pack Prizes in Forestry—Gift of \$2,000 from the Charles Lathrop Pack Foundation, Washington, D.C., the income from which is to be used for prizes for the best essays of a popular nature on forestry during the year, or other evidence of accomplished work in the interests of public cooperation and public appreciation of forestry. Contest open to every regularly enrolled undergraduate forestry student. Three prizes of \$30, \$20, and \$10 are awarded.

F. H. Peavey and Company, Van Dusen-Harrington Company Undergraduate Scholarship—Gift of \$300 from the F. H. Peavey and Company of Minneapolis, Minnesota, for a scholarship to aid a junior or senior student qualified as follows: Must have graduated from a Minnesota high school in a creditable manner, must have demonstrated in his college program an interest in cereal crops, must be majoring in Agronomy, Plant Pathology, or Soils, and preferably indicate a continuing interest in cereal crops in Minnesota, and must have demonstrated the capacity to do satisfactory college work and need of financial aid to complete his college education.

Phi Upsilon Omicron Alumnae Scholarship—Contribution of \$50 yearly from the Twin City Chapter of Phi Upsilon Omicron for a scholarship for a student in Home Economics, preferably a freshman or sophomore. Awarded on basis of scholarship, personality, and public service.

Ruedlinger Memorial Fund—Contributions from the Twin City Nurserymen's Association, the income from which is to be used for award of a \$25 (or less) prize to the undergraduate presenting the best paper on some horticultural subject. Papers judged on basis of general interest of subject matter, accuracy of factual statements, clearness and style of presentation.

Sears-Roebuck Agricultural Scholarships—Offered each year by the Sears-Roebuck Foundation of Chicago, Illinois.

Freshman Scholarships: \$50 to \$100 each to Minnesota farm boys who enroll as beginning freshmen in the agricultural course in the College of Agriculture, Forestry, and Home Economics. Basis of award: Promise of success in college, leadership, and financial need.

Sophomore Scholarship: \$200 to the outstanding student in the group of Sears-Roebuck freshman scholars of the previous year.

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 Sears-Roebuck sophomore scholars from other agricultural colleges of the United States for a junior scholarship.

Silver Anniversary Scholarship Fund—Contributions from the Class of 1920 and the Class of 1921 of the College of Agriculture, Forestry, and Home Economics at their twenty-fifth anniversary reunion, for scholarships or awards to students as recommended by the Scholarship Committee. Contributions from other classes, if received, will be added to this fund.

O. A. Storvick Memorial Fund—Fund of \$2,000 from the National Creamery Buttermakers Association, established in honor of Mr. O. A. Storvick, a pioneer and energetic creameryman who was effectively interested in the programs of work for which this fund is provided. The income from the fund, together with a stipulated fraction of the principal, is to be applied to (a) the presentation of medals to the members of the Dairy Products Judging Team, and (b) paying of

not to exceed one half of the expense of sending a Dairy Products Judging Team to the Annual Dairy Products Judging Contest held under the auspices of the American Dairy Science Association.

A. D. Wilson Prize—Income from funds contributed by friends of A. D. Wilson, formerly director of Agricultural Extension at the University of Minnesota, to be used as awards to students excelling in the study of cooperation and cooperative enterprises, to stimulate interest among students in problems of agricultural cooperation. Prizes awarded in essay competitions, open to all regularly enrolled students on subjects usually in the field of agricultural cooperation.

Florence Munson Wilson Memorial Fund—Fund in trust, interest from which will be used for scholarships, as recommended by the Scholarship Committee, to students in the College of Agriculture, Forestry, and Home Economics.

Gardner Cowles, Jr. WNAX Agricultural Scholarships—Scholarships of \$300 each awarded by the Cowles Broadcasting Company, Yankton, South Dakota, as an aid to a qualified farm boy and a farm girl. Students to be eligible must have completed the equivalent of at least the freshman year of work in a creditable manner and must specify an intention to major in agriculture and its related fields and in home economics respectively. Award made on basis of outstanding scholarship, promise of leadership, character, and financial need.

Xi Sigma Pi Freshman Scholarship Recognition—Recognition given to the freshman in Forestry with the highest scholastic rating for the year, through engraving of his name on a permanent honor plaque placed in the Forestry Library.

Miscellaneous Awards—A number of additional awards and medals are given in competitions of various kinds, such as judging contests, etc.

Loan Funds—General university loan funds, as well as funds specifically for students in this college, are available through the Bureau of Student Loans and Scholarships to help any student who is making normal progress toward a degree. Usually a student must have completed two quarters in attendance at the University before becoming eligible for loan assistance. However, aid can be obtained to meet emergency needs.

CURRICULA

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

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

ALL-COLLEGE

Four-Year Curricula

(See pages 23-29)

I. Science Specialization—This curriculum provides for more intense specialization, particularly in the sciences basic to many fields of agriculture. Only that amount of technical training in practical agriculture is required which deals with the special science or field selected. Selection of the Science Specialization Curriculum should, in practically all cases, be followed by graduate study to at least the Master's degree. Only those students who have demonstrated aptitude for science and who have a high school record considerably above average should attempt the Science Specialization Curriculum. For special scholarship requirements of this curriculum, see page 23.

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

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

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

Employment possibilities in this field are largely with public conservation agencies, either state or federal, and have a wide variety of specific specializations all dependent on basic technical knowledge. Among such specializations may be listed game fish, bird, or mammal management in relation to other land uses on public or private lands; research in ecological or economic phases of such manage-

ment; teaching or extension programs in colleges or schools; and opportunities in improving hunting or fishing on privately owned areas. (See also Forestry Wildlife Curriculum, page 50.)

AGRICULTURE

Four-Year Curricula

(See pages 30-45)

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

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

For Pretheological "Major" in Agriculture accepted by the Conference on Cooperation between Colleges of Agriculture and Theological Seminaries for entrance to many theological seminaries in training for rural church work, see page 34.

For training in Rural Education, see page 41.

II. Agricultural Education—Designed especially for those who plan to teach agriculture in the secondary schools and communities of Minnesota. This curriculum is also adapted to the general needs of agricultural extension workers, agricultural missionaries, and others preparing to work with people in rural areas.

The curriculum (given jointly with the College of Education) provides broad training in technical agriculture and permits emphasis on such fields as dairying, agronomy, agricultural economics, horticulture, animal husbandry, etc. In addition, it offers special training in education and qualifies graduates for certification as agriculture instructors in high schools.

By completing a fifth year in the combined five-year curriculum with the College of Education, students may receive the degree of master of education.

III. Agricultural Extension—Designed for training for agricultural county agents, extension specialists, boys' and girls' club leadership, and other specialties in agricultural extension. No single curriculum is prescribed because of the numerous variations which are possible and desirable. In general, the student is advised to select a curricular pattern in Technical Agriculture or in Agricultural Education. Around the selected pattern the student, with the help of his adviser, may build the curriculum best suited to his needs. A wide range of valuable subject matter is available in this and other colleges of the University. For a more complete discussion, see page 36.

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

and in the School of Business Administration. Students completing this curriculum will receive the degree of bachelor of agricultural business administration.

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

Students definitely interested in agricultural journalism should register in the School of Journalism of the College of Science, Literature, and the Arts, but should consult both the dean of the College of Agriculture, Forestry, and Home Economics and the director of the School of Journalism, College of Science, Literature, and the Arts.

VI. Rural Education—A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics. Students register in the College of Education beginning with the freshman year. The first two years of the curriculum are the same as for elementary education as listed in the *Bulletin of the College of Education*. However, modifications may be made in individual cases in conference with the major adviser. (See page 41.)

Preprofessional Curriculum

I. Preveterinary Medicine—At least two years of college training are required for admission to the School of Veterinary Medicine at the University. (See page 42 for preveterinary requirements at the University of Minnesota.)

Five-Year Curricula

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

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

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

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

Fifth Year Leading to a Professional Degree

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

FORESTRY

(See pages 46-55)

Three forestry and three technological curricula are offered in forestry.

Forestry Curricula

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

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

III. Forestry-Wildlife Management—Preparation for technical work in public and private forest and game management. (See also Fish and Wildlife Management Curriculum, pages 27-29.)

Technological Curricula

IV. Lumber Merchandising and Construction—Preparation for work in lumber-yard management and in light building construction.

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

VI. Wood Technology-Furniture—Preparation for work in the furniture industry.

Fifth Year Leading to the Professional Master of Forestry Degree

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

HOME ECONOMICS

(See pages 56-75)

Four-Year Curricula

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

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

III. Home Economics Education—Offered jointly with the College of Education. For those who wish to teach home economics in the high schools and obtain a teacher's certificate. Students should have a high school record better than

average. A high scholastic average is required for college work. A five-year curriculum is also offered and leads to a master of education degree at the end of the fifth year.

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

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

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

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

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

IX. Journalism-Home Economics (major)—See requirements for Journalism in the *Bulletin of the College of Science, Literature, and the Arts*.

(See also All-College curricula, pages 23-29, and Rural Education curriculum, page 41.)

Five-Year Curriculum

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

VETERINARY MEDICINE

Curriculum in Veterinary Medicine Leading to the Degree of Doctor of Veterinary Medicine

A school of veterinary medicine is being organized at the University to provide a four-year professional curriculum leading to the degree of doctor of veterinary medicine.

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

See pages 75-76 for the first and second years of the professional veterinary curriculum.

AIR SCIENCE AND TACTICS

(See page 76)

MILITARY SCIENCE AND TACTICS

(See page 77)

NAVAL SCIENCE AND TACTICS

(See page 78)

ALL-COLLEGE CURRICULA

Four-Year Curricula

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

I. SCIENCE SPECIALIZATION

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

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

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

REQUIREMENTS

All-college requirements for students in this college. See page 9.

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

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.

FRESHMAN YEAR

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

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

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

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

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

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

Orie. 1, College Orientation Lectures, 1

P.H. 3,¶ Personal Health, 2

Rhet., Communications requirement

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

SOPHOMORE YEAR

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

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

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

Ag.Bi. 5, Plant Biochemistry, 5 (Or.Chem. 3 or equiv.) or Ag.Bi. 6, Animal Biochemistry, 3 (Or.Chem. 3 or equiv.)

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

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

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

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

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

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

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

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

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

JUNIOR AND SENIOR YEARS

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

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

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

* See Mathematics requirement, page 10.

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

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

¶ Not required of students with military service records.

** To receive credit for this course, the student must complete both Ag.Ec. 1 and 2.

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

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

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

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

II. FOOD TECHNOLOGY

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

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

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

REQUIREMENTS

The Food Technology Curriculum requires 204 credit hours for graduation.

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

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

All-college requirements for students in this college. See page 9.

FRESHMAN-SOPHOMORE YEARS (109 credits)

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

Ag.En. 3, Mechanical Drawing, 3

Ch.En. 80, Chemical Engineering Materials, 1

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

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

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

Mathematics:

Math. 6,* Trigonometry, 5 (Math. 1)

Math. 7, College Algebra, 5 (Math. 6)

Math. 30, Analytic Geometry, 5 (Math. 6 and 7)

Math. 50, Differential Calculus, 5 (Math. 30)

Math. 51, Integral Calculus (Math. 50) or

M.&M. 11, College Algebra, 5 (M.&M. 9 or equiv.)

M.&M. 12, Trigonometry, 5 (M.&M. 11)

M.&M. 13, Analytic Geometry, 5 (M.&M. 11 and 12)

M.&M. 24, Calculus I: Differential, 5 (M.&M. 13)

M.&M. 25, Calculus II: Integral, 5 (M.&M. 24)

Na.Sc. 7-8-9, General Biology, 10

Or.Ch. 61,62,63, Elementary Organic Chemistry, 11

Or.Ch. 64, Elementary Organic Chemistry, Laboratory, 3 (Or.Ch. 61,62,63 or parallel)

Orie. 1, College Orientation Lectures, 1

Phys. 7, General Physics (Mechanics and Heat), 5 (M.&M. 24 or parallel)

Phys. 8, General Physics (Electricity), 5 (Phys. 7)

Phys. 9, General Physics (Sound and Light), 5 (Phys. 7)

P.H. 3,† Personal Health, 2

Rhetoric Communications requirement

JUNIOR-SENIOR YEARS (97-99 credits)

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

Ag.Bi. 5, Plant Biochemistry, 3 (Or.Chem., Course 3 or equiv.)

Ag.Bi. 6, Animal Biochemistry, 3 (Or.Chem., Course 3 or equiv.)

Bact. 53, General Bacteriology, 5 (10 cred. in Chem. and 4 cred. in Bot. or Zool.)

Ch.En. 101, Unit Operations, 3 (Ch.En. 80 and An.Ch. 1-2)

Ch.En. 102, Unit Operations, 5 (Ch.En. 101)

Ch.En. 103, Unit Operations, 5 (Ch.En. 102)

Ch.En. 111, Unit Operations Laboratory, 1 (Ch.En. 101)

Ch.En. 112, Unit Operations Laboratory, 1 (Ch.En. 102)

Economics:

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

Ag.Ec. 2, Principles of Economics II, 5 or

Econ. 6-7, Principles of Economics, 10

Food 51-52, Food Analysis, 4 (Ag.Bi. 2 and 3)

Food 101-102, Food Technology, 6 (Ag.Bi. 3 and Food 52, Bact. 53, and a course in Physics)

Ph.Ch. 101-102-103, Physical Chemistry, 9 (two years college chemistry, one year college physics, and mathematics through differential and integral calculus)

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

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

Social Science electives (see all-college requirements, page 9). (8 credits)

Electives, selected from list below, or from other courses and departments approved by Subcommittee on Food Technology (27-29 credits)

SUGGESTED ELECTIVE COURSES FOR FOOD TECHNOLOGY

College of Agriculture, Forestry, and Home Economics

Agricultural Biochemistry—119, Colloids; 129, Colloids Laboratory; 120, Proteins; 130, Proteins Laboratory; 121, Carbohydrates; 131, Carbohydrates Laboratory; 122, Lipides; 132, Lipides Laboratory; 123, Enzymes; 133, Enzymes Laboratory; 124, Vitamins; 103, Dairy Chemistry; 108, Chemistry of Wheat and Wheat Products; 110, Flour Laboratory Methods; 116, Advanced Animal Nutrition; 117, Animal Nutrition Laboratory.

* See Mathematics requirement, page 10.

† Not required of students with military service records.

§ To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

- Agricultural Economics**—25, Principles of Accounting; 40, Principles of Marketing Organization; 90, Agricultural Statistics; 141, 142, 143, Marketing Organization.
- Agricultural Engineering**—70, Dairy Engineering.
- Agronomy and Plant Genetics**—21, Grain Crops; 22, Grain and Hay Grading; 31, Principles of Genetics.
- Animal Husbandry**—50, Meat Selection and Utilization; 52, Meats; 53, Advanced Meats.
- Dairy Husbandry**—3, Testing Dairy Products; 4, Dairy Products Practice; 50, Dairy Bacteriology; 110, 111, 112, Dairy Products; 113, Technical Control; 114, Milk By-Products; 115, Advanced Dairy Bacteriology.
- Entomology and Economic Zoology**—5, Economic Entomology; 51, Introductory Parasitology; 128, 129, Insect Physiology; 177, Insecticides and Their Action.
- Food Technology**—104, Frozen Food Processing and Storage.
- Home Economics**—31, Introduction to Nutrition; 33, Nutrition I; 35, Nutrition II; 40, Food Preparation; 41, Food Management and Marketing; 45, Quantity Cookery; 64, Institution Buying; 142, Experimental Cookery; 146, Special Food Problems; 170, Nutrition of the Family.
- Horticulture**—138, 139, Vegetable Crops.
- Plant Pathology**—1, Plant Pathology; 105-106-107, Mycology; 160, Plant Histo-chemistry; 161, Technology of Fruits and Vegetables (may include refrigeration); 163, Practical Applications of Plant Physiology.
- Poultry Husbandry**—52, Poultry Selection; 153, Poultry Nutrition and Feeding; 154, Poultry Products.

Other Colleges

- Analytical Chemistry**—101, 102, Quantitative Analysis; 105, Polarizing Microscope; 127, Optical Methods; 131, Application of Indicators in Neutralization Reactions and pH Determinations; 132, Electrometric Measurements; 133, Voltammetry and Amperometric Titrations; 140, Water Analysis.
- Bacteriology**—104, Sanitary Bacteriology; 113, 114, Molds, Yeasts, and Actinomycetes; 121-122, Physiology of Bacteria; 123, Applied Bacteriology.
- Chemical Engineering**—105, Fuels and Combustion; 117, 118, Chemical Engineering Equipment Design; 121, Chemical Engineering Economics.
- Economics**—3, Elements of Money and Banking; 22, Principles of Accounting; 28, Business Law; 161, Labor Problems and Trade Unionism.
- Mechanical Engineering**—180, Refrigeration; 189, Refrigeration Laboratory.
- Organic Chemistry**—105, 106, 107, Advanced Organic Chemistry; 110, Org. Qual. Anal.; 130, Organic Quantitative Analysis; 142, 143, The Chemistry of Natural Products.
- Physical Chemistry**—104, 105, 106, Physical Chemistry Laboratory; 128, Colloid Chemistry; 129, Adsorption and Catalysis; 130, Colloids in Industry; 131, Colloidal Processes; 132, 133, 134, Colloid Chemistry Laboratory.
- Physics**—114-116-118, Elementary Physical Investigation; 131, Geometrical Optics; 134, Experimental Optics; 144, Electricity Measurements.
- Physiology**—4, Human Physiology; 100, 101, Physiological Chemistry.
- Political Science**—1-2-3, American Government and Politics.
- Psychology**—1-2, General Psychology.
- Public Health**—100, Elements of Preventive Medicine and Public Health; 102, Environmental Sanitation I; 110, Biometric Principles; 111, Biostatistics Laboratory.
- Zoology**—21, Histology; 51, Introductory Animal Parasitology; 145, Parasitic Protozoa; 146, Helminthology.

III. FISH AND WILDLIFE MANAGEMENT

(See also Forestry-Wildlife Management Curriculum, page 50)

Fish and Wildlife Management has developed into an established profession requiring a college training for both research and administrative positions. The work may involve a wide range of activities including the management of upland game, big game, waterfowl, wilderness species, game fish and commercial fish on public or private lands or waters in agricultural or forested areas. It also includes the artificial propagation of game fish or fur animals and the control of injurious or undesirable species. In most cases men working in any of these fields find that they must integrate their special interests with other forms of land use—commercial,

forestry, recreational, or agricultural. Thus it is necessary to include a wide variety of college course work for the essential basic training. Within the colleges of the University many courses are available which contribute valuable information and basic principles to students in this curriculum.

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

REQUIREMENTS

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

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

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

FRESHMAN YEAR

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

Ag.En. 3, Mechanical Drawing, 3

Bot. 1-2, General Botany, 6

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

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

Math. 1,* Higher Algebra, 5

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

Math. 7, College Algebra, 5 (Math. 6)

Orie. 1, College Orientation Lectures, 1

P.H. 3,† Personal Health, 2

Rhet. Communications requirement, 9

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

SOPHOMORE YEAR

1. Freshman courses not completed

2. **General courses**

Ag.Bi. 2, 3, 6, Quantitative Methods, Introduction to Biochemistry, Animal Biochemistry, 11 (In.Ch. 8 cred.)

Ag.En. 19, 50, Elem. and Adv. Surveying, 6 (Ag.En. 3, Math. 6)

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

Bot. 52, Elementary Taxonomy, 3 (Bot. 1-2)

Math. 30, Analytical Geometry, 5

Or.Ch. 61-62, Elementary Organic Chemistry, 8

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

JUNIOR YEAR

1. Freshman and sophomore courses not completed

2. **General courses**

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

* See Mathematics requirement, page 10.

† Not required of students with military service records.

- Bot. 113, Flora of Minnesota, 3, or Bot. 115, Spring Flora of Minnesota, 3 (Bot. 52)
 Ent. 52, Introductory Entomology, 5 (Zool. 1-2-3)
 Po.Sc. 5, American Government and Politics, 5
 Rhet. 22, Public Speaking, 3
 Rhet. 51, Exposition, 5 (Rhet. 22)
 Zool. 22, Comparative Anatomy, 5 (Zool. 1-2-3)
 Zool. 50, Introduction to General Physiology, 5 (Zool. 1-2-3)
 Zool. 51, Introductory Animal Parasitology, 5 (Zool. 1-2-3)
 Zool. 83, Introduction to Genetics and Eugenics, 3 (Zool. 1-2-3)
3. **Biological Station at Itasca State Park (Summer Session)** is required
- Two of the following courses should be taken:
 Bot. 112, Aquatic Flowering Plants, 4
 Bot. 176, Freshwater Algae, 4
 Ent. 162, Ecology of Terrestrial Vertebrates, 4
 Zool. 116, Limnology, 4

SENIOR YEAR

1. General courses

- Ag.Ec. 1-2, § Principles of Economics, 8
 Biostatistics 110-111, Biometric Principles, 5
 Ent. 63, Mammalogy, 4 (Zool. 22)
 Ent. 64, Introduction to Fish and Wildlife Management, 5 (Zool. 1-2-3)
 Geol. 8, Earth Features and Their Meaning, 5
 Zool. 53, Faunistic Zoology, 5 (Zool. 1-2-3)
 Zool. 57, Introductory Ornithology, 3 (Zool. 1-2-3)
 Zool. 58, Introductory Ornithology, 3, or Zool. 119, Animal Ecology, 3
 Zool. 121, Ichthyology, 3 (Zool. 22)

2. Recommended electives

- Ag.En. 31, Principles of Drainage, 3
 Ag.Jo. 54, Editing Agricultural Bulletins, 3
 Classics 24, Technical Terms of Science, Medicine, and the Humanities, 3
 For. 1, General Forestry, 3
 For. 3-4, Dendrology, 7
 For. 20, Grazing, 3
 For. 126, Silvics, 3
 For. 131, Forest Policy, 3
 For. 155, Forest Protection, 3
 German or Russian, 15
 Pl.Pa. 53, Food Plants of Game Animals, 3
 Rhet. 54, Advanced Public Speaking, 3

§ To receive credit for this course a student must complete both Ag.Ec. 1 and 2.

CURRICULA IN AGRICULTURE

Four-Year Curricula

- I. Technical Agriculture, page 30.
- II. Agricultural Education, page 34.
- III. Agricultural Extension, page 36.
- IV. Agricultural Business Administration, page 38.
- V. Agricultural Journalism, page 39.
- VI. Rural Education, page 41.

Preprofessional Curriculum

- I. Preveterinary Medicine, page 42.

Five-Year Curricula

- I. Agricultural Engineering (professional), page 43.
- II. Agricultural Engineering Business Administration, page 44.

Fifth Year Leading to Professional Degree

- I. Agricultural Education, page 44.

Four-Year Curricula

I. TECHNICAL AGRICULTURE

The possibilities in this group are numerous and varied. Each student in this group arranges his curriculum with the aid of his adviser and in conformity with regulations given below to fit his vocational objective. Specialization begins normally in the junior year but may also extend into the sophomore year. Every subject-matter division of the college (see pages 80-137) offers one or more vocational or professional fields of specialization. Some divisions offer a fairly large number of such fields. Freshman and sophomore students should therefore consult carefully with the staff of the division in which they plan to major.

The vocational opportunities are too varied to permit complete enumeration. In general, technical agriculture includes all those vocations in which a technical knowledge of at least some fields of agriculture is required and put to immediate and practical use. Where more intense specialization is desired through graduate study or in highly specialized fields, the other curricula in agriculture (pages 23-29) should be considered and discussed with major divisions concerned.

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

high schools, see Agricultural Education, page 34. For preparation for rural church work, see Pretheological Major, page 34, which is now accepted for admission to a large number of theological seminaries. For training in Rural Education, see page 41.

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

REQUIREMENTS

All-college requirements for students in this college. See page 9.

Farm experience requirement.

This curriculum requires 192 credit hours for graduation, including:

- A. Freshman-sophomore years—Required of all students registered in Technical Agriculture, pages 31-32. See also required courses in the junior year.
- B. Junior-senior years—see pages 32-33.

A. FRESHMAN-SOPHOMORE YEARS—REQUIRED COURSES

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

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

Freshman Year

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

Agron. 1*§§, General Farm Crops, 3.
An.Hu. 1,*† Livestock Production, 4.

* Graduates of the University of Minnesota schools of agriculture or students presenting high school work in any of these courses or areas may upon passing an exemption examination substitute elective courses. See page 7.

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

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

Bot.1-2, General Botany, 6.

Dy.Hu. 1,*† Elements of Dairying, 3.

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

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

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

Math. 1,§ Higher Algebra, 5, or Ag.En. 11, Applied Mathematics, 5.**

Orie. 1, College Orientation Lectures, 1.

P.H. 3,¶ Personal Health 2.

Rhet. Communications requirement.

Sophomore Year

1. Freshman courses which were not completed during the freshman year.

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

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

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

Ag.Bi. 5, Plant Biochemistry, 3 (Or.Ch., 3 or equiv.); or Ag.Bi. 6, Animal Biochemistry, 3 (Or.Ch., Course 3 or equiv.).

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

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

Ag.En., 3 credits selected from the following:†† 3, Mechanical Drawing, 3; 6, Farm Buildings, 3; 12, Agricultural Machinery, 3; 13, Gas Engines and Tractors, 3; 31, Principles of Drainage, 3; 67, Rural Sanitation and Water Supply, 3.

Ag.En. 23, General Physics, 5. Those presenting a year of high school physics may omit this course and substitute 5 credits elective later in their curriculum.

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

Ent. 5, Economic Entomology, 5 (Zool. 14-15 or equiv.).

For. 10,§§ Farm Forestry, 3.

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

Zool. 14-15, General Zoology, 6.

B. JUNIOR-SENIOR YEARS

Required Courses

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

Rhet. 54, Advanced Public Speaking, 3 (Rhet. 22) or Rhet. 31, English Literature I, 5 (Rhet. Communications requirement) or Rhet. 32, English Literature II, 3 (Rhet. Communications requirement) or Rhet. 60, Contemporary Literature, 3 (Rhet. Communications requirement) or Rhet. 33, American Life in American Literature, 3 (Rhet. Communications requirement) or Rhet. 12, Debate and Discussion, 3 (Rhet. Communications requirement, 22 recommended).

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

Rhet. 51, Exposition, 3 (Rhet. Communications requirement). Cannot be taken earlier than junior year.

* Graduates of the University of Minnesota schools of agriculture or students presenting high school work in any of these courses or areas may upon passing an exemption examination substitute elective courses. See page 7.

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

§ See Mathematics requirement, page 10.

¶ Not required of students with military service records.

** Credit permitted for only one of these courses.

†† Students with credit in Ag.En. 54 admitted to Ag.En. 12 or 13 by petition only. Students with credit in Ag.En. 12 or 13 admitted to Ag.En. 54 by petition only.

¶¶ To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

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

Elective Courses

Every student is required to file in the Office of Admissions and Records by the end of his sophomore year a statement of the major, minor, and limited electives, approved by his adviser, which he plans to take during his junior and senior years. Such statements from each student will make it possible to provide a workable program of subject courses. A change from one curriculum to another after the close of the sophomore year is permitted only on approval and does not exempt the student from any of the requirements of the curriculum which he finally selects. Such changes usually involve inconvenience and sometimes loss of credit to the student. All students are invited to consult with the dean of the college concerning the selection of curricula.

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

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

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

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

Elective Groups and Subgroups

	Page		Page
Agricultural Biochemistry*	80	Dairy Husbandry	99
Agricultural Economics (See also Agricultural Business Administration, page 38)	82	a. Dairy Production	
Agricultural Education (Minor only, on approval of Department of Agricultural Education. See special curriculum)	84	b. Dairy Products	
Mechanized Farming (Courses offered in the Division of Agricultural Engineering. For engineering curriculum see page 43)	86	Entomology and Economic Zoology	102
Agronomy and Plant Genetics	90	a. Entomology*	
a. Agronomy		b. Wildlife Management (for minor only. See special curriculum, page 27)	
b. Plant Genetics*		Forestry. (For minor only. See Forestry Curriculum, page 46)	105
Animal Husbandry	92	Horticulture	116
		a. General Horticulture	
		b. Landscape Gardening	
		Plant Pathology and Botany*	124
		Poultry Husbandry	127
		Soils	133

* As a major in Technical Agriculture approval of division is required. A major in this group will usually be selected under the Science Specialization Curriculum, page 23.

Special Majors and Minors

Agricultural Journalism (minor). See page 41. The minor program must have the approval of the School of Journalism in the College of Science, Literature, and the Arts.

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

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

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

Freshman-sophomore years

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

Junior-senior years

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

Minor: 18 credits in one of the following technical agriculture divisions or groups: Agricultural Engineering, Agronomy, Animal 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 Cooperation Between Colleges of Agriculture and Theological Seminaries, requires, in addition to the college requirements for graduation in Technical Agriculture, the following:

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

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

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

II. AGRICULTURAL EDUCATION

Students who have completed the required work of the freshman and sophomore years of the Agricultural Education curriculum of the College of Agriculture, Forestry, and Home Economics, or equivalent from other agricultural curricula, may qualify for certification as agriculture instructors in the public schools by completing the junior and senior years in a combined curriculum of the College of Education and the College of Agriculture, Forestry, and Home Economics leading to the degree of bachelor of science. By completing a fifth year in the combined five-year curriculum with the College of Education, they may receive the degree of master of education. See page 44.

During the junior year, the student is required to take the psychological and other examinations given in the College of Education.

For all-college requirements for students in this college, see page 9.

An average honor point ratio of 1.5 is required for graduation in 18 courses out of those listed below and out of the designated number of elective courses recommended on page 36.

Agricultural Economics 102, 103, and one elected course.
 Agricultural Engineering 7, 41, 54, 55, 60, 67.
 Agronomy 21, 23, 31.
 Animal Husbandry 56, 57 or Dairy Husbandry 103, Animal Husbandry 112 or 113.
 Dairy Husbandry 1 and 5 elected credits.
 Entomology 5.
 Horticulture 1 and one elected course.
 Plant Pathology 1, 3.
 Poultry Husbandry 1 and one elected course.
 Soils 4, 5.
 Veterinary Medicine 52.

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

FRESHMAN-SOPHOMORE YEARS—REQUIRED COURSES

Freshman Year

Ag.Ed. 1, Introduction to Agricultural Education, 1.
 Ag.En. 7, Farm Building Construction, 3.
 Ag.En. 23, General Physics, 5. Not required of students who present a year of high school physics.
 Ag.En. 41, Metal Work, 3.
 Agro. 1,* General Farm Crops, 3.
 An.Hu. 1,* Livestock Production, 4.
 Bot. 1-2, General Botany, 6.
 Dy.Hu. 1,* Elements of Dairying, 3.
 Hort. 1, General Horticulture, 3.
 In.Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may omit this course and register for In.Ch.4-5.
 In.Ch. 4-5, General Inorganic Chemistry, 8 (one year of high school chemistry). Those required to take In.Ch. 1-2 may omit this course.
 Math. 1,† Higher Algebra, 5 cred., or Ag.En. 11, Applied Mathematics, 5§.
 Ori. 1, College Orientation Lectures, 1.
 Pl.Pa. 3, Weeds, 3.
 Rhet. Communications requirement.

Sophomore Year

Ag.Bi. 1, Elementary Organic Chemistry, 5.
 Ag.Ec. 1,** Principles of Economics I, 3.
 Ag.Ec. 2, Principles of Economics II, 5.
 Ag.En. 67, Rural Sanitation and Water Supply, 3.
 Agro. 31, Principles of Genetics, 4.
 Bact. 53, General Bacteriology, 5.
 Educ. 55B, Introduction to Secondary School Teaching, 5.
 Ent. 5, Economic Entomology, 5.
 Po.Hu. 1, Poultry Production, 4.
 P.H. 3,¶ Personal Health, 2.
 Soil. 4, Soils, 3.
 Soil. 5, Soil Management, 3.
 Zool. 14-15, General Zoology, 6.

* Graduates of the University of Minnesota schools of agriculture or students presenting high school work in any of these courses or areas may upon passing an exemption examination substitute elective courses. See page 7.

† See Mathematics requirement, page 10.

§ Credit permitted for only one of these courses.

¶ Not required of students with military service records.

** To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

JUNIOR-SENIOR YEARS

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

Junior Year

1. Freshman-sophomore courses which were not completed.
2. Rhet. 51, Exposition, 3.
3. Social science requirements. See page 9.
4. Education courses
 - Ag.Ed. 54, Rural Education and Community Leadership, 2.
 - Ag.Ed. 56, Rural Youth Leadership, 3.
 - Ag.Ed. 81, Teaching Agriculture, 3.
 - Ag.Ed. 82, Methods in Teaching Agriculture, 3.
5. Agricultural courses
 - Ag.Ec. 102, Farm Organization, 3.
 - Ag.Ec. 103, Farm Operation, 3.
 - Ag.En. 55, Electricity in Agriculture, 2.
 - Agro. 21, Grain Crops, 4.
 - An.Hu. 56, Livestock Feeding I, 3 or Dy.Hu. 103, Dairy Stock Feeding, 3.
 - An.Hu. 57, Livestock Feeding II, 3.
 - Pl.Pa. 1, Plant Pathology, 5.
 - Pl.Pa. 3, Weeds, 3.
 - Rhet. 22, Public Speaking, 3.
 - Ve.Me. 52, Anatomy, Physiology, and Hygiene of Domestic Animals, 3.

Senior Year

1. Education courses
 - Ag.Ed. 91, Supervised Teaching Experience, 6.
 - Ag.Ed. 101, Young Farmer Education in Agriculture, 2
 - Ag.Ed. 103, Facilities and Materials, 3.
 - Ag.Ed. 104, Planning Programs, 2.
2. Agricultural courses
 - Ag.En. 54, Farm Power and Machinery, 4.
 - Ag.En. 60, Introduction to Soil and Water Control, 3.
 - Agro. 23, Forage Crops, 4.
 - An.Hu. 112, Animal Breeding, 3 or An.Hu. 113, Livestock Management, 3.
 - Rhet. 51, Exposition, 3.
 - Soc. 14, Rural Sociology, 3.

Electives Recommended To Meet Area Requirements for Graduation

Agricultural Economics, 3 credits. Suggested courses—8, 40, 50, 80, 144.
 Animal Husbandry, 3 credits. Suggested courses—8, 9.
 Dairy Husbandry, 5 credits. Suggested courses—3, 9, 52, 101
 Horticulture, 3 credits. Suggested courses—21, 22, 32, 101, 135.
 Poultry Husbandry, 3 credits. Suggested course—52.

Additional Electives Recommended

Agronomy 22, 126, 133	Agricultural Journalism 53
Educational Psychology 120, 133	Rhetoric 12
Forestry 10	Rural Sociology 161

III. AGRICULTURAL EXTENSION

Experience has shown that it is not wise or feasible, because of the wide range of possible major and minor specialization, to set up a formal curriculum for training in agricultural extension. The college does, however, offer special opportunities for an adequate training in many branches of this educational field. Any

student desiring such training has the privilege as well as the responsibility of formulating his own curriculum under the general curricular requirements of Technical Agriculture or Agricultural Education.

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

Agricultural extension work involves the educational presentation and promotion of agricultural information and practices. It must be founded primarily on a thorough knowledge of some field of technical agriculture and a general knowledge of the total field. The extension methods must vary with different extension jobs and must be built up on a wide range of sociological subject matter.

A major adviser should be selected in the major subject-matter field of the student. It may also be advisable for such students to select a second adviser either from the extension staff or from some member of the resident teaching staff who is familiar with extension problems.

Since there is no single subject-matter course which can prepare the student for all of the intricate problems involved in extension methods and procedures, it becomes necessary for the student, with the help of his adviser, to select carefully from the total offerings subject-matter courses from various divisions in this college and from departments in the University which will give him a background of knowledge which can be utilized in his extension work. While some deal with subject matter in technical agriculture, others will fall in the social science group. For the benefit of such students and for the convenience of advisers a list of suggested courses is given below. Other courses may be advisable, or, in some cases, preferable. The list is merely suggestive.

It is generally recognized that "personality" is an important factor in the selection of extension workers and in the success of their subsequent vocational service. A judicious participation in student and community activities which give opportunities for the development of leadership is recommended. Students should also avail themselves of those numerous social and cultural opportunities of the University which contribute to a better understanding of how to meet and work with people.

REQUIREMENTS

All-college requirements for students in this college. See page 9.

SUGGESTED COURSES FOR AGRICULTURAL EXTENSION

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

College of Agriculture, Forestry, and Home Economics

Agricultural Economics: 40, Principles of Marketing Organization; 80, Farm Accounting; 102, Farm Organization; 103, Farm Operation.

Agricultural Education: Ed. 55B, Introduction to Secondary School Teaching; 54, Rural Education and Community Leadership; 102, Adult Education in Agriculture.

Agricultural Engineering: 6, Farm Buildings; 7, Farm Building Construction; 60, Introduction to Soil and Water Control; 67, Rural Sanitation and Water Supply.

Agricultural Journalism: 53, Publicity.

Agronomy and Plant Genetics: 1, General Farm Crops; 21, Grain Crops; 23, Forage Crops; 31, Principles of Genetics; 133, Pasture Crops and Management; 135, Weed Control.

Animal Husbandry: 1, Livestock Production; 8, Breeds of Livestock; 56, Livestock Feeding I; 57, Livestock Feeding II; 112, Animal Breeding; 113, Livestock Management.

Dairy Husbandry: 1, Elements of Dairying; 101, Milk Production; 103, Dairy Stock Feeding; 104, Dairy Stock Selection; 52, Dairy Herd Management.

Entomology and Economic Zoology: 5, Economic Entomology.

Forestry: 10, Farm Forestry.

Horticulture: 1, General Horticulture; 40, Horticultural Laboratory.

Plant Pathology and Botany: 1, Plant Pathology; 3, Weeds.

Poultry Husbandry: 1, Poultry Production; 153, Poultry Nutrition and Feeding.

Rhetoric: 22, Public Speaking; 54, Advanced Public Speaking; 28, Play Production.

Soils: 5, Soil Management; 111, Field and Laboratory Studies of Soils.

College of Science, Literature, and the Arts

Political Science: 1-2-3, American Government and Politics; 9-10, Fundamentals of Government and Politics.

Psychology: A, Elementary Psychology, or 1-2, General Psychology.

Sociology and Social Work: 14, Rural Sociology; 160, Rural Community Organization; 161, Rural Community Analysis; 162, Rural Social Institutions.

The above is not a complete list of the possible courses which might be chosen in preparing for participation in the agricultural extension program, but includes a wide range and is suggestive of the additional possibilities.

IV. AGRICULTURAL BUSINESS ADMINISTRATION

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

REQUIREMENTS

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

The freshman year consists of the regular freshman courses outlined in Technical Agriculture curriculum on page 30, except that students are advised to take Math. 8 rather than Ag. En. 11; or Math. 1 if they do not have the prerequisites for Math. 8. If any course of the freshman year is deferred to the sophomore year it should be An. Hu. 1.

SOPHOMORE YEAR

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

1. Freshman courses which were not completed during the freshman year.
2. General courses
 - Ag.Ec. 1,** Principles of Economics I, 3.
 - Ag.Ec. 2, Principles of Economics II, 5 (Ag. Ec. 1).
 - Ag.Ec. 8, Rural Economics, 3 (Ag.Ec. 2 or 3).
 - Ag.Ec. 50, Farm Finance, 5 (Ag.Ec. 2).
 - Econ. 22-23, Principles of Accounting, 8.
 - Ent. 5, Economic Entomology, 5 (Zool. 14-15 or equiv.).
 - Psy. 1-2, General Psychology, 6.
 - Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).
 - Zool. 14-15, General Zoology, 6.
3. Electives—Enough elective credits should be selected to make with the required work of the freshman and sophomore years a total of 101 credit hours.

JUNIOR YEAR

1. General requirements
 - Bu.Ad. 51 and 52 or 53, Business Law, 6 (Ag.Ec. 2).
 - Econ. 142, Monetary and Banking Policy, 3 (Ag.Ec. 2, 50).
2. Special requirements
 - Ag.Ec. 30, Agricultural Prices, 3 (Ag.Ec. 2).
 - Ag.Ec. 40, Principles of Marketing Organization, 3 (Ag.Ec. 2).
 - Ag.Ec. 90, Agricultural Statistics, 5.
 - Ag.Ec. 110, Economics of Agricultural Production, 3 (Ag.Ec. 2).
 - Ag.Ec. 131, Market Prices, 3 (Ag.Ec. 30, 40).
 - Ag.Ec. 140, Marketing Organization: Staples, 3 (Ag.Ec. 40) or Ag.Ec. 141, Marketing Organization: Dairy and Poultry Products, 3 (Ag.Ec. 40) or Ag.Ed. 143, Marketing Organization: Livestock and Meats, 3 (Ag.Ec. 40).
 - Ag.Ec. 141, Marketing Organization: Dairy and Poultry Products, 3 (Ag.Ec. 40).
 - Rhet. 51, Exposition, 3 (Rhet. Communications requirement).

SENIOR YEAR

1. General requirements
 - Bu.Ad. 58, Elements of Public Finance, 3 (Ag.Ec. 2).
 - Bu.Ad. 71, Transportation: Services and Charges I, 3 (Ag.Ec. 2).
 - Econ. 80-81, Intermediate Economic Analysis, 6 (20 cred. in social science including Ag.Ec. 1-2, or equiv.)
 - Bu.Ad. 139, Analysis of Financial Statements, 3 (Econ. 23) or Ag.Ec. 47, Marketing Accounting, 4 (Ag.Ec. 25)
 - Econ. 149, Business Cycles, 3 (Econ. 142)
2. Special requirements
 - Ag.Ec. 135, Methods of Price Analysis, 3 (Ag.Ec. 131, 191).
 - Ag.Ec. 150, Advanced Farm Finance, 3 (Ag.Ec. 50 or equiv.).
 - Ag.Ec. 170, Land Economics, 3 (Ag.Ec. 110).
 - Ag.Ec. 191, Advanced Agricultural Statistics, 3 (Ag.Ec. 90).

V. AGRICULTURAL JOURNALISM

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

** To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

MAJOR IN AGRICULTURAL JOURNALISM

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

Requirements for Combined Curriculum in Agriculture and Journalism

FRESHMAN YEAR

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

SOPHOMORE YEAR

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

JUNIOR YEAR

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

SENIOR YEAR

Jour. 93, Weekly Editorial Administration, 3 (Jour. 51 or concurrent registration in 51).
 Jour. 94, Newspaper Advertising, 3 (Jour. 51).
 Jour. 112, Current Newspaper Problems, 3 (Jour. 140 and 141).
 Jour. 140-141, Interpretation of Contemporary Affairs, 6 (Jour. 109-110 and 20 cred. in the social studies or consent of major adviser in Journalism).
 Ag.Jo. 54, Editing Agricultural Bulletins, 3 (Jour. 13-14-15, 51-52 and 69 or 73 or permission of instructor).
 Electives, Jour., 3.
 Electives, 24.

SUGGESTED ELECTIVES

Journalism: 65, 68, 78, 95, 130-131.
 Agriculture, Forestry, or Home Economics:
 Ag.Ec. 104, 110-111, 170.
 Ag.Jo. 53.
 Agro. 1, 31.
 For. 1, 10, 136.
 Hort. 6, 10, 24, 32.
 An.Hu. 1, 56-57.
 Dy.Hu. 1.
 Po.Hu. 1
 Other:
 So.Sc. 1-2-3.
 Hist. 1-2-3, 20-21-22.
 Hum. 1, 2, 3.
 Po.Sc. 1-2-3, 7, 25.
 Psy. 1-2, 4-5, 56.
 Soc. 2, 45, 100, 110, 114.

** To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

MINOR IN JOURNALISM

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

Minor in Journalism should include Jour. 11, 41, 69, and Ag.Jo. 53, and six additional credits selected from Jour. 78, 110, 111, 121, and 130 or from Ag.Jo. 54 and 55.

VI. RURAL EDUCATION

A joint curriculum between the College of Education and the College of Agriculture, Forestry, and Home Economics. Students register in the College of Education beginning with the freshman year. The first two years of the curriculum are the same as for elementary education, page 42, *Bulletin of the College of Education*. However, modifications may be made in individual cases in conference with the major adviser, and many of the courses under A below should be taken in the freshman and sophomore years. Courses under B and C below will all be in the program of the junior and senior years.

Requirements for a Major in Rural Education

A. Specialization in Rural Life—Forty to forty-five credits.

- Ag.Ec. 3, Principles of Economics (Home Economics), 5.
- Ag.Ec. 8, Rural Economics, 3.
- Ag.Ed.54, Rural Education and Community Leadership, 2, or Ag.Ed. 56, Rural Youth Leadership, 3.
- Agro. 1, General Farm Crops, 3.
- An.Hu. 1, Livestock Production, 4.
- Dy.Hu. 1, Elements of Dairying, 3.
- Hort. 6, Fruit Growing, 3, or Hort. 56, Plant Propagation, 3, or Hort. 32, Vegetable Growing, 3.
- Soc. 14, Rural Sociology, 3.

A minimum of 14 credits chosen from the following:

- H.Ec. 1, Choice and Care of Clothing, 4, or G.C. 15A, Clothing Selection, Purchase and Care, 3.
- H.Ec. 31, Introduction to Nutrition, 3, or H.Ec. 30, Introduction to Nutrition, 2, (Minneapolis Campus), or G.C. 14A, Food Selection and Purchase, 3.
- H.Ec. 20, Introduction to Related Art, 4, or H.E. 24, Problems in Home Planning and Furnishing, 5, or G.C. 16A, Selecting and Maintaining a Home, 3.
- H.Ec. 50, Textiles, 3, or H.E. 52, Introduction to Textiles, 3.
- G.C. 17, Income Management, Individual and Household Buying, 2.

B. General and Elementary Education

- Ed. 71A,B,C, Introduction to Elementary School Teaching, 15.
- Art.Ed. 84, Teaching of Art in the Elementary Grades, 3.
- Mu.Ed. 50B, Teaching Music in the Intermediate Grades, 2.
- Ed.C.I. 60, The Teaching of Reading in the Elementary School, 3.
- Ed.C.I. 61, The Teaching of Social Studies in the Elementary School, 3.
- Ed.C.I. 62B, The Teaching of Arithmetic in the Elementary School, 3.
- Ed.C.I. 63, Children's Literature, 2.
- Ed.C.I. 64, The Teaching of English in the Elementary School, 3.
- Ed.C.I. 65, The Teaching of Science in the Elementary School, 2.
- Ed.T. 54A-B, Directed Teaching in the Elementary School, 8.
- H.Ed. 180, The School and the Social Order, 3.

C. Additional courses to complete the total of 186 credits.

Required course: P.H. 59, Health of the School Child, 3.

Recommended courses are: Soc. 160, Rural Community Organization, 3; Soc. 161, Rural Community Analysis, 3; Soc. 162, Rural Social Institutions, 3; For. 10, Farm Forestry, 3; additional courses in home economics; additional courses in curriculum and instruction and in educational psychology; Ed.C.I. 117, Rural Education for Administrators and Teachers.

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

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

Preprofessional Curriculum

I. PREVETERINARY MEDICINE

Every prospective student in this curriculum is urged to obtain, before entering college, at least six months' practical experience on a farm. Entering students whose farm 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.

A. Requirements for Admission to the Preveterinary Curriculum

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

B. Preveterinary Requirements

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

English or Rhetoric and Public Speaking—12 credits.

Chemistry—25 credits including general inorganic chemistry, qualitative and quantitative analysis and organic chemistry.

Mathematics—5 to 10 credits with a minimum in trigonometry.

Zoology and Botany—13 credits.

Physics—8 credits including laboratory.

Animal, Poultry, and Dairy Husbandry—15 credits.

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

Suggested Preveterinary Curriculum at the University of Minnesota

FIRST YEAR PREVETERINARY

An.Hu. 1, Livestock Production, 4.

An.Hu. 8, Breeds of Livestock, 4.

Bot. 1, General Botany, 3.

Chem. 1-2 or 4-5, General Inorganic Chemistry, 8; Chem. 11, Qualitative Analysis, 4.

Dy.Hu. 1, Elements of Dairying, 3.

Math. 15,16, Elementary Mathematical Analysis, 10.

Orie. 1, College Orientation, 1.
 Rhet. Communications requirement, 9.
 Total 46 credits.

SECOND YEAR PREVETERINARY

Ag.Bi. 2, Quantitative Methods, 5.
 Ag.En. 24, 25, Agricultural Physics, 8.
 Po.Hu. 1, Poultry Production, 4.
 Chem. 61, 62, Elementary Organic Chemistry, 8.
 Rhet. 22, Public Speaking, 3.
 Zool. 1-2-3, General Zoology, 10.
 Electives, 9.
 Total 47 credits.

Five-Year Curricula

I. AGRICULTURAL ENGINEERING (PROFESSIONAL)

This curriculum (5 years) leads to the degree of bachelor of agricultural engineering and is offered jointly by the College of Agriculture, Forestry, and Home Economics, and the Institute of Technology. Four distinct lines of specialization are provided, namely, Agricultural Physics and Rural Electrification, Farm Power and Machinery, Farm Structures, and Soil and Water Conservation.

FIRST YEAR

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

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

SECOND YEAR

Ag.E. 21, Elements of Surveying, 5 (Draw. 3, M.&M. 12).
 Draw. 21, Drafting, or M.E. 20, Elem. Mach. Design, 2 (Draw. 3).
 M.E. 8, Machine Shop Practice, 2 (Draw. 2 and In.Chem. 2, 5, 7, or 10)
 M.&M. 24, Calculus I, Differential, 5 (M.&M. 13).
 M.&M. 25, Calculus II, Integral, 5 (M. & M. 24).
 M.&M. 26, Technical Mechanics, Statics, 5 (M. & M. 25).
 Nat.Sci. 7-8-9, General Biology, or Bot. 1-2-3, General Botany, 10.
 Phys. 7, General Physics, Mechanics and Heat, 5 (M.&M. 24 or parallel).
 Phys. 8, General Physics, Electricity, 5 (Physics 7).
 Phys. 9, General Physics, Sound and Light, 5 (Phys. 7).
 Soil. 4, Soils, 3 (In.Ch. 1-2 or 4-5).
 Ag. sequence, 3 or 4 credits.

THIRD YEAR

Ag.E. 18, Agricultural Automotives, 3 (M.E. 131)
 Ag.E. 43, Mechanical Laboratory, 3
 Ag.E. 51, Soil and Water Conservation, 3 (Ag.E. 21, Soils 4, M.&M. 129 or parallel)
 Econ. 8, General Economics, 3 (Soph.)
 Econ. 9, General Economics, 3 (Econ. 8)
 M.E. 24, Elements of Machine Design, 3 (M.&M. 128)
 M.E. 26, Kinematics and Mechanism, 3 (M.&M. 24)
 M.E. 131, Thermodynamics, 3 (M.&M. 25 and Phys. 8)
 M.&M. 127, Technical Mechanics, Dynamics, 5 (M.&M. 26)
 M.&M. 128, Strength of Materials, 5 (M.&M. 26)
 M.&M. 129, Fluid Mechanics, 4 (M.&M. 26)
 M.&M. 141, Materials Testing Laboratory, 1 (M.&M. 128 or parallel)
 M.&M. 143, Hydraulics Laboratory, 1 (M.&M. 86, 129, or 130, or parallel)
 Ag. sequence, 6 or 8 credits
 Electives, 3 or 4 credits

FOURTH YEAR

Ag.E. 52, Elements of Farm Machinery, or 53, Farm Structures, 3 (M.E. 24, M.&M. 128, C.E. 37 or parallel)
 Ag.E. 61, Irrigation, 3 (Ag.E. 51)
 Ag.E. 172, Applied Electricity, 3 (E.E. 38 or parallel)
 Ag.Ec. 102, Farm Management, Organization, 3 (Ag.Ec. 2 or Econ. 8, 9)
 C.E. 37, Elementary Structural Engineering, 3 (M.&M. 26 or 84)
 Econ. 161, Labor Problems and Trade Unionism, 3 (Econ. 6-7, or 83)
 Econ. 164, Labor Legislation and Social Insurance, 3 (Econ. 161)
 E.E. 36, Electrical Engineering Survey, 3 (Phys. 9)
 E.E. 37, Electrical Engineering Survey, 3 (E.E. 36)
 E.E. 38, Electrical Engineering Survey, 3 (E.E. 37)
 Hum. 21-22-23, American Life, 9
 Electives, 12 or 15 credits

FIFTH YEAR

Ag.E. 36, Rural Sanitation and Water Supply, 3 (M.&M. 129)
 Ag.E. 52, Elements of Farm Machinery, or 53, Farm Structures, 3 (M.E. 24, M.&M. 128, C.E. 37 or parallel)
 Ag.E. 63, Farm Structures Laboratory, 3 (Ag.E. 53 or parallel, M.&M. 141)
 Ag.E. 150, Inspection Trip, 1
 Engl. 85, Adv. Tech. Communications, 3 (Engl. 6)
 Engl. 86, Adv. Tech. Communications, 3 (Engl. 85)
 Geol. 5, Engineering Geology, 3
 G.E. 101, Contracts and Specifications, 3 (jr. or sr.)
 G.E. 103, Professional Problems, 1 (sr.)
 Rhet. 22, Public Speaking (or other elective to complete Humanistic Social Requirement), 3 (Engl. 6)
 Electives, 14 to 24 credits

II. AGRICULTURAL ENGINEERING BUSINESS ADMINISTRATION

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

Fifth Year Leading to Professional Degree

I. AGRICULTURAL EDUCATION

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

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

1. A total of 249 credits or 45 credits beyond the requirement for a Bachelor's degree in agricultural education.
2. In addition to the period of observation and practice teaching required for graduates in the four-year curriculum, a period of internship will be required for which a maximum of 8 credits will be given.
3. In the courses comprising the fifth year of the curriculum, a "B" average (2 honor points per credit) is required.
4. Satisfactory completion of the requirements for the professional degree as defined in the *Bulletin of the College of Education*.

5. A satisfactory report on a health examination within one year prior to obtaining the M.Ed. degree will be required.
6. The distribution of credits for the fifth year will include:
 - a. Agricultural Education: 12-15 credits of which not more than 6 credits may be in problems courses.
 - b. Education other than Agricultural Education: 11-15 credits.
 - c. Technical Agriculture and areas other than those listed above: 15-22 credits.

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

CURRICULA IN FORESTRY AND FORESTRY TECHNOLOGY

Four-Year Curricula

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

Forestry Curricula

- I. Forestry-Forest Management, page 48.
- II. Forestry-Range Management, page 49.
- III. Forestry-Wildlife Management, page 50.

Technological Curricula

- IV. Lumber Merchandising and Construction, pages 51 and 52.
- V. Wood Technology, pages 52 and 53.
- VI. Wood Technology-Furniture, pages 53 and 54.

The Forestry Curricula lead to the bachelor of science (B.S.). The B.S. degree is awarded students on the completion of four years of satisfactory work consisting of basic courses in the physical and biological sciences, social sciences, rhetoric, etc., and including about 90 quarter credits in forestry and closely related courses. Satisfactory completion of the work, requiring 204 credits, for the B.S. degree equips the student with sufficient training for some types of forestry positions in county, state, federal, and private employment. However, keen competition for positions in the future can be anticipated and can be successfully met only by more adequate and better professional training.

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

Forestry Curricula

GENERAL REQUIREMENTS

All-college requirements for students in this college.

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

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

is called to the faculty requirements for classification in the junior class, page 10, and to the 18 credit Social Science requirement for graduation. See page 9 for details.

FRESHMAN YEAR

1. Required general courses

- Ag.En. 3, Mechanical Drawing, 3.
- Bot. 1-2-3, General Botany, 10.
- For. 1, General Forestry, 3.
- For. 3, Dendrology, 3.
- For. 4, Dendrology, 4.
- In.Ch. 1-2, General Inorganic Chemistry, 8. Students presenting a year of high school chemistry may omit this course and register for In.Ch. 4-5.
- In.Ch. 4-5, General Inorganic Chemistry, 8. Those required to take In.Ch. 1-2 may omit this course.
- Math. 1, Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 credits elective.
- Math. 6,* Trigonometry, 5 (Math. 1 or equiv.).
- Orie. 1, College Orientation Lectures, 1.
- Rhet. Communications requirement.

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

All students in the professional curricula, including students who transfer to the University with junior standing, are required to attend this session at the Itasca Forestry and Biological Station. Students must complete their Itasca work before the beginning of the sophomore year unless given permission by petition to defer it one year. Only students with a satisfactory scholastic average during the preceding year may register. No student will be permitted to register for junior work before completing this Itasca requirement.

Students must register for all of the following courses:

- Bot. 6su, Field Botany, 1½.
- Ent. 13su, Field Zoology, 1½.
- For. 5su, Field Silvics, 1½.
- For. 6su, Field Mensuration, 1½.
- For. 11su, Camp Management, 1.
- Total credits at Itasca, 7.
- Total credits for freshman year, 58.

SOPHOMORE YEAR

1. Freshman courses not completed.

2. Required general courses

- Ag.Bi. 1, Elementary Organic Chemistry, 5 (In.Ch. 8 cred.).
- Ag.Bi. 3, Introduction to Biochemistry, 3.
- Ag.Ec. 1,†† Principles of Economics I, 3.
- Ag.Ec. 2, Principles of Economics II, 5 (Ag.Ec. 1).
- Ag.En. 19, Elementary Surveying, 3 (Ag.En. 3, 11 or Trig.).
- Ag.En. 50,† Advanced Surveying, 3 (Ag.En. 19).
- For. 7-8-9, Forest Mensuration, 9 (For. 6).
- Pl.Pa. 10, Forest Pathology, 5 (Bot. 6 cred.).
- Geol. 1,‡ General Geology, 3, and Geol. A, General Geology Laboratory, 2; or Geol. 8, Earth Features and Their Meaning, 5.
- Soc. 1,‡ Introduction to Sociology, 3.
- Zool. 1-2-3,§ General Zoology, 10.
- P.H. 3,¶ Personal Health, 2.
- Total credits for sophomore year, 45 or 46.

Recommended Electives for Forestry

- Ag.Bi. 5, Plant Biochemistry, 3, Forestry: Forest Management students.
- Ag.Bi. 6, Animal Biochemistry, 3, Forestry: Wildlife and Range Management students.

* See Mathematics requirement, page 10.

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

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

¶ Not required of students with military service records.

** See page 8 for special fees.

†† To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

To be eligible for the civil service examination for the U. S. Forest Service, Wildlife majors should take one additional forest products course, such as Logging, Lumber Merchandising and Grading, etc.

I. FORESTRY-FOREST MANAGEMENT

Suggested for those who are preparing for general technical forest work involving the growth, management, and harvesting of forest crops (such as positions in the federal or state services, or foresters for paper companies, lumber companies, or other large timber owners). In addition to the general undergraduate requirements, the course of study for the first four years must include the following courses in the junior and senior years:

JUNIOR YEAR

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

SENIOR YEAR

1. Freshman, sophomore, and junior courses not completed.
 2. Required courses
 - Bot. 51, General Plant Physiology, 3.
 - Ent. 56, Forest Entomology, 5.
 - Ent. 64, Introduction to Fish and Wildlife Management, 5
 - For. 126, Silvics, 3.
 - For. 131, Forest Policy, 3.
 - For. 136, Forest Economics, 3.
 - For. 137, Seeding and Planting, 3.
 - For. 155, Forest Protection, 3.
 - Rhet. 51, Exposition, 3.
- Total credits for senior year, 31.

*Spring Quarter of Senior Year at the Cloquet Experimental Forest**

Prerequisites: An accumulative h.p.r. of at least 1.0 at the end of the fall quarter of the senior year, which must be maintained through the winter quarter; and also completion of a majority of the required forestry courses 100 or over.

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

Students must register for all of the following courses:

- Ent. 167, Techniques in Forest Wildlife Management, 3.
 - For. 128, Introduction to Silviculture, 3.
 - For. 129, Silviculture Laboratory, 3.
 - For. 132, Introduction to Forest Management, 3.
 - For. 133, Forest Management Laboratory, 3.
 - For. 180, Aerial Photography in Forest Management, 1.
- Total credits Cloquet, 16.
Total credits for senior year, 47.

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

II. FORESTRY-RANGE MANAGEMENT

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

JUNIOR YEAR

1. Freshman and sophomore courses not completed.

2. Required courses

- Ag.Ec. 25, Accounting Principles, 4, or Econ. 22, Principles of Accounting, 4.
 - Ag.En. 50, Advanced Surveying, 3.
 - An.Hu. 1, Livestock Production, 4.
 - Bot. 51, General Plant Physiology, 3.
 - Econ. 28, Business Law, 3, or other social science course.
 - Ent. 56, Forest Entomology, 5.
 - For. 20, Grazing, 3.
 - For. 53, Wood Structure and Identification, 3.
 - For. 151, Logging, 3.
 - Geol. 8, Earth Features and Their Meaning, 5; or Geol. 1, General Geology, 3, and Geol. A, General Geology Laboratory, 2.
 - Pl.Pa. 3, Weeds, 3.
 - Pl.Pa. 4, Grasses and Sedges, 3.
 - Soc. 1, Introduction to Sociology, 3.
 - Soil. 4, Soils, 3.
 - Zool. 83, Introduction to Genetics and Eugenics, 3, or Agron. 31, Principles of Genetics, 4.
- Total credits for the junior year 50-52.

SENIOR YEAR

1. Freshman, sophomore, and junior courses not completed.

2. Required courses

- Ag.En. 24-25, Agricultural Physics, 8.
 - For. 56, Forest Products, 3.
 - For. 126, Silvics, 3.
 - For. 131, Forest Policy, 3.
 - For. 136, Forest Economics, 3.
 - For. 155, Forest Protection, 3.
 - Rhet. 22, Public Speaking, 3.
 - Rhet. 51, Exposition, 3.
- Total credits, 29†

*Spring Quarter of Senior Year at the Cloquet Experimental Forest**

Prerequisites: See Forest Management Curriculum.

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

Students must register for all of the following courses:

- Ent. 167, Techniques in Forest Wildlife Management, 3.
 - For. 128, Introduction to Silviculture, 3.
 - For. 129, Silviculture Laboratory, 3.
 - For. 132, Introduction to Forest Management, 3.
 - For. 133, Forest Management Laboratory, 3.
 - For. 180, Aerial Photography in Forest Management, 1.
- Total credits Cloquet, 16.
- Total credits for senior year, 47.

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

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

III. FORESTRY-WILDLIFE MANAGEMENT

(See also Fish and Wildlife Management Curriculum, page 27)

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

JUNIOR YEAR

1. Freshman and sophomore courses not completed.
2. Required courses.
 - Ag.En. 50, Advanced Surveying, 3.
 - Ag.En. 24-25, Agricultural Physics, 8.
 - Econ. 22, Principles of Accounting, 4, or Ag.Ec. 25, Principles of Accounting, 4.
 - Econ. 28, Business Law, 3, or other social science course.
 - Ent. 56, Forest Entomology, 5.
 - For. 56, Forest Products, 3.
 - Geol. 1, General Geology, 3, and Geol. A, General Geology Laboratory, 2; or Geol. 8, Earth Features and Their Meaning, 5.
 - Rhet. 22, Public Speaking, 3.
 - Soc. 1, Introduction to Sociology, 3.
 - Soil. 4, Soils, 3.
 - Zool. 22, Comparative Anatomy, 5.
 - Zool. 51, Introductory Animal Parasitology, 5.

SENIOR YEAR

- Ent. 63, Mammology, 4.
- Ent. 64, Introduction to Fish and Wildlife Management, 5.
- Bot. 51, General Plant Physiology, 3.
- For. 20, Grazing, 3.
- For. 53, Wood Structure and Identification, 3.
- For. 126, Silvics, 3.
- For. 131, Forest Policy, 3.
- For. 136, Forest Economics, 3.
- For. 155, Forest Protection, 3.
- Rhet. 51, Exposition, 3.

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

*Spring Quarter of Senior Year at the Cloquet Experimental Forest**

Prerequisites: See Forest Management Curriculum.

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

- Ent. 167, Techniques in Forest Wildlife Management, 3.
- For. 128, Introduction to Silviculture, 3.
- For. 129, Silviculture Laboratory, 3.
- For. 132, Introduction to Forest Management, 3.
- For. 133, Forest Management Laboratory, 3.
- For. 180, Aerial Photography in Forest Management, 1.
- Total credits Cloquet, 16.
- Total credits for senior year, 49.

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

Technological Curricula

IV. LUMBER MERCHANDISING AND CONSTRUCTION

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

FRESHMAN YEAR

1. Required courses

Ag.En. 3, Mechanical Drawing, 3.

Bot. 1-2, General Botany, 6.

For. 1, General Forestry, 3.

For. 3-4, Dendrology, 7.

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

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

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

Math. 6,† Trigonometry, 5 (Math. 1 or equiv.).

Math. 7, College Algebra, 5 (Math. 6).

Orie. 1, College Orientation Lectures, 1.

Rhet. Communications requirement.

Total credits for the freshman year, 52.

SOPHOMORE YEAR

1. Freshman courses not completed

2. Required courses

Ag.Bi. 1, Elementary Organic Chemistry, 5 (In.Ch. 3 cred.).

Ag.En. 24-25, Agricultural Physics, 8.

Econ. 3, Elements of Money and Banking, 5.

Econ. 6-7, Principles of Economics, 10.

Econ. 22-23, Principles of Accounting, 8.

Econ. 28, Business Law, 3 (Econ. 6 cred.).

For. 7, Forest Mensuration, 3 (Math. 6).

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

Zool. 14-15, General Zoology, 6.

Total credits for sophomore year, 51.

JUNIOR YEAR

1. Sophomore courses not completed

2. Required courses

Arch. 57, 58, Building Materials and Methods, 8.

Bu.Ad. 77, Survey in Marketing, 3 (Econ. 6-7 or equiv.)

Bu.Ad. 89, Production Management, 3 (Econ. 6-7 or equiv.)

Econ. 5, Elements of Statistics, 5.

Econ. 142, Monetary and Banking Policy, 3 (Econ. 3 and 6-7).

Econ. 161, Labor Problems and Trade Unionism, 3 (Econ. 6-7).

Econ. 175, Government Regulation of Business, 3 (20 cred. in soc. sci. including Econ. 6-7).

For. 53-54, Wood Structure and Identification, 6 (For. 3-4).

For. 121, Wood Finishing, 3 (8 cred. in chem. or permission of instructor).

P.H. 3, Personal Health, 2.*

Total credits for the Junior year, 39.

SENIOR YEAR

1. Junior courses not completed

2. Required courses

Bu.Ad. 68, Sales Management, 3 (Bu.Ad. 77).

For. 56, Forest Products, 3.

* Not required of students with military service records.

† See Mathematics requirement, page 10.

- For. 57, Wood Utilization, 3 (For. 53-54).
 For. 58, Lumber Merchandising and Grading, 3 (For. 53-54).
 For. 114-115-116, Mechanical and Physical Properties of Wood, 9 (Math. 7 and For. 53-54).
 For. 120, Estimating, 3.
 For. 125, Wood Preservation, 3 (For. 53-54).
 For. 152, Wood Seasoning, 3 (For. 53-54).
 Pl.Pa. 10, Forest Pathology, 5 (Bot. 6 cred.).
 Rhet. 51, Exposition, 3 (Rhet. Communications requirement).
 Total credits for the senior year, 38.

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

V. WOOD TECHNOLOGY

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

FRESHMAN YEAR

Required courses

- Bot. 1-2, General Botany, 6.
 For. 3, Dendrology, 3.
 For. 4, Dendrology, 4.
 In.Ch. 1-2, General Inorganic Chemistry, 8 (Students presenting a year of high school chemistry may register for In.Ch. 4-5).
 In.Ch. 4-5, General Inorganic Chemistry, 8 (One year of high school chemistry.) Those required to take In.Ch. 1-2 are exempt.
 In.Ch. 11, Semimicro Qualitative Analysis, 4.
 Math. 1,§ Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 elective credits.
 Math. 6,§ Trigonometry, 5 (Math. 1 or equivalent).
 Math. 7, College Algebra, 5 (Math. 6).
 Ori. 1, College Orientation Lectures, 1.
 Rhet. Communications requirement, 9.
 Total credits for the freshman year, 50.

SOPHOMORE YEAR

1. Freshman courses not completed

2. Required courses

- Ag.Bi. 2, Quantitative Methods, 5 (Gen. Inorg. Chem. 8 cred.)
 Ag.Ec. 90, Agricultural Statistics, 5.
 Ag.En. 3, Mechanical Drawing, 3.
 Math. 30, Analytic Geometry, 5 (Math. 7).
 Math. 50, Differential Calculus, 5 (Math. 30).
 Math. 51, Integral Calculus, 5 (Math. 50).
 Pl.Pa. 10, Forest Pathology, 5 (Bot. 6 cred.).
 Rhet. 22, Public Speaking, 3 (Rhet. Communications requirement).
 Soc. 1, Introduction to Sociology, 3.
 Total credits for the sophomore year, 39.

JUNIOR YEAR

1. Sophomore courses not completed

2. Required courses

- Econ. 6-7, Principles of Economics, 10.
 For. 53-54, Wood Structure and Identification, 6 (For. 3-4).
 Or.Ch. 61-62, Elementary Organic Chemistry, 8 (15 cred. in college chem.).

§ See Mathematics requirement, page 10.

P.H. 3,† Personal Health, 2.

Phys. 7-8-9, General Physics, 15 (Math. 15-16 or equiv.).

Total credits for the junior year, 41.

SENIOR YEAR

1. Junior courses not completed

2. Required courses

Ag.Bi. 119, Colloids, 3 (Or.Ch. 4 or 8 cred., Phys. 9 advised).

Ag.Bi. 121, Carbohydrates, 3 (Ag.Bi. 119).

Bact. 53, General Bacteriology, 5 (Chem. 10 credits, 4 cred. in botany or zoology).

For. 56, Forest Products, 3.

For. 57, Wood Utilization, 3 (For. 53-54).

For. 113, Wood Pulp and Paper, 3.

For. 114-115-116, Mechanical and Physical Properties of Wood, 9 (For. 53-54, Math. 7).

For. 119, Advanced Wood Structure, 4 (For. 53-54).

For. 125, Wood Preservation, 3 (For. 53-54).

For. 142, Wood Chemistry, 3 (Or.Chem., For. 53-54).

For. 152, Wood Seasoning, 3 (For. 53-54).

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

Total credits for the senior year, 45.

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

VI. WOOD TECHNOLOGY—FURNITURE

Suggested for those who wish to enter into technical and administrative work in wood using industries, with special emphasis on the manufacture and marketing of furniture. Includes fundamental courses in business, the structure, properties, uses, and finishing of wood and the manufacture, properties, and uses of plywoods.

FRESHMAN YEAR

1. Required courses

Bot. 1-2, General Botany, 6.

For. 1, General Forestry, 3.

For. 3-4, Dendrology, 7.

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

In.Ch. 4-5, General Inorganic Chemistry, 8 (One year of high school chemistry). Those required to take In.Ch. 1-2 are exempt.

In.Ch. 11, Semimicro Qualitative Analysis, 4.

Math. 1, Higher Algebra, 5.

Math. 6,* Trigonometry, 5.

Math. 7, College Algebra, 5.

Orie. 1, Freshman Orientation, 1.

Rhet. Communications requirement.

SOPHOMORE YEAR

1. Freshman courses not completed

2. Required courses

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

Ag.En. 24-25, Agricultural Physics, 8.

Draw. 1-2, Engineering Drawing, 6.

Draw. 3, Descriptive Geometry, 3 (Draw. 2).

Econ. 22-23, Principles of Accounting, 8.

Econ. 28, Business Law, 3 (Ec. 6 cred. or senior).

Me.En. 4, Machine Woodworking, 2.

P.H. 3,† Personal Health, 2.

Rhet. 22, Public Speaking, 3.

Soc. 1, Introduction to Sociology, 3.

* See Mathematics requirement, page 10.

† Not required of students with military service records.

§ To receive credit for this course a student must complete both Ag.Ec. 1 and 2.

JUNIOR YEAR

1. Sophomore courses not completed

2. Required courses

- Bu.Ad. 130, Cost Accounting Survey, 3 (Ec. 23).
- Econ. 161, Labor Problems and Trade Unionism, 3 (Ec. 7 or 83).
- For. 53-54, Wood Structure and Identification, 6 (For. 4).
- For. 56, Forest Products, 3.
- For. 57, Wood Utilization, 3 (For. 53-54).
- For. 119, Advanced Wood Structure, 4 (For. 53-54).
- For. 142, Wood Chemistry, 3 (Or.Ch. 62, For. 53-54).
- Or.Ch. 61-62, Elementary Organic Chemistry, 8 (12-15 cred. in chem.).
- Rhet. 51, Exposition, 3 (Rhet. Comm. req.).

SENIOR YEAR

1. Junior courses not completed

2. Required courses

- Bu.Ad. 89, Production Management, 3 (Ec. 7 or equiv.).
- For. 58, Lumber Merchandising and Grading, 3 (For. 53-54).
- For. 114-115, Mechanical and Physical Properties of Wood, 6 (For. 54, Math. 7).
- For. 116, Fabrication and Properties of Wood Products, 3 (For. 114).
- For. 121, Wood Finishing, 3 (8 cred. in chem. or permission of instructor).
- For. 125, Wood Preservation, 3 (For. 53-54).
- For. 152, Wood Seasoning, 3 (For. 53-54).
- Me.En. 60, Woodworking Machinery, 3 (M.E. 4).
- Me.En. 61, Glues, Gluing, Joints and Fastenings, 3 (For. 53-54).
- Me.En. 118, Plywood and Laminated Assemblies, 3 (For. 114, M.E. 61).

FIFTH YEAR LEADING TO THE MASTER OF FORESTRY DEGREE

A fifth year of work in the various fields of forestry (Forest Management, Range Management, Wildlife Management) is provided to meet the increasingly rigid requirements for the practice of professional work. Applicants for admission to the fifth year leading to the professional master of forestry degree must have completed all the requirements for the B.S. degree in the corresponding curriculum and must have maintained an acceptable honor point average. The professional degree, master of forestry (M.F.), is awarded only after the satisfactory completion of 52 credits of prescribed and elective courses, a major report, and comprehensive written and oral examinations, and the maintenance of an honor point average of at least 1.5.

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

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

*Fifth Year Program Leading to the Master of Forestry Degree***I. FORESTRY-FOREST MANAGEMENT****Required courses**

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

Total credits for the fifth year, 52.

II. FORESTRY-RANGE MANAGEMENT**Required courses**

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

Total credits for the fifth year, 52.

III. FORESTRY-WILDLIFE MANAGEMENT**Required courses**

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

Total credits for the fifth year, 52.

CURRICULA IN HOME ECONOMICS

Four-Year Curricula

- I. General Home Economics, page 57.
- II. Dietetics, page 58.
- III. Home Economics Education, page 60.
- IV. Home Economics in Business, page 63.
- V. Institution Management, page 69.
- VI. Home Economics and Nursery School Education, page 70.
- VII. Home Economics Extension, page 71.
- VIII. Preparation for Research (page 72) in (a) Experimental Foods, page 73, (b) Nutrition, page 73, (c) Textiles and Clothing, page 74.
- IX. Journalism—Home Economics (major). See requirements in the *Bulletin of the College of Science, Literature, and the Arts*.

Five-Year Curriculum

- I. Home Economics Education, page 74.

Four-Year Curricula

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

Specialization in any of the fields of home economics involves two types of training for each student. Throughout the training period there is a core of courses required for homemaking purposes and, in addition, courses are required depending upon the student's vocational interest and choice. The four-year period includes a study of the physical, biological, and social sciences, English, and art, with opportunities for electives in other fields. The requirements for each field of specialization will be found under appropriate headings, e.g., those interested in preparing for teaching home economics, see page 60; those interested in other curricula see the appropriate pages listed above for each field.

New opportunities for persons with home economics training are opening up, so careful attention should be given to the choice of electives. Home economists are needed with more training in economics, accounting, statistics, and sociology than 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. These must include enough courses in the field of social science to meet the all-college requirement of 18 credits (see page 9). Before the junior year each student must sign a specialization card for that phase of home economics in which she is most interested. Such cards are signed after conference with (a) the student's adviser and (b) the head of the section involved.

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

A total of at least 185 credits is required for the B.S. degree. See also requirements for *all* students in the college, page 9.

I. GENERAL HOME ECONOMICS

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

REQUIREMENTS

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

- Orie. 1, College Orientation Lectures, 1.
 H.E. 1, Choice and Care of Clothing, 4 (Not open to students having had G.C. 15 or seniors in H.E.).
 H.E. 3, Clothing Construction A, 3 (H.E. 1; 3rd qtr. fr.).
 H.E. 17, Personal and Family Living, 3 (Not open to seniors in H.E.).
 H.E. 20, Introduction to Related Art, 4 (Not open to seniors in H.E.).
 H.E. 31, Introduction to Nutrition, 3 (Not open to seniors in H.E.).
 H.E. 40, Food Preparation, 5 (8 cred. chem.).
 Rhet. Communications requirement.
 Soc. 1, Introduction to Sociology, 3.
 Ph.Ed., Physical Education, 3 (May be completed any time during four years of residence).
 Psy. A, Elementary Psychology, 5 (3rd qtr. fr.; C average)
 or Psy. 1-2 (See sophomore list).

Take Group I or II

Group I

- C.C. 10A-B, Human Biology, 6.
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).

Group II

- Zool. 14-15, General Zoology, 6.
 Physiol. 4, Human Physiology, 4 (1 qtr. zool.; 1 qtr. chem. Open to sophomores).
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).

Take Group I or II

Group I

- G.C. 7C, The Nature of Chemistry, 5.
 G.C. 7B, Sound, Astronomy, Technology, 5.
 G.C. 7A,* Physical Science, 5
 or Ag.En. 35,* Household Physics, 5.

Group II

- Chem. 1-2, General Inorganic Chemistry, 8
 or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance cred. in chem.)
 or Chem. 6-7, General Inorganic Chemistry, 10
 or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance cred. in chem.).
 G.C. 7A,* Physical Science, 5
 or Ag.En. 35,* Household Physics, 5.
 Ag.Bi. 1 (See sophomore list).

SOPHOMORE YEAR

- H.E. 4, Clothing Construction B, 3 (H.E. 3).
 H.E. 24, Problems in Home Planning and Furnishing, 5 (H.E. 20, to be followed by H.E. 120)
 or H.E. 21, Color and Design I, 3 (H.E. 20)
 and H.E. 22, Color and Design II, 3 (H.E. 1 and 20, to be followed by H.E. 27, H.E. 180).
 H.E. 27, Related Art Problems, 3 (H.E. 21).
 H.E. 34, Nutrition Problems, 4 (3rd qtr. soph.; H.E. 31, 40, physiol. or hum. biol.)
 or H.E. 76, Nutrition, 4 (H.E. 30 or 31 and 40)
 or H.E. 170 (See junior-senior list)
 and H.E. 171 (See junior-senior list).

* Students who have had one year of high school physics may be exempt from Ag.En. 35 or G.C. 7A.

- H.E. 41, Food Management and Marketing, 5 (H.E. 31, 40).
 H.E. 49, Household Equipment, 3 (Ag.En. 35 or permission of instructor).
 Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
 Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
 or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
 or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
 or Rhet. 60 (See junior-senior list).
 Bact. 53, General Bacteriology, 5 (8 cred. in chem. and 4 cred. in bot. or zool.; soph. with C average in prereq. courses)
 or Dy.Hu. 20 (See freshman list).
 Ag.Bi. 1, Introduction to Organic Chemistry, 5 (In.Ch. 8-10 cred.).
 Ag.Ec. 3, Principles of Economics, 5.
 Soc. 2, Individual and Minority Group Adjustment, 5 (Soc. 1)
 or Soc. 14, Rural Sociology, 3 (Soc. 1)
 or Soc. 49, Social Pathology, 3 (3rd qtr. soph. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.)
 or Soc. 119 (See junior-senior list).
 Psy. 1-2, General Psychology, 6.

JUNIOR AND SENIOR YEARS

- H.E. 50, Textiles, 3 (H.E. 1).
 H.E. 76, Nutrition, 4 (H.E. 30 or 31 and 40).
 H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
 H.E. 86, Home Management Laboratory, 4 (H.E. 85 or parallel, 40, 41 advised, P.H. 52a-b).
 H.E. 120, Art History, 3 (See soph. sequence 20, 24; must be senior college or graduate student).
 H.E. 170, Nutrition of the Family, 3 (H.E. 31, 40, Ag.Bi. 1 and 3 cred. in physiol.)
 and H.E. 171, Child Nutrition, 3 (H.E. 170, H.E.Ed. 90).
 H.E. 180, Home Planning and Furnishing, 5 (H.E. 27, 120 recommended; see sophomore sequence 21, 22, 27).
 Rhet. 51, Exposition, 3 (Rhet. Comm. req.).
 Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.; see sophomore sequence 31, 32).
 P.H. 52a, Health Care of the Family, lectures, 2 (Bact. 53 or Dy.Hu. 20, Physiol. 4, open to soph.).
 P.H. 52b, Health Care of the Family, laboratory, 1 (Bact. 53 or Dy.Hu. 20; Physiol. 4; open to soph.).
 Soc. 119, The Family, 3 (Soc. 1 and 15 cred. in soc. sci., child welfare, education, philosophy, or psychology or consent of instructor).
 H.E.Ed. 90, Child Training, 3 (Psy. A or Psy. 1, 2 or parallel 2).

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

II. DIETETICS*

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

REQUIREMENTS

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

- Orie. 1, College Orientation Lectures, 1.
 H.E. 1, Choice and Care of Clothing, 4 (Not open to H.E. seniors).
 H.E. 17, Personal and Family Living, 3 (Not open to H.E. seniors).
 H.E. 20, Introduction to Related Art, 4 (Not open to H.E. seniors).

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

- H.E. 31, Introduction to Nutrition, 3 (Not open to H.E. seniors).
 H.E. 40, Food Preparation, 5 (8 cred. chem.).
 Rhet. Communications requirement.
 Zool. 14, 15, General Zoology, 6.
 Chem. 1-2, General Inorganic Chemistry, 8
 or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance cred. in chem.)
 or Chem. 6-7, General Inorganic Chemistry, 10.
 or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance cred. in chem.)
 Physiol. 4, Human Physiology, 4 (1 qtr. chem., 1 qtr. zool.).
 Ag.En. 35,† Household Physics, 5.
 Soc. 1, Introduction to Sociology, 3.
 Econ. 22, Principles of Accounting, 4 (3rd qtr. freshmen)
 or Ag.Ec. 25 (See sophomore list).
 Ph.Ed., Physical Education, 3 (May be completed any time during four years of residence).
 Psy. A, Elementary Psychology, 5 (3rd qtr. fr. with C average)
 or Psy. 1-2 (See sophomore list).

SOPHOMORE YEAR

- H.E. 24, Problems in Home Planning and Furnishing, 5 (H.E. 20).
 H.E. 33, Nutrition I, 4 (Ag.Bi. 1, Physiol. 4).
 H.E. 35, Nutrition II, 4 (H.E. 33).
 H.E. 41, Food Management and Marketing, 5 (H.E. 31, 40).
 H.E. 45, Quantity Cookery, 6 (H.E. 41).
 H.E. 46, Cafeteria Experience, 3.
 H.E. 49, Household Equipment, 3 (Ag.En. 35 or permission of instructor).
 Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
 Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
 or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
 or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
 or Rhet. 60 (See junior list).
 Bact. 53, General Bacteriology, 5 (8 cred. in chem. and 4 cred. in bot. or zool.; soph. with C average in prereq. courses).
 Ag.Bi. 1, Introduction to Organic Chemistry, 5 (8 cred. in in. ch.).
 Ag.Bi. 2, Quantitative Methods, 5 (8 cred. in in. ch.).
 Ag.Ec. 3, Principles of Economics, 5.
 Ag.Ec. 25, Principles of Accounting, 4
 or Econ. 22 (See freshman list).
 Psy. 1-2, General Psychology, 6.

JUNIOR AND SENIOR YEARS

- H.E. 50, Textiles, 3 (H.E. 1).
 H.E. 64, Institution Buying, 4 (H.E. 45 or parallel; 46 or parallel—one of these required).
 H.E. 65, Institution Management Problems, 3 (H.E. 45, 46, 64).
 H.E. 79, Selected Problems for Dietitians, 3 (H.E. 170 or equiv.).
 H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
 H.E. 86, Home Management Laboratory, 4 (H.E. 85 or parallel, 40, 41 advised, P.H. 52a and 52b).
 H.E. 142, Experimental Cookery, 3 (H.E. 40, Ag.Bi. 1).
 H.E. 170, Nutrition of the Family, 3 (H.E. 31, 40, Ag.Bi. 1, physiol. 3 cred.).
 H.E. 171, Child Nutrition, 3 (H.E. 170, H.E.Ed. 90).
 H.E. 173, Nutrition in Disease, 4 (H.E. 170, 35 also advised).
 H.E. 176, Advanced Nutrition, 4 (H.E. 35 or parallel, Ag.Bi. 2)
 or H.E. 177, Digestion and Metabolism, 3 (H.E. 35).
 H.E. 178, Clinical Problems in Nutrition, 2 (H.E. 170, 35 or parallel).
 H.E. 179, Readings in Nutrition, 2 (H.E. 170).
 Rhet. 51, Exposition, 3 (Rhet. Comm. req.).
 Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.)
 or Rhet. 31 or 32 or 33 (See sophomore list).

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

P.H. 52a, Health Care of the Family, lectures, 2 (Bact. 53 or Dy.Hu. 20, Physiol. 4)

P.H. 52b, Health Care of the Family, laboratory, 1 (Bact. 53 or Dy.Hu. 20, Physiol. 4)

H.E.Ed. 90, Child Training, 3 (Psy. A or Psy. 1-2 or parallel 2).

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

III. HOME ECONOMICS EDUCATION

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

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

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

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

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

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

Four-Year Curriculum in Home Economics Education Leading to the B.S. Degree

General Home Economics Teaching

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

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

Orie. 1, College Orientation Lectures, 1.

H.E. 1, Choice and Care of Clothing, 4 (Not open to H.E. seniors).

H.E. 3, Clothing Construction A, 3 (H.E. 1; 3rd qtr. fr.).

H.E. 17, Personal and Family Living, 3 (Not open to H.E. seniors).

H.E. 20, Introduction to Related Art, 4 (Not open to H.E. seniors).

H.E. 21, Color and Design I, 3 (H.E. 20).

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

- H.E. 22, Color and Design II, 3 (H.E. 1, 20).
 H.E. 31, Introduction to Nutrition, 3 (Not open to H.E. seniors).
 H.E. 40, Food Preparation, 5 (8 cred. chem.).
 Rhet. Communications requirement, 9.
 Soc. 1, Introduction to Sociology, 3 (or 5).
 Ph.Ed., Physical Education, 3 (May be completed any time during four years of residence).

Take Group I or II

Group I

- Zool. 14-15, General Zoology 6.
 Physiol. 4, Human Physiology, 4 (1 qtr. zool., 1 qtr. chem.).
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).

Group II

- G.C. 10A-B, Human Biology, 6.
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).

Take Group I or II

Group I

- Chem. 1-2, General Inorganic Chemistry, 8
 or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance cred. in chem.)
 or Chem. 6-7, General Inorganic Chemistry, 10.
 or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance cred. in chem.)
 G.C. 7A, Energy and Matter, 5
 or Ag.En. 35, Household Physics, 5.

Group II

- G.C. 7C, The Nature of Chemistry, 5.
 G.C. 7A, Energy and Matter, 5
 or Ag.En. 35, Household Physics, 5.

SOPHOMORE YEAR

- H.E. 4,* Clothing Construction B, 3 (H.E. 3, 20).
 H.E. 27, Related Art Problems, 3 (H.E. 21).
 H.E. 34, Nutrition Problems, 4 (3rd qtr. soph., H.E. 31, 40, physiol. or human biol.)
 or H.E. 76, Nutrition, 4 (H.E. 30 or 31 and 40. Not open to students having cred. for H.E. 34.)
 or H.E. 170 (See junior-senior list)
 and H.E. 171 (See junior-senior list).
 H.E. 41, Food Management and Marketing, 5 (H.E. 40).
 H.E. 49, Household Equipment, 3 (Ag.En. 35 or permission of instructor).
 Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
 Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
 or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
 or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
 or Rhet. 60 (See junior-senior list).
 Bact. 53, General Bacteriology, 5 (10 cred. in chem. and 4 cred. in bot. or zool.)
 or Dy.Hu. 20, Household Microbiology, 4 (See freshman list).
 Ag.Bi. 1, Introduction to Organic Chemistry, 5 (in. ch. 8 cred.).
 Ag.Ec. 3, Principles of Economics, 5
 or Econ. 6-7, Principles of Economics, 10 (soph., jr., sr.).
 Psy. 1-2, General Psychology, 6.

JUNIOR AND SENIOR YEARS

- H.E. 50, Textiles, 3 (H.E. 1).
 H.E. 53,* Advanced Clothing, 3 (H.E. 4, 50).
 H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
 H.E. 86, Home Management Laboratory, 4 (H.E. 85 or parallel, H.E. 40, 41 advised, P.H. 52a, 52b).

* Home experience in the construction of garments is required as a prerequisite for H.E. 4 or 53. The character and amount of experience will be determined by a member of the textiles and clothing section.

- H.E. 170, Nutrition of the Family, 3 (H.E. 31, 40, Ag.Bi. 1, physiol. 4 cred.) and 171, Child Nutrition, 3 (H.E. 170, H.E.Ed. 90) or H.E. 34 (See sophomore list).
- H.E. 180, Home Planning and Furnishing, 5 (H.E. 27, 120 recommended).
- P.H. 52a, Health Care of the Family, lectures, 2 (Bact. 53 or Dy.Hu. 20, Physiol. 4, or permission of instructor).
- P.H. 52b, Health Care of the Family, laboratory, 1 (Bact. 53 or Dy.Hu. 20, Physiol. 4).
- P.H. 59, Health of the School Child, 3 (P.H. 3 and 4, or 3 and 51, or 50 or 52 or 100).
- Rhet. 51,† Exposition, 3 (Rhet. Com. req.).
- Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req., or Rhet. 31 or 32 or 33. See sophomore list.)
- Ed. 55A-B, Introduction to Secondary School Teaching, 10 (6 cred. in psy. and a C average).
- Ag.Ec. 126, Economics of Consumption, 3 (Ag.Ec. 3).
- H.E. 180, The School and the Social Order, 3 (6 cred. in soc. sci.).
- H.E.Ed. 90, Child Training, 3 (Psy. 1-2 or parallel 2).
- H.E.Ed. 91,‡ Observation, Materials, Teaching in Home Economics, 5 (H.E. 4, 21, 22, 41, Psy. 1-2, Ed. 55A-B, parallel H.E.Ed. 93).
- H.E.Ed. 92, Teaching Problems in Home Economics, 2 (H.E.Ed. 91-93, parallel 94, 192, 194).
- H.E.Ed. 93,§¶ 94,§ Supervised Teaching in Home Economics, 9 (H.E. 4, 21, 22, 41, Psy. 1-2, Ed. 55A-B, home experience parallel H.E.Ed. 91).
- H.E.Ed. 192, Evaluation in Home Economics Education, 2 (Ed. 55A-B, H.E.Ed. 91, parallel with 94).
- H.E.Ed. 194A, Adult Education in Home Economics, 3 (H.E.Ed. 91-93, parallel with 92-94).

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

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 (Jr., sr.; H.E. 53 or permission of instructor).
- H.E. 102, Advanced Textiles, 3 (Jr., sr.; H.E. 50, Ag.Bi. 1, Ag.Ec. 3 or parallel).
- H.E. 115, Economic and Social Aspects of Clothing, 3 (Jr., sr.; H.E. 50, Ag.Ec. 3).
- H.E. 120, Art History, 3 (Senior college and grad. students only).
- Bot. 1, General Botany, 4.

Teaching Foods

To the requirements in general teaching add:

- H.E. 45, Quantity Cookery, 6 (Jr., sr.; H.E. 40, 41).
- H.E. 142, Experimental Cookery, 3 (Jr., sr.; H.E. 40, Ag.Bi. 1).
- H.E. 146, Special Food Problems, 3 (Sr.; H.E. 142).
- Ag.Bi. 2, Quantitative Methods, 5 (Soph., jr., sr.; in. ch. 8 cred.).

Teaching Nutrition

Omit from the requirements in general teaching the following courses: H.E. 3, 4, 21, 22, 27, 34, 53, 180, G.C. 7A-C, 10A-B, and Ag.Ec. 126.

To the requirements in general teaching add:

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

† Unless exempt by examination.

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

¶ Plans for the home experience prerequisite for H.E.Ed. 91 and 93 should be made with an adviser in Home Economics Education.

Teaching Related Art

Those interested in teaching Related Art should:

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

H.E. 23, Advanced Design, 3 (Soph., jr.; H.E. 21).

H.E. 25, Design Applied to Crafts, 3 (Soph.; H.E. 21 or 22).

H.E. 120, Art History, 3 (Open to senior college and grad. students only).

H.E. 122, Advanced Interior Design, 3 (Jr., sr.; H.E. 27, 120 or permission of instructor)

or 125, Advanced Costume Design, 3 (Jr., sr.; H.E. 3, or permission of instructor, H.E. 22, 25 recommended).

H.E.Ed. 197, Organization and Methods for Related Art Teaching, 1-3 (Sr.; H.E.Ed. 91, H.E. 180 or parallel; permission of instructor).

Six credits from the following:

Art 1, Introduction to Art, 4.

Art 20-21, Drawing and Painting I, 2 cred. each (Art I or equiv. or permission of instructor).

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 demonstration, or similar enterprise. The student's ability to get this experience will depend on her own initiative and success in the work she undertakes. The ability to use a typewriter is important. For those interested in radio work, participation in the Radio Guild is suggested.

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

Orie. 1, College Orientation Lectures, 1.

Rhet. Communications requirement.

H.E. 1, Choice and Care of Clothing, 4 (Not open to H.E. seniors).

H.E. 17, Personal and Family Living, 3 (Not open to H.E. seniors).

H.E. 20, Introduction to Related Art, 4 (Not open to H.E. seniors).

H.E. 31, Introduction to Nutrition, 3 (Not open to H.E. seniors).

H.E. 40, Food Preparation, 5 (8 cred. in chem.).

Zool. 14-15, General Zoology, 6.

Physiol. 4, Human Physiology, 4 (1 qtr. zool., 1 qtr. chem.).

Chem. 1-2, General Inorganic Chemistry, 8

or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance cred. in chem.)

or Chem. 6-7, General Inorganic Chemistry, 10

or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance cred. in chem.).

Ag.En. 35,** Household Physics, 5.

Soc. 1, Introduction to Sociology, 3 (or 5).

Ph.Ed., Physical Education, 3 (May be completed at any time during four years' residence).

Psych. A, Elementary Psychology, 5 (3rd qtr. fr.; C average)

or Psych. 1-2 (See sophomore list).

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

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

Any two of the following:

- G.C. 26a, Photography, 3
or Jour. 10† (See junior-senior list).
Jour. 41 (See junior-senior list).
Jour. 69 (See junior-senior list).
An.Hu. 50 (See junior-senior list).
Rhet. 54 (See junior-senior list).

SOPHOMORE YEAR

- H.E. 24, Problems in Home Planning and Furnishing, 5 (H.E. 20).
H.E. 41, Food Management and Marketing, 5 (H.E. 31, 40).
H.E. 45, Quantity Cookery, 6 (H.E. 40, 41).
H.E. 46, Cafeteria Experience, 3.
H.E. 49, Household Equipment, 3 (Ag.En. 35 or equiv.).
Psych. 1-2, General Psychology, 6
or Psych. A (See freshman list).
Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
or Rhet. 60 (See junior-senior list).
Ag.Bi. 1, Introduction to Organic Chemistry, 5 (In. ch. 8 cred.).
Ag.Ec. 3, Principles of Economics, 5.
Bact. 53, General Bacteriology, 5 (Soph. with C in prereq. courses, jr., sr.; 8 cred. in chem., 4 cred. in bot. or zool.).
Jour. 11, Introduction to Reporting, 3 (Soph., jr., sr. with C average; Eng. A-B-C or Comp. 4-5-6 or Rhet. 1, 2, 3 or exemption from English requirement).

JUNIOR AND SENIOR YEARS

- H.E. 50, Textiles, 3 (H.E. 1).
H.E. 70, Advanced Food Preparation, 3 (Ag.Bi. 1, H.E. 41).
H.E. 71, Demonstrations, 1 (H.E. 41, open only to 3rd qtr. jr., sr.).
H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
H.E. 86, Home Management Laboratory, 4 (H.E. 85 or parallel, 40, 41 advised, P.H. 52a, 52b).
H.E. 120, Art History, 3 (Senior college and grad. only).
H.E. 142, Experimental Cookery, 3 (H.E. 40, Ag.Bi. 1).
H.E. 146, Special Food Problems, 3 (H.E. 142, open to sr. only).
H.E. 170, Nutrition of the Family, 3 (H.E. 31, 40, Ag.Bi. 1, physiol. 3 cred.).
H.E. 171, Child Nutrition, 3 (H.E. 170, H.E.Ed. 90).
H.E. 179, Readings in Nutrition, 2 (H.E. 170).
H.E.Ed. 90, Child Training, 3 (Psy. A or Psy. 1-2 or parallel 2).
Psy. 56, Psychology of Advertising, 3 (Psy. 1-2, Ag.Ec. 3).
P.H. 52a, Health Care of the Family, lectures, 2 (Bact. 53, Physiol. 4).
P.H. 52b, Health Care of the Family, laboratory, 1 (Bact. 53, Physiol. 4).
Bu.Ad. 88, Advertising, 3 (Ag.Ec. 126 or B.A. 77, and Psy. 56).
Ag.Ec. 126, Economics of Consumption, 3 (Ag.Ec. 2 or 3)
or Econ. 185, Economics of Marketing, 3 (Econ. 6-7 or 83)
or Bu.Ad. 167, Personnel Administration, 3 (Econ. 161)
or Econ. 161, Labor Problems and Trade Unions, 3 (Econ. 6-7 or 83).
Rhet. 51, Exposition, 3 (Rhet. Comm. req.).
Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.)
or Rhet. 31 or Rhet. 32 or Rhet. 33 (See sophomore list).

Any two of the following:

- Jour. 41, Editing for Nonmajors, 3 (Jour. 11 or 13).
Jour. 69, Newspaper and Magazine Articles, 3 (Jour. 41).
An.Hu. 50, Meat Selection and Utilization, 3.

† A fee of \$5 is charged for this course.

G.C. 26A (See freshman list)
or Jour. 10, Photography, 3.

Rhet. 54, Advanced Public Speaking, 3 (Rhet. 22).

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

Related Art†

The curriculum in Related Art and Business is planned to give students a background of knowledge and experience in the applications of color and design, leading primarily to work in department stores, interior furnishing studios, and dress and specialty shops. The curriculum listed here constitutes a basic preparation in the general field of related art with a major emphasis upon interior furnishings and dress design.

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

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

Orie. 1, College Orientation Lectures, 1.

H.E. 1, Choice and Care of Clothing, 4 (Not open to H.E. seniors).

H.E. 17, Personal and Family Living, 3 (Not open to H.E. seniors).

H.E. 20, Introduction to Related Art, 4 (Not open to H.E. seniors).

H.E. 21, Color and Design I, 3 (H.E. 20).

H.E. 22, Color and Design II, 3 (H.E. 1, 20).

H.E. 31, Introduction to Nutrition, 3 (Not open to H.E. seniors).

H.E. 40, Food Preparation, 5 (8 cred. chem.; honor point ratio 1.00 or above).

Rhet. Communications requirement.

G.C. 10A, Human Biology I, 3.

G.C. 10B, Human Biology II, 3 (G.C. 10A).

P.H. 3,* Personal Health, 2.

P.H. 4,* Health Problems of Adult Life, 2 (P.H. 3).

Ag.En. 35,§ Household Physics, 5.

G.C. 7C, The Nature of Chemistry, 5.

Soc. 1, Introduction to Sociology, 3.

Hist. 1-2, Civilization of the Modern World, 6

or Hist. 17, Modern Economic and Social Problems 5 (3rd qtr. fr.).

Psy. A, Elementary Psychology, 5 (3rd qtr. fr. C average)

or Psy. 1-2 (See sophomore list).

Ph.Ed., Physical Education, 3 (May be completed at any time during four years of residence).

Art 1, Introduction to Art, 4.

Art 20, 21, Drawing and Painting I, 2 cred. per qtr. (Art I or equiv. or permission of instructor).

SOPHOMORE YEAR

H.E. 23, Advanced Design, 3 (H.E. 21)

or H.E. 25, Design Applied to Crafts, 3 (H.E. 21 or 22).

H.E. 27, Related Art Problems, 3 (H.E. 21).

H.E. 34, Nutrition Problems, 4 (3rd qtr. soph.; H.E. 31, 40; physiol. or hum. biol.)

or H.E. 76, Nutrition, 4 (H.E. 30 or 31 and 40).

H.E. 49, Household Equipment, 3 (Ag.En. 35 or permission of instructor).

Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).

Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)

or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)

or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)

or Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.).

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

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

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

- Comp. 27-28, Advanced Writing, 6 (Eng. A-B-C or Comp. 4-5-6 or exemption)
 or Comp. 7, Composition Review, 3 (Comp. 4-5-6 or Comm. 1-2-3; not open to students
 who have taken Eng. A-B-C)
 or Rhet. 26, Original Writing, 3 (Rhet. Comm. req.)
 or Jour. 11, Introduction to Reporting, 3 (Eng. A-B-C or Comp. 4-5-6 or Comm. 1-2-3 or
 Rhet. 1-2-3 or exemption)
 or Jour. 41, Editing for Nonmajors, 3 (Jour. 12 or 13)
 or 5 or 6 additional credits in English Literature.
- 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

- H.E. 50, Textiles, 3 (H.E. 1).
 H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
 H.E. 86, Home Management Laboratory, 4 (H.E. 85 or parallel, 40, 41 advised, P.H. 52a and
 52b).
 H.E. 120, Art History, 3 (Senior college and grad. students only).
 H.E. 121, Textile Design, 3 (H.E. 50, 27, 23 recommended).
 H.E. 122, Advanced Interior Design, 3 (H.E. 27, 120 or permission of instructor).
 H.E. 125,* Advanced Costume Design, 3 (H.E. 3 or permission of instructor, H.E. 22).
 H.E. 180, Home Planning and Furnishing, 5 (H.E. 27, 120 recommended).
 Rhet. 51, Exposition, 3 (Rhet. Comm. req.).
 Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.)
 or Rhet. 31 or Rhet. 32 or Rhet. 33 (See sophomore list).
 Ag.Ec. 126, Economics of Consumption, 3 (Ag.Ec. 2 or 3).
 Psy. 56, Psychology of Advertising, 3 (Psy. 1-2 and Ag.Ec. 3)
 or Bu.Ad. 88, Advertising, 3 (Permission of instructor).
 Jour. 41, Editing for Nonmajors, 3 (Jour. 12 or 13)
 or Comp. 27-28 (See sophomore list)
 or Jour. 11 (See sophomore list)
 or Comp. 7 (See sophomore list)
 or Rhet. 26 (See sophomore list)
 or 5 or 6 additional credits in English Literature.
- H.E.Ed. 90, Child Training, 3 (Psy. A or Psy. 1-2 or parallel 2).
 Bu.Ad. 69, Retail Store Management, 3 (Ag.Ec. 3).

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

Costume Design

To the general courses listed under Related Art add:

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

Omit

- H.E. 122, Advanced Interior Design, 3 (H.E. 27, 120 or permission of instructor).

Journalism†

To the general courses listed under Related Art add:

- Comp. 27-28, Advanced Writing, 6 (Eng. A-B-C or Comp. 4-5-6 or exemption).
 Jour. 11, Introduction to Reporting, 3 (Eng. A-B-C or Comp. 4-5-6 or Comm. 1-2-3 or Rhet.
 1-2-3 or exemption).
 Jour. 14, Newspaper Reporting, 3 (Soph.; Comp. 27-28, permission of instructor)
 or Jour. 65, Graphic Arts: Processes, 3 (Jr., sr., permission of instructor).
 Jour. 41, Editing for Nonmajors, 3 (Jr.; Jour. 12 or 13).
 Jour. 69, Newspaper and Magazine Articles, 3 (Jr.; Jour. 41).

Omit

- Art 20-21, Drawing and Painting, 2 cred. per qtr.

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

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

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

Textiles and Clothing*

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

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

- Orie. 1, College Orientation Lectures, 1.
 H.E. 1, Choice and Care of Clothing, 4 (Not open to seniors in H.E. or to students having had G.C. 15).
 H.E. 3, Clothing Construction A, 3 (H.E. 1, 3rd qtr. freshman).
 H.E. 17, Personal and Family Living, 3 (Not open to seniors in H.E.).
 H.E. 20, Introduction to Related Art, 4 (Not open to seniors in H.E.).
 H.E. 21, Color and Design I, 3 (H.E. 20).
 H.E. 22, Color and Design II, 3 (H.E. 1 and 20).
 H.E. 31, Introduction to Nutrition, 3 (Not open to seniors in H.E.).
 H.E. 40, Food Preparation, 5 (8 cred. in chem.).
 Rhet. Communications requirement.
 Ag.En. 35,† Household Physics, 5
 or G.C. 7A, Energy and Matter, 5.
 Ph.Ed., Physical Education, 3 (May be taken at any time during four years of residence).
 Soc. 1, Introduction to Sociology, 3.
 Psy. A, Elementary Psychology, 5 (3rd qtr. fr.; C average)
 or Psy. 1-2 (See sophomore list).

Take Group I or II

Group I

- Zool. 14-15, General Zoology, 6.
 Physiol. 4, Human Physiology, 4 (1 qtr. zool., 1 qtr. chem.).
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).

Group II

- G.C. 10A-B, Human Biology, 6.
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).
 Chem. 1-2, General Inorganic Chemistry, 8
 or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance cred. in chem.)
 or Chem. 6-7, General Inorganic Chemistry, 10 (Entrance cred. in chem.)
 or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance cred. in chem.)
 or G.C. 7B, Nature of Chemistry (Omit for textile testing), 5.

SOPHOMORE YEAR

- H.E. 4, Clothing Construction B, 3 (H.E. 3).
 H.E. 27, Related Art Problems, 3 (H.E. 21).
 H.E. 34, Nutrition Problems, 4 (3rd qtr. soph., 31, 40, physiol. or hum. biol.)
 or H.E. 76, Nutrition, 4 (H.E. 30 or 31 and 40)
 or H.E. 170 (See junior list)
 or H.E. 171 (See junior list).
 H.E. 49, Household Equipment, 3 (Ag.En. 35 or permission of instructor).
 Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
 Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
 or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
 or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
 or Rhet. 60 (See junior list).
 Bact. 53, General Bacteriology, 5 (Chem. 10 cred., zool. or bot. 4 cred.)
 or Dy.Hu. 20 (See freshman list).
 Ag.Bi. 1, Introduction to Organic Chemistry, 5 (In.ch. 8 cred. or G.C. 7B).

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

† Students who have had one year of high school physics may be exempt from Ag.En. 35 or G.C. 7A.

- Ag.Ec. 3, Principles of Economics, 5
 or Econ. 6-7, Principles of Economics, 10.
 Ag.Ec. 25, Principles of Accounting, 4
 or Econ. 22, Principles of Accounting, 4.
 Psy. 1-2, General Psychology, 6.

JUNIOR AND SENIOR YEARS

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

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

Store or Other Commercial Enterprises

- H.E. 53, Advanced Clothing, 3 (Jr., H.E. 4, 50 or parallel).
 French 1, Beginning French, 5 (or one year of high school French).

Journalism

- Comp. 27-28, Advanced Writing, 6 (Eng. A-B-C or Comp. 4-5-6 or exemption).
 H.E. 53, Advanced Clothing, 3 (Jr., H.E. 4, 22, 50).
 Jour. 13, Introduction to Reporting, 3 (Soph. with C average; Eng. A-B-C or Comp. 4-5-6 or exemption)
 or Jour. 12, Newspaper Reporting, 5 (Soph., jr., sr., with average of C; Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement and consent of instructor).
 Jour. 41, Editing for Nonmajors, 3 (Jr., Jour. 12 or 13).
 Jour. 69, Newspaper and Magazine Articles, 3 (Jr., Jour. 15 or 41).

Textiles Testing

- H.E. 107, Textile Analysis, 3 (Jr., sr., grad.; H.E. 50, Ag.Bi. 1 and 2).
 Bot. 4, General Botany, 5 (Fr.).
 P.H. 110, Biometric Principles, 3 (18 cred. biol. sci. or math. through anal. geom.; to be taken with 111)
 and P.H. 111, Biostatistics Laboratory, 2 (To be taken with 110)
 or Ag.Ec. 90, Agricultural Statistics, 5 (Jr.).
 Ag.Bi. 1, Introduction to Organic Chemistry, 5 (Soph., 8-10 cred. in in. chem.).
 Ag.Bi. 2, Quantitative Methods, 5 (Soph., 8-10 cred. in in. chem.).

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

V. INSTITUTION MANAGEMENT*

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

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

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

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

- Orie. 1, College Orientation Lectures, 1.
 H.E. 1, Choice and Care of Clothing, 4 (Not open to H.E. seniors).
 H.E. 6,† Institution Experience, 3.
 H.E. 17, Personal and Family Living, 3 (Not open to H.E. seniors).
 H.E. 20, Introduction to Related Art, 4 (Not open to H.E. seniors).
 H.E. 31, Introduction to Nutrition, 3 (Not open to H.E. seniors).
 H.E. 40, Food Preparation, 5 (8 cred. chem.).
 Rhet. Communications requirement.
 Chem. 1-2, General Inorganic Chemistry, 8
 or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance cred. in chem.)
 or Chem. 6-7, General Inorganic Chemistry, 10.
 or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance cred. in chem.)
 Ag.En. 35,§ Household Physics, 5
 or G.C. 7A, Energy and Matter, 5.
 Soc. 1, Introduction to Sociology, 3.
 Econ. 22, Principles of Accounting, 3 (3rd qtr. fr.)
 or Ag.Ec. 25, Principles of Accounting, 4.
 Ph.Ed., Physical Education, 3 (May be taken at any time during four years in residence).
 Psy. A, Elementary Psychology, 5 (3rd qtr. fr.; C average)
 or Psy. 1-2 (See sophomore list).

Take Group I or II

- Group I
 Zool. 14, 15, General Zoology, 6.
 Physiol. 4, Human Physiology, 4 (1 qtr. chem. and 1 qtr. zool.).
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).
 Group II
 G.C. 10A,B, Human Biology, 6.
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).

SOPHOMORE YEAR

- H.E. 24, Problems in Home Planning and Furnishing, 5 (H.E. 20).
 H.E. 41, Food Management and Marketing, 5 (H.E. 31, 40).

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

† Not open to non-majors.

§ Students who have had one year of high school physics are exempt from Ag.En. 35 or G.C. 7A.

- H.E. 45,¶ Quantity Cookery, 6 (H.E. 40, 41).
 H.E. 46,¶ Cafeteria Experience, 3.
 H.E. 49, Household Equipment, 3 (Ag.En. 35 or permission of instructor).
 Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
 Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
 or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
 or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
 or Rhet. 60 (See junior list).
 Bact. 53, General Bacteriology, 5 (10 cred. in chem., 4 cred. in bot. or zool.; soph. with C average in prereq. courses)
 or Dy.Hu. 20 (See freshman list).
 Ag.Bi. 1, Elementary Organic Chemistry, 5 (In.Ch. 1-2 or 4-5).
 Ag.Ec. 3, Principles of Economics, 5
 or Econ. 6, 7, Principles of Economics, 10.
 Ag.Ec. 25, Principles of Accounting, 4
 or Econ. 22 (See freshman list).
 Soc. 2, Individual Minority Group Adjustments, 3 (Soc. 1)
 or Soc. 14, Rural Sociology, 3 (Soc. 1).
 Psy. 1-2, General Psychology, 6.

JUNIOR AND SENIOR YEARS

- H.E. 50, Textiles, 3 (H.E. 1).
 H.E. 64, Institution Buying, 4 (H.E. 45 or parallel, 46 or parallel—one of these required).
 H.E. 65, Institution Management Problems, 3 (H.E. 45, 46, 64).
 H.E. 70, Advanced Food Preparation, 3 (Ag.Bi. 1, H.E. 41).
 H.E. 173, Nutrition in Disease, 4 (H.E. 170, 35 also advised).
 H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
 H.E. 86, Home Management Laboratory, 4 (H.E. 85 or parallel, 40, 41 advised; P.H. 52a and 52b).
 H.E. 142, Experimental Cookery, 3 (H.E. 40, Ag.Bi. 1).
 H.E. 170, Nutrition of the Family, 3 (H.E. 31, 40, Ag.Bi. 1, physiol. 3 cred.).
 H.E. 171, Child Nutrition, 3 (H.E. 170, H.E.Ed. 90).
 H.E.Ed. 90, Child Training, 3 (Psy. A or Psy. 1-2 or parallel 2).
 Rhet. 51, Exposition, 3 (Rhet. Comm. req.).
 Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.)
 or Rhet. 31 or 32 or 33 (See sophomore list).
 P.H. 52a, Health Care of the Family, lectures, 2 (Bact. 53 or Dy.Hu. 20, Physiol. 4).
 P.H. 52b, Health Care of the Family, laboratory, 1 (Bact. 53 or Dy.Hu. 20, Physiol. 4).
 P.H. 100, Elements of Preventive Medicine and Public Health, 5 (P.H. 3 or 50 or equiv. and a course in bact.)
 or P.H. 102, Environmental Sanitation I, 3 (Sr., grad.; P.H. 50 or 51 or 53 or 100 or parallel, or permission of instructor).
 Ag.Ec. 126, Economics of Consumption, 3 (Ag.Ec. 2 or 3).
 Bu.Ad. 77, Survey in Marketing, 3 (Ag.Ec. 3 desirable).
 or Ag.Ec. 40, Principles of Marketing Organization, 3 (Ag.Ec. 2).
 Bu.Ad. 167, Personnel Administration, 3 (permission of department)
 or Econ. 161, Labor Problems, 3 (Econ. 6-7)
 or Psy. 160, Psychology in Personnel Work, 3 (Psy. 1-2, Econ. 6-7)
 or Psy. 56, Psychology of Advertising, 3 (Psy. A or 1, 2 and Princ. of Econ.).
 An.Hu. 50, Meat Selection and Utilization, 3 (H.E. 40, 41 desirable).

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

Recommend H.E. 146, Special Food Problems, as an elective.

VI. HOME ECONOMICS AND NURSERY SCHOOL EDUCATION

All-college requirements for students in this college. See page 9.

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

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

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 offered by the Institute of Child Welfare. They are listed under Methods and Directed Teaching in the *Bulletin of the College of Education*.

JUNIOR-SENIOR COURSES

Ed.T. 55, Principles of Early Childhood Education, 3 (C.W. 80 or parallel).

C.W. 80, Child Psychology, 3 (Psy. 1, 2).

Ed.T. 57, Nursery School-Kindergarten Laboratory in Art, Literature, and Social Studies, 5 (Ed.T. 55).

Ed.T. 58, Nursery School-Kindergarten Laboratory in Permanent Play Materials, Music, and Science, 5 (Ed.T. 55, 57).

Ed.T. 77, Directed Teaching in the Nursery School, 4 (Ed.T. 55, 57, 58).

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

VII. HOME ECONOMICS EXTENSION

A combined curriculum with the College of Education. See all-college requirements for students in the College of Agriculture, Forestry, and Home Economics, page 9.

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

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

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

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

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

Those in this curriculum should:

Omit from the requirements in general home economics teaching the following courses: H.E. 53, Ag.Bi. 1, Rhet. 51, H.E.Ed. 92, 94, 192, Ag.Ec. 126.

Add to the requirements in general home economics teaching*:

- Soc. 2, Individual and Group Adjustment, 5 (Soc. 1)
 or Soc. 14, Rural Sociology, 3 (Soc. 1)
 or Soc. 91, Case Methods Applied to the Study of Human Problems, 3 (Jr., sr.; Soc. 50 or 51 or consent of major adviser)
 or Soc. 95, Introduction to Public Welfare, 3 (Jr., sr.; Soc. 50 or 51 or consent of major adviser)
 or Soc. 101, Social Organization, 3 (Jr., sr., grad.; Soc. 1 and 15 cred. in social sci., child welfare, educ., philos., or psy., or consent of instructor).
- Pub. 53,† Publicity, 3 (Jr., sr., Rhet. Comm. req.).
- H.E.Ed. 95, Field Experience for Home Demonstration Agents, 6 (Completion of jr. year, consent of head of Home Econ. Educ. and director of Extension).
- H.E.Ed. 194A, Adult Education in Home Economics, 3 (Jr., sr., grad.; H.E.Ed. 91, 93 or parallel).
- Ag.Ec. 8, Rural Economics, 3 (Jr., sr.; Ag.Ec. 2 or 3)
 or Ag.Ec. 126, Economics of Consumption, 3 (Jr., sr.; Ag.Ec. 2 or 3).

VIII. PREPARATION FOR RESEARCH

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

These curricula are planned for superior students who wish to be prepared to pursue graduate work, with the expectation of filling a teaching 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 following courses are required for all students taking these curricula.

All-college requirements for students in this college. See page 9.

FRESHMAN YEAR

- Orie. 1, College Orientation Lectures, 1.
 H.E. 1, Choice and Care of Clothing, 4 (Not open to H.E. seniors).
 H.E. 17, Personal and Family Living, 3 (Not open to H.E. seniors).
 H.E. 20, Introduction to Related Art, 4 (Not open to H.E. seniors).
 H.E. 31, Introduction to Nutrition, 3 (Not open H.E. seniors).
 H.E. 40, Food Preparation, 5 (8 cred. in chem.).
 Rhet. Communications requirement.
 Zool. 14, 15, General Zoology, 6.
 Dy.Hu. 20, Household Microbiology, 4 (3rd qtr. fr.)
 or Bact. 53 (See sophomore list).
 Physiol. 4, Human Physiology, 4 (1 qtr. chem., 1 qtr. zool.).
 Chem. 1-2, General Inorganic Chemistry, 8
 or Chem. 4-5, General Inorganic Chemistry, 8 (Entrance credits in chem.)
 or Chem. 6-7, General Inorganic Chemistry, 10
 or Chem. 9-10, General Inorganic Chemistry, 10 (Entrance credits in chem.).
 Ag.En. 35, Household Physics, 5
 or Phys. 1, 2, 3, Introduction to Physical Science, 9 (H.S. alg. and plane geom.)
 or Phys. 1a, 2a, 3a, Introduction to Physical Science, 12 (H.S. alg. and plane geom.)
 or Phys. 4, 5, 6, General Physics, 15 (Math. 15-16 or Math. 6, 7, 8)
 or Phys. 7, 8, 9, General Physics, 15 (Math. 15-16 or equiv.).
 Soc. 1, Introduction to Sociology, 3.
 Ph.Ed., Physical Education, 3 (May be taken at any time during four years in residence)
 Math., Mathematics, 10.
 Psy. A, Elementary Psychology, 5 (3rd qtr.; C average)
 or Psy. 1-2 (See sophomore list).

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

† Required in place of Rhetoric 51.

SOPHOMORE YEAR

- H.E. 24, Problems in Home Planning and Furnishing, 5 (H.E. 20)
or H.E. 180 (See junior list).
- H.E. 49, Household Equipment, 3 (Ag.En. 35 or equiv.).
- Rhet. 22, Public Speaking, 3 (Rhet. Comm. req.).
- Rhet. 31, English Literature I, 5 (Rhet. Comm. req.)
or Rhet. 32, English Literature II, 3 (Rhet. Comm. req.)
or Rhet. 33, American Life in American Literature, 3 (Rhet. Comm. req.)
or Rhet. 60 (See junior list).
- Bact. 53, General Bacteriology, 5 (8 cred. in chem.; 4 cred. in bot. or zool.; soph. with C average in prereq. courses)
or Dy.Hu. 20 (See freshman list).
- Ag.Bi. 2, Quantitative Methods, 5 (8 cred. in in. ch.)
or An.Ch. 1-2, Quantitative Analysis, 10 (In.Ch. 12-13)
or An.Ch. 7, Quantitative Analysis, 4 (In.Ch. 11 or 12).
- Ag.Bi. 1, Introduction to Organic Chemistry, 5 (8 cred. in in. ch.)
or Or.Ch. 61-62, Elementary Organic Chemistry, 8 (12-15 cred. in chem.).
- 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

- H.E. 50, Textiles, 3 (H.E. 1).
- H.E. 85, Home Management Principles, 3 (H.E. 40, 41 advised).
- H.E. 86, Home Management Laboratory, 4 (H.E. 40, 85 or parallel, 41 advised; P.H. 52a and 52b).
- H.E. 170, Nutrition of the Family, 3 (H.E. 31, 40; Ag.Bi. 1, physiol. 3 cred.)
- H.E. 180, Home Planning and Furnishing, 5 (H.E. 27, 120 recommended)
or H.E. 24 (See sophomore list).
- Rhet. 51, Exposition, 3 (Rhet. Comm. req.).
- Rhet. 60, Contemporary Literature, 3 (Rhet. Comm. req.)
or Rhet. 31 or 32 or 33 (See sophomore list).
- P.H. 52a, Health Care of the Family, lectures, 2 (Bact. 53 or Dy.Hu. 20, Physiol. 4)
- P.H. 52b, Health Care of the Family, laboratory, 1 (Bact. 53 or Dy.Hu. 20, Physiol. 4).
- H.E.Ed. 90, Child Training, 3 (Psy. A or Psy. 1-2 or parallel 2).

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

A. Major in Experimental Foods

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

B. Major in Nutrition

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

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

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

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

Modern Language, 9 credits.

IX. 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 its 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.

Five-Year Curriculum

I. HOME ECONOMICS EDUCATION

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

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

Special requirements

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

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

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

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

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

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

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

CURRICULUM IN VETERINARY MEDICINE

Leading to the Degree of Doctor of Veterinary Medicine

Training in veterinary medicine is based upon two years of college level pre-veterinary studies (see page 42) and four years of professional work, or a total of six years.

REGISTRATION

Application for admission should be filed near completion of the preveterinary studies and not later than May 15. Students who have taken their preveterinary work at schools other than the University of Minnesota must submit to the Office of Admission and Records, University Farm, at the time at which application is made, a transcript of all work taken up to that time.

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

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

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

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

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

See page 11 for scholarship requirements, and page 9 for granting of the B.S. degree.

PROFESSIONAL CURRICULUM

FIRST YEAR

Agro. 31, Principles of Genetics, 4.
 Ve.Me. 101-102-103, Animal Anatomy (gross), 16.
 Ve.Me. 111-112-113, Animal Histology and Embryology, 15.
 Ve.Me. 121, Animal Bacteriology, 5.
 Ph.Ch. 102-103, Physiological Chemistry, 12.
 Total, 52 credits.

SECOND YEAR

Ve.Me. 122-123, Animal Bacteriology, 10.
 Ve.Me. 135-136, Animal Physiology, 15.
 Ve.Me. 151-152, Animal Pathology, 15.
 Ve.Me. 161, 162, Animal Parasitology, 10.
 Ve.Me. 170, Veterinary Clinical Diagnosis, 2.
 Pharmacol. 101, Introduction to Pharmacology, 2.
 Po.Hu. 153, Poultry Nutrition and Feeding, 3.
 Total, 57 credits.

As the School of Veterinary Medicine at the University of Minnesota is in a formative period, that part of the professional curriculum concerned with the third and fourth year training has not been established.

AIR SCIENCE AND TACTICS

The University of Minnesota is one of the many colleges selected by the Department of the Air Force to participate in the establishment of the new four-year curriculum to qualify the student for a commission in the Air Force Reserve. The goal is to produce in a four-year college course, an officer, with a broad knowledge of the position of the Air Force in the National Defense Establishment; to explain how an Air Force functions in the discharge of its mission, and to define the responsibilities and obligations of an Air Force Officer. The objective of the Air ROTC program is to provide the Department of the Air Force with an adequate reserve of trained officers in their field of specialization.

For students with no prior military training, the program comprises a four-year course; former servicemen are exempt from the first two years of training. The first two years of Air Science I and Air Science II consists of orientation into the Air ROTC and administration of Air Power. Students who have completed six months of service in the Armed Forces (Army, Navy, Coast Guard, or Marine Corps) receive credit for Air Science I and those who have completed one year of service may receive credit for both Air Science I and II. Air Science I and Air Science II carry one credit per quarter for three class hours per week. No expense is attached to this course, uniforms and textbooks being furnished by the Air Force.

The advanced course, or Air Science III and Air Science IV consists of studying the apprenticeship for duty assignment and apprenticeship as an officer. This

includes a summer camp of six weeks' duration between the two years, concerned with the practical application of the classroom studies. The course carries three credits per quarter for five class hours per week. A liberal monetary allowance for the advance two school years and summer camp is paid each enrolled student. Students in the advanced courses are selected on the basis of demonstrated leadership and scholastic standing.

Students accepted for Air ROTC training must be citizens of the United States, physically qualified, meet age limitations, and have the time remaining in school required to complete the course.

All classes will be conducted in the Armory, Minneapolis Campus, and follow the normal academic class schedules. Air ROTC is a University elective and students register for the courses at the same point and time designated by the University for academic course registration.

Additional information may be secured from the Professor of Air Science and Tactics, Armory, Minneapolis Campus.

MILITARY SCIENCE AND TACTICS

The University of Minnesota is one of the many colleges and universities of the nation maintaining senior division units of the Reserve Officers Training Corps (ROTC). Courses offered in military science and tactics are designed to qualify the student for commission as an officer in the Officers Reserve Corps, a reserve component of the Army of the United States. The program is derived from the most recent development in military doctrine and tactics and offers the student a wide choice of specialized studies closely related to the various academic professional courses. The objective of the national ROTC program, begun in all major schools following World War I, is to provide the nation with an adequate reserve of trained officers available for leadership and direction in any future national emergency. The value of the program to the individual and the national security was forcibly demonstrated in World War II, when 60 per cent of all Army officers in the initial stages of mobilization and training came from the Officers Reserve Corps.

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

Corps of Engineers, Ordnance Department, Anti-Aircraft Artillery, Signal Corps, Transportation Corps, and Quartermaster Corps are the separate Advanced courses offered. Students elect one of the branches at the time of entrance to the Advanced Course, and will be commissioned in that branch following completion of the course. Material presented in these courses serves as a valuable supplement to specific academic courses (i.e., Quartermaster Corps and Agriculture). The Advanced Course includes a summer camp of six weeks' duration between the two

years, consisting of practical application of the class studies. The course carries three credits per quarter for five class hours per week. A liberal monthly monetary allowance for the two school years and summer camp is paid each enrolled student. No expense is attached to the course. Students in the Advanced Course are selected on the basis of demonstrated leadership ability and scholastic standing.

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

All classes are conducted in the Armory, Minneapolis Campus, and follow the normal academic class schedules. If interest is sufficient one section of M.S.&T. 1, 2, 3 will be conducted on the St. Paul Campus for students in the College of Agriculture, Forestry, and Home Economics. ROTC is a university elective and students register for the courses at the same point and time designated by the University for academic courses registration.

NAVAL SCIENCE

Naval Science is a four-year course in naval subjects offered by the Naval Reserve Officers' Training Corps Unit. It is a three-credit course comprised of three one-hour classroom periods and one two-hour laboratory session each week. The purpose of this course is to train selected college students for eventual commissions in the Regular Navy or Marine Corps, or the Naval Reserve or Marine Corps Reserve.

The Regular Students in the Naval ROTC Program attend on a navy scholarship, and are actually enrolled in a Naval Officer Training Program. They are selected in the fall of each year through a nation-wide competitive examination from applicants among high school seniors or college students who meet the physical requirements, are unmarried, and between the ages of 17 and 21. After selection, they are appointed Midshipmen, USNR. The Navy provides their tuition, fees, and textbooks for a period not to exceed four years. They are uniformed at government expense, and receive a \$600 per year living allowance. They obligate themselves to complete the prescribed Naval Science curriculum, to attend three summer cruises of from six to eight weeks, to accept a commission as Ensign, USN (or Second Lieutenant, USMC) upon graduation, and to serve on active duty for two years after commissioning, unless released earlier by the Navy Department.

Contract Students are selected by the Professor of Naval Science from freshmen or sophomores in a five-year course enrolled in the University during registration preceding the fall quarter. They have the status of civilians who have entered into a mutual contract with the Navy. They are uniformed at government expense, their Naval Science textbooks are furnished, and, during their junior and senior years, are paid a subsistence allowance of approximately \$30 per month. They obligate themselves to complete the Naval Science curriculum, to make one summer cruise of about three weeks' duration, and to accept a commission upon graduation as Ensign, USNR (or Second Lieutenant, USMCR). Contract Students may, if they desire and if their services are required, receive a commission in the Regular Navy or Marine Corps.

Both Regular and Contract Students may select any course at the University they may desire. Any course leading to a Bachelor's degree is acceptable. In addition to the requirements of completing the Naval Science curriculum, they must complete mathematics through trigonometry and one year of college physics by the end of their sophomore year.

Naval Science subjects are acceptable elective subjects in almost any field of academic endeavor, and are available to any student at the University. This type of student is termed a Naval Science student, and is not connected with the Naval ROTC.

Further information on Naval Science or the Naval Reserve Officer's Training Corps may be obtained from the NROTC office, Room 203, Armory.

DESCRIPTION OF COURSES

AGRICULTURAL BIOCHEMISTRY

Freshman and Sophomore Courses

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

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

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

Organic Chemistry 61, 62, 63, 64 (14 credits); Physics 4-5-6 or 7-8-9 (15 credits); Mathematics through Integral Calculus: Physical Chemistry 101-102-103 (9 credits); Agronomy and Plant Genetics 31 (4 credits); Agricultural Biochemistry 2, 119, 120, 121, 122, 123, 129, 130, 131, 132, 133, and either 116 and 103 or 108-110, depending on whether the student's interest lies in animal or plant biochemistry.

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

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

* By special permission of the student's adviser, General College Courses 7A and 7C will be acceptable as prerequisites for home economics students.

‡ A laboratory fee of \$2 is required for this course. Two \$5 cards (from which the \$2 fee will be deducted) are to be purchased from the cashier's office, St. Paul Campus, before a laboratory desk will be assigned. Veterans will obtain authorization for cards from the Bureau of Veterans' Affairs and obtain cards directly from the secretary of the Division of Agricultural Biochemistry.

6. Animal Biochemistry. An introduction to the chemistry, metabolism, and nutrition of animals based on the organic and inorganic compounds which are characteristic of animals and animal products, and their reactions and interactions. (3 cred.; soph., jr., sr.; prereq. org. chem., Course 3 or equiv.)
52. Biochemistry and Microbiology of Cereal Grains. Physical properties and chemical composition of cereal grains and their mill products; microorganisms associated with cereal grains and their products; the biochemistry and microbiology of grain storage, milling, malt production, and breadmaking. (3 cred.; jr., sr.; open only to students registered in the Mechanical Engineering Curriculum (Milling Option); prereq. elem. org. chem. 5 cred. and general biology 9 cred. or equiv.) (Same as Pl.Pa. 52)
- 103.‡ Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, the chemistry of the various constituents of milk and of the processes involved in the manufacture of dairy products. (6 cred.; jr., sr.; prereq. 2, 6, or equiv.)
105. Same as 5 except that a term paper is required.
106. Same as 6 except that a term paper is required.
108. Chemistry of Wheat and Wheat Products. A lecture course, with collateral library reference work, on the chemical technology of the production and milling of wheat and its conversion into food. (3 cred.; jr., sr.; 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.; jr., sr.; prereq. 2 and parallel 108, or equiv.)
116. Advanced Animal Nutrition. Lectures and reading on the biochemistry of animal nutrition. (3 cred.; jr., sr.; prereq. 6 or equiv.)
- 117.‡ Laboratory Problems in Animal Nutrition. A laboratory course on methods used in nutrition studies. (3 cred.; jr., sr.; prereq. 116, instructor's permission)
- 118.‡ Laboratory Problems in Biochemistry. Laboratory work in the preparation and isolation of pure compounds, and in special methods of identification or determination of biochemical products. (3 to 5 cred.; sr., grad.; permission of instructor)
119. Colloids. Lectures and assigned readings dealing with the colloidal state of matter, the preparation and properties of colloidal systems, and the relation of these to biochemical processes. (3 cred.; sr.; prereq. Physics 9 advised, Ag.Bi. 3, or 8 cred. in org. chem.)
120. Proteins. Lectures and assigned readings on composition, structure, chemical and physical properties, and the functions of proteins and amino acids. (3 cred.; sr.; prereq. 119 or permission of instructor)
121. Carbohydrates. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. (3 cred.; sr.; prereq. 119 or permission of instructor)
122. Lipides. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the fats and fat-like compounds. (3 cred.; sr.; prereq. 119 or permission of instructor)
123. Enzymes. Lectures and assigned readings on enzyme action, including the methods of preparation and investigation of enzymes and their function in biological and industrial processes. (3 cred.; sr.; prereq. 119 or permission of instructor)

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

124. Vitamins. Lectures and reading on the biochemistry of vitamins and their physiological action. (3 cred.; jr., sr., grad.; prereq. 6 or equiv.)
- 129.‡ Colloids Laboratory. Methods for the preparation, purification, and study of the physico-chemical properties of inorganic and biocolloid systems. (2 cred.; sr., grad.; prereq. 2 or equiv., parallel 119)
- 130.‡ Proteins Laboratory. Preparation, identification, and analysis of proteins and their hydrolytic products. (2 cred.; sr., grad.; prereq. 2 or equiv., parallel 120)
- 131.‡ Carbohydrate Laboratory. Preparation, identification, and analysis of sugars and polysaccharides. (2 cred.; sr., grad.; prereq. 2 or equiv., parallel 121)
- 132.‡ Lipides Laboratory. Preparation, identification, and analysis of the lipides. (2 cred.; sr., grad.; prereq. 2 or equiv., parallel 122)
- 133.‡ Enzymes Laboratory. Preparation and measurement of enzymes and for the study of their properties. (2 cred.; sr., grad.; prereq. 2 or equiv., parallel 123)

AGRICULTURAL ECONOMICS

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

Freshman and Sophomore Courses

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

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

§ To receive credit for this course the student must complete both Ag.Ec. 1 and 2.

Junior and Senior Courses

- 50.* Farm Finance. The mechanism of exchange with special reference to the financing of the production and marketing of farm products. (5 cred.; jr., sr. in ag. or for. only; prereq. 2)
- 80.* Farm Accounting. Kinds and uses of farm records; calculation of measures of farm earnings; accounting analysis of farm business. Discussion and practice. (3 cred.; jr., sr.)
- 90.*† Agricultural Statistics. Statistical method applied to the analysis of agricultural data; collection, tabulation, and graphical presentation; averages; measures of dispersion; time series, and simple correlation. (5 cred.; jr., sr.)
102. Farm Organization. Characteristics of farming as a business; factors determining type of farming; farm tenure and farm selection; farm layout and farm improvements; factors affecting the selection of crops and livestock for a particular farm. (3 cred.; jr., sr., grad.; prereq. 2)
103. Farm Operation. Farm budgeting; personal and business factors affecting farm financial success; utilization of labor, power, and equipment; farm management research methods and farm management services. Special problem in farm planning. Field visit to well-managed farms. (3 cred.; jr., sr., grad.; prereq. 102)
104. Types of Farming. A study of factors affecting the geographic distribution of agricultural production by type-of-farming areas and of crop and livestock systems and practices within these areas. (3 cred.; jr., sr.; prereq. 2)
107. Farm Work Simplification. A study of principles and methods of accomplishing farm work in less time and with less effort. Methods of analyzing jobs, principles of motion economy, efficient working methods for different farm enterprises. Practice in planning improved working methods. (3 cred.; jr., sr., grad.; prereq. 2)
110. Economics of Agricultural Production. The principles of production economics applied to agriculture, special emphasis being placed upon profitable combinations of factors of production, comparative advantage, and localization of production. (3 cred.; jr., sr., grad.; prereq. 2)
126. Economics of Consumption. Nature of human wants; standards of living; costs of living; income, administration of income; nature of demand; demand and price; relation of consumption to the population problem. (3 cred.; jr., sr., grad.; prereq. 2 or 3)
131. Market Prices. Manner in which prices are determined in the market place. Local, wholesale, and retail prices. Price fluctuation and speculation. Prices and market grades. Market quotations. (3 cred.; jr., sr., grad.; prereq. 30, 40)
135. Methods of Price Analysis. Statistical methods for the study of the forces determining prices, forecasting price changes, and determining "established prices." Survey of research work in the field. (3 cred.; sr., grad.; prereq. 131, 191)
140. Marketing Organization: Staples. Principles of production economics applied to the organization of markets and marketing organizations for the grains, tobacco, cotton, and wool. Special attention to grain marketing. (3 cred.; jr., sr., grad.; prereq. 40)
141. Marketing Organization: Dairy and Poultry Products. (3 cred., jr., sr., grad.; prereq. 40)

* Open to sophomores on petition.

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

142. Marketing Organization: Fruits and Vegetables. (2 cred.; jr., sr., grad.; prereq. 40)
143. Marketing Organization: Livestock and Meats. (3 cred.; jr., sr., grad.; prereq. 40)
144. Cooperative Organization. Development of cooperation in agriculture in the United States and foreign countries. Analysis of economic problems peculiar to cooperative organizations, especially of marketing agencies. (3 cred.; jr., sr., grad.; prereq. 40)
150. Advanced Farm Finance. A consideration of credit problems of farmers with special attention to institutions financing farmers. (3 cred.; jr., sr., grad.; prereq. 50 or equiv.)
170. Land Economics. Land as a factor of production; rural and urban utilization; rents and land values; land classification; land exchange. (3 cred.; jr., sr., grad.; prereq. 110)
172. Economics of World Agriculture. Distribution, quality, and utilization of agricultural resources; variations in population densities and characteristics; internal organization and techniques; comparative advantage; world trade in agricultural products; national and international policies relating to agriculture; future trends and prospects. (3 cred.; jr., sr., grad.; prereq. Ag.Ec. 110 or consent of instructor)
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.; jr., sr., grad.; prereq. 90)

See also courses in Economics and Business Administration.

AGRICULTURAL EDUCATION

Courses for Undergraduate Students

1. Introduction to Agricultural Education. An orientation course for students interested in exploring opportunities for employment and service in agricultural education and related fields. Qualifications of teachers, survey of preparatory offerings, and an overview of the program of agricultural education in Minnesota. (1 cred.; fr.; no prereq.)
54. Rural Education and Community Leadership. Investigations and discussions of the schools as community centers. Elements of leadership in rural areas, ways and means of organizing educational and recreational activities such as clubs, festivals, fairs, and other features of rural community life. (2 cred.; soph., jr., sr., no prereq.)
56. Rural Youth Leadership. A lecture, demonstration, and laboratory course in cooperation with leaders and specialists in the various fields of rural and agricultural education. Emphasis is placed on the Future Farmers of America, 4-H clubs and other extension activities, and young farmer programs of high school agriculture departments. (3 cred.; soph., jr., sr.; no prereq.)
81. Teaching Agriculture. The laws of learning applied to vocational agriculture. Guidance for rural youth and the use of the home, farm, and community in teaching agriculture. The Minnesota plan for vocational agriculture. Observation of learning-teaching situations. (3 cred.; jr., sr.; prereq. Ed. 55B)

- 82.‡ Methods in Teaching Agriculture. Fundamentals in teaching as related to vocational agriculture on the secondary level. Use of the Minnesota Vo-Ag Planning and Record Book. Determining needs and organizing learning experiences. The individualized course of study, group activities, intra-curricular functions of the F.F.A., and problems of evaluation. Observation and participation in learning-teaching situation. (3 cred.; jr., sr.; prereq. 81)
- 91.‡ Supervised Teaching Experience. Participation in programs of vocational agriculture in selected schools. Actual experience in the work of an agriculture instructor. Includes supervision of individual farming programs, contacting parents, analysis of the program in terms of community needs, conducting classes, community service activities, and case studies. (6 cred.; sr.; prereq. 82 and C average in major)

Courses for Undergraduate and Graduate Students

101. Young Farmer Education in Agriculture. Developing and organizing a continuing program of educational activities for farm youth not in school and not established in an occupation. Coordinating community resources, determining needs, establishing goals and individual plans of procedure for establishment in farming or related occupations. Observation of young farmer programs. (2 cred.; jr., sr., grad.; prereq. 91 or permission of instructor)
102. Adult Education in Agriculture. Systematic instruction for established farmers. Analysis of the farming situation with special emphasis on adoption of approved practices. Determining needs in production, marketing, credit, conservation, etc. Developing a continuing program. Observation of adult education programs. (2 cred.; jr., sr., grad.; prereq. 91 or permission of instructor)
103. Facilities and Materials. A study of resources for departments of vocational agriculture. Physical facilities such as classroom, laboratory, shop, room fixtures, references, audio-visual aids, etc. Relationships with other agencies, use of radio and press, records and reports. (3 cred.; jr., sr., grad.; prereq. 91 or permission of instructor)
104. Planning Programs. Factors involved in planning long-time and annual programs for departments of vocational agriculture. Advisory councils in program planning. Professional improvement for agriculture instructors. (2 cred.; sr., grad.; prereq. 91 or permission of instructor)
121. Enterprise Analysis. Experience in analyzing farm enterprises as a basis for identifying problems. Constructing learning experiences on the basis of approved practices. Distribution of problems according to levels of learning in the individualized course of study. (2 cred.; sr., grad.; prereq. 82)
141. Supervised Farm Practice in Vocational Agriculture. A course dealing specifically with the selection, planning, supervising, and summarizing of the individual farming programs. (3 cred.; prereq. 10 cred. in educ.)
145. The Integrated Course of Study in Agriculture. A study of the organization, administration, and teaching in agriculture departments in secondary schools. Special emphasis on planning programs for individual students. (2 cred.; sr., grad.; prereq. 10 cred. in educ.)

AGRICULTURAL ENGINEERING

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

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

and irrigation, soil erosion control, farm home conveniences, and rural electrification. Because of the broad scope of the field, those majoring therein are advised to consult with the division for assistance in outlining a program of study.

A Professional Course in Agricultural Engineering is offered jointly with the Institute of Technology. This is designed to train engineers in the various phases of technology as applied to agricultural practices and industries. Details concerning the professional curriculum are given on page 43.

Mechanized Farming

Freshman and Sophomore Courses

3. Mechanical Drawing. Drafting instruments and their uses. Lettering, scale reading, conventional symbols, standards, tracings, and reproductions. Multiple view drawings, pictorial drawing, plats of surveys and contour maps. (3 cred.; no prereq.)
6. Farm Buildings. Arrangement, planning, and economics of farm buildings. Requirements of animal shelters, crop and machine storage buildings, and farm homes. (3 cred.; no prereq.)
- 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.; no prereq.)
11. Applied Mathematics. Combination higher algebra and trigonometry. Includes graphing, logarithms, series, proportions, variations, and investments. Rules of practical mathematics with special attention to formulas and problems directly related to agricultural and forestry work. (5 cred.; prereq. high school elementary algebra and plane geometry or their qualitative equivalent)
12. Agricultural Machinery. Machinery as a factor in agricultural production; development, construction, and operation. (3 cred.; prereq. 23 or equiv.) (Students with credit in Ag.En. 54 admitted by petition only)
- 13.‡ Gas Engines and Tractors. Lecture and laboratory dealing with the theory, operation, adjustment, and use of internal combustion engines in agriculture. (3 cred.; prereq. 23 or equiv.) (Students with credit in Ag.En. 54 admitted by petition only)
- 19.‡ Elementary Surveying. Use of tape, level, transit, and traverse board in agricultural and forestry field problems, e.g., mensuration surveys, traverses, differential and profile leveling; plotting and mapping. Care and adjustment of instruments. (3 cred.; prereq. 3, 11 or trigonometry)
- 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.)
- 25.‡ Agricultural Physics II. A practical lecture, recitation, and laboratory course on electricity and light. (4 cred.; prereq. 24)
31. Principles of Drainage. Elementary principles and practice of soil erosion control and of farm drainage in relation to plant growth, crop and land values, and farm operation and development. (3 cred.; no prereq.)
32. Elements of Supplemental Irrigation. A study of the place and purpose of supplemental irrigation in humid regions. Systems and methods, plans of layouts, costs and return therefrom. (2 cred.; no prereq.)

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

- 35.‡ Household Physics. Lectures, laboratory exercises, and experimental demonstrations of selected principles in physics, with special attention to those involved in household appliances and processes. (5 cred.; no prereq.)
- 40.‡ Mechanical Training. Instruction and laboratory practice in rope work, belts and lacings, cement work, soldering, sheet metal projects, electric wiring. (3 cred.; no prereq.)
- 41.‡‡ Metal Work. Instruction and laboratory practice in pipe fitting, drilling, use of taps and dies, riveting, oxyacetylene welding, brazing, cutting, and electric arc welding. (3 cred.; no prereq.)
- 42.‡‡‡ Art Metal Work. Working in mild steel, copper, brass, aluminum, and pewter. Making trays, plates, bowls, candlesticks, bracelets, etc. Use of jeweler's saw; soft soldering, making wooden hammers. (3 cred.; no prereq.)

Junior and Senior Courses

50. Advanced Surveying (Formerly Course 20). Topographic surveys by stadia and other methods, running simple curves, cross sectioning, plotting the survey, profile buildings, grade determination, and figuring of quantities in earthwork. (3 cred.; soph., jr., sr.; prereq. 19)
54. Farm Power and Machinery (Formerly Course 14). Farm power and machinery as factors in agricultural production. Theory, management, and use of internal combustion engines, tractors, and farm machines. (4 cred.; prereq. 41 and 23 or equiv.) (Designed primarily for Agricultural Education students; students with credit in Ag.En. 12 or 13 admitted by petition only)
55. Electricity in Agriculture (Formerly Course 15). Elementary theory of electrical circuits and instruments. A study of the application of electrical energy to agricultural processes. Selection and maintenance of equipment. (2 cred.; prereq. Ag.En. 11 or equiv., and 23 or equiv.)
60. Introduction to Soil and Water Control (Formerly Course 33). Use of engineer's level and tape. General information relative to the subdivision of land. General principles and practices of farm drainage and soil erosion control practices. (3 cred.; prereq. 11 or equiv. and Ag.En. 23 or equiv. and Soils 4)
67. Rural Sanitation and Water Supply (Formerly Course 37). Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. (3 cred.; soph., jr., sr.; prereq. 11 or equiv., and 23 or equiv., and Soils 4)
70. Dairy Engineering. A study of refrigeration equipment, steam boilers, heat transfer, insulating materials, and fluid flow as applied to the dairy processing plant. (3 cred.; jr., sr.; prereq. Ag.En. 23 or equiv.)
104. The Soil Moisture Relation in Agriculture. The scientific basis of soil moisture regulation and conservation in such phases as irrigation, drainage, and soil erosion. Lectures and special problems. (3 cred.; prereq. 9 cred. in ag. en. including phys.)
105. Drainage, Irrigation, and Soil Erosion Control Design. Design and field layout of drainage, erosion control, and irrigation systems for the control and conservation of soil and water in agriculture. (4 cred.; prereq. Ag.En. 61 and 106 or special arrangement)

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

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

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

114. Buildings, Equipment, Materials, and Methods of Construction. The relation of structures and building equipment to agriculture. Lectures and special problems. (3 cred.; prereq. 9 cred. in ag. en. including 3 and 6 or equiv.)
124. Agricultural Machinery and Mechanical Power Management. Machinery and power management and use and its cost as a factor of agricultural production. Lectures and special problems. (3 cred.; prereq. 9 cred. in ag. en. including phys. and Ag.En. 12)
125. Topics in Agricultural Physics. An advanced study of the essential physical principles involved in the utilization of electricity in agriculture. (3 cred.; prereq. Ag.En. 72 or calculus and Ag.En. 24 and 25 or equiv.)

Engineering (Professional)

18. Agricultural Automotives. Principles of internal combustion engines and tractors including ignition, lubrication, carburetion, cooling, real gas cycles, transmission systems, and drive members. (3 cred.; prereq. M.E. 131; 2 lect. and 3 lab. hrs. per week) Strait, Torrance.
- 21.† Elements of Surveying. Use of tape, level, transit, traverse board in differential and profile leveling, cross sectioning, running tangents, and simple curves, topographic and agricultural surveys. Mapping, calculation of earthwork, and adjustments of instruments. (5 cred.; prereq. Draw. 3, M.&M. 12; 1 lect. and 12 lab. hrs. per week) Manson.
36. Rural Sanitation and Water Supply (Formerly Course 37). Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. (3 cred.; prereq. M.&M. 129; 3 lect. hrs. per week) Tyler.
- 43.‡ Mechanical Laboratory. Instruction and laboratory practice in mechanical work, embracing belt lacing and pulleys, soldering, welding, pipe fitting, electric wiring. (3 cred.; no prereq.; 1 lect. and 5 lab. hrs. per week) Dent.
51. Soil and Water Conservation. Principles and practices of land drainage, soil erosion control, and water conservation in relation to plant growth, farm operation, land development, and community interest. (3 cred.; prereq. Ag.En. 21, Soils 4, M.&M. 129 or reg. in M.&M. 129; 3 lect. hrs. per week) Manson.
52. Elements of Farm Machinery. Principles of design, construction, and economics of agricultural machines. Drawbar power. (3 cred.; prereq. M.E. 24; 1 lect., 1 rec., and 3 lab. hrs. per week) Schwantes, Johnson.
53. Farm Structures. Planning and economics of farm buildings. Functional and structural requirements. (3 cred.; prereq. C.E. 37 or reg. in C.E. 37, M.&M. 128, Econ. 9; 1 lect., 1 rec., and 3 lab. hrs. per week) Otis.
61. Irrigation. Principles and practices of irrigation in arid and humid regions in relation to plant growth. Design, cost, and construction of irrigation systems of all types. (3 cred.; prereq. Ag.En. 51; 3 lect. hrs. per week) Allred.
63. Farm Structures Laboratory (Formerly Course 5). Materials and construction methods used in farm buildings. Tests of materials and assemblies. (3 cred.; prereq. 53 or reg. in 53, M.&M. 141; 6 lab. hrs. per week) Otis.
73. Steam Boilers and Heat Engines. Steam boilers and heat engines in their applications to agriculture. A study of steam equipment, internal combustion engines, and refrigeration including properties of vapors, thermodynamics of theoretical

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

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

- and real cycles, heat transfer, operating principles, and performance characteristics. (3 cred.; prereq. Ag.En. 18 and M.E. 131; 2 lect. and 3 lab. hrs. per week) Strait.
- 101-102-103. Advanced Problems in Soil Moisture Regulation. Special problems in surface runoff, soil permeability, relation of soil and crop type of soil moisture, shape and regulation of water table in relation to root growth, etc. (2 to 6 cred. per qtr.; prereq. Ag.En. 61) Manson, Allred.
105. Drainage, Irrigation, and Soil Erosion Control Design. Design and field layout of drainage, erosion control, and irrigation systems for the control and conservation of soil and water in agriculture. (4 cred.; prereq. Ag.En. 61 and 106 or special arrangement; 2 lect. and 6 lab. hrs. per week) Manson, Allred, Larson.
106. Agricultural Hydrology. Hydrologic cycle. Source, distribution, and measurement of precipitation. Rainfall intensity-frequency. Transpiration and evaporation. Infiltration rates. Measurement of runoff. Estimating runoff by rational method, statistical and probability methods, unit graphs, synthetic hydrographs. Ground water hydrology. (3 cred.; prereq. Ag.En. 51 or special arrangement. 3 lect. hrs. per week) Larson.
- 111-112-113. Farm Building Problems. Investigations in building materials, methods of construction, or building equipment. (2 to 6 cred. per qtr.; prereq. Ag.En. 167; ar.) Christopherson, Otis.
- 121-122-123. Farm Power and Machinery Problems. Special studies of farm machinery and mechanical power for the farm. Tests, designs, and adaptability. (2 to 6 cred. per qtr.; prereq. Ag.En. 171; ar.) Schwantes, Strait.
125. Topics in Agricultural Physics. An advanced study of the essential physical principles involved in the utilization of electricity in agriculture. (3 cred.; sr., grad.; prereq. Ag.En. 72 or calculus and Ag.En. 24 and 25 or equiv.) Hustrulid.
126. Management of Agricultural Machinery. Principles of power and machinery management. (3 cred.; prereq. Ag.En. 171, Ag.Ec. 102; 2 lect. and 3 lab. hrs. per week) Schwantes.
- 131-132-133. Rural Electrification Problems. Advanced studies dealing with the design, testing, and use of electrical equipment for farm applications. (2 to 6 cred. per qtr.; sr., grad.; prereq. Ag.En. 172; ar.) Hustrulid.
150. Inspection Trip. During the spring vacation of the senior year an inspection trip is made to observe activities, in agriculture and industry, that have agricultural significance. (1 cred.; no prereq.; required of senior agricultural engineers)
167. Advanced Farm Structures (Formerly Course 67). Design of structural members and assemblies for farm structures. Insulation and ventilation of animal shelters. Building equipment. (3 cred.; prereq. 63, M.E. 160, C.E. 146; 1 lect., 1 rec., and 3 lab. hrs. per week) Otis.
171. Design of Agricultural Machinery (Formerly Course 71). Operating principles and problems in design of agricultural machines. (3 cred.; prereq. Ag.En. 52, and M.E. 121; 1 lect. and 6 lab. hrs. per week) Strait.
172. Applied Electricity (Formerly Course 72). A study of topics important in the application of electric power to agriculture, including instruments, farmstead wiring, lighting, motors and controls, control circuits, and storage batteries. (3 cred.; prereq. E.E. 38 or reg. in E.E. 38; 2 lect. and 4 lab. hrs. per week) Hustrulid.

AGRICULTURAL JOURNALISM

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

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

AGRONOMY AND PLANT GENETICS

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

Recommended courses for major in:

1. **Technical Agriculture:** Agro. 21, 22, 23, 31, 132, 133, 134, 135; Pl.Pa. 1, 3, 4; Soils 5; from 3 to 6 credits in other plant science courses may be added with the approval of the adviser.
2. **Science Specialization:** A major sequence in either agronomy or plant genetics may be arranged in consultation with the major adviser. The courses will be selected in relation to the major interest of the student and may include any courses fundamental to basic training in plant science.

Minor sequence:

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

Freshman and Sophomore Courses

1. General Farm Crops. Adaptation, distribution, production, and uses of the important field crops of the United States. (3 cred.; no prereq.)
21. Grain Crops. Production, improvement, and uses of corn, small grains, flax, and buckwheat. Lectures and laboratory work. (4 cred.; soph., jr., sr.; prereq. 1)
22. Grain and Hay Grading. Development of grades, study of grading methods, and actual practice in grading grain and hay samples according to federal standards. Lectures and laboratory work. (3 cred.; soph., jr., sr., prereq. 1)
23. Forage Crops. Distribution, characteristics, production, preservation, and uses of forage crops. Lectures and laboratory work. (4 cred.; soph., jr., sr.; prereq. 1)
31. Principles of Genetics. Fundamental principles of breeding, heredity, variation, biometry, and evolution. Lectures and laboratory work. (4 cred.; soph., jr., sr.)

52. Production and Grading of Cereal Crops. Production, harvesting, and grading of varieties and cultural methods; factors affecting quality and methods of harvesting; laboratory practice in grading small grains. (4 cred.; jr., sr.; open only to students registered in the Mechanical Engineering Curriculum (Milling Option); prereq. 9 cred. in gen. biol. or equiv.) (Same as Soils 52)

Junior and Senior Courses

126. Crop Judging. Laboratory practice in identification of crops, weeds, and diseases in relation to judging and grading farm crops. (4 cred.; jr., sr., grad.; prereq. 22)
132. Farm Crops Plant Breeding. Applied genetics. Methods of breeding each of the important agricultural crops. Lectures and laboratory problems. (4 cred.; jr., sr., grad.; prereq. 31)
133. Pasture Crops and Management. Characteristics, distribution, establishment, renovation, and management of crops for temporary and permanent pastures. Lectures, laboratory, and field work. (4 cred.; jr., sr., grad.; prereq. 23)
134. Seminar in Agronomy. Critical studies of problems in agronomy. (2 cred.; sr., grad.; prereq. 9 cred. in agron.)
135. Weed Control. Cultural and chemical methods of weed control; weed and seed laws pertaining to dissemination and control. Lectures, laboratory, and field work. (3 cred.; jr., sr., grad.; prereq. Agron. 1 and Pl.Pa. 3) (Same as Pl.Pa. 135)

AIR SCIENCE AND TACTICS

- 31, 32, 33. Orientation in the Air ROTC. Evolution of air power. Introduction to aeronautics. Aerodynamics and propulsion, weather, navigation; applied air power; applied air weapons and general weapons. (1 cred. per qtr., 3 hrs. per week)
- 34, 35, 36. Administration of Air Power. Leadership, drill, and exercise of command; organization of the USAF; executive procedures; logistics; field of specialization. (1 cred. per qtr., 3 hrs. a week; prereq. 31, 32, 33, or 6 months of military service or completion of Junior ROTC)
- 131, 132, 133. Apprenticeship for Duty Assignment. Psychology of leadership; air operations and field of specialization. (3 cred. per qtr., 5 hrs. per week)
- 134, 135, 136. Apprenticeship as an Officer. Officer development; applied fields of officer orientation; military law; air inspector general; air aspects of geopolitics; air force management; career development; field of specialization.

Additional information may be secured from the Professor of Air Science and Tactics, Armory, Minneapolis Campus. See also page 76.

ANALYTICAL CHEMISTRY

Institute of Technology

Freshman and Sophomore Courses

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

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

‡ A fee of \$3 per quarter is charged for this course. The student should purchase a \$10 chemistry deposit card from the bursar, in the Administration Building. No student will be assigned a desk in the laboratories until he presents this card. The \$2 course fee, laboratory material, and breakage will be charged against this deposit.

ANIMAL HUSBANDRY

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

Recommended courses for majors in:

Animal Husbandry

1. **Technical Agriculture:** An.Hu. 8, 9, 51, 52, 53, 56-67, 58, 101, 112, 113; Vet. 50, 51, 52; Agro. 23, 31, 133; Ag.Bi. 6; Ag.Ec. 40, 143.
2. **Science Specialization:** Consult adviser.

Freshman and Sophomore Courses

1. Livestock Production. Opportunities and problems in livestock production. A survey of practices followed in the production of beef cattle, sheep, swine, and horses. Lectures and laboratory practice in classifying and appraising livestock. (4 cred.; no prereq.)
8. Breeds of Livestock. The origin, history, characteristics, and economic importance of the breeds of livestock. Factors for consideration in the selecting of breeding animals. (4 cred.; soph., jr., sr.; prereq. 1)
9. Livestock Judging. Practice in judging beef and dual-purpose cattle, sheep, hogs, and horses. (3 cred.; soph., jr., sr.; prereq. 8)

Junior and Senior Courses

50. Meat Selection and Utilization. A study of the different cuts of pork, beef, veal, mutton, and lamb, with reference to prices, relative economy, uses, nutritive value, chemical composition, ripening, curing, and palatability. (3 cred.; jr., sr., agriculture and home economics students; no prereq.)
52. Meats. Slaughter of animals and the cutting of carcasses. Lectures, demonstrations, and laboratory; meat judging practice. (3 cred.; jr., sr., prereq. 1, 50)
53. Advanced Meats. The relation of animal form to carcass yield. The commercial wholesale and retail meat cuts. Factors affecting the quality of meat. Meat products. (3 cred.; jr., sr.; prereq. 52)
56. Livestock Feeding I. A study of the nutritional requirements of farm animals and the composition and characteristics of livestock feeds. Differences in the utilization of feeds by ruminants and non-ruminants. (3 cred.; jr., sr.; prereq. 1)
57. Livestock Feeding II. The values of individual feeds and of combinations of feeds for beef cattle, sheep, swine, and horses. The feeding of farm livestock for the most economical production of livestock products. (3 cred.; jr., sr.; prereq. 56)
58. Market Classes and Grades of Livestock and Livestock Products. A study of the market classes and grades of livestock and livestock products. Marketing methods; transportation problems; stockyards management; sanitary regulations; buying and selling animals for breeding use; visits to the South St. Paul livestock market and wool warehouses. (3 cred.; jr., sr.; prereq. 1)

101. Livestock Selection. Competitive selection of all types and breeds of livestock. Evaluation of pedigrees, performance records, and other factors as aids to observation in selecting breeding animals. Visits to stock farms. (3 cred.; jr., sr., grad.; prereq. 9)
107. Meat Problems. The wholesale cuts and grades of meat; the processing industry and the utilization of by-products. Special problems and visits to processing and merchandising establishments. (3 cred.; jr., sr., grad.; prereq. 53)
112. Animal Breeding. The application of the physiology of reproduction and genetics to the breeding of farm animals. (3 cred.; jr., sr., grad.; prereq. Agron. 31)
113. Livestock Management. A study of the management principles involved and the problems of care in each of the several types of specialization in livestock production. A general course covering beef cattle, sheep, hogs, and horses. (3 cred.; jr., sr., grad.; prereq. 56-57, 112)
114. Artificial Insemination. Lectures and laboratory on the fundamentals and technics involved in artificial insemination. Problems and procedures in managing artificial breeding associations. (5 cred.; jr., sr., grad.; prereq. 112 and approval of instructor)
116. Prenatal Development of Farm Animals. Textbooks, lectures, and demonstration dealing with prenatal development in farm animals. (3 cred.; jr., sr., grad.; prereq. approval of instructor)

ANTHROPOLOGY

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

40. Introduction to Anthropology. (5 cred.; no prereq.)
42. Introduction to World Ethnology. (5 cred.; no prereq.)

Junior and Senior Courses

54. Social Organization. (3 cred.; jr., sr.; no prereq.)
56. Primitive Science. (3 cred.; jr., sr.; no prereq.)
80. The American Indian. (3 cred.; jr., sr.; no prereq.)
81. Archeology of North America. (3 cred.; jr., sr.; no prereq.)
109. General Linguistics. (3 cred.; jr., sr., grad.; no prereq.)
110. Physical Anthropology. (3 cred.; jr., sr., grad.; no prereq.)
111. Advanced Physical Anthropology. (3 cred.; jr., sr., grad.; prereq. 110, or Zool. 22 or 175, or a course in human anatomy, or permission of instructor)
113. The Character of Cultures. (3 cred.; jr., sr., grad.; no prereq.)
119. The Contact of Cultures. (3 cred.; jr., sr., grad.; no prereq.)
120. Indians of the Plains. (3 cred.; jr., sr., grad.; no prereq.)
- 122-123-124. Problems in Anthropology. (Cred. ar; jr., sr., grad.; prereq. permission of instructor)
126. Ethnology of India. (3 cred.; jr., sr., grad.; no prereq.)
127. Races and Cultures of China. (3 cred.; jr., sr., grad.; no prereq.)
128. Races and Cultures of Japan. (3 cred.; jr., sr., grad.; no prereq.)
130. The Pre-Muslim Cultures of the Near East. (3 cred.; jr., sr., grad.; no prereq.)
131. The Growth of Islam. (3 cred.; jr., sr., grad.; no prereq.)
132. The Contemporary Near East. (3 cred.; jr., sr., grad.; no prereq.)

140. Field Trip in Archeology (1-8 cred.; jr., sr., grad.; prereq. male students only, permission of instructor required)
161. Primitive Religion. (3 cred.; jr., sr., grad.; no prereq.)
165. Psychological Phases of Culture. (3 cred.; jr., sr., grad.; no prereq.)
166. History of Anthropological Theory and Method. (3 cred.; jr., sr., grad.; prereq. 40 or 42)
169. Peoples of the South Seas. (3 cred.; jr., sr., grad.; no prereq.)
171. Peoples of Northeastern Asia and Northwestern North America. (3 cred.; jr., sr., grad.; no prereq.)

For Graduate Students Only

- 204-205-206. Seminar in Anthropology. (3 cred. per qtr.; grad.)

ARCHITECTURE

Institute of Technology

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

Junior and Senior Courses

- 40.‡ Graphic Representation. Projection, shades and shadows, perspective, etc. (6 cred.; 3rd qtr. soph.; prereq. solid geometry)
- 51-52-53. History of Architecture. (The same as Fine Arts 51-52-53) (12 cred.; jr., sr.)
57. Building Materials and Methods, Part I (4 cred.; jr., sr.; no prereq.)
- 58-59. Building Materials and Methods, Part II (8 cred.; prereq. 57)
- 61-62-63. Tutorial Work in History of Architecture. (The same as Fine Arts 61, 62, 63) (6 cred.; jr., sr.; prereq. 53)
- AD-I.‡ Architectural Design, Grade I. (10 cred.; jr., sr.; prereq. 40)
- AD-II.‡ Architectural Design, Grade II. (15 cred.; jr., sr.; prereq. AD-I)

ART

Junior College Courses

- 1.‡‡ Introduction to Art (Formerly F.A. 1,2,3). A lecture and work shop course introducing the student to the various problems involved in the first approaches to objects of art. Examples selected from the great works of painting, sculpture, and architecture will be used to illustrate principles of design. The student will be introduced through the work shop technique to problems arising from the natures of materials, both two dimensional and three dimensional. (4 cred.; no prereq.)
- 2,3. Masters in Art. A selective study of some acknowledged masters and master pieces of world art from Phidias to Picasso; concentration on a number of important artists and works of art, using these to illustrate broad principles and stylistic tendencies. (3 cred. per qtr.; prereq. Art 1).

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

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

- 4,‡5.‡ General Design (Formerly ArtEd. 1-2-3). An awareness of organic design in the contemporary environment is developed through analysis of the structural basis of pictorial, decorative, and industrial design simultaneously with individual creative and practical problems. (3 cred. per qtr.; prereq. Art. 1 or equiv., or consent of instructor)
- 10.‡‡‡ Photography (Formerly F.A. 10). Fundamental principles of photography. The use of cameras, developing, printing, and other elementary techniques. (The same as Jour. 10) (3 cred.; soph., jr., sr.; no prereq.)
- 20,‡21.‡ Drawing and Painting I (Formerly D.P.-1, ArtEd. 4,6,8, and Draw. 41, 42,43). Introduction to materials and techniques; still life, figure, and landscape. (2 cred. per qtr.; prereq. Art 1, or equiv. or consent of instructor)
- 43,‡‡44,‡‡45.‡‡ Design Work Shop. (Formerly ArtEd. 31,32,33,34). Studies in the natures of materials, exercises in three-dimensional design. Work in metal, wood, clay, leather, plastics, etc. (3 cred. per qtr.; prereq. Art 1, or equiv., or consent of instructor).

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

ART EDUCATION

College of Education

Senior College Courses

- 81A-B. Puppetry in Art Education Programs. The use of various forms of simple puppetry as a teaching technique with emphasis on problems of motivation and correlation with school subjects. Construction, manipulation, and stage techniques approached as they relate to typical school situations. (3 cred.; no prereq.)
85. Art in Life and Education. (For majors in other secondary teaching fields—not open to art education majors or to those with credit in Art Ed. 17-18-19). Emphasizes opportunities for correlation between art and other subjects in the secondary schools which are frequently overlooked by the general educator unaware of esthetic values in contemporary life and education. (3 cred.; no prereq.)
156. Intercultural Education through Art. A course designed to foster national unity and international understanding through recognition of the cultural contributions of diverse peoples to world-wide development and experience with special emphasis on twentieth-century exchange. Timely approaches toward understanding the fundamental problems arising out of current ethnic and racial conflicts will be considered in the light of specific needs of teacher, community worker, layman. (3 cred.; no prereq.)
157. Art Movements of Twentieth-Century Scandinavia. (3 cred.; no prereq.)
189. Application of Esthetic Theory in Education. Examination of contemporary theories of art, their psychological and philosophical foundations as revealed through experimental evidence. Application of tested principles of art education to improving programs of modern general education at elementary, secondary and college levels. Open to teachers, supervisors, and administrators with or without previous experience in art who are concerned with making art function in general education. (3 cred.; no prereq.)

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

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

‡‡‡ A fee of \$5 is charged for this course.

BACTERIOLOGY AND IMMUNOLOGY

Medical School

Freshman and Sophomore Courses

- 53.§‡‡‡ General Bacteriology. Lectures, demonstration, and laboratory exercises are employed for instruction in the morphology, physiology, taxonomy, and ecology of bacteria. The practical applications of these fundamental principles in other phases of science and industry are emphasized. (5 cred.; soph. with a C average in the prerequisite courses, jr., sr.; prereq. 10 cred. in chem. and 4 cred. in biological sciences or permission of instructor)

Junior and Senior Courses

- 102.§‡‡‡ Medical Bacteriology. The pathogenic bacteria, especially in their relationship to disease; principles of infection and immunity. For students other than medical students. (5 cred.; prereq. Bact. 53, 99 hrs.)
103. Soil Microbiology. Methods for enumeration and study of microflora and microfauna. Biochemical activities of soil population. (3 cred.; jr., sr., grad.; prereq. Bact. 53 and 8 cred. in org. chem.)
104. Sanitary Bacteriology. Standard and other methods for the bacteriological analysis of water, sewage, food and dairy products. Preparation of standard culture media, technic, and evaluation of results. Primarily for majors in bacteriology. (4 cred.; prereq. Bact. 53 and 15 cred. in chem.; 77 hrs.) (Limited to 15 students).
107. Microbiological Genetics. Application of the principles of genetics to the study of heredity in microorganisms. The special technics developed for the genetic study of these forms will be detailed and critically evaluated; special emphasis on the yeasts, bacteria, and viruses. (3 cred.; prereq. Bact. 121-122)
- 113-114.‡‡‡ Fungi. Morphology, physiology, and taxonomy. Staining, isolation, culturing, identification. Special emphasis on fungi of importance in medicine and industry. (8 cred.; jr., sr., grad.; prereq. Bact. 53 and 5 cred. in bact. or 4 cred. in pl. pa.)
- 121-122. Physiology of Bacteria. Growth; enzymes; metabolism; dormancy; death. (6 cred.; prereq. Bact. 53 and 8 cred. in org. chem. or biochem. 33 hrs.)
123. Applied Bacteriology. Industrial fermentations; bacteriology of water and sewage. (3 cred.; prereq. Bact. 121-122; 33 hrs.)

BOTANY

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

- 1‡-2‡-3‡ General Botany. (10 cred.; all; no prereq.)
- 4‡‡-5‡‡ General Botany. (10 cred.; all; no prereq.)
10. Minnesota Plant Life. (3 cred.; all; no prereq.) (Not offered 1949-50)
12. Plants Useful to Man. (3 cred.; all; no prereq.)

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

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

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

§ Microscope required. Students may obtain use of microscope by purchasing \$3 microscope cards from the bursar.

Junior and Senior Courses

- 50.‡ General Plant Ecology. (3 cred.; soph. with grade of C in 1-2-3 or 4-5, or Nat.Sci. 7-8-9, jr., sr.; prereq. 1-2-3 or 4-5 or Nat.Sci. 7-8-9)
- 51.‡ General Plant Physiology. (3 cred.; soph. with grade of C in 1-2-3 or 4-5, or Nat. Sci. 7-8-9, jr., sr.; prereq. 1-2-3 or 4-5 or Nat.Sci. 7-8-9 and two qtrs. of in. ch. or consent of instructor)
- 52.‡ Elementary Taxonomy. (3 cred.; soph. with grade of C in 1-2-3 or 4-5, jr., sr.; prereq. 1-2-3 or 4-5)
- 53.‡ Morphology of Thallophytes and Bryophytes. (3 cred.; soph. with grade of C in 1-2-3 or 4-5 or Nat.Sci. 7-8-9, jr. sr.; prereq. 1-2-3 or 4-5 or Nat.Sci. 7-8-9)
- 54.‡ Morphology of Pteridophytes and Spermatophytes. (3 cred.; soph. with grade of C in 1-2-3 or 4-5 or Nat.Sci. 7-8-9, jr., sr.; prereq. 1-2-3 or 4-5 or Nat.Sci. 7-8-9)
108. Pteridophytes. (5 cred.; sr., grad.; prereq. 54) (Not offered 1949-50)
110. Gymnosperms. (5 cred.; sr., grad.; prereq. 54) (Not offered 1949-50)
- 112.‡ Aquatic Flowering Plants. (3 cred.; prereq. bot. or zool. 10 cred. or consent of instructor)
- 113.‡ Flora of Minnesota. (3 cred.; jr., sr., grad.; prereq. 10 cred. in bot. or consent of instructor)
- 114.‡ Phyletic Taxonomy of Angiosperms. (3 cred.; jr., sr., grad.; prereq. 52 or 54 or consent of instructor)
- 115.‡ Spring Flora of Minnesota. (3 cred.; jr., sr., grad.; prereq. 10 cred. in bot. or consent of instructor)
117. Floristic Plant Geography. (5 cred.; jr., sr., grad.; prereq. 52 or consent of instructor) (Not offered 1949-50)
- 118.‡ Extranuclear Cytology. (3 cred.; jr., sr., grad.; prereq. 10 cred. in bot. or zool. or consent of instructor)
- 119.‡ Nuclear Cytology. (3 cred.; jr., sr., grad.; prereq. 10 cred. in bot. or zool. and an elementary course in genetics or consent of instructor)
- 120.‡‡‡ Research Methods in Cytology. (3 to 5 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and consent of instructor) (Not offered 1949-50)
- 121.‡ Developmental Anatomy. (5 cred.; jr., sr., grad.; prereq. 10 cred. in bot. and consent of instructor)
- 123.‡‡‡ Research Methods in Histology. (3 to 5 cred.; jr., sr., grad.; prereq. 1-2-3 or 4-5, 121, and consent of instructor)
125. Morphogenesis. (5 cred.; jr., sr., grad.; prereq. 10 cred. in bot.)
- 127.‡ Anatomy of Vascular Plants. (5 cred.; jr., sr., grad.; prereq. 10 cred. in bot.)
- 130.‡ General Plant Ecology. (3 cred.; sr., grad.; prereq. 10 cred. in bot.)
131. Field Ecology. (5 cred.; jr., sr., grad.; prereq. 50 or 13 or For. 2,3,4)
- 132.‡ Morphological Ecology. (5 cred.; jr., sr., grad.; prereq. 50 or 13 or For. 2,3,4)
133. Ecological Plant Geography. (5 cred.; jr., sr., grad.; prereq. 50 or 13 or For. 2,3,4)
- 134.‡ Research Methods in Ecology. (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 50 or 13)
- 137.‡ Experimental Ecology. (5 cred.; jr., sr., grad.; prereq. 18 cred. in plant science incl. 50 or 130, 51)

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

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

140. Advanced Survey of Plant Physiology. (3 cred.; jr., sr., grad.; prereq. an elementary course in bot. or zool.; a course in plant physiology or consent of instructor; a course in organic chemistry or biochemistry.) (Students who have had Course 51 should not enroll in 140)
- 154.††† Spectroscopy and Photochemistry Applied to Biology. (3 to 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem. or consent of instructor) (Not offered 1949-50)
- 165.‡ Introduction to Pollen Analysis. (3 cred.; jr., sr., grad.; prereq. consent of instructor)
170. Water Relations of Plants. (3 cred.; sr., grad.; prereq. 51 or 140, 20 cred. in chem. or ag. bioch., and Phys.Ch. 101-102-103 or 107-108, or consent of instructor) (Not offered 1949-50)
171. Mineral Nutrition of Plants. (3 cred.; sr., grad.; prereq. 51 or 140, 20 cred. in chem. or ag. bioch., and Phys.Ch. 101-102-103 or 107-108, or consent of instructor) (Not offered 1949-50)
172. Plant Growth. (3 cred.; sr., grad.; prereq. 51 or 140, 20 cred. in ch. or bioch., and Phys.Ch. 101-102-103 or 107-108, or consent of instructor) (Not offered 1949-50)
- 173.††† 174.††† 175.††† Advanced Physiology Laboratory. (2 cred. per qtr.; sr., grad.; to be taken with or after 170-171-172 respectively) (Not offered 1949-50)
176. Plant Respiration. (3 cred.; sr., grad.; prereq. 51 or 140, 20 cred. in ch. or ag. bioch., and Phys.Ch. 101-102-103 or 107-108, or consent of instructor)
177. Photosynthesis. (3 cred.; sr., grad.; prereq. Bot. 51 or 140, 20 cred. in ch. or ag. bioch., and Phys.Ch. 101-102-103 or 107-108, or consent of instructor)
178. Nitrogen Metabolism. (3 cred.; sr., grad.; prereq. 51 or 140, 20 cred. in ch. or ag. bioch., and Phys.Ch. 101-102-103 or 107-108, or consent of instructor)
- 179.††† 180.††† 181.††† Advanced Physiology Laboratory. (2 cred. per qtr.; sr., grad.; to be taken with or after 176, 177, 178 respectively)
- 197‡-198‡-199.‡ Problems. (1 to 5 cred.; jr., sr., grad.; prereq. consent of instructor)

CHILD WELFARE

Freshman and Sophomore Courses

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

Junior and Senior Courses

80. Child Psychology. A survey of child psychology and its applications. (3 cred.; jr., sr.; prereq. Psy. 1-2)
130. Motor, Linguistic, and Intellectual Development of the Child. Lectures, readings, and reports. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)
131. Personality, Emotional, and Social Development of the Child. Lectures, readings, and reports. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)
132. Later Childhood and Adolescence. Growth, social adjustment, emotional, mental, and personality development. (3 cred.; prereq. 12 cred. in psy. or equiv.)
- 133-134. Research Methods. Methods used in the study of children. Laboratory exercises and problems. (2 or 4 cred.; sr., grad.; prereq. 10 cred. in psy. or ed. psy., and 3 cred. in statistics and permission of instructor)

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

††† A fee of \$3 per quarter is charged for this course.

140. Behavior Problems in Younger Children. Nature and origin of behavior difficulties in younger children. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)
141. Behavior Problems in Older Children. Nature and origin of behavior difficulties in older children, with particular reference to readjustment in adolescence. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)
142. Psychology of Atypical Children. Survey of scientific literature on children with mental and physical handicaps. (3 cred.; prereq. 10 cred. in psy. or equiv.)
143. Problems of Mental Deficiency. The psychology of the mentally deficient; training, institutional and home care, social and vocation adjustment. Special problems in the clinical diagnosis and appraisal of mental deficiency. (3 cred.; sr., grad.; 12 cred. in psy. or equiv.)
- 150-151-152. Childhood Education. 150, History and Philosophy; 151, Organization and Administration; 152, Methods and Materials, (2, 4, or 6 cred.; prereq. 12 cred. in educ. or equiv.)
160. Physical Growth and Development. The growth of the human body and its systems from early fetal life to maturity. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)
166. Maturity and Aging, Development Changes and Adjustment. Survey of scientific literature of changes in ability and learning that accompany maturity and senescence. (3 cred.; sr., grad.; prereq. 15 cred. in psy., educ., or soc.)
170. Parent Education. History and survey of programs, materials, methods. Administration and organization. Lectures, discussions, and reports. (3 cred.; sr., grad.; prereq. 15 cred. in child welfare or ho. ec., or ed., or psy., or soc., or pub. health)
185. Children in a Changing World. The effects of social change and social stress upon children. Some emphasis upon war, depressions, and catastrophes. (3 cred.; sr., grad.; prereq. 12 cred. in psy., educ., or soc.)
190. Use and Interpretation of Tests for Children. Survey of mental and personality testing from viewpoint of the teacher, social worker, etc. Lectures, demonstrations, readings, and reports. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)

DAIRY HUSBANDRY

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

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

1. Technical Agriculture: Recommended courses for majors in:

Dairy Production: Ag.Bi. 116; Ag.Ec. 40, 80, 102, 103, 104; Agro. 21, 23, 31; An.Hu. 56, 112, 113, 114; Dy.Hu. 2, 9, 51, 52, 101, 103, 104, 105, 106, 116, 117; Pl.Pa. 1; Po.Hu. 1; Soc. 114; Vet. 50-51-52.

Dairy Products: Ag.Bi. 6, 101, 103, 119, 120, 121, 122, 123, 129; Ag.Ec. 25, 40, 50, 131, 140, 141; Ag.En. 24, 25, 40, 41, 70; Dy.Hu. 2, 3, 4, 10, 51, 101, 105, 106, 110, 111, 112, 113, 114, 115; Econ. 25, 40, 50, 90, 141; Po.Hu. 1, 51, 154.

2. Science Specialization: Consult adviser.

Freshman and Sophomore Courses

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

Junior and Senior Courses

50. Dairy Bacteriology (Formerly Course 2). Lectures and laboratory exercises. Types of milk organisms; the contamination of milk and how prevented; relation of milk to the public health; the bacteriology of dairy products. (3 or 5 cred.; 3 cred. for lect., 2 cred. for lab.; soph., jr., sr.; prereq. Bact. 53) (Lecture taken separately only on permission of instructor)
51. Market Milk. Lectures and laboratory work. Classes of market milk; transportation and distribution; sanitary inspection; equipment and operation of plants; problems of public control. (3 cred.; jr., sr.; prereq. 1, 2)
52. Dairy Herd Management. Demonstration of management practices with dairy cattle. (2 cred.; jr., sr.; prereq. 101, 103)
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.; jr., sr., grad.; prereq. 1)
103. Dairy Stock Feeding. Application of principles of nutrition to feeding dairy animals. Feeding standards; characteristics of various feeding stuffs; formulation of rations. (3 cred.; sr., grad.; prereq. 101, An.Hu. 56)
104. Dairy Stock Selection. An evaluation of inherited characters in dairy cattle from an economic standpoint. (3 cred.; jr., sr., grad.; prereq. 9, 101 or parallel)
105. Seminar I. Special investigation and study of selected topics. Study of dairy literature. Preparation of bibliographies. Each student presents papers and reports on assigned subjects and reviews recent scientific investigations in dairy husbandry. (1 cred.; sr., grad.; prereq. 3 courses in dairy husbandry)
106. Seminar II. Continuation of 105. (1 cred.; sr., grad.; prereq. 105)

110. Dairy Products: Ice Cream and Frozen Desserts. The manufacture of ice cream with special reference to the chemical and physical processes involved. Organization, construction, equipment, and operation of such factories. Laboratory exercises and lectures. (3 cred.; jr., sr., grad.; prereq. 1, 3)
 111. Dairy Products: Butter. The manufacture of butter with special reference to the chemical and bacteriological processes involved. Organization, construction, equipment, and operation in such factories. Laboratory exercises to illustrate these processes. (3 cred.; jr., sr., grad.; prereq. 1, 2, 3)
 112. Dairy Products: Cheese. The manufacture of cheese, with special reference to the chemical, bacteriological, and physical processes involved. Organization, construction, equipment, operation of such factories. Laboratory exercises and lectures. (3 cred.; jr., sr., grad.; prereq. 1, 2, 3)
 113. Technical Control. Lectures and laboratory. Chemical and bacteriological laboratory methods used in technical control of milk and its products. Use of Mon-jonnier tester, cryoscope, and bacteriological control methods. (3 cred.; sr., grad.; prereq. 2, 111, or 112)
 114. Milk By-Products. The manufacture of condensed milk, dry milk, and other milk by-products with special reference to the physical processes involved. Laboratory exercises and lectures. (3 cred.; jr., sr., grad.; prereq. 1, 3)
 115. Advanced Dairy Bacteriology. Investigations of specific problems on the bacteriology and mycology of milk and dairy products. (3 cred.; sr., grad.; prereq. 2, 111, or 112)
 116. Milk Secretion. Lecture assignments covering the anatomy and physiology of milk secretion and factors influencing the quality and quantity of milk. (3 cred.; sr., grad.; prereq. Physiol. 9 cred. and Ag.Bi. 103)
 117. Dairy Cattle Breeding. Application of the principles of genetics to the improvement of dairy cattle. Evaluation of breeding animals and formulation of breeding plans. (3 cred.; jr., sr., grad.; prereq. 101, 104, Agro. 31)
- (For courses in Dairy Chemistry see Agricultural Biochemistry 103, page 81.)

ECONOMICS

School of Business Administration

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

See also courses in Agricultural Economics.

EDUCATIONAL ADMINISTRATION

College of Education

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

EDUCATIONAL PSYCHOLOGY

College of Education

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

ENGLISH

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

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

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

ENTOMOLOGY AND ECONOMIC ZOOLOGY

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

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

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

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

Students wishing to major in economic zoology should consult the special curricula in Fish and Wildlife Management (page 27)

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.; soph., jr., sr.; prereq. Zool. 14-15 or equiv.)
13. Field Zoology. For forestry freshmen at Itasca Park. (1½ cred.; no prereq.)
- 21.‡ Principles of Beekeeping. Life history, morphology, and physiology of the honeybee. Colony development. History of beekeeping. Equipment and apiary management. Chemistry and food value of honey. Pollination. Diseases of bees and their control. Economics of beekeeping. Practical laboratory and apiary work. (3 or 5 cred.; no prereq.)

Junior and Senior Courses

- 51.*†‡ Introductory Parasitology. An elementary course dealing with parasitic protozoa, worms, and arthropods and their relation to diseases of man and animals. (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)

* Offered on the Minneapolis Campus.

† Open to sophomores on petition.

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

- 52.*‡‡ Introductory Entomology. General morphology, life histories, habits, and classification of insects. (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)
- 55.‡‡ Entomological Techniques. Practical laboratory instruction in mounting, preservation of insect larvae; preparation of microscopic mounts of minute insects; labeling, classifying, and cataloguing specimens of insects for scientific study. (9 hrs. lab., 3 cred.; jr., sr.)
- 56.‡ Forest Entomology. Lectures and laboratory work dealing with the principles of controlling insects that attack trees and forest products, together with a consideration of the life history and habits of important representative species. (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)
57. Mill Pests and Their Control. The life histories, habits, and methods of control of the insect and rodent pests of elevators, flour mills, and warehouses. Laboratory work in the determination of the more important forms. (5 cred.; jr., sr.; open only to students in the Mechanical Engineering Curriculum (Milling Option); prereq. general biol. 9 cred. or equiv.)
- 63.‡ Mammalogy. Distinguishing characteristics and life histories of the various mammal groups, particularly those represented in the state. Consideration is given to the possibilities of fur farming in case of certain species. (4 cred.; jr., sr.; prereq. Zool. 22)
- 64.‡ Introduction to Fish and Wildlife Management. Survey of the management of fishery and wildlife resources with a discussion of principles and administration. Lecture and library work. (5 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv., Bot. 50 or For. 20)
- 114.‡ Apiculture. Problems of bee management, disease control, wintering, bee breeding, processing, and marketing bee products. Lectures, laboratory, and field practice. (3 cred.; jr., sr., grad.; prereq. 9 cred. in ent.)
- 117.*‡ Animal Ecology. General ecology stressing ecological principles and land communities. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 118.‡§ Animal Ecology. Experimental approach to the study of environmental factors affecting animal populations. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.; permission of instructor required)
- 119.*‡ Animal Ecology. A study of the conditions for life in the water and distribution of aquatic animals. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 120.‡ General Ecology of Insects. Ecology with special reference to insects, their dispersal, distribution, abundance, natural control, and related problems. Lectures, laboratory, and field work. (3 cred.; jr., sr., grad.; alternative to 119, or both may be taken; prereq. 117-118)
- 121.*‡ Ichthyology. A study of the taxonomy and habits of North American fishes with special reference to those of upper Mississippi drainage. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 125‡-126‡-127.*‡ Advanced General Entomology. Morphology, biology, and classification of insects. Lectures and laboratory. Frequent field trips in 127. (9 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)

* Offered on the Minneapolis Campus.

‡ Open to sophomores on petition.

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

‡‡ A fee of \$5 per quarter is charged for this course.

§ Note that in the winter quarter this course is offered at the St. Paul Campus.

- 128††-129.†† Insect Physiology. General and comparative physiology of insects, a survey of the organ systems and their functioning in various insects. Special emphasis is placed on research methods and evaluation of data. Lectures, laboratory, and reading. (8 cred.; sr., grad.; prereq. 15 cred. in zool. or ent. and permission of instructor. Zool. 50 or equiv. recommended)
- 140.†† Biological Microscopy. Necessary elements of optics, and limitations of the various types of microscopes, interpretation of microscopical data. Lab.: demonstration plus project in field of student's interest. (4 cred.; sr., grad.; prereq. 15 cred. in zool., ent., or bot. Permission of instructor required)
- 141†-142.‡ Insects in Relation to Plant Diseases. A study of the principal insect vectors and their habits, types of insect injuries affecting health of plants; modes of insect transmission and dissemination of plant disease; methods of rearing and handling insect vendors. (6 cred.; jr., sr., grad.; prereq. 8 cred. in ent., or pl. pa.) (Same as Pl.Pa. 141-142)
- 144.*‡ Medical Entomology. A study of the principal arthropods noxious to man and animals. Special emphasis is placed on those arthropods which serve as vectors or pathogenic organisms of man and animals. Lectures and laboratory. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent. including 52 or equiv. and permission of instructor)
- 145.*‡ Parasitic Protozoa. The structure, life histories, and economic relations of protozoal parasites of man and animals. Lecture, laboratory diagnosis. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. and consent of instructor)
- 146.*‡ Helminthology. Worm parasites of man and animals, their structure, life histories, and biological relationships. Lecture and laboratory. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. and consent of instructor)
- 150.‡ Introduction to Aphidology. The biology and taxonomy of Aphididae. (3 cred.; jr., sr., grad.; prereq. Ent. 52 or equiv. or permission of instructor)
- 164†-165†-166.‡ Wildlife Management. Detailed study of the life histories, ecology, and management of North American game animals including field studies of research and management techniques at appropriate times during the year. Lectures, library, laboratory, and field work. (9 cred.; jr., sr., grad.; prereq. Ent. 63, 64, Zool. 46-47, Bot. 50, and Pl.Pa. 53)
167. Techniques in Forest Wildlife Management. Largely field work; use of censuses applicable to the major local forms of forest wildlife; preparation of a wildlife management plan for a small forested area. (3 cred.; grad.; prereq. Ent. 64. Given at Cloquet)
- 168††-169.††† Fishery Biology and Management. Methods and theory of fishery biology; age and rate of growth, condition factor, populations, mortality and harvest, indices of productivity, lake and stream survey methods and planning, lake and stream improvement, fish pond management. Lectures and laboratory. (10 cred.; jr., sr., grad.; prereq. Zool. 53, 118, 119, and 121. Bot. 57 or equiv., Biostatistics 110, 111, or equiv., or permission of instructor)
- 170.‡ Fisheries Resources. Fisheries resources of the United States; fisheries products; methods and description of commercial fisheries; state, federal, and international administration of fisheries; significant laws and current legislation controlling United States fisheries. Organization of fishery programs. (3 cred.; jr., sr., grad.; prereq. Ent. 168, 169, or permission of instructor)

* Offered on the Minneapolis Campus.

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

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

†† A fee of \$5 per quarter is charged for this course.

- 175.‡ Principles of Economic Entomology. Methods and principles of insect control. Lectures and demonstration laboratory. (4 cred.; jr., sr., grad.; prereq. 15 cred. in ent. including Ent. 5 or equiv., or permission of instructor)
- 176.‡ Legal and Regulatory Aspects of Pest Control. Principles of quarantine and administration of control campaigns. Lectures, discussions, and demonstrations. (3 cred.; jr., sr., grad.; prereq. 15 cred. in entomology including Ent. 5 or equiv., or permission of instructor)
- 177.‡‡ Insecticides and Their Action. Chemistry, physiological action, toxicology and laboratory testing of insecticides. Lectures and laboratory. (5 cred.; sr., grad.; prereq. 15 cred. in ent. including Ent. 5 or equiv., or consent of instructor; inorganic and organic chemistry)
- 179.‡ Recent Advances in Entomology. Lectures in special fields of entomological research given by a visiting professor. (Cred. and hrs. ar.; sr., grad.; no prereq.)
197. Introduction to Research. Preparation for investigational work in lines of entomology, parasitology, ecology, economic zoology, or beekeeping. Advanced laboratory, field, and library work; training in preparation of bibliographies and manuscripts; special problems. Summer work should be planned when possible. (5 or more cred.; sr., grad.; prereq. work as prescribed by the division)

FOOD TECHNOLOGY

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

FORESTRY

Freshman and Sophomore Courses

1. General Forestry. A brief survey of the various fields of forestry; and the forest situation in the United States. Lectures and collateral reading. (3 cred.; no prereq.)
- 3-4. Dendrology. The forest trees of the United States; their classification, characteristics, and range. Lectures, assigned reading, laboratory. (Course 3, 3 cred., and Course 4, 4 cred.; no prereq.)

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

‡‡ A fee of \$5 per quarter is charged for this course.

‡‡‡ A laboratory fee of \$5 is required for each quarter of this course. The \$5 card purchased from the cashier's office, St. Paul Campus, must be presented before laboratory space will be assigned. A \$5 breakage card against which breakage can be charged must be purchased also. Veterans will obtain authorization for cards from the Bureau of Veterans' Affairs and obtain cards directly from the secretary of the Division of Agricultural Biochemistry.

5. Field Silvics. 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. (1½ cred.; no prereq. Given at Itasca Park)
6. Field Mensuration. Largely field work. Includes use of compass, pacing and mapping; and elementary work in tree measurements, timber cruising including the elementary use of aerial photographs, and growth determination. (1½ cred.; no prereq. Given at Itasca Park)
- 7-8-9. Forest Mensuration. The basic principles underlying the determination of the volume of forest products, and trees, stands, and forests including the elementary theory and use of aerial photographs; the growth and yield of trees; stands, and forests; and elementary methods of compiling and analyzing numerical data. (9 cred.; all; prereq. 6, Math. 1 and 6)
10. Farm Forestry. The place of forestry in land-use planning. The economic status of the farm woodlot. The establishment and care of woodlots and windbreaks. Forest influences with special reference to soil erosion control. The use of wood on the farm. Lecture and laboratory. (3 cred.; not open to students majoring in forestry; no prereq.)
11. Camp Management. Experience in camp management. Each student will be placed in charge of the summer camp under faculty supervision for a short period of time. (1 cred.; no prereq. Given at Itasca Park)
20. Grazing. History of grazing in the West. Kind of stock used. Forage plants. Regulations and methods of handling stock on the national forests. Range management and protection. Lectures and reading. (3 cred.; soph., jr., sr.; no prereq.)
49. Identification of Commercial Woods. Structure, classification, and identification of domestic woods important to the woodworking industries. Lectures and laboratory. (2 cred.; soph., jr., sr.; not open to forestry students; no prereq.)

Junior and Senior Courses

- 53-54. Wood Structure and Identification. Structure, classification, and identification of the domestic commercial woods. Lectures, reading, laboratory. (6 cred.; jr., sr.; prereq. 3-4)
56. Forest Products. An introductory survey of forest products; lumber, naval stores, tannins, wood pulp, paper, etc. Lectures, reading, reports. (3 cred.; jr., sr.; no prereq.)
57. Wood Utilization. Production, distribution, qualities, amounts, manufacture and prices of wood products. Lectures, reading, reports. (3 cred.; sr.; prereq. 53-54)
58. Lumber Merchandising and Grading. A study of the lumber industry, lumber associations, lumber grades, lumber prices, and lumber distribution. (3 cred.; sr.; prereq. 53-54)
101. Advanced Dendrology. A continuation of Course 3-4 with special studies in classification and distribution of some important timber species of the world. (3 cred.; jr., sr., grad.; prereq. 3-4)
- 111-112. Advanced Forest Mensuration. Continuation of Course 9 with special emphasis on the application of statistical methods in forest mensuration. (6 cred.; grad.; prereq. 9 or consent of instructor)
113. Wood Pulp and Paper. A detailed study of production of wood pulp and paper products. Lectures, reading reports. (3 cred.; jr., sr., grad.)

- 114-115. Mechanical and Physical Properties of Wood. Derivation and application of formulas used in determining the stresses in wood. Laboratory methods in timber physics. Lectures, reading, class problems, laboratory and reports. (6 cred.; jr., sr., grad.; prereq. 53-54, Math. 7)
116. Fabrication and Properties of Wood Products. The use of timber connectors in heavy construction. Physical and mechanical properties of plywood and various fiber boards. Principles of glued wood construction. Lectures, laboratory and reports. (3 cred.; jr., sr., grad.; prereq. 114)
119. Advanced Wood Structures. The micro-technique of wood tissue and structure, identification and classification of tropical woods. Lectures, reading, and laboratory. (4 cred.; sr., grad.; prereq. 53-54)
120. Estimating. A general course in building cost estimating. (3 cred.; sr., grad.; no prereq.)
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.; jr., sr., grad.; prereq. org. chem.)
125. Wood Preservation. Lectures and collateral reading of the history, development, and methods of wood preservation. Different systems now in use and preservatives used. (3 cred.; jr., sr., grad.; prereq. 53-54)
126. Silvics. A study of the life history and 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.; sr., grad.; prereq. 3 and 4 or equiv.)
127. Silviculture. A study of the different methods of making intermediate and final cuttings in the forest. An analysis of European methods as they apply to American forest types and conditions. (3 cred.; grad.; prereq. 126)
128. Introduction to Silviculture. Description of reproduction and intermediate cutting methods, with special emphasis on thinnings, improvement cuttings and reproduction cuttings. Lectures and field laboratory. (3 cred.; sr., grad.; prereq. 126)
129. Silvicultural Laboratory. Application of cutting methods to the specific forest types in the Cloquet Experimental Forest; and cone collection, seed extraction, and forest nursery practices. (3 cred.; sr., grad.; prereq. 126)
130. Forest Valuation. The business and financial aspects of forest management. A study of the different factors entering into the valuation of forest property. (5 cred.; grad.)
131. Forest Policy. Policy of the United States and the states toward the utilization of the public forest resources. Policy of other owners toward forest resources controlled by them. Administration of the national and state forests. (3 cred.; sr., grad.)
132. Introduction to Forest Management. Practical adaptation of forest regulatory methods to American forests. Lectures and reports. (3 cred.; sr., grad. Given at Cloquet Experimental Forest)
133. Forest Management Laboratory. Collection of data necessary for a forest management plan, including timber estimating, making of growth studies and preparation of maps required for such plans. (3 cred.; sr., grad. Given at Cloquet Experimental Forest)
136. Forest Economics. The place of the forest in the productive utilization of land; past and present markets and source of supply of timber and timber products, particularly with reference to the present situation in North America. (3 cred.; jr., sr., grad.; prereq. Ag.Ec. 2)

137. Seeding and Planting. Principles of seeding and planting in the establishment of forest tree plantations. Forest nursery practices. Storage, pretreatment and germination of forest tree seeds. Lecture and laboratory. (3 cred.; jr., sr., grad.)
140. Forest Management. Organization and administration of the national and state forests, and methods of regulating and allotting the cut from a forest under management. Preparation of a forest management plan. Lectures and reports. (5 cred.; grad.; prereq. 128, 132)
141. Principles of Silvics. Principles underlying the silvical characteristics of trees and the reactions of trees to their environments. A review of silvical literature of special significance. (3 cred.; grad.; prereq. 126, 127 or special permission of instructor)
142. Wood Chemistry. The chemical composition, reaction, and analyses of wood components and derivatives. The chemical technology of wood and wood products. (3 cred.; jr., sr., grad.; prereq. org. chem., For. 53-54)
143. Forest Recreation. The recreational use of the forest from an economic, sociological, and technical point of view. Administrative and technical problems arising from recreational use. (3 cred.; grad.; no prereq.)
144. Forage and Browse Plants. The important forage and browse plants of the United States; their identification, nutritive value, palatability, growth habits, and distribution. Includes a general study of forage types, the classes of forage, carrying capacities, and methods of ecological investigation. (3 cred.; jr., sr., grad.; prereq. Bot. 113 and Pl.Pa. 4)
151. Logging. The principles and general methods of logging in the different forest regions of the United States, and the modifications required by forest management. (3 cred.; jr., sr., grad.; no prereq.)
152. Wood Seasoning. Theory and practice of air seasoning and kiln drying of wood. (3 cred.; jr., sr., grad.; prereq. 53-54)
155. Forest Protection. The protection of forests from fire—fire prevention and fire suppression. The causes of forest fires and their elimination, climate and fires, fire fighting and fire legislation. (3 cred.; jr., sr., grad.; no prereq.)
- 156-157. Major Report. Independent study and the preparation of a comprehensive report on some phase of general forestry, range management, or wildlife management. (2 cred. per qtr.; grad.)
- 158-159. Forestry Seminar. Assigned topics with special reference to current forestry problems. Critical and historical review of current forestry literature. (1 cred. per qtr.; grad.)
180. Aerial Photography in Forest Management. Use of aerial photographs in timber estimating, forest type and contour mapping, and for forest management plans. (1 cred.; sr., grad.; prereq. 7,8,9)

GENERAL COLLEGE

4. Problems of Contemporary Society. (5 cred.)
- 7A. Physical Science: Principles of Physics. (5 cred.)
- 7B. Physical Science: Sound and Astronomy. (5 cred.)
- 7C. Physical Science: The Nature of Chemistry. (5 cred.)
- 7D. Physical Science: Elements of Geology. (5 cred.)

- 10A.‡ Human Biology: The Fundamental Similarities in the Living World. (3 cred.)
- 10B. Human Biology: How the Living Machinery in Man Works. (3 cred.)
- 10C. Human Biology: Healthful Living. (3 cred.)
- 30A. Literature Today: The Individual and Literature. (3 cred.)
- 30B. Literature Today: Critical Standards in Selecting Books. (3 cred.)
- 30C. Literature Today: Themes in Current Literature. (3 cred.)
- 30D. Literature Today: American Ideals in Literature. (3 cred.)
- 30E. Literature Today: An Introduction to World Literature. (3 cred.)
41. Practical Applications of Psychology. (5 cred.)
- 44B. Current History. (2 cred. per qtr. May be repeated up to 6 cred. total)
- 45A. The United States in World Civilization. (5 cred.)
- 46A. The American Citizen and His Government. (3 cred.)
- 46B. The Functions and Problems of Government. (3 cred.)
- 46C. International Relations. (3 cred.)

GEOLOGY AND MINERALOGY

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

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

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

GERMAN

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

1. Beginning German A. (5 cred.; all; no prereq.)
2. Beginning German B. (5 cred.; all; prereq. 1 or one year of high school German)
3. Beginning German C. (5 cred.; all; prereq. 2 or two years of high school German)
- 1b-2b-3b. Beginning Course—Reading Section. Five class meetings a week. Aim of the course: to develop reading proficiency in the shortest time by concentrating from the outset on vocabulary building and reading techniques and reducing grammar to a minimum. (15 cred.; no prereq.)
4. Intermediate German. (5 cred.; all; prereq. 3 or three years of high school German)
- 24a-25a-26a.† Chemical German. (12 cred.; no prereq.)
33. Medical German. (5 cred.; prereq. 3)

* To receive credit for any part of this course a student must complete the parts preceding the dagger, except that students in Forestry may take 1 and A for 5 credits without completing 2 and B.

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

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

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

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

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

HISTORY AND PHILOSOPHY OF EDUCATION

College of Education

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

HOME ECONOMICS

Freshman and Sophomore Courses

1. Choice and Care of Clothing. Guidance in planning, selecting and caring for the wardrobe. Principles of design and color as they relate to dress and personal appearance, and basic textile knowledge which should help the consumer. (4 cred.; fr.; not open to seniors in home economics, men or students who have had G.C. 15; no prereq.)
3. Clothing Construction A. Involves cutting, fitting, pressing and constructing dresses of rayon fabrics; commercial pattern interpretation and fitting, garment alteration and sewing machine maintenance. (3 cred.; third quarter fr., soph.; prereq. 1)
4. Clothing Construction B. Involves fitting dress and sleeve forms; applying various techniques of pattern fitting or redesigning and of garment fitting, pressing and construction to wool dresses; methods of fabric renovation and repair; designing, cutting and reconstructing garment. (3 cred.; soph., jr.; prereq. 3)
- 6.* Institution Experience. Practical work in the cafeteria. Each student works independently under supervision of instructor. Intended to help student decide upon her specialization. (3 cred.; fr.; no prereq. Limited to 3 each quarter. For Institution Management majors, consent of instructor)
17. Personal and Family Living. Democratic family living; characteristics of the 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.; fr., soph.; no prereq.)
20. Introduction to Related Art. The development of an appreciation of the art involved in the everyday life of the student. Experiences in making selections in varied fields such as dress, house furnishings, etc., are directed toward a discriminating taste. The arts and crafts of various countries are studied briefly for their contribution toward breadth of view, enjoyment and understanding of other cultures. (4 cred.; fr., not open to home economics seniors or those who have had 56)
21. Color and Design I. Experience in applying principles of design and color to specific problems in the selection and arrangement of home furnishings; selection and framing of pictures; lettering; block printing and stenciling. (3 cred.; prereq. 20)

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

22. Color and Design II. Work in fashion designing. 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. Advanced Design. Experience in creative designing with emphasis on the relation of the design to the materials; techniques and their use. Aim: facility in designing. (3 cred.; soph., jr.; prereq. 21)
24. Problems in Home Planning and Furnishing. Exteriors and interiors of houses are studied for their design and suitability to family and locality. Problems in planning and furnishing a home are worked out on the basis of family living. Class work is done in combining fabrics, furniture and accessories in rooms. Field trips. (5 cred.; soph.; prereq. 20. Not open to students who have had G.C. 16, F.L. 15, H.E. 57 (formerly 56B) or H.E. 180. Not open to majors in Textiles and Clothing in Business, Related Art, and Home Economics Education)
25. Design Applied to Crafts. The crafts which may be selected are principally those which can be carried out with the equipment available in the typical home such as needlework, weaving, simple metal work, leather tooling, etc. The emphasis is upon well-designed and suitable articles for use in dress and in the home. (3 cred.; prereq. 21 or 22)
27. Related Art Problems. The emphasis in this course is upon home furnishings. Working with house furnishing materials, the student learns further to understand 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 are included. (3 cred.; jr., sr.; prereq. 21)
- 30.*§ Introduction to Nutrition. A course designed for students wishing a discussion of the application of the principles of nutrition to the selection of food. (2 cred.; not open to home econ. students; no prereq.)
31. Introduction to Nutrition. The application of nutrition principles to food selection of college students. Includes information on the relation of food to the promotion and maintenance of health. (3 cred.; fr., not open to seniors nor to students having credit for H.E. 30; no prereq.)
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.; soph., jr., sr.; prereq. Ag.Bi. 1, Physiol. 4 or parallel)
34. Nutrition Problems. A consideration of the nutrition problems most commonly met by adults and children in typical families. (4 cred.; 3rd qtr. soph., jr., sr.; prereq. 31, 40, physiol., or hum. biol. Not open to students having credit for H.E. 76)
35. Nutrition II. A study of tissues and tissue metabolism as well as work on blood, milk, and urine. (4 cred.; soph., jr., sr.; prereq. 33)
40. Food Preparation. The development of technique and the application of fundamental science principles to cookery processes and preservation. The establishment of good standards for food products. (5 cred.; fr.; prereq. 2 qtrs. chem.)
41. Food Management and Marketing. Determination and study of the management factors involved in the food problems of the homemaker and consumer. A study of the quality, cost, and conservation of foods. Meal planning, preparation and service. (5 cred.; soph., jr., sr.; prereq. 31,40)

* Offered on the Minneapolis Campus.

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

- 45.¶ Quantity Cookery. Application of the principles of cookery to large quantity preparation; planning of meals for dining hall, cafeteria, and tearoom; a study of standardized formulas and production costs. (6 cred.; jr., sr.; prereq. 40, 41)
- 46.¶ Cafeteria Experience. Experience in the minor problems of cafeteria, dining hall, and tearoom administration. (3 cred.; soph., sr.; no prereq.)
49. Household Equipment. A study of the principles which should guide in the selection, operation, care and convenient arrangement of equipment in the home. (3 cred.; soph.; prereq. Ag.En. 35 or permission of instructor)

Junior and Senior Courses

50. Textiles. Consumer textile problems; the characteristics of fibers, fabrics and modern finishes; the selection, maintenance and serviceability of fabrics for clothing and home furnishing; laboratory study of selected fabrics. (3 cred.; jr., sr.; prereq. 1)
52. Introduction to Textiles. A study of the factors which influence the quality and value of fabrics used in men's and women's wearing apparel and household furnishings. Designed primarily to meet the needs of those interested in merchandising. (3 cred.; for S.L.A., Bus.Adm., U.C., and ArtEd.; no prereq. Written permission must be obtained from the Junior College Office, 107TSF)
53. Advanced Clothing. Problems in designing, fitting and tailoring a lined wool coat or suit; use of a plaid, striped or figured fabric in the designing and construction of a garment; social and economic problems involved in children's clothing. (3 cred.; jr., sr.; prereq. 4, 50 or parallel)
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.; jr., sr., prereq. 53 or permission of instructor)
56. Applications of Color and Design I. (Formerly 56A) 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 a consideration of problems relating to dress. Arrangement of display cases is studied through actual experiences. (3 cred.; not open to home economics students or to those who have had H.E. 20. No prereq. Written permission must be obtained from the Junior College Office, 107TSF)
57. Applications of Color and Design II. (Formerly 56B) A continuation of 56 with the emphasis upon house planning and furnishing problems. Rooms and display cases are arranged. A brief study of some of the arts and crafts of other countries gives a background of appreciation and standards for judging quality. (3 cred.; not open to home economics students or to those who have had G.C. 16, F.L. 15, H.E. 24 or H.E. 180; prereq. 56. Written permission must be obtained from the Junior College Office, 107TSF)
64. Institution Buying. Problems involved in the purchasing and use of foods and equipment for the institution. (4 cred.; jr., sr.; prereq. 45 and 46—may parallel one or the other)
65. Institution Management Problems. Problems affecting the efficient administration of the institution; departmental organization, operation, maintenance; employment problems; business policies. (3 cred.; jr., sr.; prereq. 45, 46, 64)

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

70. Advanced Food Preparation. A continuation of Course 40, emphasizing particularly the scientific principles that underlie cookery processes and food preservation. (3 cred.; prereq. Ag.Bi. 1, H.E. 41)
71. Demonstrations. Consideration of the purposes and techniques of food demonstrations with special reference to their application in the field of business. 1 cred.; open to 3rd qtr. jr., sr.; prereq. 41)
76. Nutrition. The application of the principles of nutrition to the problems of food selection most commonly met in everyday living. (4 cred.; jr., sr.; prereq. 30 or 31 and 40. Not open to students having credit for H.E. 34)
- 79.§ Selected Problems for Dietitians. A selected group of problems related to the work of the dietitian involving discussions, assigned readings, and field trips. (3 cred.; jr., sr., prereq. 170 or equiv.)
85. Home Management Principles. A study and discussion of managerial aspects of homemaking; work simplification of household activities; financial records and budget-making for the individual and the family. (3 cred.; jr., sr.; prereq. 40, 41 advised)
86. Home Management Laboratory. Residence for one-half quarter in one of the two home management houses, with direct experience in managing and sharing the various activities and responsibilities involved in the group-living of the students in residence. (4 cred.; jr., sr.; prereq. 85 or parallel, 40, 41 advised, P.H. 52a,b)
89. Special Problems in Household Equipment. A further study of certain pieces of equipment with emphasis on efficiency in operation including demonstration techniques. (3 cred.; jr., sr.; prereq. Ag.En. 35, H.E. 49. Permission of instructor necessary)
98. Home Economics Extension. Study of the objectives, organization, and functioning of home economics extension service in Minnesota and elsewhere. Observation of work in the Twin Cities. Discussion and conferences. (3 cred.; sr.; prereq. H.E.Ed. 91 or parallel)
102. Advanced Textiles. An intensive study of textile materials with reference to the nature of the raw materials; economic, chemical, and physical problems involved in their manufacture and use; the measurement and significance of the physical characteristics of yarns and fabrics. (3 cred.; jr., sr., grad.; prereq. 50, Ag.Bi. 1, Ag.Ec. 3 or parallel)
107. Textile Analysis. The application of quantitative methods in the analysis of textile materials, with special reference to fiber composition and finishes. (3 cred.; jr., sr., grad.; prereq. 50, Ag.Bi. 1,2)
115. Economic and Social Aspects of Clothing. Trends in clothing consumption, clothing expenditure patterns, clothing budgets for low-income and dependent groups, motivation in dress, the sociological and economic aspects of fashion in dress, the ready-to-wear industry. (3 cred.; jr., sr.; prereq. 50, Ag.Ec. 3)
116. Family Clothing Problems. The buying of clothing, governmental controls of clothing productions; the simplification of clothing, the labeling and standardization of clothing, the sizing of garments and patterns, recent developments in the choice of clothing for specific uses such as work clothing and clothing for infants and children. (3 cred.; jr., sr., prereq. 3, 50)

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

120. Art History. A general view of the history of art from the Egyptian period to the present. The development of painting, sculpture, architecture, furniture, and costume is studied in order to understand the influences and the contributions of the past and their significance to contemporary houses, their furnishings and to dress. Field trips. (3 cred.; sr. col. and grad. only)
121. Textile Design. A study of historic and modern textile designs and designers. Original designs applied to textiles by means of silk screen, stencil, batik, and block print techniques. (3 cred.; jr., sr.; prereq. 27, 50; 23 recommended)
122. Advanced Interior Design. Small house interiors are designed and elevation drawings are rendered in color. Each student designs a piece of furniture with a model and working drawings. Studies and reports are made on modern trends, designers and their work, and other topics of practical and historic interest. Actual materials will be used as far as possible. Field trips are made to shops and homes. (3 cred.; jr., sr.; prereq. 27, 120 or permission of instructor)
125. Advanced Costume Design. A study of modern and historic costume. Figure construction. Studies and reports on selected topics. Problems in draping and sketching designs for various figure types. Pencil, crayon, and watercolor techniques. (3 cred.; jr., sr.; prereq. 3 or permission of instructor, 22)
140. New Developments in Food Preparation. Demonstrations, discussions, and some laboratory work illustrating recent trends in food preparation. (3 cred.; jr., sr., grad.; prereq. 40 or equiv.)
142. § Experimental Cookery. An intensive study of problems in foods and food preparation by means of individual laboratory problems. (3 cred.; jr., sr.; prereq. 40, Ag.Bi. 1)
146. § Special Food Problems. Class problems in foods and food preparation. (3 cred.; sr.; prereq. 142)
170. Nutrition of the Family. The fundamental principles of human nutrition and their application in the promotion and maintenance of optimal health of the family. (3 cred.; jr., sr.; prereq. 31, 40, Ag.Bi. 1, physiol. 3 cred.)
171. Child Nutrition. Lectures 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.; jr., sr.; prereq. 170, H.E.Ed. 90)
173. § Nutrition in Disease. A study of the fundamental principles involved in using diet in the treatment of certain diseases. (4 cred.; jr., sr.; prereq. 170; 35 also advised)
176. Advanced Nutrition. Selected quantitative methods applicable to investigation relating to digestion and metabolism. (4 cred.; jr., sr.; prereq. 35 or parallel, Ag.Bi. 2)
177. Digestion and Metabolism. A study of selected problems relating to digestion and metabolism involving lectures, readings, and laboratory work. (3 cred.; jr., sr.; prereq. 35)
178. § Clinical Problems in Nutrition. The application of nutrition information to problems in health and disease involving assigned readings, discussions, and experience in a clinic. (2 cred.; jr., sr.; prereq. 170, 35 or parallel)
179. Readings in Nutrition. A course designed to give experience in the use of nutrition books and periodicals, involving assigned readings, oral and written reports. 2 cred.; jr., sr.; prereq. 170)

§ Students must sign up in the Office of Admissions and Records, St. Paul Campus, at least 2 quarters prior to registration in this course.

180. Home Planning and Furnishing. Problems in planning and furnishing a home to meet family needs. Esthetic, economic, social, and managerial aspects are considered. Each student develops a plan for a house and its furnishings based on family living. Such studies are included as: the house and the community; analysis of floor plans; remodeling; construction features; style developments; design; the manufacture and standards for judging floor coverings, furniture, tableware, and other household furnishings. Field trips. (5 cred.; jr., sr.; prereq. 27, 120 recommended. Not open to students who have had G.C. 16, F.L. 15, H.E. 24 or H.E. 57 [formerly 56B])
181. Housing Problems of the Family. Plans for both urban and rural homes will be considered and the economic, art, and social aspects will be evaluated. Discussions, field trips, and classroom analyses will constitute a part of the work. (3 cred.; jr., sr., grad.; prereq. 24 or 27)
185. Family Relationships. A study of factors that promote satisfaction in family living, and inter-relationships of the family and the community. (3 cred.; jr., sr., grad.; prereq. 17, 86, H.E.Ed. 90 or permission of instructor)
186. Problems in Income Management. Specific aspects of financial management for the individual and for the family are studied. Readings, discussions and field work. (3 cred.; jr., sr., grad.; prereq. 85, 86, 34 or equiv., or permission of instructor)

HOME ECONOMICS EDUCATION

College of Education

Junior and Senior Courses

90. Child Training. A brief study of the physical and mental development of the child is followed by a discussion of the problems of training small children. Lectures, observations of children at various age levels. Reports. (3 cred.; soph., jr., sr.; prereq. Psy. 1-2)
- 91.† Observation, Materials, Teaching in Home Economics. A study of philosophy basic to the home economics program; students' needs and interests; books, bulletins and illustrative materials for instruction purposes; curriculum guides and unit construction; development of home economics in the school program. (5 cred.; jr., sr.; prereq. H.E. 4, 41; Psy. 1-2; Ed. 55A-B; home experience*; parallel H.E.Ed. 93)
92. Teaching Problems in Home Economics. A study of teaching procedures; management of the homemaking department, space and equipment; relationship of teacher to a school, community, and the profession. (2 cred.; sr.; prereq. H.E.Ed. 91, 93; parallel with H.E.Ed. 94 and 192)
- 93‡-94.§‡ Supervised Teaching in Home Economics. Observation, participation, and actual teaching experience under supervision in different home economics situations and on different age levels. In the second quarter the student spends a month in a selected school in the state. (9 cred.; jr., sr.; prereq. H.E. 4, 41; Psy. 1-2; Ed. 55A-B; paralleling H.E.Ed. 91 and 92. Students must have completed home experience* in foods, clothing, and other phases of home economics)

* Plans for the home experience prerequisite for H.E.Ed. 91 and 93 should be made with adviser in Home Economics Education.

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

‡ Students must sign up in the Office of Admissions and Records, St. Paul Campus, at least 2 quarters prior to registration in this course.

95. Field Experience for Home Demonstration Agents. Observation, participation, and actual experience under supervision in the agricultural extension program. This experience includes a study of the program on the St. Paul Campus and participation in a selected county program with a home demonstration agent. A written report summarizing the experience will be required. (6 cred.; permission of the head of Home Economics Education and the director of Agricultural Extension is required for registration)
192. Evaluation in Home Economics Education. Evaluation as a means of measuring progress toward important goals in different areas of home economics; study of available tests and other evaluation materials; construction and refinement of various evaluation instruments. Study of elementary statistical techniques useful to home economics teachers. (3 cred.; sr., grad.; prereq. Ed. 55A-B, H.E.Ed. 91)
- 193A. Home Economics Curriculum. (Secondary level.) A study of the contribution of home economics at elementary and secondary levels; evaluation of curriculum practices and techniques employed in curriculum planning and reconstruction. (3 cred.; sr., grad.; prereq. H.E.Ed. 94 or parallel or permission of instructor)
- 193B. Home Economics Curriculum. (College level.) The place of home economics in higher education; problems facing home economics in small colleges; curriculum offerings; teaching schedules and load; appropriate reference materials. (3 cred.; sr., grad.; prereq. consent of instructor)
- 194A. Adult Education in Home Economics. A study of problems affecting family and community living; teaching procedures used to help out-of-school youth and adults meet problems. Planned for teachers of adults and extension workers. (3 cred.; sr., grad.; prereq. H.E.Ed. 91, 93)
- 194B. Adult Education in Home Economics. Objectives of adult education; community programs; emphasis on special problems. Planned for teachers and supervisors of adult classes. (3 cred.; sr., grad.; prereq. H.E.Ed. 91, 93)
- 197.‡ Organization and Methods of Related Art Teaching. A course which aims to develop a working philosophy of related art. Courses are planned and methods studied to relate art and home economics subject matter in various aspects of home and community life. Illustrative material is collected and evaluated. (1 to 3 cred.; sr.; prereq. H.E.Ed. 91, H.E. 180 or parallel or permission of instructor)
- 199E.‡ Internship. Directed teaching and practice work at the graduate level for candidates for the master of education degree. (Cred. ar.; grad.)

HORTICULTURE

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

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

- 1. Technical Agriculture**—The courses listed below are recommended for students majoring in horticulture in the indicated fields:
- a. Vegetable Growing: Hort. 32, 110, 135, 136, 138, 139; Agro. 31.
 - b. Fruit Growing: Hort. 6, 40, 56, 107, 110, 111, 121; Agro. 31.
 - c. Landscape Gardening: Hort. 6, 11, 21, 22, 24, 25, 40, 51, 56, 176; Ag.En. 3, Draw. and Des. Geom. 41, 42, 43.
 - d. Floriculture: Hort. 12, 14, 51, 56, 110, 153; Agro. 31.

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

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

Freshman and Sophomore Courses

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

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

Junior and Senior Courses

51. Garden Flowers. A study of the common annuals, biennials, and perennial flowers, with special emphasis on their uses in landscape planting. Lectures, reference reading, laboratory, and field trips. (3 cred.; jr., sr.; prereq. Bo. 9 cred. or equiv., instructor's permission)
56. Plant Propagation. Methods of propagating plants by seed, cuttings, layers, and grafting. Practical work in management of nursery stock, bulbs, and plants. Lectures, reference reading, and field trips. (3 cred.; jr., sr.; prereq. Bo. 6 cred. or equiv.)
107. Orchard Management. A detailed study of the various operations in orchards and berry fields. Operating costs and profits. Lectures, laboratory, and individual problems. (3 cred.; jr., sr., grad.; prereq. 6. Limited to major or minor students in horticulture or instructor's permission)
110. Horticultural Crop Breeding. The principles of plant improvement, their special application to horticultural plants, and the breeding methods used with each of the important horticultural crops. (3 cred.; jr., sr., grad.; prereq. Agro. 31)
111. Systematic Pomology. Fruit varieties. Classification, description, identification, and elements of judging. Lectures, laboratory, and a survey of the literature. (3 cred.; jr., sr., grad.; prereq. 6, Bo. 9 or equiv. Limited to major or minor students in horticulture or instructor's permission)
121. Small Fruit Culture. Cultural practices for each of the small fruits. Brief consideration is given to their botanical relationships and the history of their commercial development. Lectures, problems, and survey of literature. (3 cred.; jr., sr., prereq. 6 or 32, Bo. 9 cred. or equiv. Limited to major or minor students in horticulture or instructor's permission)
135. Potatoes. Culture, handling, seed maintenance, varieties, improvement, and physiology of the potato plant. (3 cred.; jr., sr.; prereq. 32, Bo. 9 cred. or equiv.)
136. Adaptation and Maintenance of Vegetable Varieties. The origin and development of leading varieties and their adaptation to different vegetable producing areas. Methods of seed production and maintaining of varieties. Activities of plant breeding organizations toward further improvement of varieties for future use of growers. (3 cred.; jr., sr., grad.; prereq. 32, Bo. 9 cred. or equiv.)

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

INORGANIC CHEMISTRY

Institute of Technology

Freshman and Sophomore Courses

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

MATHEMATICS

College of Science, Literature, and the Arts

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

‡ A fee of \$3 per quarter is charged for this course. Nonveterans must purchase a \$10 chemistry blue purchase card from the bursar in the Administration Building (Minneapolis Campus) before he will be assigned a desk in the laboratory. Veterans will receive information from the instructor concerning purchase card and checking into the laboratory. The course fee, laboratory material, and breakage will be punched out of the purchase card.

Freshman and Sophomore Courses

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

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

MILITARY SCIENCE AND TACTICS

- 1,2,3. First Year Basic Course ROTC. Military organization, leadership, first aid, maps and aerial photographs, individual weapons and marksmanship, National Defense Act. (1 cred. per qtr.; 3 hrs. per week)
- 4,5,6. Second Year Basic Course ROTC. Evolution of warfare, military administration, military law, leadership, physical development methods, maps and aerial photographs. (1 cred. per qtr.; 3 hrs. per week; prereq. 1,2,3 or 6 months of military service or completion of Junior ROTC)
- 151,152,153. First Year Advanced Course ROTC. Tactics and technique of one of the following: Corps of Engineers, Ordnance Department, Anti-Aircraft Artillery, Signal Corps, Transportation Corps, and Quartermaster Corps. (3 cred. per qtr., 5 hrs. per week)
- 154,155,156. Second Year Advanced Course ROTC. Tactics and technique of one of the branches listed above. (3 cred. per qtr., 5 hrs. per week; prereq. 151, 152,153)

Additional information may be procured from the Professor of Military Science and Tactics, Room 106, Armory, Minneapolis Campus. See also page 27.

MUSIC**College of Science, Literature, and the Arts**

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

Freshman and Sophomore Courses

1. Fundamentals of Music. (2 cred.; for nonmusic majors; no prereq.; all)
- 1T-2T-3T. Music Theory. A correlated course including Ear Training, Sight Singing, Melodic and Harmonic Dictation, Keyboard and Written Harmony. (9 cred.; primarily for music majors and minors. Students must make arrangements for a placement test in the office of the Department of Music)
- 4T-5T-6T. Music Theory. Continuation of Music Theory 1T-2T-3T. (12 cred.; prereq. 3T)
- 31-32-33.¶ Music Appreciation. Cultivation of better understanding of music heard today. The course is designed for students with a general interest in music rather than for those majoring in music. (6 cred.; no prereq.)

¶ Students may enter any quarter.

- 11.‡ Piano.
 12.‡ Voice.
 13.‡ Violin.
 14-26.‡ Other Orchestral Instruments.
 27.‡ Organ.
 40-41-42. Orchestra. (3 cred.; all; prereq. consent of director)
 43-44-45. University Chorus. (3 cred.; all; prereq. consent of director)

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

- 43StP,44StP,45StP. Music Ensembles. Vocal and instrumental. Special reference to music used in extension, farm, home, school, and recreational activities and situations. (1 cred. per qtr.; all; prereq. consent of director) Open to students on St. Paul Campus only.
 46-47-48. Concert Band. (3 cred.; all; prereq. consent of director)

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

NAVAL SCIENCE AND TACTICS

Information on Naval Science or the Naval Reserve Officers' Training Corps may be obtained from the NROTC Office, Room 203, Armory, Minneapolis Campus. See also page 78.

ORGANIC CHEMISTRY

Institute of Technology

- 61††-62.††† Elementary Organic Chemistry. Lectures and laboratory work. (8 cred.; jr., sr.; prereq. 15 cred. in college chem.)
 63. Elementary Organic Chemistry. Lectures. (3 cred.; jr., sr.; prereq. 62)
 64.†† Elementary Organic Chemistry Laboratory. (3 cred.; jr., sr.; prereq. 62. Must be preceded or accompanied by 63)

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

ORIENTATION

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 this course in their first quarter in college. (1 cred.)

PHYSICAL CHEMISTRY

Institute of Technology

- 101-102-103. Physical Chemistry. (3 cred. per qtr.; jr., sr., grad.; prereq. An.Ch. 1,2; Phys. 7-8-9; differential and integral calculus)

† No credit is given unless both quarters of the course are completed.

‡ Fees for Music 11 to 27 inclusive: (1) One individual lesson per week, 2 credits, \$30.

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

†† A fee of \$3 per quarter is charged for this course. The student should purchase a \$10 deposit card from the bursar, in the Administration Building (Minneapolis Campus). No student will be assigned a desk in the laboratory until he presents this card. The \$2 course fee, laboratory material, and breakage will be charged against the deposit.

104‡-105‡-106‡ Physical Chemistry Laboratory. (1 to 2 cred. per qtr.) To accompany or follow 101-102-103.

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

PHYSICAL EDUCATION FOR MEN

The Physical Education Department offers men the opportunity to elect instruction in sports of a recreational nature in which men can participate during their college career and in later life.

A towel and locker fee of \$2.50 per quarter is charged all students using physical education facilities for activity. Uniforms for class work or recreational activity are \$2 per quarter.

Not more than nine credits in courses in physical activities may be counted toward graduation.

- 1A.‡‡ Sports Education. (1 cred. per qtr.; all; no prereq.)
 (a) Touchball, volleyball, badminton or
 (b) Beginning swimming or
 (c) Adapted activities (by permission of instructor only)
- 1B.‡‡ Sports Education. (1 cred. per qtr.; all; no prereq.)
 (a) Wrestling, handball, squash, basketball or
 (b) Beginning swimming or
 (c) Adapted activities (by permission of instructor only)
- 1C.‡‡ Sports Education. (1 cred. per qtr.; all; no prereq.)
 (a) Swimming, track, softball, tennis or
 (b) Beginning swimming or
 (c) Adapted activities (by permission of instructor only)
- 2A.‡‡ Sports Education. (1 cred.; all; prereq. 1A,B,C or permission of instructor)
 Sections in the following sports: (1) bowling, (2) intermediate swimming, (3) advanced swimming, (4) wrestling, (5) boxing, (6) gymnastics and weight lifting, (7) folk dancing, (8) ballroom dancing, (9) golf, (10) handball and squash.
- 2B.‡‡ Sports Education. (1 cred.; all; prereq. 1A,B,C or permission of instructor)
 Sections in the following sports: (1) bowling, (2) intermediate swimming, (3) advanced swimming, (4) badminton, (5) wrestling, (6) gymnastics and weight lifting, (7) folk dancing, (8) ballroom dancing, (9) golf.
- 2C.‡‡ Sports Education. (1 cred.; all; prereq. 1A,B,C or permission of instructor)
 Sections in the following sports: (1) life saving, (2) tennis, (3) golf, (4) handball and squash, (5) folk dancing, (6) ballroom dancing.

For additional courses and course descriptions and for special four- and five-year professional courses for physical education majors see the *Bulletin of the College of Education*.

PHYSICAL EDUCATION FOR WOMEN

The General Course in Physical Education offered by the Department of Physical Education for Women provides a wide program of sports and other activities to meet the varying interests and needs of all the women students. The program

‡ A fee of \$3 per quarter is charged for this course. The student should purchase a \$10 deposit card from the bursar, in the Administration Building (Minneapolis Campus). No student will be assigned a desk in the laboratory until he presents this card. The \$2 course fee, laboratory material, and breakage will be charged against the deposit.

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

offers an opportunity to take courses in body building and conditioning and for the acquisition of personal and recreational skills.

All women students will be required to take at least 3 credits in physical education. The course chosen must be approved by the Department of Physical Education for Women.

For professional courses designed to prepare graduates for the responsible direction of physical education activities, and for required courses for Nine-Credit State Endorsement for teaching part-time physical education, see the *Bulletin of the College of Education*.

Statement of Fees—A physical education fee of \$2.50 per quarter is charged for all courses except Horseback Riding and Rifle Marksmanship. Maximum fee per student, \$5 per quarter.

Students must report to the Norris Gymnasium for Women on either of the first two days of the quarter in order to be placed in the proper section, day, and hour of the activity course. This registration is in addition to the regular registration.

*College Program in Physical Education (1½ cred. per qtr. for classes meeting three times per week. 1 cred. per qtr. for classes meeting two times per week.)

Aquatics

Swimming, Beginning, Advanced Beginning, Intermediate, Intermediate and Advanced, Advanced, Advanced and Diving, Advanced and Synchronized	Red Cross Life Saving Canoeing †Water Safety Instructors' Courses
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Body Building

Individual Body Building

Individual Sports

Archery, Elementary, Elementary and Intermediate	Horseback Riding, Elementary
Badminton, Elementary, Intermediate	Rifle Marksmanship
Bowling	Skating, Elementary
Fencing	Skiing, Elementary
§Golf, Elementary, Intermediate, Advanced	Social Games and Mixers
	Tennis, Elementary, Intermediate and Advanced

Rhythm

Ballroom Dance, Elementary	Modern Dance, Elementary, Intermediate and Advanced
Folk and Square Dances	Tap Dance, Elementary

Team Sports

Basketball	Field Hockey
Softball	Volleyball

* Intermediate and advanced classes are open only to students having had regular instruction and with permission of the instructor.

† This course covers all requirements by the Red Cross for candidates for the rank of "Water Safety Instructor." The prerequisite is a Senior Life Saving Certificate.

§ Students must supply their own equipment.

PHYSICS

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

- 1-2†-3. Introduction to Physical Science. (9 cred.; all; prereq. high school algebra and plane geometry)
- 1a††-2a†††-3a†††. Introduction to Physical Science. Laboratory included. (12 cred.; all; prereq. high school algebra and plane geometry)
- 7††-8†††-9†††. General Physics. Laboratory work an integral part of the course. For students majoring in physics, mathematics, and chemistry and for students in the Institute of Technology.) (15 cred.; all; prereq. registration in differential calculus)

PHYSIOLOGY

Medical School

Freshman and Sophomore Courses

4. Human Physiology. For academic, home economics, pharmacy, and other students. Lectures, recitations, and demonstrations. (4 cred.; all; prereq. 1 qtr. zool., 1 qtr. chem.)

Junior and Senior Courses

60. Human Physiology. Primarily for Medical Technology and 5-year nursing students. (6 cred.; prereq. courses in physiological chemistry and human or mammalian anatomy)
101. Human Physiology (Formerly 58-59). Primarily for dental students. (10 cred.; prereq. courses in physiological chemistry and human or mammalian anatomy)
- 106-107. Human Physiology (Formerly 103-104). Primarily for medical and graduate students. (15 cred.; prereq. courses in zoology, organic chemistry and neuroanatomy). (Now a single course. Registration for either 106 or 107 singly not permitted)

PLANT PATHOLOGY AND BOTANY

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

Two fields of specialization are available in the division: (a) plant pathology and (b) agricultural botany and applied plant physiology.

A. Plant Pathology—Students interested in plant pathology will ordinarily register in the Science Specialization Curriculum with a view to taking graduate work. A major in plant pathology in the Technical Agriculture Curriculum must have approval of the division.

Recommended for major in plant pathology:

1. **Science Specialization:** P1.Pa. 1 or 10; 105-106-107; 111 or 112 or 14; 119, 143.
2. **Technical Agriculture**—Consult adviser in Plant Pathology.

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

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

B. Agricultural Botany and Applied Plant Physiology—A major in agricultural botany and applied plant physiology should include basic courses in the Department of Botany in the College of Science, Literature, and the Arts. Since the student may wish to apply his botanical training to one of the several fields of horticulture, agronomy, soils, forestry, and entomology and economic zoology, subjects from these divisions should also be included in either the major or minor.

A major in agricultural botany and applied plant physiology in the Technical Agriculture Curriculum must have approval of the division. A major in Science Specialization assumes continuation in graduate work. For courses recommended for major in both the Technical Agriculture and Science Specialization Curricula, consult divisional adviser.

Plant Pathology

Freshman and Sophomore Courses

1. Plant Pathology. An introductory course in plant diseases. Lectures, laboratory, and reference. (5 cred.; soph., jr., sr.; not open to those who have completed Course 10; prereq. 9 cred. in plant sciences of which at least 6 shall be in botany)
10. Forest Pathology. Diseases of forest and shade trees, and the rotting of timber. Symptoms, etiology, and control. Lectures, laboratory, and reference work. (5 cred.; soph., jr., sr.; not open to those who have completed Course 1; prereq. bot. 6 cred.)

Junior and Senior Courses

52. Biochemistry and Microbiology of Cereal Grains. Physical properties and chemical composition of cereal grains and their mill products; microorganisms associated with cereal grains and their products; the biochemistry and microbiology of grain storage, milling, malt production and breadmaking. (3 cred.; jr., sr.; open only to students in Mechanical Engineering Curriculum (Milling Option); prereq. elem. org. chem. 5 cred., and general biol. 9 cred. or equiv.) (Same as Ag.Bi. 52)
56. Introduction to the Study of Fungi. The structure, development and identification of fungi, especially those of economic importance. (3 cred.; jr., sr.; prereq. bot. 9 cred. or instructor's permission)
104. Industrial Mycology. Fungi in relation to industrial processes and products. (3 cred.; jr., sr., grad.; prereq. 56 or 1 or 10)
- 105-106-107. Mycology. Morphology and taxonomy of fungi. Lectures, laboratory, and field work. (3 or 5 cred. per qtr.; jr., sr., grad.; prereq. 1 or 10 or equiv.)
111. Diseases of Field Crops. Detailed study of diseases of field crops including symptomatology, etiology, and practical methods of control. (4 cred.; jr., sr., grad.; prereq. 1 or 10)
112. Diseases of Fruit and Vegetable Crops. Special study of diseases of fruit and vegetable crops, especially those important in Minnesota. Laboratory, lectures, and field work. (3 cred.; jr., sr., grad.; prereq. 1 or 10) (Given in alternate years; not offered in 1949-50)
113. Fungi. A study of representative fungi in the principal taxonomic groups, with special emphasis upon morphology, physiology and taxonomy. (4 cred.; jr., sr., grad.; prereq. biol. 10 cred., chem. 10 cred., Bact. 53)
114. Advanced Forest Pathology. A detailed study of wood rots, including a study of the deterioration of wood products caused by fungi. Lectures and laboratory work. (3 cred.; jr., sr., grad.; prereq. 1 or 10)

117. Virus Diseases of Plants. The nature of plant viruses and types of diseases they cause; particular emphasis on methods for studying virus diseases. (3 cred.; jr., sr., grad.; prereq. 1 or 10) (Given in alternate years; not offered in 1950-51)
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.; jr., sr., grad.; prereq. 1 or 10) (Given in alternate years; not offered in 1949-50)
119. Principles of Plant Disease Control. A general consideration of principles and practices in controlling plant diseases. (3 cred.; jr., sr., grad.; prereq. 1 or 10)
120. Advanced Plant Pathology. A course in general plant pathology, including lectures, laboratory, and greenhouse work and special problems. (3 cred.; jr., sr., grad.; prereq. 14 cred. in plant sciences or permission of instructor; not recommended for those who have had 1 or 10)
- 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 disease; methods of rearing and handling insect vectors. (6 cred.; jr., sr., grad.; prereq. 8 cred. in ent. or pl. pa.)
143. Methods. Theoretical and practical consideration of methods used in pathological and mycological research. (3 cred.; jr., sr., grad.; prereq. 1 or 10)
156. Advanced Study of Fungi. General characters of fungi, especially those used in identification; cultural and taxonomic procedures and practices. (3 cred.; jr., sr., grad.; prereq. bot. 9 cred. or instructor's permission)

Agricultural Botany and Applied Plant Physiology

Freshman and Sophomore Courses

3. Weeds. A study of the identification, structures, and habits of weed plants in relation to methods of controlling them. (3 cred.; fr., soph., jr., sr.; prereq. bot. 6 cred.)
4. Grasses and Sedges. A study of the grasses and a few of the sedges of this area relative to their identification, anatomy, ecology, and economic value. (3 cred.; soph., jr., sr.; prereq. bot. 9 cred. or equiv.)
9. Seed Technology and Testing. Testing, including germination, identification, purity, seed storage; processing and preparation of seed for trade, seed legislation. (3 cred.; soph., jr., sr.; prereq. bot. 9 cred. or equiv.)

Junior and Senior Courses

53. Food Plants of Game Animals. A study of food plants: uses, habits, reproduction and identification. (3 cred.; jr., sr.; prereq. one yr. of bot. and one yr. of zool., or equiv.)
101. Special Agricultural Botany. Botanical characters, environmental relations, and utilization of important groups of plants, especially those of the tropics and subtropics. (3 or 5 cred.; jr., sr., grad.; prereq. bot. 9 cred. or equiv.)
102. Physiology of Seeds. Physiology of development, ripening, storage, dormancy, viability, and germination; processing and seed treatment in relation to viability. (3 cred.; jr., sr., grad.; prereq. 15 cred. in plant sciences or permission of instructor)

103. Physiology of Crop Plants. A study of physiological factors affecting the growth and development of crop plants; lectures and laboratory. (3 or 5 cred.; jr., sr., grad.; prereq. 15 cred. in plant sciences or permission of instructor)
135. Weed Control. (Same as Agro. 135) Cultural and chemical methods of weed control; weed and seed laws pertaining to dissemination and control. Lectures, laboratory, and field work. (3 cred.; jr., sr., grad.; prereq. Agro. 1 and Pl.Pa. 3)
160. Plant Histochemistry. A study of the identification and function of plant constituents, with a special consideration given to economic plants; lectures and laboratory. (3 cred.; jr., sr., grad.; prereq. 15 cred. in plant sciences or permission of instructor) (Offered in alternate years; not offered in 1949-50)
161. Technology of Fruits and Vegetables. A study of the methods used in transporting, storing, and ripening fruits and vegetables; lectures and laboratory. (3 cred.; jr., sr., grad.; prereq. 15 cred. in plant sciences or permission of instructor) (Offered in alternate years; offered in 1949-50)
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.; jr., sr., grad.; prereq. 15 cred. in plant sciences or permission of instructor)
163. Practical Applications of Plant Physiology. A study of the applications of plant physiological principles to agriculture, horticulture, and forestry; lecture and laboratory. (3 cred.; jr., sr., grad.; prereq. 15 cred. in plant sciences or permission of instructor)

POLITICAL SCIENCE

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

- 1-2†-3. American Government and Politics—Parts 1-2. National, state, and local. Constitutions and fundamental laws; governmental organization; division and separation of powers; legislative, executive, and judicial procedure and problems. Part 3. Principal functions and services of government, defense, law enforcement, regulation of business, public works, and social services. (9 cred.; all; no prereq.)

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

POULTRY HUSBANDRY

Students whose major interests lie in the fields of poultry production, processing, distribution and 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, 104, 153, 154; An.Hu. 112; Vet. 109; Ag.Bi. 6; Ag.Ec. 25, 40; Agro. 31.
- 2. Science Specialization:** Consult adviser.

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

Freshman and Sophomore Courses

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

Junior and Senior Courses

51. Hatchery Management. Principles of incubation, study of commercial incubators and problems of hatchery operation and flock improvement. (3 cred.; jr., sr.; prereq. 1, Zool. 14-15)
52. Poultry Selection. Practice in selection for standard and production qualities of poultry. (3 cred.; jr., sr., prereq. 1)
55. Special Problems. Special individual assignments in Poultry Husbandry. (1-3 cred.; jr., sr.; prereq. 9 cred in po. hu.)
102. Poultry Breeding. The application of the principles of genetics and physiology of reproduction to the breeding of poultry. (4 cred.; jr., sr., grad.; prereq. 1, Agro. 31)
104. Seminar. A study of current problems and developments in the poultry industry. (2 cred.; jr., sr., grad.; prereq. 6 cred. in po. hu.)
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.; jr., sr., grad.; prereq. 1, Ag.Bi. 1)
154. Poultry Products. A study of grades and classes of market poultry and eggs, methods of processing and storage, and problems in produce plant operation. (4 cred.; jr., sr., grad.; prereq. 1)

PSYCHOLOGY**College of Science, Literature, and the Arts****Freshman and Sophomore Courses**

- A. Elementary Psychology. An introduction to psychology with special attention to its applications. (5 cred.; fr.,* soph.; no prereq.)
- 1-2† General Psychology. A general introduction to the study of human behavior with emphasis on the development of the individual. (6 cred.; soph., jr., sr.; no prereq.)
3. Psychology Applied to Daily Life. (3 cred.; soph., jr., sr.; prereq. 1-2)
- 4‡-5.†‡ Introductory Laboratory Psychology. (4 cred.; soph., jr., sr.; may be taken with or after 1-2)

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

PUBLIC HEALTH**Medical School****Freshman and Sophomore Courses**

3. Personal Health. Elementary principles of normal body function; predisposing and actual causes of disease; ways in which disease may be avoided. (2 cred.; fr., soph.; no prereq.; not open to students who have taken Hu.Biol. 10C in the General College)

* This course is open to a limited number of first and second quarter freshmen with the approval of their advisers and to third quarter freshmen with a C average.

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

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

4. Health Problems of the Community. Personal health and prevention of disease in the family; relation to community health and disease control; important diseases and their prevention. (2 cred.; all; prereq. 3 or G.C. 10C or successful passing of exemption exam.; not open to students excused from P.H. 3 on basis of military service)

Junior and Senior Courses

50. Public and Personal Health. Causes of diseases and of physical defects; fundamental principles and working methods of health conservation and disease prevention. Lectures, discussions, and directed readings. (3 cred.; open to jr. and sr. who have not taken Courses 3, 4, 52, 53, or 100; no prereq.)
51. Community Hygiene. Elementary concepts of development, spread, and prevention of preventable diseases; community programs for their control. (3 cred.; jr., sr.; prereq. 3 or 50 or G.C. 10C; not open to students who have taken 4, 50, 52, 53, or 100 or those excused from P.H. 3 or 50 on basis of military service)
- 52a,b,§ Health Care of the Family. Factors affecting the health of the family as a unit; environmental factors, including elementary sanitation; prevention of accidents; communicable diseases, their transmission and prevention; prenatal and infant hygiene; principal problems in preschool and school hygiene; care of the sick room; observation and care of the patient; elementary symptomatology. For students of home economics. (3 cred.; soph., jr., sr.; prereq. Bact. 53, Physiol. 4; not open to students who have taken 50, 51)
57. Health of Infant and Preschool Child. Maternal and child health in public health program, problems of infant and maternal mortality, growth and development of infant and young child, care and feeding of normal infant; prevention and correction of physical defects. (2 cred.; jr., sr.; prereq. 4 or 50 or 51 or 52 or 53 or 100)
59. Health of the School Child. Mental and physical growth; prevention and control of diseases common to the school-age child; health appraisal; correction of physical defects; emotional problems; care of the handicapped; the school environment and its effect on child health; accident prevention and emergency care; practical problems of health supervision and administration. (3 cred.; jr., sr.; prereq. 3 and 4 or 3 and 51 or G.C. 10C and 4 or G.C. 10C and 51, or 50 or 53 or 100)
60. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States; early diagnosis and sanatorium treatment; tuberculosis in children; psychology of tuberculosis; supervision of returned sanatoria patients; state program for the eradication of tuberculosis; legislation. (2 cred.; jr., sr.; prereq. 4, or 50 or 51 or 52 or 53 or 100 and 62 which may be taken concurrently)
95. Principles of Human Nutrition (with particular reference to public health). The role of nutrients, nutritional composition of foods, food requirements, nutritional aspects of food production and processing, laws and regulations, food habits. (3 cred.; prereq. 8 cred. in chem. and 10 cred. in biol.)

§ Lectures given fall and spring quarters only; laboratory sections given fall, winter, and spring quarters.

102. Environmental Sanitation I. Methods for promoting man's health and comfort by controlling his environment; water supply sanitation, food sanitation, pollution abatement; sewage, excreta, and waste disposal; bathing place sanitation, air hygiene, illumination, housing control of insect and animal vectors of disease, industrial hygiene and sanitation. (3 cred.; sr., grad.; prereq. 50 or 51 or 53 or 100 or by permission or may be taken concurrently with any of these)

For additional courses see the *Bulletin of the School of Public Health*.

RHETORIC

All freshmen in the College of Agriculture, Forestry, and Home Economics must satisfy certain requirement in four communication skills, and should report to Green Hall Auditorium the first period each day for the first week of every quarter. After a week of diagnosis they will be sectioned according to their needs and abilities. All sections will then continue to meet during the first period, but for only three days a week.

Students with a good scholastic record in their freshman communication courses are eligible to try the Rhetoric 51 exemption examination which, if passed, exempts them from the Rhetoric 51 requirement.

Freshman and Sophomore Courses

- 1.‡ Communications I. Diagnostic tests in listening, reading, speaking, writing. Sectioning and specialized training according to individual needs. Core assignments integrating the use of all four skills. Progress tests. Re-examination to determine what further training in communication is needed for attainment of the level of proficiency required of our college freshmen. (3 cred.; all, no prereq.)
2. Communications II. Expository communication. Balanced training in adapting the four communication skills to the presentation and assimilation of oral and written materials of expository nature. Note-taking, outlining, written papers, oral reports. (3 cred.; all; prereq. placement test.)
3. Communications III. Persuasive communication. Balanced training in adapting the four communication skills to the presentation and critical analysis of oral and written materials of a persuasive nature. Argument, evidence, and the techniques of documentation. Brief-writing and persuasive speaking. (3 cred.; all; prereq. placement test)
- 12.‡ Debate and Discussion. Classroom and intercollegiate debating; briefing, methods of public discussion, the elements of persuasion. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
- 22.‡ Public Speaking. A practical course in the fundamentals of speech making. Particular emphasis upon organizing the speech and projecting it to the audience. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
26. Original Writing. Intended for students interested in writing popular articles or creative materials including the essay, the short story, poetry, the one-act play. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
- 28.‡ Play Production. History of the theater, theories of acting, staging, etc. A survey of the problems confronting the producer of amateur plays. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)

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

31. English Literature I. An introduction to poetry and drama, stressing the comprehension and appreciation of good literature. Records and visual aids supplement lecture and discussion. (5 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
32. English Literature II. An introduction to the essay, biography, and fiction. A continuation of Rhet. 31 but may be taken independently. Records and visual aids supplement lecture and discussion. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)
33. American Life in American Literature. A careful examination of the works and influence of ten preeminent contributors to our national literature. (3 cred.; soph., jr., sr.; prereq. Rhet. Comm. requirement)

Junior and Senior Courses

51. Exposition. Essays; semi-technical 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.; jr., sr.; prereq. Rhet. Comm. requirement)
- 54.‡ Advanced Public Speaking. Training for specific speech situations most likely to be encountered professionally soon after graduation from college. Aids in informative speaking. Psychology of persuasion. (3 cred.; jr., sr.; prereq. 22)
- 59.‡ Advanced Play Production. Continuation of Course 28. Problems of directing, staging, and make-up. Study of representative one-act plays. Each student is required to produce a one-act play. A practical course for teachers. (3 cred.; jr., sr.; prereq. 28 or permission of instructor)
60. Contemporary Literature. Reading and analysis of important books of the current period. (3 cred.; jr., sr.; prereq. Rhet. Comm. requirement)
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 employed to expedite work in vocabulary, enunciation, and pronunciation. First class session held the first Wednesday of each quarter at 3:00 p.m., Room 311 Agricultural Engineering. Subsequent class sessions arranged to suit the convenience of the student. (No cred.; 2 hrs. per week; no prereq.)

ROMANCE LANGUAGES

College of Science, Literature, and the Arts

FRENCH

Junior College Courses

- 1-2. Beginning French. (10 cred.; all; no prereq.)
- 3-4. Intermediate French. (10 cred.; all; prereq. 1-2, or two years of high school French. Students who have had three years of high school French may omit Course 3 and take Course 4)
20. Oral and Written French. (5 cred.; all; prereq. 4 or four§ years high school French)

Senior College Courses

53. French Composition. (3 cred.; jr., sr.; prereq. 3-4)

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

§ Students who have had three years of high school French may be admitted to Course 20 with the consent of the department.

- 54-55. French Conversation. (6 cred.; jr., sr.; prereq. 53 or 20)
- 70-71-72. Survey of French Literature. (9 cred.; jr., sr.; prereq. 3-4)
- 73-74. Survey of French Literature. (10 cred.; jr., sr.; prereq. 3-4)

SPANISH

Junior College Courses

- 1-2. Beginning Spanish. (10 cred.; all; no prereq.)
- 3-4. Intermediate Spanish. (10 cred.; all; prereq. 1-2, or two years of high school Spanish. Students who have had three years of high school Spanish may omit Course 3 and take Course 4)
- 20. Oral and Written Spanish. (5 cred.; all; prereq. 4 or four½ years of high school Spanish)

Senior College Courses

- 53. Spanish Composition. (3 cred.; jr., sr.; prereq. 3-4)
- 54-55. Spanish Conversation. (6 cred.; jr., sr.; prereq. 53 or 20)
- 65-66-67. Survey of Spanish Literature. (9 cred.; jr., sr.; prereq. 3-4)
- 68-69. Survey of Spanish Literature. (10 cred.; jr., sr.; prereq. 3-4)
- 74-75-76.† Survey of Spanish-American Literature. Contemporary prose and poetry. (9 cred.; jr., sr.; prereq. 3-4)

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

SOCIOLOGY AND SOCIAL WORK

College of Science, Literature, and the Arts

Freshman and Sophomore Courses

- 1. Introduction to Sociology. (5 cred.; no prereq.)
- 2. Intermediate Sociology. (5 cred.; soph., jr., sr.; prereq. 1)
- 14. Rural Sociology. (3 cred.; soph., jr., sr.; prereq. 1)
- 45. Social Statistics. (5 cred.; soph., jr., sr.; prereq. 1. Not open to students who have received credit in Econ. 5)
- 49. Social Problems. (3 cred.; 3rd qtr. soph., jr., sr.; prereq. Soc. 1)

Junior and Senior Courses

- 50-51. Areas of Social Work. (8 cred. for Sequence D students, 6 cred. for other students; jr., sr.; prereq. 49)
- 111. Population Trends. (3 cred.; jr., sr., grad.; prereq. same as for 160)
- 115. Social Aspects of Housing and Standards of Living. (3 cred.; sr., grad.; prereq. same as for 160)
- 120. Social Psychology. (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 15 cred. in soc. sci., child welfare, ed., phil., or psy., or consent of instructor)
- 141. The Family. (3 cred.; jr., sr., grad.; prereq. same as for 160)
- 160. Rural Community Organization. (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 15 cred. in soc. sci., child welfare, ed., phil., or psy., or consent of instructor)

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

‡ Students who have had three years of high school Spanish may be admitted to Course 20 with the consent of the department.

161. Rural Community Analysis. (3 cred.; jr., sr., grad.; prereq. same as for 160 and consent of instructor)
162. Rural Social Institutions. (3 cred.; jr., sr., grad.; prereq. same as for 160)
170. Social Life and Cultural Change. (3 cred.; jr., sr., grad.; prereq. same as for 160)
181. Problems in Rural Social Research. (2 cred.; sr., grad.*; prereq. same as for 160)

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

SOILS

Soils majors in either Technical Agriculture or Science Specialization are expected to take Courses 5, 108, 109, and 111. Technical Agriculture majors should select, with the help of the adviser, a sufficient number of related elective courses in other plant sciences to complete the major sequence. In the Science Specialization Curriculum majors will be expected to select a combination of courses from those offered in botany, chemistry, geology, mathematics, and physics. In either case the subjects selected will be somewhat dependent upon the objective of the course of study being pursued.

Freshman and Sophomore Courses

4. Soils. Origin, formation and classification of soils. The soil profile and its development; physical and chemical properties of soils; organic matter and biological relationships; forms and movement of soil water; erosion control. (3 cred.; soph., jr., sr.; prereq. In.Ch. 1-2 or 4-5)
5. Soil Management. Nutrient requirements of crops; fertilizers and fertilizer materials; fertilizer practices; use of lime; farm manures, their composition, value and use; green manuring; soil management and fertility maintenance. (3 cred.; soph., jr., sr.; prereq. Soils 4)

Junior and Senior Courses

52. Production and Grading of Cereal Crops. Production, harvesting, and grading of cereal crops including soil management practices and fertilizers, selection of varieties and cultural methods; factors affecting quality and methods of harvesting; laboratory practice in grading small grains. (4 cred.; jr., sr.; open only to students registered in the Mechanical Engineering Curriculum (Milling Option); prereq. general biol. 9 cred. or equiv.) (Same as Agro. 52)
103. Principles of Soil Erosion. Causes and forms of erosion; relation of erosion to climate, vegetation, slope, soil type, and soil management. Practices employed in controlling soil erosion. Organizations dealing with soil conservation. (3 cred.; jr., sr., grad.; prereq. Soils 4)
104. Soil Mapping. Field experience in soil surveying. Students will be assigned to areas where soil surveys are in progress. Arrangements must be made in advance. (3 cred.; jr., sr., grad.; prereq. Soils 108 and 109)
- 108.† Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. Lectures and laboratory. (3 cred., jr., sr., grad.; prereq. Soils 4)

* Primarily for graduates, but mature students who are not graduates may be admitted with the consent of the adviser and the instructor.

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

109. Soil Genesis and Classification. Genesis, nature, and distribution of the soil types of Minnesota; development of soils as influenced by climatic, topographic, geologic, and vegetative factors and their classification; productivity ratings of Minnesota soils. (3 cred.; jr., sr., grad.; prereq. Soils 4, 108)
110. Chemistry of the Soil. The chemistry of soil formation, chemical composition of soils, organic matter, mineral matter, ionic exchange. The soil nutrient elements and the factors affecting their availability. (3 cred.; jr., sr., grad.; prereq. Soils 4)
111. Field and Laboratory Studies of Soils. Soil maps; soil texture, structure, and color, soil reaction; nutrient deficiencies; lime and fertilizer materials; fertilizer plot techniques and interpretation of data. Erosion control practices. Lectures, laboratory, and field. (3 cred.; jr., sr., grad.; prereq. Soils 4)

THEORY AND PRACTICE OF TEACHING

College of Education

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

VETERINARY MEDICINE

Those contemplating matriculation in the School of Veterinary Medicine are referred to the curriculum on page 75, and to advisers in this division.

Junior and Senior Courses

- 50-51-52. Anatomy, Physiology, and Hygiene of Domestic Animals. Fundamentals of structure, function, and reproduction of domestic animals. The principles of animal hygiene, including the etiology and means of control of the more important communicable diseases. (9 cred.; jr., sr.)
- 101-102-103. Animal Anatomy. Gross anatomy of domestic animals. (7 cred. for 101, 5 cred. for 102, 4 cred. for 103; open only to first year veterinary students and to graduate students with permission) (Enrolment limited)
104. Special Studies in Animal Anatomy. Individual problems for further study in animal anatomy. (1-3 cred. per qtr.; registration for more than one quarter permitted; prereq. 101)
109. Anatomy, Physiology, and Hygiene of Poultry. This course will be confined to the general anatomy of the fowl, the physiology of digestion and reproduction, and the prevention and control of the more important diseases affecting chickens and turkeys. (3 cred.; jr., sr.; prereq. Zool. 14-15, P.H. 1)
- 111-112-113. Animal Histology and Embryology. Microscopic studies of the various tissues and organs, including embryology, of the domestic animals. (6 cred. for 111, 5 cred. for 112, 4 cred. for 113; open only to first year veterinary students and to graduate students with permission) (Enrolment limited)
114. Special Studies in Animal Histology and Embryology. Individual problems for further study in animal histology and embryology and histological techniques. (1-3 cred. per qtr.; registration for more than one quarter permitted; prereq. 111 or equiv.)
- 121-122-123. Animal Bacteriology. Morphology, classification, and characteristics of pathogenic bacteria. Principles of infection and immunity and studies of bacteria, viruses, yeasts, molds and actinomycetes associated with animal diseases. For students in veterinary medicine and graduate students with permission. Limited enrolment. (5 cred. per qtr.; jr., sr., grad.; prereq. zool 10 cred., chem. 13 cred.)

- 135-136. Animal Physiology. The physiology of circulation, respiration, digestion, kidney function, endocrine function, reproduction, nervous system, and special senses in the domestic animals. For students in veterinary medicine and graduate students with permission. Limited enrolment. (8 cred. for 135, 7 cred. for 136; sr., grad.; prereq. Physiol.Chem. 103, Vet.Med. 103 and 113, or permission of instructor)
- 151-152. Animal Pathology. Descriptions, discussions, and gross and microscopic demonstrations of tissue reactions, including retrogressive and inflammatory changes, neoplasms, and reparative processes. (8 cred. for 151, 7 cred. for 152; sr., grad.; prereq. Vet.Med. 103, 113, and 135 or equiv. with permission of instructor)
161. Animal 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. (5 cred.; sr., grad.; prereq. Vet.Med. 103, 113 or equiv. with permission of instructor)
162. Animal Parasitology. A study of the helminth parasites and parasitic diseases of animals with particular emphasis on principles of control. (5 cred.; sr., grad.; prereq. Vet.Med. 161)
170. Veterinary Clinical Diagnosis. Procedures of physical diagnosis and restraint of animals. (2 cred.; sr.; prereq. Vet.Med. 136, 151)

ZOOLOGY

College of Science, Literature, and the Arts

Courses in this department are closely correlated with those offered by the Division of Entomology and Economic Zoology of the College of Agriculture, Forestry, and Home Economics. For courses of that division, see page 102.

Credit is given for acceptable work done at any approved seaside or freshwater laboratory.

Freshman and Sophomore Courses

- 1‡-2‡-3.*†‡ General Zoology. (10 cred.; all; no prereq.)
- 14‡-15.†‡ General Zoology. Structure, physiology, embryology, classification, and evolution of animals. (6 cred.; all; no prereq.) (Limited to 174)
- 21.‡ Histology. (5 cred.; soph., jr., sr.; prereq. 1-2-3)
- 22.†‡ Comparative Anatomy. (5 cred.; soph., jr., sr.; prereq. 1-2-3)

Junior and Seniors Courses

- 50.‡ Introduction to General Physiology. (5 cred.; soph., jr., sr.; prereq. 1-2-3 or 15 cred. in bot., and 10 cred. in chem. or permission of instructor)
- 51.‡ Introductory Animal Parasitology. (5 cred.; jr., sr.; prereq. 1-2-3)
- 52.‡¶ Introductory Entomology. (5 cred.; jr., sr.; prereq. 1-2-3)

* Lectures may be elected without laboratory with the consent of the chairman of the department. Laboratory must be taken with the lectures, however, if zoology is offered as the required laboratory science. Students should elect lecture sections in which they can continue throughout the three quarters.

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

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

†† A fee of \$7 is charged for this course.

¶ Sections limited to 20 each.

- 53.† Fauna of the Central United States. (5 cred.; jr., sr.; prereq. 1-2-3)
- 57.†-58.†† Introductory Ornithology. (6 cred.; jr., sr.; prereq. 1-2-3 or 14-15 and permission of instructor)
- 59.‡ Comparative Embryology. (5 cred.; jr., sr.; prereq. 1-2-3 and 21 or equiv.)
- 81.‡ Invertebrate Zoology. (3 cred.; jr., sr.; prereq. 1-2-3)
82. Organic Evolution. (3 cred.; jr., sr.; prereq. 1-2-3 or Bo. 1, 7, 21)
83. Introduction to Genetics and Eugenics. (3 cred.; jr., sr.; prereq. 1-2-3 or 10 cred. in bot.)
- 107.†-108.‡ Protozoology. (6 cred.; jr., sr., grad.; prereq. 15 cred.)
- 109.‡ Sense Organs. (3 cred.; jr., sr., grad.; prereq. 15 cred. and consent of instructor)
- 110.‡ Animal Reactions. (3 cred.; jr., sr., grad.; prereq. 15 cred. and consent of instructor)
- 112.‡ Advanced General Physiology. (3 cred.; jr., sr., grad.; prereq. 15 cred. with consent of instructor)
- 113.‡ Special Topics in Advanced General Physiology. (3 cred.; jr., sr., grad.; prereq. 15 cred. with consent of instructor)
- 117.‡ Animal Ecology. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 118.‡ Animal Ecology. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent. and consent of instructor)
- 119.‡ Animal Ecology. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent.)
- 120.‡ General Ecology of Insects. (3 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)
- 121.‡ Ichthyology. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool.)
- 125.†-126.†-127.‡ Advanced Entomology. (9 cred.; jr., sr., grad.; prereq. 15 cred.)
- 128.††-129.†† Insect Physiology. (8 cred.; jr., sr., grad.; prereq. 15 cred. in zool. or ent. and consent of instructor. Zool. 50 or equiv. recommended)
- 132.‡ General Physiology of Development. (3 cred.; jr., sr., grad.; prereq. proper preparation in adv. genetics and consent of instructor)
- 140.†† Biological Microscopy. (4 cred.; sr., grad.; prereq. 15 cred. in zool., ent., or bot.; permission of instructor required)
- 144.‡ Medical Entomology. (3 cred.; jr., sr., grad.; prereq. 15 cred. including 52 or equiv. and consent of instructor)
- 145.‡ Parasitic Protozoa. (3 cred.; jr., sr., grad.; prereq. 15 cred. and consent of instructor)
- 146.‡ Helminthology. (3 cred.; jr., sr., grad.; prereq. 15 cred. in zool. and consent of instructor)
- 149.†-150.‡ Histology and Organology. (6 cred.; jr., sr., grad.; prereq. 15 cred. in zool., permission of instructor necessary)
- 155.†156.‡157.‡ Biophysics. (3 cred. each qtr.; jr., sr., grad.; prereq. 28 credits distributed between physics and biology and permission of instructor. Physical chem. and gen. physiol. recommended. Any section of this course may be taken separately)

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

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

†† A fee of \$5 per quarter is charged for this course.

- 160‡-161‡-162‡ Cytology. (9 cred.; jr., sr., grad.; prereq. 15 cred. with consent of instructor)
- 170.‡ Advanced Genetics. (3 cred.; jr., sr., grad.; prereq. 15 cred. including 83, or consent of instructor)
171. Genetics of Speciation. (3 cred.; jr., sr., grad.; prereq. 15 cred. including 83 or consent of instructor)
175. Human Genetics. (3 cred.; jr., sr., grad.; prereq. 83 and consent of instructor)
181. Endocrines and Reproduction. (3 cred.; jr., sr., grad.; prereq. 15 cred. including 21 or equiv.)
182. Experimental Embryology. (3 cred.; jr., sr., grad.; prereq. 15 cred. including 21 or equiv.)

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

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

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