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Department of Preventive Medicine and Public Health Announcement for the Year 1940-1941

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UNIVERSITY CALENDAR

1940-41

Fall Quarter

1940			
September	16	Monday	Extension registration first semester begins
September	19	Thursday	Payment of fees closes, except for new students[1]
September	23	Monday	Entrance tests
September	23-27		Examinations for removal of conditions Physical examinations Registration period,[2] College of Science, Literature, and the Arts
September	25-28		Freshman Week
September	26-27		Registration days[2] for all colleges not included above. Payment of fees closes for new students
September	30	Monday	Fall quarter classes begin 8:30 a.m.[3] First semester extension classes begin[4]
October	5	Saturday	Last day for extension registration without penalty
October	12	Saturday	Last day for Graduate School registration
November	5	Tuesday	Election Day; a holiday (except for extension)
November	11	Monday	Armistice Day; a holiday (except for extension)
November	28	Thursday	Thanksgiving Day; a holiday
December	13-14 and 16-19		Final examination period
December	19	Thursday	Commencement Convocation Fall quarter ends 6:00 p.m.[5]

Winter Quarter

December	26	Thursday	Payment of fees closes for all students in residence fall quarter[1]
1941			
January	3-4		Registration[2] for new students in all colleges except the Institute of Technology. Payment of fees closes for new students at 12:00 noon, January 4
January	6	Monday	Winter quarter classes begin 8:30 a.m.[3]
January	18	Saturday	Last day for Graduate School registration
January	27	Monday	Extension registration second semester begins
February	8	Saturday	First semester extension classes close
February	10	Monday	Second semester extension classes begin[4]
February	12	Wednesday	Lincoln's Birthday; a holiday (except for extension)

February	15	Saturday	Last day for extension registration without penalty
February	22	Saturday	Washington's Birthday; a holiday
March 14-15 and 17-20			Final examination period
March	20	Thursday	Commencement Convocation
			Payment of fees closes for all students in residence winter quarter[1]
			Winter quarter ends 6:00 p.m.

Spring Quarter

March	28-29		Registration[2] for new students in all colleges except the Institute of Technology. Payment of fees closes for new students at 12:00 noon, March 29
March	31	Monday	Spring quarter classes begin 8:30 a.m.[3]
April	11	Friday	Good Friday; a holiday (except for extension)
April	12	Saturday	Last day for Graduate School registration
May	30	Friday	Memorial Day; a holiday (except for extension)
June	6	Friday	Second semester extension classes close
June 6-7 and 9-13			Final examination period
June	13	Friday	Spring quarter ends 6:00 p.m.
June	14	Saturday	Sixty-ninth annual commencement

Summer Session

June	16-17		Registration, first term
June	18	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Friday	Independence Day; a holiday
July	25	Friday	First term closes
July	28	Monday	Registration and payment of fees for second term close
			Second term classes begin 8:00 a.m.
August	29	Friday	Second term closes

[1] New students must pay fees on dates announced for registration in the registration instructions. Fees of graduate students are due one week after their registration is approved by the dean of the Graduate School.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 60 of the Bulletin of General Information. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

[3] First hour classes begin at 8:15 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

[5] Extension classes continue to Saturday, December 21, and will resume Monday, January 6, 1941.

FACULTY

ADMINISTRATIVE OFFICERS

Guy Stanton Ford, Ph.D., Litt.D., LL.D., L.H.D., President of the University
Theodore C. Blegen, Ph.D., L.H.D., Dean of the Graduate School
Harold S. Diehl, M.A., M.D., D.Sc., Dean of the Medical Sciences
Rodney M. West, B.A., Registrar
Gaylord W. Anderson, B.A., M.D., Head of the Department of Preventive Medicine and Public Health
Mellie F. Palmer, R.N., B.S., C.P.H., Acting Director of the Course in Public Health Nursing

DEPARTMENT OF PREVENTIVE MEDICINE AND PUBLIC HEALTH

PUBLIC HEALTH ADMINISTRATION AND EPIDEMIOLOGY

Gaylord W. Anderson, B.A., M.D., Professor and Head of the Department of Preventive Medicine and Public Health
Ruth E. Boynton. M.S., M.D., Professor of Preventive Medicine and Public Health and Director of the Students' Health Service
Albert J. Chesley, M.D., Clinical Professor of Preventive Medicine and Public Health; Executive Officer, Minnesota State Board of Health
F. E. Harrington, B.S., M.D., Clinical Professor of Preventive Medicine and Public Health; Commissioner of Health, Minneapolis
J. Arthur Myers, M.D., Ph.D., Professor of Preventive Medicine and Public Health
Ralph V. Ellis, M.A., M.D., Associate Professor of Preventive Medicine and Public Health
Orianna McDaniel, M.D., Clinical Associate Professor of Preventive Medicine and Public Health; Director of the Division of Preventable Diseases, Minnesota Department of Health
Lucy S. Heathman, Ph.D., M.D., Clinical Assistant Professor of Preventive Medicine and Public Health; Chief of Laboratories and Assistant Director of the Division of Preventable Diseases, Minnesota Department of Health
Herman E. Hilleboe, B.S., M.D., M.P.H., Clinical Assistant Professor of Preventive Medicine and Public Health; Chief of the Medical Unit, Division of Social Welfare under the Minnesota Department of Social Security
Robert N. Barr, B.S., M.D., M.P.H., Clinical Instructor in Preventive Medicine and Public Health; Director of Rural Health Unit Services, Minnesota Department of Health
Paul W. Kabler, M.D., Ph.D., Clinical Instructor in Preventive Medicine and Public Health; Bacteriologist, Division of Preventable Diseases, Minnesota Department of Health

Clara Nigg, Ph.D., Clinical Instructor in Preventive Medicine and Public Health; Director of Rockefeller Foundation Influenza Research Laboratory

Malvin J. Nydahl, B.S., M.D., C.P.H., Clinical Instructor in Preventive Medicine and Public Health; Head of the Bureau of Crippled Children, Minnesota Department of Social Welfare

Viktor O. Wilson, B.S., M.D., M.P.H., Clinical Instructor in Preventive Medicine and Public Health; Director, Division of Child Hygiene, Minnesota Department of Health

PUBLIC HEALTH ENGINEERING

Frederic H. Bass, B.S., Professor of Municipal and Sanitary Engineering and Head of the Department of Civil Engineering

Charles A. Mann, Ph.D., Professor of Chemistry and Chief of the Division of Chemical Engineering

Harold A. Whittaker, B.A., Clinical Associate Professor of Preventive Medicine and Public Health; Director of the Division of Sanitation, Minnesota Department of Health

Theodore A. Olson, M.A., Assistant Professor of Preventive Medicine and Public Health; Associate Biologist, Division of Sanitation, Minnesota Department of Health

George O. Pierce, M.S., C.P.H., Assistant Professor of Preventive Medicine and Public Health; Sanitary Engineer, Division of Sanitation, Minnesota Department of Health

Herbert M. Bosch, B.S., M.P.H., Lecturer; Public Health Engineer, Division of Sanitation, Minnesota Department of Health

Otto E. Brownell, C.E., Lecturer; Public Health Engineer, Division of Sanitation, Minnesota Department of Health

Philip R. Carter, D.V.M., M.P.H., Lecturer; Sanitarian, Division of Sanitation, Minnesota Department of Health

Jack J. Handy, B.S., Lecturer; Public Health Engineer, Division of Sanitation, Minnesota Department of Health

Harvey G. Rogers, Lecturer; Public Health Engineer, Division of Sanitation, Minnesota Department of Health

Dean M. Taylor, B.Chem.Eng., Lecturer; Associate Public Health Engineer, Division of Sanitation, Minnesota Department of Health

PUBLIC HEALTH NURSING

Mellie F. Palmer, R.N., B.S., C.P.H., Assistant Professor of Preventive Medicine and Public Health and Acting Director of the Course in Public Health Nursing

Laura Draper, B.A., B.S., R.N., Clinical Assistant Professor of Preventive Medicine and Public Health; Director of the Minneapolis Community Health Service

Olivia T. Peterson, R.N., Clinical Assistant Professor of Preventive Medicine and Public Health; Director of the Division of Public Health Nursing, Minnesota Department of Health

Gertrude Lyons, R.N., Clinical Instructor in Preventive Medicine and Public Health; Director of Family Nursing Service of St. Paul

Phyllis Pangburn, R.N., B.A., Instructor in Preventive Medicine and Public Health

Mary E. Parker, B.S., R.N., Instructor in Preventive Medicine and Public Health

Pearl Shalit, R.N., M.S.S., Clinical Instructor in Preventive Medicine and Public Health; Director of Education, Family Nursing Service of St. Paul

Jean Taylor, R.N., B.A., Clinical Instructor in Preventive Medicine and Public Health; Director of Education, Minneapolis Community Health Service

PERSONAL HEALTH AND HEALTH EDUCATION

Ruth E. Boynton, M.S., M.D., Professor of Preventive Medicine and Public Health and Director of the Students' Health Service

J. Arthur Myers, M.D., Ph.D., Professor of Preventive Medicine and Public Health

William A. O'Brien, M.D., Professor of Preventive Medicine and Public Health and Director of Postgraduate Medical Education

Ralph V. Ellis, M.A., M.D., Associate Professor of Preventive Medicine and Public Health

Donald W. Cowan, M.D., M.S., Assistant Professor of Preventive Medicine and Public Health

Carl J. Potthoff, M.D., Assistant Professor of Preventive Medicine and Public Health

John J. Boehrer, B.A., M.D., Instructor in Preventive Medicine and Public Health

Hally J. Fisher, R.N., Instructor in Preventive Medicine and Public Health

Frederick W. Hoffbauer, M.S., M.D., Instructor in Preventive Medicine and Public Health

Phillip D. Kernan, B.S., M.D., Clinical Instructor in Preventive Medicine and Public Health

Elizabeth H. Lange, B.A., M.D., Instructor in Preventive Medicine and Public Health

BIOSTATISTICS

Alan E. Treloar, Ph.D., Associate Professor of Preventive Medicine and Public Health

Margaret P. Martin, M.A., Instructor in Preventive Medicine and Public Health

FIELD ASSOCIATES

Marie Bestul, R.N., B.S., Nurse Supervisor, Rural Health Unit District No. 3, Minnesota Department of Health, Rochester

Gertrude Cromwell, R.N., M.S., Supervisor, Health Education and School Nursing, Des Moines, Iowa

Adelia Eggestine, R.N., M.A., Field Advisory Nurse, Minnesota Department of Health

Grace E. Hanson, R.N., B.S., Nurse Supervisor, Rural Health Unit District No. 1, Minnesota Department of Health, Bemidji

Laura N. Hegstad, R.N., B.S., Nurse Supervisor, Rural Health Unit District No. 2, Minnesota Department of Health, Mankato

Cora T. Helgesen, R.N., Supervisor, Nursing Service, Board of Education, Minneapolis

Adah Hershey, R.N., Director of the Public Health Nursing Association, Des Moines, Iowa

Mary A. Johnson, R.N., B.S., Field Advisory Nurse, Division of Child Hygiene, Minnesota Department of Health

Leah Keable, R.N., Nurse Supervisor, Rural Health Unit District No. 4, Minnesota Department of Health, Duluth

Ann Nyquist, R.N., Field Advisory Nurse, Division of Child Hygiene, Minnesota Department of Health

Astrid Peterson, R.N., Supervisor, Rural Hennepin County Nursing Service

Nora Rolf, R.N., B.S., Field Advisory Nurse, Minnesota Department of Health

SPECIAL LECTURERS, 1939-40

Ray M. Amberg, Ph.C., Superintendent University Hospitals, University of Minnesota

J. J. Bloomfield, Past Assistant Sanitary Engineer, Division of Industrial Hygiene, National Institute of Health, United States Public Health Service

Carl E. Buck, Field Director, American Public Health Association

F. Stuart Chapin, Professor, Chairman Department of Sociology, Director Graduate Course in Social Work, University of Minnesota

Lloyd K. Clark, Director, Division of Engineering, North Dakota State Department of Health

Leslie Frank, Sanitary Engineer, United States Public Health Service

Frederick W. Jackson, Deputy Minister of Health, Province of Manitoba

Richard E. Scammon, Distinguished Service Professor, University of Minnesota

Frank R. Shaw, District Engineer, Interstate Sanitary District No. 3, United States Public Health Service

William P. Shepard, Pacific Coast Welfare Director, Metropolitan Life Insurance Company

John Sundwall, Director, Division of Hygiene and Public Health, University of Michigan

W. W. Towne, Director, Division of Sanitary Engineering, South Dakota State Board of Health

L. F. Warrick, State Sanitary Engineer, Wisconsin State Board of Health

A. H. Wieters, Director of the Division of Public Health Engineering, Iowa State Department of Health

COURSES IN PREVENTIVE MEDICINE AND PUBLIC HEALTH

GENERAL STATEMENT

The Department of Preventive Medicine and Public Health offers a wide selection of general and professional courses. The general courses are designed for the student who desires some knowledge of personal health and an understanding of the community programs that exist for the promotion of the public health. The professional courses are intended to furnish technical training for those who seek a career in public health work or who wish to use technical knowledge and procedures in their future work in allied fields. Because of its close relationship to public health work, the biostatistical instruction at the University is incorporated as a part of the work of the Department of Preventive Medicine and Public Health.

PROFESSIONAL COURSES FOR PHYSICIANS, ENGINEERS, AND NURSES

In keeping with the plans of the United States Public Health Service for the training of public health personnel under the terms of the Social Security Act, the University of Minnesota provides courses for the training of health officers, public health engineers, and public health nurses. Arrangements may also be made for special courses of study for other persons with professional training and public health experience.

The Department of Preventive Medicine and Public Health was authorized and established by the Board of Regents in 1922 in response to the increasing demand for health education and for trained leaders in public health. Since that time it has developed a teaching program in close collaboration with other departments of the medical sciences group, and with other departments of the University dealing with collateral fields of knowledge—in particular, engineering, biology, and social sciences. The training of personnel for public health service is a part of the special interest of the University in training individuals for public service. Unusually broad facilities are afforded for acquiring factual material, techniques, and points of view which are conducive to an intelligent approach to the problems of the various fields of public health service.

Equally important in this type of education is the opportunity to observe the application of these principles by official and voluntary agencies. To this end, close working relationship has been developed with the Minnesota State Department of Health. Its Divisions of Preventable Diseases, of Sanitation, of Child Hygiene, and of Public Health Nursing are housed on the University campus. Teaching has been recognized as one of its legitimate activities. Accordingly the state health officer, his department heads, and technical assistants have assumed a responsible and interested part in the instruction of students enrolled in the University. In addition the directing heads and technical assistants of a large number of official and voluntary health organiza-

tions have been enlisted in the effort to give supervised experience in field activities in both urban and rural areas.

With the establishment of a training center at the University of Minnesota, it has been further possible to invite health officers and sanitary engineers from neighboring states, and officers of the United States Public Health Service to participate in planning the curriculum and, as guest lecturers, to discuss problems peculiar to their fields of interest. Funds made available by the Social Security Act have also facilitated the employment of additional teaching staff by the University.

The recent rapid expansion in public health work has created a demand for trained personnel. The University recognizes that adequate training for this field cannot be acquired in a few weeks. There is a general consensus of opinion that the training period should extend over at least one academic year or three university "quarters" of postgraduate study. As far as possible those students entering the University for this type of study should, therefore, attempt to devote a year to this training.

There is, however, a large group of physicians, engineers, and nurses already, or about to be, engaged in public health work who are unable to devote more than one "quarter" to this work at the present time. Many of these individuals have had a good basic training but little or no previous experience in public health work. Others have had long experience in the practical field but little or no opportunity for theoretical study and instruction. Their practical experience, while long in years in one position, may not have offered the opportunity to observe the work of other agencies engaged in comparable work. To meet the needs of this group certain courses have been concentrated in the fall quarter for physicians and in the winter quarter for engineers so that they may be elected by those who are unable to devote more time to these studies. It is not contemplated that the courses offered during this one quarter of study will be regarded as adequate professional preparation. They have been planned to prepare the individual, as thoroly as possible in the short space of time allowed, for the practical demands of the public health position to which he will return. At the same time a basis will be laid and credit given for the completed work, so that at a later time more advanced courses may be taken leading to a degree or certificate.

COURSES FOR TRAINING MEDICAL HEALTH OFFICERS

Requirements for admission.—Students are admitted by the dean of the Graduate School, and must satisfy the requirements of this school as well as possess professional training. Admission will in general be limited to those who possess the following requirements:

1. A Bachelor's degree or its equivalent from a reputable college or university, with a satisfactory record in the college courses.*

* Students who entered a medical school without a Bachelor's degree or its equivalent or who did not earn such degree during the medical school course, must register as special students in the Medical School (see page 29 for fee differences). Such students will be eligible to receive the certificate in public health, but will not be admitted as candidates for a Master's degree.

2. The degree of doctor of medicine from an acceptable institution (i.e., in Class A of the American Medical Association).

3. One year's experience as an intern in an approved hospital, or an acceptable substitute.

Application blanks for admission will be supplied by the Department of Preventive Medicine and Public Health, upon request. They should be filed with the dean of the Graduate School at least two weeks before reporting for registration. A letter from the registrar of the college of graduation, certifying to the professional degree and including an official transcript of the student's college record, should accompany the application.

PLAN OF INSTRUCTION

The course of instruction covers three academic quarters of study leading to the certificate of public health or the degree of master of science or both, depending upon the student's ability. The three quarters of study may be taken in a single academic year or divided among two or more years according to the preference of the student. The following program of courses is suggested. (See page 21 for description of courses.)

Fall Quarter

No.	Title	Credits
P.M.&P.H. 102	Environmental Sanitation—General	5
P.M.&P.H. 106	Public Health Administration—General	3
P.M.&P.H. 107	Child and Adult Hygiene	4
Pol.Sci. 120	Municipal Functions	3
Bact. 124	Filterable Viruses	4

Winter Quarter

P.M.&P.H. 104	Epidemiology I	5
P.M.&P.H. 108	Care of the Handicapped Child	2
P.M.&P.H. 122	Public Health Administration Problems	3
Pol.Sci. 121	Municipal Administration	3
Bact. 116	Immunity	3
Med. 205	Tuberculosis	2
Ped. 108	Contagious Diseases	1

Spring Quarter

P.M.&P.H. 105	Epidemiology II—Special	3
P.M.&P.H. 110	Biometric Principles	3
P.M.&P.H. 111	Biostatistics Laboratory	2
P.M.&P.H. 170	Supervision in Public Health Nursing	3
Pol.Sci. 122	Municipal Problems	3
Med. 269	Syphilis Therapy	2
Jour. 78	Press Relations	3

Among the courses from which the student may choose as substitutes for certain of the above courses are the following:

No.	Title	Instructor
Anat. 160	Seminar in Human Growth	Dr. Boyd
Bact. 101, 102	Medical Bacteriology	Dr. Larson
Bact. 114	Molds, Yeasts, Actinomycetes	Dr. Henrici
Bact. 120	Diseases of Animals Transmissible to Man	Dr. Green
C.W. 130-131	Child Development	Mr. Anderson

No.	Title	Instructor
C.W. 190	Principles of Mental Measurement of Young Children	Miss Goodenough
Ped. 102	Fundamental Principles of Nutrition and Metabolism as Applied to Children	Dr. McQuarrie
Psy. 144-145	Abnormal Psychology	Mr. Bird
Soc. 100	Social Psychology	Mr. Kirkpatrick
Zool. 107-108	Protozoology	Mr. Turner
Zool. 144-145-146	Animal Parasites and Parasitism	Mr. Riley

Requirements for degree or certificate.—See page 18.

COURSES FOR TRAINING PUBLIC HEALTH ENGINEERS

Requirements for admission.—All students are admitted by the dean of the Graduate School. Entrance upon work for which credit will be received toward the advanced degree of master of science with a major in public health engineering is limited to those who have (a) an engineering degree, preferably with a major in sanitary, civil, or chemical engineering, or (b) a university degree with adequate training in the basic and applied sciences, including bacteriology. It is desirable, tho not required, that applicants shall have had some actual experience and have demonstrated an interest in the field of public health engineering.

Application blanks will be supplied upon request to the Department of Preventive Medicine and Public Health. They should be filed with the dean of the Graduate School at least two weeks before reporting for registration. A letter from the registrar of the college of graduation, certifying to the professional degree, and a transcript of the applicant's college record, should accompany the application. Applicants who are deficient in any of the above requirements but who are otherwise acceptable, may arrange to attend the University during the fall quarter and register for such courses as may be available in the desired subjects. The Department of Preventive Medicine and Public Health will advise applicants and assist them in registering in such courses.

PLAN OF INSTRUCTION

Long course.—This comprises three quarters of study leading to the certificate of public health or the degree of master of science, or both. depending upon the student's ability. The three quarters of study may be taken in a single academic year or divided among two or more years according to the preference of the student.

The program of study to be followed should include such courses as will supplement the engineer's previous education and experience in order that he may acquire a training in all phases of environmental sanitation and in other important branches of public health work. The program, therefore, includes courses dealing with water, milk, and food sanitation; sewage, excreta, and waste disposal; occupational hygiene; control of animals and insects involved in the spread of disease; sanitation of building and recreational areas; public health administration; epidemiology; public health nursing; and biostatistics.

The following program of courses is suggested, with the addition of such electives from the approved list as are needed to complete a program

of 45 credit hours required for the certificate or Master's degree. (See page 21 for description of courses.)

Fall Quarter

No.	Title	Credits
P.M.&P.H. 110	Biometric Principles	3
P.M.&P.H. 111	Biostatistics Laboratory	2
P.M.&P.H. 171	Advanced Problems in Public Health Nursing	3
	Electives	6-9

Winter Quarter

P.M.&P.H. 106	Public Health Administration—General	3
P.M.&P.H. 109	Environment and Disease	3
P.M.&P.H. 112	Environmental Sanitation—Water Supply	4
P.M.&P.H. 113	Environmental Sanitation—Pollution of Waters, Sewage, Excreta, and Waste Disposal	2
P.M.&P.H. 115	Environmental Sanitation—Milk and Other Foods	2
P.M.&P.H. 116	Environmental Sanitation—Problems, Methods, and Organization	3

Spring Quarter

	Electives	11-18

Short course.—This is offered during the winter quarter and is designed primarily to train public health engineering personnel for immediate service in state, district, county, and local health organizations. It also serves as a part of a program of work extending over three university quarters, leading to a Master's degree or a certificate.

The courses to be pursued should include the following. In special circumstances other courses may be substituted, but not over 18 hours of study may be elected. (See page 21 for description of courses.)

Winter Quarter

No.	Title	Credits
P.M.&P.H. 106	Public Health Administration—General	3
P.M.&P.H. 109	Environment and Disease	3
P.M.&P.H. 112	Environmental Sanitation—Water Supply	4
P.M.&P.H. 113	Environmental Sanitation—Pollution of Waters; Sewage, Excreta, and Waste Disposal	2
P.M.&P.H. 115	Environmental Sanitation—Milk and Other Foods	2
P.M.&P.H. 116	Environmental Sanitation—Problems, Methods, and Organization	3

Among the courses from which the student may choose to complete the requirements for the certificate or a degree are the following:

No.	Title	Instructor
Agr.Biochem. 103	Dairy Chemistry	Mr. Palmer
Agr.Biochem. 106	Animal Biochemistry	Mr. Palmer
Anal.Chem. 108	General Technical Analysis	Mr. Sandell
Anal.Chem. 140	Water Analysis	Mr. Sandell
Bact. 101	Medical Bacteriology	Dr. Larson

No.	Title	Instructor
Bact. 123	Applied Bacteriology	Dr. Halvorson
Chem.Eng. 140	Sanitary Chemistry	Mr. Stoppel
C.E. 161	Hydrology	Mr. Bass
C.E. 162-163	Water Supply and Sewerage	Mr. Bass
C.E. 172	City Planning	Mr. Bass, Mr. Jones
C.E. 261-262	Water and Sewage Purification	Mr. Bass
D.H. 102	Dairy Bacteriology	Mr. Macy
D.H. 115	Advanced Dairy Bacteriology	Mr. Macy
Ent. 176-177	Advanced Economic Entomology	Mr. Ruggles
Geol. 110	Economic Geology	Mr. Schwartz
M.E. 160	Heating, Ventilating, and Air Conditioning	Mr. Rowley
M.E. 165	Advanced Heating, Ventilating, and Air Conditioning	Mr. Rowley
Pol.Sci. 120	Municipal Functions	Mr. Ludwig
Pol.Sci. 121	Municipal Administration	Mr. Ludwig
Pol. Sci. 122	Municipal Problems	Mr. Ludwig
P.M.&P.H. 130	Statistical Inference	Mr. Treloar
P.M.&P.H. 131	Sampling Laboratory	Mr. Treloar
Soc. 104	Principles of Sociology	Mr. Monachesi
Zool. 144-145-146	Animal Parasites and Parasitism	Mr. Riley

Requirements for degree or certificate.—See page 18.

COURSES FOR TRAINING PUBLIC HEALTH NURSES

Requirements for admission.—Candidates for admission to the course in public health nursing must meet the entrance requirements of the University.* They must present approved high school credentials; if unable to do this, they are required to take certain special entrance examinations. Students who have to take these special examinations should come to the University three or four days before the date of registration. (See Bulletin of General Information which may be obtained from the registrar.)

Candidates must be graduates of a recognized school of nursing.

Students should write directly to the registrar of the University of Minnesota for application blanks, including the supplemental form for nurses. These should be filled out and forwarded to the registrar at the University of Minnesota at least one month prior to the date fixed for registration. University approval of a candidate's credentials is necessary before registration.

Advanced credit for the professional nursing course will be determined by the Nursing Committee, who will indicate any additional hospital services to be completed before full credit is granted. Forty-five credits represent approximately the average advanced standing granted for a satisfactory course of study in a school of nursing.

All students should be in good health and are required to have a complete health examination during the first quarter in residence and an annual examination while enrolled in the University.

* Occasionally students who are not eligible for matriculation in the University but who have had considerable experience in public health nursing may be accepted as "special students," but will not be entitled to academic credit. Students who wish to enter in this manner should write to the director of the Course in Public Health Nursing and plan for a personal interview.

Part-time employment.—Students who wish to obtain part-time work in a hospital while they are attending the University should apply directly to the superintendent of nurses at the following hospitals: University of Minnesota Hospitals, Minneapolis; General Hospital, Minneapolis. Part-time employment is occasionally available at any of the other hospitals in Minneapolis or St. Paul and also through the University Employment Bureau. Information regarding loans and scholarships and employment may be obtained from the registrar by writing for the bulletin *University Aids for Student Expenses.* Students may not ordinarily work while they are having field experience.

Field observation prior to matriculation.—Field experience, or at least one week's observation of home visiting in any public health agency, is a prerequisite for the first courses in public health nursing. The University will arrange for this period of observation for students who have not had such experience and cannot provide for it in their own community prior to beginning study. All requests for such arrangement must be made to the Department of Preventive Medicine and Public Health. Arrangements will then be made for a period of observation of public health nursing in Minneapolis or St. Paul *preceding registration.*

Plan of instruction.—The curriculum is so arranged that *beginning work in public health nursing* must be taken in the *fall quarter* (or Summer Session—see Summer Session Bulletin). Students planning to take their first work in public health nursing should stay at least for the fall and winter quarters as several of the courses extend over the two quarters. Students who are planning to stay more than a year are advised to take their general academic work before their professional courses. These students may enter any quarter and take courses in other departments.

New students.—New students entering in the fall quarter, even when they enter with advanced standing, may take advantage of Freshman Week activities. The *Introduction to the University* (Freshman Week Handbook) may be obtained at the main entrance in the Administration Building. The following activities are especially recommended: the lectures on the library, the tour of the library, and the lectures on "How To Study."

Field work.—Field work is an essential part of the training of any public health nurse. Experience in an urban family health agency and in rural and school services is required for the degree and the certificate in public health nursing. Field work with a family health agency in an urban area can usually be arranged for students who plan to stay three or more quarters provided application is made at least two quarters in advance.

Field experience in rural and school services is arranged for students who have completed their work in a family health agency. Application for this work should be made well in advance as only a limited number of students can be taken each quarter. Students taking field work are required to furnish and wear a public health nurse's uniform and suitable hat, coat, and

shoes. Transportation to and from the field and board and lodging must be financed by the student. *More valuable rural experience is available to students who can bring their own cars.*

The opportunity to observe and take part in closely supervised field work has been arranged in collaboration with the Minnesota State Department of Health, the municipal health departments of Minneapolis and St. Paul, the school health services of Minneapolis and St. Paul, the Minneapolis Community Health Service, the Family Nursing Service of St. Paul, and the Iowa State Department of Health and Public Health Nursing Association of Des Moines, Iowa.

Course of study.—The course of study, outlined on page 16, leads to a bachelor of science degree with a major in public health nursing. This course is offered in the Medical School and students are registered in that school. If a student wishes to specialize in school nursing or health education, she should register for the curriculum in the College of Education. (See College of Education Bulletin.)

The course leading to a certificate in public health nursing is offered only to students who already have a Bachelor's degree. (See page 16 for special curriculum.) Students who can satisfactorily meet the requirements may work for a Master's degree instead of a certificate in public health nursing if they wish. (See page 17 of this bulletin and the Graduate School Bulletin for further information.)

Students are requested to plan their course of study after careful reading of the bulletin before they register. This plan should be made tentatively for all the quarters they expect to stay in the University. These programs must be approved by the major adviser at registration.

Requirements for degree.—A total of 180 credits is required for a degree with a major in public health nursing. A certificate in public health nursing is granted at the same time as this degree. The usual number of credit hours taken each quarter is 15. The student is expected to maintain a satisfactory academic standing while attending the University and may not graduate with less than a C average in all work as well as a C average in the major sequence. For every 5 honor points in excess of 1 honor point per credit, the credit hours required for graduation are diminished by one, but the student must complete all the required courses in the curriculum. The College of Education requires an honor point ratio of 1.5 (C+) in the major sequence (see College of Education Bulletin), and 5 credits in physical education.

For requirements for the advanced degree in public health nursing see page 18 of this bulletin.

Residence requirements.—One year in residence is required for the bachelor of science degree; two quarters must be in the senior year. Thirty of the 45 credits for the certificate in public health nursing must be taken at the University of Minnesota.

CURRICULUM FOR THE BACHELOR OF SCIENCE DEGREE WITH A MAJOR IN PUBLIC HEALTH NURSING

Required Courses

No.	Title	Credits
English		9–15
	(The required course will depend upon the results of the English placement test which must be taken before the date of registration)	
Social Sciences		
Soc. 1	Introduction to Sociology	5
Soc. 49	Social Pathology	3
Soc. 129 or 90	Principles of Social Case Work	3
	Elective in child welfare group	3
	Courses from social science group exclusive of sociology (history, political science, economics)	9
		23
Natural Sciences		
Psy. 1-2	General Psychology	6
Bact. 53 or 101	General Bacteriology or Medical Bacteriology	5
	Courses from science group (bacteriology, chemistry, zoology, etc.)	14
		25
Professional Courses		
P.M.&P.H. 53	Elements of Preventive Medicine and Public Health	5
P.M.&P.H. 62-63	Principles of Public Health Nursing	6
P.M.&P.H. 65	Field Work in School Nursing	15–23*
P.M.&P.H. 66	Field Work in Rural Nursing	
P.M.&P.H. 67	Field Work in Family Health Agency	
P.M.&P.H. 133 or 61	Mental Hygiene Aspects of Public Health Nursing	3
	Electives from Department of Preventive Medicine and Public Health	8§
Free electives from any department		27–41
		135
Advanced standing for three years hospital training		45†
		180

The curriculum in the College of Education leading to a bachelor of science degree with a major in public health nursing differs from the above curriculum only in that 26 credits in education are required, and this leaves 0–14 free electives depending upon the subjects chosen.

CURRICULUM FOR CERTIFICATE IN PUBLIC HEALTH NURSING

(Open only to students with a Bachelor's degree)

Prerequisites.—If these have not been taken through the curriculum leading to a Bachelor's degree, they must be taken now.

Bacteriology
General Psychology
Introductory Course in Sociology

* Exemption from part of this requirement may be given for satisfactory public health nursing experience obtained on an approved staff or in the undergraduate nursing curriculum.

† Approximately. Additional electives will be required if less than 45 credit hours are allowed for hospital training.

§ Or more.

Requirements for a Certificate

No.	Title	Credits
P.M.&P.H. 53	Elements of Preventive Medicine and Public Health	5
P.M.&P.H. 62-63	Principles of Public Health Nursing	6
P.M.&P.H. 65	Field Work in School Nursing	15-23*
P.M.&P.H. 66	Field Work in Rural Nursing	
P.M.&P.H. 67	Field Work in Family Health Agency	
P.M.&P.H. 133	Mental Hygiene Aspects of Public Health Nursing	3
	Electives from Department of Preventive Medicine and Public Health	6
	Electives to be chosen from related departments	2-10

This curriculum requires a total of 45 credits, that is, 3 to 3½ quarters' work, including field work.

RECOMMENDED ELECTIVES IN THE DEPARTMENT OF PREVENTIVE MEDICINE AND PUBLIC HEALTH FOR PUBLIC HEALTH NURSES

No.	Title	Credits
P.M.&P.H. 2	First Aid	1
P.M.&P.H. 55	Nursing and Social Problems in the Control of Gonorrhea and Syphilis	2
P.M.&P.H. 58	Maternal and Child Hygiene	2
P.M.&P.H. 59	Health of the School Child	3
P.M.&P.H. 60	Tuberculosis and Its Control	2
P.M.&P.H. 69	School Nursing	3
P.M.&P.H. 70	Special Methods and Supervised Practice in Health Teaching	6
P.M.&P.H. 76	Nutrition	3
P.M.&P.H. 91	Community Sanitation	3
P.M.&P.H. 108	Care of the Handicapped Child	2
For Advanced Students		
P.M.&P.H. 102	Environmental Sanitation	5
P.M.&P.H. 104	Epidemiology I	5
P.M.&P.H. 106	Public Health Administration	3
P.M.&P.H. 110	Biometric Principles	3
P.M.&P.H. 111	Biostatistics Laboratory	2
P.M.&P.H. 170	Supervision in Public Health Nursing	3
P.M.&P.H. 171-172	Advanced Problems in Public Health Nursing	Ar
P.M.&P.H. 173	Field Work in Supervision	Ar
P.M.&P.H. 174	Seminar in Public Health Nursing	Ar

PROGRAM OF STUDY LEADING TO A MASTER'S DEGREE

All candidates for advanced degrees are admitted through the office of the dean of the Graduate School. It is required that the candidate have a Bachelor's degree or its equivalent from a reputable college or university and have made a satisfactory record in her college course. It is expected that public health nurses desiring to work for a Master's degree will have had basic courses in Principles of Public Health Nursing, Elements of Preventive Medicine and Public Health, and Mental Hygiene and university courses in field work or equivalent practical experience. If the student is lacking in

* Exemption from part of this requirement may be given for satisfactory public health nursing experience obtained on an approved staff or in the undergraduate nursing curriculum.

any of these courses she should plan to take them at the University before proceeding to advanced work. Application blanks for admission to the Graduate School may be obtained from the Department of Preventive Medicine and Public Health. They should be returned directly to the Graduate School and be accompanied by an official transcript of the student's college and hospital record. The program leading to the Master's degree requires about 3 quarters of work. Students should consult the Graduate School Bulletin for further information.

Courses to be taken by the candidate for the Master's degree should include the following:

No.	Title	Credits
P.M.&P.H. 102	Environmental Sanitation—General	5
P.M.&P.H. 104	Epidemiology I	5
P.M.&P.H. 106	Public Health Administration—General	3
P.M.&P.H. 110	Biometric Principles	3
P.M.&P.H. 111	Biostatistics Laboratory	2
P.M.&P.H. 170	Supervision in Public Health Nursing	3
P.M.&P.H. 173	Field Work in Supervision	Ar

Courses may be chosen from the following or other related fields to complete the requirements:

Sociology—Social Case Work
Child Welfare
Education
Psychology—Psychiatry
Biological Science
Nursing Education

REQUIREMENTS FOR ADVANCED DEGREES AND CERTIFICATES

Courses of study leading to the degree of master of science are available for physicians, public health engineers, and public health nurses. Other students if properly qualified will be admitted by arrangement with the Department of Preventive Medicine and Public Health. Programs of study for all candidates for advanced degrees or certificates in preventive medicine and public health, regardless of their field of specialization, will be approved only if they include basic courses in the following subjects unless exemption is made by the department faculty: (1) Public Health Administration; (2) Sanitation; (3) Epidemiology; (4) Statistics, and (5) Public Health Nursing. The additional credits to qualify the candidate for an advanced degree may be secured in the special branch of public health and allied fields in which the student is interested. See the Bulletin of the Graduate School for full details regarding requirements for advanced degrees. Students receiving such degrees are eligible to receive also the certificate in public health.

A certificate in public health will be issued to all graduate students who complete satisfactorily a program of study of not less than 45 credits which embraces fundamental courses outlined above, even tho the course or the quality of work may not satisfy the requirements for a Master's degree.

COURSES OF STUDY

COURSES IN PUBLIC HEALTH ADMINISTRATION AND EPIDEMIOLOGY

No.	Title	Credits
P.M.&P.H. 53	Elements of Preventive Medicine and Public Health	5
P.M.&P.H. 58	Maternal and Child Hygiene	2
P.M.&P.H. 59	Health of the School Child	3
P.M.&P.H. 60	Tuberculosis and Its Control	2
P.M.&P.H. 100	Preventive Medicine	3
P.M.&P.H. 101	Public Health Administration and Field Work	2
P.M.&P.H. 103	Public Health Bacteriology	Ar
P.M.&P.H. 104	Epidemiology I	5
P.M.&P.H. 105	Epidemiology II	3
P.M.&P.H. 106	Public Health Administration—General	3
P.M.&P.H. 107	Child and Adult Hygiene	4
P.M.&P.H. 108	The Care of the Handicapped Child	2
P.M.&P.H. 109	Environment and Disease	3
P.M.&P.H. 122	Public Health Administration Problems	3

COURSES IN PUBLIC HEALTH ENGINEERING

P.M.&P.H. 102	Environmental Sanitation—General	5
P.M.&P.H. 112	Environmental Sanitation—Water Supplies	4
P.M.&P.H. 113	Environmental Sanitation—Pollution of Waters	2
P.M.&P.H. 115	Environmental Sanitation—Milk and Other Foods	2
P.M.&P.H. 116	Environmental Sanitation—Problems, Methods, and Organization	3

COURSES IN PUBLIC HEALTH NURSING

P.M.&P.H. 54	Principles of Public Health Nursing for Hospital Personnel	3
P.M.&P.H. 55	Nursing and Social Problems in Gonorrhea and Syphilis Control	2
P.M.&P.H. 62-63	Principles of Public Health Nursing	6
P.M.&P.H. 65	Field Practice in School Nursing	Ar
P.M.&P.H. 66	Field Practice in Rural Nursing	Ar
P.M.&P.H. 67	Field Practice with Family Health Agency	Ar
P.M.&P.H. 68	Orthopedic Nursing Field Work	Ar
P.M.&P.H. 69	School Nursing Procedures	3
P.M.&P.H. 70	Special Methods and Supervised Practice in Health Teaching	6
P.M.&P.H. 76	Nutrition for Public Health Nurses	3
P.M.&P.H. 133	Mental Hygiene Aspects of Public Health Nursing	3
P.M.&P.H. 170	Supervision in Public Health Nursing	3
P.M.&P.H. 171-172	Advanced Problems in Public Health Nursing	Ar
P.M.&P.H. 173	Field Work in Supervision	Ar

COURSES IN PERSONAL HEALTH AND HEALTH EDUCATION

P.M.&P.H. A1	Home Nursing and Hygiene I	2
P.M.&P.H. A2	Home Nursing and Hygiene II	2
P.M.&P.H. A8	Hygiene	1
P.M.&P.H. 2	First Aid	1
P.M.&P.H. 3	Personal Health	2
P.M.&P.H. 4	Health Problems of Adult Life	2
P.M.&P.H. 50	Public and Personal Health	3
P.M.&P.H. 51	Community Hygiene	3
P.M.&P.H. 52	Health Care of the Family	3
P.M.&P.H. 57	Health of Infant and Preschool Child	2
P.M.&P.H. 59	Health of the School Child	3
P.M.&P.H. 60	Tuberculosis and Its Control	2
P.M.&P.H. 91	Community Sanitation	3

COURSES IN BIOSTATISTICS

No.	Title	Credits
P.M.&P.H. 90	Measurement in Medicine	2
P.M.&P.H. 110	Biometric Principles	3
P.M.&P.H. 111	Biostatistics Laboratory	2
P.M.&P.H. 120	Correlation Analysis	3
P.M.&P.H. 121	Correlation Laboratory	2
P.M.&P.H. 130	Statistical Inference	3
P.M.&P.H. 131	Sampling Laboratory	2
P.M.&P.H. 140	Topics in Biostatistics	Ar
P.M.&P.H. 150	Life Tables	3

DESCRIPTION OF COURSES

EXPLANATIONS

Course numbering.—A course is designated by a department name, a number, and a letter. It has the same number in whatever quarter it is offered. The quarter is indicated by letter (f, fall; w, winter; s, spring; su, summer).

Examples:

1f-2w, a two-quarter course given in the fall and winter.
1w-2s, the same course given in the winter and spring.
3f,w,s, a one-quarter course given each quarter.

Room schedules will be posted on the Public Health bulletin board in Millard Hall as well as published in the Official Daily Bulletin of the *Minnesota Daily*.

ABBREVIATIONS AND SYMBOLS

I, II, III, etc.	Main campus, first hour (8:30 to 9:20), second hour (9:30 to 10:20), third hour (10:30 to 11:20), fourth hour (11:30 to 12:20), fifth hour (12:30 to 1:20), sixth hour (1:30 to 2:20), seventh hour (2:30 to 3:20), eighth hour (3:30 to 4:20), ninth hour (4:30 to 5:20).
Ar.	To be arranged or assigned.
Cred.	Credits.
Lab.	Laboratory.
Lect.	Lecture.
MTWThFS	Monday, Tuesday, etc.
Prereq.	Prerequisite.
Rec.	Recitation.
Sec.	Section.

A parenthetical statement after the title of each course gives the following information: the number of credits the course carries, the classes to whom it is open, and the courses prerequisite to it. *Abbreviated statement:* (5 cred.; jr., sr.; prereq. 6). *Expanded statement:* This course carries five credits, is open to juniors and seniors only, and has for a prerequisite, Course 6 in the same department.

SUBCOLLEGIATE COURSES IN SCHOOL OF AGRICULTURE

No.	Title	Hour	Day	Bldg.	Instructor
A1.	Home Nursing and Hygiene I. Personal and community hygiene. Prevention and care of illness in the home; methods of improvising nursing equipment.				
	(Fall)	I	W	WH	Miss Fisher
		I, II	F		
	(Winter)	II	W	WH	Miss Fisher
		I, II	F		

No.	Title	Hour	Day	Bldg.	Instructor

A2. Home Nursing and Hygiene II. Hygiene requirement during infancy, childhood, womanhood; preparation for maternity, care of infant, household emergencies. (Winter.) W I, M I, II; WH. Miss Fisher.

A8. Hygiene. Methods of promotion of health and prevention of disease, fundamentals of healthful living; individual and community activities against the spread of disease.

Sec. 1 (Fall)	II	S	Ar	Dr. Hoffbauer
2	III	S	Ar	Dr. Hoffbauer
Sec. 1 (Winter)	II	S	Ar	Dr. Hoffbauer
2	III	S	Ar	Dr. Hoffbauer

PREVENTIVE MEDICINE AND PUBLIC HEALTH

2f,s. First Aid. General care and observation of patients. Emergencies and first aid treatment. Laboratory demonstrations and practice. (1 cred.; open to all except phys. ed. students; no prereq.) Room A, WH(UF).

(Fall)	VI, VII	T	Miss Fisher
Sec. 1 (Spring)	I, II	Th	Miss Fisher
2	VI, VII	W	Miss Fisher

3f,w,s.* 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 Human Biology (G.C.10C.) in the General College.)

(Fall)	VI	MW	BuAud	Dr. O'Brien
(Winter)	VI	WF	BuAud	Dr. O'Brien
(Spring)	VI	MW	BuAud	Dr. O'Brien

4w,s.* Health Problems of Adult Life. Personal health and prevention of disease in the family; relation to community health and disease control, important diseases and their prevention. (2 cred.; prereq. 3 or Human Biology (G.C.10C.) in the General College.) TTh VI. Dr. Potthoff.

50f,s.* 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 jrs. and srs. who have not taken Course 3, 4, 52, or Human Biology (G.C.10C.) in the General College; no prereq.)

(Fall)	VII	MWF	Ar	Dr. Boehrer
(Spring)	IV	MWF	Ar	Dr. Boehrer

51f,s.* Community Hygiene. Elementary concepts of development, spread, and prevention of preventable diseases; community programs for their control. (3 cred.; jr., sr.; prereq. 3, or Human Biology (G.C.10C.) in the General College; not open to students who have taken 50, 52, or 53.)

(Fall)	VII	MWF	Ar	Dr. Cowan
(Spring)	IV	MWF	Ar	Dr. Cowan

52f,w,s.* 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

* No credit granted for this course in major sequence in public health nursing.

No.	Title	Hour	Day	Bldg.	Instructor

prevention; prenatal and infant hygiene and care; principal problems in preschool and school hygiene; care of the sick room; observation and care of the patient; elementary symptomatology. For home economics students. (3 cred.; jr., sr.; prereq. Bact. 53, Human Physiol. 4. Not open to students who have taken 50 or 51.) MWF VI, 313HE(UF). Dr. Lange, Miss Fisher.

53f. Elements of Preventive Medicine and Public Health. Susceptibility, resistance, and immunity to disease; methods of spread and the prevention of communicable and degenerative diseases; protection of food, water, and milk; school health work; vital statistics. (5 cred.; public health nurses and students in med. soc. work; prereq. 3 or 50, or equiv. and a course in Bacteriology.)

Lect.	II	MWF	Ar	Dr. Anderson
Rec. Sec. 1	III	TTh	Ar	
2	VI	TTh		

54. Principles of Public Health Nursing for Nursing School Personnel. Health teaching in the various services of a public health program with particular emphasis on the public health nurse's part in each phase of the program (morbidity, maternity, infancy, preschool, school and adult health problems; communicable disease, tuberculosis, venereal disease, orthopedic and accident prevention). Brief consideration of the organization and administration of public health nursing programs. (3 cred.) (Not offered 1940-41 except in Extension.) Miss Pangburn.

55s. Nursing and Social Problems in the Control of Gonorrhea and Syphilis. History, prevalence, and epidemiology of gonorrhea and syphilis, public health control measures; individual and family problems resulting from these diseases. Provision will be made for conferences and case discussion. (2 cred.; prereq. 53 and 62 or Soc. 90 or 109 may be substituted by medical social service students; may be taken simultaneously with any of these prereq.) TTh II. Miss Parker.

57s.* 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. Psy. 1 and 2, P.M.&P.H. 4, 50, 51, 52 or 53.) TTh III. Dr. Boynton.

58w. Maternal and Child Hygiene. The maternal welfare program; importance of breast feeding; conduct of infant welfare clinics in cities and rural communities; consideration of child of preschool and school age as to malnutrition, physical defects, cardiac and nervous disorders. (2 cred.; public health nurses; prereq. 53 and 62.) MF II. Dr. Boynton.

59s.† Health of the School Child. Mental and physical growth; discovery of physical defects; exercise, fatigue, emotional problems; health habits; diseases of school children; practical problems of health supervision and

* No credit granted for this course in major sequence in public health nursing curriculum.

† Students cannot receive credit for both Courses 59 and 69.

No.	Title	Hour	Day	Bldg.	Instructor

health instruction. (3 cred.; prereq. 4, 50, 51, 52 or 53; will be waived for teachers and school nurses, but cred. granted only after completion of prereq.) MWF II. Dr. Ellis.

60f,s. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States; early diagnosis and sanatorium treatments; tuberculosis in children; psychology of tuberculosis; supervision of returned sanatoria patients; state program for eradication of tuberculosis; legislation. (2 cred.; public health nurses, others admitted by special permission; prereq. 4, 50, 51, 52 or 53, and 62.) TS IV. Dr. Myers.

62f-63w.* Principles of Public Health Nursing. The public health nurse's role in the various services of a public health program; discussion of individual, family, and community health problems; teaching in the home, principles of organization and administration of public health nursing services including planning of the program; some discussion of special services such as school and industrial nursing. (3 cred. per qtr.; public health nurses only; jr., sr.)

Sec. 1§	IV	MWF	Ar	Miss Palmer
2§	VI	MWF	Ar	Miss Parker

65f,w,s.‡ Field Practice in School Nursing.† Credits allowed according to experience in this field. Working with the school nurse the student observes and participates in the activities included in the school nursing program; special attention to organization, relationships, techniques, methods of informal health teaching, provision for handicapped children, and home visiting. (Cred. ar.; public health nurses only; jr., sr.; prereq. 53, 62, and 67.) Miss Palmer.

66f,w,s.‡ Field Practice in Rural Nursing.† Credits allowed according to experience in this field. The student accompanies the rural nurse on her rounds and observes and participates in the activities in a rural nursing program. Special attention to organization for rural health work, methods of health teaching, development of community leadership, planning and conducting classes of various types for differing age groups, home visiting, etc. (Cred. ar.; public health nurses only; jr., sr.; prereq. 53, 62, and 67.) Miss Palmer.

67f,w,su.‡ Field Practice with Family Health Agency.† Credits allowed according to experience in this field. Lectures, demonstrations, and supervised experience in prenatal and infant clinics and in home visiting. This includes bedside care of all types of cases, with emphasis on promotion of physical and mental health and recognition of social problems. (Cred. ar.; public health nurses only; jr., sr.; prereq. 53, 62.) Miss Palmer, Miss Draper, Mrs. Lyons, Miss Shalit, Miss Taylor.

* To receive credit for any part of this course the student must complete both parts.

† Students must maintain a C average in theory completed before they are admitted to any field work.

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

§ Section 1 is for students who have had practical experience in public health nursing; section 2 is for students who have not had such experience.

68s.‡ Field Work in Orthopedic Nursing. This course includes lectures and clinics at the curative workshop in Minneapolis; observation of physiotherapy treatments in the workshop and at home; observation of home visits to orthopedic cases and of orthopedic services in hospitals and out-patient departments. (Cred. ar.; prereq. 67, Phys. Ed. 50 or by permission; jr., sr.; public health nurses only.) Miss Palmer.

69s.* School Nursing. Development, organization, and scope of programs; relationship of school nursing to general public health program, to health education in schools, and to school curriculum. (3 cred.; prereq. 53, and 62, 63, and some field experience but may be taken simultaneously with 63.) MWF I. Miss Palmer.

70w,s.‡‡ Special Methods and Supervised Teaching in Health Education for Public Health Nurses. (Same as Ed.T.50.) Includes practice in planning instruction and in teaching adults. (6 cred.; jr., sr.; prereq. P.M.&P.H. 65, 66, 67, and permission of instructor.) (Enrolment limited.) Ar. Miss Palmer.

76f. Nutrition for Public Health Nurses. (Same as H.E. 76.) Principles of nutrition applied to family teaching, consideration of diet for normal living, at special periods in life, and for certain diseases. Discussion of diet problems of low income groups. (3 cred.; prereq. 62 or may be taken concurrently.) III TThS. Miss Donelson.

90w. Measurement in Medicine. Consideration of quantitative as opposed to qualitative methods of description; some elements of statistical analysis, particularly as they pertain to vital statistics. (2 cred.; medical students only.) Mr. Treloar.

91f. Community Sanitation. Public health aspects of water, milk, and food supplies; sewage and waste disposal; swimming pools; industrial establishments; ventilation and illumination of schoolrooms; the problem of housing; problems incidental to control of insect vectors of disease. (3 cred.; jr., sr.; prereq. 50 or 51 or 52 or 53 or may be taken concurrently with any of these.) MWF III. Mr. Pierce.

100s. Preventive Medicine. Environmental and biologic factors concerned in the maintenance and transmission of disease, and the possibilities of control or prevention through the efforts of the private physician alone or in collaboration with community, state, or federal agencies. (3 cred., 36 hrs.; junior medical students.) Dr. Anderson.

101f,w,s,su. Public Health Administration and Field Work. A series of field trips to acquaint the student with the activities of the State Board of Health and with problems of water filtration, sewage disposal, and milk sanitation. (2 cred.; senior medical students.) Dr. Anderson.

102f. Environmental Sanitation—General. Public health supervision of water supplies; production, processing, and distribution of milk and other foods; treatment and disposal of sewage, excreta, garbage, and other wastes, bathing places; control of occupational health hazards and of animals and insects involved in the spread of disease. Lectures,

* Students cannot receive credit for both Courses 59 and 69.

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

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

No.	Title	Hour	Day	Bldg.	Instructor

field and laboratory demonstration. (5 cred.; prereq. Bact. 53, P.M.&P.H. 53, 100 or equiv. or consent of instructor.) TThS III and WF VI-VII. Mr. Whittaker, Mr. Olson, Mr. Pierce, associates, and guest lecturers.

103f,w,s. Public Health Bacteriology. Bacteriologic and serologic diagnosis, public health laboratory administration and methods. (Cred. ar.; grad.; prereq. Bact. 101-102, 116 and permission of instructor.) Dr. Heathman.

104w. Epidemiology I. Factors underlying the spread of infectious diseases, with detailed discussion of selected diseases; statistical and epidemiologic methods in the study of diseases. Lectures, laboratory, and seminars. (5 cred.; jr., sr., grad.; prereq. 53 or 100 and consent of instructor; physicians, others by permission.)

	VI-VII	MWF	Ar	Dr. Anderson, Dr. Diehl, Mr. Trelcar

105s. Epidemiology II—Special. Epidemiology of certain diseases of public health importance; study of selected source material. (3 cred.; physicians; prereq. 104.) Ar. Dr. Anderson.

106f,w. Public Health Administration. Structure, basic functions, and activities of public health agencies; public health laws and regulations; administrative procedures in public health practice; relationship to other governmental and social activities. (3 cred.; physicians, engineers, nurses, social workers, and others by arrangement; prereq. 53, 100, 109, or equiv. or to be taken simultaneously with any of these prereq.)

	I	TThS		Dr. Anderson

107f. Child and Adult Hygiene. Promotion of hygiene through public health and community effort, maternal, infant, preschool, school, college, industrial, and adult. Lectures and field trips. (4 cred.; physicians and graduate students in medical social work; prereq. 53 or 100.) MW mornings. Dr. Boynton, Dr. Ellis, and associates.

108w. Care of the Handicapped Child. Extent of problem; history and development of program for care; types of physical defects; means of prevention and correction; medical social aspects; mental and emotional aspects; vocational training and placement. (2 cred.; prereq. 53, 57, 58, or 100.) MW I and T VI, VII, VIII. Dr. Hilleboe and associates.

109w. Environment and Disease. Epidemiology of important diseases with special consideration of the conditions under which certain diseases of man are transmitted by water, milk, and other foods, by air with especial reference to dusts, by insects, and by animals; their relationship to occupation and their administrative control. (3 cred.; engineers; prereq. Bact. 53.) TThS II. Dr. Anderson.

110f,s. Biometric Principles. Introduction to statistical analysis with emphasis on basic principles of statistical reasoning. The description of univariate distributions, normal correlations, simple tests of significance, and goodness of fit. (3 cred.; jr., sr., grad.; prereq. 18 cred. in biol. sci. or math. through anal. geom.; to be taken with 111.)

(Fall)	III	TThS	Ar	Mr. Treloar
(Spring)	I	TThS	Ar	Mr. Treloar

No.	Title	Hour	Day	Bldg.	Instructor

111f,s.‡ Biostatistics Laboratory. Practical training in machine calculation and statistical techniques. To be taken concurrently with Course 110. (2 cred.) Miss Martin.

112w. Environmental Sanitation—Water Supply. Sanitary problems associated with the location, construction, and operation of water supplies, purification works, and distribution systems including a consideration of plumbing installations and fixtures; methods of public health supervision. Lectures, field and laboratory demonstrations. (4 cred.; prereq. 109 and 102 or C.E. 165 or 162.)

III	TThS	Ar	Mr. Whittaker,
V-VII	M		Mr. Pierce,
VI-VIII	Th		and associates

113w. Environmental Sanitation—Pollution of Waters; Sewage, Excreta, and Waste Disposal. Methods for the study and control of stream and lake pollution; public health supervision of, and methods for treatment and disposal of sewage, excreta, garbage, and other wastes. Lectures, field and laboratory demonstrations. (2 cred.; prereq. 109 and 102 or C.E. 165 or 163.)

IV	TS	Ar	Mr. Whittaker,
VI-VIII	T		Mr. Olson,
			Mr. Pierce,
			and associates

115w. Environmental Sanitation—Milk and Other Foods. Sanitary problems associated with the production, processing, and distribution of milk and other foods; methods of public health supervision. Lectures, field and laboratory demonstrations. (2 cred.; prereq. 109 and 102 or D.H. 51.)

II	MF	Ar	Mr. Whittaker,
VI-VIII	F		Dr. Carter

116w. Environmental Sanitation—Problems, Methods, and Organization. Sanitary problems of urban and rural communities; control of occupational health hazards and of diseases involving insect vectors and animal hosts; environmental sanitation in activities of federal, state, and local government. Lectures, seminars, field and laboratory demonstrations. (3 cred.; prereq. 106, 112, 113, and 115 or may be taken concurrently with these prereq.)

III	MWF	Ar	Mr. Whittaker,
VI-VIII	W		Mr. Pierce,
			associates,
			and special
			lecturers

120w. Correlation Analysis. Total, partial, and multiple correlation and regression; correlation ratio; contingency; biserial methods; tetrachoric correlation; rank-order correlation; the symmetrical table and intraclass correlation. Course 121 to be taken concurrently. (3 cred.; prereq. 110.) TThS III. Miss Martin.

121w.‡ Correlation Laboratory. Practical training in the above techniques of correlation analysis. To be taken concurrently with Course 120. (2 cred.) Miss Martin.

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

No.	Title	Hour	Day	Bldg.	Instructor

122w. Public Health Administration Problems. Conference discussion of selected problems; relative values of different public health procedures and activities. (3 cred.; prereq. 106 or may be taken concurrently.) TThS III. Dr. Anderson.

123f,w,s. Topics in Public Health. Selected readings in public health with discussion based on these readings. (Cred. ar.; prereq. permission of instructor.) Dr. Anderson and associates.

130s. Statistical Inference. A discussion of the sampling distributions of the more familiar statistics, and analysis of the problems of interpretation of differences, with special reference to small samples. Course 131 may be taken concurrently. (3 cred.; prereq. 110.) TThS III. Mr. Treloar.

131s.‡ Sampling Laboratory. Study of the distributions of statistics derived from small samples by practical test. To be taken concurrently with Course 130. (2 cred.) Miss Martin.

133w. Mental Hygiene Aspects of Public Health Nursing. (Same as Med. 133.) Discussion of emotional factors underlying wholesome family relations and of problems which interfere with successful adjustment in family and community life. Illustrative case material related to problems met by the public health nurse will be used. (3 cred.; prereq. 62 or experience.)

Lect.	II	TTh	Dr. Clarke
Rec. Sec. 1	II	S	Miss Shalit
2	III	S	Miss Shalit

140.‡ Topics in Biostatistics. Studies in special topics for advanced students. (Cred. ar.; prereq. 120, 130, or consent of instructor.) Mr. Treloar.

150.‡ Life Tables. Mortality rates and the construction of the life table. Laboratory course with discussions, offered when sufficient demand exists. (3 cred.; prereq. permission of instructor.) Mr. Treloar.

170s. Supervision in Public Health Nursing. Nature of supervision, classification of activities; methods of supervision, including field visitation, individual counseling, group conferences, staff education programs, administrative functions of supervisors, preparation and selection of supervisors. (3 cred.; prereq. 53, 61, 63 and experience in public health nursing, or by permission.) TThS III. Miss Palmer.

171f,w,s. Advanced Problems in Public Health Nursing. For advanced students who wish to work on special problems in public health nursing. (Cred. ar.; prereq. 170 or permission of instructor.) Miss Palmer and associates.

173f,w,s.‡‡ Field Work in Supervision. (Cred. ar.; public health nurses only; prereq. 170 or permission of instructor.)

200f,w,s. Research. Opportunities will be offered by the University and by the various co-ordinated organizations for qualified students to pursue research work. Ar. Dr. Anderson, Dr. Diehl, and others.

210f,w,s. Seminar in Preventive Medicine and Public Health. M 4:00 p.m. Staff.

‡ A fee of $1 is charged for this course.
‡‡ A fee of $3 is charged for this course.

GENERAL INFORMATION FOR ALL STUDENTS

EXPENSES

1. Tuition fee per quarter*‡

Resident (full schedule)	$20.00
Nonresident (full schedule)	40.00
Resident, per credit hour	1.75
Nonresident, per credit hour	3.50

2. Matriculation deposit*

For graduates	3.00
For undergraduates	10.00

3. Incidental fee per quarter* 8.50
4. Special course fees are charged in addition to the regular tuition.

UNIVERSITY FEES

The university year, extending from October to June, is divided into three terms called quarters. On the specified dates (see Calendar, pages 2-3) prior to the opening of each quarter, the following fees are due from each student: (a) tuition, (b) incidental, and (c) such special fees and deposits as may be required.

Payment of fees cannot be deferred. Special attention is called to the paragraph on Late Fees (Bulletin of General Information) for further instruction on late registration and late payment of fees.

Checks and drafts received in payment of any fee whatsoever are accepted subject to final payment in cash or solvent credits; and all banks in the banking routine of collection of such items are accepted by the student as his own agents, and not those of the University, whether such items be sent directly or indirectly to the payer bank.

RESIDENCE DORMITORIES

For women.—Comstock Hall on the Mississippi River Road will house 278 girls and Sanford Hall at 1100 University Avenue Southeast accommodates 250. The charge for board and single room is from $105 to $130 per quarter; for occupants of double rooms, $95 to $125 per quarter. All applications for residence must be made for the entire school year. Communications requesting residence or regarding prices or any other details should be addressed to the director of the residence halls for women.

* If a student receives a stipend under the terms of the Social Security Act the university registrar should receive official authorization from the State Department of Health as to the payment of university fees before time of registration. The tuition amounts indicated are for registration in the College of Science, Literature, and the Arts, the College of Education, and the Graduate School. For tuition rates for other colleges the Bulletin of General Information should be consulted.

‡ Tuition fees for special students in the Medical School are $75 per quarter for residents and $125 per quarter for nonresidents of Minnesota.

Co-operative cottages, each in charge of a chaperone, offer comfortable homes for about 115 women. By assisting with the work of the houses, the students are able to keep expenses under $25 a month. Applications may be made to the manager of university cottages, Shevlin Hall.

For men.—Pioneer Hall, a residence hall of 16 houses on East River Road, one block east of the medical buildings, accommodates 536 men. Board and room are provided at rates from $110 per quarter in a double room to $135 per quarter in a bay window three-room suite for two men—a study and two bedrooms.

ROOMING HOUSES

Room and board may be secured in approved rooming houses accommodating either men or women. Room rent varies from $15 to $18 per month for a single room, and from $12 to $15 per month for a double room. Board at present prices may be secured at $6 to $7 per week for two meals per day. For lists of approved rooming houses consult the Housing Bureau at Shevlin Hall.

FURTHER INFORMATION

For further details regarding admission, expenses, health service, scholarships, etc., consult the Bulletin of General Information which may be obtained upon request. Address Registrar, University of Minnesota, Minneapolis. Minn.

The Bulletin of the
UNIVERSITY *of* MINNESOTA

The School of Agriculture
Courses in Agriculture and Home Economics
Part I

Announcement of Courses for the Years 1940-1942

Volume XLIII, Number 54 August 27, 1940

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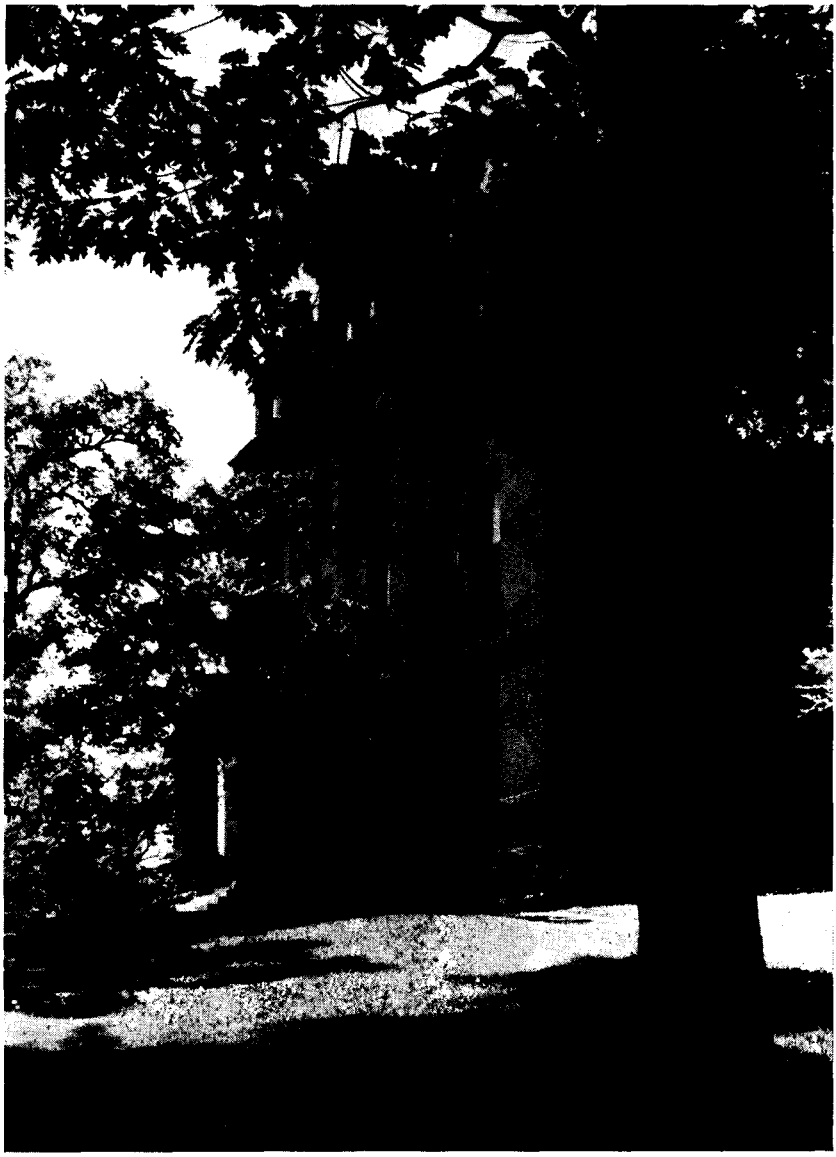


Pendergast Hall Entrance
One of the three dormitories for boys

THE SCHOOL OF AGRICULTURE

FACULTY

ADMINISTRATION

Guy Stanton Ford, Ph.D., Litt.D., LL.D., L.H.D., President, University of Minnesota
Walter C. Coffey, M.S., LL.D., Dean and Director of the Department of Agriculture
John O. Christianson, B.A., Superintendent, the School of Agriculture and Director of Agricultural Short Courses
Rodney M. West, B.A., Registrar
Johanna Hognason, B.A., Matron Boys' Dormitories
Laura A. Matson, M.A., Matron Girls' Dormitories
Harriet W. Sewall, B.A., Librarian

AGRICULTURAL BIOCHEMISTRY

Ross A. Gortner, Ph.D., D.Sc., Chief; Leon H. Johnson, B.A.

AGRICULTURAL ECONOMICS

Oscar B. Jesness, Ph.D., Chief; Louis B. Bassett, Truman R. Nodland, B.S., George E. Toben, M.S.

AGRICULTURAL ENGINEERING

Arthur J. Schwantes, M.S. in A.E., Chief; Clarence H. Christopherson, M.A., J. Grant Dent, Andrew Hustrulid, Ph.D., John Strait, B.S. in M.E., James M. Torrance, B.S. in Agr., Arthur G. Tyler, B.S., Hall B. White, M.S.

AGRONOMY AND PLANT GENETICS

Herbert K. Hayes, D.Sc., Chief; Carl Borgeson, M.S., Royse P. Murphy, M.S., Ernest H. Rinke, M.S., Herman K. Schultz, Ph.D.

ANIMAL AND POULTRY HUSBANDRY

Walter H. Peters, M.Agr., Chief; Philip A. Anderson, B.S. in Agr., Thomas H. Canfield, M.S., Ralph E. Comstock, Ph.D., Evan F. Ferrin, M.Agr., Willard W. Green, Ph.D., Alfred L. Harvey, M.S., Donald W. Johnson, Ph.D., Hubert J. Sloan, Ph.D., Laurence M. Winters, Ph.D.

DAIRY HUSBANDRY

James B. Fitch, M.S., Chief; Nat N. Allen, Ph.D., Thor W. Gullickson, Ph.D., Joe C. Olson, Jr., B.S., William E. Petersen, Ph.D., Arless Spielman, M.S.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

William A. Riley, Ph.D., D.Sc., Chief; John Hughes, M.A., Arthur G. Ruggles, M.A., Maurice C. Tanquary, Ph.D.

FORESTRY

Henry Schmitz, Ph.D., Chief; Henry Hansen, B.S.

HOME ECONOMICS

Wylle B. McNeal, M.A., Chief; Carlotta M. Brown, Mary Frances Inman, M.S., Hedda Kafka, M.A., Ella J. Rose, M.A., Ruth F. Segolson, M.A.

HORTICULTURE

William H. Alderman, B.S.A., Chief; Troy M. Currence, Ph.D., Arthur E. Hutchins, Ph.D., Lewis E. Longley, Ph.D., Louis Sando, James D. Winter, M.S.

PHYSICAL EDUCATION AND ATHLETICS

Marshall W. Ryman, M.Phys.Ed., Director; Marie F. Eibner, B.S.

PLANT PATHOLOGY AND BOTANY

Elvin C. Stakman, Ph.D., Chief; Milton F. Kernkamp, M.S., Alvin H. Larson, B.S. in Agr., Matthew B. Moore, M.S.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

Ruth Boynton, M.S., M.D., Director Students' Health Service; Hally J. Fisher, R.N., Frederick W. Hoffbauer, M.S., M.D.

RHETORIC

Robert C. Lansing, M.A., Chief; Elizabeth A. Bacheller, B.S., Monica Langtry, B.A., Ella Oerting, Ph.M.

SCHOOL (GENERAL)

John O. Christianson, B.A., Superintendent; David W. Boland, Johanna Hognason, B.A., Elmer M. Johnson, B.S., Peder L. Johnsrud, B.S. in Agr., Muriel Jones, B.S., Laura A. Matson, M.A., Ralph E. Miller, M.S., Doris E. Nelson, B.S., Philip Neville, B.A., LL.B., Victor A. Newcomb, M.A., Lloyd Plette, B.S., Ross Smith, B.A., Sidney Suddendorf, B.S.

SOILS

Frederick J. Alway, Ph.D., Chief; George H. Nesom, B.A., B.S.

VETERINARY MEDICINE

Willard L. Boyd, D.V.S., Chief; Reuel Fenstermacher, D.V.M., Alfred G. Karlson, D.V.M., M.S., Howard C. H. Kernkamp, D.V.M., M.S.

The School of Agriculture

GENERAL INFORMATION

Over fifty years ago there was established at University Farm, St. Paul, the first agricultural school as a part of a university in America. The objectives of that school were to train farm people in the business of agriculture and homemaking, and to train them in a philosophy of rural life which would enable them to work together in the interests of better farm homes and communities. Throughout this fifty-year period the school has maintained that objective. Any farm young person, regardless of previous training, may here find an opportunity for getting further education in his or her life work.

The School of Agriculture at University Farm is not a high school. Neither is it a college. It is a type of school that is unique in this state and nation. It corresponds more nearly to the Danish folk schools than anything else in America. The School of Agriculture is a finishing school, a school of specialization for those who intend to carry on with farming and homemaking. For that reason the School of Agriculture plays an important part in the agricultural education program of the state. There are thousands of farm young people throughout the state of Minnesota who are seventeen years of age or over who have not had

Planning Committee

a high school education; either they were not interested in high school or did not have the opportunity to get such training. For those persons the School of Agriculture offers real opportunity to have all the advantages offered by a great university and to receive the best training for life. Also, it serves those high school graduates who do not intend to go through four years of college, but who do wish to supplement high school training by a couple of years at University Farm before taking up the business of farming and homemaking.

ADMISSION

Before coming to the school, students should correspond with the superintendent, School of Agriculture, University Farm, St. Paul, Minnesota, to make the necessary preliminary arrangements for registration.

All male students are required to have had one year of farm experience before entrance to the school.

No student under seventeen years of age will be admitted. Exceptions to this rule may be considered if the applicant has had two years of senior high school work. Similar exception may be considered when no high school is immediately available to the applicant.

Students who have completed eighth grade work, or its equivalent, in the common schools are admitted without examination. Persons desiring to make application for admission to the school should write to Superintendent J. O. Christianson for an application blank which should be filled out and returned. Diplomas should not be sent. Students from

Student Leaders Plan School Activities

city or grade schools must present a dismissal card from the last school attended; they will not be admitted before finishing eighth grade work, nor until their former school records have been passed upon. These records must be presented at least three weeks prior to the opening of the school and must be accompanied by letters of recommendation.

Applicants of mature years who cannot meet the above entrance requirements will be admitted for special programs. Such students can graduate when the entrance requirements, as well as the requirements of the prescribed course, are fully met.

BUILDING A SOUND FOUNDATION

The School of Agriculture emphasizes human relationships and the intangible values and forces that in the long run determine the happiness of an individual and of a people. It is felt that the greatest need in any worth-while education is a sound foundation of moral and spiritual values. Factual information is of little use unless it is coupled with a

better understanding of those social and moral forces which have been, and are, basic to all civilization. For that reason, the School of Agriculture provides such training and experience for the student body as is most helpful in the development of a Christian philosophy of life and a sense of values which will aid each student in working with and getting along with others. It may well be said that the objective of the school is to teach people how to get along together and how to work together—in fact, such is the final objective of education. In addition to the teaching of technical work in the various lines of agriculture, emphasis is placed upon music, upon dramatics, upon psychology, upon leadership and group activities, and upon co-operation in all its various phases of producer and consumer co-operation.

The International Relations Club

REQUIREMENTS FOR GRADUATION

The diploma of the School of Agriculture is granted on the completion of:

1. The prescribed course of study, including all of the required work and enough elective work to make 111 credit hours for agriculture students, 3 of which must be earned in summer project work taken each summer after the student has been in residence. Not more than 9 credits of project work may be counted toward graduation. Home economics students are required to complete 108 credits for graduation. At least 36 of the credits required for graduation must be earned by class attendance in this school.
2. Physical education, 1 credit hour for each term of residence.
3. Social problems for boys, 1 credit hour, or social training for girls, 2 credit hours.
4. An honorable standing in deportment.

HOME PROJECTS

Putting science into practice is the aim of the School of Agriculture. The school is organized on a plan which provides for teaching agriculture through six months of study at the school, October through March, and six months of supervised home project work on the farm. Home project work is advised for every student in the school but is as yet

A Class in Meal Preparation

required for graduation of the boys only. The purpose of the home project work is to give the pupils an opportunity to apply some phase of their classroom instruction to the operation of a farm or farm home.

The students may have a free choice as to the nature of their projects but are advised to choose those connected with the class work being taken. Registration should be completed before the student leaves the school in the spring. At the time of registration a project book with forms suitable for recording the necessary data will be provided.

During the summer season the work of the students will be inspected by instructors from the school as far as possible. The project book must be submitted to the classroom instructors and be graded by them and must then have final approval of the Home Project Committee. Home project work cannot be accepted for credit from students who are not properly registered before starting upon the project.

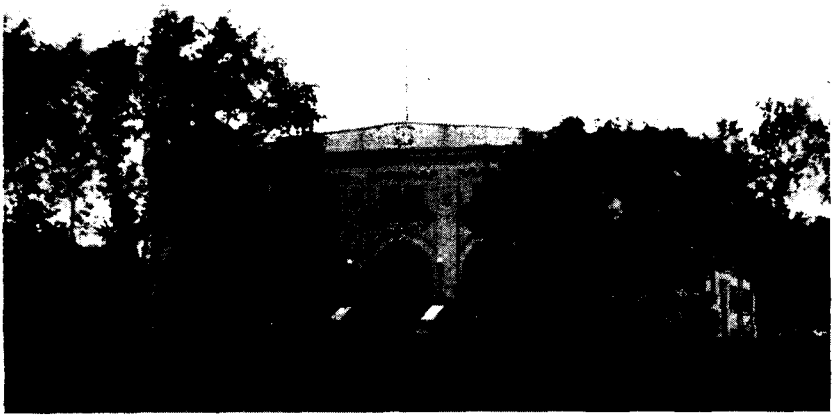
Three credits of home project work are all that any student should attempt to earn in one season. These may be counted toward graduation from the school, or, in the event that a student expects to enter the College of Agriculture, Forestry, and Home Economics, they may be used as one unit toward entrance to the college. A special bulletin on home projects may be obtained from the superintendent's office.

FACILITIES OF ENTIRE UNIVERSITY

One outstanding advantage that young men and young women who attend the school have is that they receive instruction from the outstanding leaders in whatever field they are interested. For instance, many of the men who teach in the regular four-year degree course of the College of Agriculture, Forestry, and Home Economics also teach the

A Class in Decorative Needlework

students in the School of Agriculture. There is no other school that can provide the opportunity for outstanding people on its faculty that the School of Agriculture at University Farm does. This is made possible because of the school's location right at the University Farm campus where all the facilities of the entire University are available.



The School Gymnasium

COST OF ATTENDING

The school year is made up of two terms of three months each, the fall term beginning the early part of October and ending around Christmas time, and the winter term beginning the first part of January and ending the latter part of March. The total cost per term of three months, including board, room, laundry, books, tuition, and entertainment, is approximately $72.

TABLE OF CHARGES

Tuition fee, per term	
Resident of Minnesota	$ 3.00
Nonresident	6.00
Deposit, as guarantee for the return of books and equipment	5.00
Incidental fee	8.00
Textbook rental fee (for those not desiring to purchase their books) per term	1.50
Music fee, per course (private lessons) (if desired)	6.55
Room in dormitory, per term (price subject to change)	16.00
Board—	
First term (price subject to change)	37.65
Second term (price subject to change)	37.65
Laundry, per term (price subject to change). Required of all in dormitories	4.00
Gymnasium suits—	
Boys (price subject to change)	2.00-3.00
Girls (price subject to change)	1.50
Average cost drawing instruments, notebooks, stationery, and supplies, per year	3.00-5.00

The $5 deposit fee, which is required at the time of enrolling, is refunded at the close of the school year when the student has returned all books and equipment satisfactorily. The total cost for board will vary

according to length of term. Each student is required to pay for breakage of apparatus used in practical work.

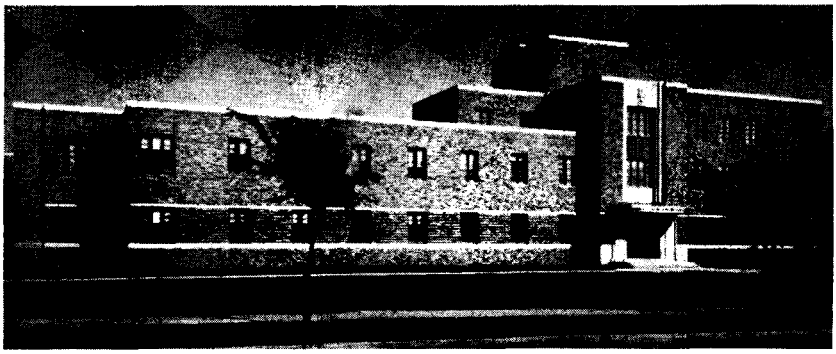
The approximate payments to be made to the school at the time of registration are:

	Fall Term	Winter Term‡
Student in dormitory		
Resident of Minnesota	$75.15	$70.15
Nonresident	78.15	73.15
Day student		
Resident of Minnesota	17.50	12.50
Nonresident	20.50	15.50

The expenses given above are to be paid in full at the beginning of the term unless the student desires to pay his board and room by installments. The first installment is due at the beginning of the term when the tuition fee and the deposit of $5 are paid, making a total payment then of about $46. The second and third installments on board and room are payable in advance at the beginning of each month.

By this installment plan, the payments run approximately as follows:

	Fall Term			Winter Term‡		
	1st	2nd	3rd	1st	2nd	3rd
Student in dormitory						
Resident of Minnesota	$46.50	$15.50	$13.15	$41.50	$15.00	$13.65
Nonresident	49.50	15.50	13.15	44.50	15.00	13.65

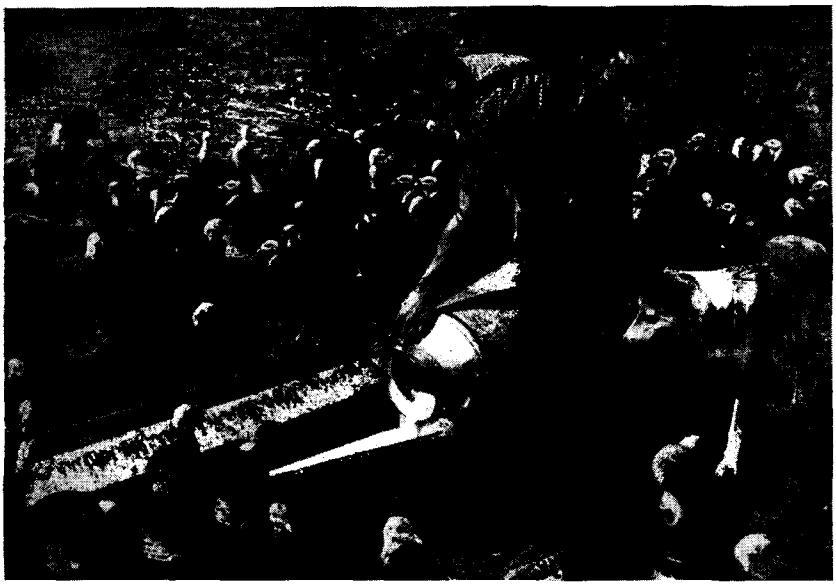


The Students' Health Service

STATE AID

The state of Minnesota, believing in the value of the School of Agriculture, has mode provision to pay the laboratory, tuition, and equipment fees for any farm boy or girl under twenty-one years who has completed the eighth grade, but who is not yet a high school graduate, and who comes from a school district which does not maintain an accredited high school within its own jurisdiction. A rate of $6 per month has been established to cover all the tuition, laboratory, and equipment fees (except deposits) of such students. This reduces the cost of attending to include only board, room, and laundry. Students must secure a tuition certificate from their county superintendent of schools in their

‡ If not in attendance first term, add $5 as a deposit fee to the payment made at the beginning of the term.



Project Work on Home Farm

home county and present it when registering at the School of Agriculture. For further information, write directly to Superintendent J. O. Christianson, School of Agriculture, University Farm, St. Paul.

ASSEMBLY

Another advantage School of Agriculture students have is the proximity to the outstanding centers of interest in the state here in the Twin Cities. The students become acquainted with the various leaders and institutions in all lines of activities through speakers at assembly and occasional tours. A wide range of topics, many of which relate to rural and agricultural problems, are discussed by outstanding men and women who speak to the students of the School of Agriculture at the assembly held four times a week at 12:10 p.m. These speakers include prominent state and national officials, business men, particularly those connected with the agricultural industries, professional men and women, prominent clergymen of all denominations, educators from other institutions, and successful farmers and homemakers.

HIGH SCHOOL GRADUATES

It is often difficult for the average person to realize that the University of Minnesota maintains and has maintained now for over fifty years a school of this kind, that is open to any farm boy or girl regardless of whether he or she has had high school training. During the past several years there has been an increase in the number of high school graduates, or former high school students, who have attended the School of Agriculture. More and more generally that high school graduate who does not intend to go through four years of college for a degree, but who wishes to supplement high school training by further specializa-

tion along the lines of his or her particular interest, comes to the School of Agriculture. There is flexibility and opportunity here for specialized programs and for following the lines of one's particular interest.

For those students who have had work in well-equipped high school agricultural departments, credit will be given for the elementary courses in the School of Agriculture. Such students can and do find many courses at the School of Agriculture with which to continue. Most high school graduates are able to finish the regular School of Agriculture course in two years of six months each year. High school courses equivalent to courses offered in the school will receive the same credit as those given in the school.

The School of Agriculture Band

STUDENTS' HEALTH SERVICE

A health fee of $3 a term, included in the incidental fee, is paid by each student for the maintenance of the Students' Health Service. For this fee the student may receive physical examination and the professional services of the staff when needed. For services which are specialized and individual in character, such as operations, board and laundry when in the hospital, drugs, X rays, outpatient calls, dentistry, etc., special fees, calculated on a cost basis, are charged. No student, however, will be denied service because of inability to pay these fees.

The offices of the Health Service and the Students' Hospital and Dispensary on the University Farm campus are located in the new Health Service Building. The services of the hospital and dispensary are available at all hours of the day and night. Physicians of the Health Service will be in attendance daily.

SERVES TWO GROUPS

The School of Agriculture at University Farm, then, very definitely serves two groups—first, those students who are older, have completed the eighth grade, and now see the need of further education; second, those high school graduates who want to supplement their high school training by a year or two in getting the advantages of association with

outstanding leaders and students in a great university school of agriculture. Then, too, the school serves those who have had only a year or two of high school and who feel they are too old to go back to high school for further education. They find the more practical work at the School of Agriculture; their interest is rekindled; and very often it is found that those students become outstanding as leaders in their communities and as good farmers and homemakers.

A Class in Livestock Judging

LEADERS IN AGRICULTURE

During the more than fifty years that the School of Agriculture has been in existence at University Farm, over 19,000 young men and young women have attended. In every county of the state of Minnesota among the outstanding leaders in various farm organizations and farm movements are former students and graduates of the School of Agriculture. At the School of Agriculture those students have had the opportunity of contact with men whose names are recognized in agriculture, not only in this state, but throughout the entire nation. The association with such leaders is a most vital and worth-while part of the educational program of the School of Agriculture. For education is not gained from books and laboratories alone, but in the long run the most worth-while part of education is gained through association with great minds and with the leading young people of all of the communities as brought together here at this great farm school.

HOME LIFE ON THE CAMPUS

The life of the student while attending the School of Agriculture is subject to supervision. The home life of each student is carefully guarded, and everything is done to promote a healthful and moral atmosphere. The use of tobacco on the campus and the use of intoxicating

liquors of any kind are strictly forbidden. No student will be allowed to have a car while attending the School of Agriculture. Anyone not in accord with these restrictions and not willing to lend a hand toward promoting a strong moral growth should not come to the School of Agriculture. It is the aim of the administration to be firm, reasonable, and sympathetic. A student who becomes antagonistic to the spirit of the school will be dismissed whenever the general welfare requires it. The school does not wish to undertake the problem of disciplining students who are not in sympathy with its purpose. A pamphlet containing the rules and regulations of the school will be furnished each student at the time of registration or upon application to the registrar's office.

The students' social and dormitory life is supervised and directed by two women instructors of the school faculty, one in charge of the girls' dormitory and the other in charge of the boys' dormitories. Resident in each of the boys' dormitories is a young college man who acts as a counselor. All regulations governing the campus life of the student are subject to the approval of the dean of the Department of Agriculture and the superintendent of the school.

A Carpentry Class in Action

From 8:15 a.m. to 4:30 p.m. and also after 7:30 p.m. students not at classes or assembly are expected to be in their rooms or at the library studying or reading. The rooms shall at all times be quiet, especially in the evening, so that no student will be disturbed.

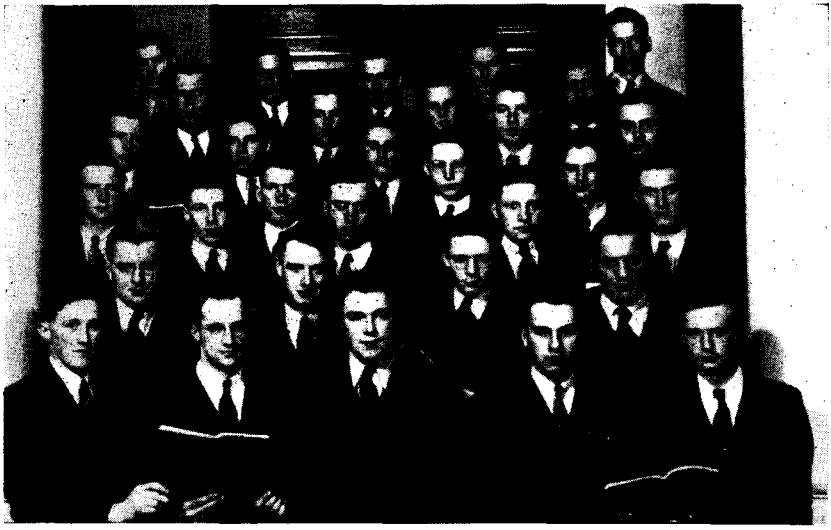
The buildings are all lighted by electricity and warmed by steam. The sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, chairs, and a table. The student provides sheets, blankets or quilts, bedspread, pillow, pillowcases, and towels. Laundry is collected weekly and is returned a week later, which necessitates having a sufficient supply of clothing and bedding.

Each prospective student who desires to room in the dormitory is required to send in a deposit of $2, which will be returned in case the application is received after all dormitory rooms are assigned or in the

event that the student cannot come. All money orders or checks should be made payable to the Department of Agriculture, University of Minnesota.

EXTRA-CURRICULAR ACTIVITIES

Each Sunday morning at 8:30, throughout the school year, students of the School of Agriculture meet at a song service sponsored by the Y.M.C.A. and the Y.W.C.A. Dean Coffey is one of the people who speaks to the group at this service. The Y.M.C.A. and the Y.W.C.A. are active voluntary organizations on the campus, the members having regular weekly meetings as well as sponsoring occasional get-togethers of all the students. Other opportunities for a student to participate in whatever line of activity he is interested in while attending school are afforded by the International Relations Club for those who are interested in world affairs, the 4-H Club, Dairy and Livestock Club, Rural Theatre Players for those interested in dramatics, the Girls' Athletic Association, the extemporaneous speaking contest, debate teams, literary societies, student religious groups, both Protestant and Catholic.



The Boys' Glee Club

Students who play instruments, or sing, have opportunities of being a part of musical groups such as the band, orchestra, vocal trios, quartets, glee clubs, and chorus. These groups often appear at assemblies during the year, as well as at meetings of other groups and organizations in the cities. Students are occasionally asked to appear on the School of Agriculture radio program, "Up with the Sun," which is presented over the University Station WLB on Mondays, Wednesdays, and Fridays at 7:15 a.m.

The *Agreview,* the school paper, is published monthly during the school year by a selected group of students under the supervision of a faculty adviser. It aims to give publicity of interest to students and alumni and to serve as a tie between the school and the alumni.

The *Agrarian* is a yearbook published by the senior class of the school. This book reviews and pictures the school activities of the year.

ATHLETICS

Interscholastic.—Competition in basketball, wrestling, and cross-country running provides an opportunity for the men students to try their skills in competition with other schools and organizations. Games and contests with other schools of agriculture are highlights of the inter-school program. During the winter term the girls participate in basketball games with other school teams. Athletics are regarded as an important phase of the activities of the department of physical education, the aim of the interscholastic athletic program being to realize through proper organization and administration as many of the educational opportunities of athletics as possible.

The Cross-Country Team

Instruction, team, and individual practice periods under competent coaches will be held each afternoon between 3:30 and 5:30 p.m. at the gymnasium. Cross-country practice begins with the opening of school in the fall, and matches are held in the early part of the fall term. Basketball and wrestling team practices start in November with scheduled contests beginning in December and extending through the winter quarter.

The "A," one of the most highly prized awards, is given to those men and women who have achieved distinction in interscholastic athletics and have fulfilled the participation requirements during the season.

Intramural.—The intramural program provides for every student in the school the opportunity to enjoy and participate in athletics and recreational activities. Emphasis is placed on those sports which develop leisure time interests and habits. Intramural athletics provide a natural outgrowth of the required program of physical education.

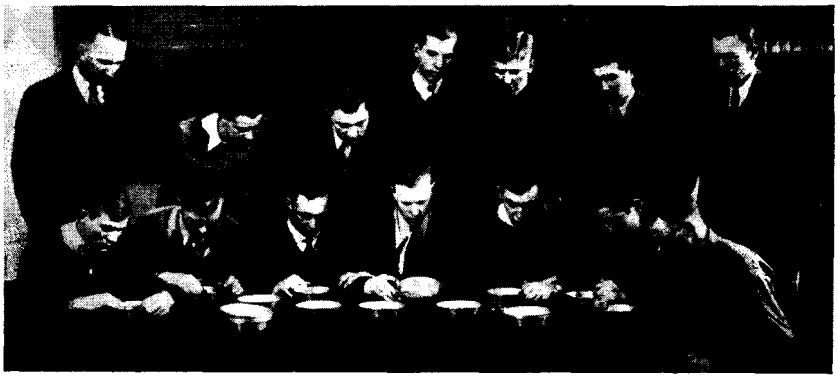
A varied program of activities consisting of diamondball, touchfootball, football, field meet, horseshoe, table tennis, archery, swimming, basketball, volleyball, track and field meet, and boxing and wrestling tournaments is offered during the school year. An intramural committee, composed of a representative from each class, serves the director in an advisory capacity.

The Department of Physical Education and Athletics urges students to participate in the varied program and to use the facilities and equipment of the gymnasium. A large basketball court, running track, swim-

ming pool, badminton and volleyball courts, archery range, handball and squash courts, separate boxing and wrestling rooms, golf driving net, and social games room provide adequate indoor facilities, and the excellent recreational field adjoining the gymnasium offers opportunities to each student to take part in activities which are physically wholesome, mentally stimulating and satisfying, and socially sound.

STUDENT AID

The School of Agriculture has maintained a helpful policy in furnishing employment for students and in providing loans. The prospective student who desires to make application for such work or loan in order to help meet his expenses while attending school should write directly



Students Practicing Crops Judging

to Superintendent J. O. Christianson, School of Agriculture, University Farm, St. Paul. Various organizations have maintained student scholarship and loan funds so that for any deserving young man or young woman from the farms of Minnesota who is really interested in attending the school, there is always a way of making that interest become an actuality. The Ludden Trust, the Minnesota Farm Bureau Loan Fund, and funds left by the classes of 1902, 1916, 1924, 1925, 1929, 1930, 1931, and 1932 are available for temporary loans to students who are worthy and who need such help in order to attend.

SCHOLARSHIPS

A fund willed by the late Caleb Dorr of Minneapolis furnishes cash prizes amounting to $90 each year, which are offered to students securing the highest standings in general scholarship. Of this amount $35 will be offered each term in five prizes of $10, $8, $7, $5, and $5. All students carrying the full work of 18 credit hours per term are eligible for these prizes. One prize of $15 will be awarded at the close of the second term for the senior student graduating from the School of Agriculture with the highest scholarship and student activity record for the first five terms.

The awards will be made (1) on class standings as recorded by instructors for the term's work, and (2) on student activities and deportment. The class standings will count for 90 per cent and the student activities for 10 per cent. In determining the grades of scholarship the merit point system adopted by the registrar's office will be used. The rating for student activities will be based on the quality of leadership

as indicated by a review of the activities participated in and the general deportment of the student during attendance at school. This rating will be determined by the scholarship committee in consultation with the preceptresses and the superintendent of the School of Agriculture.

The annual income from a fund of $500, which was established in memory of the late Peter Gideon, the originator of the Wealthy apple, is divided into two prizes for the best home projects in horticulture.

Interest from the LeRoy Cady scholarship fund of $1,500, which was raised by popular subscription by the Minnesota Garden Flower Society, is used to aid deserving students who are pursuing courses in horticulture.

Sears Roebuck and Company of Chicago, Illinois, have established a scholarship fund to aid worthy farm boys and girls attending the School of Agriculture who have maintained a satisfactory grade of scholarship and citizenship, who come from farm homes, and who intend to continue in agricultural work.

The Minnesota Livestock Breeders' Association has made available the interest from a fund which has accumulated in connection with the Junior Livestock Show in memory of William A. McKerrow. These McKerrow scholarships are awarded to worthy boys and girls who, in the light of their opportunities, have made commendable progress in livestock development and activities.

Students and Faculty Put on Radio Programs

YEARS OF OPPORTUNITY

Any young man or young woman in a rural area who is interested in more training along the line of agriculture or home making and who plans and wants to be a good farmer and homemaker may write to J. O. Christianson, School of Agriculture, University Farm, St. Paul, for further information about this school. The golden years between seventeen and twenty-five come only once—they are the greatest years of opportunity that any person ever knows. The faculty of the School of Agriculture at University Farm wishes to be of service to the youth of this state in helping them to make the most of those years.

COURSES OF STUDY

Figures following the names of courses indicate the number of credit hours. One credit hour is equivalent to one class period devoted to recitation or lecture or to two such periods devoted to laboratory work.

For description of the courses listed in the following outline see pages 27 to 38, and for schedule of classes, School of Agriculture Bulletin, Part II.

See pages 7 and 8 for statement with reference to home project work.

Courses which may be taken either term are indicated by (f,w), those which are offered in the fall term only are indicated by (f), and those offered only in the winter term by (w).

Every student in agriculture who plans to graduate is expected to select one of the following courses of study: (a) general farming, (b) farm mechanics, (c) horticulture, (d) livestock production, or (e) crop production.

Adults desiring a special course should consult the Enrolment Committee.

Special students of mature years who do not desire a diploma but who wish to take special work may, by action of the Enrolment Committee, be allowed to arrange a curriculum under the supervision of a faculty adviser.

The program for boys at the School of Agriculture is intended primarily for those who expect to return to the farm. With the increased complexity of operating a farm, with more mechanization and larger capital investments, successful management calls for a high degree of skill and knowledge through agricultural training such as is provided through the School of Agriculture.

Some school graduates are occupying positions as *farm superintendents*. The demand for farm superintendents increases as farms are operated in larger units with hired help and more machinery.

Certain courses at the School of Agriculture will fit a man to become a *successful herdsman*. Market Livestock Production, Dairy Stock Judging, Livestock Feeding and Management, Milk Production, and Veterinary Studies are helpful courses toward this end.

Young men who have had training at the School of Agriculture are especially fitted to go out as *testers for cow testing associations*. This is an excellent means of gaining valuable experience in dairy management.

Students who complete the regular course in the School of Agriculture and then take the Short Course for Creamery Operators at the University Farm are particularly well fitted to become *buttermakers and creamery operators*.

A young man who has skill in the use of tools may find remunerative employment as a *carpenter* in rural districts after he has finished his course at the School of Agriculture—especially if he has specialized in the mechanical training courses including Carpentry, Farm Buildings, and Mechanical Drawing. Also, many who take the regular Mechanics Course find employment as *garage men*. Courses in Mechanical Training, Tractor and Gas Engines, Heat and Electricity, and Farm Electrical Equipment, provide a very fine training for this work.

A regular three-year course is planned for those desiring to take up *Landscape Gardening and Nursery Work*. The instruction is very practical. Many graduates have secured well-paid positions as *gardeners and caretakers of summer homes and golf courses*. Some of the most

successful nurseries in the state are owned and managed by graduates of the School of Agriculture.

Practically all counties in Minnesota are hiring properly prepared young men as *county 4-H Club leaders*. The School of Agriculture training, where students can obtain courses in Leaders and Leadership, Parliamentary Law, and Psychology, equips those who have natural leadership qualities for these county leadership jobs.

For those boys who wish to *continue their education* at college, working toward a degree, and who have not previously finished high school, the School of Agriculture, altho essentially a vocation school, provides the necessary prerequisites.

For a farm boy who has *completed high school and who plans to follow farming as his life work*, the School of Agriculture offers the opportunity of more specialized training along lines of particular interest and at the same time provides broad general training in group activities and leadership through all the facilities of a great university. No duplication of high school work is required. Credit will be given for such high school courses as correspond to any courses given at the school. High school graduates generally complete the regular three-year course in two years of six months each year.

GENERAL FARMING

FRESHMAN YEAR

Required—First Term	Required—Second Term
English I, 3(f,w)	English Classics, 3(f,w)
Hygiene, 1(f,w)	Soils, 3(f,w)
Farm Arithmetic, 3(f,w)	Animal Biology, 3(f,w)
Market Livestock Production, 3(f,w)	Chemistry in Agriculture, 3(f,w)†
Drawing, 3(f,w)	Physical Education, 1(f,w)
Agricultural Botany, 3(f,w)	Electives, 6*
Physical Education, 1(f,w)	
Social Problems for Boys, 1(f,w)	
Electives, 2*	

JUNIOR YEAR

Required—First Term	Required—Second Term
Business English, 3(f,w) or Debating, 3(w)	English Composition, 3(f,w)
Forage Crops, 3(f,w)	Grain Crops, 3(f,w)
Farm Horticulture, 3(f,w)	Farm Dairying, 3(f,w)
Dairy Stock Feeding, 3(f,w)	General Poultry Management, 3(f,w)
Livestock Feeding and Management, 3(f,w)	Physical Education, 1(f,w)
Physical Education, 1(f,w)	Electives, 6*
Electives, 3*	

SENIOR YEAR

Required—First Term	Required—Second Term
Public Speaking, 3(f,w)	English VI, 3(f,w)
National Government, 3(f)	State and Local Government, 3(w)
Livestock Breeding, 3(f,w)	Rural Sociology, 3(f,w)
Farm Management I, 3(f,w)	Farm Management II, 3(f,w)
Physical Education, 1(f,w)	Crop Breeding, 3(w)
Electives, 6*	Physical Education, 1(f,w)
	Electives, 3*

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* For elective courses, see pages 24-26.

† Not equivalent to high school chemistry.

FARM MECHANICS

FRESHMAN YEAR

REQUIRED—FIRST TERM

English I, 3(f,w)
Hygiene, 1(f,w)
Farm Arithmetic, 3(f,w)
Market Livestock Production, 3(f,w)
Drawing, 3(f,w)
Agricultural Botany, 3(f,w)
Physical Education, 1(f,w)
Social Problems for Boys, 1(f,w)
Electives, 2*

REQUIRED—SECOND TERM

English Classics, 3(f,w)
Mechanics and Water Supply, 4(f,w)
Mechanical Training, 3(f,w)
Woodworking, 3(f,w)
Chemistry in Agriculture, 3(f,w)†
Physical Education, 1(f,w)
Electives, 2*

JUNIOR YEAR

REQUIRED—FIRST TERM

Business English, 3(f,w) or
Debating, 3(f)
Judging Breeds of Livestock, 3(f,w) or
Livestock Feeding and Management, 3(f,w)
Gas Engines, 3(f,w)
Soils, 3(f,w)
National Government, 3(f)
Physical Education, 1(f,w)
Electives, 3*

REQUIRED—SECOND TERM

English Composition, 3(f,w)
Grain Crops, 3(f,w) or Forage Crops, 3(f,w)
Farm Dairying, 3(f,w)
Farm Implements, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

SENIOR YEAR

REQUIRED—FIRST TERM

Public Speaking, 3(f,w)
Farm Buildings, 3(f)
Rural Sociology, 3(f,w)
Farm Management I, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

REQUIRED—SECOND TERM

English VI, 3(f,w)
State and Local Government, 3(w)
Farm Management II, 3(f,w)
Tractors and Diesel Engines, 3(f,w) or
Carpentry, 3(f,w) or
Metal Working, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

HORTICULTURE

FRESHMAN YEAR

REQUIRED—FIRST TERM

English I, 3(f,w)
Hygiene, 1(f,w)
Farm Arithmetic, 3(f,w)
Agricultural Botany, 3(f,w)
Plant Propagation and Nursery Practice, 3(w)
Social Problems for Boys, 1(f,w)
Physical Education, 1(f,w)
Electives, 5*

REQUIRED—SECOND TERM

English Classics, 3(f,w)
Chemistry in Agriculture, 3(f,w)
Soils, 3(f,w)
Drawing, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

JUNIOR YEAR

REQUIRED—FIRST TERM

Business English, 3(f,w) or
Debating, 3(w)
Animal Biology, 3(f,w)
Landscape Gardening I, 2(f)
Physical Education, 1(f,w)
Electives, 10*

REQUIRED—SECOND TERM

English Composition, 3(f,w)
Vegetable Gardening, 3(f)
Physical Education, 1(f,w)
Electives, 12*

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* For elective courses, see pages 24-26.
† Not equivalent to high school chemistry.

SENIOR YEAR

Required—First Term

Public Speaking, 3(f,w)
National Government, 3(f)
Plant Diseases, 3(f)
Insect Pests of Plants, 3(f)
Physical Education, 1(f,w)
Electives, 6*

Required—Second Term

English VI, 3(f,w)
State and Local Government, 3(w)
Rural Sociology, 3(f,w)
Bookkeeping I, 3(f,w)
Small Fruit Growing, 3(w)
Physical Education, 1(f,w)
Electives, 3*

Optional Courses§

Floriculture, 3(f)
Greenhouse Construction, 3(w)
Landscape Gardening II, 2(w)
Orchard Fruit Growing, 3(f)
Potato Production, 3(w)
Special Problems in Horticulture, variable credit (f,w)
Seed Testing, 2(w)
Farm Forestry, 3(w)

LIVESTOCK PRODUCTION

FRESHMAN YEAR

Required—First Term

English I, 3(f,w)
Hygiene, 1(f,w)
Farm Arithmetic, 3(f,w)
Market Livestock Production, 3(f,w)
Drawing, 3(f,w)
Agricultural Botany, 3(f,w)
Physical Education, 1(f,w)
Social Problems for Boys, 1(f,w)
Electives, 2*

Required—Second Term

English Classics, 3(f,w)
Soils, 3(f,w)
Animal Biology, 3(f,w)
Chemistry in Agriculture, 3(f,w)†
Physical Education, 1(f,w)
Electives, 6*

JUNIOR YEAR

Required—First Term

Business English, 3(f,w) or Debating, 3(w)
Forage Crops, 3(f,w)
Physiology and Hygiene of Breeding, 2(f)
Livestock Feeding and Management, 3(f,w)
Dairy Stock Feeding, 3(f,w)
Physical Education, 1(f,w)
Electives, 4*

Required—Second Term

English Composition, 3(f,w)
Veterinary Studies, 3(f,w)
Farm Dairying, 3(f,w)
Judging Breed Types of Livestock, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

SENIOR YEAR

Required—First Term

Public Speaking, 3(f,w)
National Government, 3(f,w)
Livestock Breeding, 3(f,w)
Farm Management I, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

Required—Second Term

English VI, 3(f,w)
State and Local Government, 3(w)
Rural Sociology, 3(f,w)
Farm Management II, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

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* For elective courses, see pages 24-26.

† Not equivalent to high school chemistry.

§ Four courses must be selected from this group to fulfill graduation requirements in Horticulture Course.

CROP PRODUCTION

FRESHMAN YEAR

REQUIRED—FIRST TERM

English I, 3(f,w)
Hygiene, 1(f,w)
Farm Arithmetic, 3(f,w)
Social Problems for Boys, 1(f,w)
Drawing, 3(f,w)
Agricultural Botany, 3(f,w)
Soils, 3(f,w)
Physical Education, 1(f,w)
Electives, 2*

REQUIRED—SECOND TERM

English Classics, 3(f,w)
Chemistry in Agriculture, 3(f,w)
Grain Crops, 3(f,w)
Forage Crops, 3(f,w)
Market Livestock Production, 3(f,w)
Physical Education, 1(f,w)
Electives, 3*

JUNIOR YEAR

REQUIRED—FIRST TERM

Business English, 3(f,w) or
Debating, 3(w)
Weeds, 2(f,w)
Genetics and Eugenics, 3(f)
Grain and Hay Grading, 2(f)
Farm Horticulture, 3(f,w)
Farm Management I, 3(f,w)
Physical Education, 1(f,w)
Electives, 2*

REQUIRED—SECOND TERM

English Composition, 3(f,w)
Seed Testing, 2(w)
Potato Production, 3(w)
Livestock Feeding and Management, 3(f,w)
Physical Education, 1(f,w)
Electives, 7*

SENIOR YEAR

REQUIRED—FIRST TERM

Public Speaking, 3(f,w)
National Government, 3(f)
Rural Sociology, 3(f,w)
Plant Diseases, 3(f)
Insect Pests of Plants, 3(f)
Physical Education, 1(f,w)
Electives, 3*

REQUIRED—SECOND TERM

English VI, 3(f,w)
State and Local Government, 3(f,w)
Crop Breeding, 3(w)
Farm Management II, 3(f,w)
Dairy Stock Feeding, 3(f,w)
Physical Education, 1(f,w)
Electives, 3*

HOME ECONOMICS

The primary purpose of the Home Economics Course is to train young women to become efficient homemakers, but in addition, it is possible for them to elect work along several different lines in preparation for wage earning. Many girls go out as home nursing aids, doing practical home nursing in their home communities. Those who intend to enter training to become professional nurses receive an advantageous background of related course work at the school. Some girls qualify for positions as nursemaids or governesses.

Girls may elect business courses and prepare to become clerks, stenographers, or bookkeepers. This general training fits them particularly well for work in county agent offices or other similar offices, as well as for bookkeeping or clerical work in village or country stores.

Several school graduates are employed as county 4-H club leaders. The training at the school equips those who have natural leadership qualities for these positions.

Positions as home managers are often taken by girls who have had School of Agriculture training.

Courses in music give, to those who have special ability along that line, an opportunity to learn to conduct community singing and orchestras and to give elementary instruction in music. Each girl makes her program under the direction of one of the members of the Home Economics faculty.

* For elective courses, see pages 24-26.

FRESHMAN YEAR

Required—First Term

Related Science I, 3(f)
English I, 3(f,w)
Selection and Preparation of Food, 3(f,w)
Related Art, 3(f,w)
Physical Education, 1(f,w)
Social Training, 2(f,w)
Electives, 6*

Required—Second Term

Related Science II, 3(f,w)
English Classics, 3(f,w)
Meal Planning and Preparation, 3(w)
Clothing Planning and Construction, 3(f,w)
Physical Education, 1(f,w)
Electives, 6*

JUNIOR YEAR

Required—First Term

Business English, 3(f,w) or Debating, 3(w)
Foods and Nutrition, 2(f)
Textiles and Dressmaking, 3(f)
Home Nursing and Hygiene I, 2(f,w)
Physical Education, 1(f,w)
Electives, 8*

Required—Second Term

English Composition, 3(f,w)
Animal Biology, 3(f,w)
House Planning and Furnishing, 3(w)
American History, 3(f,w)
Child Development, 3(f,w)
Physical Education, 1(f,w)
Electives, 3*

SENIOR YEAR

Required—First Term

Public Speaking, 3(f,w)
National Government, 3(f)
Household Buying, 2(f)
Physical Education, 1(f,w)
Rural Sociology, 3(f,w)
Electives, 7*

Required—Second Term

English VI, 3(f,w)
State and Local Government, 3(w)
Home Nursing and Hygiene II, 2(w)
The Girl's Wardrobe, 3(w)
Home Management, 3(w)
Physical Education, 1(f,w)
Electives, 4*

ELECTIVES

Open to All

FRESHMAN YEAR

Animal Biology, 3(f,w)
Chemistry in Agriculture, 3(f,w)
Grain Crops, 3(f,w)
Forage Crops, 3(f,w)
Elementary Beekeeping I, 3(f,w)
Elementary Beekeeping II, 3(f,w)
Farm Horticulture, 3(f,w)
Plant Propagation, 3(w)
Floriculture, 3(f)
Landscape Gardening I, 2(f)
Landscape Gardening II, 2(w)
Agricultural Botany, 3(f,w)
General Poultry Management, 3(f,w)
Poultry Judging and Marketing, 3(f,w)
Incubation, Brooding, and Breeding, 3(w)
Turkey Production, 2(w)
Advanced Farm Arithmetic, 3(f,w)
Algebra I, 7(f,w)
Algebra II, 7(f,w)
Geometry I, 7(f,w)
Geometry II, 7(f,w)
Elements of Music, 2(f,w)
How To Study, 1(f,w)
Harmony I, 2(f,w)
Chorus, 1(f,w)
Violin, 1(f,w)
Piano, 1(f,w)
Instrumental Music, 1(f,w)
Orchestra, 2(f,w)
Voice, 1(f,w)
Harmony II, 2(f,w)
Harmony III, 2(f,w)
Choral Class, 2(f,w)
Appreciation of Music, 2(f,w)
Band, 2(f,w)
Directing of Plays, 2(f,w)
Acting, 2(f,w)
Stagecraft, 2(f,w)
Drama, 2(f,w)
Spelling, 1(f,w)
Penmanship, 1(f,w)
Typewriting I, 3(f,w)
Typewriting II, 3(f,w)
Stenography I, 3(f,w)
Stenography II, 3(f,w)
Stenography III, 3(f,w)
Bookkeeping I, 3(f,w)
Bookkeeping II, 3(f,w)
Commercial Law, 3(f,w)
Physiology, 3(w)

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* For elective courses, see pages 24-26.

JUNIOR YEAR

Chemistry of Plant and Animal Life I, 3(f,w)§
Chemistry of Plant and Animal Life II, 3(f,w)§
Genetics and Eugenics, 3(f)
Farm Electrical Equipment, 3(w)
Farm Dairying, 3(f,w)
Utilization of Meats, 3(w)
Advanced Beekeeping, 3(f,w)
Insect Pests of Plants, 3(f)
Orchard Fruit Growing, 3(f)
Small Fruit Growing, 3(w)
Business English, 3(f,w)
Books and Reading, 3(f)
Special Problems in Horticulture, (w)
Special Problems in Entomology, (w)
Debating, 3(w)
Plant Diseases, 3(f)
Advanced Debating, 3(w)
Parliamentary Law, 2(f,w)
Marketing, 3(f,w)
Industrial History, 3(f)
American History, 3(f,w)
History of Civilization, 3(f,w)
Farm Finance, 3(w)
Typewriting III, 3(f,w)
Typewriting IV, 3(f,w)
Stenography IV, 3(f,w)
Stenography V, 3(f,w)
Office Practice, 3(f,w)
Elements of Bacteriology, 3(w)§

SENIOR YEAR

Advanced Public Speaking, 3(w)
English Literature I, 5(f,w)
English Literature II, 5(w)
Economics, 3(f,w)
Leaders and Leadership, 3(f,w)
Psychology, 3(f,w)

Open to Agriculture Students Only

FRESHMAN YEAR

Gas Engines, 3(f,w)
Mechanical Training, 3(f,w)
Metal Working, 3(f,w)
Woodworking, 3(f,w)
Market Livestock Production, 3(f,w)
Mechanics and Water Supply, 4(f,w)
Carpentry, 3(f,w)
Home Problems, 2(w)
Soils, 3(f,w)
Grain Crops, 3(f,w)
Forage Crops, 3(f,w)

JUNIOR YEAR

Farm Implements, 3(f,w)
Tractors and Diesel Engines, 3(f,w)
Heat and Electricity, 4(w)
Farm Butchering and Curing of Meats 3(f,w)
Livestock Feeding and Management, 3(f,w)
Dairy Stock Feeding, 3(f,w)
Grain and Hay Grading, 2(f)
Crop Breeding, 3(w)
Crop Judging, 1(w)
Judging Breed Types of Livestock, 3(f,w)
Dairy Stock Judging, 2(f,w)
Farm Forestry, 3(w)
Vegetable Gardening, 3(f)
Greenhouse Management, 3(f)
Potato Production, 3(w)
Seed Testing, 2(w)
Weeds, 2(f)
Veterinary Studies, 3(f,w)
Dairy Testing, 1(w)

SENIOR YEAR

Farm Management I, 3(f,w)
Farm Management II, 3(f,w)
Farm Buildings, 3(f)
Livestock Breeding, 3(f,w)
Milk Production, 3(w)
Advanced Dairy Stock Feeding, 3(w)
Dairy Stock Selection, 3(f)

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§ Courses should be elected by those who contemplate taking the nurse's training upon graduation.

Open to Home Economics Students Only

FRESHMAN YEAR

Home Economics Units, (w)
3 units of 1 cred. each
Home Crafts, 3(w)
Home Service, 3(f)
Farm Arithmetic, 3(f,w)

JUNIOR YEAR

Decorative Needlework, 2(w)
Millinery, 2(f)
Special Home Problems, 2(f)
Food Problems, 3(f)
Home Economics Projects, 1-3(f,w)
Units in Agriculture (Horticulture, Poultry, Dairy), 1-3(f)

ADMISSION TO THE COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

Graduates of the School of Agriculture of the University of Minnesota who have completed the two summers of supervised farm work offered in the school course, one additional school year, and one additional summer's work, or the equivalent thereof, will be admitted to the College of Agriculture, Forestry, and Home Economics.

DESCRIPTION OF COURSES

AGRICULTURAL BIOCHEMISTRY

A1-2. Chemistry of Plant and Animal Life I, II. The fundamental principles of chemistry necessary for an understanding of common daily phenomena. The scope of agricultural chemistry and the help which the farmer may expect from the chemical laboratories of the state are outlined. (Equivalent of high school chemistry.)

A4. Chemistry in Agriculture. A survey discussion—lecture course indicating the important part that chemistry plays in agriculture and modern civilization. (Not the equivalent of high school chemistry.)

AGRICULTURAL ECONOMICS

A21. Farm Management I (Farm Records and Accounts). Forms and procedure for recording inventories, cash receipts and expenses, crop acreages and yields, feed for livestock, farm produce used in the house, and other information concerning the farm business. Calculation of measures of earnings and of management efficiency. Practice in recording and analyzing a year's business for a Minnesota farm.

A22. Farm Management II (Organization). Farm organization as related to types of farming, combinations of enterprises, crop rotation, soil management, fields and farmstead arrangement, and the efficient use of labor and equipment.

AGRICULTURAL ENGINEERING

A10. Farm Implements. Studies of the selection, operation, and care of farm machinery, also the cost, depreciation, and adaptability of the various machines to the work to be accomplished.

A11. Gas Engines. Theory and practice work in gasoline and kerosene engines.

A12. Tractors and Diesel Engines. Carburetor and Diesel type engines and tractors. Their adjustment, care, and operation.

A16. Mechanical Training. General. Instruction and laboratory practice in rope splicing, knots, belt lacing, pulleys and shafting, soldering, electric wiring, and cement work.

A17. Metal Working. Instruction and laboratory practice in pipe fitting, valves, forage work, cold metal work, oxyacetylene welding, brazing, cutting, and electric arc welding.

A18. Mechanics and Water Supply. The mechanics of solids, liquids, and gases. Special emphasis is given to water supplies, water systems, sewage disposal, weather conditions, and forecasts. Laboratory work will be a part of this course.

A19. Heat and Electricity. Heat and electricity as applied to home heating and lighting, with a study of storage batteries, motors, and other appliances. Laboratory work will be given.

A20. Farm Electrical Equipment. Principles of electric motors and generators. Care and operation of electrical equipment.

A21. Woodworking. Construction of practical projects in wood with information and practice on tool processes, saw filing, tool sharpening, painting, and glazing.

A22. Carpentry. Instruction and practice in farm building construction, estimating, laying out and framing sills, joists, studs, rafters, and other parts of buildings.

A31. Drawing. Sketching, lettering, conventional symbols, and training in pictorial drawing, and orthographic projection related to agriculture. Set of instruments not required.

A32. Farm Buildings. Location, planning, construction, and maintenance of farm buildings.

AGRONOMY AND PLANT GENETICS

A1. Grain Crops. The history, culture, and uses of the important grain crops and corn.

A2. Forage Crops. The identification, culture, harvesting methods, storage, value for feed and market, and uses for soil conservation of the important forage grasses and legumes.

A3. Genetics and Eugenics. The laws of heredity with plants, animals, and human beings, inheritance of important characters in man, including physical abnormalities, mental deficiencies, intelligence, etc., and the relation of these principles to problems of race improvement.

A4. Crop Judging. Identification of farm crops, weeds, and plant diseases from plant and seed specimens, varietal identification, practice in judging wheat, oats, barley, flax, alfalfa, and sweet clover.

A5. Crop Breeding. Modern methods of breeding and propagating the various farm and horticultural crops with plans for growing and certifying pedigreed seed.

A6. Grain and Hay Grading. The identification of the important varieties of major farm crops, practice in commercial grain and hay grading, judging methods, including practice with corn, small grains, grasses, and legumes.

ANIMAL AND POULTRY HUSBANDRY

ANIMAL HUSBANDRY

A1. Market Livestock Production. The livestock industry; demonstration of types and market classes of cattle, horses, sheep, and swine, and their relation to production; score card practice and the fundamentals of livestock judging.

A2. Judging Breed Types of Livestock. The origin, present-day characteristics, and adaptability of the breeds of cattle, horses, sheep, and swine. Practice in judging purebred animals.

A4. Farm Butchering and Curing of Meats. Lectures, demonstrations, and practice in slaughtering and dressing animals and in cutting and curing meats.

A5. Livestock Breeding. Livestock improvement and variation, heredity, environment, and selection as factors therein; line breeding, inbreeding, crossbreeding, and grading up; the purebred sire pedigree, registration; practical breeders' problems.

A7. Utilization of Meats. Lectures on methods of utilizing cuts from the beef, pork, and lamb carcass; curing and storing meats for summer use; laboratory practice in preparing cuts of meat for cooking; sausage making, and lard rendering. (This course is intended primarily for women students.)

A9. Livestock Feeding and Management. The important principles involved in the selection and preparation of feeds; methods of feeding beef cattle, swine, sheep, and horses. The business side of livestock production, buying and selling animals, housing, care, and sanitary measures; planning the livestock enterprise.

POULTRY HUSBANDRY

A11. General Poultry Management. The poultry industry, its magnitude, advantages and disadvantages, seasonable market classes and breeds best adapted to egg production and to different markets, nutrition, feeds, feeding, winter egg production, houses and appliances, yards, prevention of disease.

A12. Poultry Judging and Marketing. Lectures and laboratory practice in judging for standard requirements and selecting for production qualities; grading live and dressed poultry, candling and grading eggs for market.

A13. Incubation, Brooding, and Breeding. Instruction in the principles and practice of incubation; feeding and management of growing chicks; breeding for flock improvement.

A14. Turkey Production. Instruction in breeds, breeding, incubation, brooding and rearing, feeding and marketing of turkeys. Possible and probable profits, merits of different varieties, shelters for old and young, hatching, brooding, and marketing.

DAIRY HUSBANDRY

A1. Dairy Stock Feeding. The principles of feeding. A study of feedstuffs, and formulation of rations for dairy animals.

A2. Farm Dairying. Development of the dairy industry, breeds of dairy cattle, composition and properties of milk and milk products, dairy farm sanitation, care and operation of dairy farm equipment.

A3. Dairy Stock Judging. Practice in judging dairy cattle both from the standpoint of the farmer who is interested in the production of dairy products for market and the breeder of purebred cattle.

A5. Milk Production. A study of the problems in dairy herd management, raising of calves and young stock, and factors influencing the cost of producing milk.

A6. Advanced Dairy Stock Feeding. An advanced course dealing with rations and special feeding problems.

A7. Dairy Stock Selection. Characteristics of the dairy breeds, selection of breeding stock, valuation of pedigrees, and selection of sires.

A8. Dairy Testing. Laboratory practice in use of the Babcock test and other simple tests for milk and milk products.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

A1. Animal Biology. Fundamental principles of animal life such as metabolism, respiration, digestion, growth, and reproduction. The more important groups of the animal kingdom and their relation to man.

A4. Elementary Beekeeping I. Fundamentals of bee behavior and of beekeeping practice during spring and early summer; spring management. Swarming, swarm control, and increase.

A5. Elementary Beekeeping II. Fundamentals of bee behavior and of beekeeping practice during late summer, fall, and winter. Production of extracted honey, comb honey, and wax. Feeding, requeening. Wintering of bees. Bee diseases.

A6. Advanced Beekeeping. Commercial and out-apiaries. Migratory beekeeping. Package bees and nuclei. Home queen rearing. Marketing of honey.

A16. Insect Pests of Plants. Life cycles of insect pests injurious to cultivated plants and methods of combating them.

A18. Special Problems. Properly qualified students will be given oppor-

tunity to carry on individual work in biology, economic entomology, and beekeeping. In each case permission of the instructor must be obtained in advance.

FORESTRY

A1. Farm Forestry. Planting and care of farm windbreaks, shelterbelts, and woodlots. Seed collecting, storage, and germination problems. Preservative treatments for farm timbers and fence posts. Raising coniferous and deciduous seedlings.

HOME ECONOMICS

A2. Clothing Planning and Construction. A study of the student's clothing needs for the improvement of personal appearance. The care and repair of clothing, cleaning, laundering, and study of cotton clothing.

A4. Textiles and Dressmaking. The selection of suitable fabrics and designs for clothing. The construction of dresses or other garments for school and home use.

A5. The Girl's Wardrobe. The application of design, textile, and economic information to the problems of assembling a wardrobe. The planning and construction of garments suited to the student's needs.

A6. Decorative Needlework. Color and design applied to needlework, adapted to use in the making of clothing and household furnishings.

A7. Millinery. Design, care, and renovation of hats, hat materials, and trimmings. Construction of different types of hats.

A21. Related Art. The principles of design and color harmony applied to suitable clothing; furnishings and arrangement of rooms; craft problems.

A26. House Planning and Furnishing. A consideration of the house in relation to the needs of the family. Consideration will be given to location, exterior design, convenient arrangement of floor space; selection of interior finish, wall and floor coverings, furniture, curtains, and pictures; furniture refinishing.

A27. Home Economics Units. Unit I: The study of unusual dishes which add variety to meals, including preparation and marketing; Unit II: Foods used in other countries; Unit III: Desserts for various meals and foods for sale.

A28. Home Crafts. The principles of design and color harmony are applied to articles made of wood, metal, paper, etc. Shop experiences are provided in the repair, maintenance, and refinishing of furniture and other household equipment.

A31. Selection and Preparation of Food. A study of food in relation to planning, preparation, and serving of luncheons and suppers. The care and upkeep of kitchen and dining room equipment. Methods of food preservation.

A32. Meal Planning and Preparation. Advanced food study in relation to the preparation and serving of dinners. Food combinations, marketing, and plans for family meals. Opportunity for small groups to prepare and serve meals.

A33. Foods and Nutrition. A study of the food needs for optimum health of individuals and families. Food for different individuals, infants, children, and the sick.

A34. Home Management. Analysis of the problems of the homemaker as manager. Selection and use of techniques for utilizing material and human resources. Planning for home hospitality.

A35. Child Care and Development. A study of the factors influencing the proper growth (mental and physical) of the small child, a dis-

cussion of the best literature and toys for children's use. Direct experience with observation of children in their own homes is provided.

A36. Home Service. A study of the accepted forms of table service with emphasis on the duties of a waitress. Opportunities for experience in serving meals and giving parties.

A37. Household Buying. A study of the availability, the market, the price, the basis for selection, and the methods of purchase of commodities in common use by the average person or family.

A39. Food Problems. A study of desirable standards for preserved and baked foods for home use and for salable products. Development of skill in their preparation.

A40. Home Economics Projects. Students may select a project in the home economics field with guidance, carry on independent work, report to the teacher at intervals, and make a final report. Credit will be granted according to the quality of the completed project.

A50. Related Science I. A study of the interesting phenomena of everyday life, especially those relating to the home. Work with household materials such as furniture and metal polishes, soaps, etc.

A51. Related Science II. A study of certain science principles and applications that relate to foods, textiles and clothing, water, electricity, lighting, and simple machines found in the home.

A52. Units in Agriculture (Poultry, Dairy, Horticulture). Unit I: Management of the farm flock including principles of brooding and rearing, feeding, housing, selection and culling, and factors affecting the market quality of poultry products. Unit II: The preparation of dairy products on the farm with particular attention given to the manufacture of farm cheeses, butter, and ice cream. Unit III: Establishing and managing plantings of small fruits, with special reference to the possibilities of supplementing farm income from the sale of berries.

A53. Special Home Problems. A study of the care and management of the home under conditions of illness or other emergencies.

A73. Home Problems. The study of the selection of food; fundamental processes of cooking; adequate food for the family; financial management; selection and care of clothing; family and community relationships. This course is planned for young men.

HORTICULTURE

A1. Farm Horticulture. Principles of landscape planning and use of ornamentals for the farm home. Growing fruits and vegetables for use on the farm. Location and planting of the orchard and garden, and culture of the important crops.

A2. Orchard Fruit Growing. Commercial orcharding with special consideration of the profitable management of an orchard on the Minnesota farm. Location; planting; selection of varieties; cultural systems; pruning; pest control; harvesting and marketing of fruit.

A3. Vegetable Gardening. Growing of vegetable crops for market. Locating, planting, and care of the commercial garden; consideration of the important crops; marketing methods; types of glass structures, their uses, and the production of vegetables under glass.

A4. Small Fruit Growing. A practical study of berry growing as a commercial enterprise in Minnesota and the Northwest, covering the establishing and managing of plantations of strawberries, raspberries, gooseberries, currants, and grapes.

A5. Plant Propagation. Methods of propagation of plants by seeds, cuttings, layers, grafting, and budding are studied. The principles of

greenhouse management, transplanting, watering, and ventilation are studied.

A7. Floriculture. A working knowledge of the culture and use of house plants, annuals, and perennials.

A8. Landscape Gardening I. Most of the term will be devoted to a study of the trees and shrubs used in landscape planting. In the latter part of the term some attention will be given to the principles of landscape gardening.

A9. Landscape Gardening II. Practice and principles of ornamental plantings as applied to the home and community, with special reference to the small place and the farmstead.

A10. Greenhouse Management. Management of the greenhouse from the standpoint of the fruit, vegetable, or flower grower. Various crops in relation to types of glass construction. Practice work in crops in the greenhouse.

A14. Potato Production. Growth, climatic requirements, regional distribution, standardization of varieties according to soil, climate, and markets. Identification, exhibiting, judging, handling of seed plots, certification, cultural methods, storage, and marketing.

A15. Special Problems in Horticulture. Individual instruction in the various phases of horticulture adjusted to meet the needs of the student. Credit may be earned in one or more quarters.

PHYSICAL EDUCATION AND ATHLETICS

MEN

The Department of Physical Education and Athletics attempts to present to the student a well-rounded program embracing required physical education, interschool athletics, and intramural activities to provide for growth and development of the physical, psychological, social, and recreational abilities of each individual. A primary objective is the development of interests, abilities, attitudes, and appreciations for physical activities.

Intramural or interclass athletics are organized and established to provide the opportunity and enjoyment of participation in athletic activities for every student of the school. Student recreation and health is the purpose of the varied intramural program offering activity in diamondball, touchball, football, field meet, horseshoe, table tennis, archery. swimming, basketball, volleyball, track and field meet, boxing and wrestling tournaments, ice skating, and social dancing.

Interscholastic competition with other schools of agriculture and colleges in basketball, cross-country running, swimming, and wrestling is an important part of the school program each term.

The various phases of the physical education and athletic program provide an opportunity for development of motor co-ordination and skill in the fundamental sports activities and for leisure time recreational interests, and contribute to the development of a broad social background.

The required physical education course activities consist of the following:

A1. Physical Education Activities. Development of skills and sports fundamentals; a comprehensive knowledge of rules, techniques, and strategies; body control, team play and co-operation; and the health habits and safety factors associated with these various physical activities. Fall term—diamondball, touch football, speedball, volleyball, tumbling, swimming; winter term—basketball, track, boxing, wrestling, volleyball, handball, marching, social games, tumbling, and pyramids.

A2. Beginning Swimming. For non-swimmers and those unable to swim in deep water. Health and safety factors in the pool; developing confidence in the water; elementary strokes; artificial respiration.

A3. Boxing. Stance and positions; leading, simple and combination blows, defensive and offensive tactics; ring strategy; scientific aspects of the sport and presentation as a means of exercise and development.

A4. Social Games and Recreational Sports. Instruction in active and social games, and home play. Rural recreation suggestions. An advanced course dealing with more intensive play and knowledge of badminton, handball, table tennis, shuffleboard, golf driving, horseshoes, archery, dart baseball, deck tennis, aerial tennis.

A5. Sports Administration. Leadership, initiative factors in sports; development of play and recreation facilities; principles of physical education; practice in administration and organization of various athletic events; history of sports; rural recreation organizations.

WOMEN

This department offers a program of health and physical education planned to meet the needs of the students and to achieve the desirable outcomes of an activity program. A selected number of group, individual, and dual sports are offered to enable students to acquire skill and knowledge in the field of recreational activities. Students are encouraged to take work in folk dancing, gymnastics, rhythmic activities, and body building exercises to develop ease of movement, co-ordination, grace, and self-confidence. The importance of correct posture is stressed in all teaching and special help in posture correction is given individually. Definite hours are arranged for the activities in the Girls' Athletic Association. These activities are: basketball, volleyball, archery, swimming, badminton, skating, shuffleboard, and baseball. Through this program an opportunity is afforded to the students for making friends and developing better social qualities.

A1. Team Games. An opportunity for experience in team games of field ball, diamondball, and volleyball (fall quarter); and basketball, hit pin baseball, and volleyball (winter quarter). Discussion of rules and techniques of various skills of each sport.

A2. Recreational Games. Instruction in archery, shuffleboard, tenikoit, badminton, and table tennis.

A3. Rhythmical Activities. Instruction in tap and folk dancing and singing games.

A4. Beginning Swimming. This is a course for those who do not know how to swim or are not at home in deep water. Instruction will be given in elementary strokes, diving, and water emergency measures.

A5. Lifesaving and Water Front Safety. Instruction in junior and senior lifesaving tests and methods of water rescue which have been set up by the American Red Cross. Techniques and methods of teaching swimming at beach or camp, including instruction in organization and program-planning for all age levels.

A6. Recreational Leadership. Instruction in organizing, conducting, and planning a program of recreational activities for various age levels. Knowledge of team games, individual sports, social games, and mixers, presented with the idea of developing teaching ability and leadership.

A7. Intermediate and Advanced Swimming. Instruction in basic swimmining strokes, correction of self-taught swimming activities to more efficient movements, water emergency measures, diving and water safety.

PLANT PATHOLOGY AND BOTANY

A1. Agricultural Botany. The structure and life processes of economic plants and their relation to agricultural practices. Growth, absorption, food manufacture, reproduction, and respiration. The dependence of man and animals on green plants. The nature of fungi and bacteria, and their importance in causing disease and decay.

A2. Seed Testing. The seeds of the common farm weeds, with special attention to those of noxious weeds. A set of seed cases is made and practice is given in testing seeds for purity and germination.

A11. Plant Diseases. Important diseases of fruit, vegetable, and field crops in Minnesota, with emphasis on the nature of the cause and methods of control.

A12. Weeds. Farm weeds with special emphasis on their identification, control, and eradication.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

A1. Home Nursing and Hygiene I. Personal and community hygiene. Prevention and care of illness in the home; methods of improvising nursing equipment.

A2. Home Nursing and Hygiene II. Hygiene requirement during infancy, childhood, womanhood, preparation for maternity, care of infant, household emergencies.

A8. Hygiene. Methods for promotion of health and prevention of disease, fundamentals of healthful living, and individual and community activities against the spread of disease.

RHETORIC

A1. English I. Themes, outlining, use of the dictionary and the library. Supplementary reading.

A2. English Classics. Types of literature. Evaluation of books and periodicals.

A3. Business English. Practice in various forms of correspondence and business forms. English usage.

A4. English Composition. Paragraphs and themes of narration, description, and exposition.

A5. Public Speaking. Voice exercise, platform deportment. Practice in delivery of memorized and extemporaneous speeches.

A6. English VI. Exposition and argument. Gathering and outlining material.

A14. Advanced Public Speaking. A continuation of Course A5. Selecting and organizing material for speeches and the presentation of speeches effectively before a given audience.

A21-22. English Literature I, II. The history of English literature, with a study of selections. For students planning to enter the College of Agriculture, Forestry, and Home Economics.

A23. Books and Reading. Interpretation of recent literature. The home library.

A32. Debating. Gathering of evidence. Reasoning. Briefing. Debate.

A33. Advanced Debating. Principles of argumentation and persuasion applied in debate.

SCHOOL (GENERAL)

A1. Farm Arithmetic. Training in simple mathematical processes, applications of principles to problems requiring measurements of material, extension, capacity. Practical applications to farm and home life. Assists in the mathematics of the technical school courses.

A2. Advanced Farm Arithmetic. Similar in outline to Course A1. Special emphasis on farming as a business.

A4. Algebra I. Fundamental operations; properties of algebraic numbers, addition, subtraction, multiplication, division, factoring, simple equations, fractions.

A5. Algebra II. Fractional equations, literal numbers, proportions, simultaneous equations, radicals, quadratics. Emphasis upon the development and use of formulae. Problems taken from fields allied to agriculture.

A6. Geometry I. Parallel and perpendicular lines, triangles, loci, polygons, proportion, similar polygons. Theorems developed both inductively and deductively. In this term's work, emphasis is placed upon geometry as a reasoning process.

A7. Geometry II. Inequalities, circles, numerical relations, areas, regular polygons. Special emphasis on those problems relating to farm life such as the calculation of areas, surveying, and problems taken from mechanics.

A8. Acting. Fundamental principles of acting, such as pantomime, voice training, interpretation of lines, with opportunities for actual acting in plays as a cast member.

A9. Stagecraft. Designing appropriate sets for plays, constructing and painting scenery, lighting of the set, how to make use of materials at hand.

A10. Directing of Plays. The actual production of a one-act play, including the choosing of the play, casting, blocking action, directing rehearsals, and preparing the play for the audience.

A11. Drama. Study of dramatic literature to gain an appreciation of it. Reading knowledge of drama.

A21. Elements of Music. Fundamental principles of musical notation, pitch, rhythm, musical terms, formation of major scales, sight reading, singing, and ear training.

A22. Harmony I. Formation of minor scales, intervals, chord construction, ear training in rhythm and intervals. Musical terms. Chords applied to piano.

A23. Chorus. Men's Glee Club, Girls' Glee Club, and quartets will be developed from among students of ability as shown through voice tryouts. One evening of group practice and two hours of individual practice a week. Definite assigned work will be given.

A24. Violin. Elementary: Hoffman, *Kayser Etudes, Schradieck Scales, Solos in Comparison.* Intermediate: scales in all positions, Seveik, Mazas, Dont, compositions of medium difficulty. Advanced: Kreutzer, Fiorillo, Rode, Gavinie, sonatas of Handel, Gade, David, concertos of Viotti, DeBeriot, Mendelssohn. Ten thirty-minute lessons, $6.55 per term.

A25.* Piano. Elementary and advanced technical training, scales, arpeggios, octaves, chords, selected technical studies. Bach: *Inventions, Well-Tempered Clavichord.* Sonatinas: Clementi, Kuhlan; Sonatas; Haydn, Mozart, Beethoven. Solos for all grades; classics and best modern material. Ten thirty-minute lessons, $6.55 per term.

A26. Instrumental Music. Band and orchestral instruments, such as cornet, clarinet, saxophone, trombone, baritone, alto, horn, tuba, etc., using standard textbook containing latest methods. Ten thirty-minute lessons, $6.55 per term.

A27. Orchestra. Standard works in orchestral music. Special attention

* Piano students may register for orchestra and receive training through piano quartet (two pianos), subject to the approval of the instructor.

is given to interpretation, rhythm, phrasing, intonation, and sight reading.

A28. Voice. Voice placing, breath development, enunciation, diction, illustrated by elementary studies and exercises by Sieber, Clippinger, Con Cone; songs of medium difficulty. Ten thirty-minute lessons, $6.55 per term.

A29. Harmony II. Formation and progression of triads, seventh and ninth chords, harmonizing a given bass.

A30. Harmony III. Harmonizing simple melodies, cadences, modulations, transposition, accompaniment, writing, and melody building.

A31. Choral Class. Fundamentals of voice production; i.e., breath control, acquiring freedom of the articulating muscles, resonance, pure vowel sounds, diction, sight singing, tone values, intervals. Emphasis given to chorus organization and directing. A comprehensive examination held at the end of each term.

A32. Appreciation of Music. Brief history; biographies of well-known composers; and a knowledge of standard musical literature for the orchestra, band, chorus, solo work, and any combination or group of instruments or voices.

A34. Band. Ensemble playing, sight reading, breathing, scales, intonation, phrasing, rhythm, and practical band experience is given. Best standard musical literature. Advanced methods in nonpressure tone production and attack. Three hours a week individual practice.

A40. Leaders and Leadership. Study of types of leaders, origins, social stimuli, personality, character, inhibitions, tact, system, and organization. An analysis of leaders, applied to rural activities and organizations.

A41. Parliamentary Law. Principles of parliamentary law, how to organize a society, duties of officers, how to record proceedings, and how to conduct meetings. Students will be given practice under the direction of the instructor.

A43. Economics. Fundamental laws governing production, consumption, distribution, and exchange. Principles of economics as applied to the farmer's relationships, as a producer and as a consumer. A discussion of wages, rent, and interest.

A44. Marketing. Elementary principles to be considered in organizing a local co-operative. Types of marketing organizations both local and terminal. The marketing of perishables, semi-perishables, and staple commodities. A discussion of pooling and hedging.

A45. Industrial History. The history of the development of industry in the United States with special emphasis upon the development of agriculture. Significance and relationship to present-day movements.

A46. Rural Sociology. A practical course including a study of rural conditions, how to make a survey, the causes of present conditions and how they may be improved. Study of rural organizations, religions, and educational institutions.

A47. American History. Causes and effects of great movements are emphasized. History of the westward migration, immigration, foreign relations, and special emphasis on our history since 1900.

A48. History of Civilization. A survey of the social, political, and economic backgrounds of the ancient and medieval civilizations, contributions of their science, art, literature, laws, institutions, and thought to the present.

A49. Farm Finance. Money and its use as a medium of exchange. Monometallism and bimetallism. Systems of credit and banking opera-

tions. A discussion of the agricultural credit system, the federal farm land banks, federal intermediate credit banks, Federal Reserve System.

A53. National Government. National governmental machinery, functions, and finance, adding to the routine treatment some consideration of the modern tendencies and agencies of national control, regulation, and ownership.

A54. State and Local Government. The state, county, town, and school district in their present-day aspects as social and economic agents of the people of Minnesota; state and local finance, considering the sources, uses, collection.

A55. Social Training. Fundamental principles governing the individual in social contacts; attention to the rights and the responsibilities of the individual in institutional life; the home as the social center; discussion of problems arising in current social activities.

A56. Social Problems for Boys. An open forum for the discussion of social conventions of home, school, and public life.

A61. Spelling. Students poor in spelling should elect this course and continue until able to spell words in ordinary conversation and correspondence. A spelling text is used and drills on lists of commonly misspelled words are given.

A62. Penmanship. A standard muscular movement system is taught. Students who are poor in penmanship should elect this course.

A92. Psychology. A study of human activity and behavior as influenced by the reactions which the individual makes to his environment. A study of adjustments to new situations and development of personality.

A94. How To Study. Training in inventorying of study habits, in budgeting of time and planning a schedule, in effective reading, in technique of concentration, in taking notes, and in preparing for examinations.

BUSINESS COURSES

The object of these courses is to prepare students for office work on the farm, in the village, or in subordinate positions in regular business offices.

The subject-matter of these courses, combined with the courses in homemaking and agriculture, gives the students a training which qualifies them to take positions as office assistants in farm bureaus, co-operative creameries, and local elevators and other farm organizations.

A80. Typewriting I. The touch method of typewriting is taught. Following the memorization and fingering of the keyboard, drills for acceleration, concentration, and rhythm are given.

A81. Typewriting II. A continuation of carefully planned drills for the development of accuracy and speed. Work in tabulating, letter writing, and practice on different makes of typewriters, with their care.

A82. Typewriting III. Business correspondence from the typist's viewpoint. Business letters and documents which help in gaining correct first impressions are studied and copied. Construction work requiring judgment in arrangement, and the exercising of initiative in solving original problems. Drills for the development of speed and accuracy are stressed.

A83. Stenography I. Beginning material of *The Gregg Shorthand Manual* and co-ordinating articles in Alice Hunter's *Graded Readings* are studied. Suitable elementary material is dictated to the class.

A84. Stenography II. Class continues the study of *The Gregg Shorthand Manual* and Alice Hunter's *Graded Readings*. Drills and dictation given in class.

A85. Stenography III. The study of *The Gregg Shorthand Manual* and Alice Hunter's *Graded Readings* continued. Supplementary material is studied. Dictation of suitable material in class for the development of skill in the taking and reading of shorthand notes.

A86. Bookkeeping I. Principles of double entry illustrated by keeping a set of books for a firm, making out the forms necessary for the various transactions, and closing the books.

A87. Bookkeeping II. Takes up the partnership form of business organization and continues accounting principles. An advanced set of books is kept.

A88. Commercial Law. Elementary principles governing contracts, a discussion of insurance, wills, deeds, mortgages, stocks, and bonds. Reference made to types of business organizations such as partnerships and corporations. Safe investments and the proper use of credit. Use of negotiable instruments.

A89. Typewriting IV. Course concentrates on the development of accuracy and speed in typing. Letters dictated to machine. Instructions given on the cutting of mimeograph stencils.

A90. Stenography IV. Completion of *The Gregg Shorthand Manual*. Study of much correlated supplementary material. Dictation and transcription work.

A91. Stenography V. Study of *Speed Studies* and advanced shorthand material. Much dictation of material at increasing rates of speed to develop shorthand skill. Accuracy of transcribing from shorthand notes emphasized.

A92. Office Practice. Actual office methods and practice as well as apprentice work in various offices on the University Farm campus, and use of office appliances, such as dictaphone, mimeograph machine, and comptometer.

SOILS

A1. Soils. Minnesota soils, their formation, properties, and characteristics. Treatment of lime-deficient, alkali, and peat soils. Farm manures, green manures, and commercial fertilizers. Laboratory demonstrations, examination of soils, and discussion of soil problems.

VETERINARY MEDICINE

A1. Physiology. The purpose of the course is to give an intelligent conception of the various organs and systems of the body; how they function and how they are managed for continued health and efficiency.

A4. Elements of Bacteriology. Lectures and demonstrations of the fundamental principles underlying the science of bacteriology, with special reference to organisms which cause disease. The use of vaccines, bacterines, antitoxins, immune sera.

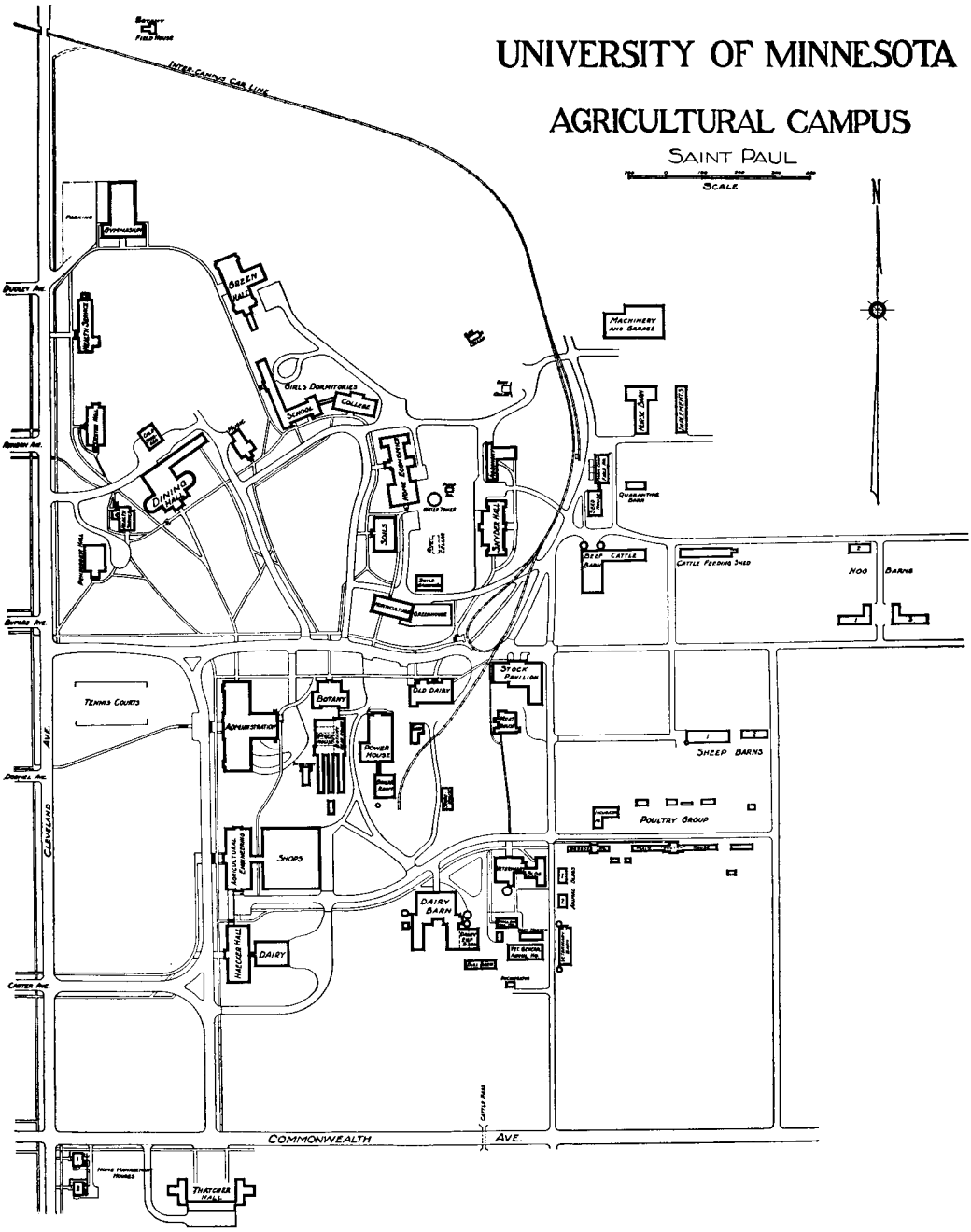
A7. Veterinary Studies. The animal body in health and disease; causes, prevention, and management of disease including common parasitic diseases.

THE SCHOOL OF AGRICULTURE AT UNIVERSITY FARM

If you plan to enter the School, write to Superintendent J. O. Christianson, University Farm, St. Paul, and ask for an admission blank. Please do NOT send DIPLOMAS. In case you have had any high school work, be sure to have those credits recorded on the blank or send certificates covering the work done.

A $2 room reservation fee, made payable to the University Department of Agriculture, will reserve a room in the dormitories for you. This fee should accompany your application blank.

If you have any questions at all, write directly to Superintendent J. O. Christianson, University Farm, St. Paul.


UNIVERSITY OF MINNESOTA
AGRICULTURAL CAMPUS
SAINT PAUL
SCALE
N
BOTANY FIELD HOUSE
INTER-CAMPUS CAR LINE
PARKING
GYMNASIUM
GREEN HALL
NORTH SCHOOL
GIRLS DORMITORIES
SCHOOL
COLLEGE
DINING HALL
PARKING
HOME ECONOMICS
SOILS
SOILS GREENHOUSE
ANIMAL HUSBANDRY
SNYDER HALL
MACHINERY AND GARAGE
HORSE BARN
SHEEP SHEDS
QUARANTINE BARN
HOG BARN
BEEF CATTLE BARN
CATTLE FEEDING SHED
HOG BARNS
HORTICULTURE
GREENHOUSE
TENNIS COURTS
ADMINISTRATION
BOTANY
OLD DAIRY
STOCK PAVILION
POWER HOUSE
SHEEP BARNS
POULTRY GROUP
SHOPS
AGRICULTURAL ENGINEERING
HATCHER HALL
DAIRY
DAIRY BARN
VETERINARY CLINIC
VET SCHOOL ANIMAL HOS.
ANIMAL BLDG
PASTEURIZING
CLEVELAND AVE.
DUDLEY AVE.
ROBBINS AVE.
BUFORD AVE.
DOERNEL AVE.
CARTER AVE.
CATTLE PASS
COMMONWEALTH AVE.
HOME MANAGEMENT HOMES
THATCHER HALL

The Bulletin of the
UNIVERSITY *of* MINNESOTA

The College of Education Announcement of Late Afternoon and Saturday Morning Classes 1940-1941

Volume XLIII, Number 55 August 29, 1940

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UNIVERSITY CALENDAR

1940			*Fall Quarter*
September 23-27			Examinations for removal of conditions
September 25-28			Freshman Week
September 26-27			Registration, College of Education
September 26-27, Sept. 30–Oct. 5			Registration days for teachers in service*
September	30	Monday	Fall quarter classes begin 8:30 a.m.
October	12	Saturday	Last day for Graduate School registration
October	26	Saturday	Homecoming Day
November	5	Tuesday	Election Day; a holiday (except for extension)
November	11	Monday	Armistice Day; a holiday (except for extension)
November	16	Saturday	Dads Day
November	28	Thursday	Thanksgiving Day; a holiday
December 13-14 and 16-19			Final examination period
December	19	Thursday	Commencement Convocation
			Fall quarter ends 6:00 p.m.

1941			*Winter Quarter*
January 3-4			Registration, College of Education
January 3-4, 6-11			Registration days for teachers in service*
January	6	Monday	Winter quarter classes begin 8:30 a.m.
January	18	Saturday	Last day for Graduate School registration
February	12	Wednesday	Lincoln's Birthday; a holiday (except for extension)
February	22	Saturday	Washington's Birthday; a holiday
March 14-15 and 17-20			Final examination period
March	20	Thursday	Commencement Convocation
			Winter quarter ends 6:00 p.m.

			Spring Quarter
March	28-29		Registration, College of Education
March 28-29, March 31-April 5			Registration days for teachers in service*
March	31	Monday	Spring quarter classes begin 8:30 a.m.
April	11	Friday	Good Friday; a holiday (except for extension)
April	12	Saturday	Last day for Graduate School registration
May	10	Saturday	Mothers Day
May	15	Thursday	Cap and Gown Day Convocation
May	30	Friday	Memorial Day; a holiday (except for extension)
June 6-7 and 9-13			Final examination period
June	8	Sunday	Baccalaureate service
June	13	Friday	Spring quarter ends 6:00 p.m.
June	14	Saturday	Sixty-ninth annual commencement

* Teachers in service will be allowed to register in the College of Education during the first week of classes without penalty. After that period a late fee of $2 will be charged.

DIRECTORY OF ADMINISTRATIVE OFFICERS

(University of Minnesota Telephone—Main 8177)

	Room
W. E. Peik, Dean of the College of Education	204Bu
Marcia Edwards, Assistant to the Dean of the College of Education	202Bu
Jean Alexander, Chairman, Students' Work Committee	206Bu
W. S. Carlson, Director of Student Teaching	103UHS

See list of advisers on pages 15-16.

GENERAL INFORMATION

The following program of late afternoon and Saturday classes is arranged by the College of Education for teachers in service. Many of the offerings are required subjects in the regular course of training for high school teachers or in the specialized curricula. Students expecting to qualify for a degree should secure a copy of the College of Education Bulletin Announcement of Courses 1940-42, which contains a statement of general requirements for graduation, required courses in majors and minors, descriptions of course content, and the specialized curricula. Students should consult a major adviser as early in their programs as possible. Failure to do so often delays graduation and makes extra work necessary. Graduate students should get the Bulletin of the Graduate School.

The small letter f after a course number indicates that the course is taught in the fall quarter; w indicates winter quarter; s indicates spring quarter.

Bulletin changes and room schedules will be posted each quarter on the official bulletin board outside the door of Room 210 Burton Hall.

The fee for part-time registration is at the rate of $1.75 per credit for residents and at $3.50 per credit for nonresidents.

QUALIFYING EXAMINATION SCHEDULE

Comprehensive examinations in the subject-matter fields of preparation have been discontinued because studies indicate that the selection of students by the honor point ratio served the purpose equally well. An average of C+ in the major field is required for admission to methods courses and practice teaching. Comprehensive examinations will continue in Education and in General English. They are required of all students. The dates will be announced at the beginning of each quarter.

PSYCHOLOGICAL EXAMINATIONS

The psychological examinations, which are general examinations designed to show a student's capacity to pursue professional curricula in education, are required of both classified and unclassified undergraduate students of education, and are considered a prerequisite to graduation. Dates when they are given will be announced at the beginning of fall, winter, and spring quarters. They will also be given on a Saturday afternoon at the beginning of each quarter for teachers in service and others who are unable to attend during the week.

PROGRAM*

1940-41

ART EDUCATION

Major adviser.—Professor Raymond.

Group A—Design

Senior College and Graduate Courses

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.152	*Landscape Design (Not offered)*				
ArtEd.154-155E	Art in Society				
154f	Personality and Its Expression in Costume (3 cred.; sr., grad.)	4:00-5:00	MWF	207bJ	Miss Raymond
155E	*Painting (Not offered)* (Students expecting to register in 1941-42 should consult Mr. Torbert about prerequisite reading)				

Group C—Representation

Junior College Courses

ArtEd.23f,w,s	Composition Clinic (2 cred.; prereq. evidence of fitness)	I-II and ar	S	207J	Mr. Torbert

Senior College Courses

ArtEd.61,62,63f,w,s	Painting (2 cred. each)	I-IV	S	207J	Miss Lutz
ArtEd.66,67,68f,w,s	Painting (Continuation of 61, 62, 63)	I-IV	S	207J	Miss Lutz
ArtEd.124E-125E-126Ef,w,s	Advanced Painting (2 to 6 cred.)	I-IV	S	207J	Miss Lutz

Group D—Appreciation

For History of Art see offerings in Fine Arts.

Senior College and Graduate Courses

ArtEd.57-58	*Art and Leisure*—Participation in cultural advantages of Twin City galleries and auditoriums (1 cred. each) *(Not offered as a separate course in 1940-41)* (See F.A. 1, G.C. 119-120-121)
ArtEd.154f-155E	Art in Society (See Group A)

Group E—Professional Courses

Senior College and Graduate Courses

ArtEd.183Es	Philosophy of Art Education (3 cred.; sr., grad.)	4:00-5:00	MWF	207bJ	Miss Raymond

* To get this bulletin out early it was necessary to leave a number of hours and classrooms to be arranged. These will be announced in the Teachers Bulletin issued the first week of school.

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.185s	Types of Arts Instruction II (3 cred.; sr., grad.)				
	Ar. in	4:00-5:00	TTh		
		and			
		III-IV	S	207bJ	Ar
ArtEd.189w	Application of Esthetic Theory to Public Education (3 cred.; sr., grad.)				
		4:00-5:00	MWF	207bJ	Miss Raymond
ArtEd.284Ef	Reading and Research in Art Education (3 cred.; grad.)				
		I-II and ar	S	Ar	Ar
ArtEd.290E,291E, 292Ef,w,s	Special Problems in Art Education				
		Ar	Ar	Ar	Miss Raymond and others
ArtEd.295f,w,s*	Special Problems in Art Education				
		Ar	Ar	Ar	

CURRICULUM AND INSTRUCTION

Major advisers.—Professors Bossing and Brueckner; Associate Professor Bond.

All courses under *Curriculum and Instruction* carry a fee of $1 per credit.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.105s‡	Visual Aids in Teaching (2 cred.; jr., sr., grad.) (Formerly Ed. 105)				
		III-IV	S	106Pt	Miss Clark
Ed.C.I.107f‡	Radio in Education (3 cred.; jr., sr.; prereq. 9 cred. in ed.) (Formerly Ed. 107)				
		IX-X	W	115UHS	Mr. Tyler
		and			
		1 hr. ar.			
Ed.C.I.114w‡	Methods and Materials in the Field of Adult Education (2 cred.; jr., sr., grad.)				
		I-II	S	Ar	Mrs. May
Ed.C.I.145s‡	Remedial Reading (2 cred.; prereq. Ed.C.I. 143 or 144 or 159)				
		I-II	S	100Pt	Mr. Bond
Ed.C.I.171f,w,s‡	Curriculum Laboratory Practice—A course in the analysis and construction of units, courses of study, and curricula; class projects and individual projects according to needs, interests, level, and specialization (2 to 6 cred.; sr., grad.; prereq. 170 or consent of instructor)				
		Ar	Ar	Ar	Mr. Bossing. Mr. Cook
Ed.C.I.190w‡	Principles of Selection of Materials for Reading in the Elementary School (2 cred.; sr., grad.; prereq. 63 or 122 or equiv.)				
		III-IV	S	204aUHS	Miss Smith
Ed.C.I.207f,w,s*‡	Problems in Radio Education (Cred. ar.) (Formerly Ed. 207)				
		Ar	Ar	Ar	Mr. Tyler
Ed.C.I.271f,w,s*‡	Problems in Curriculum Construction (2 or 3 cred. a qtr. with a maximum of 6; prereq. completion of or current enrolment in one of the following: Ed.C.I. 113, 119, 170 or consent of instructor)				
		Ar	Ar	Ar	Mr. Bossing, Mr. Cook, Mr. Archer
Ed.C.I.273f,w,s*‡	Problems in Reading (2 to 6 cred.; prereq. previous training in reading such as Ed.C.I. 159 or equiv.)				
		Ar	Ar	Ar	Mr. Bond

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

ELEMENTARY EDUCATION

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.63Tf‡	Children's Literature (2 cred.; for teachers in service)	IX-X	M	106Pt	Miss Smith
Ed.C.I.119f‡	Elementary School Curriculum (3 cred.; sr., grad.; prereq. Ed.C.I. 61C or equiv.)	III-IV	S	115UHS	Mr. Cook
Ed.C.I.119T-120T‡	*Elementary School Curriculum* (4 cred. See 119) *(Not offered)*				
Ed.C.I.143f‡	Teaching of Reading in the Elementary School (2 cred.; jr., sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A or 61A)	I-II	S	100Pt	Mr. Bond
Ed.C.I.144w‡	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (2 cred.; sr., grad.; prereq. same as for 143)	I-II	S	100Pt	Mr. Bond
Ed.C.I.146w‡	Current Developments in Language Expression in the Elementary School (2 cred.; jr., sr., grad.; prereq. Ed. 61A,B,C or equiv. Not open to students who have had Ed. 54B)	IX-X	M	204aUHS	Miss Smith
Ed.C.I.148‡	*The Teaching of Primary Arithmetic* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv. Not open to students who have had Ed.T. 54B) *(Not offered)*				
Ed.C.I.149w‡	The Teaching of Intermediate Grade Arithmetic (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv. Not open to students who have had Ed.T. 54B)	I-II	S	210Bu	Mr. Brueckner
Ed.C.I.150f‡	Supervision and Improvement of Instruction (3 cred.; sr., grad.; prereq. Ed. 61C or equiv.)	I-II 1 hr. ar.	S	204bUHS	Mr. Brueckner
Ed.C.I.152‡	*The Adjustment of Schools to Individual Differences* (2 cred.; sr., grad.; prereq. 15 hrs. in ed.) *(Not offered)*				
Ed.C.I.153s‡	Supervision and Teaching of English in the Elementary Schools (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.)	I-II	S	204aEd	Mr. Archer
Ed.C.I.155‡	*Supervision and Teaching of Arithmetic* (2 cred.; sr., grad.; prereq. Ed. 61C or equiv.) (See Ed.C.I. 148, 149) *(Not offered)*				
Ed.C.I.157f,w,s‡	Practice in Supervision (3 cred. a qtr.; sr., grad.; prereq. consent of instructor)	Ar	Ar	Ar	Mr. Brueckner
Ed.C.I.160s‡	Supervision of Elementary Subjects (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.)	IX-X 1 hr. ar.	T	204bUHS	Mr. Brueckner, Miss Smith, Mr. Wesley, Mr. Bond
Ed.C.I.170Aw‡	Curriculum and Course of Study Construction—A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the elementary school level (3 cred.; sr., grad.; prereq. 119 or consent of instructor)	III-IV	S	115UHS	Mr. Cook
Ed.C.I.181s‡	Foundations of Elementary School Methods (3 cred.; sr., grad.; prereq. 9 hrs. in ed.)	I-II 1 hr. ar.	S	204bUHS	Mr. Brueckner
Ed.C.I.181T-182T‡	*Foundations of Elementary School Methods* (See 181 above) *(Not offered)*				
Ed.C.I.224f-225w-226s‡	Seminar in Elementary School Problems (Formerly Ed. 224-225-226)	IX-X	Th	209Bu	Mr. Brueckner, Mr. Bond, Mr. Cook, Mr. Archer
Ed.C.I.259‡*	*Supervision and Teaching of Reading* (2 cred.) *(Not offered)*				
Ed.C.I.261f,w,s*‡	Special Problems in School Supervision (2 cred.; prereq. 10 hrs. in ed. including Ed. 51A)	Ar	Ar	220Bu	Mr. Brueckner

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.263f*‡	Research in Arithmetic Instruction (2 cred.; prereq. Ed.C.I. 156 or 148 or 149 or equiv.)	IX-X	T	204aUHS	Mr. Brueckner
Ed.C.I.264w*‡	Research in Educational Diagnosis (2 cred.; prereq. Ed.C.I. 151 or equiv.)	IX-X	T	204aUHS	Mr. Brueckner, Mr. Bond
Ed.C.I.265‡*	*Recent Literature in Supervision* (2 cred.) *(Not offered)*				

SECONDARY EDUCATION

Ed.C.I.113f‡	High School Curriculum (4 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51A-B-C)	IX-X	MW	209Bu	Mr. Bossing
Ed.C.I.122s‡	Literature for Adolescents (2 cred.; jr., sr., grad.; prereq. Ed. 51C or junior-senior teaching experience)	I-II	S	117UHS	Miss Smith
Ed.C.I.135w‡	Teaching of Occupations and Group Guidance (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	Ar	Miss Edwards, Miss Wright
Ed.C.I.144w‡	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A)	I-II	S	100Pt	Mr. Bond
Ed.C.I.168w‡	Current Developments in the Social Studies (2 cred.; grad. only)	III-IV	S	206UHS	Mr. Wesley
Ed.C.I.170Bw,s‡	Curriculum and Course of Study Construction—A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the secondary school level. (3 cred.; sr., grad.; prereq. 113 or consent of instructor)				
	(winter)	I-II and 1 hr. ar.	S	204aUHS	Mr. Bossing
	(spring)	IX-X and 1 hr. ar.	M	115UHS	Mr. Bossing
Ed.C.I.188‡	*Advanced Course in Methods of Teaching Modern Languages* (2 cred.; sr., grad.; prereq. Ed.T. 72A-B-C, or experience in teaching the modern languages) *(Not offered)*				
Ed.C.I.191s‡	Advanced Course in the Teaching and Supervision of Secondary School Mathematics (2 cred.; prereq. Ed. 51C or permission of instructor)	I-II	S	115UHS	Mr. Walker
Ed.C.I.198s‡	Recent Literature in Methods and Curriculum in English (2 cred.; sr., grad.; prereq. Ed.T. 66A-B-C, or equiv.) (Students should not register for this course in the same year with Ed.C.I. 294)	IX-X	M	Ar	Miss Smith
Ed.C.I.199Ef,w,s‡	Internship (Cred. ar.; grad.)	Ar	Ar	Ar	Ar
Ed.C.I.201f-202w-203s*‡	Problems in Teaching the Social Studies (3 cred. a qtr.; grad.; prereq. consent of instructor)	4:00	T	226Bu	Mr. Wesley
Ed.C.I.204s‡	Social Studies Curriculum (2 cred.)	III-IV	S	206UHS	Mr. Wesley
Ed.C.I.222f-223w-224s‡	Current Problems in Technique of High School Instruction (Cred. ar.; prereq. Ed. 51C and Ed.C.I. 113)	IX-X	Th	204bUHS	Mr. Bossing, Mr. Johnson, Miss Smith, Mr. Wesley
Ed.C.I.225f,w,s*‡	Special Problems in Supervision of Instruction in Secondary Schools (Cred. ar.)	Ar	Ar	218Bu	Mr. Boardman
Ed.C.I.254‡	*Supervision of the Social Studies* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.) *(Offered alternate years. Not offered in 1940-41)*				

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.266s‡	Supervision of High School Instruction (3 cred. This course is part of a three-quarter sequence. For fall and winter courses see Ed.Ad. 264-265. Students may register for any quarter.)	III-IV 1 hr. ar.	S	204bUHS	Mr. Boardman
Ed.C.I.287f‡	Advanced Course in the Teaching of Science (2 cred.; sr., grad.; prereq. Ed. 51C)	IX-X	T	202UHS	Mr. Johnson
Ed.C.I.293s*‡	Foundations of Secondary School Methods (3 cred.)	IX-X and 1 hr. ar.	T	202UHS	Mr. Johnson
Ed.C.I.294f*‡	Advanced Course in Methods of Teaching English (2 cred.; prereq. Ed.T. 66A-B-C or equiv.)	III-IV	S	204aUHS	Miss Smith
Ed.C.I.296w-297s*‡	Special Problems in Techniques of Secondary School Instruction (Cred. ar.; grad.)	Ar	Ar	206Bu	Miss Smith

HIGHER EDUCATION

Ed.C.I.184f‡	Supervision of Student Teaching (2 cred.; sr., grad.)	I-II	S	117UHS	Mr. Carlson
Ed.C.I.228f-229w-230s*	Problems of College Education (6 cred.) (Formerly Ed. 228-229-230)	Ar	Ar	Ar	Mr. McConnell, Miss Eckert
Ed.C.I.250f‡	Higher Education in the United States—Curriculum and Instruction (3 cred.; prereq. 15 hrs. in ed.) (Formerly Ed. 250)	I-II 1 hr. ar.	S	114UHS	Miss Eckert
Ed.C.I.285f‡	Professional Education of Teachers (2 cred.; prereq. 15 hrs. in ed.) (Formerly Ed. 285)	III-IV	S	328Lib	Mr. Peik
Ed.C.I.286f,w,s*‡	Problems in Teacher Training (2 cred. a qtr.; prereq. 285 or permission of instructor) (Formerly Ed. 286)	Ar	Ar	Ar	Mr. Peik
Ed.C.I.287s‡	See Ed.Ad. 287 (Formerly Ed. 287)				

EDUCATIONAL ADMINISTRATION

Major advisers.—Professors Neale, Boardman, and Bossing.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Ad.124f	Public School Administration (3 cred.; sr., grad.; prereq. 10 hrs. in ed.)	IX	MWF	210Bu	Mr. Neale
Ed.Ad.125w	Techniques in Administration (3 cred.; sr., grad.; prereq. 124)	IX-X 1 hr. ar.	M	210Bu	Mr. Neale
Ed.Ad.205f,w	Problems in Adult Education (2 cred. a qtr.; open to graduate students and professional workers in the field with permission of instructor; prereq. Ed.Psy. 293-294, Ed.C.I. 114, Ed.Ad. 144)	Ar	Ar	Ar	Mrs. May
Ed.Ad.210s*	Financial Aspects of Public School Business Administration (3 cred.; prereq. 124, 125)	I-II 1 hr. ar.	S	111UHS	Mr. Neale

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Ad.226s	School Plant Planning and Management (3 cred.; sr., grad.; prereq. 124, 125)	IX-X 1 hr. ar.	M	224Bu	Mr. Neale
Ed.Ad.228f,w,s*	Special Problems in Educational Administration (1 or 3 cred.; prereq. 124, 125)	Ar	Ar	224Bu	Mr. Neale
Ed.Ad.230f*	Public Relations for Schools (3 cred.; grad.)	I-II 1 hr. ar.	S	111UHS	Mr. Neale
Ed.Ad.235f-236w-237s	Seminar in Educational Administration	Ar	Ar	224Bu	Mr. Neale

ELEMENTARY EDUCATION

Ed.Ad.115w	Organization of the Elementary School (3 cred.; jr., sr., grad.; prereq. 10 hrs. in ed.)	III-IV 1 hr. ar.	S	111UHS	Mr. Neale

SECONDARY EDUCATION

Ed.Ad.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.) (Formerly Ed. 133)	III-IV	S	106Pt	Miss Edwards, Miss Wright
Ed.Ad.167	*Junior High School* (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51) *(Not offered in 1940-41)* (Formerly Ed. 167)				
Ed.Ad.218f-219w-220s	Current Problems in Secondary School Education (Cred. ar.) Fall—Issues in Secondary Education Winter—Critical Analysis of the Co-operative Study of Secondary School Standards Spring—Recent Literature in Secondary Education	IX-X	Th	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.264f-265w	High School Administration (3 cred. a qtr.; grad. For third quarter continua tion of this course see Ed.C.I. 266. Students may register for any quarter.)	III-IV 1 hr. ar.	S	204bUHS	Mr. Boardman
Ed.Ad.270f,w,s*	Special Problems in Secondary Education (Cred. ar.; maximum 9 cred.)	Ar	Ar	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.280f,w,s‡	Practice in High School Administration (2 cred. a qtr.; sr. grad.; prereq. 264-265 or equiv. and consent of instructor)	Ar	Ar	Ar	Mr. Boardman

HIGHER EDUCATION

Ed.Ad.287s	Instruction and Administration in Teacher Training Institutions (2 cred.; prereq. 15 hrs. in ed.)	I-II	S	328Lib	Mr. Peik

EDUCATIONAL PSYCHOLOGY

Major advisers.—Professors Miller, Johnson, McConnell, and Wrenn; Associate Professors Cook and Van Wagenen.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.60f	Introduction to Statistical Methods (2 cred.; jr., sr.; prereq. 6 cred. in psy.)	I-II	S	106Pt	Mr. Fattu
Ed.Psy.116w-117s	Statistical Methods in Education (4 cred.; sr., grad.)	IX-X	T	115Psy	Mr. Van Wagenen

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.120f	Basic Principles of Measurement (3 cred.; sr., grad.; prereq. Ed.Psy. 60 or equiv.)	VIII	MWF	106Pt	Mr. Cook
Ed.Psy.120s	Basic Principles of Measurement (3 cred. See 120f)	III-IV 1 hr. ar.	S	115UHS	Mr. Cook
Ed.Psy.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	106Pt	Miss Edwards, Miss Wright
Ed.Psy.138-139†	*Experimental Educational Psychology* (4 cred.; sr., grad.; prereq. 51A or equiv.) *(Not offered)*				
Ed.Psy.142f	Individual Aptitude Testing (3 cred.; sr., grad.; prereq. 120 or equiv.)	4:30-5:45	TTh	210Bu	Mr. Bond
Ed.Psy.143w	Individual Mental Testing Laboratory (2 cred.; prereq. Ed.Psy. 142)	4 hr. ar.	Ar	212Bu	Mr. Bond
Ed.Psy.149f-150w-151s	Psycho-educational Clinic (2 to 6 cred.; sr., grad.; permission of instructor; prereq. 120, 140 and 141 or 142)	Ar	Ar	212Bu	Mr. Bond
Ed.Psy.159f	Personality Adjustments in Education (3 cred.; sr., grad.; prereq. 9 hrs. in ed. and psy. including one recent course in psy.)	III-IV 1 hr. ar.	S	115Psy	Mr. Wrenn
Ed.Psy.180	*Esthetics in Education* (2 cred.; sr., grad.; consent of instructor) *(Not offered)*				
Ed.Psy.189	*The Human Organism* (3 cred.; sr., grad.; prereq. permission of instructor) *(Not offered)*				
Ed.Psy.201f-202w-203s	Seminar in Educational Psychology	Ar	Ar	301Psy	Mr. Miller, Miss Edwards, Mr. Johnson, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
Ed.Psy.208w	Methods in Educational Research (2 cred.)	IX-X	M	114UHS	Mr. Johnson
Ed.Psy.233f,w,s	Problems in Guidance and Personnel Work (Cred. ar.) (Formerly Ed. 233)	Ar	Ar	Ar	Miss Edwards, Mr. Wrenn
Ed.Psy.240f,w,s*	Problems in Measurement (2 cred. a qtr.)	Ar	Ar	Ar	Mr. Johnson
Ed.Psy.243f,w,s	Problems in Statistics for Students in Education and Psychology (With or without credit. Cred. ar.)	Ar	Ar	Ar	Mr. Johnson
Ed.Psy.253f-254w-255s*	Research Problems (Ar.; prereq. consult instructor) (See also Ed.Psy. 233 and Ed.Psy. 240)	Ar	Ar	Ar	Mr. Miller, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
Ed.Psy.281f,w,s	Practice in Personnel Work (2 cred. a qtr.; prereq. satisfactory preparation in psy. and ed. and approval of instructor)	Ar	Ar	Ar	Miss Edwards, Mr. Wrenn, Mr. Darley

* This course may be taken for independent study under Plan B for the Master's degree.

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

ELEMENTARY EDUCATION

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.113f-114w-115s	Psychology of Elementary School Subjects (2 cred. per qtr.; jr., sr., grad.; prereq. 10 cred. in psy. and ed.)	IX-X	W	109Psy	Mr. Van Wagenen
Ed.Psy.146w-147s†	Child Guidance (4 cred.; jr., sr., grad.; prereq. 15 cred. in psy. and ed.)	I-II	S	106Pt	Mr. Challman
Ed.Psy.157	*Psychology of Child Development* (2 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) *(Not offered)* (See Child Welfare 130-131)				
Ed.Psy.182f	Education of Handicapped Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or 61A or equiv.) (Formerly Ed.C.I. 110)	IX-X	W	100Pt	Mr. Bond
Ed.Psy.183w	Education of Gifted Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	IX-X	W	100Pt	Mr. Bond
Ed.Psy.184s	Education of the Slow Learning Child (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	IX-X	W	100Pt	Mr. Bond

HIGHER EDUCATION

Ed.Psy.254s	Measurement and Evaluation in Higher Education (3 cred.; 15 hrs. in ed.)	I-II 1 hr. ar.	S	114UHS	Mr. Johnson

HISTORY AND PHILOSOPHY OF EDUCATION

Major advisers.—Professor Wesley; Associate Professor Brameld; Instructor Jean H. Alexander.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
H.Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had H.Ed. 71) (Formerly Ed. 103)	IX-X 1 hr. ar.	W	210Bu	Miss Alexander
H.Ed.162s	Significance of Progressive Education (2 cred.; sr., grad.) (Formerly Ed.C.I. 162)	IX-X	M	204bUHS	Mr. Brueckner, Mr. Brameld
H.Ed.176f	Conflicting Issues in Modern Education (2 cred.; jr., sr., grad.; not open to students who have taken 76; prereq. 6 hrs. in psy.)	IX-X	M	204aUHS	Mr. Brameld
H.Ed.180w	The School and the Social Order (2 cred.; jr., sr., grad.; prereq. 12 cred. in soc. sci.)	IX-X	M	204aUHS	Mr. Brameld
H.Ed 241f-242w-243s*	Problems in the History of Education (2 cred. a qtr.; prereq. permission of instructor)	IX-X	M	Ar	Mr. Wesley
H.Ed.276f,w,s*	Problems in Educational Philosophy and Sociology (Cred. ar.; consult instructor)	Ar	Ar	Ar	Mr. Brameld

ELEMENTARY EDUCATION

H.Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had H.Ed. 71) (Formerly Ed. 103)	IX-X 1 hr. ar.	W	210Bu	Miss Alexander

* This course may be taken for independent study under Plan B for the Master's degree.

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

HOME ECONOMICS EDUCATION

Major advisers.—Professors Wylle B. McNeal and Clara M. Brown; Assistant Professor Ella J. Rose.

Note.—Courses in Home Economics are open to all students in the College of Education who have satisfied the prerequisites or by permission of the chief of the division. For program of courses see page 149 of the Combined Class Schedule.

No.	Title	Hour	Day	Bldg.	Instructor
H.E.Ed.93f,w‡§¶	Supervised Teaching in Home Economics (3 cred.; jr., sr.; prereq. H.E. 4, 34 [or 170], 41, 50, 55, Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 91)	Ar 3 consecutive hrs. daily between 8:15-3:00 and 1 hr. ar.	Ar	Ar	Miss Rose and others
H.E.Ed.94w,s‡¶	Supervised Teaching in Home Economics (3 cred.; sr.; prereq. H.E.Ed. 91, 93, parallel H.E.Ed. 92 and 192)	Ar 3 consecutive hrs. daily between 8:15-3:00 and 1 hr. ar.	Ar	Ar	Miss Rose and others
H.E.Ed.192f	Educational Measurement in Home Economics (3 cred.; grad.; prereq. Ed. 51A or equiv.)	Ar	Ar	Ar	Miss Clara Brown
H.E.Ed.192w,s	Educational Measurement in Home Economics (2 cred.; sr., grad.; prereq. Ed. 51A or equiv., parallel H.E.Ed. 92 and 94)	VIII	TTh	213HE	Miss Clara Brown, Miss Rose
H.E.Ed.193f,w,s	Home Economics Curriculum (2 or 3 cred.; sr., grad.; prereq. or parallel H.E.Ed. 94 or permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose
H.E.Ed.194af	Adult Education Problems (3 cred.; sr., grad.; prereq. H.E.Ed. 91, 93 or equiv.)	Ar	Ar	Ar	Miss Krost
H.E.Ed.194bs	Adult Education Problems (3 cred.; sr.; prereq. same as for 194a)	Ar	Ar	Ar	Miss Krost
H.E.Ed.197f,w,s‡	Organization and Methods for Related Art Teaching (1 to 3 cred.; sr.; prereq. H.E.Ed. 91; H.E. 180 or parallel)	Ar	Ar	Ar	Miss H. Goldstein
H.E.Ed.243f,w,s	Trends in Home Economics (3 cred.)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose
H.E.Ed.292w,s*	Educational Measurement Problems (3 cred.; prereq. H.E.Ed. 192)	Ar	Ar	Ar	Miss Clara Brown
H.E.Ed.293f,w,s*	Special Studies in Home Economics Education (1 to 3 cred.; prereq. permission of instructor)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose

* This course may be taken for independent study under Plan B for the Master's degree.

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

§ Passing the qualifying examination in English is prerequisite to registration in this course.

¶ A grade of at least C is required in the following courses: H.E. 3, 4, 21, 22, 34 (or 170), 40, 41, 55.

No.	Title	Hour	Day	Bldg.	Instructor
H.E.Ed.294f,w,s*	Research Problems (1 to 5 cred.; prereq. permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose
H.E.Ed.295f,w,s*	Current Problems (1 to 3 cred.)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose

INDUSTRIAL EDUCATION

Major adviser.—Professor Homer J. Smith.

No.	Title	Hour	Day	Bldg.	Instructor
Ind.11f,w,s‡	Special-Class Woodwork (2 cred.; no prereq.; not open to those who have credit in bench woodwork or cabinet making; for teachers of art, subnormal and elementary grade work. Not a part of the four-year curriculum) (Limited to 24)	I-IV	S	6Pt	
Ind.30f	Graphic Presentation (2 cred.; no prereq.)	IX-X	F	202EdH	
Ind.40f	Analysis (2 cred.; no prereq.)	IX-X	Th	202EdH	
Ind.42w	Course Organization (2 cred.; prereq. Ind. 40)	IX-X	Th	202EdH	
Ind.44w	Equipment and Management (2 cred.; prereq. Ind. 40, 42)	III-IV	S	202EdH	
Ind.50Af-50Bw-50Cs‡§	Directed Teaching (6 cred.; sr.; prereq. Ind. 70 or 75, and 80)	Ar	Ar	6Pt	Mr. Micheels
Ind.60f	Philosophy of Vocational Education (2 cred.; no prereq.)	IX-X	M	202EdH	Mr. Widdowson
Ind.61w	Practices in Vocational Education (2 cred.; prereq. Ind. 60)	IX-X	M	202EdH	Mr. Widdowson
Ind.65	*Non-vocational Subjects* (Not a part of the four-year curriculum) *(Not offered)*				
Ind.66w	Related Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	
Ind.70s‡	Methods in Shop Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	
Ind 75s‡	Methods in Drawing (2 cred.; prereq. 10 cred. in drawing or consent of instructor. Not a course in drawing)	IX-X	T	8UHS	
Ind.80f	General Industrial Training (2 cred.; no prereq.) (Not a shop course)	IX-X	T	202EdH	
Ind.81w	The General Shop (2 cred.; jr., sr.; prereq. Ind. 80. Not a shop course)	IX-X	W	202EdH	
Ind.101f	Tests in Industrial Subjects (2 cred.; prereq. Ed. 51A)	I-II	S	Ar	Mr. Widdowson
Ind.103w	Instructional Aids (2 cred.; sr., grad.; prereq. Ind. 40, 42)	IX-X	T	202EdH	Mr. Widdowson
Ind.105w	Industrial Education (3 cred.; jr., sr., grad. Not a part of the four-year curriculum. For certain students in the specialty and for students of administration and supervision, commercial education, etc.)	I-II and 1 hr. ar.	S	Ar	Mr. Smith
Ind.107s	Co-ordination (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61 or 105 or consent of instructor)	IX-X	M	202EdH	Mr. Widdowson
Ind.108s	Apprenticeship (2 cred.; jr., sr., grad.; prereq. same as for 107)	IX-X	T	209EdH	
Ind.110w	Guidance in the Schools (3 cred.; jr., sr., grad.; prereq. Ed. 51A. See Ed. 133)	IX-X and 1 hr. ar.	F	209EdH	Mr. Smith

* This course may be taken for independent study under Plan B for the Master's degree.

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

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done, are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ind.115s	Supervision of Industrial Education (2 cred.; sr., grad.; prereq. Ind. 60, 80, Ed.Ad. 124 or consent of instructor. Not a part of the four-year curriculum. For advanced students in the specialty and for students of administration and supervision)	IX-X	W	202EdH	
Ind.170f	Day Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61)	IX-X	Th	209EdH	
Ind.171w	Evening Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 170)	IX-X	Th	209EdH	
Ind.172s	Part-time Education (2 cred.; jr., sr., grad.; prereq. Ind. 170, 171)	IX-X	Th	209EdH	
Ind.200f,w,s*	Research Problems (3 to 9 cred.; prereq. admission to Graduate School and consent of instructor)	IX	M	209EdH	Mr. Smith
Ind.250f-251w-252s	Problems in Vocational Education (6 cred.; prereq. admission to Graduate School and consent of instructor. Plan for full year)	IX-X	W	209EdH	Mr. Smith
	Off-Campus Courses and Services	Ar	Ar	Ar	Mr. Widdowson

Shop and Drawing Courses—arranged by Mr. Smith.

Shop and drawing courses are available in wide variety in the Institute of Technology, University campus, and the Division of Agricultural Engineering, Farm campus. Students may elect to pursue courses, day or evening, at the William Hood Dunwoody Industrial Institute without fees other than those paid to the University, except a deposit of $1. All shop and drawing courses should be taken under special advice and may be either extensive or intensive in resultant preparation for teaching. Degree candidates, especially those transferring from other institutions, should bear in mind the maximum of forty-five quarter credits of shopwork and drawing combined which is enforced in this department. Twenty credits of shopwork and ten credits of drawing are required. Credits in excess of forty-five will be recorded but will not be counted toward degree requirements. Certain off-campus courses and services will be available. Those interested should consult with members of the Industrial Education staff.

METHODS AND DIRECTED TEACHING

Major adviser.—Associate Professor Carlson.

SECONDARY EDUCATION

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.68Af-68Bw-68Cs†‡§	Special Methods Course and Directed Teaching in Secondary School Science (9 cred.; sr.; prereq. consent of instructor)	IX and 6 hr. ar.	MW	6aPt	Mr. Johnson, Mr. Peterson
Ed.T.68Amf-68Bmw†‡§	Methods of Teaching Secondary School Science (4 cred.; sr.; prereq. consent of instructor)	IX	MW	6aPt	Mr. Johnson, Mr. Peterson
Ed.T.70Af-70Bw-70Cs†‡§	Special Methods and Directed Teaching in German (9 cred.; sr.; prereq. German Comp. 50-51-52, German Conversation 53-54-55 and 15 additional credits)	IX and 6 hr. ar.	MW	114UHS	Miss Will
Ed.T.71Af-71Bw-71Cs†‡§	Special Methods and Directed Teaching in Latin (9 cred.; jr., sr.; prereq. 73 and any two of Latin courses numbered between 50 and 100)	IX and 6 hr. ar.	MW	112UHS	Miss Marlowe
Ed.T.72Af-72Bw-72Cs†‡§	Special Methods and Directed Teaching in Romance Languages (9 cred.; sr.; prereq. 20 cred. above French 4. Consult instructor)	IX and 6 hr. ar.	TTh	206UHS	Miss Walker

* This course may be taken for independent study under Plan B for the Master's degree.

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

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

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.88Af-88Bw-88Cs†‡§	Special Methods and Directed Teaching in Speech (9 cred.; prereq. 30 cred. in speech)				
		IX(f) VIII(s)	TTh	308F	Ar
		VIII(f,w) and 6 hr. ar.	TTh	210Bu	Miss Smith

MUSIC EDUCATION

Major advisers.—Professors Scott, Pepinsky; Instructor Hazel B. Nohavec.

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.60f-61w-62s†‡§	Supervision and Teaching (9 cred.; sr.; prereq. Ed. 51A,B,C and Mu.Ed. 50A,B, 53 and a C+ average in the major)				
		IX-X and 6 hr. ar.	W	4Mu	Mrs. Nohavec
Mu.Ed.220Ef,w,s	Survey and Application of Research in Music Education (3 cred.; prereq. Mu.Ed. 101)				
		Ar	Ar	Ar	Mrs. Nohavec
Mu.Ed.224Ef,w,s	Seminar and Individual Research Problems in Music Education (Cred. ar.)				
		Ar	Ar	Ar	Mrs. Nohavec and others
Mu.Ed.225Ef,w,s‡‡	Advanced Applied Music (2 to 4 cred.; prereq., entrance exam.)				
		Ar	Ar	Ar	Ar

ADDITIONAL COURSES IN ACADEMIC SUBJECTS

There are also some late afternoon and Saturday morning academic courses offered in the respective teaching fields. Persons who desire to take work in any such department can get the necessary information by securing from the Registrar's Office the bulletin entitled Combined Class Schedule for 1940-41. Its price is 35 cents.

MAJOR ADVISERS*

1940-41

Subject	Name of Instructor	Room
General Curriculum Adviser	Jean H. Alexander, Chairman Students' Work Committee	206Bu
EDUCATIONAL FIELDS		
Adult Education	Elizabeth May	300EdH
Agricultural Education	G. F. Ekstrom	205Hort (UF)
	A. M. Field	205Hort (UF)
Art Education	Ruth Raymond	209J
Commercial Education	W. S. Carlson	103UHS
Curriculum and Instruction	W. E. Peik (Teacher Training)	204Bu
	T. R. McConnell (Higher)	214Bu
	N. L. Bossing (Secondary)	222Bu
	G. L. Bond (Elementary)	212Bu
	L. J. Brueckner (Elementary)	220Bu
	C. P. Archer (Elementary)	208Bu
Educational Administration	C. W. Boardman (Secondary)	218Bu
	N. L. Bossing (Secondary)	222Bu
	M. G. Neale (General)	224Bu

* For Graduate School advisers see Bulletin of the Graduate School.

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

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

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

‡‡ One individual lesson per week, 2 credits, $25; two individual lessons per week, 4 credits, $50.

Subject	Name of Instructor	Room
Educational Psychology	W. W. Cook	305AEdH
	P. O. Johnson	216Bu
	T. R. McConnell	214Bu
	W. S. Miller	302Psy
	M. J. Van Wagenen	351Psy
	C. G. Wrenn	113APsy
	Marcia Edwards	202Bu
Elementary Education	C. P. Archer	208Bu
	G. L. Bond	212Bu
	L. J. Brueckner	220Bu
History of Education	Jean H. Alexander	206Bu
	E. B. Wesley	226Bu
Home Economics Education	Clara M. Brown	101HE(UF)
	W. B. McNeal	215HE(UF)
	Ella J. Rose	111HE(UF)
Industrial Education	H. J. Smith	200EdH
Library Training	F. K. Walter	107Lib
Methods and Directed Teaching	L. J. Brueckner	220Bu
	W. S. Carlson	103UHS
	Dora V. Smith	206Bu
Music Education	Hazel B. Nohavec	213Mu
	A. Pepinsky	207Mu
Nursery School and Kindergarten Education	J. E. Anderson	205APt
Nursing Education	Katharine J. Densford	123MeS
	Lucile Petry	125MeS
Philosophy of Education	Theodore Brameld	216ABu
Physical Education for Men	L. F. Keller	204CH
	C. L. Nordly	217CH
Physical Education for Women	J. Anna Norris	102WGym
Professional Education of Teachers	W. E. Peik	204Bu
Public Health Nursing	Margaret G. Arnstein	121MH
Radio Education	T. F. Tyler	231NMA
Recreational Leadership	Elizabeth May	300EdH
	C. L. Nordly	217CH
School Health Work	G. W. Anderson	121MH
Student Teaching	W. S. Carlson	103UHS
Teachers of Subnormal Children	G. L. Bond	212Bu

SUBJECT-MATTER FIELDS

Anthropology	W. D. Wallis	106WeH
Astronomy	W. J. Luyten	359Ph
Botany	F. K. Butters	302Bo
Chemistry	P. O. Johnson	216Bu
Economics	E. A. Heilman	313VH
English	C. W. Nichols	319F
	Dora V. Smith	206Bu
Geography	D. H. Davis	101Bu
German	O. C. Burkhard	210F
History	A. C. Krey	226Bu
	Edgar B. Wesley	226Bu
Latin	R. V. Cram	118F
Mathematics	A. L. Underhill	126F
Natural Science	P. O. Johnson	216Bu
Physics	J. W. Buchta	148Ph
Political Science	O. P. Field	213Bu
Preventive Medicine and Public Health	G. W. Anderson	121MH
Psychology	R. M. Elliott	112Psy
Romance Languages	F. B. Barton	228F
Scandinavian	Alrik Gustafson	122F
Social Studies	Edgar B. Wesley	226Bu
Sociology and Social Work	C. Kirkpatrick	111J
Speech	F. M. Rarig	309AF
Speech Pathology	B. Bryngelson	410F
Zoology	J. E. Wodsedalek	9Z

The Bulletin of the
UNIVERSITY *of* MINNESOTA

The Graduate School
Announcement for the Years 1940-1942

Volume XLIII, Number 56 September 3, 1940

UNIVERSITY CALENDAR

1940

September 30-October 12			Registration of graduate students
September	30	Monday	Fall quarter classes begin, 8:30 a.m.[1]
October	10	Thursday	Examinations in German and French
November	7	Thursday	Last day for filing theses for the Ph.D. degree for the fall quarter
November	21	Thursday	Last day for filing Master's theses for the fall quarter
November	23	Saturday	Last day for filing title of Master's theses for the spring quarter
December	19	Thursday	Commencement Convocation Fall quarter ends, 6:00 p.m.

1941

January	6-18		Registration of graduate students
January	6	Monday	Winter quarter classes begin, 8:30 a.m.[1]
January	16	Thursday	Examinations in German and French
February	6	Thursday	Last day for filing theses for the Ph.D. degree for the winter quarter
February	20	Thursday	Last day for filing Master's theses for the winter quarter
March	20	Thursday	Commencement Convocation Winter quarter ends, 6:00 p.m.
March 31-April 12			Registration of graduate students
March	31	Monday	Spring quarter classes begin, 8:30 a.m.[1]
April	10	Thursday	Examinations in German and French
May	3	Saturday	Last day for filing theses for the Ph.D. degree for the spring quarter
May	10	Saturday	Last day for filing Master's theses for the spring quarter
June	13	Friday	Spring quarter ends, 6:00 p.m.
June	14	Saturday	Sixty-ninth annual commencement
June	18	Wednesday	First term Summer Session classes begin, 8:00 a.m.
July	3	Thursday	Last day for filing theses for first term of Summer Session
July	24	Thursday	Commencement Convocation
July	25	Friday	First term closes
July	28	Monday	Second term classes begin, 8:00 a.m.
August	29	Friday	Second term ends

[1] First hour classes begin at 8:15 at University Farm.

THE GRADUATE SCHOOL

ADMISSION

Any graduate holding a Bachelor's degree or its equivalent from a creditable college or university who has made a satisfactory record in his college course will be admitted to the Graduate School, and may register for such graduate work as he may be found prepared to enter upon.

Students graduating from institutions, such as teachers colleges, granting the Bachelor's degree for a narrow concentration on technical and professional courses unsupported by a reasonable amount of work in subject-matter fields represented in a standard or traditional college of arts and sciences, may be matriculated if an examination of their transcript indicates that their undergraduate work fits into one of the following patterns:

A. Seventy-five per cent of the number of credits required for the Bachelor's degree is in strictly academic fields.

B. At least sixty per cent of the number of credits required for the Bachelor's degree is in strictly academic fields so distributed that there are at least forty quarter credits in each of two of the following groups of subjects: (a) English, speech, all foreign languages, (b) music and art, (c) social sciences including geography, (d) biological sciences including psychology, (e) mathematics and physical sciences.

Students graduating from institutions (except teachers colleges) which are not on the accepted list of colleges and universities approved by the Association of American Universities, may be required by the dean of the Graduate School to register for a probationary period as *unclassed students* in the appropriate undergraduate college.* Such an unclassed student must successfully complete one quarter's work in courses acceptable for credit by the Graduate School before being permitted to transfer his registration to the Graduate School. Upon the successful completion of this probationary quarter the student may petition to transfer all work taken while registered as an unclassed student to the records of the Graduate School. Residence credit in the Graduate School will be automatically granted with such transferred credits.

Applicants not fully prepared in the field of their graduate interests and college graduates who simply desire to take additional work of undergraduate grade without a view to ultimate preparation for an advanced degree should register as special students in the college giving the work.

All inquiries concerning admission to the Graduate School should be addressed to the dean. The student should fill out an application for admission at least two weeks before presenting himself for registration and accompany this with a copy in duplicate of the official transcript of his undergraduate record, and a single copy of the official transcript of his graduate work.

GRADUATE RECORD EXAMINATION

At a date and place to be announced in the Official Daily Bulletin early in October 1940 and 1941, all entering graduate students, excepting those at the Mayo Foundation, will take a comprehensive written examination.

* This requirement is to ascertain whether or not the undergraduate preparation in the major and minor fields is adequate for the sequence of graduate courses at the University of Minnesota.

ADVANCED STANDING

Advanced standing, *except for the Master's degree,* may be granted for work done in other approved graduate schools. Transfer credits are not accepted until the candidate has passed the preliminary examination for the doctoral degree.

No transfer of graduate credits from other institutions will modify the minimum requirement of one academic year in residence as a graduate student in this University for those who are candidates for an advanced degree. This means that no transfers are made in the case of candidates for the Master's degree.

Credits for advanced courses earned while the student is registered in an undergraduate college, even if 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, petition may be filed to carry a limited amount of graduate work (approved courses numbered above 99) for graduate course credit, such courses not to be applied toward an undergraduate degree.

2. With permission of the dean of the undergraduate college concerned, undergraduates lacking not more than 6 quarter credits may be permitted to register in the Graduate School.

REGISTRATION

Full directions concerning registration are given in a booklet issued by the registrar's office for the information of new students. The essential documents for a graduate student are an official transcript in duplicate of the student's undergraduate record, and a single copy of an official transcript of graduate work.

Registration in the Graduate School includes the making out of the program, which must be approved by a departmental adviser and the dean. The student must report for an examination by the Students' Health Service of the University of Minnesota.

FEES

Tuition fee for residents (except for clinical medicine) per quarter	$20.00
Tuition fee for nonresidents per quarter	40.00
Tuition fee per credit hour for students carrying less than full work	
Residents	1.75
Nonresidents	3.50
Tuition fee for graduate study *in absentia* for the professional engineer degrees (to be paid but once for each degree)	60.00
Incidental fee	8.50
Matriculation deposit (first quarter in residence)	3.00
Special deposit for chemistry laboratory	5.00
Graduation fee	10.00
Fee for binding Master's thesis	1.50
Fee for publication of Ph.D. thesis summary	25.00

Candidates for advanced degrees must pay not less than the full normal tuition for three quarters before receiving the degree.

All the fees above mentioned apply to the regular session. For the Summer Session fees, see Bulletin of the Summer Session.

Approved registration blanks must be turned in at the registrar's office to obtain statement of fees before the close of the second week of the quarter. Fees must be paid not later than the close of the second week of each quarter. After the close of the second week of each quarter, the fee for the privilege of late registration, or late payment of fees, is $2 through the third day of the following week; on the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5.

FELLOWSHIPS AND SCHOLARSHIPS

SHEVLIN FELLOWSHIPS

Four graduate fellowships have been established by the late Thomas H. Shevlin, of Minneapolis. These are awarded one each in the College of Agriculture, Forestry, and Home Economics, the School of Chemistry, the Medical School, and the College of Science, Literature, and the Arts. Each fellowship yields $500 per annum. They are awarded annually and carry exemption from tuition. Candidates for these fellowships should file their applications before February 1 with the dean of the Graduate School.

Shevlin fellows will devote their entire time to the graduate work for which they are registered, and may not engage in private tutoring or be required to render any service to the University.

CALEB DORR RESEARCH FELLOWSHIPS IN AGRICULTURE, FORESTRY, AND HOME ECONOMICS

By bequest of the late Caleb Dorr, of Minneapolis, the income from twenty thousand dollars is available for graduate fellowships in the Department of Agriculture of the University of Minnesota. Usually three fellowships of $500 each will be awarded each year. The holders of these fellowships are exempt from tuition. The basis of the award is scholarship and the prospect and promise of productive research.

Caleb Dorr fellows will devote their entire time during the academic year (nine months) to the graduate work for which they are registered and may not engage in private tutoring or be required to render any service to the University.

Candidates for these fellowships should file their applications before February 1 with the dean of the Graduate School. Application blanks may be secured from the dean of the Graduate School or from the dean of the College of Agriculture, Forestry, and Home Economics.

ALBERT HOWARD SCHOLARSHIP

This scholarship, founded by Mr. James T. Howard, awarded to graduates of the College of Science, Literature, and the Arts of the University of Minnesota, yields $240 annually. The holder is expected to do graduate work in liberal arts.

CLARA UELAND FELLOWSHIP

The income from $11,916.67 is awarded annually to a recent woman graduate of any acceptable college or university for graduate study of problems of government and citizenship. The recipient is exempt from tuition fees.

PUBLIC ADMINISTRATION FELLOWSHIPS

Pre-service fellowships in public administration.—A limited number of these fellowships, with a stipend of $650 plus tuition and fees, are offered by the University of Minnesota each year to graduates of recognized universities and colleges who wish to prepare themselves for administrative positions in government service.

In-service fellowships in public administration.—A limited number of these fellowships with stipends varying from $1,000 to $1,500, without exemption from tuition and fees, is offered by the University of Minnesota each year to graduates

of recognized universities and colleges who have had not less than three years of experience in government service, and who wish further to prepare themselves for positions of administrative responsibility.

Application blanks and additional information concerning these fellowships may be secured from the secretary of the Committee on Training for Public Administration, 13 University Library.

ALEXANDER P. ANDERSON AND LYDIA ANDERSON FELLOWSHIPS IN BOTANICAL AND ZOOLOGICAL SCIENCES

Two fellowships of $500 each, one in botanical science and one in zoological science, are open to graduates of the University of Minnesota who:

1. have completed 27 hours of botanical or zoological science exclusive of highly specialized applied courses;
2. intend to pursue graduate work in botanical or zoological fields; and
3. have approval of the appropriate department or division.

HONORARY FELLOWSHIPS FOR VISITING SCHOLARS

Professors or other eminent scholars from other institutions, who may desire temporarily the privileges of the library, research facilities, and seminars in the University, and who are not candidates for a degree, may upon recommendation of the dean of the Graduate School and the approval of the president of the University be appointed as honorary fellows without stipend.

Honorary fellows shall not be required to pay any fees except to cover the cost of unusually expensive supplies or equipment.

DEPARTMENTAL ASSISTANTSHIPS

Besides the above fellowships there are numerous departmental assistantships with varying stipends, and exemption from tuition in the Graduate School for those with stipends of $300 or more. The amount of graduate work that can be carried is proportioned to the service burden of the assistantships.

Inquiries and requests for application blanks may be addressed either to the dean of the Graduate School, or to the head of the department in question, but all application blanks should be returned to the head of the department appointing the assistant.

GRADUATE WORK IN THE SUMMER SESSION

An increasing amount of graduate work in fields of interest to high school teachers is being offered in the Summer Session. These courses for any session may be found in the Bulletin of the Summer Session.

Students who desire graduate credit for work in the summer must register through the office of the Graduate School.

Work of graduate character done in the Summer Session of the University of Minnesota may be counted for residence credit for the Master's degree.

A limited amount of graduate work done in the Summer Session may be counted for residence credit for the doctoral degree.

MASTER'S DEGREE, PLAN A

The *course work* for the Master's degree according to Plan A (see page 12) may be completed in four separate summer terms of six weeks each. In Plan A, the candidate may be permitted to register for thesis and carry *in absentia* thesis

work to complete the equivalent of three quarters. All requirements for the Master's degree under Plan A must be completed within six years after the first registration. Students working for the Master's degree under Plan A in summer terms must file the subjects of their theses before the completion of the first half of the required work. Theses of Summer Session students must be completed at least *four weeks* before the end of the session in which they take the degree. (See page 12.)

MASTER'S DEGREE, PLAN B

All requirements for Plan B may be completed in six summer terms of six weeks each and must be completed within seven years following the first registration. (See page 15.)

GRADUATE WORK IN MEDICINE

Graduate work in the laboratory departments and in the clinical branches leading to advanced degrees is offered by the University of Minnesota. This work is under the direction of the Graduate School, and candidates for admission and degrees must meet the requirements of the Graduate School as outlined in this bulletin. The work is offered by members of the medical faculty in Minneapolis and by members of the graduate faculty on the Mayo Foundation at Rochester, Minnesota, where part or all of the residence work may be done. Several teaching fellowships supported by the University and others on the Mayo Foundation are open to qualified students pursuing graduate work in clinical medicine or in the laboratory branches. The basic sciences of medicine which may be pursued as graduate subjects by qualified students who do not hold the M.D. degree are listed in this bulletin. The Graduate Medical Bulletin should be consulted for graduate work in clinical fields.

GRADUATE WORK IN DENTISTRY

Graduate work for a limited number of properly prepared students is offered in certain fields of dental research and dental specialties. The work is under the direction of a joint committee in Dentistry and Medicine in the Graduate School. Candidates for admission must be graduates of an acceptable dental school with at least two years of preliminary general college work. They must also present or acquire sufficient training in the basic sciences, such as bacteriology, anatomy, pathology, physiology, and physiological chemistry, to enable them to apply these disciplines to research on some of the problems facing dentistry as one of the health sciences. The minimum training to meet this requirement at the University of Minnesota is in general the equivalent of that required of graduate students in the fields of clinical medicine. The basic science courses necessary as a foundation for advanced study are outlined under the departmental offerings in this bulletin. Altho a reading knowledge of German is recommended as highly desirable, candidates for the Master's degree in dentistry are exempted from the foreign language requirement. Qualified students who give full time to their studies and absolve the requirements, including a satisfactory thesis, will normally require three years for the degree of master of science in dentistry.

The fields of research and specialization in which work will be directed are: oral pathology, oral surgery, orthodontia, periodontia, restorative dentistry.

GRADUATE WORK IN LAW

Under certain properly approved conditions graduate students may offer courses in law as a minor for an advanced degree when their major work is in the Department of Political Science or Economics.

A course leading to the degree of master of laws may be taken under the direction of the Graduate School of the University. Candidates must have completed two years of college work, and the work required for the first law degree in a school which is a member of the Association of American Law Schools. No specific course of study is required, but the course elected must be approved by an adviser. Subjects in the curriculum of the Law School not counted towards the first degree may be elected and additional work in subjects already studied. The candidate may also elect studies in the social sciences in the College of Science, Literature, and the Arts, and in the School of Business Administration. The candidate must complete eight year hours of classroom work and prepare a thesis that will be accepted for publication in the *Minnesota Law Review.* The course may be shaped to secure a more extensive survey of the law and related subjects, or to give a more thoro training in some special branch.

GRADUATE WORK IN PUBLIC ADMINISTRATION

Individually planned courses of study designed to prepare persons for administrative positions in the several fields of government service—national, state, and local—and leading to the degree of master of arts in public administration* are offered to the recipients of pre-service and in-service fellowships granted by the University of Minnesota and to a limited number of other properly qualified graduate students with the approval of the Committee on Training for Public Administration.

Candidates for admission to such courses of study must be eligible for admission to the Graduate School and their preparation for graduate work in public administration must be approved by the committee. They will be expected to fulfill the general requirements of the Graduate School for the Master's degree under Plan A with the following exceptions:

Course of study.—In place of the regular major and minor requirements, an individual program of study, including courses drawn from several departments, will be planned for each student, in consultation with members of the staff, which must be approved by the Committee on Training for Public Administration. All candidates, however, must enroll in the graduate seminar in public administration. They must secure a grade of not less than B in at least two thirds of their course work, and a grade of not less than C in all other courses offered for the degree.

Residence.—A pre-service fellow must spend one year in residence at the University and one year as an intern in some governmental department. In-service fellows must spend one year and one summer term in residence at the University.

Thesis.—Pre-service fellows will be required to submit a thesis at the close of their internship year which normally will take the form of a report upon some administrative problem assigned by the governmental supervisor and approved by the training staff. In-service fellows will be required to submit a thesis

* Major adviser, Lloyd M. Short, director of training program.

upon some administrative problem of interest to their governmental employer and approved by the training staff.

Other requirements.—Candidates for this degree will be required to have a reading knowledge of a foreign language (French or German will ordinarily be required), or a working knowledge of the principles of governmental accounting or statistics. A foreign language is required for pre-service fellows. Exceptions or substitutions in this requirement in the case of in-service fellows may be considered by the training staff for recommendation to the Graduate School.

Examinations.—All candidates will be required to pass a final comprehensive written examination in public administration and final oral examinations covering all course work offered for the degree and the thesis.

GRADUATE SOCIAL WORK

The degrees of master of arts in social work, requiring two years of graduate work, and of doctor of philosophy, requiring at least three years of graduate work, are awarded to candidates who complete special curricula in the various branches of social work. Attention is directed to the following fields: protection, guidance, and placement of children; family adjustment and rehabilitation; group relationships; medical social work; psychiatric social work; rural social work; and public welfare.

A candidate for admission must hold a Bachelor's degree from an accredited college or university. He must present 39 quarter credits in social sciences, including a minimum of 12 quarter credits in sociology. In addition, the candidate should present some credits in physiology or biology. However, if the candidate is otherwise eligible for admission but lacks some prerequisites he may be permitted to enter the course but will be required to complete such prerequisites before he is eligible for a degree. Knowledge of a foreign language is not required, but is strongly recommended.

The number of beginning students is limited to fifty, with preference given to students wishing to enroll in the fall quarter. Persons with previous training and experience may be admitted at any quarter. The application for admission is considered first by a departmental committee of major advisers in social work which makes recommendations to the dean of the Graduate School upon whose approval the candidate is admitted. Acceptance of applicants is based on the following criteria: evidence of ability to meet standards of graduate work usually indicated by grades of superior quality; psychological tests when available; letters of reference indicating personal aptitude for social work.

The M.A. degree may be secured under Plan A or Plan B. The difference between the research studies in the two plans is in scope rather than in quality. Plan B, involving a shorter research study, allows more opportunity for study in related fields.

REQUIREMENTS FOR MASTER OF ARTS DEGREE IN SOCIAL WORK

	Plan A Credits	Plan B Credits
Technical social work (class)	36	36
Field work (630 hours)	21	21
Minor	9	
Related fields		18
Thesis	18	
Research topic		9
Distributed according to need of students	6	6
Total	90	90
All work must be completed within	8 years	9 years

The Ph.D. degree in social work is a three-year program based upon the general requirements for this degree as outlined on page 19 of this bulletin.

Students may be awarded a certificate in social work on the completion of 60 quarter credits distributed as follows:

	Credits
Technical social work (class)	36
Field work in social work (450 hours)	15
Related fields	9
Total	60

For detailed information consult the Bulletin of the Graduate Course in Social Work.

MASTER OF SCIENCE IN PSYCHOMETRICS

The degree of master of science in psychometrics is awarded to candidates who complete a special curriculum in the technique of psychological examining. This curriculum, while conforming to the general requirements for the Master's degree, provides for the distribution of work, with certain options, among courses in the Departments of Psychology, Educational Psychology, Sociology, and Child Welfare.

This degree will be granted under Plan A only.

CURRICULUM LEADING TO THE DEGREE OF MASTER OF SCIENCE IN PSYCHOMETRICS

Requirements:

A. Not less than 15 credits must be elected from the following group of courses:

Ed. Psy. 120	Basic Principles of Measurement. (3 cred.)
Ed. Psy. 140	Construction and Use of Educational Tests and Examinations. (3 cred.)
Ed. Psy. 141	Construction and Use of Group Aptitude Tests. (3 cred.)
Ed. Psy. 142	Construction and Use of Individual Aptitude Tests. (3 cred.)
Ed. Psy. 149-150-151	Psycho-educational Clinic. (2 to 6 cred.)
Ed. Psy. 181	Practice in Personnel Work. (2 cred.)
Psy. 230-231-232	Field Work in Psychometrics. (Cred. ar.)
C.W. 290-291†	Mental Examination of Preschool Children. (6 cred.)

B. Not less than 12 credits must be elected from the following group of courses:

Psy. 125-126†-127	Individual Differences. (6 or 9 cred.)
Psy. 130	Vocational Psychology. (2 cred.)
Psy. 160	Psychology in Personnel Work. (3 cred.)
Psy. 295-296-297	Seminar in Individual Differences. (1 cred. per qtr.)
Ed. Psy. 225	Diagnosis and Counseling in Guidance. (3 cred.)
Ed. Psy. 291	Individual Differences. (3 cred.)
C.W. 130	Motor, Linguistic, and Intellectual Development of the Child. (3 cred.)
C.W. 131	Personality, Emotional, and Social Development of the Child. (3 cred.)
C.W. 133-134†	Measurement of Child Personality. (4 cred.)
C.W. 190	Principles of Mental Measurement of Young Children. (2 cred.)
Soc. 109*	The Field of Social Work. (3 cred.)
Soc. 129-130†	Principles of Social Case Work. (6 cred.)
Soc. 132	Juvenile Courts and Probation. (3 cred.)
Soc. 138	Case Work with Children. (3 cred.)
Soc. 139	Psychiatric Problems in Social Case Work. (3 cred.)
Soc. 153‡-154‡-155‡	Field Training in Case Work. (2 to 5 cred. per qtr.)

Total A and B—Minimum of 27 quarter credits with a scholarship average of B.

C. The preparation of a satisfactory thesis. The research for the thesis must be in addition to any research problem set in the listed courses and seminars. In other words, the research for the thesis cannot be counted twice, once as part of the minimum twenty-seven course credits and again toward the thesis requirement.

D. The requirements are completed by passing the usual examination for the Master's degree.

Adviser for the Department of Psychology: D. G. Paterson.

Adviser for the Department of Educational Psychology: C. G. Wrenn.

Adviser for the Institute of Child Welfare: Florence L. Goodenough.

* This course is for mature students who have not had Courses 49 and 90.

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

‡ A fee of $3.50 is charged for this course.

INTERNATIONAL RELATIONS

For the degrees of master of arts and doctor of philosophy in international relations, it is recommended that candidates combine a major in political science with a minor in either economics or history. Under Plan B for the Master's degree, the minor should be divided between economics and history.

In political science the fields of international law, international relations, comparative government, and colonial government are recommended to such candidates. In history the recommended fields, from which two should be selected, are American, European, Far Eastern, Canadian, and Latin American diplomatic history. In economics, they are the various subdivisions of the field of international economic relations. Candidates will be expected to have a good grounding in American government, political and economic theory, history, and geography. Professors H. S. Quigley, A. L. Burt, and R. G. Blakey are advisers in political science, history, and economics, respectively, for candidates in international relations.

Requirements as to prerequisites, foreign languages, theses, and research courses are identical with those for other major and minor work in the departments concerned. All candidates are required to take the course in Scope and Methods of Political Science.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

1. The general requirements for the Master's degree.
2. Reading knowledge of French or German.
3. The passing of final written and oral examinations in courses carrying a total of 27 credits, these courses to be selected from two fields: (1) international law and relations, and (2) either international economic relations or diplomatic history.
4. Completion of a satisfactory thesis in one of the selected fields; or the passing of examinations in additional courses carrying a total of 18 credits, of which nine should be in a third field.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY WITH A MAJOR IN INTERNATIONAL RELATIONS

1. The general requirements for the Doctor's degree.
2. Reading knowledge of French and German.
3. The passing of written and oral examinations in the five fields, the emphasis and selection of courses in each field to be determined in consultation with the major adviser. Candidates already well prepared in one field will be free to concentrate in the others.
4. Satisfactory knowledge of political and economic geography, particularly with reference to regional fields of diplomatic history.
5. Presentation of an acceptable thesis in one of the fields.

The work of candidates for these degrees is under the supervision of the Committee on International Relations consisting of Professors William Anderson (Political Science), Roy G. Blakey (Economics), Alfred L. Burt (History), F. Stuart Chapin (Sociology), Oscar B. Jesness (Agricultural Economics), Lester B. Shippee (History), Dean Russell A. Stevenson (Business Administration), and Professor Harold S. Quigley (Political Science), chairman. Professors Blakey, Burt, and Quigley are advisers for such candidates.

REQUIREMENTS FOR THE MASTER'S DEGREE§

The degree of master of arts is, in general, conferred for advanced non-technical study; the degree of master of science, for advanced technical study, such as agriculture, industrial chemistry, engineering, etc. It is the field of graduate work and not the Bachelor's degree that determines whether the degree is master of arts or master of science. In the sciences usually called basic or fundamental such as physics, geology, zoology, etc. the student may elect the form he prefers.

THE TWO PLANS FOR THE MASTER'S DEGREE

Preliminary statement.—It is assumed in the plans outlined below that the student who is adequately prepared and giving full time to study will, if he meets the requirements for quality in class, thesis, and final general examinations, be able to meet the requirements for the Master's degree in one academic year or its equivalent in summer sessions. Those who lack adequate preparation, hold assistantships involving considerable services to the University, or who must do other things for self-support will find the necessary period in residence proportionately lengthened. It is not usual even for the ablest, sturdiest, and best prepared students to absolve the requirements satisfactorily within one year, even when the departmental service is at the minimum of three hours weekly in conducting quiz and discussion divisions of large elementary courses or ten hours weekly in laboratory supervision or its equivalent in reading quiz papers. Assistants doing more than this must modify their program or expect the completion of the thesis and examinations to extend beyond the minimum one-year period. The same limitations apply to those who lack a satisfactory command of spoken and written English or a reading knowledge of those modern languages which are the necessary tools in so many fields of graduate work.

In all courses *open to graduates only,* the student may be given a mark of "pass" or "satisfactory." This will be interpreted as the instructor's approval of the quality of the student's work viewed from the level upon which real graduate work is supposed to be carried on. It signifies a letter grade of B at least. In the courses open to both graduates and undergraduates the system of marking by letters is normally used. No graduate credit is allowed for course work of D quality.

Since June, 1936, qualified matriculants in the Graduate School may earn the Master's degree in certain departments (see statement preceding departmental announcements of courses) by one of two plans called hereafter Plan A and Plan B.

The student will indicate at the time of matriculation his intention to be a candidate for a Master's degree and indicate the plan he proposes to follow. This choice must be approved by an adviser or departmental committee acting for the major department and will be confirmed by the group committee in which the major department falls. Before making up and approving the student's choice and his program, the adviser or departmental committee must be supplied by the student with a statement of his undergraduate record and any additional work done with credit.

PLAN A: THE MASTER'S DEGREE WITH THESIS

Major and minor work.—In choosing any field for major or minor work, the candidate must present the minimum undergraduate preparation prescribed in

§ Under specified conditions a limited number of graduate students of high scholastic standing who take the degree of master of arts or master of science may be certified for high school teaching in Minnesota even tho they lack formal residence in the College of Education. Students who expect to qualify for certification under this plan must meet certain requirements in the College of Education and also secure the approval of the dean of that college at the outset of their program of professional study.

the departmental statements. He must complete in the Graduate School a minimum of 18 quarter credits in the major department and 9 in the minor. A grade of not less than B must be obtained in any course of this character offered as fulfilling the requirements in the major. A grade of not less than C must be obtained in minor courses. No graduate credit is allowed for course work of D quality.

The choice of the minor must be in a department whose work can be logically related to that of the department in which the student is doing his major work. The dean and the group committee may in exceptional cases allow the minor subject to be taken in the same department as that of the major.

All requirements for the Master's degree under Plan A must be completed within six years after the first registration, except in social work where the time limit is eight years.

Language requirement.—A reading knowledge of a foreign language, modern or ancient, the language to be determined by the major department, is required of candidates for the Master's degree, unless exemption is made in individual cases with the approval of the Executive Committee of the Graduate School. When no other statement is made in the departmental announcement in this bulletin, a knowledge of either French or German is expected. Blanks for making application for the language examination may be obtained in the Graduate School office. The candidate shall present to the dean of the Graduate School, not later than the close of the second quarter of residence, a certificate of proficiency in the designated language, signed by the professor in charge of the corresponding language department or his representative.

All examinations to meet the language requirement of the Graduate School, unless otherwise arranged with the language departments, shall be held on the second Thursday of each quarter.

A candidate who fails in a language examination for an advanced degree shall not be given a second examination until the following quarter.

A repetition of the language examination is considered a special examination for which a fee of $5 is charged.

Master's thesis.—Before the middle of the first quarter in residence the candidate shall file at the office of the Graduate School the subject of his thesis. The blank for filing the thesis title may be obtained in the Graduate School office. This title must be approved by his adviser and by the corresponding group committee. It should be on a topic falling within the field of the major. The candidate will ordinarily devote approximately one-half his time to the preparation of the thesis, including courses on which the thesis is based. The thesis must be written in acceptable English and show ability to work independently, and give evidence of power of independent thought both in perceiving problems and making satisfactory progress toward their solution. Familiarity with the bibliography of the special field and correct citation of authorities are expected.

The thesis is required to be in quadruplicate in order to facilitate its consideration. Two copies are retained for the University Library (as noted below), the third copy being finally returned to the candidate. Since one copy is usually desired by the adviser or department concerned, a fourth copy should be provided for this purpose. One copy must be upon the specially required red-ruled twenty-pound linen stock of 60 or 70 per cent rag content and the others may be carbon copies on bond paper. The original and first copy must contain all illustrative material. Ample margin should be left for binding purposes. Samples in the dean's office of both the linen stock and paper to be used for carbon copies

should be examined before the thesis is typewritten. The body of the thesis should be doubled spaced, but footnotes may be single spaced.

The thesis must be finished and four copies deposited in the office of the dean of the Graduate School *at least four weeks* (in the spring quarter, five weeks) before the commencement convocation at which the candidate presents himself for his degree.

The thesis will be examined by a committee of not less than three, appointed by the appropriate graduate group committee. The student's adviser will, as a rule, be the chairman of this committee. Unanimous approval by this committee will be necessary for the acceptance of the thesis.

If the thesis is accepted, the candidate must deposit with the registrar, at least two weeks before commencement, one dollar and a half for binding the two copies of this thesis, which will be cataloged and deposited in the University Library, one copy for reserve and one for loan purposes.

Examinations.—All candidates for the Master's degree will meet the regular requirements as to examinations, topics, reports, etc., of the classes in which they are registered. A special examination in the field of the minor is not required, but this does not excuse the candidate from the regular course examinations. Besides the usual course examinations, where such are given, the candidate for the Master's degree must pass a final written examination in the major and after acceptance of the thesis, a final oral examination.

The final written examination will be held *not later than two weeks* before the end of the quarter in which he takes his degree. It will cover the work of the candidate in the field of the major, and may include any work fundamental thereto. This examination will be held by his instructors in the major department, the adviser acting as chairman.

The candidate is not eligible for the oral examination until the thesis has been accepted and any language requirement absolved.

If the final written examination is satisfactory, and the thesis accepted, the final oral examination of the candidate will be held, not later than two weeks before the end of the quarter in which he takes his degree. The thesis committee, of which the adviser is chairman, will conduct the oral examination. The chairman may invite to the examination any instructors with whom the candidate has had work. The head or chairman of the department in which the major work is done is an ex-officio member of the committee. Any member of the graduate faculty may attend as a visitor. The final oral examination will cover all the work offered for the degree, and may include other work fundamental thereto. At the close of the examination, the committee will vote upon the candidate, taking into account all of his work. A majority vote is required for approval.

See tabular summary of requirements for the Master's degree with thesis below:

Requirements	Under the Direction Of	Date
Program, major and minor	Adviser and dean of the Graduate School	On entrance
Approval of thesis subject	Adviser and group committee	Not less than seven months before graduation
Language requirement	Adviser and language department	Before close of second quarter
Filing of thesis	Graduate School office	Four weeks before graduation (in June, five weeks)
Approval of thesis	Thesis committee	Before admission to final oral examination
Final written examination in major	Major department members of the graduate faculty	Not later than two weeks before commencement and before final oral examination
Final oral examination on all work	Committee	Not later than two weeks before commencement
Graduation fee and fee for binding thesis	Registrar's office	Not later than two weeks before commencement

Candidates who are eligible for the "preliminary examination" for the Doctor's degree may substitute this examination for the final oral examination for the Master's degree, provided all other requirements for the preliminary examination (see page 21) have been met.

Reports.—Special blanks are provided for signed reports concerning the thesis and the final oral examinations. All reports must be filed in the office of the dean of the Graduate School, *at least two weeks before the end of the last quarter.*

Candidates meeting the requirements as above outlined will be reported by the dean to the Executive Committee of the Graduate School, who will by vote recommend to the Board of Regents those approved for degrees.

PLAN B: THE MASTER'S DEGREE WITHOUT THESIS

The requirements under this plan in matters of admission, residence, transfer of credits from other institutions, language requirements, and final examinations follow Plan A. Plan B differs in substituting for the thesis a heavier course requirement which if met in summer sessions means more than the minimum four sessions under Plan A. (See page 6.) While it does not permit an indiscriminate scattering of courses over unrelated departments, it does not stress so definitely the concentration on one major and one minor field. It is understood that more than one field will be included outside of the field of concentration. Programs which simply represent more hours distributed between a major and a minor will be especially scrutinized by the Graduate Group Committee. In so far as it has a professional aspect, the Master's degree under Plan B is less a test of research interests and presumably more adapted to those who as teachers or school administrators will profit by a broader range of knowledge in the fields they teach or supervise. Whether taken for professional or cultural purposes, the requirements under Plan B are meant to test interests and intellectual abilities for a different purpose and not on a different level from those required for Plan A. The transfer from one plan to the other may be made with the approval of the adviser or the major department committee supervising the student's work.

Under Plan B candidates for the Master's degree must complete, with an average of B, 45 quarter credits in graduate courses listed in this bulletin. At least 21, and not more than 27, credit hours should be in a single field of concentration. At least 9 quarter credits either in the field of concentration or in related fields must be in advanced courses, seminars, or independent work under faculty supervision and requiring the preparation of written reports representing the quality but not the range of the Master's thesis. Courses which offer an opportunity to meet this 9-hour requirement are marked in this bulletin with an asterisk (*).

All requirements for the Master's degree under Plan B must be completed within seven years after the first registration, except in social work where the time limit is nine years.

The student's program, recorded on a blank provided by the Graduate School, shall have the approval of a major adviser or of a departmental committee acting for the major department and is subject to the review of the group committee. The intelligent planning of the student's program requires that he shall present to his adviser or the departmental committee a statement of all college work completed with credit.

In planning the student's program the adviser should not include in "related fields" any courses from the "field of concentration."

Under this plan the Graduate Group Committee in charge of his field of concentration shall appoint a committee of three to test each candidate by oral or written examination or both. The adviser will make available to the examining committee for their review the papers prepared in starred courses to fulfill the requirement of nine hours of independent work. At their option the group committee may call for and examine these written reports submitted to meet the 9-hour requirement.

For students electing Plan B, it is doubly important to file applications for admission and transcript in duplicate before the registration date. Otherwise delays and possible fines for late registration are almost unavoidable.

See tabular summary of requirements for the Master's degree without thesis, below:

Requirements	Under the Direction Of	Date
Program, field of concentration, 21 to 27 credits including 9 credits in starred courses; related fields 18 to 24 credits	Adviser and dean of the Graduate School	On entrance
Filing program of all graduate work, with credits showing field of concentration, etc.	Adviser and group committee	Before close of second quarter
Language requirement	Adviser and language department	Before close of second quarter
Approval of candidacy and appointment of examining committee	Dean and group committee	Beginning of third quarter
Final examinations, written or oral or both	Adviser and committee	Not later than two weeks before commencement
Graduation fee	Registrar's office	Not later than two weeks before commencement

ATTENDANCE AT COMMENCEMENT

Candidates upon whom degrees are to be conferred are required to be present at commencement unless especially excused by the dean of the Graduate School and the president of the University.

MASTER OF SCIENCE IN ENGINEERING OR ARCHITECTURE

The requirements and procedure for the degree of master of science in aeronautical, agricultural, chemical, civil, electrical, mechanical, mining, or petroleum engineering or architecture will correspond to those outlined for this degree in other subjects. The major subject and, under Plan A, the thesis will lie in the field represented by the degree. The thesis must be filed in the Graduate School office *at least four weeks* (in the spring quarter, five weeks) before the date of graduation. The final written and oral examinations must be taken at least two weeks before graduation. The language requirement is waived in all of these cases except chemical engineering, in which German is required.§

REQUIREMENTS FOR THE ENGINEER DEGREES

The advanced professional degrees, aeronautical engineer, agricultural engineer, chemical engineer, civil engineer, electrical engineer, and mechanical engineer, will be conferred upon the recommendation of the Graduate School faculty as a result of the satisfactory completion of the following requirements:

a. Bachelor's degree, from an approved school in the corresponding branch of engineering.

§ In special cases approved by the department, French may be substituted.

b. One full academic year of graduate engineering study (three quarters) in residence at this University. Graduates of this University may be permitted to carry on this study *in absentia* under the direction of the faculty. Work done *in absentia* may not be substituted for the residence work required for the master of science degree.

c. Four years in engineering experience in positions of responsibility, subsequent to receiving the Bachelor's degree. (If the graduate study is done *in absentia,* five years of experience are required.)

d. A thesis of professional grade.

Candidates for the degree of chemical engineer must have a reading knowledge of German.§

For graduates of this University, a Master's degree in the corresponding branch of engineering will be accepted as fulfilling the requirements of the year of graduate study.

The Engineer degree will not be granted in less than five years after the Bachelor's degree has been received.

If the Bachelor's degree is in another branch of engineering than that in which the professional degree is sought, the student must complete the equivalent of the subjects required for the Bachelor's degree in the new field before admission to candidacy for the desired degree.

THE MASTER'S DEGREE WITH THE ENGINEER DEGREE

It is recommended that the student who is entering upon the graduate year's study in residence for the Engineer degrees register for and obtain the Master's degree for this year's work—that is, the degree of master of science in the corresponding branch of engineering. The essential difference lies in the requirement of a thesis if the Master's degree is sought. However, the aggregate amount of work is intended to be the same in both cases, namely, from 15 to 18 credit hours per week for the three quarters. If the graduate study does not lead to the Master's degree, the student is not required to prepare a thesis as a part of the year's work. The Master's thesis, however, will not satisfy the requirement for the professional thesis which is intended to be related to the practical experience after the Bachelor's degree was received.

PROGRAM OF STUDY

Upon entrance to the Graduate School, the candidate, with the approval of the dean, will select his adviser in the field represented by the desired degree, in which field the major work and the thesis will lie. With the approval of his adviser and the dean, he will also select a minor, and will outline a study program for the year.

If the student registers for the Master's degree in engineering or architecture, he will conform to the requirements for that degree as regards major and minor work, thesis, examinations, etc.

If the graduate study during the year of residence or *in absentia* is towards the Engineer degree only, it will be divided into major and minor work, of which the major will usually constitute about two thirds and the minor one third of the total of 12 to 15 credit hours which will be carried each quarter.

STUDY IN ABSENTIA

Only graduates of this University will be permitted to undertake the graduate study *in absentia* towards one of the Engineer degrees. This permission must be

§ In special cases approved by the department, French may be substituted.

obtained from the head of the department represented by the degree, who will usually act as the adviser, and from the dean of the Graduate School. It is not necessary that this study be coincident with the academic year; it may be undertaken at any time.

The proposed plan of study should be arranged with the approval of the adviser. A flat fee of $60 must be paid in advance. The study may, and generally will, extend over more than nine months. There is also the usual graduation fee of $10. At least 1,500 actual hours of work should be performed as the equivalent of a year's study in residence.

The detailed requirements of reports and examinations will be established by the adviser. A separate written report must be submitted at the end of each quarter's work. A written examination covering the study, both major and minor, will be held at the close of the year's work. Under favorable circumstances this examination may be held in the place where the candidate resides.

Upon the satisfactory completion of the year's work, the proper credits will be recorded toward the Engineer degree.

FEES

A fee of $60 is required for the year of graduate study towards the professional Engineer degrees if taken *in absentia*. This is in addition to the regular graduation fee of $10 paid at the time of qualifying for the degree.

STUDY IN RESIDENCE

The work will consist of regular courses offered in this bulletin and may include research if desired by the student, even tho the Master's degree is not sought.

ENGINEER'S THESIS

At least six months before the graduate degree is expected, the thesis subject must be approved by the adviser and the group committee. The thesis itself must be filed with the dean at least four weeks before the commencement at which the degree is to be obtained. A deposit of one dollar and a half to cover cost of binding the thesis must be made with the registrar at least two weeks before commencement.

STATEMENT OF EXPERIENCE

With the thesis, the candidate must file a detailed statement of his professional experience since receiving his Bachelor's degree. This should amount to at least four years, if the graduate study was in residence, or five, if *in absentia*.

See tabular summary of requirements for the Engineer degree below:

Work	Under the Direction Of	Date
Program, major and minor	Adviser and dean of the Graduate School	On registration
Quarterly reports if *in absentia*	Adviser	
Thesis subject	Adviser and group committee	Six months before graduation
Written examination	Adviser and major and minor staff	At end of year's study or later, as arranged
Experience statement	Adviser and major staff	Four weeks before graduation
Filing thesis	Dean of the Graduate School	Four weeks before graduation
Graduation fee and fee for binding thesis	Registrar	Not later than two weeks before graduation

ATTENDANCE AT COMMENCEMENT

Unless specifically excused for an important reason, the candidate will be present in person to receive the degree.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

In the Graduate School, one Doctor's degree, doctor of philosophy (Ph.D.), is conferred by the University of Minnesota. This degree is granted, not on the basis of successful completion of a definite amount of prescribed work but chiefly in recognition of the candidate's high attainments and ability in his special field, to be shown, first, by the preparation of a thesis, and second, by successfully passing the required examinations covering both the general and the special fields of the candidate's subjects as detailed later.

Candidates for the Doctor's degree must spend at least three years§ of graduate study in approved subjects. The first two years or the last year must be spent in residence at the University of Minnesota.

A member of the staff of instruction above the rank of instructor will not be permitted to enroll for a Doctor's degree at this University. There is no objection, however, to his registering for graduate work at this University and credit so obtained may be presented elsewhere.

PROGRAM OF STUDY

First year.—Upon entrance to the Graduate School, the student shall select his adviser with the approval of the dean. With the approval of his adviser he shall submit to the dean a program covering his first year's work.

Second and third years.—Before beginning the work of the second year, the student shall secure from the Graduate School office the Three-Year Program Blank and submit to his adviser and the group committee for approval a statement of graduate work done and an outline of his work for the second and third years, including both the major and minor subjects. This program is then to be submitted to the dean for final approval. During the second quarter of the second year he shall file with his adviser's approval the title of his Doctor's dissertation. The blank for filing the thesis title may be obtained in the Graduate School office.

LANGUAGE REQUIREMENTS

Before admission to the preliminary examination, the student must present to the dean of the Graduate School statements from the French and German departments, certifying that the applicant has a reading knowledge of those languages.¶ In addition, a knowledge of other languages may be required in certain cases, as the candidate's major department may prescribe. The student's adviser or his representative at his option may attend the oral language examinations and provide literature in the major field from which the test passages are selected. For the dates of these language examinations consult the calendar at the beginning of this bulletin. Repetition of the language examination because of failure is considered a special examination for which a fee of $5 is charged.

§ This time requirement will be met in three years only by those students who devote all their time to graduate study. Students who merely devote the intervals between periods of professional or other regular employment to graduate study will need to extend their total period of work over a longer time. Credit for such work will be given in proportion to the amount of time actually spent in the pursuit of graduate work.

¶ The substitution of other foreign languages of greater service in the major field may be permitted by the executive committee on recommendation of the group committee.

THE MAJOR WORK

The major work must be in a department in which the candidate has had, in his undergraduate study, a minimum of 27 quarter credits if it be a department open to freshmen, or a minimum of 18 quarter credits if it be a department not open to freshmen. Part or all of this preliminary work may consist of designated prerequisite courses in the same or allied departments.

During the period of work for the Doctor's degree a student shall spend not less than two thirds of his time§ on the major subject, including the work on the thesis. During the last two years, he shall carry an average of at least one course per quarter in his major in addition to the work from which his thesis is developed.

At the close of the second year's work, and before admission to the preliminary examination, the student must obtain the written recommendation of the major department members of the graduate faculty. Such written recommendation should state that in view of the work already done by the applicant, the department is convinced of his probable capacity and ability to meet all the requirements for the degree, including the thesis, the subject of which must be stated. No preliminary examination will be given during the month of May.

In the case of a student who comes for the last year of residence only, provision for the examination will be made by the dean and the major department.

THE MINOR WORK

The minor work must be selected in a department in which the student is prepared to pursue courses advanced enough in character to be included in the group designated "For Undergraduate and Graduate Students," and numbered 100 or above.

The choice of the minor must be in a department the work of which can be logically related to that of the department in which the student is doing his major work.

In exceptional cases, the dean and the group committee may allow the minor subject to be taken in the same department as that of the major or in two related departments.

Not less than one sixth of the total work of the three years shall be devoted to the minor subject and all of this work shall be completed and certified to by the department in which the minor is taken before admission to the preliminary examination.

DOCTOR'S THESIS

The thesis, for which the accumulation of material may well be started not later than the middle of the second year, must give evidence of originality and power of independent investigation, and embody results of research, which form a real contribution to knowledge as well as exhibit mastery of the literature of the subject and familiarity with the sources of knowledge. The matter must be presented with a fair degree of literary skill.

The thesis must be typewritten in quadruplicate, to facilitate reading by the thesis committee. The four copies, certified by the adviser as complete, must be registered in the dean's office and distributed to the thesis committee *not later than six weeks* before the commencement at which the candidate expects to receive his degree. Two copies are to be bound and deposited in the Graduate School office. The thesis report must be bound with the first of these two copies.

§ In estimating the distribution of time, a week of 15 credit hours may be assumed.

The thesis will be examined by a committee of not less than four, appointed by the appropriate graduate group committee. The student's adviser will as a rule be the chairman of this committee. Unanimous approval by the committee will be necessary for the acceptance of the thesis.

REQUIRED SUMMARY FOR PRINTING

Each candidate for the Doctor's degree shall submit with his completed thesis a summary of about ten pages, acceptable to his adviser, embodying the principal findings of the research, and pay to the Graduate School the sum of $25 before the candidate be finally recommended for the degree. Such summaries will be published in appropriate volumes, and should therefore be carefully edited. If, prior to publication by the University of Minnesota of his summary, the candidate publishes his thesis through some other channel and files 100 reprints, approved by his adviser, the deposit, less the cost of binding of the reprints, will be refunded.

Directions for Preparing the Summary

1. Original copy on good quality bond, double-spaced, student's name on each page.
2. Few references and those to be listed at the end of the summary.
3. Signature of the adviser following careful editing for both content and form.
4. No bibliography.
5. No acknowledgments.
6. Extra charges will be imposed for summaries exceeding ten pages in length and for summaries containing tables and plates.

EXAMINATIONS

Written examination.—There shall be a written examination in the major subject, to be given by the members of the graduate faculty in the major department prior either to the preliminary or to the final examination or to both as the department may decide. This examination shall cover all the work done in the major, and *may include any work fundamental thereto.*

Preliminary.—At least seven months before the degree is conferred, following the completion of the minor and the language requirements, a preliminary examination of the student shall be given by the thesis committee plus at least two members appointed by the dean. The student's adviser will act as chairman. The chairman or head of the major department is ex-officio a member of any examining committee for an advanced degree. This committee must not be fewer than six, of whom five shall constitute a quorum. To pass a candidate for the doctoral degree in the preliminary examination there must be a two-thirds affirmative vote of the examining committee which shall include a minimum of four affirmative votes. The examination shall cover the graduate work taken by the student, and *may include any work fundamental thereto,* except the thesis and the field of definite specialization. This examination shall be in addition to the usual course examinations. Only after the successful completion of this examination may the student be enrolled as a candidate for the Doctor's degree. Students failing to pass this preliminary examination may be excluded from the candidacy for the degree and in any case shall not be re-examined until at least one quarter has passed.

Final oral.—After successful completion of the written examination and acceptance of the thesis and not less than two weeks before graduation, the final

oral examination shall be given. This examination shall be conducted by a committee consisting of the adviser as chairman, the members of the thesis committee, and at least two other members of the graduate faculty appointed by the dean. At least one member of this committee shall be from a group other than the one in which the major department is included. This examination has special reference to the thesis and the field of the candidate's special studies and shall not exceed three hours.

The date of the final oral examination shall be publicly announced and the examination shall be open to any member of the graduate faculty. Upon completion of the examination, a formal vote of the committee shall be taken, and a unanimous affirmative vote of the members shall be necessary for recommendation of the candidate for the degree.

Reports.—Special blanks are provided for signed reports concerning the thesis and the final oral examination. All reports must be filed in the office of the dean of the Graduate School *at least two weeks before graduation.*

Candidates meeting the requirements as above outlined will be reported by the dean to the executive committee of the graduate faculty, who will by vote recommend to the Board of Regents those approved for degrees.

ATTENDANCE AT COMMENCEMENT

Candidates upon whom degrees are to be conferred are required to be present at commencement, unless especially excused by the dean of the Graduate School and the president of the University.

See tabular summary of requirements for the Doctor's degree below:

Requirements	Under the Direction Of	Date
First Year		
Selection of major	Adviser and dean of Graduate School	
Selection of minor		
Second Year		
Three-year program	Adviser, appropriate graduate committee, and dean of Graduate School	Before beginning work of second year
Thesis title	Adviser, appropriate graduate committee, and dean of Graduate School	Before admission to preliminary examination
Languages	Adviser and language departments	Before admission to preliminary examination
Written examination	Graduate faculty of the major department	At time of preliminary or before the final oral examination
Preliminary examination	Committee	At least seven months before degree is to be conferred
Third Year		
Filing of completed thesis certified by adviser	Graduate School office	Six weeks before graduation
Approval of thesis	Thesis committee	Before admission to final oral examination
Final oral examination	Committee	Not later than two weeks before commencement
Two bound copies, summary of thesis, and deposit of $25	Graduate School office	Not later than two weeks before commencement
Graduation fee	Registrar's office	Not later than two weeks before commencement

DESCRIPTION OF COURSES

An asterisk (*) indicates courses that may be taken for independent work under Plan B, see pages 15-16.

A dagger (†) indicates that all quarters of a course must be completed before credit is received for any quarter.

AERONAUTICAL ENGINEERING

Professors John D. Akerman, Jean F. Piccard; Associate Professors Burton J. Robertson, Joseph A. Wise; Assistant Professor Charles Boehnlein.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100f-101w-102s. Aerodynamics. Atmospheric properties. Fluid mechanics. Stream functions and velocity potential. Motion of body in liquids in three dimensions. Prandtl's wing theory. Dynamic loads, stability, maneuverability, controllability. Prerequisites: Course 3 and M.&M. 25. 3 credits. Mr. Boehnlein.

103f-104w-105s. Advanced Aerodynamics. Prerequisite: Course 102. 3 credits per quarter. Mr. Boehnlein.

115f. Airplane Stresses. Deflection of structures. Theory of statically indeterminate structures. Analysis of fuselage trusses, landing gear, wing beams. Structural details and connections. Prerequisite: Course 83. 3 credits. Mr. Wise.

116w. Advanced Airplane Stresses. Theory and design of monocoque fuselages. Multispar and unit construction wings. Vibrations. Wing and control-surface flutter. Analysis and design of seaplane hulls and floats. Prerequisite: Course 115. 3 credits. Mr. Wise.

120f-121w*-122s. Airplane Design. Stress analysis of wings, fuselages, chassis, control surfaces, etc. Specifications. Performance and design calculations. Propellers. Prerequisites: Courses 83, 102, M.&M. 128. 120f, 2 credits; 121w, 4 credits; 122s, 3 credits. Mr. Akerman.

123f,w,s-124f,w,s-125f,w,s.* Advanced Airplane Design. Problems in airplane design or development. Prerequisite: Course 121. 2 to 5 credits per quarter. Mr. Akerman.

126f,w,s-127f,w,s-128f,w,s.* Advanced Problems in Airscrew Design. Graphical and analytical methods of investigation. Prerequisite: Course 122. 2 to 5 credits per quarter. Mr. Akerman.

140f,s. Aeronautical Laboratory. Study of airplane parts and their construction. Fittings. Rigging. Inspections and accessories. Prerequisite: Course 102. 2 credits. Mr. Akerman.

141f,w,s. Aerodynamics Laboratory. Measurement of air flow. Calibration of Pitot tubes and anemometers. Distribution of air pressure on surfaces. Wind tunnel tests of wing, propeller, and airplane models. Prerequisite: Course 101. 2 credits. Mr. Boehnlein.

160s. Airships. Theory and design. Rigid and nonrigid types. Stresses. Performance. Prerequisites: Courses 83, 102, M.&M. 128. 3 credits. Mr. Akerman, Mr. Piccard.

164s. Problems Relating to the Stratosphere. 3 credits. Mr. Piccard.

165f,w,s.* Advanced Aeronautical Laboratory. Advanced research problems in aeronautical engineering requiring laboratory or field research facilities. 2 to 4 credits. Prerequisite: Course 140 or 141. Mr. Akerman, Mr. Piccard.

170s. Air Transport Economics. Airports and airways and their equipment. Air commerce rules and regulations. Communication. 2 credits.

173f-174w-175s. Airway Meteorology. Organization of airways meteorology service, decoding of teletype weather reports, progressive study of consecutive synoptic charts, ceiling and pilot balloon observations, applications of air mass analysis and polar front theory to the construction and interpretation of airway synoptic charts, high altitude sounding with aero meteorographs, special applications of meteorology to airline operations. Mr. Piccard.

190f-191w-192s.* Seminar. Readings, reports, conferences, and discussions. Prerequisite: Course 102. 1 credit. Mr. Akerman, Mr. Piccard.

193f,w,s-194f,w,s-195f,w,s.* Advanced Problems in Aeronautical Engineering. 2 to 5 credits. Mr. Akerman, Mr. Piccard, Mr. Robertson, Mr. Wise, Mr. Boehnlein.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Advanced Problems in Aerodynamics. Prerequisite: Course 102 or special permission. 3 credits per quarter. Mr. Boehnlein.

260s.* Advanced Airship Stresses. Coplanar and space rigid frameworks. Secondary stresses. Buckling and elastic instability. Framework of dirigibles, gondolas, and cabins. Prerequisite: Course 115. 3 credits. Mr. Wise.

272f-273w-274s.* Research in Aeronautical Engineering. 2 credits per quarter. Mr. Akerman, Mr. Piccard, Mr. Robertson, Mr. Boehnlein.

275f-276w-277s.* Advanced Aircraft Engines. An advanced study of aircraft engines and auxiliary equipment, analysis of current developments in aircraft engines, new engine accessories, and installations, theoretical analysis of their effect upon the performance of modern aircraft. 2 to 5 credits. Mr. Akerman, Mr. Robertson.

AGRICULTURAL BIOCHEMISTRY

Professors Ross A. Gortner, Clyde H. Bailey, Herbert Freundlich, William F. Geddes, Leroy S. Palmer; Associate Professors David R. Briggs, Cornelia Kennedy, W. Martin Sandstrom.

Prerequisites.—For major work, credit in general chemistry and qualitative analysis, in organic chemistry, in quantitative analysis, and at least 10 quarter credits in biological science. College physics and physical chemistry are strongly advised. Unless the student presents credits in those subjects on entrance he will, in general, be required to register for *physical chemistry* early in his graduate program. The instructor with whom the student wishes to work may require additional prerequisites.

For minor work, credit in general chemistry and qualitative analysis, in organic chemistry, and 10 quarter credits in biological science. Minors should be arranged only after consultation with the instructors concerned.

All students majoring in this division must include Course 224 in their study programs. With the approval of the adviser, courses in bacteriology, botany, dairy husbandry, genetics, plant pathology, physiology, physiological chemistry, zoology, etc., and courses in the School of Chemistry may be accepted as major work.

Language requirement.—Candidates for the Master's degree must have a reading knowledge of German or French. (In special cases, where other languages are needed for the development of the thesis, Russian, Italian, or the Scandinavian languages may be substituted. For certain foreign students to whom English is an acquired language, exemption from a specific language may be granted on recommendation of the major adviser and approval by the graduate group committee.) In no instance where English is the native language will the language requirement be waived.

Master's degree.—Offered in general under Plan A. In exceptional cases Plan B may be offered by petition approved by a special committee composed of the major advisers of the division.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-102w. Agricultural Quantitative Analysis. Includes estimation of inorganic and organic constituents of biological products, proximate analysis of foods and feeding stuffs, and the use of special apparatus. Prerequisite: quantitative analysis. 3 credits each quarter. Mr. Briggs.

103s. Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, and on the processes involved in the manufacture of dairy products. Prerequisite: Course 106 or equivalent. Lect. 3 credits, lect. and lab. 5 credits. Mr. Palmer.

105s. 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. Prerequisite: organic chemistry. 3 credits. Mr. Reitz.

106f. 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. Prerequisite: organic chemistry. 3 credits. Mr. Palmer.

108s. 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. Prerequisite: organic chemistry. 3 credits. Mr. Geddes.

110s. Flour Laboratory Methods. A laboratory course. Analysis of wheat and its products. Designed to train students for research in the cereal industry. Prerequisite: Course 101-102 or food analysis. 3, 4, or 5 credits depending on the amount of work completed. Mr. Geddes.

111su-112su. Biochemistry. An advanced course dealing with the colloidal state, and the chemistry of proteins, carbohydrates, glucosides, tannins, fats, plant acids, enzymes and pigments, and their physicochemical relations to vital processes. Prerequisites: organic chemistry, biology, 1 year. 3 credits each term. Mr. Sandstrom.

113f-114w-115s. Biochemical Laboratory Methods. A laboratory course paralleling the lectures in 111-112, or 119 to 123. Prerequisite: quantitative analysis, parallel 111-112. 2 credits each quarter. Mr. Sandstrom.

116w. Advanced Animal Nutrition. Recent developments in animal nutrition, covering the field of proteins, mineral metabolism, and vitamins. Prerequisite: Course 106 or 120 or physiological chemistry. 3 credits. Mr. Palmer, Miss Kennedy.

117f,w,s. Laboratory Problems in Animal Nutrition. A laboratory course on methods used in nutrition studies. (Because of limited laboratory facilities permission must be obtained from the instructor before registration.) Prerequisite: Course 116. 3 credits. Miss Kennedy.

118f,w,s. Laboratory Problems in Biochemistry. Special laboratory work in the preparation and isolation of pure compounds, and in special methods of identification or determination of biochemical products. Prerequisite: Course 113-114 or 103 or 110. 3 to 5 credits. Mr. Gortner, Mr. Bailey, Mr. Geddes, Mr. Palmer, Mr. Briggs, Miss Kennedy, Mr. Sandstrom.

119f. 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. Prerequisites: Org. Chem. 53 and one year in either zoology or botany. 3 credits. Mr. Gortner.

120w. Proteins. Lectures and assigned readings on composition, structure, chemical and physical properties, and the functions of proteins and amino acids. Prerequisite: Course 119. 3 credits. Mr. Gortner.

121w. Carbohydrates. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. Prerequisite: Course 119. 3 credits. Mr. Geddes.

122s. The Lipids and Fats. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the fats and fat-like compounds. Prerequisite: Course 119. 3 credits. Mr. Briggs.

123s. 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. Prerequisite: Course 119. 3 credits. Mr. Sandstrom.

COURSES PRIMARILY FOR GRADUATE STUDENTS

180f. General Survey of Colloid Chemistry. Prerequisite: Phys. Chem. 103. 3 credits. Mr. Freundlich.

181w. Colloids in Industry. Prerequisite: Course 180 or Phys. Chem. 128-129. 3 credits. Mr. Freundlich.

182s. Colloids in Biology and Medicine. Prerequisite: Course 180. 3 credits. Mr. Freundlich.

203f,w,s,su.* Research Problems. Special work on particular research problems other than the student's major thesis. Facilities are provided for biochemical investigations and for advanced studies in plant or animal nutrition. 2 to 5 credits. Mr. Gortner, Mr. Bailey, Mr. Freundlich, Mr. Geddes, Mr. Palmer, Mr. Briggs, Miss Kennedy, Mr. Sandstrom.

205f,w,s,su.* Special Topics in Biochemical Literature. Library work followed by the preparation of written reports upon either the historical development or the current literature of special biochemical problems. A reading knowledge of German is necessary and of French desirable. Prerequisite: Courses 119, 120, 121, 122, or 123. 3 credits. Mr. Gortner, Mr. Geddes, Mr. Briggs, Mr. Sandstrom.

212f,w,s.* Special Topics in Nutritional Chemistry. A special library course with written reports on assigned readings in protein, mineral, and vitamin nutrition, primarily to train the student as a critic in this field. Prerequisites: Course 116 and reading knowledge of German. 3 credits. Mr. Palmer.

213f,w.* Seminar in Dairy Chemistry. Permission of instructor. 1 credit. Mr. Palmer.

216f,w.* Seminar in Nutrition. Permission of instructor. 1 credit. Mr. Palmer, Miss Kennedy.

219f,w.* Seminar in Colloid Chemistry. Prerequisites: Course 111-112 or 119 and permission of instructor. 1 credit. Mr. Gortner, Mr. Freundlich, Mr. Briggs.

220f,w.* Seminar in Protein Chemistry. Prerequisites: Course 111-112 or 120 and permission of instructor. 1 credit. Mr. Gortner, Mr. Sandstrom.

221f,w. Seminar in Carbohydrate Chemistry. Prerequisites: Course 111-112 or 121 and permission of instructor. 1 credit. Mr. Geddes.

222f,w.* Seminar in the Chemistry of the Lipids. Permission of instructor. 1 credit. Mr. Briggs.

223f,w.* Seminar in Enzymes. Prerequisites: Course 111-112 or 123 and permission of instructor. 1 credit. Mr. Sandstrom.

224s.* General Seminar. Reports of research work of the division. Required of all students majoring in the department. 1 credit. Mr. Gortner, Mr. Geddes, Mr. Palmer, Mr. Briggs, Mr. Sandstrom.

AGRICULTURAL ENGINEERING

Professor Harry B. Roe.

Prerequisites.—For a major in agricultural engineering the general prerequisite comprises all *specified* work in the undergraduate professional curriculum in agricultural engineering at Minnesota or its equivalent in general character, and in extent and value.

For a minor in agricultural engineering the division staff must be satisfied as to the student's preparation.

It is conceivable that a graduate of an approved undergraduate curriculum in another line of engineering might select, subject to review and amendment by the adviser, a major in some special phase of agricultural engineering for which his undergraduate work has furnished the foundation.

In any case, additional supporting work may be required where such seems desirable to the adviser in the case of a major, and to the instructor in charge in the case of a minor.

Master's degree.—Offered only under Plan A. Candidates for graduate degrees in agricultural engineering may include, with the approval of their adviser, in their major or minor or both, such courses in fundamental engineering and in agricultural or allied pure science as are considered essential in any given case.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-102w-103s.* Advanced Drainage Problems. Special drainage problems including surface run-off, soil permeability, relation of soil and crop type to drainage, shape and regulation of water table in relation to root growth, etc. Prerequisite: Course 51. 3 to 6 credits per quarter. Mr. Roe.

104f,su. 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. Prerequisite: 9 credits in agricultural engineering including physics. 3 credits. Not open to engineers. Mr. Roe.

111f-112w-113s.* Farm Building Problems. Investigations in building materials, methods of construction, cost and efficiency of farm buildings. Prerequisite: Course 67. 3 to 6 credits per quarter. Mr. White.

114w,su. Buildings, Equipment, Materials, and Methods of Construction. The relation of structures and building equipment to agriculture. Lectures and special

problems. Prerequisite: 9 credits in agricultural engineering including Courses 3 and 4 or equivalent. 3 credits. Not open to engineers. Mr. White.

121f-122w-123s.* Farm Power and Machinery Problems. Special studies of farm machinery and mechanical power for the farm, including tests, design, and adaptability to various farm conditions. Prerequisite: Course 126. 3 to 6 credits per quarter. Mr. Schwantes.

124s,su. 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. Prerequisite: 9 credits in agricultural engineering including physics and agricultural machinery. 3 credits. Not open to engineers. Mr. Schwantes.

126w. Selection and Management of Agricultural Machinery. Special problems in economical power and machine combinations and their application to the farm. Prerequisites: Courses 14 and 71 and Agr. Econ. 103. 3 credits. Mr. Schwantes.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s.* Reclamation Research. Studies of design and functioning of reclamation works with especial reference to soil types and soil water conditions. Prerequisites: Course 101 and one quarter's work in mathematical theory of statistics. 3 to 6 credits per quarter. Mr. Roe.

211f-212w-213s.* Farm Structures Research. Studies in farm structures as related to other factors in the farm business. Prerequisite: Course 111. 3 to 6 credits per quarter. Mr. White.

221f-222w-223s.* Farm Power and Machinery Research. Studies involving the design or utilization of power and machinery used in connection with farm operations. Prerequisite: Course 121. 3 to 6 credits per quarter. Mr. Schwantes.

AGRONOMY AND PLANT GENETICS

Professors Herbert K. Hayes, Forrest R. Immer, Harold K. Wilson; Associate Professors Albert C. Arny, Charles R. Burnham.

Prerequisites.—In agronomy, sufficient work in plant sciences to satisfy the adviser that advanced work may be pursued profitably. Further courses may be required without credit if in the opinion of the adviser this is necessary. With the approval of the adviser, courses in agricultural biochemistry, botany, plant pathology, plant genetics, plant physiology, and soils may be accepted as part of the major work.

In plant genetics, for major or minor work, sufficient credits in plant sciences must be presented to satisfy the adviser. With the approval of the adviser, courses in agricultural biochemistry, agronomy, botany, horticulture, plant physiology, and plant pathology may be accepted as major work. Students majoring in plant genetics are required to continue study during at least one summer. Exemption is made if similar training has been obtained at some other institution.

Master's degree.—Offered under both Plan A and Plan B. A reading knowledge of French or German is advised altho not required for the Master's degree.

AGRONOMY

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

121w. Grain Crops. Structure, functions, culture, improvement, and uses of corn, wheat, oats, barley, rye, flax, and buckwheat. 4 credits. Mr. Wilson.

122s. Grain and Hay Grading. Development of grades, study of grading methods, and actual practice in grading grain and hay samples according to federal standards. Training in judging grain and hay on quality basis. 3 credits. Mr. Wilson.

123f. Forage Crops. Characteristics of meadow and pasture plants, methods of obtaining stands, stage of maturity of cutting or grazing in relation to continued productivity, yields, and quality of product. Hay and silage makings and storage. 4 credits. Mr. Arny.

124s. Problems in Farm Crops. Through the use of the program method, the student is given opportunity to deal with important phases of agronomy. Prerequisites: Course 131 and at least two courses from 121, 123, 132, 134. 3 credits. Mr. Wilson.

126f. Crop Judging. Identification of crops, weeds, and diseases in relation to judging and grading farm crops. Prerequisite: Course 122. 4 credits. Mr. Wilson.

133s. Pasture Crops and Management. Characteristics, economic value, and distribution of pasture plants. Methods of obtaining stands. Management of temporary and permanent pastures to maintain and improve production. Prerequisite: Course 123. 3 credits. Mr. Arny.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s.* Research in Farm Crops. Special problems in crop physiology, production and classification of crop plants. Prerequisites: Courses 121, 123. 3 to 9 credits. Mr. Wilson, Mr. Arny.

202f,w.* Farm Crops Seminar. Reviews and discussions of important agronomic literature. Prerequisite: 9 credits in farm crops. 1½ credits per quarter. Mr. Wilson, Mr. Arny.

203s. Crop Research Results. Studies of the results of researches with crop plants and application to agronomic problems. Prerequisites: Courses 121, 123. 3 credits. Mr. Arny.

204w. Crop Ecology. Studies of the fundamental ecological responses of crop plants to their environment. 3 credits. Mr. Wilson.

Plant Genetics

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

131f,w. Principles of Genetics. Fundamental principles of breeding, heredity, variation, biometry, and evolution. 4 credits. Mr. Immer.

132w. Farm Crops Plant Breeding. Applied genetics. Methods of breeding each of the important agricultural crops. Prerequisite: Course 131. 4 credits. Mr. Hayes.

COURSES PRIMARILY FOR GRADUATE STUDENTS

241f,w,s.* Research in Plant Genetics. Special problems in plant genetics, inheritance of plant characters, and cytological studies in relation to plant genetics. May be taken as major or minor work. Mr. Hayes, Mr. Immer, Mr. Burnham.

242f,s.* Plant Breeding Seminar. Plant genetics in relation to plant breeding, a discussion of research problems. 1 credit per quarter. Mr. Hayes, Mr. Immer, Mr. Krantz, Mr. Burnham, Mr. Currence, Mr. Wilcox.

243f. Methods in Plant Breeding. The application of biometrical methods to field plot technique, the results of inbreeding and outbreeding, and the results of selection and crossing as a means of improving crop plants. Practice in outlining the correct mode of attack for special plant breeding problems. 3 credits. Mr. Hayes.

244f,su. Laboratory Methods in Plant Breeding. Supplementing 243f. Practice in plant breeding technique, methods of controlling pollination, and handling of plant cultures. 3 credits. Mr. Immer.

245f. Advanced Genetics. The establishment of a genetic factor hypothesis, linkage, gene mutations, chromosomal aberrations, and statistical tests as applied to genetic experiments will be emphasized. 4 credits. Mr. Burnham.

246w.* Genetics Seminar. Important contributions to genetic theory and practice. 2 credits. Mr. Hayes, Mr. Immer, Mr. Krantz, Mr. Burnham, Mr. Currence, Mr. Wilcox, Mr. Winters.

247w. Cytogenetics. Lectures on recent advances in cytogenetics. Supplementary laboratory work in smear and paraffin technique used in the study of chromosome behavior. Prerequisite: Bot. 119. 3 credits. Mr. Burnham.

248w. Applied Statistics. The application of statistical methods to the analysis of biological data, particularly with small samples. Analysis of variance, X^2 test, correlation, and regression will be emphasized. Prerequisite: P.M.&P.H. 110. 3 credits. Mr. Immer.

ANATOMY

Professors Clarence M. Jackson, Edward A. Boyden, Hal Downey, Andrew T. Rasmussen, Richard E. Scammon; Assistant Professors Raymond F. Blount, Edith Boyd.

The Department of Anatomy offers excellent facilities to students who wish to take advanced work or to pursue investigations in anatomy.

Prerequisites.—The prerequisite work for all students who desire a major or minor in the Department of Anatomy includes general zoology, 9 quarter hours, and advanced zoology or elementary courses in anatomy (including histology, embryology, and neurology), 9 quarter hours. In addition, each student who desires a major in anatomy must have had the elementary courses in that branch of anatomy in which he desires to specialize—gross anatomy, histology, embryology, hematology, or neurology. Students majoring in clinical subjects who desire a minor in anatomy must have had as prerequisites the courses in anatomy usually required of medical students (including Courses 103, 107, and 111). A reading knowledge of either French or German is required of students who desire a major in anatomy for the Master's degree, and a reading knowledge of both French and German is required of those who are candidates for the Doctor's degree.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

103s,su. Human Histology. A microscopic study of the various tissues and organs. Prerequisite: Course 100-101, or equivalent. 9 credits. Mr. Downey.

107s. Human Embryology. The development of the human body. Prerequisite: Course 100-101, or equivalent. 6 credits. Mr. Boyden.

111s,su. Human Neurology. A study of the gross and microscopic structure of the central nervous system and sense organs of man. Prerequisites: Courses 103 and 107, or Zool. 148-149-150. 6 credits. Mr. Rasmussen.

115f,w,s. History of Anatomy. Prerequisite: Course 100-101. 2 credits each quarter. Mr. Miller.

120w,s. Experimental Embryology. Prerequisite: Course 107. Hours and credits arranged. Mr. Blount.

129f-130w. Topographic Anatomy. Based upon a study of cross sections of the human body. Lectures and laboratory work. Prerequisite: Course 100-101. 2 credits (or more) each quarter. Dr. Jackson.

134f,w. Anatomy of the Newborn. A detailed laboratory study of the anatomy of the newborn. Prerequisite: Course 100-101, or equivalent. 3 credits each quarter. Mr. Boyden.

149w. Experimental Neurology. A study of the morphology of the central nervous system by experimental methods. Prerequisite: Course 111. 3 credits (or more). Mr. Rasmussen.

150f,w. Special Topics in Neurology. Largely conferences upon assigned reading. Prerequisite: Course 111. Hours and credits arranged. Mr. Rasmussen.

153f-154w-155s-156su. Advanced Anatomy. Individual topics for advanced work in gross anatomy, hematology, histology, embryology, or neurology will be assigned to students who have completed the elementary courses in the corresponding subjects. Special courses are arranged for clinical graduate students. Dr. Jackson, Mr. Boyden, Mr. Downey, Mr. Rasmussen, Mr. Blount.

157s. Developmental Anatomy of the Head. Prerequisite: Course 107. 3 credits. Mr. Boyden. (Offered in odd numbered years only.)

158s. Special Histology and Neurology of the Head Region. Prerequisites: Courses 103 and 111. 3 credits. Mr. Rasmussen. (Offered in even numbered years only.)

160w. Physical Growth. Lectures on the prenatal and postnatal growth of the external dimensions and organs of the human body. Same as Course 260 in Child Welfare. 2 credits. Dr. Boyd.

161f-162w-163s. Statistical Work. Instruction given in methods of analyzing quantitatively the data collected by the student. Same as Course 261f-262w-263s in Child Welfare. Hours and credits arranged. Dr. Boyd.

165f-166w. Hematology. Normal and pathologic morphology of the blood and blood-forming organs, with special emphasis on the study of the blood from the standpoint of diagnosis and prognosis. 4 credits each quarter. Mr. Downey.

167s. Seminar in Hematology. Discussion of literature and research. Prerequisite: Course 165-166. 11 hours; 1 credit. Mr. Downey.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s-204su. Research in Anatomy. Qualified students may undertake the investigation of problems in anatomy, including histology, embryology, and neurology. Special facilities are offered to graduate students in the clinical departments for work upon problems in applied anatomy. Dr. Jackson, Mr. Boyden, Mr. Downey, Mr. Rasmussen, Mr. Scammon, Mr. Blount.

205f-206w-207s. Anatomical Seminar. Reviews of the current literature and discussion of research work being carried on in the department. Reading knowledge of French and German desirable. 1 credit. Dr. Jackson.

ANIMAL AND POULTRY HUSBANDRY

Professors Walter H. Peters, Evan F. Ferrin, Hubert J. Sloan, Laurence M. Winters; Assistant Professors Alfred L. Harvey, Donald W. Johnson.

Prerequisites.—For major work 18 quarter credits in animal husbandry or closely allied subjects, for minor work 12 quarter credits.

Major and minor.—Upon approval of the graduate faculty, candidates doing their major work for the Master's degree in animal husbandry may take their minor in animal genetics or in meats. Candidates doing their major work for the Doctor's degree may major in general animal husbandry or in animal genetics but must take a minor in some other department. With the approval of the adviser, courses in agricultural biochemistry, genetics, botany, economics, dairy husbandry, veterinary medicine, and zoology may be accepted as major work.

Language requirement.—Students majoring in animal husbandry may be exempted from the language requirement for the Master's degree.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f. Advanced Stock Judging. Comparative judging and valuation of market and breed types of beef cattle, hogs, sheep, and draft horses, supplemented by visits to near-by stock farms. 3 credits. Mr. Harvey.

103f. Poultry Feeding and Management. Fundamentals of poultry nutrition and their application to feeding various classes of poultry. 3 credits. Mr. Sloan.

107s.* Meat Problems. The wholesale cuts and grades of meat, the packing industry and utilization of by-products, special problems, and visits to meat packing establishments. 3 credits. Mr. Anderson.

108.* Seminar. Special problems and research assignments on investigations pertaining to the livestock industry. 3 credits. Mr. Peters.

112w. Animal Breeding. The application of the principles of the physiology of reproduction and genetics to the breeding of livestock; methods of master-breeders, and consideration of the practical breeders' problems. 3 credits. Mr. Winters.

113s.* Livestock Management. Fitting the different types of livestock production into farm management systems. Management problems involved in beef cattle, sheep, swine, and horse production. 3 credits. Mr. Peters.

115f. The Marketing of Livestock. A study of the methods used in the principal livestock markets; visits to the South St. Paul market; selling purebred livestock. 3 credits. Mr. Peters.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f.* Embryology of Farm Animals. Textbooks, lectures, and laboratory dealing with prenatal development in farm animals. 3 credits. Mr. Winters.

202w.* Animal Genetics. Assigned readings and lectures dealing with the genetics of farm and laboratory animals. 3 credits. Mr. Winters.

203w. Animal Genetics. A survey of the genetics of domestic birds. 3 credits. Mr. Winters.

204s.* Physiology of Reproduction. Assigned readings and discussion of the more recent literature concerning the physiology of reproduction in mammals and birds. 3 credits. Mr. Winters.

205s.* Seminar in Animal Genetics. Review of current literature and discussion of topics having special emphasis on constructive livestock breeding. 2 credits. Mr. Winters.

206w.* Advanced Livestock Feeding. A study of experimental results bearing on feeding problems and review of scientific literature applicable to them. 3 credits. Mr. Ferrin.

207s.* Advanced Livestock Feeding. Continuation of 205. 3 credits. Mr. Ferrin.

208f*-209w*-210s.* Seminar. Special assignments and review of research problems pertaining to the livestock industry. 1 credit per quarter. Mr. Peters.

211f.* Experimental Methods. Theory, plan, and conduct of experimental work in animal husbandry. Factors affecting results, sources of error, interpretation of data. 3 credits. Mr. Ferrin.

212f,w,s.* Research in Meats. Special problems assigned to fit the needs of each student. 3 to 9 credits. Mr. Anderson.

213f,w,s.* Research in Animal Husbandry. Special problems assigned to fit the needs of each student. 3 to 9 credits. Mr. Peters, Mr. Ferrin, Mr. Winters, Mr. Anderson, Mr. Harvey, Mr. Johnson.

214f,w,s.* Research in Poultry Husbandry. Special problems assigned to fit the needs of each student. 3 to 9 credits. Mr. Sloan.

ANTHROPOLOGY

Professor Wilson D. Wallis; Assistant Professor Walter B. Cline.

Master's degree.—Offered only under Plan A.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

105f. Elements of Language. A survey of speech sounds followed by practice in phonetic recording. Analysis of phonetic patterns in language. Practical work in dictation of Chippewa, Dakota, Finnish, and other languages. 3 credits. Mr. Mandelbaum.

106w. European Prehistory. Types of prehistoric men and cultures. 3 credits. Mr. Cline.

110f. Physical Anthropology. Physical types of man, prehistoric and contemporary. 3 credits. Mr. Wallis.

116s. Indians of the Southwest. Pueblo and nomadic tribes. 3 credits. Mr. Mandelbaum.

117f.* Culture and Culture Areas. Characteristics of culture areas. Development and diffusion of culture traits. Parallelism and independent origins. Interrelations of culture traits. 3 credits. Mr. Wallis.

118f. Races and Cultures of Middle and South America. 3 credits. Mr. Cline.

119s. The Contact of Cultures. The impact of western civilization on native societies. The tenacity of culture patterns and the disintegration of aboriginal culture. Case examples from North America, Africa, and Asia. 3 credits. Mr. Mandelbaum.

120. Indians of the Plains. The aboriginal inhabitants of the prairies and plains. The tribes which lived between the Upper Mississippi and the Rockies, from the forests of western Canada to Texas. 3 credits. Mr. Mandelbaum. (Not offered in 1940-41.)

122f-123w-124s. Problems in Anthropology. Advanced work with individual guidance. For students with special problems. Credits arranged. Mr. Wallis, Mr. Cline, Mr. Mandelbaum.

131w-132s.* Races and Cultures of Arabia, Egypt, and North Africa. A chronological survey, with special emphasis upon interrelations and relations with extraneous cultures. 6 credits. Mr. Cline.

133f-134w. Races and Cultures of the Far East. This course will focus on the growth of native civilization in China and Japan. Attention will be given also to the cultures of Mongolia, Tibet, Korea, and southeastern Asia, especially in their relation to the Chinese. 6 credits. Mr. Cline.

135f-136w-137s. Cultural History of Egypt from the Earliest Times to the Sixteenth Century A.D. 9 credits. Mr. Cline, Mr. Jones.

161s.* Primitive Religion. Concepts of the sacred and the supernatural. Religious and ceremonial practices. 3 credits. Mr. Wallis.

162f. Races and Cultures of Negro Africa. Physical types and cultures of Negro Africa. Arts, industries, economic, social, and political life. 3 credits. Mr. Cline.

163w. Ethnology of India. A survey of primitive cultures in India, and relations with other areas. 3 credits. Mr. Mandelbaum.

165w.* Psychological Phases of Culture. The role of the individual in primitive culture. Psychological factors in diffusion of culture traits. 3 credits. Mr. Mandelbaum.

166w.* History of Anthropological Theory and Method. An examination and critique of theory and method in historical perspective. 3 credits. Mr. Mandelbaum.

167s. Primitive Mythology. The role of myth in culture. Cosmogonic and animal myths. Plots, motifs, and their diffusion. 3 credits. Mr. Wallis.

170s. Primitive Art. An ethnographic survey of forms of primitive art in the New World and the Old. Motifs and techniques. 3 credits. Mr. Mandelbaum.

COURSES PRIMARILY FOR GRADUATE STUDENTS

204f-205w-206s.* Seminar in Anthropology. Individually directed research. 3 credits per quarter. Mr. Wallis, Mr. Cline, Mr. Mandelbaum.

ARCHITECTURE

Professors Roy C. Jones, Leon E. Arnal, S. Chatwood Burton, Robert T. Jones.

Prerequisites.—The graduate major in architecture in every case is architectural design. The prerequisite for this field is a course in undergraduate design equal in extent and quality to that of the University of Minnesota.

Master's degree.—Offered only under Plan A.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

104f. Housing. Social, economic, political, and technical phases of modern group housing. Intended for mature students in the College of Science, Literature, and the Arts and the Institute of Technology. 3 credits. Mr. R. T. Jones, Mr. Anderson, Mr. Chapin, Mr. Filipetti, Mr. Vaile, Mr. Ludwig.

106s. Housing. Social, economic, political, and technical phases of modern group housing, with special reference to the architect's functions therein. 2 credits. Mr. R. T. Jones.

107f-108w-109s. Furniture and Decoration. Principles, methods, and materials involved in the furnishing and decorating of interiors. 6 credits. Mr. Huchthausen.

160f,w,s.‡(DP-IV). Drawing and Painting, Grade IV. Studies in graphic expression dealing especially with advanced figure composition and mural decoration. Prerequisite: DP-III or equivalent. 6 credits (normally 2 credits per quarter). Mr. Burton.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s. Special Researches in Architectural History. Prerequisites: Courses 54-55-56 and 57-58-59 or equivalent. Credits arranged. Mr. Leslie.

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

250f,w,s.(AD-V). Architectural Design, Grade V. Problems involving individual research in either composition or construction. Prerequisite: AD-IV or equivalent. Credits arranged. Mr. Arnal, Mr. R. C. Jones, Mr. R. T. Jones.

261f,w,s.(DP-V). Drawing and Painting, Grade V. Continuation of Course 160 (DP-IV). Prerequisite: Course 160(DP-IV) or equivalent. 6 credits. Mr. Burton.

262f,w,s.(M-III). Modeling, Grade III. Continuation of M-I. Prerequisite: M-II or equivalent. 6 credits. Mr. Burton.

ASTRONOMY

Professor Willem J. Luyten.

The Astronomical Observatory possesses a ten and one-half inch refracting telescope; a five-inch star camera; a filar micrometer; a photographic measuring machine by the Société Génévoise.

Prerequisites.—For major work Course 51-52-53 and Mathematics 50; for minor work, Mathematics 50 and 3 credits in astronomy.

Language requirement.—Exemption from the language requirement for the Master's degree may be made in individual cases.

Master's degree.—Offered under Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f. Celestial Mechanics. A course dealing with Newton's Laws of Motion, and their application to gravitational astronomy. Attention is directed toward the theory of planetary motion and perturbations. Prerequisite: Math. 51. 3 credits. Mr. Luyten.

121f-122w-123s.* Astrophysics and Stellar Statistics. An introductory course, with emphasis upon measurement of photographic plates, and discussions of the motion of the stars. 3 credits. Mr. Luyten.

140f. Method of Least Squares. Applied especially to engineering, physics, and astronomy. Prerequisite: Math. 51. 3 credits. Mr. Luyten.

COURSES PRIMARILY FOR GRADUATE STUDENTS

211f-212w-213s.* Seminar. For students who are prepared for advanced work along particular lines. 1, 2, or 3 credits. Mr. Luyten.

BACTERIOLOGY AND IMMUNOLOGY

A. Courses Offered at the Medical School

Professors Winford P. Larson, Head, Robert G. Green, H. Orin Halvorson, Arthur T. Henrici.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102s. Medical Bacteriology. See Bulletin of the Medical School. Prerequisite: Bacteriology 101. 4 credits. Dr. Larson.

103w. Soil Microbiology. Studies of the microscopic inhabitants of the soil. Prerequisites: Bacteriology 53 and 15 credits in chemistry. 5 credits. Mr. Skinner.

104s. Sanitary Bacteriology. Standard and other methods for the bacteriological analysis of water, sewage, food, and dairy products. Preparation of standard culture media, technique, and evaluation of results. Primarily for majors in bacteriology. Limited to 15 students. Prerequisites: Bacteriology 53 and 15 credits in chemistry. 4 credits. Mr. Skinner.

114s. Molds, Yeasts, and Actinomycetes. Introduction to mycology: study of lower fungi important in medicine and industry. Prerequisite: Bacteriology 53 or 101. 4 credits. Dr. Henrici.

116w. Immunity. Laws of hemolysis. Quantitative relationship between antigen and antibody. Wassermann reaction. Opsonins. Vaccines. Toxin. Antitoxin. Precipitin reactions. Blood grouping. Atopy. Anaphylaxis. Prerequisite: Bacteriology 102. 3 credits. Dr. Larson.

120s. Diseases of Animals Transmissible to Man. Detailed studies of plague, tularemia, undulant fever, typhus fever, spotted fever, and other human diseases obtained from animal reservoirs. Prerequisite: Bacteriology 102. 3 credits. Dr. Green.

121f-122w.† Physiology of Bacteria. Effect of environment on growth. Enzymes. Food requirements. Carbohydrate, protein, and fat metabolism. Products of growth. Dormancy. Death. Prerequisites: Bacteriology 53 and 8 credits in organic chemistry or biochemistry. 6 credits. Mr. Halvorson.

123s. Applied Bacteriology. Industrial fermentations. Bacteriology of water and sewage. Interpretations of bacteriological data. Prerequisite: Bacteriology 121-122. 3 credits. Mr. Halvorson.

124f. Filterable Viruses. Characters of filterable viruses. Nature of virus infections. Transmission of viruses by insects. Important virus diseases of man and animals. Prerequisites: Bacteriology 102, Anatomy 103 or Zoology 149, and Pathology 101. 4 credits. Dr. Green.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s. Research in Bacteriology. Graduate students with the necessary preliminary training may elect research, either as majors or minors, in bacteriology. Hours and credits arranged. Dr. Larson, Dr. Green, Mr. Halvorson, Dr. Henrici, Dr. Skinner.

203f,w,s. Seminar in Bacteriology. 1 credit. Staff.

204f-205w. Advanced Bacteriology. Special techniques in bacteriology: microscopy and photomicrography; methods for studying variation; quantitative methods. Cultivation and identification of anaerobes, etc. Methods of studying bacterial reactions catalyzed by enzymes. Prerequisite: Bacteriology 121-122, which may be taken concurrently. 6 credits. Mr. Halvorson, Dr. Henrici.

B. Courses Offered in the Mayo Foundation

Professors Thomas B. Magath, Edward C. Rosenow, Arthur H. Sanford; Assistant Professor Luther Thompson; Instructors Dorothy H. Heilman, Fordyce R. Heilman.

Prerequisites.—Opportunities for the graduate study of bacteriology and immunology are in connection with routine clinical examinations and in special research. They are open to graduates in medicine or holders of Master's degrees who have had work in both bacteriology and pathology equivalent to that given in the medical course in the University.

COURSES PRIMARILY FOR GRADUATE STUDENTS

M251f,w,s,su. Clinical Bacteriology and Parasitology. Making and examination of cultures. Preparation and administration of autogenous vaccines. Wassermann tests; special laboratory methods in clinical bacteriology or para-

sitology. Research in bacteriology and parasitology. Dr. Magath, Dr. Sanford, Dr. Thompson, Dr. F. R. Heilman.

M252f,w,s,su. Experimental Bacteriology. Research in the bacteriology of normal and diseased tissues, the blood, secretions, and exudates. Experimental inoculation of animals and immunological studies. So far as possible work limited to study of pathogenesis and to development of specific methods of prevention and treatment of various diseases presumably of infective origin. Dr. Rosenow.

In addition to the above, students majoring in bacteriology and immunology may take work in experimental physiology and biochemistry. For details, see these departments.

BIOPHYSICS

A. Courses Offered at the Medical School and in the Departments of Physics, Physiology, Radiology, and Zoology

Professor K. Wilhelm Stenstrom; Associate Professors Joseph Valasek, John H. Williams.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

170f,w,s,su. Problems in Biophysics. Investigations of the effects of Roentgen, radium, visible, and ultraviolet radiation may be undertaken. Instruments are available for spectrophotometric work in the visible and ultraviolet regions for temperature measurements by means of thermocouples, and to a certain extent for electrical measurements. Hours and credits arranged. Mr. Stenstrom.

110w‡-112s.‡ Modern Experimental Physics. Radioactivity. Mr. Williams.

134f.‡ Experimental Optics. Mr. Valasek.

152s. X Rays. Mr. Valasek.

Other courses listed under Physics may be considered for credit in biophysics.

104s. Roentgen and Radium Therapy. (See Radiology 104.)

106w. Physical Therapy. (See Radiology 106.)

155w. Physiology in Relation to Physics. (See Zoology 155w.) Application of the principles of physics to the investigation and interpretation of physiological phenomena. Lecture and demonstration. 3 credits. Mr. Schmitt.

The physiology courses below may be taken for credit in biophysics:

103f,su. Physiology of Circulation, Respiration, Digestion, Metabolism, Nutrition, and Excretion. (See Physiology 103f,su.) Several lectures on the medical aspects of genetics are included. Prerequisites: organic chemistry and zoology. 132 hours; 9 credits. Dr. Visscher, Mr. Scott, Mr. Hemingway, and others.

104w,su. Physiology of Endocrines, the Nervous System, and Special Senses. (See Physiology 104w,su.) Prerequisite: Physiology 103, or organic chemistry and neurology. 88 hours; 6 credits. Dr. Visscher, Mr. Scott, Dr. King, and others.

105f. Roentgen Rays, Light, and Radium. (See Physiology 105.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

204f,w,s,su. Research in Biophysics. Students who want to carry out more extensive and independent investigations should register for this course instead of for Course 170. Mr. Stenstrom.

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

B. Courses Offered in the Mayo Foundation

Professor Charles Sheard; Associate Professor Edward J. Baldes; Assistant Professor Marvin M. D. Williams.

Graduate work of a research character is offered in biophysics. These researches are concerned chiefly with blood flow, blood pressure, osmotic pressure, bioelectric phenomena, electroencephalography, spectroscopy and spectrophotometry, energy exchanges between the body and its environment, biological effects of radiation.

Prerequisites.—Opportunities for research for theses for the degree of doctor of philosophy are offered to a limited number of qualified fellows majoring in biophysics. In general, the Master's degree or its equivalent is a prerequisite for admission to these advanced research courses. In addition, facilities for experimental work are available to fellows majoring in other departments of surgical, clinical, and experimental work.

Minor.—There are numerous problems suitable for a minor for fellows majoring in other departments of surgical, clinical, and experimental work.

M254f,w,s,su. Special Researches in Biophysics. Mr. Sheard, Mr. Baldes, Mr. Williams.

In addition to the above, students in biophysics may do research work in physiology in the foundation or at the Medical School, and in biology in the University at Minneapolis. For details, see these departments.

BIOSTATISTICS

A. Courses Offered at the Medical School

Professor Richard E. Scammon; Associate Professor Alan E. Treloar.

Courses in mathematics, economic statistics, and those sciences deemed necessary to a broad understanding of biological measurement, may be required in individual cases at the discretion of the adviser as part of the major program.

Master's degree.—Offered in general under Plan A. In special cases Plan B may be accepted.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

P.M.&P.H.110f,s. Biometric Principles. An introduction to statistical analysis with emphasis on the basic principles of statistical reasoning. The description of univariate distributions, normal correlations, simple tests of significance, and goodness of fit. Course 111 to be taken concurrently. 3 credits. Mr. Treloar.

P.M.&P.H.111f,s.‡ Biostatistics Laboratory. Practical training in machine calculation and statistical techniques discussed in Course 110, which is to be taken concurrently. 2 credits. Miss Martin.

P.M.&P.H.120w. Correlation Analysis. Total, partial, and multiple correlations and regression; correlation ratio; contingency; biserial methods; tetrachoric correlation; rank-order correlation; the symmetrical table and intra-class correlation. Course 121 to be taken concurrently. Prerequisite: Course 110. 3 credits. Miss Martin.

P.M.&P.H.121w.‡ Correlation Laboratory. Practical training in the above techniques of correlation analysis. Course 120 to be taken concurrently. 2 credits. Miss Martin.

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

P.M.&P.H.130s. Statistical Inference. A discussion of the sampling distributions of the more familiar statistics, and analysis of the problems of interpretation of differences, with special reference to small samples. Course 131 may be taken concurrently. Prerequisite: Course 110. 3 credits. Mr. Treloar.

P.M.&P.H.131s.‡ Sampling Laboratory. Study of the distributions of statistics derived from small samples by practical test. To be taken concurrently with Course 130. 2 credits. Miss Martin.

P.M.&P.H.140.*‡ Topics in Biostatistics. Individual studies in special topics for advanced students. Credits arranged. Mr. Treloar.

P.M.&P.H.150.*‡ Life Tables. Mortality rates and the construction of the life table. Laboratory course with discussions, offered when sufficient demand exists. Prerequisite: permission of instructor. 3 credits. Mr. Treloar.

COURSES PRIMARILY FOR GRADUATE STUDENTS

P.M.&P.H.200f,w,s.* Research Problems in Biostatistics. Credits arranged. Mr. Treloar.

P.M.&P.H.210f,w,s.* Seminar in Biostatistics. 1 credit per quarter. Mr. Scammon, Mr. Treloar.

B. Courses Offered in the Mayo Foundation

Associate Professor Joseph Berkson.

Opportunities for graduate work in biometry and medical statistics in the Mayo Foundation are in connection with the Division of Biometry and Medical Statistics in the Mayo Clinic. These may include studies in clinical as well as laboratory fields.

M253f,w,s,su. Research Problems in Biometry. Dr. Berkson.

BOTANY

Professors C. Otto Rosendahl, George O. Burr, Frederic K. Butters, William S. Cooper; Associate Professor Ernst C. Abbe; Assistant Professors Elmer S. Miller, Laurence S. Moyer.

NOTE.—For courses in plant pathology and mycology, see Division of Plant Pathology.

Prerequisites.—For major work, Courses 1, 2, 5, 7, 21, 22, or their equivalent and at least 9 additional credits approved by the department; with permission of the major adviser credits in cognate subjects may be substituted. For minor work, 10 credits.

Language requirement.—Candidates for the Master's degree must have a reading knowledge of German or French; for the Doctor's degree both are required.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

108w. Morphology and Taxonomy of the Pteridophytes. An intensive study of lycopods, ferns, and their allies, their structure and history, with special attention to the classification of living forms. Lectures, reference reading, and laboratory work. Prerequisites: Courses 7 and 62. 5 credits. Mr. Butters. (Not offered in 1940-41.)

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

110w. Morphology and Taxonomy of the Gymnosperms. An intensive study of cycads, conifers, and their allies, their structure and history, with special attention to the classification of living forms. Lectures, reference reading, and laboratory work. Prerequisites: Courses 7 and 63. 5 credits. Mr. Butters.

113f-114w-115s.§ Advanced Taxonomy of Flowering Plants. An advanced course in which special attention is given to the taxonomy of difficult natural groups, involving systematic principles and practice, rules of nomenclature, systems of classification, etc. Prerequisite: 15 credits, including Course 7. 9 credits. Mr. Rosendahl.

118f.‡ Cytology I—Cytoplasmic Phenomena. A detailed study of the structure of protoplasm, the cell wall, and cell constituents in the light of their chemical and physical properties. Prerequisites: 15 credits in biology including Course 5 and an elementary course in chemistry. 3 credits. Mr. Moyer.

119w.‡ Cytology II—Nuclear Phenomena. The metabolic nucleus, mitosis, meiosis and the bearing of chromosome behavior on genetics, taxonomy, sex, and the life cycles of plants. Prerequisites: 15 credits in biology including Course 5 and an elementary course in chemistry. 3 credits. Mr. Abbe.

120s.‡‡ Research Methods in Histology and Cytology. Principles and practice of preparing materials for cytological and histological investigation; methods of investigating such preparations and presenting the results. Prerequisites: Courses 118 and 119. 3 to 5 credits. Mr. Abbe.

121f.‡ Morphogenesis. Experimental and developmental morphology, with emphasis on genetical and other factors associated with the development of form. Lectures, laboratory, and reference reading. Prerequisites: Courses 119 and 127 or their equivalents. 3 credits. Mr. Abbe.

127f. Anatomy of Vascular Plants. The microscopic structure of vascular plants with particular attention to the development and evolution of the vascular system in the root, stem, and leaf. Prerequisite: 18 credits. 5 credits. Mr. Butters.

131f. Field Ecology. A survey of the local plant communities and their development, and a study of the general principles of plant association and succession. Prerequisite: 10 credits including Course 21. 5 credits. Mr. Cooper, Mr. Lawrence.

132w.‡ Ecological Anatomy. The individual plant and its parts as related to environment; special plant forms and structures, their causes and significance. Prerequisite: 10 credits including Course 21. 5 credits. Mr. Cooper.

133s. Plant Geography of North America. Preliminary discussion of the principles of plant distribution followed by a detailed study of the vegetation regions of North America. Prerequisite: 10 credits including Course 21. 5 credits. Mr. Cooper.

134s.‡ Research Methods in Ecology. Theory and practice of instrumental study of the habitat and of precise investigation of community and succession. Prerequisites: 18 credits including Courses 21 and either 131 or 133. 5 credits. Mr. Lawrence.

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

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

§ Any quarter may be taken separately, except 115s, which requires either 113f or 114w as a prerequisite.

136s. Physiology of the Cell. Permeability, osmotic properties, viscosity, surface tension, and electrical phenomena of cells in the elucidation of protoplasm and the cell membrane. Lectures and reference reading. Prerequisites: 20 credits in physics, chemistry, or biochemistry; or permission of instructor. 3 credits. Mr. Moyer.

137w.‡ Experimental Ecology. Studies on the effects of normal fluctuating environmental conditions on plant growth and analysis of factors influencing geographic distribution of native plants. Lectures, reference reading, and laboratory experimentation with living plants. Prerequisites: 10 credits including Courses 21 and 22. 5 credits. Mr. Lawrence. (Not offered in 1940-41.)

140w. General Plant Physiology. Advanced survey of the whole field of plant physiology. Prerequisites: Course 22 or its equivalent and elementary inorganic chemistry. 3 credits. Mr. Miller.

141f. Physicochemical Principles and Measurements in Plant Physiology. Properties of solution, buffers, membranes, osmosis, transpiration, transport, electrometric measurements. Prerequisite: 20 credits in chemistry or biochemistry. 3 credits. Mr. Moyer.

142w. Photosynthesis and the Effects of Radiation. A detailed discussion of conditions, theories, and energy relations in the assimilation of carbon. Other effects of radiant energy on organisms included. Prerequisite: 20 credits in chemistry or biochemistry. 3 credits. Mr. Burr.

143s. Plant Metabolism. Nitrogen assimilation and protein synthesis, metabolism of carbohydrates, fats and proteins, biological oxidation, respiration, hormones, enzymes, stimulants, growth curves. Prerequisite: 20 credits in chemistry or biochemistry. 3 credits. Mr. Miller.

146f.‡‡ Advanced Physiology Laboratory. May be taken with or after 141. 2 credits. Mr. Moyer.

147w.‡‡ Advanced Physiology Laboratory. May be taken with or after 142. 2 credits. Mr. Moyer.

148s.‡‡ Advanced Physiology Laboratory. May be taken with or after 143. 2 credits. Mr. Miller.

154f.‡ Applied Spectroscopy in Biology. Critical examination of the methods used in spectroscopic identification and quantitative spectroscopic analyses of soils, pigments, vitamins, hormones, and sterols. Lectures and laboratory demonstrations. Prerequisite: 20 credits in chemistry or biochemistry. 3 to 5 credits. Mr. Miller.

155w.‡ Advanced Spectroscopy in Biology. Construction and calibration of a photoelectric spectrophotometer for the ultraviolet and visible spectral regions. The application of spectrophotometry for identification and analysis of plant and animal pigments, vitamins, lipids, hormones, and sterols. Prerequisite: Course 154. 3 to 5 credits. Mr. Miller.

197f-198w-199s.*‡ Problems. Advanced work in some special line. Prerequisite: consent of the instructor. 3 to 5 credits. Mr. Burr, Mr. Butters, Mr. Cooper, Mr. Rosendahl, Mr. Abbe, Mr. Lawrence, Mr. Miller, Mr. Moyer.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s.* Research Problems in the Morphology of Vascular Plants. Mr. Butters.

‡ A fee of $1 is charged for this course.
‡‡ A fee of $3 is charged for this course.

205f-206w-207s.* Research Problems in the Taxonomy of Angiosperms. Mr. Rosendahl.
209f-210w-211s.* Research Problems on the Cell. Mr. Moyer.
213f-214w-215s.* Research Problems in Embryology. Mr. Butters.
221f-222w-223s.* Research Problems in Ecology. Mr. Cooper, Mr. Lawrence.
225f-226w-227s.* Research Problems in Plant Physiology. Mr. Burr, Mr. Miller.
229f-230w-231s.* Research Problems in Cytology. Mr. Abbe.
233f-234w-235s.* Seminar. Students may register for one-hour seminar credit per quarter in any of the research subjects.

CHEMISTRY

Professor and Dean Samuel C. Lind; Professor and Administrative Assistant Lloyd H. Reyerson.

The work in the School of Chemistry is organized in five divisions or branches, namely, Analytical, Inorganic, Organic, and Physical Chemistry, and Chemical Engineering.

In addition to the completion of the prescribed work, the candidate for a higher degree is expected to show a maturity acquired by intensive personal study of the literature and of the methods of chemistry.

Prerequisites.—(a) A branch of chemistry as a *major* subject: All candidates who choose chemistry as a major subject for an advanced degree must offer the substantial equivalent of the courses in inorganic chemistry, analytical chemistry, organic chemistry, and physical chemistry required of undergraduate students in the first three years of the chemistry curriculum. All candidates must present at least one year of college physics and one year of college mathematics. (b) Chemistry or a branch of chemistry as a *minor* subject: A student may not select two branches of chemistry as major and minor subjects except with the approval of his adviser and the Graduate Group Committee.

Students whose major work lies in another field and who desire to minor in chemistry must present as preparation prerequisite at least 12 credits of general inorganic chemistry and qualitative analysis, and 5 credits of quantitative analysis and 2 quarters of organic chemistry or its equivalent.

Minors.—The choice of the particular courses to be presented in fulfillment of a minor in graduate work will be made after consultation with the student's adviser.

Language requirement.—Candidates for the Master's degree must have a reading knowledge of German or French; German is preferred. For the Doctor's degree, both are required.

Examinations.—The written and oral preliminary examinations in chemistry for the Doctor's degree will be given at only four periods during each year. Normally, these will be during the first two weeks of each regular quarter and of the first term of the Summer Session. The exact schedule will be announced at the beginning of each quarter.

Master's degree.—Offered under both Plan A and Plan B.

CHEMISTRY, ANALYTICAL

Professor Izaak M. Kolthoff; Assistant Professor Ernest B. Sandell.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101w-102s. Quantitative Analysis. Discussion of the general principles, methods, and procedure of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention is given to proper laboratory practice. Prerequisite: Inorg. Chem. 13. 5 credits per quarter. Mr. Geiger.

103f. Quantitative Inorganic Microanalysis. Representative methods of micro- and semi-microgravimetric, volumetric, and colorimetric analysis. Prerequisites: Courses 1, 2. 3 credits. 1 lecture, 6 hours of laboratory. Arranged. Mr. Sandell.

104s. Qualitative Microchemistry. The properties and identification of crystals under the microscope, qualitative and quantitative microchemistry, inorganic, organic, and applied fields. Prerequisites: Courses 1, 2. 3 credits. Mr. Sandell.

105w. Polarizing Microscope. Its use and application to chemistry. Identification of substances. Prerequisite: Phys. Chem. 101. 3 credits. Mr. Sandell.

106f-107w-108s. General Technical Analysis. Analysis of commercially important materials such as iron, steel, paper, and glass, and analysis of food materials. Use of microscope in technical problems. Quantitative analysis of heterogenous mixtures, particle size determinations. Prerequisites: Courses 1, 2. 2 or 3 credits. 1 lecture and laboratory arranged. Mr. Sandell.

109f,w,s. Rock Analysis. Laboratory course covering the technique of rock analysis. Eight laboratory hours per week. Prerequisites: Courses 1, 2. 3 credits. Mr. Ellestad.

123f,su. Advanced Analytical Chemistry. Analysis of complex materials by modern methods. Prerequisites: Courses 1, 2, or by permission. 3 credits. Mr. Meehan.

127s. Optical Methods in Analytical Chemistry. Prerequisite: Phys. Chem. 103. 2 to 3 credits. 2 lectures, and laboratory arranged. Mr. Meehan.

131f. Applications of Indicators in Neutralization Reactions and *p*H Determinations. Prerequisites: Courses 1, 2, and Phys. Chem. 103. 3 credits. Mr. Kolthoff.

132w. Electrometric Measurements and Titrations. Applications of potentiometric and conductometric methods in analytical work. Prerequisites: Courses 1, 2, and Phys. Chem. 103. 3 credits. Mr. Kolthoff.

133s. Voltammetry and Amperometric Titrations. A discussion of the use of the dropping mercury electrode (polarograph) and the platinum microelectrode in pure and applied chemistry. Prerequisite: Phys. Chem. 103. 2 to 4 credits. 2 lectures, and laboratory arranged. Mr. Kolthoff.

134f-135w-136s.* Seminar: Modern Problems in Analytical Chemistry. Prerequisites: Courses 1, 2, and Phys. Chem. 103. 1 credit per quarter. Mr. Kolthoff.

137s. Advanced Volumetric Analysis. Prerequisite: Course 131. 3 credits. Mr. Kolthoff.

140w. Water Analysis. Analysis of potable water with interpretation of results. Prerequisites: Courses 1, 2. 2 credits. Mr. Sandell.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s.* Selected Topics in Analytical Chemistry. Credits arranged. Lecture and laboratory. Mr. Kolthoff.

301f-302w-303s.* Research in Quantitative Analysis. Credits arranged. Mr. Kolthoff, Mr. Geiger, Mr. Sandell.

CHEMISTRY, INORGANIC

Professors M. Cannon Sneed, Lloyd H. Reyerson; Associate Professors Lillian Cohen, Gladstone B. Heisig; Assistant Professors Hervey H. Barber, Harold P. Klug, Norville C. Pervier; Instructor T. Ivan Taylor.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101s.* History of Chemistry. The theories of chemistry from the period of the ancients, with particular emphasis on modern theories and laws. Prerequisite: Org. Chem. 52 or permission of instructor. 2 credits. Miss Cohen.

102s. Semi-micro Qualitative Analysis. A course designed to acquaint the student with the universally applicable method and underlying principles in the identification of the more common cations by use of drop reactions on spot plate and filter paper, and separation by use of the centrifuge. Prerequisites: Anal. Chem. 1, 2. 3 credits. Mr. Barber.

103f-104w-105s. Advanced Inorganic Chemistry. A discussion of selected topics in theoretical inorganic chemistry. Prerequisites: Anal. Chem. 1, 2, Org. Chem. 52. 3 credits per quarter. Mr. Klug, Mr. Maynard, Mr. Taylor.
Fall—The Chemistry of the Solid State.
Winter—Atomic Structure and the Chemical Bond.
Spring—Co-ordination Compounds.

109w-110s.* Synthetic Inorganic Chemistry. Methods of preparation and purification of inorganic compounds of special interest. Current literature. Prerequisite: Course 13. 3 to 5 credits per quarter. Mr. Heisig.

115su. Commercial Products and Their Analysis. Study of current commercial products, their composition and methods of analysis. Prerequisites: Anal. Chem. 1, 2. Mr. Barber.

117s. Glassblowing. Exercises in the more important operations in building chemical apparatus. No graduate credit. Mr. Taylor.

120f. Crystal Analysis. Discussion of the theory and methods of crystal analysis. Crystal geometry; nature and production of X rays; interaction of X rays and crystals; methods of crystal analysis. Prerequisite: Phys. Chem. 103. 3 credits. Mr. Klug.

121w-122s. Crystal Chemistry. Discussion of the relation between crystal structure and the chemical and physical properties of solids. The elements; alloys, solid solutions, intermetallic compounds; inorganic compounds, hydrates, ammoniates, silicates, glasses; ionic and atomic radii; the chemical bond in crystals; lattice energies; molecular rotation in crystals; fiber structure; applications to qualitative and quantitative analysis and to colloidal phenomena. Prerequisite: Phys. Chem. 120. 3 credits per quarter. Mr. Klug.

134f-135w-136s. Seminar. Modern Problems in Inorganic Chemistry. Prerequisites: Anal. Chem. 1, 2, and Phys. Chem. 103. 1 credit. Mr. Sneed.

COURSES PRIMARILY FOR GRADUATE STUDENTS

301f,su-302w-303s. Research in Inorganic Chemistry. Credits arranged. Mr. Sneed, Mr. Reyerson, Miss Cohen, Mr. Heisig, Mr. Barber, Mr. Klug, Mr. Taylor.

CHEMISTRY, ORGANIC

Professors Lee I. Smith, Walter M. Lauer; Associate Professor C. Frederick Koelsch; Assistant Professor Richard T. Arnold.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

105f-106w-107s.* Advanced Organic Chemistry. An advanced descriptive course covering the field of organic chemistry, together with an introduction to the literature of organic chemistry. Prerequisite: Course 153 or equivalent. 3 credits per quarter. Mr. Smith.

110f.‡ Organic Qualitative Analysis. Reactions of typical functional groups, identification of pure organic compounds, separation and identification of constituents of mixture. Prerequisite: Course 153 or equivalent. 5 credits. Mr. Arnold.

130s. Organic Quantitative Analysis. Methods of proximate and ultimate analysis of organic compounds, with special attention to semi-micro methods. Prerequisites: Course 153 and Anal. Chem. 1, 2. 2 or 3 credits. Mr. Lauer.

139f,w,s. Advanced Organic Chemistry Laboratory Work. Selected laboratory problems of an advanced nature, including some original work. Students are urged to take this course during the winter quarter; permission of the instructor is required to take it at any other time. Prerequisite: Course 153. 2 to 5 credits. Mr. Koelsch.

140f.* Aromatic Compounds. Discussion of the chemistry of typical aromatic compounds, including derivatives of benzene, naphthalene, anthracene, phenanthrene, and other polynuclear hydrocarbons, together with a consideration of certain heterocyclic compounds which show aromatic character. The properties of these compounds will be illustrated by examples chosen from the sterols and the alkaloids. Prerequisite: Course 153. 3 credits. Mr. Koelsch. (Not offered in 1940-41.)

141f.* Reagents in Organic Chemistry. Discussion of typical reagents used in organic reactions; their limits of applicability, methods of use, and types of substances with which they react. Prerequisite: Course 153. 3 credits. Mr. Koelsch.

142w-143s.* The Chemistry of Natural Products. Discussion of the organic chemistry of important classes of natural products. Prerequisite: Course 153. 3 credits. 142w, Mr. Lauer; 143s, Mr. Arnold. (Not offered in 1940-41.)

153s. Elementary Organic Chemistry. Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Prerequisites: Courses 51, 52. 5 credits. Mr. Smith, Mr. Lauer.

156s. Elementary Organic Chemistry. Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Prerequisites: Courses 54, 55. 3 credits. Mr. Smith, Mr. Lauer.

‡ A charge of $10 is made to cover special chemicals in this course.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s.* Organic Chemistry Seminar. One hour per week. One credit. Required of all students taking major work in organic chemistry. Mr. Smith, Mr. Lauer, Mr. Koelsch, Mr. Arnold.

205f-206w.* Theoretical Organic Chemistry. Structure, reaction mechanisms, relation of physical properties to constitution, and other topics of a theoretical nature. Prerequisite: Course 107. 3 credits per quarter. Mr. Lauer.

212s.* Physico-Organic Chemistry. Contributions made to organic chemistry by kinetic and equilibrium studies of organic reactions, including mechanisms and catalytic and ionotropic reactions; and an introduction to the current electronic formations of organic reactions. Prerequisites: Course 107, Phys. Chem. 103, and calculus, or by permission of the instructor. 4 credits. Mr. Arnold.

301f-302w-303s. Research in Organic Chemistry. Credits arranged. Mr. Smith, Mr. Lauer, Mr. Koelsch, Mr. Arnold.

CHEMISTRY, PHYSICAL

Professors Frank H. MacDougall, Herbert Freundlich, Izaak M. Kolthoff, Samuel C. Lind, Lloyd H. Reyerson; Associate Professor Robert S. Livingston; Instructor Donald E. Hull.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS§

101f-102w-103s.* Physical Chemistry. A general survey of the subject. Three lectures and one recitation. Prerequisites: two years college chemistry, one year college physics. 3 credits. Mr. MacDougall, Mr. Livingston, Mr. Hull.

107f,su-108w,su. Elementary Physical Chemistry (Premed.). Three lectures, one quiz, three hours laboratory. Prerequisites: two years of college chemistry, and one year of college physics. 4 credits per quarter. Mr. Hull.

113f. Fundamentals of Reaction Kinetics. Order of reaction, collision theory, activation, chain reactions especially in gaseous systems. Prerequisite: Course 103. 3 credits. Mr. Livingston.

114w. Kinetics of Reactions in Liquid Solutions and in Heterogeneous Systems. Effect of solvents and electrolytes on reaction velocity. Homogeneous and heterogeneous catalysis. Prerequisite: Course 113. 3 credits. Mr. Livingston.

116f. Advanced Physical Chemistry. The modern theory of the atom and the molecule on the principles of wave mechanics with an introduction based on Bohr theory. Prerequisites: Course 103 and calculus. 3 credits.

117w. Advanced Physical Chemistry. Application of thermodynamics to chemical problems, free energy calculations by classical methods and by the use of spectroscopic data. Prerequisites: Course 103 and calculus. 3 credits.

118s. Advanced Physical Chemistry. The physical chemistry of the solid state on the basis of modern concepts. Prerequisites: Course 103 and calculus. 3 credits.

128f-129w-130s.* Colloid Chemistry. General survey of surface chemistry, adsorption, catalysis, electrokinetic phenomena, lyophilic and lyophobic colloids. Prerequisites: Course 103 and calculus. 2 credits per quarter.

131f-132w-133s.* Colloid Chemistry Laboratory. Credits and hours arranged. Must be preceded or accompanied by Course 128, 129, or 130. Mr. Reyerson.

§ Physical Chemistry 101-103, 104-106, 107-108, 141-142 will be acceptable in partial or complete fulfillment of the course requirements for a minor in physical chemistry for students who are not majoring in chemistry.

141su-142su. Special Topics in Physical Chemistry. Acceptable towards minor for students not majoring in chemistry. Prerequisites: two years college chemistry, one year college physics. 2 credits each. Mr. Livingston.

161f-162w.* Nuclear Chemistry and Radioactivity. Discovery; theory of atomic disintegration; properties, transformations, and preparation of radioactive elements; properties and effects of alpha, beta, and gamma rays; radioactive and nonradioactive isotopes. Prerequisite: Course 103. 3 credits per quarter. Mr. Hull.

175s. Photochemistry. A general survey, including a discussion of spectroscopy, with particular reference to the visible and ultraviolet absorption spectra of molecular gases. Prerequisites: Course 103 and optics. 3 credits. Mr. Livingston.

180f. General Survey of Colloid Chemistry. Prerequisite: Course 103. 3 credits. Mr. Freundlich.

181w. Colloids in Industry. Prerequisite: Course 180 or 128-129. 3 credits. Mr. Freundlich.

182s. Colloids in Biology and Medicine. Prerequisite: Course 180. 3 credits. Mr. Freundlich.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s.* Thermodynamics and Chemistry. A detailed study of the principles of thermodynamics and their application to physical and chemical phenomena. Prerequisites: Course 103 and calculus. 4 credits per quarter. Mr. MacDougall. (Not offered in 1940-41.)

204f-205w-206s.* Kinetic Theory and Atomistics. Kinetic theory of gases and liquids, crystal structure, structure of atom, quantum theory. Prerequisites: Course 103 and calculus. 4 credits per quarter. Mr. MacDougall.

207s. Modern Theories of Acidity and Basicity. Prerequisite: Course 103. 2 credits. Mr. Kolthoff.

211f-212w-213s.* Advanced Physical Chemistry Laboratory. To accompany or follow any of the advanced courses in physical chemistry. Prerequisite: Course 103. Credits arranged. Mr. MacDougall.

221f-222w-223s.* Colloid Seminar. 1 credit per quarter. Mr. Freundlich, Mr. Reyerson.

251f-252w-253s.* Physical Chemistry Seminar. For students taking advanced courses in physical chemistry. 1 credit per quarter. Mr. MacDougall and staff.

264f,w,s. Radioactivity Laboratory. Use and standardization of electroscopes, radioactive measurements, and quantitative determination of radium in ores, minerals, waters, and plant products. 1 or 2 credits. Must be preceded or accompanied by Radioactivity 161. Mr. Hull.

301f-302w-303s. Research in Physical Chemistry. Including work in electrochemistry, photo and radio chemistry, and colloids. Credits arranged. Mr. MacDougall, Mr. Freundlich, Mr. Kolthoff, Mr. Lind, Mr. Reyerson, Mr. Hull.

CHEMICAL ENGINEERING

Professors Charles A. Mann, George H. Montillon, Ralph E. Montonna; Assistant Professor Arthur E. Stoppel; Instructor Edgar L. Piret.

Prerequisites.—Before being admitted to major work in chemical engineering, the student should have received the Bachelor's degree in chemical engineering or

its equivalent. If he has not met this requirement, it will be necessary for him to pursue such additional preparatory studies as may be prescribed by the adviser.

The student selecting chemical engineering as a minor must present as prerequisites mathematics including integral calculus, physics, analytical, organic, and physical chemistry, and mechanical drawing.

Requirements.—For the Master's degree in chemical engineering, the major subject, including an experimental thesis, must be taken in chemical engineering.

A student majoring in chemical engineering may not take any branch of chemistry as a minor except with the approval of his adviser and the graduate group committee.

The candidate for the Master's or the Doctor's degree with chemical engineering as a major must have completed, as undergraduate or graduate, a year's work in physical chemistry, such as, for example, Phys. Chem. 101f-102w-103s or its equivalent.

For the requirements for the professional degree of chemical engineer, see pages 16 and 17.

Language requirement.—Candidates for the Master's degree in chemical engineering must have a reading knowledge of German.§ For the Doctor's degree, both French and German are required.

Examinations.—The written and oral preliminary examinations in chemical engineering for the Doctor's degree will be given at only four periods during each year. Normally, these will be during the first two weeks of each regular quarter and of the first term of the Summer Session. The exact schedule will be announced at the beginning of each quarter.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f,su.¶ Unit Operations. Principles and methods of operation, and uses of the unit operation equipment. Crushing, grinding, size separation, fluid flow, and problems in stoichiometry. Lectures and recitations. Prerequisite: Completion of two years' work in the Institute of Technology or equivalent. 3 credits. Mr. Mann, Mr. Stoppel, Mr. Grove, Mr. Piret.

102w,su.¶ Unit Operations. Continuation of Course 101 with discussions of filtration, heat transfer, evaporation, humidification, and air conditioning. Lectures, recitations, and laboratory. Prerequisite: Course 101. 6 credits. Mr. Mann, Mr. Stoppel, Mr. Grove, Mr. Piret.

103s.¶ Unit Operations. Continuation of Courses 101 and 102 with discussions of drying, distillation, absorption, extraction and crystallization, etc. Prerequisite: Course 102. 6 credits. Mr. Mann, Mr. Stoppel, Mr. Grove, Mr. Piret.

105f,su.¶ Fuels and Combustion. Technology of solid, liquid, and gaseous fuels, analysis, combustion characteristics, calculation of heat and material balances, specific uses, and furnaces. Prerequisites: Anal. Chem. 1, 2. 4 credits. Mr. Stoppel, Mr. Grove, Mr. Piret.

106f. Petroleum and Petroleum Products. Technology and testing of petroleum products, principally gasoline, illuminating, fuel, and lubricating oils. Prerequisite: Org. Chem. 51. 3 credits. Mr. Stoppel.

§ In special cases approved by the department, French may be substituted.

¶ Full graduate credit will not be allowed for these required undergraduate courses.

107w. Petroleum Refinery Engineering. Unit operations and chemical engineering design principles involved in the manufacture of the principal petroleum products. Lectures and recitations. Prerequisite: Course 103, or by special permission. 3 credits.

108w. Unit Operations Problems. Problems in adsorption, extraction, crystallization, crushing and grinding, and size separation, and discussion of the equipment used. Prerequisite: Course 103. 3 credits. (Not offered in 1940-41.)

109s. Unit Operations Problems. Advanced problems in unit operations and economic balance. Lectures and recitations. Prerequisite: Course 103. 3 credits.

110s. Special Analytical Apparatus. The use of special apparatus for chemical and physical testing of chemical products including gas apparatus, calorimeters for gases, liquids and solids, optical apparatus, viscosimeters for gases, turbidimeters, etc. Prerequisites: Anal. Chem. 1, 2. 3 credits. Mr. Stoppel.

111f-112w-113s. Chemical Engineering Plant Design. Design of equipment and layout of plants based on collected data. Classroom and laboratory work. Prerequisite: Course 103. 2 credits per quarter. Mr. Montillon, Mr. Piret.

117w,118s.¶ Chemical Engineering Equipment Design. Fundamental principles in the design of simple chemical engineering equipment. Laboratory work. Prerequisite: Course 103. 6 credits. Mr. Montonna, Mr. Grove.

120f. Chemical Engineering Thermodynamics. A study of the principles of the fundamental laws of energy as applied to chemical engineering problems. Prerequisite: Course 103. 3 credits. Mr. Grove.

121f.¶ Chemical Engineering Economics. Economic and business considerations controlling chemical engineering industries. Statistical analysis of these industries. Raw and finished products. Principles of plant location, layout and design. Unit operation costs. Principles of management, operation, and control. Prerequisite: Course 131. 3 credits. Mr. Montonna.

131s.¶ Industrial Inorganic Chemistry. Applications of unit operations common to chemical industries, chemistry involved, equipment used, marketing of products, utilization of by-products, use of trade journals. Topics: industrial waters, acids and alkalies, salts, chlorine, ammonia, glass, pigments, etc. Lectures and recitations. Prerequisites: (for chem. engrs.) Course 102; (for chem.) Anal. Chem. 1, 2. 4 credits. Mr. Mann.

132f.¶ Industrial Organic Chemistry. Similar to 131 but covering organic field. Destructive distillation of coal and wood, petroleum oils, paper unit organic processes, synthetic products, vegetable and animal oils, fats, waxes, soap, sugar, starch, etc. Lectures and recitations. Prerequisites: (for chem. engrs.) Courses 103 and 131; (for chem.) Org. Chem. 52 and Anal. Chem. 1, 2. 3 credits. Mr. Mann.

133f. Chemistry of Explosives. The history and technology of modern explosives, their manufacture and uses, and war gases. Lectures and recitations. Prerequisite: Org. Chem. 153. 3 credits. Mr. Montonna. (Not offered in 1940-41.)

134f. Intermediates and Dyestuffs. Their technical chemistry and manufacture. Processes, purification, uses, etc. Lectures and recitations. Prerequisite: Org. Chem. 153. 3 credits. (May be accompanied by laboratory work in 160.) Mr. Montonna. (Not offered in 1941-42.)

¶ Full graduate credit will not be allowed for these required undergraduate courses.

136w. Chemistry and Technology of Cellulose. Discussion on processes and industries based on the use of cellulosic materials including the chemical and technological considerations. Pulp and paper, plastics, esters, rayon, etc. Lectures and recitations. Prerequisite: Org. Chem. 153 or equivalent. 3 credits. Mr. Montonna.

140s. Sanitary Chemistry. Discussion of the chemistry of sewage and potable waters. Purification of water supplies and the treatment of municipal and industrial wastes. Lectures and recitations. Prerequisite: permission of instructor. 3 credits. Mr. Stoppel.

141s. Gas Manufacture and Distribution. Fundamental principles of manufacture of coal gas, carbureted water gas, and other industrial fuel gases, and the equipment for manufacture and distribution. Prerequisite: permission of instructor. 3 credits. Mr. Montillon.

151f,su.¶ Chemical Manufacture (Inorganic). Manufacture of technical products on a scale large enough to afford data for the determination of operating conditions and cost of manufacture. Use of semi-plant-scale equipment. Technical trade journals used. Laboratory. Prerequisites: Courses 103 and 131. 3 or more credits. Mr. Montonna, Mr. Grove.

152w,su.¶ Chemical Manufacture (Organic). Similar to 151 but covering the organic unit processes. Laboratory. Prerequisites: Courses 103 and 131. 3 or more credits. Mr. Montonna, Mr. Grove.

153f-154w-155s-156su.* Special Laboratory Problems. Investigations on chemical engineering equipment and its use in the manufacture of special chemical products on a semi-works scale. Prerequisites: Courses 151, 152. 3 or more credits. Mr. Montonna, Mr. Grove.

160f. Intermediates and Dyestuffs Laboratory. Manufacture of intermediates and dyestuffs using semi-works equipment. Operations on sulphonation, hydroxylation, nitration, reduction, alkylation, diazotization, coupling, etc. Laboratory. Prerequisites: Courses 132, 152, and preceded or accompanied by 134. 3 or more credits. Mr. Montonna.

168f. Petroleum and Petroleum Products. Technology and testing of petroleum and petroleum products. Prerequisite: Anal. Chem. 9. 3 credits. Mr. Stoppel.

176f-177w.* Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. Class and laboratory work. Prerequisite: Phys. Chem. 103. 4 credits per quarter. Mr. Montillon, Mr. Grove.

179s.* Applied Electro-Organic Chemistry. The more recent developments in the manufacture of organic products. Lectures and recitations. Laboratory optional. Prerequisite: Course 176-177. 3 or more credits. Mr. Mann.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s.* Seminar. Presentation and discussion of papers concerning the newer developments in chemical engineering. 1 credit per quarter. Mr. Mann.

205f-206w-207s. Advanced Problems in Unit Operations. A study of new developments in the unit operations. Theory and practical applications to equipment and plant process design including economic balance problems. Prerequisite: Course 103. 2 credits per quarter. Mr. Montillon. (Not offered in 1941-42.)

¶ Full graduate credit will not be allowed for these required undergraduate courses.

208f-209w-210s. Advanced Chemical Engineering. An extended study of the principles of chemical engineering and their application to industrial problems; heat and material balances, together with surveys of the literature. Prerequisite: Course 103. 2 credits per quarter. Mr. Montillon. (Not offered in 1940-41.)

301f-302w-303s.* Research in Chemical Engineering. Unit operations, applied electrochemistry and electric furnace work, and chemical manufacture. Credits arranged. Mr. Mann, Mr. Montillon, Mr. Montonna, Mr. Stoppel, Mr. Piret.

CHILD WELFARE

Professors John E. Anderson, Florence L. Goodenough; Assistant Professor Edith Boyd.

Prerequisites.—For graduate work in the Institute of Child Welfare, students are normally expected to have had the equivalent of an undergraduate major in either psychology, sociology, education, or home economics. Aside from or including the major, the student normally is expected to have had at least 10 hours in psychology, 8 hours in sociology, and 3 hours in statistics. In special cases or where the background lies in other fields, such as nursing or medicine, adjustments may be made.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

130f. Motor, Linguistic, and Intellectual Development of the Child. Lectures, readings, and reports. Prerequisite: 12 credits in psychology or educational psychology. 3 credits. Mr. Anderson.

131w. Personality, Emotional, and Social Development of the Child. Lectures, readings, and reports. Prerequisite: 12 credits in psychology or educational psychology. 3 credits. Mr. Anderson.

133w-134s. Measurement of Child Personality. Developmental records, mental tests, ratings, controlled observations, etc., used in the study of children. Practical exercises on institute records and data. Prerequisites: 10 credits in psychology or educational psychology, including statistics and permission of instructor. 4 credits. Miss Goodenough.

140f. Behavior Problems. Nature and origin of behavior difficulties in children and the relation between early behavior trends and later maladjustment. Prerequisite: 10 credits in psychology, educational psychology, or sociology. 2 credits. Miss Goodenough.

141w-142s. Practicum in Behavior Problems. Clinic and field work in the study and treatment of behavior problems. Prerequisite: Course 140. Credits arranged. Miss Goodenough.

170s. Parent Education. History and survey of programs. Materials and methods. Administration and organization. Lectures, discussions, and reports. Prerequisite: 15 credits in child welfare, psychology, education, or sociology. 3 credits. Mrs. Faegre.

190s. Principles of Mental Measurement of Young Children. Mental test methods and their interpretation. Lectures, demonstrations, readings, and reports. Prerequisite: 12 credits in psychology, educational psychology, or sociology. 2 credits. Miss Goodenough.

COURSES PRIMARILY FOR GRADUATE STUDENTS

230f-231w-232s. Seminar in Recent Literature. Reviews of current literature, and reports on research. Meetings in alternate weeks. Attendance of graduate students who are candidates for degree is required. 1 credit each quarter. Mr. Anderson.

233f-234w-235s. Research in Child Development. Credits arranged. Mr. Anderson, Miss Goodenough.

236f-237w-238s.* Seminar in Human Development: (fall) Prenatal and Infant Development; (winter) Early and Middle Childhood; (spring) Adolescence. Surveys and discussion of research findings. 2 credits each quarter. Mr. Anderson, Miss Goodenough.

250f-251w-252s.* Seminar in Nursery Education. Discussion of historical background and current practices, fundamental problems and theory, problems of administration and organization and of materials and techniques. 2 credits each quarter.

260w.* Seminar in Physical Growth. Survey of the growth of the human body and its systems from early fetal life to maturity. Same as Anat. 160. Credit cannot be received for both Anat. 160 and C.W. 260. 2 credits. Dr. Boyd.

261f-262w-263s.* Statistical and Laboratory Work on Physical Growth. Prerequisite: C.W. 260. Same as Anat. 161-162-163. Credit cannot be received for both Anat. 161-162-163 and C.W. 261-262-263. Credits arranged. Dr. Boyd.

270f-271w-272s.* Readings in Child Development. Independent readings and reports in any field such as physical growth, health, mental development, social behavior, nursery school theory, parent education, etc., approved by the listed instructors. Credits arranged. Mr. Anderson, Miss Goodenough, Dr. Boyd, Miss Cushing.

273f. Technique of Parent Education. Methods of teaching adults. Organization and administration of study groups. Demonstration lessons and observations. Prerequisites: Course 170 or equivalent and permission of instructor. 3 credits. Mrs. Faegre.

274w. Field Work in Parent Education. Lesson plans, observations, and field work. Prerequisites: Course 273 and permission of instructor. Credits arranged. Mrs. Faegre.

290f-291w. Mental Examination of Preschool Children. A study of the methods used in testing young children, together with practice in such testing. Prerequisites: Ed. Psy. 143-144-145 or 149-150, or equivalent, and permission of instructor. Registration limited. 3 or 6 credits. Miss Goodenough.

CIVIL ENGINEERING

Professors Frederic H. Bass, Alvin S. Cutler, Fred C. Lang; Associate Professors Chester A. Hughes, John V. Martenis, Joseph A. Wise; Assistant Professors Paul Andersen, Leonard F. Boon.

Master's degree.—Offered only under Plan A.

SURVEYING

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

109w,s. Cadastral Surveying. Study of the newer methods of accurate surveys of property with geodetic control and with co-ordinates of property monuments. Prerequisite: Course 16. 2 credits. Mr. Boon.

110f,s. Errors in Surveying. Study of the sources, importance, and reduction of errors in surveying. Prerequisite: Course 23. 2 credits. Mr. Boon.

111w,s. Methods of Computation. Study of the methods used in various problems in precise and geodetic surveys and distribution of errors. Prerequisite: Course 110. 2 credits. Mr. Boon.

Railway Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

121f. Railway Engineering. Train resistance, ruling and momentum grades, curvature, distance, rise and fall as factors in location and operation of railroads. Train loading, acceleration, retardation; locomotives and equipment. Operating costs governing grade revision. Prerequisite: Course 22. 3 credits. Mr. Cutler.

122w. Railway Engineering. Lectures, office work, and field inspection. Design and operation of various types of yards and terminals, and terminal facilities, including the hump, engine house, coal and water station. Signaling and interlocking. Prerequisite: Course 22. 3 credits. Mr. Cutler.

123s. Railway Engineering. Design and construction of railroad buildings and structures; culverts, wooden trestles, switches, cross-overs, crossing frogs, etc. Earthwork computation, estimates and reports. Distribution of material by mass diagram. Prerequisite: Course 22. 3 credits. Mr. Cutler.

124w. Transportation. Development of railway and inland waterway transport, railway regulation and control with special reference to the 1920 Railway Transportation Act, geographical, financial, and rate grouping of railways, Interstate Commerce Commission method of accounting, cost and value of service, present systems, and organization. Prerequisite: Course 22. 3 credits. Mr. Cutler.

125s. Transportation. Specific illustrative problems: Twin City and Mississippi Valley traffic situation, Mississippi River experiment, New York Barge Canal, Great Lakes traffic, Panama Canal status. Prerequisite: Course 121. 3 credits. Mr. Cutler.

COURSES PRIMARILY FOR GRADUATE STUDENTS

221f-222w-223s. Railway Administration. Analysis of railway organization and methods of management and operation. Special problems. Prerequisite: Course 122. 3 credits per quarter. Mr. Cutler.

224f. Railway Terminals and Yards. Continuation of Course 123. 3 credits. Mr. Cutler.

Structural Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

131w-132s. Bridge Analysis and Design. Stresses in cantilevers, arches, and continuous bridges. Design and detail of typical bridge structure. Prerequisite: Course 134. 2 credits per quarter. Mr. C. A. Hughes.

134f. Statically Indeterminate Structures. Theory of deflections and statically indeterminate stresses and their application to continuous girders, frames, swing bridges, and redundant members. Prerequisites: Course 33, M.&M. 128. 3 credits. Mr. C. A. Hughes.

135s. Advanced Reinforced Concrete Design. Analysis of structures as rigid frames. Application to reinforced concrete buildings. Effect of temperature and shrinkage. Effect of settlement of foundations. Rigid frame bridges. Prerequisite: Course 142. 4 credits. Mr. Andersen.

137w,s. Structural Laboratory. Theoretical and experimental analysis of structural members and models. Prerequisites: Courses 134, 141. 2 credits. Mr. C. A. Hughes.

141f. Reinforced Concrete. Principles of reinforced concrete. Theory of beams, slabs, and columns and the application to ordinary structures. Prerequisite: Course M.&M. 128. 3 credits. Mr. Wise.

142w. Reinforced Concrete Design. Continuation of 141 with especial emphasis on the practical features of the design of buildings, bridges, retaining walls, etc. Prerequisite: Course 141. 3 credits. Mr. Wise.

143s. Reinforced Concrete Arches. Analysis and design of reinforced concrete arches. Prerequisites: Courses 134, 142. 3 credits. Mr. C. A. Hughes.

146f,s. Plain Concrete. Theory of design and control of concrete mixtures. Practice in control tests of concrete and concrete materials. Lectures and laboratory work. Prerequisite: M.&M. 141. 3 credits. Mr. Andersen.

147w. Foundations. Design and construction of footings, cofferdams, and caissons for bridges and buildings. Piers and abutments. Underpinning of buildings. Exploration and testing of foundation sites. Excavation and removal of materials from foundation sites. Prerequisites: Course 33, M.&M. 128. 2 credits. Mr. Andersen.

148f-149w-150s. Advanced Concrete. Short research problems in concrete. Prerequisite: Course 146. 2 credits per quarter. Mr. C. A. Hughes.

180f-181w-182s. Advanced Structural Laboratory. Special problems. Prerequisite: Course 137. 3 to 5 credits per quarter. Mr. C. A. Hughes.

COURSES PRIMARILY FOR GRADUATE STUDENTS

233s. Advanced Problems in Foundations. Lateral earth pressure theories. Design of sheet piling. Bearing piles and cofferdams. Prerequisites: Courses 134, 147. 3 to 5 credits. Mr. Andersen.

234f-235w. Advanced Theory of Structures. Applications of the theory of indeterminate stresses to the more complex problems of structural analysis. Continuous and swing bridges, simple and multiple arch and suspension systems, wind stresses in tall building frames, secondary stresses. Prerequisites: Courses 132, 142. 3 to 5 credits per quarter. Mr. Wise.

236s. Advanced Reinforced Concrete Design. Effects of shrinkage and plastic flow. Eccentrically loaded concrete sections. Nonsymmetrical bending. Torsion. Prerequisite: Course 135 or 142. 3 to 5 credits. Mr. Andersen.

245f-246w-247s. Seminar. Special topics in the higher theory of structures. Prerequisites: Courses 134, 142. 3 to 6 credits per quarter. Mr. C. A. Hughes, Mr. Wise, Mr. Andersen.

Highway Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

151f,s. Highway Laboratory. Investigations in co-operation with State Highway Department. Prerequisite: Course 52. 3 to 5 credits. Mr. Lang.

152s. Highway Design. Preparing of a plan and specifications for short sections of highway and city streets, also making estimates of materials and cost. Prerequisite: Course 52. 3 to 5 credits. Mr. Lang.

153w,s. Engineering Properties of Soils. Origin and composition, characteristics, structural properties, and practical design and construction. 3 credits. Mr. Lang.

154w,s. Soils Laboratory. Laboratory study of properties of soils which pertain to their stability. 1 credit. Mr. Lang.

155s. Field Soil Studies. Soil classification and mapping, analysis of soil conditions where road failures have occurred. Prerequisite: Course 52. 2 credits. Mr. Lang.

156w. Highway Transport. Development, economic field, relation to other forms of transportation. Highway transport surveys, economics of location, economics of selection of type of surface, effect of vehicle on road and road on vehicle. Prerequisite: Course 52. 3 credits. Mr. Lang.

Hydraulic Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

161f. Power. Elementary hydrology; precipitation, evaporation, transpiration, run-off, storage and lake levels, types of water power development; dams, waterways, penstock, turbines, and accessory equipment. Prerequisite: M.&M. 129. 4 credits. Mr. Bass.

164f. Water Conservation. Weather variations and cycles, variable stream flow and water levels with respect to control in problems of public water supply, sewage disposal, water power, navigation, floods, and low water. National and state water conservation policies with discussion of typical problems. Prerequisite: M.&M. 129. 3 credits. Mr. Bass.

COURSES PRIMARILY FOR GRADUATE STUDENTS

263s. Hydraulic Engineering Problems. Special hydraulic problems in laboratory, drafting room, and field. Prerequisite: Course 164. 3 to 5 credits. Mr. Bass.

Municipal and Sanitary Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

162w-163s. Water Supply and Sewerage. Sources of water supply; quality of water. Methods of testing, collection, distribution, and purification of water. Selection of pumping machinery and motive power. Sewer systems and sewage disposal works. Prerequisite: M.&M. 129. 3 credits per quarter. Mr. Bass.

165s. Public Health Engineering. Sanitary problems associated with the location, construction, and operation of water supplies, purification works, and distribution systems, with the treatment and disposal of sewage, excreta, and waste, and with the production, pasteurization, and distribution of milk. Public health engineering methods as applied to sanitary problems in urban and rural communities including schools, institutions, camps, bathing places, dwellings, etc. Lectures, field and laboratory demonstrations. Prerequisite: P.M.&P.H. 53. 3 credits. Mr. Whittaker, Mr. Pierce, associates, and guest lecturers.

167s. Industrial Hygiene Engineering. Field and laboratory methods used by the industrial hygiene engineer in the study and control of occupational health hazards. Lectures, field and laboratory demonstrations. 3 credits. Mr. Pierce.

171w. Building Sanitation. Location and orientation of buildings; lighting, ventilation, water supply, plumbing, sewage, and refuse disposal. 2 credits. Mr. Bass, Mr. Martenis.

COURSES PRIMARILY FOR GRADUATE STUDENTS

261f-262w. Water and Sewage Purification. Design of water purification and sewage disposal works. Prerequisite: Course 163. 3 to 5 credits per quarter. Mr. Bass.

General

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

172s. City Planning. Physical elements of the city: topography, drainage, geology. Public works and structures. Internal and external transportation. Zoning. Subsurface structures. Esthetic features of the city. Prerequisite: Course 52. 3 to 5 credits. Mr. Bass, Mr. R. C. Jones.

COURSES PRIMARILY FOR GRADUATE STUDENTS

280f-281w-282s. Civil Engineering Research. Original work in concrete, structural steel, hydraulics, municipal or transportation problems. Investigations, reports, tests, designs. Prerequisite: by permission. 5 credits per quarter. Mr. Bass, Mr. Cutler, Mr. Lang, Mr. C. A. Hughes, Mr. Wise, Mr. Andersen.

CLASSICS

Professor Marbury B. Ogle; Assistant Professors Robert V. Cram, John L. Heller.

Master's degree.—Offered under both Plan A and Plan B.

For the degree of doctor of philosophy candidates will be expected to spend at least three years in preparation. A knowledge of Greek and Roman history, Greek and Roman literature, and a special knowledge of a particular Latin or Greek author, or group of authors, will be required.

Greek

Prerequisites.—Any three of the courses numbered 51, 52, 53, 73.

The degree of master of arts with a major in Greek requires a nine-credit sequence in the 200 series and either one course each quarter from the 100 series or a second nine-credit sequence in the 200 series. For a minor in Greek either the Seminar in Greek Literary Bibliography or one course each quarter from the 100 series is required.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f. Tragedy: Selected Plays. 3 credits. Mr. Heller.

102w. Comedy: Selected Plays. 3 credits. Mr. Heller.

103s. Lyric Poetry. Selections from the elegiac, iambic, lyric, and bucolic poets. 3 credits. Mr. Heller.

111f. History: Herodotus. Herodotus as a source for early Greek history. 3 credits. Mr. Heller.

112w. History: Thucydides. A study of the causes and events of the Peloponnesian War. 3 credits. Mr. Heller.

113s. Hellenistic Literature. Selections. 3 credits. Mr. Ogle.

121f-122w-123s. Advanced Composition. 9 credits. Mr. Heller.

131f. Philosophy: Plato. Dialogs representing Plato's contribution to literature and philosophy. Prerequisites: any two courses numbered above 99. 3 credits. Mr. Heller.

132w. Philosophy: Aristotle's *Ethics*. A study of the *Nicomachean Ethics* in relation to earlier and contemporary Greek moral theory. Prerequisite: Course 131 or any two courses above 99. 3 credits. Mr. Heller.

171f,172w,173s. Independent Reading Course. Prerequisites: two courses above 99; open to students of exceptional ability with consent of the instructor. 3 credits per quarter. Mr. Heller.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Graduate Seminar: Greek Literary Bibliography and Criticism. 9 credits. Mr. Heller.

211f-212w-213s. Graduate Seminar: Greek Epic. Mr. Heller.

221f-222w-223s. Graduate Seminar: Greek Drama. (Not offered in 1940-41.)

231f-232w-233s. Graduate Seminar: Greek Philosophy. (Not offered in 1940-41.)

Latin

Prerequisites.—Any four of Courses 51 to 83, and 6 credits in addition selected from the 100 series. A reading knowledge of French, German, or Greek is required of candidates for the Master's degree.

The degree of master of arts: For a major in Latin, any nine-credit sequence in the 200 series, and in addition one course each quarter selected from Courses 111 to 173 or 241-242-243; ordinarily this latter will be required in addition to the other 200 sequence. The student will be expected to choose for his thesis some problem connected with one of these courses. Besides, a minor is to be carried throughout the year in one of the following departments: Comparative Philology, English, German, Greek, History, Romance Languages, Education, or Scandinavian. For a minor in Latin, any nine-credit sequence in the 200 series or one course each quarter selected from Courses 111 to 173.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

111f-112w-113s. Advanced Prose Composition. Prerequisite: Course 73-74-75 or equivalent. 3 credits. Mr. Ogle.

121f. Advanced Vergil. *Eclogues, Georgics,* and *Aeneid.* Prerequisites: any two of the courses with numbers between 50 and 100. 3 credits. Mr. Ogle.

131f. Juvenal: Selected Satires. Prerequisites: any two of the courses with numbers between 50 and 100. 3 credits. Mr. Cram.

133s. Vulgar Latin. Development of Latin into Romance. Prerequisites: for advanced students of either Latin or Romance, consent of the instructor. 3 credits. Mr. Ogle.

142w. Tacitus. Readings in the *Annales* and *Historiae.* Prerequisites: any two of the courses numbered between 50 and 100. 3 credits. Mr. Ogle.

151f. Advanced Cicero. Prerequisites: any two of the courses with numbers between 50 and 100. 3 credits. Mr. Ogle.

152w. Lucretius. Prerequisites: any two of the courses with numbers between 50 and 100. 3 credits. (Not offered in 1940-41.)

153s. Classical Literary Tradition. Prerequisite: consent of the instructor. 3 credits. (Not offered in 1940-41.)

171f,172w,173s.* Independent Reading Course. Prerequisite: open to students of exceptional ability with the consent of the department. 9 credits.

Courses for Which No Latin or Greek Is Required

106w. General Linguistics. Prerequisites: any two courses in a foreign language above 50. 3 credits. Mr. Ogle.

107s. Cultural Aspects of Language. Prerequisites: any two courses in a foreign language above 50. 3 credits. Mr. Ogle.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Graduate Seminar: Cicero. 9 credits. (Not offered in 1940-41.)

211f-212w-213s.* Graduate Seminar: The Latin Epic. 9 credits. (Not offered in 1940-41.)

221f-222w-223s.* Graduate Seminar: Lyric Poetry. 9 credits. (Not offered in 1940-41.)

231f-232w-233s.* Graduate Seminar: Latin Historiography. 9 credits. Mr. Ogle.

241f-242w-243s.* Graduate Seminar: Introduction to Classical Philology. 9 credits. Mr. Cram.

DAIRY HUSBANDRY

Professors James B. Fitch, Willes B. Combs, Harold Macy, William E. Petersen; Assistant Professors Samuel T. Coulter, Thor W. Gullickson.

Students taking major work in dairy husbandry for a Master's degree may petition for exemption from the language requirement, with the exception of students majoring in dairy bacteriology.

Students desiring major work in dairy production should make arrangements with the Division of Dairy Husbandry previous to registration.

Prerequisites.—For a major in *dairy production* the adviser must be satisfied that the student has had sufficient preparation in chemistry, genetics, and animal physiology; for a major in *dairy products,* bacteriology, chemistry, physics, and economics; for a major in *dairy bacteriology,* chemistry, physics, bacteriology, and dairy products.

Minor.—For a minor in dairy husbandry, the chief of the division must be satisfied as to the student's preparation.

Majors.—When the preparation appears inadequate the adviser may require that additional courses be taken to make up the deficiencies. With the approval of the adviser, certain courses in agricultural biochemistry, bacteriology, genetics, and animal husbandry may be accepted as part of the major.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f. Milk Production. Problems of the dairy farmer. 3 credits. Mr. Fitch.

102w. Dairy Bacteriology. Lectures, assignments, laboratory work. Relation of bacteria and other micro-organisms to production, processing and handling of milk and its products, and to public health; the microbiology of dairy products. 3 credits. Mr. Macy.

103w. Dairy Stock Feeding. Application of the principles of nutrition to special problems of feeding the dairy cow and growing the young animals. 3 credits. Mr. Fitch.

104s. Dairy Stock Selection. Selection of dairy animals on the basis of type, pedigree, production, and progeny performance. 2 credits. Mr. Allen.

105f-106w. Seminar.* Bibliographical methods and study of dairy literature. Reports on assigned subjects and reviews of recent scientific investigations. 1 credit per quarter. Mr. Macy.

110w. Dairy Products: Ice Cream and Frozen Desserts. Similar to Course 111f with special application to ice cream. 3 credits. Mr. Combs.

111f. Dairy Products: Butter. The chemical, bacteriological, and economic problems in the manufacture and marketing of butter. 3 credits. Mr. Combs, Mr. Coulter.

112s. Dairy Products: Cheese. Similar to Course 111f with special application to cheese, condensed and powdered milk. 3 credits. Mr. Combs, Mr. Coulter.

113s. Technical Control. Chemical and bacteriological laboratory methods used in technical control of milk and its products. Prerequisites: Course 2 or equivalent, Course 110, 111, or 112. 3 credits. Mr. Coulter.

114w. Milk By-Products. The manufacture of condensed milk, dry milk, casein, and other milk by-products with special reference to the physical processes involved. Laboratory exercises and lectures. 3 credits. Mr. Coulter.

115s. Advanced Dairy Bacteriology. Investigation of specific problems in the bacteriology and mycology of milk and dairy products. Prerequisites: Course 2 or equivalent, Course 111 or 112. 3 credits. Mr. Macy.

116s. Milk Secretion. Lecture assignments covering the anatomy and physiology of milk secretion and factors influencing the quality and quantity of milk. Prerequisites: Physiol. 9 credits and Agr. Biochem. 103. 3 credits. Mr. Petersen.

117s. Dairy Cattle Breeding. Application of the principles of genetics to the improvement of dairy cattle. Evaluation of breeding animals and formulation of breeding plans. Prerequisites: Courses 101, 104, Agron. 31. 3 credits. Mr. Petersen.

COURSES PRIMARILY FOR GRADUATE STUDENTS

202f,*203w,*204s,*208su,210su. Research in Dairy Production. Facilities offered for study and investigation of subjects pertaining to dairy cattle. Students are allowed to assist at times with investigations under way in the experiment station. Arranged to meet the needs of the individual student. Open in the Summer Session only to those who have had preliminary graduate work. Mr. Fitch, Mr. Petersen, Mr. Gullickson.

205f,*206w,*207s,*209su,211su. Research in Dairy Manufacturing. Opportunity and facilities are offered for study and investigation of problems concerning dairy products. The work is arranged to meet the needs of the individual student. Open in the Summer Session only to those who have had preliminary graduate work. Mr. Combs, Mr. Coulter.

212f,*213w,*214s,*215su,216su. Research in Dairy Bacteriology. Opportunity and facilities are offered for investigation and advanced study of problems involving the bacteriology and mycology of milk and dairy products. Open in the Summer Session only to those who have had preliminary graduate work. Mr. Macy.

DENTISTRY

For staff and courses of study offered, see Graduate Medical Bulletin.

ECONOMICS AND BUSINESS ADMINISTRATION

Professor and Dean Russell A. Stevenson; Professors Eugen Altschul, Roy G. Blakey, George Filipetti, Frederic B. Garver, Ernest A. Heilman, Arthur W. Marget, Bruce D. Mudgett, John J. Reighard, J. Warren Stehman, Roland S. Vaile, Dale Yoder; Associate Professors Arthur M. Borak, Richard L. Kozelka, Emerson P. Schmidt, Arthur R. Upgren; Assistant Professors Francis M. Boddy, A. Hamilton Chute, Walter R. Myers, George J. Stigler.

Economics

GENERAL REGULATIONS

1. A minimum of nine quarter credits in economics, including the principles of economics, is required before any course work may be counted toward either a graduate major or minor in economics. It is expected that all candidates will have maintained an average of B or better in their undergraduate work in economics.

2. The programs of study of all majors must receive the approval of the Graduate Committee of the School of Business Administration.

3. In their preliminary preparation candidates for the M.A. in economics will be expected to meet the following requirements. Either

a. Twelve credits in economics or business administration courses at the Senior College level, or

b. Preparation at the elementary level in accounting, money and banking, principles of economics, and statistics.

4. Candidates for the Ph.D. in economics will be expected to meet both requirements (a) and (b) above.

5. Both written and oral examinations are required.

Master of Arts

Plan A

1. For a major in Economics the candidate must present a minimum of 18 quarter credits in courses numbered 100 or above, including Economics 103-104 or Business Administration 101-102, unless either of these courses has been completed in the undergraduate program.

2. For a minor in Economics the candidate must present 9 quarter credits in courses numbered 100 or above.

3. For the purposes of this plan the courses in economics and business administration are to be considered as one department.

4. A reading knowledge of a foreign language is required only if the thesis is written in one of the following fields: economic history, economic theory, labor, money and banking, public finance, or statistics.

5. A thesis is required.

Plan B

1. A minimum of 45 quarter credits in courses numbered 100 or above is required, including Economics 103-104 or Business Administration 101-102, unless either of these courses has been completed in the undergraduate program.

For the purposes of this plan the courses in economics and business administration may be considered as four separate fields, namely: accounting, economics, general business administration, and statistics. Normally it will be expected that all candidates under this plan will take at least 9 credits of work outside of these fields. Subject to the recommendation of an adviser and the approval of the Graduate Committee of the School of Business Administration, however, all 45 credits may be taken in these fields, provided that not less than 21 credit hours shall be in some one of these fields and not more than 27 shall be in any one of them.

2. Of the total of 45 quarter credits at least 9 quarter credits must be earned in courses requiring independent work and the preparation of written reports. These courses are as follows: Economics, all courses numbered 200 or above, 114, 124, 149, 154, 164, 192; Business Administration, 139, 156, 165, 184, not more than three quarter credits from 180-181C, and not more than 3 quarter credits from

180-181-182D; and such other courses as may be recommended by the adviser and approved by the Graduate Committee of the School of Business Administration.

3. Neither a reading knowledge of a foreign language nor a thesis is required.

Doctor of Philosophy

1. It is recommended that those who wish to become candidates for this degree should first obtain the Master's degree under Plan A.

2. The minimum total requirements for the Ph.D. in economics shall include 50 quarter credits in approved courses in the major fields. Thirty of these credits shall include 6 credits in Economics 203-204, 6 credits in Economics 207-208, and 18 credits to be chosen from any three of the following groups:

Group	Course	Credits
A	Economics 105-106	6
	Economics 206	3
	Economics 215	3
B	Economics 113-114	6
C	Economics 233-234	6
D	Economics 243-244	6

The remaining 20 credits may be selected from economics and business administration courses numbered 100 and over, or, with the approval of the Graduate Committee of the School of Business Administration, from courses in agricultural economics and economic history.

3. The student's program will be arranged by consultation with his adviser, subject to the approval of the Graduate Committee of the School of Business Administration, and the Social Science Group Committee of the Graduate School.

4. Candidates who are majors in other departments and who wish to minor in this department should consult Professor R. G. Blakey.

5. A reading knowledge of two foreign languages, usually French and German, is required. With the approval of the Executive Committee of the Graduate School, either Italian or Swedish may be substituted for French.

Business Administration

Master of Business Administration

This degree is offered for students who desire postgraduate training in business administration. Those who have received the Bachelor's degree from a recognized school of business may expect to complete the work in one year; those who are graduates of other professional schools or of liberal arts colleges, may expect it will take two years.

1. **Prerequisites.**—Candidates must meet the prebusiness requirements of the School of Business Administration in accounting, money and banking, principles of economics, and statistics. General Psychology (Psy. 1-2) is a prerequisite for specialization in advertising, foreign trade, merchandising, and personnel administration; and Commerce Algebra (Math. 8) is a prerequisite for specialization in accounting, finance, and statistics. Preparation in these prebusiness subjects, if not completed as part of the candidate's undergraduate program, may be completed after entrance upon the work for this degree by taking the appropriate courses.

2. Candidates who have not taken the core group courses required for the degree of bachelor of business administration in this University must do so as part of the work for the Master's degree. These courses are business law, advanced

money and banking, advanced general accounting, corporation finance, survey of marketing, transportation services and charges, business statistics, production management, advanced general economics, labor problems, elements of public finance, and public utilities.

3. In addition, Scientific Management in Industry (B.A.184) is a requirement for the degree.

4. All candidates will be required to pass written and oral examinations in the fields covered by the core group courses and the field of specialization.

Plan A

1. The candidate must obtain 27 quarter credits in courses numbered 100 or above.

2. Thesis and foreign language requirements are the same as for Plan A in Economics.

Plan B

1. A minimum of 45 quarter credits in courses numbered 100 or above, not less than 21 nor more than 27 of which may be in the same department. For the purposes of this plan, the same departmentalization of the courses in economics and business administration is recognized as under the master of arts degree, Plan B.

2. Of the total of 45 quarter credits a minimum of 9 quarter credits must be obtained from the following: Economics, all courses numbered 200 and above, 114, 124, 149, 154, 164, 166, 192; Business Administration 139, 156, 165, 184, not more than 3 quarter credits from 180-181C, not more than 3 quarter credits from 180-181-182D, and such other courses as may be recommended by the adviser and approved by the Graduate Committee of the School of Business Administration.

3. Neither a reading knowledge of a foreign language nor a thesis is required.

Economics

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

Note.—The following courses in other departments carry credit also in Economics: History 180-181-182, Selected Readings in Economic History; 221-222-223, Graduate Seminar in Economic History.

103f-104w. Advanced Economics. 6 credits. Mr. Garver.

105s. History of Economic Ideas: The Classical Economists. 3 credits. Mr. Garver. (Offered in alternate years.)

106s. History of Economic Ideas: The Critics of the Classical Economists. 3 credits. Mr. Stigler. (Offered in alternate years.)

108s. Applications of Economic Theory. 3 credits. Mr. Stigler.

110s. Industrial Price Control. 3 credits. Mr. Garver.

113w-114s.* Theory of Statistics. 6 credits. Mr. Mudgett.

115w. Probability and Statistics. 3 credits. Mr. Altschul.

117w. Contemporary European Economic Problems. 3 credits. Mr. Altschul.

124w.* Comparative Banking: British Systems. 3 credits. Mr. Myers.

125s. Comparative Banking: European Systems. 3 credits. Mr. Myers. (Offered in alternate years.)

127s. Comparative Banking: South American Systems. 3 credits. Mr. Myers. (Offered in alternate years.)

128s. Business Cycle Theory in European Literature. 3 credits. Mr. Altschul.
131f. Introduction to Mathematical Analysis in Economics. 3 credits. Mr. Altschul.
140s. The Co-operative Movement. 3 credits. Mr. Vaile. (Offered in alternate years.)
141f. Monetary and Banking Policy. 3 credits. Mr. Myers.
144f. Cartels and Trusts. 3 credits. Mr. Altschul.
149f,w,s.* Business Cycles. 3 credits. Mr. Marget.
154s.* Public Utilities. 3 credits. Mr. Garver.
160w. The Modern Corporation. 3 credits. Mr. Stehman.
161f,w,s. Labor Problems and Trade Unionism. 3 credits. Mr. Yoder, Mr. Schmidt.
162w. Labor and Socialist Movements. 3 credits. Mr. Schmidt.
164s.* Labor Legislation and Social Insurance. 3 credits. Mr. Schmidt.
172f. Economics of Transportation. 3 credits. Mr. Schmidt.
176f,s. International Commercial Policies. 3 credits. Mr. Blakey.
185w. Economics of Marketing. 3 credits. Mr. Vaile.
191f-192w.* Public Finance. 6 credits. Mr. Blakey.
193s. State and Local Taxation. 3 credits. Mr. Blakey.

COURSES PRIMARILY FOR GRADUATE STUDENTS

203f-204w.* Seminar in Economic Theory. 6 credits. Mr. Garver.
206s.* Seminar in Market Prices. 3 credits. Mr. Vaile. (Offered in alternate years.)
207s.* Theory of Demand. 3 credits. Mr. Stigler. (Offered in alternate years.)
208s.* Production and Distribution. 3 credits. Mr. Stigler. (Offered in alternate years.)
233f-234w.* Seminar in Public Finance. 6 credits. Mr. Blakey. (Offered in alternate years.)
243f-244w.* Seminar in Money and Banking. 6 credits. Mr. Marget. (Offered in alternate years.)
251s.* Seminar in Industrial Relations. 3 credits. Mr. Yoder. (Offered in alternate years.)
257w.* Seminar in Accounting Theory. 3 credits. Mr. Stevenson. (Offered in alternate years.)
260. Individual Research. Credits arranged. Members of the staff.

Business Administration

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-102w. Advanced General Economics. 6 credits. Mr. Garver, Mr. Mudgett, Mr. Boddy, Mr. Stigler.
101w-102s. Advanced General Economics. 6 credits. Mr. Mudgett, Mr. Boddy.
109w,s. Business Policy. 3 credits. Mr. Reighard.
112f,w,s.‡ Business Statistics. 3 credits. Mr. Mudgett, Mr. Kozelka.
130f,s. Cost Accounting Survey. 3 credits. Mr. Ostlund.
133s. Cost Accounting Methods. 3 credits. Mr. Ostlund.
134f,w. Income Tax Accounting. 3 credits. Mr. Reighard.
135f,s. Auditing and Public Accounting. 3 credits. Mr. Reighard.
136s. Internal Auditing and Accounting Control. 3 credits. Mr. Reighard.

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

139f,w,s.*‡ Advanced General Accounting. 3 credits. Mr. Heilman.
142f,w,s. Advanced Money and Banking. 3 credits. Mr. Marget, Mr. Upgren, Mr. Myers.
145s. Foreign Exchange. 3 credits. Mr. Myers.
146f. Investments. 3 credits. Mr. Upgren.
147f. Bank Administration. 3 credits. Mr. Myers.
148w. The Securities Market. 3 credits. Mr. Upgren.
150f‡-151w.‡ Accounting Practice and Procedure. 6 credits. Mr. Heilman.
150w‡-151s.‡ Accounting Practice and Procedure. 6 credits. Mr. Heilman.
152f-153w. Cost Accounting. 6 credits. Mr. Ostlund.
152w-153s. Cost Accounting. 6 credits. Mr. Ostlund.
155f,w,s. Corporation Finance. 3 credits. Mr. Stehman, Mr. Upgren.
156f.* Finance Management. 3 credits. Mr. Stehman.
158s. Governmental Accounting. 3 credits. Mr. Heilman.
159s. Public Utility and Railroad Accounting. 3 credits. Mr. Stevenson.
165f,w,s.* Economics of Public Utilities. 3 credits. Mr. Garver, Mr. Schmidt.
167f,w. Personnel Administration. 3 credits. Mr. Yoder.
170w.‡ Motion Economy. 3 credits. Mr. Cummins.
171s.‡ Production Standards. 3 credits. Mr. Cummins.
177w. Foreign Trade. 3 credits. Mr. Blakey.
180f-181w-182s. Senior Topics Courses. Intensive study of problems in respective fields of specialization.
A. Accounting.¶ 6 credits. Mr. Rotzel (f), Mr. Reighard (w).
B. Business Finance.§ 6 credits. Mr. Upgren (w), Mr. Stehman (s).
C.* Marketing. 9 credits. Mr. Vaile (f,w), Mr. Chute (w,s).
D.* Personnel Management. 9 credits. Mr. Yoder.
F. Statistics. 9 credits. Mr. Mudgett (w,s), Mr. Kozelka (f).
G. Production Management. 9 credits. Mr. Filipetti.
I. Public Utilities and Transportation.¶ 6 credits. Mr. Schmidt.
183f,w,s. Senior Practice Course. Credits arranged. Members of the staff.
184f.* Scientific Management in Industry. 3 credits. Mr. Filipetti.
194s. Advanced Advertising Procedure. 3 credits. Mr. Longstaff.

Agricultural Economics††

Professors Oscar B. Jesness, Austin A. Dowell, Warren C. Waite; Associate Professor George A. Pond; Assistant Professors Rex W. Cox, E. Fred Koller.

Prerequisites.—For major work 18 quarter credits consisting of courses acceptable to the student's adviser. Further courses may be required if in the opinion of the adviser this is necessary. For minor work 9 quarter credits.

Majors and minors.—The thesis may be in any field of agricultural economics (marketing, farm management, economics of agricultural production, agricultural prices, agricultural policy, farm finance, land economics). Candidates will be expected to take work in the different fields, the program depending upon the field of specialization. With the approval of the adviser, certain courses in general economics and business administration may be accepted as major work. The minor may be in general economics.

‡ A fee of $1 per quarter is charged for this course.
§ Winter and spring only.
¶ Fall and winter only.
†† For courses in General Economics and Business Administration, see Economics.

Language requirement.—Candidates for the Master's degree in agricultural economics are exempt from the requirement of a reading knowledge of a foreign language.

Master's degree.—Offered in general under Plan A. In exceptional cases Plan B may be accepted.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102w. Farm Management: Organization. The business side of farming with emphasis on farm selection and organization. 3 credits. Mr. Pond.

103s. Farm Management: Operation. A continuation of 102 with special attention to efficiency in farm operation. Prerequisite: Course 102. 3 credits. Mr. Pond.

104s. Types of Farming. A study of types of farming and of prevailing farm practices in the principal agricultural production areas. Prerequisites: Courses 102, 103, or equivalent. 3 credits. Mr. Pond.

110f-111w. Economics of Agricultural Production. The principles of production economics elaborated in terms of the production of the major farm products and producing areas. Economic geography and agriculture. National production policies. 6 credits. Mr. Dowell.

126f,s. Economics of Consumption. Formulation of the economic principles relating to choice between different uses of income, time, and energy by individuals and family organizations. 3 credits. Mr. Waite.

131w. Market Prices. Analysis of the price making process as it works out in the market places where the major farm products are sold. Market quotations and price quoting. 3 credits. Mr. Waite.

135s. Methods of Price Analysis. Statistical technique involved in analyzing seasonal and year-to-year movements in prices of farm products. Interpretation of results. 3 credits. Mr. Waite.

140f. Marketing Organization: Staples. Principles of production economics applied to the organization of markets and marketing organization for the grains, tobacco, cotton, and wool. Especial attention to co-operative organization. 3 credits. Mr. Cox.

141w. Marketing Organization: Dairy and Poultry Products. 3 credits. Mr. Jesness.

142s. Marketing Organization: Fruits and Vegetables. 2 credits. Mr. Cox.

143w. Marketing Organization: Livestock and Meats. 3 credits. Mr. Dowell.

144f. Co-operative Organization. 3 credits. Mr. Jesness.

150s. Advanced Farm Finance. 3 credits. Mr. Koller.

170s. Land Economics. 3 credits. Mr. Dowell.

190f. Agricultural Statistics. Intended for beginning graduate students who have had no course in the elements of statistical method. 3 credits. Mr. Cox.

191w. Advanced Agricultural Statistics. 3 credits. Mr. Waite.

COURSES PRIMARILY FOR GRADUATE STUDENTS

200f-201w-202s.* General Seminar in Agricultural Economics.§ Credits arranged. Mr. Jesness and staff.

203f-204w. Current Problems and Literature. No credit. Required of all majors in agricultural economics. Mr. Jesness.

§ Under this head are arranged special seminars on subjects suited to the needs of particular groups of graduate students, or on subjects upon which members of the staff are doing work at the time.

206w.* Seminar in Agricultural Policy. A study of economic problems of agriculture and policies adopted by governmental, agricultural, and individual agencies toward such problems. 3 credits. Mr. Jesness.

221f.* Farm Organization Studies. A seminar study of the principles involved in the analysis of farm organization data and the computation of farm costs. Attention will be given to methods used in collecting and compiling these data with special emphasis on farm records and accounts as a basis for farm organization study. 3 credits. Mr. Pond.

226s.* Advanced Farm Organization. Analysis of farm organization and the application of the budgeting method in improving the farm business. 3 credits. Mr. Pond.

230.* Research Problems in Farm Organization and Operation. A study of methods of conducting research work and analyzing problems in farm organization and operation. Students will be assigned to individual research problems or to special phases of research work being conducted by members of the staff. Reports covering progress of work and analysis of findings required as a basis for credit. Credits arranged. Mr. Pond.

237.* Seminar in Research Methods in Price Analysis. A survey and analysis of the various types of research projects being worked upon in the field of prices of farm products. 3 credits. Mr. Waite.

240.* Seminar in the Marketing of Cereals. 3 credits. Mr. Cox.

241f.* Seminar in the Marketing of Livestock and Livestock Products. 3 credits. Mr. Dowell.

244w.* Seminar in Co-operative Marketing. 3 credits. Mr. Jesness, Mr. Koller.

246f.* Seminar in Economics of Consumption. 3 credits. Mr. Waite.

247.* Seminar in Research Methods in Marketing. 3 credits. Mr. Jesness and staff.

265.* Seminar in Agricultural Taxation. 3 credits.

EDUCATION

Professor and Dean Wesley E. Peik; Professors Charles W. Boardman, Nelson L. Bossing, Clara M. Brown, Leo J. Brueckner, Albert M. Field, Palmer O. Johnson, August C. Krey, T. Raymond McConnell, Wylle B. McNeal, Wilford S. Miller, Mervin G. Neale, Dora V. Smith, Homer J. Smith, Edgar B. Wesley, C. Gilbert Wrenn; Associate Professors Guy L. Bond, Theodore Brameld, Walter W. Cook, Marvin J. Van Wagenen.

Prerequisites.—For major work in education at least 6 quarter credits in psychology and in addition to this a total of not less than 18 quarter credits of undergraduate work in education which shall include Ed. 51A-B-C or the equivalent. For minor work at least 6 quarter credits in psychology and in addition to this a total of not less than 18 credits of undergraduate work in education.

Candidates for a degree.—Students who have met the requirements for admission to the Graduate School and for the courses selected may register for graduate courses in education, but are not candidates for a degree until the formal acceptance of their candidacy.

Language requirement.—Candidates for the Master's degree majoring in any of the fields of education are exempted from the foreign language requirement without petition. Candidates for the Doctor's degree will meet the requirement of the Graduate School. (See page 19.)

Academic work.—Students who have taken their undergraduate work at teacher training institutions or have had an undergraduate major in professional or technical work should note especially the requirement in academic credits for admission to the Graduate School. (See page 3.)

MAJORS AND MINORS

Major and minor work for advanced degrees may be arranged from courses listed below under the following grouping:

Doctor's Degree

Major.—Major work will be chosen in the field of education in the following manner:

With the approval of his adviser the student will select a group of courses, excluding the field of his minor, centering about his special interest in education. Major fields are:

Education
Educational Administration
Educational Psychology

Minor.—Minors may be chosen as follows:

1. From one of the following fields not representing the major:

Education
Agricultural Education
Curriculum and Instruction
Educational Administration
Educational Psychology
History and Philosophy of Education
Home Economics Education
Industrial Education

2. Any other field of study offered in the University of Minnesota in which satisfactory courses of graduate character are available and which is obviously related to the field of major interest.

3. Students majoring in fields other than education may choose education or any of its subdivisions enumerated above under 1, as a minor when it appears that such a minor is appropriately related to a major field.

Master's Degree—Plan A

Major.—Majors may be chosen as follows:

The student, with the approval of his adviser, may select a group of courses in one of the fields listed below, excluding the field of his minor, centering about his special interest in education.

Agricultural Education
Curriculum and Instruction
Education
Educational Administration
Educational Psychology
History and Philosophy of Education
Home Economics Education
Industrial Education

Minor.—Minors may be chosen as follows:

1. From any of the groupings of courses enumerated above when such grouping is not included in the major.

2. From any other field of study offered at the University of Minnesota in which satisfactory courses of graduate character are available and which is obviously related to the major field.

3. Students majoring in fields other than education may choose education or any of its subdivisions enumerated above as a minor when it appears that such a minor is appropriately related to the major field.

Master's Degree—Plan B

Field of concentration.—Under Plan B, which encourages a wider selection of courses, the student will be expected to select a field of concentration in which he will attain from 21 to 27 credit hours. The field of concentration differs from a major in that it encourages the choice of a somewhat wider range of courses related to the student's interest. As in the case of the major, however, the student will be expected to indicate his field of concentration according to the general arrangement of courses that prevails for the requirement of a major. This arrangement is as follows:

Agricultural Education
Curriculum and Instruction
Education (in special cases)
Educational Administration
Educational Psychology
History and Philosophy of Education
Industrial Education

Additional courses.—The student may elect the additional courses required to complete the total of 45 credits from areas of education not included in the field of concentration and from any other fields of study offered at the University of Minnesota in which satisfactory courses of graduate character are available and which are obviously related to the student's interest. Further work in subject-matter areas is encouraged.

Candidates for the Master's degree under Plan B are expected to earn 9 credits in advanced courses involving papers prepared in independent study. This requirement may be satisfied in starred courses.

Agricultural Education

Prerequisites.—For major or minor work, 18 credits in agricultural education and preparation in agricultural subjects satisfactory to the Department of Agricultural Education.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

Agr.Ed.101f. Part-time School Instruction. Instructional programs for rural young men not regularly enrolled in school. Analysis of rural youth situations and placement problems. Prerequisite: Course 81. 2 credits. Mr. Ekstrom.

Agr.Ed.102w. Evening School Instruction. Instructional programs for adult farmer groups. Organization of courses, teaching procedures, follow-up work, community programs of adult education. Prerequisite: Course 81. 3 credits. Mr. Ekstrom.

Agr.Ed.103s. Facilities and Materials. A study of the physical arrangement for departments of vocational agriculture. Building facilities, room fixtures, references, equipment, visual aids, illustrative materials. Prerequisite: Course 82. 3 credits. Mr. Ekstrom.

Agr.Ed.104s. Planning Programs. Long-time and annual plans for departments of vocational agriculture. Schedule of activities, analysis of results. Prerequisite: Course 82. 2 credits. Mr. Ekstrom.

Agr.Ed.137. Course of Study Construction in Agriculture. A lecture and clinical laboratory course designed to aid teachers in constructing courses of study appropriate to the needs of local communities. Consideration of the principles for the selection, distribution, and organization of subject-matter for the integrated course of study in agriculture. Prerequisite: 10 credits in education 3 credits. (Not offered in 1940-41.)

Agr.Ed.141‡. Supervised Practice in Vocational Agriculture. A special methods course dealing with the selection, planning, supervising, and summarizing of the practical work in agriculture. Special emphasis on the problem method of teaching and the use of the farm and community for teaching purposes. Prerequisite: 10 credits in education. 3 credits. (Not offered in 1940-41.)

Agr.Ed.145. The Integrated Course of Study in Agriculture. A presentation of the problems of organization, administration, and teaching in departments of agriculture in the secondary schools. Special emphasis on planning programs for individual students. Prerequisite: Course 51. 3 credits. (Not offered in 1940-41.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

Agr.Ed.221f,222w,223s. Graduate Problems. Making investigations, gathering data, and formulating plans regarding vocational agriculture. Prerequisite: Consult adviser. Credit arranged. Mr. Field, Mr. Ekstrom.

Agr.Ed.232su.* Research in Agricultural Education. Introduction to investigational work in problems of teaching agriculture in high schools. Experience in selecting problems, preparing bibliographies, analyzing and interpreting data, and preparing manuscripts. 3 credits. Mr. Field.

Agr.Ed.237su. Adult Education in Agriculture. The organization, objectives, and techniques for conducting evening schools and part-time schools for farmers and out-of-school youth. Prerequisite: 15 credits in education. 2 to 3 credits. Mr. Ekstrom.

Agr.Ed.238su. Planning and Evaluating Programs of Agricultural Education. Surveying community needs and the establishment of objectives and goals to meet these needs. Developing long-time and annual programs in agricultural education with suggestions as to means of accomplishments and the evaluation of outcomes. Prerequisite: 15 credits in education. 2 to 3 credits. Mr. Ekstrom.

Agr.Ed.247su.‡ Foundations of Methods in Teaching Agriculture. A study of the progressive philosophy which forms the basis for the current trends in the organization and methods of procedure in teaching agriculture in the secondary schools. Emphasis on the problem of co-ordinating farm practice and the course of study activities of individual students. Critical evaluation of procedures in the adaptation of the learning activities to the level of the individual needs, abilities, and interests of the students. Evaluation of the results of learning, diagnosis of student difficulties, and planning of remedial measures. Prerequisite: 15 credits in education. 2 to 3 credits. Mr. Field.

Agr.Ed.286su. Special Problems in Agricultural Education. Analysis and discussion of special problems of individual teachers. Opportunity for intensive study of specific problems related to local school programs. 3 credits. Mr. Field.

Art Education

ArtEd.153w-154f. Art in Society. An advanced course in appreciation designed to develop student awareness of the relations that have existed between the artist and his product and the society which produced both. The home and costume approached as evidences of the psychological temper of various times, with art as the objective record of man's consciousness. ArtEd. 153, The Home; ArtEd. 154, Personality and Its Expression in Costume. Prerequisite: consult instructor. 3 credits per quarter. Miss Raymond.

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

ArtEd.189w. Application of Esthetic Theory to Public Education. A scrutiny of the varying claims made for art in its wider functional aspect; the validity of the claims tested in everyday living; findings applied to education. Prerequisite: 9 credits in drawing, 9 credits in design. 3 credits. Miss Raymond.

Curriculum and Instruction

Note.—Courses in this department were formerly listed under General Education (Ed.), Administration and Supervision (Ed.Ad.), and Theory and Practice of Teaching (Ed.T.). In most cases the course numbers remain the same.

Fees.—All courses in Curriculum and Instruction carry a fee of $1 per credit.

General Courses

Ed.C.I.104f.‡ Adult Education. An examination of the main lines of development in the fields of adult education, with special attention to principles of adult learning, methods of teaching adults, and the organization of adult education. 2 credits.

Ed.C.I.105s.‡ Visual Aids in Teaching. A study of the characteristics, advantages, limitations, and practical schoolroom use of visual aids of non-projection and projection types. Specific laboratory practice in operation of usual projection machines. Sources of materials available for all grade levels and demonstrations of practical uses of visual aids in various school subjects. 2 credits.

Ed.C.I.107f,s.‡ Radio in Education. The major purpose of the course is to assist teachers and prospective teachers in making the most effective use of radio in the classroom. This necessitates consideration of such aspects as production, techniques of classroom use, selection of equipment, teaching appreciation, and the administrative use of the radio in the schools. Field trips, demonstrations, activities, and concrete examples are used. Individual interests and needs are met by intensive study of one of the several units into which the course is divided. Prerequisite: 9 credits in education. 3 credits. Mr. Tyler.

Ed.C.I.114w.‡ Methods and Materials in the Field of Adult Education. Prerequisite: Course Ed.C.I. 104 or equivalent. 2 credits.

Ed.C.I.145s.‡ Remedial Reading. A study of the remedial practices in reading that are useful to both the classroom teacher and the reading specialist in the light of contributions of research, projects, and observations of remedial techniques. Same as Ed.Psy. 145. Prerequisite: Course 143 or 144 or 259. 2 credits. Mr. Bond.

Ed.C.I.171f,w,s.‡ Curriculum Laboratory Practice. A practice course in the analysis and construction of units, courses of study, and curricula; class projects and individual projects according to needs, interests, level, and specialization. Prerequisite: Course 170 or consent of instructor. 2 to 6 credits. Mr. Bossing, Mr. Cook.

Ed.C.I.174f-175w-176s.†‡§ Clinical Methods and Practice in Speech Pathology. Case history and analysis; testing and diagnosis of speech defects; techniques and work programs for treatment; practical clinical work with children in the public schools and adults in the University Speech Clinic. Prerequisites:

‡ A fee of $1 per credit is charged for this course.
§ Passing the qualifying examination is prerequisite to this course.

Sp. 1-2-3, 61, 67, 162; Psy. 4-5; Zool. 83 or Psy. 52; Ed.Psy. 60; Human Physiol. 2; Human Anat. 3; and permission of instructor. 9 credits. Mr. Bryngelson, Mr. Brown.

Ed.C.I.207f,w,s.*‡ Problems in Radio Education. Individual problems for graduate students whose work in Ed.C.I. 107 has indicated a special aptitude and interest in the field. Each student selects a problem, studies it intensively, outlines the proposed procedure, and carries it through to completion under the guidance of the instructor. Meetings of the class are called from time to time for discussion and criticism of individual projects. Prerequisite: Course 107. Credit arranged. Mr. Tyler.

Ed.C.I.271f,w,s.*‡ Problems in Curriculum Construction. Special problems in the field of the student's individual choice. Prerequisite: completion or current enrolment in one of the following: Ed.C.I. 113, 119, 170; or the consent of the instructor. 2 to 6 credits. Mr. Bossing, Mr. Cook, Mr. Archer.

Ed.C.I.273f,w,s.*‡ Problems in Reading. Recent problems, issues, studies, and findings. Intended for those who have had previous training in reading and have a special problem or who wish to survey the most recent literature. Prerequisite: previous training in reading such as Course 145 or 259. Credit arranged. Mr. Bond.

Elementary Education

Ed.C.I.119f.‡ Elementary School Curriculum. A study of curriculum issues, viewpoints, and a survey of the methods, problems, and findings of research by subjects. An analysis of selected state and local curricula will be made. Prerequisite: Course Ed. 61C or equivalent. 3 credits. Mr. Cook.

Ed.C.I.143f.‡ Teaching of Reading in the Elementary School. A study of the objectives, the materials, and the teaching procedures in lower and intermediate grades in the light of the contributions of research; survey of current practices and curricula; class and individual projects; observation of reading techniques and materials in the demonstration school. Prerequisite: 9 credits in education. 2 credits. Mr. Bond.

Ed.C.I.144w.‡ Teaching of Reading in the Upper Grades, and Junior and Senior High Schools. A study of the teaching procedures, objectives, and materials, with special consideration for the teaching of reading in the various subject-matter fields. Prerequisite: 9 credits in education. 2 credits. Mr. Bond.

Ed.C.I.146w.‡ Current Developments in Language Expression in the Elementary School. A general course in the function and development of power in connection with all experiences of the school day. Materials, methods, and current philosophies of language instruction in the elementary school. Prerequisite: Course Ed. 61A-B-C or equivalent. Not open to students who have had Ed.T. 64. 2 credits. Miss Smith.

Ed.C.I.148.‡ The Teaching of Arithmetic in the Primary Grades. Functions of arithmetic; curriculum studies, preparation of informational units; tests of arithmetic readiness; organization of materials; teaching methods. Prerequisite: Ed. 61C or equivalent. Not open to students who have had Ed.T. 54B. 2 credits. (Not offered in 1940-41.)

Ed.C.I.149w.‡ The Teaching of Intermediate Grade Arithmetic. Functions of arithmetic instruction; curriculum studies; development of socialized units; measurement and diagnosis; experimental research on methods of arithmetic

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

instruction; literature on arithmetic. Prerequisite: Ed. 61C or equivalent. Not open to students who have had Ed.T. 54B. 2 credits. Mr. Brueckner.

Ed.C.I.150f.‡ Supervision and Improvement of Instruction. An analysis of the functions and duties of a supervisor as related to the improvement of instruction; specific supervisory technique, objective analysis of classroom activity; concrete applications to present-day problems; case studies. Prerequisite: Ed. 61C or equivalent. 3 credits. Mr. Brueckner.

Ed.C.I.151w.‡ Diagnosis and Remedial Instruction. Objective evaluation of the results of teaching; diagnosis of pupil difficulty; remedial work; tests as aids to teaching; following up a testing program. Prerequisite: Course 150 or equivalent. 3 credits. Mr. Brueckner.

Ed.C.I.152.‡ Supervision—The Adjustment of Schools to Individual Differences. The adaptation of the school, the curriculum, and classroom procedures to the abilities and interests of pupils. Prerequisite: 15 hours in education. 2 credits. (Not offered in 1940-41.)

Ed.C.I.153s.‡ Supervision and Teaching of English in the Elementary Schools. Improvement of instruction in language, grammar, spelling, and handwriting; the results of scientific investigation; use of standardized and informal tests; remedial work. Prerequisite: Ed. 61C or equivalent. 2 credits. Mr. Archer.

Ed.C.I.155.‡ Supervision and Teaching of Arithmetic. Locating supervisory needs; enrichment of instruction; selection, organization, gradation of the curriculum; diagnostic and remedial teaching; recent trends and research. Prerequisite: Ed. 61C or equivalent. 2 credits. (Not offered in 1940-41.)

Ed.C.I.156s.‡ Practice Supervision—Group Problems and Field Work. Instructional and supervisory problems studied with the help of direct classroom visitation in university demonstration schools and schools in the Twin Cities, followed by conferences with teachers and supplemented with research in the literature. Prerequisite: 15 hours in education, and permission of instructor. 3 credits. Mr. Brueckner, Mr. Bond.

Ed.C.I.157f,w,s.‡ Practice in Supervision. Individual research on special supervisory problems, especially intended for supervisors in service. Prerequisite: consent of instructor. 3 credits per quarter. Mr. Brueckner.

Ed.C.I.160s.‡ Supervision of Elementary Subjects. An overview course for giving supervisor and superintendent information as to recent trends in elementary education. Prerequisite: Course 150. 2 credits. Mr. Brueckner, Miss Smith, Mr. Wesley, Mr. Bond.

Ed.C.I.170Aw.‡ Curriculum and Course of Study Construction. A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the elementary school level. Prerequisite: Course 119 or consent of instructor. 3 credits. Mr. Cook.

Ed.C.I.181s.‡ Foundations of Elementary School Methods. A survey of the current philosophy and research which form the bases for improvement of elementary school instruction. Observation in the demonstration school. Prerequisite: 9 credits in education. 3 credits. Mr. Brueckner.

Ed.C.I.181T‡-182T.‡ Foundations of Elementary School Methods. (Same as Course 181 above for teachers.) 3 credits. (Not offered in 1940-41.)

Ed.C.I.190w.‡ Principles of Selection of Materials for Reading in the Elementary School. An advanced course in reading and selection of materials suitable for

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

the elementary school with emphasis upon curriculum needs, principles of child development, and scientific determination of reading difficulty. Prerequisite: Ed. 61C or equivalent. 2 credits. Miss Smith.

Ed.C.I.224f-225w-226s.‡ Seminar in Elementary School Problems. Mr. Peik, Mr. Brueckner.

Ed.C.I.259w.‡ Supervision and Teaching of Reading. The improvement of instruction and supervision of reading by teachers, principals, and supervisors. 2 credits. (Not offered in 1940-41.)

Ed.C.I.261f,w,s.*‡ Special Problems in School Supervision. Intended primarily for graduate students majoring in supervision and others qualified to make intensive studies of specific problems related to school supervision. Fall, surveys of instruction; winter, construction of tests for measuring the extent to which objectives are achieved; spring, problems in the evaluation of teaching. Prerequisite: 10 credits in education. 2 credits per quarter. Mr. Brueckner.

Ed.C.I.263f.*‡ Research in Arithmetic Instruction. A study of recent research in curriculum, gradation of subject-matter, methods, materials, and supervision of arithmetic. Prerequisite: Course 156 or 148 or 149 or equivalent. 2 credits. Mr. Brueckner.

Ed.C.I.264w.*‡ Research in Educational Diagnosis. A study of recent research in the methods of diagnosis in education, and the techniques of preventive and remedial teaching. Prerequisite: Course 151 or equivalent. 2 credits. Mr. Brueckner.

Ed.C.I.265s.*‡ Recent Literature in Supervision. A study of recent research on problems of elementary school supervision. Prerequisite: consent of instructor. 2 credits. (Not offered in 1940-41.)

Secondary Education

Ed.C.I.113f.‡ High School Curriculum. A study of viewpoints and curriculum issues; organization trends; typical research findings by subjects; and the analysis of state and local curricula. Prerequisite: Ed. 51A-51B-51C or equivalent. 4 credits. Mr. Bossing.

Ed.C.I.121w.‡ Educational Advising of Women and Girls. A course designed to acquaint students with the problems of educational advising of young women and girls, particularly those of high school age. Students admitted to the course through conference with instructor. Prerequisite: 15 credits in education and psychology. 3 credits. Miss Blitz.

Ed.C.I.122s.‡ Literature for Adolescents. A background for pupil guidance in extensive reading in junior and senior high schools; analysis of studies of adolescent choices in literature; principles of selection; critical reading in broad field of literary, biographical, historical, scientific, and vocational interests of boys and girls. Prerequisite: Ed. 51C or jr.-sr. high school teaching experience. 2 credits. Miss Smith.

Ed.C.I.135w.‡ Teaching of Occupations and Group Guidance. Problems of group work in guidance in the secondary schools. Content and materials for home room groups, occupations classes, and other guidance courses in junior and senior high schools. Prerequisite: 9 credits in education. 2 credits. Miss Edwards, Miss Wright.

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

Ed.C.I.144.‡ Teaching of Reading in the Upper Grades and Junior and Senior High Schools. A study of the teaching procedures, objectives, and materials, with special consideration for the teaching of reading in the various subject-matter fields.

Ed.C.I.168w.‡ Current Developments in the Social Studies. A survey of contemporary literature, curricular trends, the commission report, and recent developments in integration. 2 credits. Mr. Wesley.

Ed.C.I.169s.‡ Extracurricular Activities. Types of activities in junior and senior high schools; aims and values; practices in organizing, administering, and supervising; methods of evaluation. Prerequisite: 10 hours in education, including Ed. 51A. 3 credits.

Ed.C.I.170Bw,s.‡ Curriculum and Course of Study Construction. A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the secondary school level. Prerequisite: Course 113 or consent of instructor. 3 credits. Mr. Bossing.

Ed.C.I.188s.‡ Advanced Course in Methods of Teaching Modern Languages. An advanced course of the seminar type in methods of teaching modern foreign languages. Designed primarily for experienced teachers and graduate students. Lectures, readings, discussions. Prerequisite: Ed.T. 72A-B-C or equivalent. 2 credits. (Not offered in 1940-41.)

Ed.C.I.191s.‡ Advanced Course in the Teaching and Supervision of Secondary School Mathematics. Evaluation of present practices in methods, content, and administration of junior and senior high school mathematics. Prerequisite: Ed. 51C or permission of instructor. 2 credits. Mr. Walker.

Ed.C.I.198s.‡ Recent Literature in Methods and Curriculum in English. (Students should not register for this course in the same year with Ed.C.I. 294.) 2 credits. Miss Smith.

Ed.C.I.201f-202w-203s.*†‡ Problems in Teaching the Social Studies. Consent of the instructor is necessary. 2 credits per quarter. Mr. Krey, Mr. Wesley.

Ed.C.I.204s.‡ Social Studies Curriculum. Prerequisite: Ed.T. 69A-69B-69C or equivalent. 2 credits. Mr. Wesley.

Ed.C.I.222f-223w-224s.‡ Seminar in the Technique of High School Instruction. No credit. Required of students working on theses. Mr. Bossing, Mr. Johnson, Miss Smith, Mr. Wesley.

Ed.C.I.225f,w,s.*‡ Special Problems in the Supervision of Secondary Schools. Credit arranged. Mr. Boardman.

Ed.C.I.254.‡ Supervision of the Social Studies. The scientific work being done on the course of study in geography, history, science, and related fields; improvement of instruction in social sciences. Prerequisite: Ed. 61C or equivalent. 2 credits. (Offered alternate years. Not offered in 1940-41.) (See Course 168.)

Ed.C.I.266s.‡ Supervision of High School Instruction. The present status of high school supervision; its proper scope and function. A course combining consideration of principles and their application to improving high school instruction in the academic and special subjects. This is the third part of a three-quarter sequence. For fall and winter courses see Ed.Ad. 264-265. Students may register for any quarter. 3 credits. Mr. Boardman.

Ed.C.I.284f.‡ Advanced Course in the Teaching of Science. A study of recent developments in the teaching of science and a critical evaluation of the investigations dealing with science teaching. 2 credits. Mr. Johnson.

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

Ed.C.I.293s.*‡ Foundations of Secondary School Methods. A study of the investigations which form the bases of the technique of high school instruction and the application of their results to subject-matter and to classroom procedure. Each member will work primarily in the field of his teaching choice, with a final synthesis by the class as a whole. 3 credits. Mr. Johnson.

Ed.C.I.294f.*‡ Advanced Course in Methods of Teaching English. Evaluation of present practices in methods and content of junior and senior high school English courses in the light of the known results of scientific investigations in that field. Prerequisite: Ed.T. 66A-B-C or equivalent. 2 credits. Miss Smith.

Ed.C.I.296-297.*‡ Special Problems in Techniques of Secondary School Instruction. Special research problems in the field of the student's individual choice. 2 credits per quarter. Miss Smith.

Higher Education

Ed.C.I.184f.‡ Supervision of Student Teaching. A course primarily for teachers engaged in the direction of student teachers in secondary education. 2 credits. Mr. Carlson.

Ed.C.I.228f-229w-230s.*‡ Problems of College Education. Problems of student personnel, of college curricula and instruction, of organization and administration. Topic for the year the Educational Program of Higher Institutions. 6 credits. Mr. Peik, Mr. McConnell, and others.

Ed.C.I.250f.‡ Higher Education in the United States. A survey of the historical development of institutions of higher education and a consideration of the following topics: the functions of higher education in a democracy; types of higher institutions; the articulation of secondary and higher education; readjustments in organization and administration, curriculum, and instruction; the control of higher education; the evaluation of higher institutions by accrediting agencies; educational principles and theories underlying present curriculum practices; the functional relationship of curriculum and aims; relating the curriculum to student needs and characteristics; the curriculum as a whole; the curriculum for general education and for advanced and special education; and the improvement of instruction. Prerequisite: 15 credits in education. 3 credits. Mr. McConnell.

Ed.C.I.285f.‡ The Professional Education of Teachers. A study of the present status of teacher education and of the problems that relate to the institutional training of teachers for public schools and higher education. Prerequisite: 15 hours in education. 2 credits. Mr. Peik.

Ed.C.I.286f,w,s.*‡ Individual Problems in Teacher Training. Planned for those who have a special interest in this field. An intensive study of specific problems. Consult instructor before enrolling. Prerequisite: Ed.C.I. 285 or consent of instructor. 2 credits. Mr. Peik.

Ed.C.I.287s.‡ Instruction and Administration in Teachers' Colleges. In this course emphasis is placed on the historical development, the present status, and the prospects of future development. An intensive study is made of curricula, departmental organization, and practice teaching. Emphasis is placed also on the supervision of instruction. Prerequisite: 15 hours in education. 2 credits. Mr. Peik.

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

Educational Administration

General Courses

Ed.Ad.124f. Public School Administration. The organization, administration, and general support of public schools in state and local school districts. Prerequisite: 10 hours in education. 3 credits. Mr. Neale.

Ed.Ad.125w. Techniques in Administration. Standard practices regarding child accounting problems, records and reports; procedures having to do with personnel and school board relations and rules and regulations; standard office practices, including textbook and supply management. Prerequisite: Course 124. 3 credits. Mr. Neale.

Ed.Ad.144s. Organization and Administration of Adult Education in Public and Private Agencies. Prerequisite: Course Ed.C.I. 104 or consent of instructor. 2 credits.

Ed.Ad.205f,w,s. Problems in Adult Education. Open to graduate students and professional workers in the field with permission of the instructor. Prerequisites: Ed.Psy. 293-294, Ed.C.I. 114, Ed.Ad. 144. 2 credits per quarter.

Ed.Ad.210s.* Financial Aspects of Public School Business Administration. Financial program planning, budgeting, accounting, cost finding, income and expenditure control; and the preparation and analysis of financial reports. Prerequisites: Courses 124 and 125. 3 credits. Mr. Neale.

Ed.Ad.226s. School Plant Planning and Management. Plant program planning and financing, including operation and maintenance of public school buildings. Prerequisite: Course 124. 3 credits. Mr. Neale.

Ed.Ad.228f,w,s.* Special Problems in Educational Administration. This course is designed primarily for superintendents and principals qualified to make intensive studies of specific problems related to the administration of a school system. 1 or 2 credits per quarter. Mr. Neale.

Ed.Ad.230f.* Public Relations for Schools. Theory and practice of educational interpretation. Principles involved; machinery and personnel; the teacher's contacts with the community; the role of the pupil; professional and lay organization. 3 credits. Mr. Neale.

Ed.Ad.235f-236w-237s. Seminar in Educational Administration. Enrolment limited to candidates for Master's degrees under Plan A and candidates for Ph.D. degrees in educational administration. No credit. Mr. Neale.

Elementary Education

Ed.Ad.115w. Organization of the Elementary School. Problems relating to the organization for instruction and classification of pupils in elementary schools with critical examination of current practices. Prerequisite: 10 credits in education. 2 credits. Mr. Neale.

Secondary Education

Ed.Ad.133f. Guidance in Secondary Schools. Basic principles and current practices in educational and vocational guidance in junior and senior high schools. Application of principles through case discussions. Same as Ed.Psy. 133. Prerequisite: 9 credits in education. 2 credits. Miss Edwards.

Ed.Ad.167s. Junior High School. Sources of the movement; purposes, functions, and limitations; types of reorganization; fundamental problems of reorganization; reorganization of subject-matter. Prerequisite: 10 hours in education, including Ed. 51. 2 credits. (Not offered in 1940-41.)

Ed.Ad.218f-219w-220s. Current Problems in Secondary School Education. Fall—Issues in Secondary Education; winter—Critical Analysis of Co-operative Study of Secondary School Standards; spring—Recent Literature in Secondary Education. Credit arranged. Mr. Boardman, Mr. Bossing.

Ed.Ad.264f-265w. High School Administration. Organization of secondary school units; housing; selection and assigning of the staff; schedule making; public relations and publicity; organization of guidance and of extracurricular activities; pupil, equipment, and internal fund accounting and related problems of administration; government; problems related to instruction. For continuation of this course in spring quarter, see Ed.C.I. 266. Prerequisite: 10 hours in education including Ed. 51A. 2 credits per quarter. Mr. Boardman.

Ed.Ad.270f,w,s.* Special Problems in Secondary Education. Primarily for those at work in high schools who are qualified to make intensive studies. Consult instructor before registering. Prerequisite: 10 hours in education including Ed. 51A. 2 credits. Mr. Boardman.

Ed.Ad.280f,w,s.‡ Practice in High School Administration. Practical experience in problems of administration, pupil personnel, curriculum administration, extracurricular activities, staff problems, program and schedule making, etc. Consult instructor before registering. Prerequisite: 10 hours in education including Ed. 51C. 2 credits per quarter. Mr. Boardman.

Higher Education

Ed.Ad.253w. Administration in Higher Education. Control, faculty and employee personnel administration, budget making and administration, financial accounting and reporting, protection of college funds, public relations. Prerequisite: consent of instructor. 3 credits. Mr. Neale.

Ed.Ad.287s. Instruction and Administration in Teacher Training Institutions. See Ed.C.I. 287. 2 credits. Mr. Peik.

Educational Psychology

General Courses

Ed.Psy.116w-117s. Statistical Methods in Education. A course designed to lay the foundations of statistical theory and to give practice in applying the theories in the solution of educational and psychological problems. 3 credits per quarter. Mr. Van Wagenen.

Ed.Psy.120f,s. Basic Principles of Measurement. Principles applied to the construction and use of tests and to the interpretation and evaluation of scores. Illustrations from mental and other aptitude tests, education, personality, and character tests. Prerequisite: Course 60 or equivalent. 3 credits. Mr. Cook.

Ed.Psy.138-139.† Experimental Educational Psychology. A laboratory course designed to train students in the use of experimental methods in the study of educational problems, particularly in the field of the psychology of learning. It is suggested that this course supplement either 133 or 290, 291, 292, 293-294. Prerequisite: Ed. 51A or equivalent. 4 credits. (Not offered in 1940-41.)

Ed.Psy.140w. Construction and Use of Educational Tests and Examinations. A study of tests for elementary and secondary school pupils and for graduate students. Each student will have opportunity to construct examinations and evaluate published tests in the field of his major interest. Prerequisite: Course 120 or equivalent. 3 credits. Mr. Cook.

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

Ed.Psy.141w. Construction and Use of Group Aptitude Tests. A study of group aptitude tests for all school levels with special emphasis on reliability and validity as instruments for educational and vocational guidance. Prerequisite: Course 120 or equivalent. 3 credits. Mr. Miller.

Ed.Psy.142f. Construction and Use of Individual Aptitude Tests. Application of basic principles of measurement to individual diagnosis. Demonstration and practice. Stanford-Binet, Kuhlman-Binet, and performance tests. Consideration of other clinical methods. Prerequisite: Course 120 or equivalent. 3 credits. Mr. Bond.

Ed.Psy.143w. Individual Mental Testing Laboratory. Prerequisite: Course 142. Mr. Bond.

Ed.Psy.149f-150w-151s. Psycho-educational Clinic. Conducted in co-operation with existing clinics and agencies in the Twin Cities. Students will receive practice in giving psychological examinations, in case study, and in scientific interpretation of data. Prerequisites: Courses 120, 140, and 141 or 142, permission of instructor. 2 to 6 credits. Mr. Bond.

Ed.Psy.159f. Personality Development and Mental Hygiene in Education. A survey course for educational workers, particularly teachers and counselors. Emphasis on an understanding of the factors involved in personality development and on the preventive rather than the remedial phases of mental hygiene. Attention is given to the various types of maladjustments as well as to the conditions under which a teacher or counselor can safely attempt remedy or treatment. Prerequisite: 9 credits in education including one recent course in psychology. 3 credits. Mr. Wrenn.

Ed.Psy.180. Esthetics in Education. An objective approach to the existence, causes, and methods of dealing with individual differences in esthetic abilities. Prerequisites: 15 credits in education and psychology. 2 credits. (Not offered in 1940-41.)

Ed.Psy.189. The Human Organism. The development of the human organism in relation to educational practice. Prerequisite: permission of instructor. 3 credits. (Not offered in 1940-41.)

Ed.Psy.201f-202w-203s. Seminar in Educational Psychology. A research course for graduate students. Required of all students writing theses in educational psychology. Does not carry credit as course work. Mr. Johnson, Mr. McConnell, Mr. Miller, Mr. Wrenn, Mr. Bond, Mr. Cook, Miss Edwards, Mr. Van Wagenen.

Ed.Psy.208w.* Methods in Educational Research. A study of the methods employed in the investigation and report of educational problems. Designed to aid students in the preparation of theses. Suggested for all candidates for degrees. 2 credits. Mr. Johnson.

Ed.Psy.216f-217w-218s. Statistical Methods in Education. A course designed to lay the foundations of statistical theory and to give practice in applying the theories in the solution of educational and psychological problems. Primarily for graduate students. 3 credits per quarter. Mr. Johnson.

Ed.Psy.225w. Diagnosis and Counseling in a Student Personnel Program. An advanced course requiring recent background in both psychological measurement and principles of guidance. Stress is laid upon skill in interpreting diagnostic material rather than upon theory. Attention is given to the techniques for collecting information regarding a student, the making of a

diagnosis, and the techniques of counseling and interviewing. Case studies are used as problems and visits made to several guidance clinics. Credit arranged. Mr. Wrenn.

Ed.Psy.233f,w,s.* Problems in Guidance and Personnel Work. During the fall and winter quarters this course is designed only for those who have research problems upon which they wish assistance or who desire advanced reading in certain areas of the general field. There are no class meetings. During the spring quarter the class meets as an advanced seminar for those who are well along in their Master's or doctoral program in personnel work. Credit arranged. Mr. Wrenn, Miss Edwards.

Ed.Psy.240f,w,s.* Problems of Measurement. Intensive study and individual research in problems of educational and vocational measurement. 2 credits. Mr. Johnson.

Ed.Psy.243f,w,s. Problems in Statistics for Students in Education and Psychology. A seminar devoted to recent developments in statistical science with special reference to their application to educational and psychological problems. Credit arranged; or may be taken without credit. Mr. Johnson.

Ed.Psy.253f-w-s.* Research Problems. Prerequisite: consult instructor. Mr. Johnson, Mr. McConnell, Mr. Miller, Mr. Bond, Mr. Cook, Mr. Van Wagenen.

Ed.Psy.281f,w,s. Practice in Personnel Work. Designed to give properly qualified students experience in the use of psychological and related methods in dealing with individuals. Prerequisite: satisfactory preparation in psychology and education and approval of adviser. 2 credits per quarter. Mr. Wrenn, Miss Edwards.

Ed.Psy.290f. Original Nature of Man. Advanced work in genetic psychology, man's unlearned behavior, and inherited capacities. Prerequisites: Ed. 51A and Ed.Psy. 60 and permission of instructor. 3 credits. Mr. Miller.

Ed.Psy.291w. Individual Differences. A study of group and individual differences and their relations to educational practice. Prerequisites: Ed. 51A and Ed.Psy. 60 and permission of instructor. 3 credits. Mr. Miller.

Ed.Psy.292s.* Recent Literature in Educational Psychology. Readings and reports on problems in educational psychology. Prerequisites: Ed. 51A and Ed.Psy. 60 and permission of instructor. 3 credits. Mr. Miller.

Ed.Psy.293w-294s.* Psychology of Learning. A systematic study of theories and research in human learning and their implications for curriculum and instruction. Prerequisite: 12 credits in psychology and educational psychology. 3 credits per quarter. Mr. McConnell.

Ed.Psy.293Tw.* Psychology of Learning. For teachers and administrators. See 293-294. 3 credits. (Not offered in 1940-41.)

Ed.Psy.297-298-299.* Problems in Subnormality. Phases of subnormality studied intensively. Review of important literature and original investigation. Student required to make report on assigned topics and submit a paper on some problem at the close of the quarter. (Not offered in 1940-41.)

Elementary Education

Ed.Psy.113f-114w-115s. Psychology of Elementary School Subjects. A discussion of the research studies in the field of the psychology of elementary school subjects. Prerequisite: 10 hours in education and psychology. 2 credits per quarter. Mr. Van Wagenen.

Ed.Psy.146w-147s.† Child Guidance. The understanding and treatment of all forms of behavior problems in children of school age. Didactic lectures, reading, and presentation of clinical case records. Prerequisite: 15 credits in psychology and education. 2 credits per quarter. Mr. Challman.

Ed.Psy.157. Psychology of Child Development. The physical, mental, social, and emotional development of children from birth to adolescence. Prerequisite: 6 credits in psychology. 2 credits. (Not offered in 1940-41). See Child Welfare 130-131.

Ed.Psy.182f. Education of Handicapped Children. Prerequisite: Ed. 51A or 61A or equivalent. 2 credits. Mr. Bond.

Ed.Psy.183w. Education of Gifted Children. A study of the abilities and characteristics of intellectually gifted children and adults. Prerequisite: Ed. 51A or 61A or equivalent. 2 credits. Mr. Bond.

Ed.Psy.184s. Education of the Slow Learning Child. A study of physical and mental traits of intellectually subnormal children and adults; social problems of feeble-mindedness. Prerequisite: Ed. 51A or 61A or equivalent. 2 credits. Mr. Bond.

Secondary Education

Ed.Psy.133f. Guidance in Secondary Schools. Basic principles and current practices in educational and vocational guidance in junior and senior high schools. Application of principles through case discussions. Same as Ed.Ad. 133. Prerequisite: 9 credits in education. 2 credits. Miss Edwards, Miss Wright.

Ed.Psy.158s. Psychology of Adolescence. A study of the physical and mental changes that characterize the transition from childhood to adult life. Implications for educational guidance during the period of secondary education. Prerequisite: Ed. 51A or equivalent. 2 credits. Miss Edwards.

Higher Education

Ed.Psy.252s. Student Personnel Work in College and University. An advanced course for students who have had at least one earlier course in higher education and who wish to become familiar, as college personnel workers or college teachers, with student personnel functions. The course will consider the philosophy back of student personnel work, the specific personnel services with particular regard to the work of the counselor and the faculty adviser and the student personnel administration. Prerequisite: Ed.C.I. 250 or Ed.Ad. 253 or Ed.Psy. 254. 3 credits. Mr. Wrenn.

Ed.Psy.254s. Measurement and Evaluation in Higher Education. A consideration of the examination program in American institutions of higher learning; principles of examination instruction at the college level; the design of investigations and the critical evaluations of investigations in higher education. Prerequisite: 15 credits in education. 3 credits. Mr. Johnson.

History and Philosophy of Education

General Courses

H.Ed.101f. Historical Foundations of Modern Education. Historical analysis and interpretation of the more important elements in modern education derived from the Greeks, Romans, the Middle Ages, and the Renaissance. Prerequisite: 6 credits in psychology. 3 credits. Miss Alexander.

H.Ed.102w. History of Modern Secondary and Higher Education. A historical study of the origin, aims, growth, and existing types of European and American secondary schools. Prerequisite: 6 credits in psychology. 3 credits. Miss Alexander.

H.Ed.103s. History of Modern Elementary Education. The institutions, theories, and problems of modern elementary education in the light of their history. Emphasis upon the rise of state systems and upon the history of modern educational reform. Not open to students who have had H.Ed. 71. Prerequisite: 6 credits in psychology. 3 credits. Miss Alexander.

H.Ed.129-130. Educational Classics. An intensive study of selected writings of educational leaders from ancient times to the present day. (Not offered in 1940-41.)

H.Ed.131-132. Comparative School Systems. A survey of the existing school systems in foreign countries including France, England, Germany. Emphasis upon present problems. (Not offered in 1940-41.)

H.Ed.162s. Significance of Progressive Education. A critical survey of the progressive education movement in terms of its basic philosophy and its effect on educational practices. 2 credits. Mr. Brueckner, Mr. Brameld.

H.Ed.176f. Conflicting Issues in Modern Education. A critical survey of major philosophies of education in their social setting. Not open to students who have taken Course 76. Prerequisite: 6 credits in psychology. 2 credits. Mr. Brameld.

H.Ed.177w. Philosophic Foundations of Modern Education. Emphasis will be placed upon the essential derivations of current educational philosophy with a view to placing the latter in clearer relation to modern life and society, and with some effort to frame a satisfactory educational philosophy for prospective teachers. Prerequisite: Course 76 or 176 or 6 credits in general philosophy. 3 credits. Mr. Brameld.

H.Ed.178f. Education and Problems of American Democracy. A study of the conflicts and tensions in current American life as these affect the program of the public schools and colleges. Concern will be given such issues as the role of education in social reconstruction, the function of teacher organizations in political life, the meanings of academic freedom and indoctrination in relation to democracy, etc. Prerequisite: Course 76 or 176 or 12 credits in social science. 3 credits. Mr. Brameld.

H.Ed.179s. Critical Thinking for Teachers. Through the practical examination of typical educational materials, this course will aim to increase the ability of prospective teachers to think more logically, to read and listen more critically, and to convey something of this ability to their students. Besides this constructive feature, emphasis will be placed also on the detection of common fallacies and propaganda devices as these appear in educational literature, pressure groups, in the schools, etc. Prerequisite: 6 credits in psychology. 3 credits. Mr. Brameld.

H.Ed.180w. The School and the Social Order. This course will consider the cultural and social setting within which schools function today. Such problems will be weighed as the relation of education and the state, etc. Prerequisite: 12 credits in social science. 2 credits. Mr. Brameld.

H.Ed.181s. Tutorial Work in Educational Philosophy and Sociology. This course will be designed on an individualized basis for students who have developed

a special interest in problems raised by some previous courses in educational philosophy and sociology. Prerequisite: 5 credits from Courses 76, 176, 177, 178, 179, 180. 3 credits. Mr. Brameld.

H.Ed.231f,w,s. Problems in Comparative Education. Prerequisite: Course 131. Credit arranged. (Not offered in 1940-41.)

H.Ed.241f-242w-243s.* Problems in the History of Education. Prerequisite: permission of instructor. 2 credits per quarter. Mr. Wesley.

H.Ed.276f,w,s.* Problems in Educational Philosophy and Sociology. Prerequisite: consult instructor. Credit arranged. Mr. Brameld.

Elementary Education

H.Ed.103s. History of Modern Elementary Education. See above under General Courses. 3 credits. Miss Alexander.

Secondary Education

H.Ed.102w. History of Modern Secondary and Higher Education. See above under General Courses. 3 credits. Miss Alexander.

Home Economics Education

See Home Economics Education, pages 109-110.

Industrial Education

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

Ind.101f. Tests in Industrial Subjects. Acquaintance with such available tests of aptitude and achievements as are useful in industrial education; application of known techniques in remedial teaching to the work of shop and drawing teachers. Critical evaluation and planning. Prerequisite: Ed. 51A. 2 credits. Mr. Widdowson.

Ind.102w. The General Shop (not a shop course). Purpose of the new general shop organization; current practice as to types of shops, equipments, instructional materials and procedures, pupil personnel plans, etc. Special attention to planning for individual school situations of those enrolled. Prerequisite: Ind. 80 or equivalent. 2 or 3 credits.

Ind.103w. Instructional Aids. Analysis of various instructional aids; preparation of instruction sheets; work plans for their use. Prerequisites: Courses 40, 42. 2 credits.

Ind.105w. Industrial Education. For superintendents, principals, and teachers not specializing in the field named; general and vocational phases considered; objectives, administration, and supervision; programs and practices; laws, rulings, and standards for aid; significant literature; how to judge teachers, courses, and methods in the special field. 3 credits. Mr. Smith.

Ind.107w. Co-ordination. An analysis of the province and duties of co-ordinators in trade schools, part-time programs, and cosmopolitan high schools offering training opportunities. Informational for school administrators and in the nature of guidance and training for those having interest in this new type of school work. Prerequisites: Courses 60, 61 or 105 or consent of instructor. 2 credits.

Ind.108s. Apprenticeship. History and recent development of apprenticeship in the United States; trends, practices, organization, laws, and rulings; state plans for vocational education in their varying relationships to apprenticeship. Prerequisite: same as for 107. 2 credits.

Ind.110w. Guidance in the Schools. The history of the educational and vocational guidance movement; typical public school means and methods; collection and use of occupational information; duties of the counselor; organization and relationships. Prerequisite: Ed. 51A. 2 credits. Mr. Smith.

Ind.115s. Supervision of Industrial Education. Principles of creative supervision applied in industrial teaching; analysis of duties, organization for supervision; functional analysis of modern concepts of industrial education. 2 credits.

Ind.170f. Day Industrial Schools. National, state, and local organization and types; buildings and equipment; promotion and advertising; co-operative relationships; teaching staff; pupil guidance, training, and placement. Prerequisites: Courses 60, 61. 2 credits. Mr. Craigo.

Ind.171w. Evening Industrial Schools. Development of the after-training of adults; agencies and scope of the movement; national and state legislation; qualification of instructors; problems and difficulties; records and certification, fees and charges; building, equipment, and instruction facilities. Prerequisite: Course 170. 2 credits.

Ind.172s. Part-time Education. A study of the new movement for part-time education; social and economic background; organization of classes, study of special student groups, courses of study; typical schools; comparative state legislation and plans. Prerequisites: Courses 170, 171. 2 credits.

COURSES PRIMARILY FOR GRADUATE STUDENTS

Ind.200f,w,s.* Research Problems. Independent work for the degrees master of arts, Plan B, and master of education, Plan Y. Prerequisite: consent of instructor. 3, 6, or 9 credits per enrolment; 9 credits required. Mr. Smith.

Ind.250f-251w-252s (formerly Ind.150-151-152). Problems in Vocational Education. Six credits offered. Survey of printed reports; critical analysis; selection of thesis problems; formulation of work plans; reports of progress; organization and presentation. Not a part of the four-year curriculum. Limited to those with full status as candidates for the Master's degree. Prerequisite: consent of instructor. 6 credits. Mr. Smith.

ELECTRICAL ENGINEERING

Professors John M. Bryant, Henry E. Hartig; Associate Professors Elmer W. Johnson, John H. Kuhlmann, James S. Webb.

Prerequisites.—For major work, E.E. 121 to 126 or their equivalent; for minor work, 6 credits in physics, integral calculus, and one of the following: E.E. 38, 45, 48, or 125.

Master's degree.—Offered under both Plan A and Plan B.

Courses Acceptable Both for Communication and Radio Engineering and Power Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

111f. Junior Electrical Engineering. Alternating current circuits and machinery. Prerequisites: Courses 15 and 16. 5 credits.

112f. Junior Electrical Engineering Laboratory. Taken with Course 111. Experimental study of alternating current circuits and machinery. Prerequisite: registration in Course 111. 2 credits.

113w-115s. Junior Electrical Engineering. Alternating current circuits and machinery. Prerequisites: Courses 111, 112 for 113; and Courses 113, 114 for 115. 3 credits per quarter.

114w-116s. Junior Electrical Engineering Laboratory. Taken with Course 113-115. Experimental study of alternating current circuits and machinery. Prerequisite: registration in Course 113-115. 1 credit per quarter.

117w-119s. Engineering Electronics. Fundamental theory of electronic devices. Prerequisites: Courses 111, 112 for 117, and Course 117 for 119. 3 credits per quarter.

121f-123w-125s. Senior Electrical Engineering. Theory of alternating and direct current machinery. Prerequisites: Courses 115, 116, 119. 3 credits per quarter.

122f-124w-126s. Senior Electrical Engineering Laboratory. Operating characteristics of alternating and direct current machinery. Prerequisites: Course 116 and registration in Courses 121, 123, 125. 2 credits per quarter.

127f-128w-129s. Transient Electrical Phenomena. Mathematical study of electric circuits during sudden changes of conditions. Classical and operational methods of analysis applied to electric circuits and machines, and use of the oscillograph in the analysis of these problems. Prerequisite: registration in Course 121-123-125. 3 credits per quarter. Mr. Bryant, Mr. Johnson.

156s. Vacuum Tube and Control Devices. Two, three, four, and five electrode vacuum tubes. Thyration, kenetron, grid glow, photoelectric tubes, etc. Theoretical study of apparatus and circuits with demonstrations. 2 credits. Mr. Webb.

176f-177w-178s. Electronics. Theoretical and laboratory study of the following subjects with aspects of their engineering applications. Electron emission from hot bodies. Richardson's equation, Langmuir-Childs equation, secondary electron emission, ionization and resonance potentials, external and internal photoelectric effect, positive ion emission, shot effect, discharge of electricity through gases, "getter" action. Barkhausen-Kurtz effect, ionization due to radioactivities, etc. Heaviside layer as a reflecting and refracting medium, long period echo effect, electron waves, vacuum gauges, vacuum technique, etc. Registration by permission of instructor. 2 credits per quarter. Mr. Webb.

183f-184w-185s. Special Electrical Laboratory. Efficiency tests and special problems. Prerequisite: Course 116. Credits arranged.

191f-192w-193s. Seminar. Weekly discussion of current electrical periodicals. Prerequisite: Course 111. 1 or 2 credits per quarter.

194f-195w-196s. Vacuum Tube Applications. A study of commercial thermionic vacuum, vapor, and gas discharge tubes including an extensive survey and detailed study of their scientific and industrial applications. Registration open to graduates and seniors in electrical engineering by permission. 3 credits per quarter.

COURSES PRIMARILY FOR GRADUATE STUDENTS

227f-228w-229s. Transients in Electrical Machinery and Transmission Lines. Theoretical and laboratory study of transients in electric power machinery and of lightning surges and lightning protection. Prerequisites: Course 127-128-129. 3 credits per quarter. Mr. Bryant.

255f-256w-257s.* Electrical Engineering Applications. Special investigation of electrical engineering applications. This course requires laboratory study, library study, and research both in residence and in the field, to be followed by complete written reports with oral presentation and discussion. 1 to 3 credits per quarter. Mr. Bryant, Mr. Johnson.

275f-276w-277s.* Electrical Engineering Research. Investigation of special problems in laboratory or library. 2 to 6 credits per quarter. Mr. Bryant, Mr. Hartig, Mr. Johnson, Mr. Kuhlmann, Mr. Webb.

284f-285w-286s. Precise Electrical Engineering Measurements. Measurements of resistance, voltage, current, self-induction, and capacity; standardization of measuring instruments. Prerequisite: Course 122. 2 credits per quarter.

291f-292w-293s.* Graduate Seminar. Discussions of problems and results of research work. 1 credit per quarter.

294f-295w-296s. Vacuum Tube Circuit Analysis. Prerequisite: completion of Course 194-195-196 or equivalent. 3 credits per quarter. Mr. Hartig.

Power Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

132f-134w-136s. Electrical Design. The design of direct current generators and motors, alternating current transformers, generators, and synchronous motors. Prerequisite: for 132, registration in Course 121; for 134, registration in Course 123; for 136, registration in Course 125. 2 credits per quarter. Mr. Kuhlmann.

137s. Power Transmission Line Design. Preparation of detailed plans and specifications for the construction of high voltage transmission lines and distributing systems. Prerequisites: Courses 134, 142. 3 credits. Mr. Johnson.

138f-139w-140s. Power Systems. Short-circuit currents in power networks, unbalanced loads in polyphase circuits, transformers and motors, harmonics, stability of power systems under steady state conditions. Application of relay, oil circuit breakers, and lightning arresters to power systems for protection of apparatus and service. Prerequisite: registration in Courses 121, 123, or 125. 3 credits per quarter. Mr. Bryant, Mr. Johnson.

141f. Central Stations. Electric power generating stations and distribution systems. Economic considerations. Costs, load curves, plant location, selection of prime movers, station equipment. Prerequisite: registration in Course 121. 3 credits. Mr. Johnson.

142w. Electrical Transmission. Considerations involved in the designing and building of transmission lines. Mechanical, electrical, and economic considerations. Lightning protection, underground lines, high-voltage d-c transmission. Prerequisite: registration in Course 123. 3 credits. Mr. Johnson.

143s. Valuation of Public Utility Properties. Factors affecting value depreciation. Taxation and regulation of public utility properties. Elements of engineering economics, cost analysis, economic investigations, rate making. 3 credits. Mr. Johnson.

144w. Railway Electrical Engineering. Principles of mechanics applied to electric train movement. Prerequisite: Course 42, 45, 48, or 115. 2 credits. Mr. Johnson.

145s. Railroad Electrification. Reasons for electrification. Study of European and American systems. Results of electrification. Prerequisite: Course 144. 2 credits. Mr. Johnson.

151f. Illuminating Engineering. Nature of light. Laws of vision, principles of illumination, photometry, sources of light, and their characteristics. Lighting equipment. Illumination requirements and calculation for various fields of use. Prerequisite: Phys. 43. 2 credits. Mr. Johnson.

152f. Photometric Laboratory. Photometric practice. Distribution curves of lamps with reflectors. Measurement of lighting installations. To be taken with Course 151. 1 credit. Mr. Johnson.

153w-154s. Illumination Problems. Illumination design and specifications applied to problems in street, residence, industrial, commercial, and other kinds of lighting. Prerequisite: Course 151. 2 credits per quarter. Mr. Johnson.

173f-174w-175s. High Voltage Engineering. Study of insulation and generating equipment for high voltage; measurements of electrical quantities at high voltage; surges and surge proof equipment. Prerequisite: senior or graduate standing. 2 or 3 credits.

197f-198w-199s. Electrical Design. Special problems. Prerequisite: Course 132-134-136. Credits as arranged. Mr. Kuhlmann.

COURSES PRIMARILY FOR GRADUATE STUDENTS

211f-212w-213s. Advanced Circuit Analysis. Circuit analysis using Heaviside's *Operational Calculus*. Prerequisite: M.&M. 151. 2 credits per quarter.

251w-253s.* Illuminating Engineering. Lectures and laboratory work. Methods of determining location, kind, and quality of lights for obtaining desired illumination. Prerequisite: Course 151. 2 credits per quarter. Mr. Johnson.

Communication and Radio Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

161f-162w-163s. Radio Communication. Theoretical and laboratory study of radio transmitting and receiving circuits and apparatus. Amplifiers, detectors, oscillators. Electromagnetic waves in free space and on antenna systems. Prerequisite: registration in Course 121-123-125. 3 credits per quarter. Mr. Webb.

164f*-165w*-166s.* Electric Communication. Telephone circuits at audio and carrier frequencies. Theoretical and laboratory study of circuits having distributed constants. Use of hyperbolic functions. Wave filters, balancing networks, equalizers, repeaters. Prerequisite: Course 66. 4 credits per quarter. Mr. Hartig.

168w,169s. Radio Receiver Design. Detailed study of the problems arising in broadcast receiver design. 2 or 3 credits; registration by permission. Mr. Webb.

181s. Communication Frequency Measurements. Vector treatment of network. Bridge circuits for measuring of resistance, inductance, and capacity at audio and carrier frequencies. Prerequisite: Course 126. 2 credits. Mr. Hartig.

187f-188w-189s. Special Communication Laboratory. Special problems in electrical communication. Open by permission to qualified students. Includes weekly seminar meeting. 1 to 3 credits per quarter. Mr. Hartig.

COURSES PRIMARILY FOR GRADUATE STUDENTS

261f-263w-265s.* Advanced Radio Communication. Theoretical study of the transmission of electromagnetic waves. Design and testing of radio transmitting and receiving apparatus. Theory of electron tubes and their use in radio circuits. High frequency measurements. Taken with Course 262-264-266. 2 credits per quarter; registration by permission. Mr. Webb.

262f-264w-266s. Advanced Radio Laboratory. Special problems in radio laboratory and station, usually taken in connection with Course 261-263-265. For students specializing in electrical communication. 1 or more credits per quarter; registration by permission. Mr. Webb.

267f-268w-269s. Telephone Transmission. Advanced transmission theory at communication frequencies. Class and laboratory. 2 or 3 credits; registration by permission. Mr. Hartig.

272f-273w-274s. Electromechanical Vibrating Systems and Engineering Acoustics. Theoretical discussion of the production of sound by electrically driven vibrating systems, sound transmission, reflection, absorption. Laboratory study of vibrating systems, pipes, horns, absorbing materials, sound pressure, articulation, reverberation, resonance, sound filters. Prerequisite: M.&M. 151. 3 credits. Mr. Hartig.

281w-282s.* Advanced High Frequency Measurements. Vector treatment of circuit networks. Bridge circuits for the measurement of resistance, inductance and capacity at audio and radio frequencies. Prerequisite: Course 126. 2 credits per quarter. Mr. Webb.

287f-288w-289s.* Advanced Communication Laboratory and Seminar. Special problems in communication. Study and discussion of current articles on communication. 2 or 3 credits; registration by permission. Mr. Hartig.

General Engineering

Professor John M. Bryant.

See also Aeronautical, Agricultural, Chemical, Civil, Electrical, Mechanical, and Mining and Petroleum Engineering, and Architecture.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

112f-113w-114s.* Rates for Public Utility Properties. Determination of the rate base and depreciation amount for transportation, gas, water, electric power and telephone utilities operating expenses, the rate structure for particular utilities, service, and discrimination. Open only to senior and graduate students in engineering and to properly qualified students in economics and business administration. 3 credits per quarter. Mr. Bryant.

ENGLISH

Professors Joseph W. Beach, G. Tremaine McDowell, Cecil A. Moore, Martin B. Ruud, Elmer E. Stoll, Joseph M. Thomas; Associate Professors Huntington Brown, William P. Dunn, James T. Hillhouse, Charles W. Nichols; Assistant Professors Muriel B. Carr, John T. Flanagan, Elizabeth Jackson, Anna H. Phelan.

Before registering for graduate courses, students should consult with the director of graduate work for the department, Mr. Brown.

Before the acceptance of his subject for a thesis, a candidate for the degree of M.A. or Ph.D. must have given evidence to the department that he speaks and writes English with propriety.

Master's degree.—Offered under both Plan A and Plan B.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

Plan A

1. **Prerequisite.**—(1) For major work, not less than 27 credit hours in English literature, 12 of which must be of Senior College grade, including satisfactory courses in Chaucer and Shakespeare; for minor work, not less than 27 credit hours in English literature, including courses in Shakespeare. (2) Unless special exception is made upon petition to the department, the candidate is required to have a reading knowledge of one of the following languages: French, German, Latin, Greek.

2. The minimum requirement of 18 credits in the major is interpreted to mean 18 credits in subjects listed below as "Courses in English." Before taking the oral examination the candidate is given a written examination which calls for some acquaintance with each of the following periods of English literature: Old and Middle English, Renaissance, Seventeenth Century, Eighteenth Century, and English or American Literature of the nineteenth and twentieth centuries. Candidates will ordinarily find it necessary to supplement their undergraduate work by a considerable amount of independent reading as well as by taking graduate courses, and are advised that while the examination is designed primarily as a test of knowledge, it affords no lack of opportunity for the display of scholarship and critical judgment. If the candidate has not previously had an elementary course in Old English (Anglo-Saxon), this subject must be included in his program of graduate study.

In addition to the option of electing work in some other related field for a minor for the Master's degree, the candidate may select courses from one of the following groups as a minor:

a. **Philology,** including English 100 (Old English), 102 (Old English Poetry), 103 (Beowulf), 141-142-143 (Historical Grammar), 160 (History of the English Language), 165 (Historical Study of Modern English), and any other philological courses in other language departments which may be approved by the Department of English.

b. **Comparative Literature,** including Dante in English, Arthurian Romances, Metrical Romances, Pre-Elizabethan Drama, Medieval Drama (seminar), Modern Drama, and courses in foreign literature in other departments.

c. **American Literature,** including all graduate courses in that subject.

Plan B

Prerequisites.—For the M.A. under Plan B, no thesis is required; undergraduate prerequisites and the requirements in Old English and a foreign language remain. Nine credits must be in a seminar (all courses numbered above 200, and 123-124-125). With the permission of the director of graduate work, courses numbered above 100 in which research papers are required may be substituted for a seminar. Plan B includes the comprehensive qualifying examination in English Literature.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

1. The field of English is divided for convenience into seven parts: Old English, Middle English, Renaissance, seventeenth century, eighteenth century, nineteenth and twentieth centuries, American literature. Of these the candidate shall, in consultation with his adviser, elect five, exclusive of his special field (see below), in which to present himself at his preliminary examination, and his choice shall be

noted on his three-year program at the time this is filed (see p. 19). The preliminary examination will be devoted to the five divisions of the field designated by the candidate, and to the minor subject (see p. 21).

2. The part of the field within which the subject of the candidate's dissertation falls, or to which it is most closely related, shall be designated as his special field, and his knowledge of this shall be thoroly tested at the final examination.

3. The candidate must have completed, before the preliminary examination, advanced courses of at least one quarter each in Chaucer and Shakespeare and a course of one full year or three quarters in Old English.

4. The candidate is required to have a reading knowledge of two of the following foreign languages: French, German, Latin, Greek (see p. 19). A good reading knowledge of Latin is in all cases desirable, and in some cases may be indicated by the candidate's adviser as indispensable.

5. Candidates who have not already taken the comprehensive written examination given to M.A. candidates must take it, not later than their third quarter of residence. This requirement will be waived if the candidate's record contains satisfactory evidence of attainments equivalent to those it is designed to test.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100f. Old English. Old English prose and poetry. The relation to modern English is particularly emphasized. Prerequisite: 6 credits above 50. 4 credits. Mr. Ruud.

101f. Middle English. An outline of Middle English grammar, including the interpretation of selected texts. Prerequisites: Courses 75 and 100. 2 credits. Mr. Ruud. (Not offered in 1940-41.)

102w. Old English Poetry. Critical reading of poems. Prerequisite: Course 100. 3 credits. Mr. Ruud.

103s. Beowulf. An introduction to the Old English poem, with reading of considerable portion of the text. Prerequisite: Course 100. 3 credits. Mr. Ruud.

105w-106s.† Eighteenth-Century Poetry. From Pope to Burns, with special reference to the rise and growth of romanticism. Prerequisite: 6 credits above 50. 6 credits. Mr. Moore. (Not offered in 1940-41.)

107w-108s.† Eighteenth-Century Prose. Special study of fiction and the essay. Prerequisite: 6 credits above 50. 6 credits. Mr. Moore.

109f-110w.† The Romantic Poets of the Nineteenth Century. From Wordsworth to Keats. Prerequisite: 6 credits above 50. 6 credits. Mr. Beach.

111f-112w.† Seventeenth-Century Prose. General survey of the prose of the century to 1660. Prerequisite: 6 credits above 50. 6 credits. Mr. Moore. (Not offered in 1940-41.)

113f. American Short Story. Prerequisite: Course 73-74. 3 credits. Mr. McDowell.

115w-116s.† The Development of English Prose Style. Intensive study of short selections from both literary and scientific texts, from Caxton to the present day. Prerequisite: 6 credits above 50. 6 credits. Mr. Brown.

123f-124w-125s.† The Technique of the Novel. Special studies in novels of the late nineteenth and twentieth centuries, with particular regard to structure. Prerequisite: 6 credits above 50 and permission of the instructor. 9 credits. Mr. Beach.

126f-127w. Drama, 1660-1880. Prerequisite: 6 credits above 50. 6 credits. Mr. Hillhouse, Mr. Nichols.

129s. Modern Drama. Contemporary drama from 1880 to the present. Prerequisite: Course 55-56 or 126-127. 4 credits. Mr. Stoll.

133f. Ballads. A study of a large number of traditional ballads, English and foreign, and of ballad style and origins. Prerequisite: 6 credits above 50. 3 credits. Mr. Ruud. (Not offered in 1940-41.)

135w. Spenser. A study of his poems. Prerequisite: 6 credits above 50. 3 credits. Mr. Stoll. (Not offered in 1940-41.)

136s. Advanced Shakespeare. Shakespeare's development traced to the end. A careful analysis of four plays. Problems in the interpretation of Shakespeare's dramatic methods. Prerequisite: Course 55-56. 4 credits. Mr. Stoll.

137f. Late Eighteenth-Century Poetry. Principal figures are Crabbe, Cowper, Burns, and Blake. Prerequisite: 6 credits above 50. 3 credits. Mr. Moore.

140s. Advanced Chaucer. The more important poems (except those read in Course 75). The treatment will be primarily literary and historical, linguistic proficiency being presumed. Prerequisite: 6 credits above 50, including Course 75. 4 credits. Mr. Ruud.

141f-142w-143s. Historical Grammar of the English Language. This course is identical with Comparative Philology 141-142-143. Prerequisite: 6 credits above 50, including Course 75 or 81-82. 6 credits. Mr. Ruud. (Not offered in 1940-41.)

146w-147s.† Medieval Romances. The stories of Troy, of Alexander, of Charlemagne, and of English heroes. Prerequisite: 6 credits above 50, including Course 75 or 81-82. 6 credits. Miss Carr.

148w-149s.† Arthurian Romances. A study of the development of romance relating to Arthur, Merlin, Tristan and Iseult, Gawain, Lancelot, and Perceval, from the earliest documents to Malory's *Morte d'Arthur*. Prerequisite: 6 credits above 50. 6 credits. Miss Carr. (Not offered in 1940-41.)

150w. Victorian Poetry. The poetry of the Victorian era, apart from Browning's and Tennyson's. The principal names are: Matthew Arnold, the Rossettis, Fitzgerald, Morris, Swinburne, Hardy, and Meredith. Prerequisite: 6 credits above 50. 4 credits. Mr. Stoll.

151s. Recent Poetry. Poetry in England and America since the death of Queen Victoria. The main tradition and tendencies now prevailing. Prerequisite: 6 credits above 50. 4 credits. Miss Jackson.

152s. Pre-Elizabethan Drama. The late medieval and the Renaissance drama, moralities, interludes, and farces up through the earlier years of the Elizabethan period. Prerequisite: Course 55-56. 3 credits. (Not offered in 1940-41.)

153s. Seventeenth-Century Lyrists. Prerequisite: 6 credits above 50. 3 credits. Mr. Moore. (Not offered in 1940-41.)

154w-155s.† The American Novel. The history of the American novel from the beginning to the present. Prerequisite: Course 73-74; or 31-32 and 6 credits above 50. 6 credits. Mr. McDowell.

156s. The American Drama to 1880. Survey of American drama in the eighteenth and nineteenth centuries. Prerequisite: Course 73-74. 3 credits. Mr. Nichols.

157f-158w.† Elizabethan Non-Dramatic Literature. A survey of prose and poetry, 1558-1603. Prerequisite: 6 credits above 50, including Course 55-56 or 135 or 170. 6 credits. Mr. Brown.

159s. Colonial Literature in America. Covers the period from 1608 to 1783. Prerequisite: Course 73-74. 3 credits. Mr. Nichols. (Not offered in 1940-41.)

160w. History of the English Language. Prerequisite: 6 credits above 50, including Course 100. 2 credits. Mr. Ruud. (Not offered in 1940-41.)

162f. Restoration Non-Dramatic Literature. Prerequisite: 6 credits above 50. 3 credits. Mr. Moore.

163w-164s.† Restoration Drama. Prerequisite: 6 credits above 50. 6 credits. Mr. Moore.

165w. The Historical Study of Modern English. Prerequisite: 6 credits above 50. 3 credits. Mr. Ruud. (Not offered in 1940-41.)

167w-168s.† English Literary Criticism. A historical sketch, with special reference to Aristotle, Sir Philip Sidney, Dryden, Dr. Johnson, Coleridge, Arnold, T. S. Eliot. Prerequisite: 6 credits above 50. 3 credits. Mr. Brown. (Not offered in 1940-41.)

169f. Browning and Tennyson. Most of the time will be spent on Browning. Prerequisite: 6 credits above 50. 4 credits. Mr. Stoll.

170f. Elizabethan Drama. Elizabethan dramatic art aside from Shakespeare's. Special attention to the art of the chief writers—Marlowe, Jonson, Beaumont and Fletcher, Webster, Middleton, and Ford. Prerequisite: Course 55-56. 4 credits. Mr. Stoll. (Not offered in 1940-41.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

213f-214w-215s.† Eighteenth-Century Drama. 9 credits. Mr. Moore. (Not offered in 1940-41.)

217f-218w-219s.† Restoration Drama. 9 credits. Mr. Moore. (Not offered in 1940-41.)

220f-221w-222s. Medieval Drama. A study of the beginnings of the modern drama in the liturgy of the church and its development to the great vernacular cycles. 9 credits. Mr. Ruud. (Not offered in 1940-41.)

225f-226w-227s.† Elizabethan Drama. Elizabethan and Jacobean dramatists, from Lyly to Shirley. Problems assigned may involve Shakespeare, and in general his contemporaries will be studied less for their own sakes than for the light they shed upon him. 9 credits. Mr. Stoll.

228f-229w-230s.† Eighteenth-Century Novel. The rise and development of the novel as a form of literature; the use made of the novel as a medium of religious, social, and political theory. 9 credits. Mr. Moore.

231f-232w-233s.† Shakespeare's Tragic and Comic Art. 9 credits. Mr. Stoll. (Not offered in 1940-41.)

234f-235w-236s.† Middle English Alliterative Poetry. A literary and linguistic study of selected Middle English alliterative poems. 9 credits. Mr. Ruud. (Not offered in 1940-41.)

237f-238w-239s.† Chaucer. A study of some of the important problems in the Chaucer canon and in the works of Chaucer. 9 credits. Mr. Ruud. (Not offered in 1940-41.)

240f-241w-242s.† The Canterbury Tales. 9 credits. Mr. Ruud.

243f-244w-245s.† Non-Dramatic Literature of the Sixteenth Century. The Renaissance in England; prose and poetry, with special attention to Spenser and his contemporaries. 9 credits. Mr. Brown. (Not offered in 1940-41.)

253f-254w-255s.† American Romanticism I: New England. 9 credits. Mr. McDowell.

256f-257w-258s.† Spenser and Milton. Reading of the poetry in full and a good deal of Milton's prose. The two poets will be studied as the great English exponents of Renaissance ideas and ideals. 9 credits. Mr. Brown.

259f-260w-261s.† The Romantic Period of the English Novel. The Gothic romances and the Revolutionary novel, the realistic novel of national manners, and Jane Austen. Sir Walter Scott and the more important later romancers. Mr. Hillhouse. (Not offered in 1940-41.)

262f-263w-264s.† Studies in Nineteenth-Century Novel. The chief novelists of the period, Dickens, Thackeray, and George Eliot as well as several of the minor novelists. Emphasis on social theories in the novels and reflection of the life of the times. 9 credits. Mr. Hillhouse. (Not offered in 1940-41.)

265f-266w-267s.† American Romanticism II: Poe, Whitman, and Melville. 9 credits. Mr. McDowell. (Not offered in 1940-41.)

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Professors William A. Riley, Arthur G. Ruggles, Maurice C. Tanquary; Associate Professors Alexander A. Granovsky, Clarence E. Mickel; Assistant Professors Alexander C. Hodson, Harold H. Shepard, Gustav A. Swanson.

Prerequisites.—27 credits in zoology and entomology. Depending on the proposed field of specialization within the division there may be accepted in partial fulfillment of this requirement such courses as bacteriology, plant pathology, or biochemistry.

Master's degree.—Offered in general under Plan A. In exceptional cases Plan B may be offered by petition.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

114s. Apiculture. Problems of bee management, disease control, wintering, bee breeding, processing and marketing bee products. Given in the form of seminar discussion and laboratory and field practice. 3 credits. Mr. Tanquary.

117f-118w-119s. General Ecology. General animal ecology. Frequent field trips. Lectures, laboratory, and field work. 9 credits. Mr. Eddy, Mr. Hodson.

120s. General Ecology of Insects. General ecology with special emphasis on its application in insect control. 3 credits. Mr. Hodson.

125f-126w-127s. Advanced General Entomology. Morphology and classification of insects with lectures on the history of entomology. Lectures and laboratory. 9 credits. Mr. Mickel.

139f-140w. Histology and Development of Insects. Lectures and laboratory work on the histology, embryonic and postembryonic development of insects. Individual work along these lines is available to properly qualified students under Course 197. 6 credits. Mr. Riley.

141f-142w. Insects in Relation to Plant Diseases. A study of the principal insect vectors and their habits; types of insect injuries affecting health of plants; modes of insect transmission and dissemination of plant diseases; the methods of rearing and handling the carriers. Of interest to students in entomology, plant pathology, horticulture, forestry, and agronomy. Prerequisites: entomology or plant pathology, 8 credits. 6 credits. Mr. J. J. Christensen, Mr. Granovsky.

144w-145s-146s. Animal Parasites and Parasitism. Lectures and laboratory work. Second term devoted primarily to the relation of insects to diseases of man and animals. 9 credits. Mr. Riley.

150s. Introduction to Aphidology. The biology and taxonomy of Aphididae. 3 credits. Mr. Granovsky.

160f,w,s. General Forest Entomology. Lectures, laboratory, and library work treating of the life history, habits, and ecological relationships of insects that affect trees and forest products. 3 credits per quarter. Mr. Hodson.

161f. Waterfowl and Upland Game Birds. Life histories, habits, classification, environmental factors, and economic importance of game birds. Lectures, laboratory, and field work. 3 credits. Mr. Swanson.

163f. Mammalogy (formerly Course 63). Biology and classification of mammals with emphasis on the game and fur-bearing species. 3 credits. Mr. Hatfield.

165w. Game Management (formerly Course 66). Theory and practice of game management; properties of game populations and component factors of game environments; methods of recognizing and measuring these properties and factors, and management measures for the various species. 3 credits. Mr. Swanson.

166s. Methods in Field Zoology. A course in field techniques. Collection and use of field data, mapping, census methods, collection and care of specimens, cataloging, identification and interpretation of field signs, environmental analyses and wild life surveys. 3 credits. Mr. Swanson.

175f. Insecticides and Their Action. Special studies of insecticides. Lectures and laboratory. 4 credits. Mr. Shepard.

176w. Advanced Economic Entomology. A study of the principles of insect control and the history of economic entomology. Lectures. 3 credits. Mr. Ruggles.

197f,w,s,su. Introduction to Research. Preparation for investigational work in lines of entomology, parasitology, insect and plant diseases, or economic zoology. Summer work should be planned when possible. Mr. Hodson, ecology; Mr. Riley, parasitology and insect morphology; Mr. Ruggles, Mr. Granovsky, general economic entomology; Mr. Tanquary, apiculture; Mr. Swanson, economic vertebrate zoology; Mr. Mickel, systematic entomology; Mr. Shepard, insecticides.

COURSES PRIMARILY FOR GRADUATE STUDENTS

200. Seminar. Assigned topics, each term dealing with some special field of work of the division. Mr. Riley and staff members.

201-204. Research in Entomology. Mr. Riley, Mr. Granovsky, Mr. Mickel.

205-208. Research in Economic Entomology. Mr. Ruggles, Mr. Hodson.

209-212. Research in Economic Vertebrate Zoology. Mr. Swanson.

261-264. Research in Parasitology and Medical Entomology. Mr. Riley.

265-268. Research in Insecticides. Mr. Shepard.

269-272. Research in Apiculture. Mr. Tanquary.

FARM MANAGEMENT AND AGRICULTURAL ECONOMICS

For courses and staff see Agricultural Economics, on page 64.

FINE ARTS

Assistant Professor Laurence Schmeckebier.

Master of Arts

Under normal conditions of adequate preliminary preparation and full-time study, the student should be able to meet the requirements for the Master's degree within one year, or its equivalent in summer sessions.

The M.A. degree is offered under both Plan A and Plan B. In each case the candidate must present a minimum undergraduate preparation of 18 Senior

College credits in fine arts or its equivalent.§ In those cases where the candidate is interested in a combination of creative, theoretical, and historical work in fine arts he may, with the permission of the department head, the dean, and the group committee, choose the minor subject from within the department.

The thesis subject and major work may be chosen from either the historical, theoretical, or creative (i.e., practical studio) fields; in the latter case it is expected that the various historical and theoretical aspects of the problem undertaken be thoroly integrated.

Doctor of Philosophy

As a preliminary for major work in the Department of Fine Arts, the candidate must present a minimum undergraduate preparation of 18 Senior College credits in fine arts or its equivalent.§

The subject of the thesis may be chosen from either the historical, theoretical, or creative (i.e., practical studio) fields. Should it be specifically creative in nature it is expected that the various theoretical, compositional, and technical problems involved be not only thoroly integrated with their historical antecedents, but also show the results of independent research, a knowledge of sources and literary aspects.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

141f. Art in Egypt and the Near East. The development of architecture, painting, sculpture, and the minor arts of vase painting, mosaic, and metal work in Egypt, Mesopotamia (Hittite, Sumerian, Babylonian, and Assyrian), and Persia. Particular emphasis will be placed on the history and exploitation of the various archeological sites as well as on the methods of archeological research. Prerequisites: 9 credits in fine arts, or 9 credits in history or literature with consent of instructor. 3 credits. Mr. Lesley.

142w. Greek Art. A study of the various Aegean styles (Minoan, Helladic) and particularly the evolution of Greek architecture and sculpture from the archaic through the Classic and Hellenistic periods. Prerequisites: 9 credits in fine arts, or 9 credits in history or literature with consent of instructor. 3 credits. Mr. Lesley.

143s. Etruscan and Roman Art. Architecture, painting, and sculpture from the early Etruscan period through Rome of the Republic and Imperial epochs and the period of Constantine. Prerequisites: 9 credits in fine arts, or 9 credits in history or literature with consent of instructor. 3 credits. Mr. Lesley.

151. Early Medieval Art (Offered in alternate years. Not offered in 1940-41.)

152. Carolingian and Romanesque Art. (Offered in alternate years. Not offered in 1940-41.)

153. Gothic Art. (Offered in alternate years. Not offered in 1940-41.)

154f. Italian Painting and Sculpture of the Early Renaissance. The development of painting and sculpture in Italy from Masaccio and Ghiberti to Donatello and the great painters of the fifteenth century in Florence, Rome, and Venice. Prerequisites: 9 credits in fine arts, or 9 credits in history or literature with consent of instructor. 3 credits. Mr. Schmeckebier.

155w. Great Masters of the High Renaissance. A study of the sources and the important works of Leonardo de Vinci, Raphael, Michelangelo, Titian, and

§ To be determined by comprehensive examination.

Correggio, with a survey of their influence in the Renaissance art of Spain, France, and Flanders. Prerequisites: 9 credits in fine arts, or 9 credits in history or literature with consent of instructor. 3 credits. Mr. Schmeckebier.

156s. Renaissance Art in Northern Europe. The development of painting and sculpture in Flanders, Northern France, and Germany from the Van Eycks to Albrecht Dürer and Hans Holbein. Particular emphasis will be given to the evolution of the graphic arts in the fifteenth century, their influence and contributions to the culture of the Renaissance. Prerequisites: 9 credits in fine arts, or 9 credits in history or literature with consent of instructor. 3 credits. Mr. Schmeckebier.

163f-164w-165s. Museum Science and Management. (This course may be taken only by special permission from Mr. Schmeckebier. Credits, hours, and days to be arranged.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Seminar. Special problems in American art. Prerequisite: 18 credits in Senior College courses in fine arts or consent of instructor. 3 credits per quarter. Mr. Schmeckebier.

FORESTRY

Professors Henry Schmitz, John H. Allison, Edward G. Cheyney; Associate Professors Thorwald S. Hansen, Frank Kaufert; Assistant Professors Randolph M. Brown, Louis W. Rees.

Prerequisites.—For graduate work in forestry, students normally are expected to have had the equivalent of an undergraduate course in forestry. The choice of major must be approved by the chief of the division and the professor concerned. The facilities of the forest experiment stations at Cloquet and Lake Itasca are available to students taking this work.

Language requirement.—Exemption from the language requirement for the Master's degree may be made in individual cases of students majoring in forest administration or commercial lumbering.

Master's degree.—Offered under Plan A only.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101w. Advanced Dendrology. A continuation of Course 3-4 with special studies in classification and distribution of the timber species of the world. Prerequisite: Course 3-4. 3 credits. Mr. Rees.

111s. Advanced Forest Mensuration. Continuation of Course 8 with special emphasis on the application of alinement charts and correlation in forest mensuration. Consent of instructor necessary. Mr. Brown.

113f. Wood Pulp and Paper. A detailed study of production of wood pulp and paper products. Lectures, reading, reports. Prerequisites: For. 53-54, Chem. 3 or 10. 3 credits. Mr. Kaufert.

114f. Mechanical and Physical Properties of Wood. Derivation and application of the formulas used in determining stresses in wood. Laboratory methods in timber physics. Lectures, reading, laboratory, and reports. Prerequisite: Course 53-54. 3 credits. Mr. Rees.

115w-116s. Mechanical and Physical Properties of Wood. Study of the physical properties of wood. Shrinkage, relation of strength to moisture content, etc., and their bearing on wood utilization. Laboratory, reading, and reports. Prerequisite: Course 114. 6 credits. Mr. Rees.

119w. Advanced Wood Structure I. The microtechnique of woody tissues. Lectures, reading, and laboratory work. Prerequisite: Course 53-54. 4 credits. Mr. Kaufert.

125s. Wood Preservation. Lectures and collateral reading upon the history, development, and methods of wood preservation. Different systems now in use and preservatives used. Prerequisite: Course 53-54. 3 credits. Mr. Kaufert.

126f. Silvics. The fundamentals forming the basis of silviculture with special attention to the silvics of the important tree species. Lectures, readings, and required papers. 3 credits. Mr. Cheyney.

127w. Silviculture. A study of the general principles underlying the art of silviculture, and a brief study of the European methods as applied to American conditions. Prerequisite: Course 126. 3 credits. Mr. Cheyney.

128s. Silvicultural Laboratory. Nursery practice and field planting. Preparation of a silvicultural plan for a small tract of timber and the application of that plan. Prerequisite: Course 127. Cloquet Forest Experiment Station. Mr. Cheyney.

129f,w,s. American Silvicultural Practice. A study of the silvicultural methods now being employed in the United States and the probable results of the application of other European methods. Reading. Prerequisites: Courses 126 and 127. 3 credits. Mr. Cheyney.

130f. Forest Valuation. The business of forest management. A study of the different factors entering into the valuation of forest property. 5 credits. Mr. Allison.

131w. Forest Policy and Administration. The 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. 5 credits. Mr. Allison.

132s. Forest Regulation Laboratory. Field work. The collection of the data necessary to work up a forest working plan. Includes the making of the timber estimates, growth studies, and maps, necessary to a forest working plan. Prerequisite: Course 130. Cloquet Forest Experiment Station. 6 credits. Mr. Allison.

136f. 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. Prerequisite: Course 131. 3 credits. Mr. Allison.

137w. Seeding and Planting. A study of the principles of seeding and planting and the various methods of nursery practice in the different regions of the United States. Prerequisite: Course 126 or 127. 3 credits. Mr. Cheyney.

140f. Forest Working Plan. A study of methods of regulating and allotting the cut from a forest under management. Preparation of a working plan. Lectures and reports. Prerequisites: Courses 128, 132. 3 credits. Mr. Allison.

141f. Principles of Silvics. A study of the principles underlying the silvical characteristics of trees and the reactions of trees to their environments. Prerequisite: Course 126. 3 credits. Mr. Cheyney.

142s. Wood Chemistry. Wood composition, the constitution of wood components, the reactions of wood components and derivatives, and the analysis and chemical technology of wood and wood products. Prerequisites: Org. Chem. 52, For. 54. 3 credits. Mr. Kaufert.

143w. 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 credits. Mr. Cheyney.

144s. Forage and Browse Plants. A study of the important forage and browse plants; their identification, nutritive value, palatability, growth habits, and distribution. Includes a general study of forage types, classes of forage, carrying capacities, and methods of ecological investigation. Prerequisites: Bot. 113 and Pl. Path. 7. 3 credits. Mr. Schmitz.

151f,w,s. Logging. The principles and general methods of operation in the United States, and the modifications required by forest management. 3 credits. Mr. Brown.

152s. Wood Seasoning. The theory and practice of air seasoning and kiln drying of wood. Prerequisite: 53-54. 3 credits. Mr. Rees.

155w. Forest Protection. The protection of forest from fire—fire prevention and fire suppression. The causes of forest fires and their elimination, climate and fires, fire fighting and fire legislation. Prerequisite: 127. 3 credits. Mr. Schmitz.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. Research Problems in the Science and Practice of Silviculture. Mr. Cheyney.

203-204. Research Problems in Forest Management and Working Plans. Mr. Allison.

205-206. Research Problems in Forest Economics. Mr. Allison.

207f-208w-209s. Research Problems in Wood Technology. Mr. Rees.

210f-211w-212s. Special Problems in Forest Research and Research Methods. Mr. Schmitz.

213f-214w-215s. Special Problems in Forest Utilization. Mr. Schmitz, Mr. Rees.

216f-217w. Forestry Seminar. Mr. Schmitz.

218f-219w. Research Problems in Forest Mensuration. Mr. Brown.

220-221-222. Major Report. Independent study and the preparation of a comprehensive report on some phase of general forestry, range management, or game management. 2 credits per quarter. Staff. (Not offered 1940-41.)

223f-224w-225s. Literature Seminar. Assigned topics with special reference to current forestry problems. Critical and historical review of current forestry literature. 1 credit per quarter. Mr. Schmitz.

GEOGRAPHY

Professor Darrell H. Davis; Associate Professor Ralph H. Brown; Assistant Professor Samuel N. Dicken.

Prerequisites.—For major work, Courses 11, 41, and 5 additional credits in geography, Economics 6-7, and Geology 1 or 8. For minor work, 10 credits in the department.

Language requirement.—Exemptions from the language requirement for the Master's degree may be made in individual cases.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101w. Geography of Europe. A study of the various European countries and their economic development. Prerequisite: 20 credits in social science, to include 10 credits in geography. 3 credits. Mr. Dicken.

102s. Trade Routes and Trade Centers. A study of the major land and ocean routes, ports and interior trade centers, and the nature and significance of the traffic. Prerequisite: Course 41. 3 credits. Mr. Dicken.

110f. Geography of South America. A study of the major geographic regions of South America, with emphasis upon the economic activities and their geographic basis. Prerequisite: 20 credits in social science, to include Course 11 or 41. 3 credits. Mr. Brown.

111w. Cartography and Graphic Representation. The construction and use of maps and graphs. Prerequisite: 10 credits in Senior College work in geography, geology, history, or other subjects in which the use of maps is necessary. 3 credits. Mr. Dicken. (Not offered in 1940-41.)

120s. Geography of Asia. Areal differentiation in the major geographic regions of Asia. Special consideration of China, Japan, and India. Prerequisite: 20 credits in social science, to include Course 11 or 41. 3 credits. Mr. Davis.

133w. Climatology. Weather and climate in their relation to man and his activities. Prerequisite: Course 11. 3 credits. Mr. Brown.

COURSES PRIMARILY FOR GRADUATE STUDENTS

241f,s.* Field Course in Geography. A consideration of the problems of field work, illustrated by field trips. Prerequisite: 18 credits in geography. 3 credits. Mr. Davis.

251f-252w-253s.* Seminar in Geography. A survey of current literature with reports and discussion on assigned topics. Prerequisite: 20 credits in geography or permission of instructor. 3 credits. Mr. Davis and staff.

301f,w,s.* Research Problems in Geography. Credits arranged. Mr. Davis, Mr. Brown, Mr. Dicken.

GEOLOGY AND MINERALOGY

Professors William H. Emmons, Frank F. Grout, Clinton R. Stauffer; Associate Professors John W. Gruner, George M. Schwartz, George A. Thiel.

Prerequisites.—For major work in geology: Elementary courses in geology, such as Courses 1 and 2, or the equivalent; Mineralogy 23 and 24; General Chemistry, such as Courses 1, 2, and 3, or equivalent. In addition, elementary physics, such as Courses 3 and 4, or equivalent, is required for those specializing in mineralogy, petrography, and economic geology; and for those specializing in paleontology or stratigraphy, Index Fossils (Course 91-92-93), and Elementary Zoology, such as Course 1-2-3, or its equivalent, are required. Students who have not had the necessary prerequisites may take them without credit along with other work for which they are prepared.

Major and minor.—Whatever field of special interest is pursued, it is expected that the student registering for the doctorate in this department will take some courses in each of the major divisions of geology, if he has not already had them, and those conducting the preliminary examination will assume that this has been done.

A student selecting some branch of geology as a major will not be allowed to select general geology as a minor. It is always preferable that the minor be taken outside of the major department.

Language requirement.—Exemptions from the language requirement for the Master's degree may be made in individual cases. Students who are deficient in modern languages are advised to take a language along with their graduate work. Examinations in French or German are required of candidates for service on the United States Geological Survey.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100.¶ Field Work in Northern Minnesota—July 15 to 30, approximately. Students interested in this trip should consult the department. 4 credits. Mr. Gruner, Mr. Thiel.

101f-102w. Sedimentation. The origin of sedimentary rocks and their primary structures; interpretation of sediments in relation to paleogeography. Lectures, laboratory work, and assigned readings. 6 credits. Mr. Thiel.

103w-104s. Micropaleontology. The study and classification of Foraminifera, diatoms, and other small fossil organisms and their use for purposes of correlation in oil fields. 3 credit hours of laboratory work. Open to students who have had Geol. 11 or 91, and 105. Mr. Stauffer.

105s. Rock Study. The occurrence and genesis of rocks; their mineral and chemical composition and classification; their structure, texture, and alteration. Prerequisite: Course 24. Mr. Grout.

106f. Petrography. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. Prerequisite: Course 105. 3 credits. Mr. Grout.

107f-108w-109s. Paleontologic Practice. The collection, preparation, and study of materials, with a view to gaining a working knowledge of groups of fossils, and the use of literature. Prerequisite: Course 91-92-93. 9 credits. Mr. Stauffer.

110f. Economic Geology. A study of nonmetallic minerals of economic value and discussion of geologic guides to prospecting for these deposits. 3 credits. Mr. Schwartz.

111w. Ore Deposits. The nature, distribution, and genesis of ore deposits of the United States; relation of ore deposits to geologic structure; the deformation and superficial alteration of ore deposits. Prerequisites: Courses 2, 3, or 51, and 105. 3 credits. Mr. Emmons.

112s. Geology of Petroleum. The first part treats of deposits of metals, giving special attention to those outside of the United States. The second half deals with the nature, origin, and distribution of petroleum and with the various oil fields of the world. Prerequisite: Course 111. 3 credits. Mr. Emmons.

118w. Principles of Geomorphology. A study of the fundamental principles governing the morphology of the earth's surface. The evolution of various types of valleys, shore lines, glacial and eolian land forms. A comparative study of the cycle of erosion of plains and plateaus, and a genetic analysis of different types of mountains. Prerequisite: Course 2 or 3 or 13. 3 credits. Mr. Hanley.

¶ A comprehensive report will be required for Graduate School credit.

119s. Geomorphology of the United States. The development of the surface features of the United States as affected by the rock structure and geologic history. Description and genetic analysis. Prerequisite: Course 2 or 3 or 13. 3 credits. Mr. Hanley.

120s. Glacial Geology. The nature and process of glacial action; land forms resulting from mountain and continental glaciers; distribution and character of Pleistocene glacial deposits. Prerequisite: Course 2 or 3 or 13. 3 credits. Mr. Hanley.

121f. Crystallography. The symmetry relations in the thirty-two crystal classes. Crystal drawings and measurements. Projections and mathematical calculations. Prerequisites: Math. 7 and Inorg. Chem. 6-7-8 or 9-10. 3 credits. Mr. Gruner.

124w-125s. Structural and Metamorphic Geology. The conditions, processes, and results of metamorphism; structural features resulting from deformation under varying conditions of load. Prerequisites: Courses 2, 3, or 51 and 105. 6 credits. Mr. Schwartz.

131w-132s. Advanced Petrology. Advanced optical methods. Criteria for rapid identification of the common rock clans. Regional and genetic studies. Petrographic reports. Prerequisite: Course 106. 8 credits. Mr. Grout.

137f. Testing Economic Minerals. Laboratory tests of coal, clay, oil, building stone, and metallic ores. Prerequisites: Courses 2, 3, or 51 and 105. 3 credits. Mr. Gruner.

140w-141s. Applied Petrography. Determination of ore and gangue minerals, microscopic studies of paragenesis of ores and other mineral associations. Practical problems in mining and geology. Prerequisite: Course 131. 6 credits. Mr. Grout.

144f-145w. Interpretation of Geologic and Topographic Maps. Methods of geological examination; study and problems in construction and interpretation of geologic maps. Prerequisites: Courses 2, 3, or 51 and 124. 6 credits. Mr. Hanley.

150s.§ Field Geology. Detailed, systematic work, conforming to official surveys. For prerequisites see members of the department. Credits arranged. Mr. Gruner, Mr. Schwartz.

151f-152w-153s. Advanced General Geology. Geologic processes and their results; development of the North American continent. Prerequisite: Course 2, 3, or 51. 9 credits. Mr. Stauffer.

161w. Crystal Structure. Study of point groups and space groups. Diffraction of X rays by crystals. Interpretation of powder and Laue diagrams. Prerequisites: Course 121, elementary physics, and analytical geometry. 3 credits. Mr. Gruner.

166f-167w. Mineralography. Methods of studying opaque minerals and application of the methods to problems in ore genesis and history. Prerequisites: Courses 111, 131. 6 credits. Mr. Schwartz.

170f,w,s. Geologic Problems. Prerequisite: permission of major adviser. 3 credits.

COURSES PRIMARILY FOR GRADUATE STUDENTS

211f-212w-213s.* Advanced Paleontology. Selected groups of fossils. Class work supplemented by reference reading and thesis. 9 credits. Mr. Stauffer.

214.* Seminar in Ore Deposits. 3 credits. Mr. Emmons.

§ A maximum of 8 credits will be granted after field report is completed.

215s.* Geology and Ore Deposits of the Western Hemisphere. Open to graduate students and to those undergraduates who have had Course 51. 3 credits. Mr. Emmons.

216s.* Geology and Ore Deposits of the Eastern Hemisphere. Open to graduate students and to those undergraduates who have had Course 51. 3 credits. Mr. Emmons.

241.* Field Course in Geology. To be arranged with individual students upon application to the department. Credit will be given for field work done satisfactorily as prescribed in the joint announcement of various universities.

243-244.* Research Course in Geology. Advanced work in geology; chiefly individual work on selected subjects. Data and collections of material gathered in the course of field work studied under instructor. Methods follow standards of federal and state surveys. Mr. Emmons, Mr. Grout, Mr. Stauffer, Mr. Gruner, Mr. Schwartz, Mr. Thiel.

245-246.* Research Course in Sedimentation. Methods of Course 101-102 applied to sedimentary petrography. 3 credits per quarter. Mr. Thiel.

251-252.* Original Problems. Morphology and physical measurements of minerals. 3 credits per quarter. Mr. Gruner.

253-254.* Research Course in Ore Deposits. Methods of Course 243-244 applied to ore deposits. 3 credits per quarter. Mr. Emmons, Mr. Grout, Mr. Gruner, Mr. Schwartz.

263-264.* Research Course in Petrology. Methods of Course 243-244 applied to petrology. 3 credits per quarter. Mr. Emmons, Mr. Grout.

GERMAN

Professors Oscar C. Burkhard, Konstantin Reichardt; Assistant Professors Lynwood G. Downs, Frederick L. Pfeiffer.

Prerequisites.—For major work, 27 Senior College quarter credits or equivalent. For minor work, 18 Senior College quarter credits or equivalent.

A survey of German literature, the equivalent of Course 120-121-122, is required of all candidates for degrees.

Ph.D. candidates whose major is German literature must offer at least 18 credits in Germanic linguistics. A minor in comparative philology will require at least 27 credits in linguistic courses.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

107su. Historical German Grammar. Phonology, inflection, word formation, syntax. Intended primarily for prospective teachers of German. 3 credits. Mr. Downs.

108s. Phonetics. A study of speech sounds and the nature of their production, with special reference to English, French, and German. Open to students in the modern languages. 3 credits. (Not offered in 1940-41.)

110f-111w-112s. Introduction to Germanic Philology. The Germanic languages and literary tradition. Introduction to bibliography and philological methods. 9 credits. Mr. Reichardt. (Not offered in 1940-41.)

115f-116w-117s.* Middle High German Literature. "Heldenepos, Höfisches Epos, Minnesang." 9 credits. (Not offered in 1940-41.)

118w. Germanic Heroic Poetry. 3 credits. Mr. Reichardt. (Not offered in 1940-41.)

119s. Germanic Mythology. 3 credits. Mr. Reichardt.

120f-121w-122s.† Proseminar: History of German Literature. This course provides the necessary background for graduate work in German literature, and serves as an introduction to bibliography, methodology, and literary criticism. Required of all graduate majors in German. 9 credits.

120f. German Literature to the Reformation Period. Mr. Reichardt.

121w. The Sixteenth, Seventeenth, and Eighteenth Centuries. Mr. Holske.

122s. The Nineteenth Century. Mr. Pfeiffer.

140f-141w-142s.* Early High German Literature, 1500-1700. 9 credits. Mr. Downs. (Not offered in 1940-41.)

143f-144w-145s.* The Classical Period: Goethe. 9 credits. Mr. Holske.

150f-151w-152s.* Die Novelle. A study of the technique and development. Assigned readings and reports. 9 credits. Mr. Burkhard. (Not offered in 1940-41.)

153f-154w-155s.* Studies in German Literature of the Nineteenth Century: Austrian Drama. 9 credits. Mr. Burkhard.

160f-161w-162s.* Lyric Poetry of the Eighteenth and Nineteenth Centuries. 9 credits. (Not offered in 1940-41.)

163f-164w-165s.* German and English Literary Relations in the Seventeenth, Eighteenth, and Nineteenth Centuries. 9 credits. Mr. Pfeiffer.

173f-174w-175s.* The Modern Novel, 1890-1940. 9 credits. Mr. Pfeiffer. (Not offered in 1940-41.)

180f-181w-182s.* The Romantic School in Germany. 9 credits. Mr. Pfeiffer. (Not offered in 1940-41.)

183f-184w-185s.* Gottfried Keller, Conrad Ferdinand Meyer, and Carl Spitteler. 9 credits. Mr. Pfeiffer. (Not offered in 1940-41.)

192f. Gothic. The course is designed as an introduction to Germanic linguistics and to a comparative study of the Indo-European languages. 4 credits. Mr. Reichardt. (Not offered in 1940-41.)

193w. Gothic Texts. 2 credits. Mr. Reichardt. (Not offered in 1940-41.)

194s. Old Saxon. The Heliand. 3 credits. Mr. Reichardt. (Not offered in 1940-41.)

195w. Introduction to Old Norse Language and Literature. Survey of Old Icelandic history and literature. Old Norse phonology and morphology. 4 credits. Mr. Reichardt.

196s. Eddic Poetry. 3 credits. Mr. Reichardt.

COURSES PRIMARILY FOR GRADUATE STUDENTS

209f-210w-211s.* Old High German. Phonology, morphology, and syntax. 9 credits. Mr. Reichardt.

215f-216w-217s.* Middle High German. Phonology, morphology, and syntax. 9 credits. Mr. Reichardt. (Not offered in 1940-41.)

218f-219w-220s.* Germanic Languages and Literature. Texts in Germanic dialects, their linguistic, literary, and cultural background. Prerequisite: a good knowledge of at least two Germanic dialects. 9 credits. Mr. Reichardt.

253f-254w-255s.* Nineteenth-Century Drama. Kleist, Grillparzer, Hebbel. 9 credits. Mr. Burkhard. (Not offered in 1940-41.)

GREEK

For courses and staff see Classics, page 56.

HISTORY

Professors Lester B. Shippee, Theodore C. Blegen, Alfred L. Burt, Herbert Heaton, August C. Krey, George M. Stephenson; Associate Professors Harold C. Deutsch, Ernest S. Osgood, Lawrence D. Steefel, David H. Willson; Assistant Professors Tom B. Jones, Faith Thompson, Alice F. Tyler; Instructor Rodney C. Loehr.

Prerequisites.—Of the four fields in which general survey courses in history are usually given, namely, ancient, American, English, and European, students entering upon graduate work in history will usually be expected to have covered two or three courses. In addition they will be expected to have taken advanced or Senior College courses in two of these fields and at least one course in which intensive work with the beginnings of investigation is done.

Minor.—A student who makes history a minor will be expected to have completed approximately the same amount of prerequisite work as that indicated in the preceding paragraph with the possible exception of the course involving intensive work.

Language requirement.—The department attaches much importance to adequate preparation in the foreign languages, which may be used by the student in the course of advanced and research work. Except in very unusual cases, where the nature of the field studied calls for another language, French and German are the best tools; adequate reading knowledge of one of these must be demonstrated not later than the close of the second quarter in which the student is registered for an advanced degree.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

Master's degree.—Offered under both Plan A and Plan B.

Plan A (with thesis).—Before entering upon the work for this degree the candidate shall satisfy his adviser, by examination or otherwise, that he is sufficiently prepared to carry on graduate work in the fields of his selection; he shall also, by the end of the second term of residence, demonstrate his ability to read French or German. The candidate shall select from the appended list two fields in which to do his work; for example, Group C 3 and Group D 3, or Group B 1 and Group C 3. While course work may be expected to cover some portion of the selected fields, and perhaps material outside of them, the candidate is expected to prepare himself to stand examination on fields rather than on courses. The thesis shall fall within one of the selected fields which shall be chosen in consultation with an adviser of the department. Generally a minimum of 18 credits in the major fields and 9 in the minor will be expected; the thesis accounts for the remainder of the credits. Upon completion of the work the candidate will be given a written examination upon the two fields, and an oral examination upon the history fields, the minor field, and the thesis.

Group A

1. The Old Orient
2. Greece
3. Rome

Group B

1. Europe, 395-1300
2. England to 1485
3. Renaissance and Reformation
4. Economic History, 1300-1700

Group C

1. England since 1485
2. Modern Europe§
3. Economic History, 1700 to present

Group D

1. American History to 1789
2. The United States, 1789-1865
3. The United States since 1865
4. Economic History of the United States, 1790-1860
5. Economic History of the United States since 1860

Group E

1. Asia since 476
2. European Colonies and Dependencies
3. Latin America
4. Canadian History

Plan B (without thesis).—Candidates for the Master's degree will meet the general requirements of the Graduate School for this degree (see p. 12 of this bulletin), and by the end of the second quarter of residence demonstrate ability to read French or German. The program of the candidate shall be made out in consultation with an adviser in the department who will see to it that the candidate registers for courses which will give a balanced training in the general field of history together with some attention to the supporting fields in the social studies (political science, economics, sociology, anthropology, geography). One of the courses in history, carrying at least 9 credits, shall be a seminar. In special cases, this requirement may be fulfilled in courses numbered 150-200 or by an equivalent amount of work done by independent reading with written reports under direction of an adviser; the reports must show familiarity with source material in some selected field. As in the case of candidates for the degree under Plan A, the candidate under Plan B must present evidence that he is prepared to pursue courses giving graduate credit (deficiencies must be made up by carrying without credit undergraduate courses which will be sufficient in scope and number to supply the necessary background). On completion of the courses presented for the degree the candidate will be given an oral examination covering the work.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates will be expected to fulfill the general requirements as given in this bulletin, pages 19-22.

Preliminary Examination

For a major in history, the candidate shall choose five fields from those listed above. At least one period or field shall be chosen from Group A or B and at least one from Group C or D. Three of these fields including that containing the subject of the proposed thesis must be related. The selection of these fields must be made in consultation with, and subject to the approval of, the chairman of the candidate's examination committee. These selections shall be reported by the adviser to the chairman of the History Department. In exceptional cases, the department may approve fields not included in the list.

The preliminary examination will cover the minor and four of the periods or fields chosen for the major. That field in which the candidate intends to do special

§ The candidate, with the advice and consent of his adviser, may choose one or more fields in the modern history of Continental Europe. These fields may be arranged (a) on a regional or (b) on a topical basis, or (c) in exceptional cases may be limited to the history of a single country. *Examples* of (a) would be Western Europe with special attention to France and Spain, Central Europe, with special emphasis on Germany and Italy, Eastern Europe with special emphasis on Russia and the Near East, the Mediterranean region, or the Baltic region. *Examples* of (b) would be international relations from the end of the 15th century to the end of the 18th or from the end of the 18th century to the present, the constitutional history of Continental Europe since the beginning of the French Revolution, the history of European nationalism. *Examples* of (c) would be the history of France since the middle of the 15th century, Germany since the middle of the 16th, or Russia.

work shall be reserved for the final examination. The scope of this reserved field shall be indicated to the department and approved by it at the time when the candidate is certified for the preliminary examination. The preliminary examination for candidates majoring in history is both written and oral.

Final Examination

In this examination, taken after the successful completion of the preliminary examination and the acceptance of the candidate's thesis, the emphasis shall be placed upon testing the highly detailed knowledge of the student in his special subject. It shall cover that subject reserved in the preliminary examination, and, under the rules of the Graduate School, is given by the same committee that sat in the preliminary examination. This examination includes the usual defense of the thesis, its methods, results, and contribution to the field investigated.

GENERAL REQUIREMENT

201f-202w-203s. Historical Bibliography and Criticism. 1 credit per quarter. Required of candidates for advanced degrees in history who do not present evidence of similar training elsewhere. (S I; 339 Lib.) Mr. Steefel and others.

Students, proposing to make history their major field or field of concentration under Plan B, who enter upon their graduate work with inadequate preparation in certain fundamental courses may, upon recommendation of their adviser, enroll for one or more of the following courses numbered between 100 and 149. In each case the student shall attend and do all the work required in the designated course, including preparation of papers and taking tests; in addition the student shall do such supplementary reading and perform such other tasks as the instructor shall require. No major program or program of concentration will, however, be approved where the bulk of work is in such courses; the emphasis must be placed on courses numbered 150 and above.

Graduate students whose major field or field of concentration is not history may, on recommendation of their respective advisers and with the permission of the Department of History, enroll for these courses.

These courses are not open to undergraduates.

101f-102w-103s.† Ancient History. Student does the work of History 50-51-52 or 50a-51a-52a. 9 credits. Mr. Jones.

104f-105w-106s.† Medieval History. Student does the work of History 53-54-55 or History 53a-54a-55a. 9 credits. Mr. Krey.

107f-108w-109s.† European History. Student does the work of History 56-57-58, 59-60-61, 62-63-64 or 65-66. 9 credits. Mr. Deutsch, Mr. Steefel, Mr. Willson.

110f-111w-112s.† English History. Student does the work of History 70-71-72 or History 73-74-75. 9 credits. Mr. Willson, Miss Thompson.

113f-114w-115s.† Canada and Canadian-American Relations. Student does the work of History 76-77-78. 9 credits. Mr. Burt.

116f-117w-118s.† American Economic History. Student does the work of History 83-84-85. 9 credits. Mr. Heaton.

119f-120w-121s.† Economic History. Student does the work of History 80-81-82. 9 credits. Mr. Heaton.

122f-123w-124s.† West in American History. Student does the work of History 90-91-92. 9 credits. Mr. Osgood.

125f-126w-127s.† American Diplomatic History. Student does the work of History 93-94-95. 9 credits. Mr. Shippee.

128f-129w-130s.† Minnesota and the Northwest. Student does the work of History 90a-91a-92a. 9 credits. Mr. Blegen.

131f-132w-133s.† The American Colonies. Student does the work of History 86-87-88. 9 credits. Mrs. Tyler.

Courses numbered 150 to 200 are open to seniors and graduates; prerequisites are the appropriate survey courses (see courses numbered 50 to 100 in the Combined Class Schedule Bulletin). Graduate students who do not present the appropriate survey courses or their equivalent are required to carry such courses without credit; in cases where such procedure is feasible the student may register for the courses numbered above 149 and also attend the meetings of the appropriate survey course, being therein held responsible for class exercises and examinations if the instructor and major adviser consider it advisable.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

150f-151w-152s.† Selected Readings in Ancient European History. 9 credits. Mr. Jones.

153f-154w-155s.† Selected Readings in Medieval and Renaissance History. 9 credits. Mr. Krey, Miss Thompson.

156f-157w-158s.† Selected Readings in Modern European History. 9 credits. Mr. Steefel, Mr. Deutsch, Mr. Willson.

170f-171w-172s.† Selected Readings in English History. 9 credits. Mr. Willson, Miss Thompson.

176f-177w-178s.† Selected Readings in Canadian History. 9 credits. Mr. Burt.

180f-181w-182s.† Selected Readings in Economic History. 9 credits. Mr. Heaton.

190f-191w-192s.† Selected Readings in American History. 9 credits. Mr. Shippee, Mr. Blegen, Mr. Stephenson, Mr. Osgood, Mrs. Tyler.

(See Combined Class Schedule for description, meetings, etc. of Courses 150 to 190.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

204f-205w-206s.*† Seminar in Medieval History. 9 credits. Mr. Heaton, Mr. Krey.

208f-209w-210s.*† Seminar in American History. 9 credits. Mr. Shippee, Mr. Blegen, Mr. Stephenson, Mr. Osgood.

221f-222w-223s.*† Seminar in Economic History. 9 credits. Mr. Heaton.

224f-225w-226s.*† Seminar in Modern European History. 9 credits. Mr. Steefel, Mr. Deutsch.

230f-231w-232s.*† Seminar in Ancient History. 9 credits. Mr. Jones.

HISTORY OF SCIENCE

Richard E. Scammon, Ph.D., LL.D., Distinguished Professor in the Graduate School.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

190f-191w-192s-193su. History of Science. Course in the social history of science, open to qualified graduate and Senior College students in any field of scientific or historical specialization. Conferences, readings, and occasional lectures. This course may count as major or minor on approval of the student's adviser in the Graduate School. Credits arranged. Consult Professor Scammon before registering.

HOME ECONOMICS

Professors Wylle B. McNeal, Clara M. Brown; Associate Professors Alice Biester, Harriet Goldstein, Jane M. Leichsenring, Isabel Noble, Ethel Phelps; Assistant Professor Eva Donelson.

Prerequisites.—Students desiring to major in home economics must present undergraduate subject-matter credits in certain of the following: social sciences, physical sciences, biological sciences, art and education—which shall be satisfactory to the adviser under whose direction the major work is to be done. In addition the student must have adequate undergraduate training in that field of home economics in which she wishes to specialize.

Major and minor.—Students majoring in home economics for a Master's or a Doctor's degree and those minoring in this division for the Doctor's degree must include Course 209, 249, 279, or 299 in the study program.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102f,s. Advanced Textiles. A study of textile materials with special reference to the following: nature of the raw materials; economic, chemical, and physical applications involved in their manufacture and use; methods and significance of physical testing. Prerequisites: H.E. 50, Agr. Biochem. 4, Agr. Econ. 3 or parallel. 3 credits. Miss Phelps.

107w. Textile Analysis. Problems and applications of quantitative methods in textile analysis with special reference to establishing standards for fabrics. Prerequisites: Course 102, Agr. Biochem. 2. 3 credits. Miss Phelps.

115w. Clothing Economics. A study of those aspects of clothing which directly or indirectly affect the consumer. Prerequisites: H.E. 50, Agr. Econ. 3. 2 credits. Miss Brew.

120f,w,s. Art History and Appreciation. The historical development of painting, sculpture, architecture, decoration, furniture, and costumes, studied with special emphasis on design and influence upon modern styles. Open to Senior College and graduate students only. 3 credits. Miss H. Goldstein, Miss V. Goldstein.

122s. Advanced Interior Design. Special problems of small house decoration, involving execution of elevation drawings. Studies and reports on topics of historical and practical interest. Actual materials used as far as possible. Prerequisites: Courses 120, 180, or permission of instructor. 3 credits. Miss H. Goldstein, Miss V. Goldstein.

125w. Advanced Costume Design. Study of figure construction. Relation of color and texture to dress design. Studies and reports on assigned topics. Laboratory work with fabrics. Designs in pencil and water colors. Prerequisites: Course 4 or permission of instructor, 22, 26 recommended. 3 credits. Miss H. Goldstein.

142f,w,s. Experimental Cookery. An intensive study of problems in foods and food preparation with individual laboratory problems. Prerequisite: Course 40. 3 credits. Miss Noble.

143f,w. Experimental Cookery. An intensive study of problems in foods and food preparation with individual laboratory problems. Prerequisite: Course 40. 5 credits. Miss Noble.

146s. Special Food Problems. Individual problems in foods and food preparation. Prerequisite: Course 142. 3 to 5 credits. Miss Noble.

163s. Institution Management Problems. Problems affecting the efficient administration of the institution; departmental organization, operation, maintenance; employment problems; business policies. Field trips to various types of institutions. Prerequisites: Courses 61, 62, 64. 3 credits. Miss Dunning.

170f,w. Nutrition of the Family. The fundamental principles of human nutrition and their application in the promotion and maintenance of optimal health of the family. Prerequisites: Courses 31, 40, Agr. Biochem. 4, Physiol. 4. 3 credits. Miss Biester, Miss Donelson, Miss Hunt.

171w,s. Child Nutrition. Lectures, discussions, and field work dealing with the principles of child nutrition and with the formation of desired food habits. Prerequisites: Course 170, H.E.Ed. 90. 3 credits. Miss Leichsenring, Miss Donelson.

173s. Nutrition in Disease. A study of the fundamental principles involved in using diet in the treatment of certain diseases. Prerequisites: Courses 170, 175. 3 credits. Miss Hunt.

175w. Nutrition II. A study of tissues and tissue metabolism, as well as work on blood, milk, and urine. Prerequisite: Course 33. 4 credits. Miss Donelson, Miss Hunt.

176w. Advanced Nutrition. Selected quantitative methods applicable to investigations relating to digestion and metabolism. Prerequisites: Course 175 or parallel, Agr. Biochem. 2. 4 credits. Miss Biester.

177s. Digestion and Metabolism. An intensive study of problems relating to digestion and metabolism involving lectures, reading, and laboratory work. Prerequisite: Course 175. 3 credits. Miss Leichsenring.

178f,w,s. Clinical Problems in Nutrition. The application of nutrition information to problems in health and disease involving assigned readings, discussions, and experience in a clinic. Prerequisites: 75 or parallel, 170 or parallel, 175. 2 credits. Limited to 8. Miss Hunt.

179f,s. Readings in Nutrition. A course designed to give experience in the use of nutrition books and periodicals, involving assigned readings, oral and written reports. Prerequisite: Course 170. 2 credits. Miss Donelson, Miss Hunt.

180w. Home Planning and Furnishing. Study of the small house which aims at more intelligent planning in building and furnishing. House plans, kitchen arrangements, and equipment of house studied from homemaker's point of view, economy, convenience, and beauty. Prerequisite: Course 55, 120 recommended. 5 credits. Miss H. Goldstein, Miss V. Goldstein.

185f,w,s. Family Relationships. A consideration of the factors that promote security, stability, and satisfaction in the immediate family group; and the responsibilities of the family in its relationship to community life. Prerequisites: 85 or parallel; H.E.Ed. 90. 2 credits. Miss Studley.

186s. Problems in Income Management. A study of problems relating to individual and family budgets. Readings, discussions, and field work. Prerequisites: H.E. 85 or parallel, 86, 170, Agr. Econ. 126 or parallel. 3 credits. Miss Studley.

195s. Development of Home Economics. A discussion of the development of home economics with emphasis upon current problems. 2 credits. Miss McNeal.

COURSES PRIMARILY FOR GRADUATE STUDENTS

202. Animal Fibers. An advanced course dealing with the structure, composition, chemical and physical properties, and special problems of manufacture of wool

and silk in relation to their use. Prerequisites: Quant. Chem. 5 cred., Org. Chem. 5 cred., Adv. Textiles 3 cred. 2 credits. Miss Phelps.

204. Plant and Manufactured Fibers. Study of the structure, composition, physical and chemical properties, and special problems of manufacture of cotton, flax, rayon, and certain minor fibers in relation to their use. Prerequisites: Bot. 5 cred., Quant. Chem. 5 cred., Org. Chem. 5 cred., Adv. Textiles 3 cred. 2 credits. Miss Phelps.

208. Microanalysis of Textile Fibers. Laboratory applications of histological and microchemical methods in the study of textile materials. Prerequisites: Bot. 5 cred., Biol. Sci. 10 cred., Org. Chem. 5 cred., Textile Analysis 3 cred. 2 or 3 credits. Miss Phelps.

209f,w,s.* Seminar in Textiles and Clothing. Reviews and interpretations of the literature of this field, emphasizing recent advances and involving individual assignments and oral and written reports. Registration with permission of the instructor. 1 credit. Miss Phelps.

247s.* Special Food Problems. Individual problems with special emphasis on the application of scientific techniques to the solving of food preparation problems. Prerequisites: Course 142, Agr. Biochem. 2. 3 or 5 credits. Miss Noble.

249w.* Seminar in Foods. Reviews and interpretations of the literature in the field of foods and experimental food preparation involving individual assignments and oral or written reports. Permission of the instructor. 1 or 2 credits. Miss Noble.

270-271. Principles of Human Nutrition. An advanced course dealing with certain aspects of digestion, metabolism, excretion, and food requirements under various conditions. Prerequisites: Courses 170, 175. 3 credits per quarter. Miss Biester, Miss Leichsenring, Miss Donelson, Miss Hunt.

279f,w,s.* Seminar in Nutrition. Reviews and interpretations of the literature of this field, emphasizing recent advances and involving individual assignments and oral and written reports. Permission of the instructor. 1 credit. Miss Biester, Miss Leichsenring, Miss Donelson, Miss Hunt.

295-296.* Home Economics Problems. Opportunity is offered for the investigation of selected problems in home economics in fields such as foods, nutrition, textiles, home management, and related art. Independent study and written reports. Permission of instructor. 1 to 5 credits. Miss Clara Brown, Miss Biester, Miss H. Goldstein, Miss Leichsenring, Miss Noble, Miss Phelps, Miss Studley, Miss Brew, Miss Donelson, Miss Hunt.

299f,w,s.* Home Economics Problems. A critical study of recent advances in the field of home economics, involving independent study, reading and oral or written reports. Permission of instructor. 1 credit. Miss McNeal, Miss H. Goldstein, Miss Studley.

HOME ECONOMICS EDUCATION

Professors Wylle B. McNeal, Clara M. Brown.

Prerequisites.—For a major or minor adequate preparation in psychology, educational psychology, education, and home economics must be presented. The prerequisites must be satisfactory to the major adviser.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

192f,w,s. Educational Measurement in Home Economics. Study of the techniques of measurement applicable in home economics; construction and evaluation of objective devices; review of published tests and scales. Prerequisites: Courses 91 and 93. 2 to 3 credits. Miss Clara Brown, Miss Rose.

193f,w,s. Home Economics Curriculum. A study of the contributions of home economics at various educational levels; evaluation of curriculum practices and techniques employed in curriculum planning and reconstruction. Prerequisite or parallel Course 94; or consent of instructor. Miss Clara Brown, Miss Rose.

194af. Adult Education Problems. Objectives of adult education; planning an adult program; teaching procedures; discussion of special problems. This course is planned for high school and extension teachers and supervisors of home economics classes. Prerequisites: Courses 91, 93 or equivalent. 3 credits per quarter. Miss Krost.

194bs. Adult Education Problems. Development of unit outlines, illustrative material, and bibliography for use in adult classes. This course is planned for teachers and supervisors of local leader groups or adult classes. Prerequisites: Courses 91, 93 or equivalent. Miss Krost.

197f,w,s.‡ Organization and Methods for Related Art Teaching. Organization of a related art course and methods of teaching art as applied to familiar objects and processes. The course is planned on an individual basis. Permission of the instructor is required for registration. 1 to 3 credits. Miss H. Goldstein.

COURSES PRIMARILY FOR GRADUATE STUDENTS

243f,w,s. Trends in Home Economics. The place of home economics in the educational program today; the ways in which content and procedures are being modified to meet changing conditions. 3 credits. Miss McNeal, Miss Clara Brown, Miss Rose.

292w,s.* Educational Measurement Problems. A continuation of Course 192, with emphasis upon individual problems in the field of measurement. Prerequisite: Course 192. 3 credits. Miss Clara Brown.

293f,w,s.* Special Studies in Home Economics Education. Designed to meet the needs of advanced students for opportunity to do independent study. Readings, oral and written reports are required. Prerequisite: permission of instructor. 1 to 3 credits. Miss McNeal, Miss Clara Brown, Miss Rose.

294f,w,s.* Research Problems. A study of the methods used in collection, treatment, and interpretation of data in the field of home economics; the writing of a technical report. Prerequisite: permission of instructor. 1 to 5 credits. Miss Clara Brown, Miss Rose.

295f,w,s.* Current Problems. Discussion and reports on present-day problems in the field of home economics education. 1 to 3 credits. Miss McNeal, Miss Clara Brown, Miss Rose.

HORTICULTURE

Professors William H. Alderman, Wilfrid G. Brierley, Rodney B. Harvey, Fred A. Krantz; Associate Professor Troy M. Currence; Assistant Professor Arthur N. Wilcox.

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

Prerequisites.—For a major in horticulture a student must have completed a sufficient amount of work in plant sciences to satisfy the advisers and the Division of Horticulture Graduate Committee that graduate study in this field may be satisfactorily undertaken. In certain cases further foundation courses may be required without credit.

Language requirement.—Master degree candidates will be accepted under either Plan A (with thesis) or Plan B (without thesis). The graduate committee in horticulture in individual cases may waive the foreign language requirement under Plan B, but under Plan A a reading knowledge of a foreign language will be required.

Major.—With the approval of the advisers, courses in closely allied fields of science may be accepted as part of the major work.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

107f. Orchard Management. A detailed study of the various operations in orchards and berry fields. Operating costs and profits. Lectures, laboratory, and individual problems. Prerequisite: Course 6. 3 credits. Mr. Brierley. (Offered only in even numbered years.)

110w. Horticultural Crop Breeding. The application of plant breeding methods to the principal horticultural crops, with stress on the formulation of methods of attack and on the genetic and cytogenetic background. Prerequisite: Agron. 31. 3 credits. Mr. Wilcox.

111f. Systematic Pomology. A study of fruit varieties. Lectures, laboratory, and a survey of the literature. Prerequisites: Course 6 and 10 credits in botany. 3 credits. Mr. Brierley. (Offered only in odd numbered years.)

121w. Small Fruit Culture. Cultural practices for each of the small fruits; botanic relationship; history of commercial development. Lectures, problems, and survey of literature. Prerequisites: Course 6 and 10 credits in botany. 3 credits. Mr. Brierley.

135f. Potatoes. Culture, handling, storage, seed maintenance, varieties, improvement, and physiology of the potato plant. Prerequisites: Course 32, 10 credits in botany. 3 credits. Mr. Krantz.

137w. Vegetable Crops. Lectures and survey of literature relating to vegetable crop production. Assigned readings include the classification, culture, improvement, and physiology of leading vegetable crops. Prerequisites: Course 32, 10 credits in botany. Mr. Currence.

153w. 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. Prerequisite: 10 credits in botany or equivalent. 3 credits. Mr. Longley. (Offered only in odd numbered years.)

176s. Landscape Construction. Construction and maintenance of turf for lawns, golf courses, and other play areas; garden architecture, grading, planting and care, costs of construction. Lectures, field trips, and reports. Prerequisite: Course 74. 3 credits. Mr. Longley. (Offered only in odd numbered years.)

190f-191w-192s. Special Problems. A study of problems based upon the work given in the preceding courses. 2 to 4 credits per quarter. Horticultural staff.

193f-194w. Horticultural Seminar. Reports and discussions of problems and investigational work. Required of graduate students. 1 credit per quarter. Horticultural staff.

COURSES PRIMARILY FOR GRADUATE STUDENTS

241w. Organization of Horticultural Research. A survey of the organization and administration of horticultural research in agricultural experiment stations with special emphasis on the development of the project, co-operation with other groups, and relationship of federal and state agencies. 2 credits. Mr. Alderman, Mr. Krantz.

242w. Horticultural Crop Breeding Topics. A critical study of recent research in breeding and genetics. 2 credits. Mr. Krantz, Mr. Wilcox.

243f-244w. Advanced Topics in Horticulture. A critical analysis of recent research in the fields of horticulture selected with consideration of the interests of individual students. 3 credits per quarter. Mr. Alderman, Mr. Brierley, Mr. Harvey, Mr. Currence, Mr. Longley, Mr. Wilcox.

245f-246w. Growth Factors in Crop Production. An analysis of growth and environmental factors as applied to crop plants. 3 credits per quarter. Mr. Harvey.

247f,w,s,su.* Report on Special Horticultural Topics. A review of the literature dealing with a selected topic or problem in horticulture and the preparation of a written report. Designed for students taking the Master's degree without thesis. 9 credits. Final approval by graduate committee in horticulture. Mr. Alderman, Mr. Brierley, Mr. Harvey, Mr. Krantz, Mr. Currence, Mr. Longley, Mr. Wilcox.

248w. Truck Crop Breeding. Survey of literature related to the improvement of vegetable garden crops. Lectures and reading on methods of controlling pollination, seed setting, maintenance of breeding material, sources of new varieties, etc. Prerequisites: Courses 32s, 137w, and Agron. 131f or 131w. 3 credits. Mr. Currence.

The following seminars are given in co-operation with Plant Genetics. See under Agronomy and Plant Genetics.

242f,s.* Plant Breeding Seminar. Plant genetics in relation to plant breeding, a discussion of research problems. 1 credit per quarter. Mr. Hayes, Mr. Immer, Mr. Krantz, Mr. Currence, Mr. Wilcox.

246w.* Genetics Seminar. Important contributions to genetic theory and practice. 2 credits. Mr. Hayes, Mr. Immer, Mr. Krantz, Mr. Currence, Mr. Wilcox, Mr. Winter.

JOURNALISM

Professors Ralph D. Casey, Mitchell V. Charnley, Ralph O. Nafziger.

Prerequisite.—A total of 27 credits in journalism and English or the social sciences, distributed as follows:

In journalism, a minimum of 15 credits including reporting, news editing, and special feature articles. Additional credits to make up the 27 credits should include either courses in English, including a sophomore English composition course, or 12 credits in either political science, economics, history, or sociology. Freshman composition will not satisfy the requirement in the English option. A reading knowledge of at least one foreign language.

Minor.—For minor work, 12 credits, or their equivalent, in journalism. A candidate offering a graduate minor in journalism is advised that he may best satisfy this requirement by electing courses from among the following: Journalism 103, 109-110, 111, 112, 114, 130-131-132, 205.

Fees.—A typewriter fee of $1 is charged each quarter to all students registered for one or more journalism courses other than Journalism 5.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101w. Reporting of Public Affairs. Instruction and practice in methods of reporting the courts; local, state, and federal administrative departments, and political and social organizations. Prerequisites: Course 51 and 9 credits in political science. 3 credits. Mr. Nafziger.

103s. Literary Aspects of Journalism. A study of the best journalistic work of such writers as Daniel Defoe, Benjamin Franklin, Philip Freneau, Mark Twain, Lafcadio Hearn, Stephen Crane, Rudyard Kipling, Ambrose Bierce, etc. Lectures, outside reading, and some practice in writing. Prerequisite: Eng. 21-22 or 22-23. 3 credits. Mr. Ford.

109w-110s. History of Journalism. A study of the evolution of the newspaper in Europe and the United States with special reference to the problems of present-day journalism. Prerequisite: Course 15. 6 credits. Mr. Ford.

111f.* Foreign News Sources. An examination of foreign news and the methods by which it is obtained and prepared for American readers. The importance of foreign news, the methods of correspondents in various countries, the newspapers in those countries, and some of the factors affecting the news from those countries are considered. This is not a course for training foreign correspondents but is intended to help the reader understand the background of foreign news. Prerequisites: Course 41 or 51 and one history or political science course in international relations, or permission of instructor. Mr. Nafziger.

112w. Current Newspaper Problems. Present-day standards of editorial practice and questions of editorial policy. The civic and social responsibility of the press. The handling by various metropolitan papers of news of politics, public affairs, labor, crime, sports, literature and the arts, organized women's affairs, etc. Various influences that bear upon the press, including propaganda and the demands of organized groups. The socio-economic nature of the press and the problems arising out of this dualism. Prerequisite: Course 109-110 or 111. 3 credits. Mr. Ford.

114w. The Influence of the Newspaper. Influences of the newspaper upon the attitudes, opinions, moral standards, taste, written and spoken English, and standards of living of readers. Prerequisite: Course 15 or 41. 3 credits. Mr. Ford. (Not offered in 1940-41.)

130f-131w-132s.* The Press and Public Opinion. Research dealing with the various ways in which newspapers and magazines attempt to influence public opinion. A study of the technique and effectiveness of these methods. General problems of propaganda and censorship. Prerequisite: 20 credits in sociology, psychology, and political science. 9 credits. Mr. Casey.

140f-141w-142s. Contemporary Affairs. A study of important state, national, and world problems about which the newspaper man must be informed and concerning which he must serve as interpreter. The course will aim to unify the separate social studies which students have had in other departments of the University with a view to the focusing of these studies on contemporary questions and on problems in journalistic practice. Prerequisites: Courses 109-110 and 20 credits in social science. 9 credits. Mr. Casey, Mr. Charnley, Mr. Nafziger.

COURSES PRIMARILY FOR GRADUATE STUDENTS

205f,w,s.* Topics in International News Communications. Advanced study of the controls imposed on news-gathering agencies in the world, and research problems in the rise and development of news communications. Prerequisite: consent of the chairman of the department. 3 credits. Mr. Casey, Mr. Nafziger.

210f,w,s.* Research in Newspaper Problems. Individual research in either historical or contemporary phases of newspaper, magazine, or advertising fields. Prerequisite: consent of department. 2 to 3 credits. Mr. Casey, Mr. Nafziger.

LATIN

For courses and staff see Classics—Latin, page 57.

LINGUISTICS AND COMPARATIVE PHILOLOGY

Major adviser, Professor Ogle.

For details, see the department in which the courses are listed.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

Anthropology 105f. Elements of Language.
Classics 106w. General Linguistics.
Classics 107s. Cultural Aspects of Language.
Classics 133s. Vulgar Latin.
English 100f. Old English.
English 102w. Old English Poetry.
English 103s. Beowulf.
English 165w. The Historical Study of Modern English.
French 171f-172w-173s.† History of French Language.
German 110f-111w-112s. Introduction to Germanic Philology.
German 115f-116w-117s. Middle High German Literature.
German 192f. Gothic—Introduction to Germanic Linguistics.
German 193w. Gothic Texts.
German 194s. Old Saxon.
German 195w. Introduction to Old Norse Language and Literature.
German 196s. Eddic Poetry.
Linguistics 121f-122w-123s. Introduction to Arabic. Prerequisites: Two courses above 50 in any foreign language. 9 credits. Mr. Cline.
Linguistics 131f-132w. Introduction to Sanscrit. Prerequisites: At least two Senior College courses in any Indo-European language. 4 credits. Mr. Reichardt.

COURSES PRIMARILY FOR GRADUATE STUDENTS

French 201f-202w-203s. Old French Phonology and Morphology.
German 209f-210w-211s. Old High German.
German 215f-216w-217s. Seminar: Middle High German Texts.
Spanish 241f-242w-243s. Old Spanish Philology.

MATHEMATICS AND MECHANICS

Professors Raymond W. Brink, William H. Bussey, William L. Hart, Dunham Jackson, Willem J. Luyten, George C. Priester, Royal R. Shumway, Lorenz G. Straub, Hugh B. Wilcox; Associate Professors Henry C. T. Eggers, Edward L. Hill, Anthony L. Underhill; Assistant Professors Elizabeth Carlson, Gladys E. C. Gibbens, Glenn H. Peebles.

Mr. Bussey is chairman and Mr. Underhill is secretary of the group. Students majoring in mathematics and mechanics should consult one or the other.

Prerequisites.—For major work 10 credits in calculus and 14 other credits in non-Junior College courses.

Minor.—For minor work, those courses specified as prerequisite to the chosen specific graduate courses.

Students may also consult the Bulletin of the Institute of Technology and the Combined Class Schedule.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102w-103s.* Advanced Analytic Geometry. 3 credits per quarter. Mr. Bussey.

106f. Differential Equations. 3 credits. Miss Gibbens.

107w-108s. Advanced Calculus. 3 credits per quarter. Mr. Underhill.

118f-119w-120s.* Vectors and Matrices. 3 credits per quarter. Mr. Jackson.

127f,w,s. Technical Mechanics. Prerequisite: Course 26. 5 credits. Mr. Wilcox.

128f,w,s. Strength of Materials. Prerequisite: Course 26. 5 credits. Mr. Priester.

129f,w,s. Hydraulics. Prerequisite: Course 26. 4 credits. Mr. Straub, Mr. Doeringsfeld.

130f. Open Channel Flow. Prerequisites: Courses 129 and 143. 3 credits. Mr. Straub.

132f-133w-134s. Advanced Hydraulic Problems. Prerequisite: Course 130 or registration in 130 or by special permission. 2 credits per quarter. Mr. Straub.

137s.* Advanced Theory of Equations. Prerequisites: Courses 51 and 62. 3 credits. Miss Gibbens.

151f. Differential Equations. Prerequisite: Course 25. 3 credits.

152w-153s. Advanced Calculus with Applications. Prerequisite: Course 25. 3 credits per quarter. Mr. Scherberg.

154f*-155w*-156s.* Vector Analysis with Applications. Prerequisite: Course 26. 3 credits per quarter. Mr. Turrittin.

161f*-162w*-163s.* Advanced Technical Mechanics. Prerequisite: Course 127. 3 credits per quarter. Mr. Wilcox.

164f*-165w*-166s.* Operational Methods and Operational Calculus. Prerequisite: Course 151 or permission of instructor. 3 credits per quarter. Mr. Scherberg.

167f*-168w*-169s.* Mathematics of Modern Engineering. Prerequisite: Course 26. 3 credits per quarter. Mr. Opatowski.

180w.* Advanced Strength of Materials. Prerequisite: Course 128. 3 credits. Mr. Priester.

181f-182w-183s. Applied Elasticity. Prerequisite: Course 128. 3 credits per quarter. Mr. Priester.

184f-185w-186s. Advanced Testing Materials Laboratory. Prerequisite: Course 141. 2 credits per quarter. Mr. Priester.

190w. Mechanics of Similitude and Dimensional Analysis. Prerequisites: Courses 127, 128, 129. 3 credits. Mr. Straub.

191w. Hydraulic Motors and Pumps. Prerequisite: Course 129. 3 credits. Mr. Straub.

192s. Natural and Artificial Waterways. Prerequisites: Course 129 and preferably 130. 3 credits. Mr. Straub.

193w. Hydraulic Measurements. Prerequisite: Course 192. 3 credits. Mr. Straub.

194f-195w-196s. Advanced Hydraulics Laboratory. Prerequisites: Courses 129 and 143. 2 credits per quarter. Mr. Straub.

197f-198w-199s. Mechanics of Soils. Prerequisites: Courses 129, 143. 2 credits per quarter. Mr. Straub.

COURSES PRIMARILY FOR GRADUATE STUDENTS

206f*-207w*-208s.* Theory of Functions of Real and Complex Variables. 3 credits per quarter.

221f.* Calculus of Variations. 3 credits. Mr. Underhill. (Not offered in 1940-41.)

248f*-249w*-250s.* Reading and Research. Competent students will be assisted in independent reading and reports by members of the department. 1 to 3 credits per quarter.

271f*-272w*-273s.* Theory of Linear Differential and Integral Equations. 3 credits per quarter. Mr. Brink.

The following courses have been offered from time to time in the past, and similar courses or other courses of corresponding grade, will be provided at any time there is sufficient demand for them.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

104. Synthetic Geometry.
109. Theory of Numbers.
114. The Mathematics of Small Vibrations.
115. Differential Geometry.
121*-122*-123.* Mathematical Theory of Statistics.
131. Advanced Algebraic Theory.
135. Introduction to the Theory of Small Samples.
140.* Projective Geometry.
142. Theory of Invariants.
144*-145*-146.* Topics in Mathematical Analysis.
149. Introduction to Group Theory.
157-158-159. Determinants and Solid Analytic Geometry.

COURSES PRIMARILY FOR GRADUATE STUDENTS

232*-233*-234.* Advanced Fluid Mechanics.
245-246-247. Advanced Function Theory.
251*-252*-253.* Functions in Hilbert Space and Related Topics.
254*-255*-256.* Modern Analysis (based on Whittaker and Watson's text).
261*-262*-263.* Functions of a Complex Variable.
267*-268*-269.* Advanced Dynamics (Vol. I, *Routh's Rigid Dynamics*).
274-275-276. Advanced Dynamics of a Particle.
277-278-279. Advanced Statics.
281-282-283. Hydrodynamics.
284-285-286. Advanced Hydrodynamics.
294-295-296. Mathematical Theory of Elasticity.
297-298. Vibration Problems.

The Galois Theory of Equation.
Higher Plane Curves.
The Calculus of Finite Difference.
Modern Theories of Integration.
Advanced Descriptive Geometry.
Perspective.

Fourier's Series and Spherical Harmonics.
Advanced Analytic Geometry of Space.
Elliptic Functions and Integrals with Applications.
Limits and Series.

The following courses given in the Department of Physics and the Department of Astronomy may count for credit in this department: Physics 201-202-203, 204-205-206, 207-208-209, 210-211-212, Astronomy 101, 140.

Drawing and Descriptive Geometry

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

115f-116w-117s. Curve Fittings. 3 credits per quarter. Mr. Eggers.
152f,w,s-153w-154s. Nomography. 3 credits per quarter. Mr. Levens.
157f-158w-159s. Graphical Mathematics. 2 credits per quarter. Mr. Eggers.

MECHANICAL ENGINEERING

Professors John R. DuPriest, Charles A. Koepke, Frank B. Rowley, Charles F. Shoop; Associate Professors John V. Martenis, Burton J. Robertson, Robert E. Summers.

Master's degree.—Offered only under Plan A.

Mechanical Engineering Design

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

121f. Machine Design. Spur, bevel, and worm gears, flywheels, and pulleys; rotating discs; belt and rope transmission; force and shrink fits; critical speeds; lubrication. Prerequisite: Course 24. 2 credits. Mr. Ryan.

122w-123s. Mechanical Engineering Design. Machine elements as applied to complete machines. Mathematical theory of lubrication; vibration analysis; stress analysis by photoelastic methods. Study of materials for special purposes, high temperatures, etc. Prerequisite: Course 121. 2 credits per quarter. Mr. Ryan.

125w. Machine Design Laboratory. Experimental studies of critical speeds, vibration, balancing, and noise in high speed machinery; complex stresses in machine parts; the use of vibrograph, oscillograph, stroboscope, photoelastic polariscope, and noise meter. Prerequisite: Course 121. 2 credits. Mr. Ryan.

127w. Lubrication. Hydrodynamic theory of lubrication and applications to the design and construction of thrust and journal bearings. Pressure distribution, end leakage, film thickness, temperatures, and heat losses. Prerequisite: Course 121. 3 credits. Mr. Ryan.

128f. Photoelastic Stress Analysis. Fundamentals of stress analysis; optics of the polariscope; studies in tension, bending, and shears; combined stresses; concentrated stresses; auxiliary equipment; Mohr's diagrams; complex stress analysis. Prerequisite: M.&M. 128. 3 credits. Mr. Ryan.

129s. Vibration Engineering. Fundamental analysis; factors influencing vibration, critical speeds; rotating, reciprocating, torsional vibration; balancing; instruments for measuring and recording vibration. Prerequisite: Course 121. 3 credits. Mr. Ryan.

197w. Mechanical Equipment of Buildings. Investigation of heating, ventilating, refrigerating, power, elevator, fire protection, and special equipment for large

buildings. Disposal of wastes, light distribution, communication, and plumbing. Lectures, inspection trips, reports with equipment layout. Prerequisites: Course 160, Phys. 43. 3 credits. Mr. Martenis.

COURSES PRIMARILY FOR GRADUATE STUDENTS

221f-222w-223s. Advanced Mechanical Engineering Design. Prerequisite: Course 121. 3 credits per quarter. Mr. DuPriest, Mr. Martenis, Mr. Ryan.

Steam Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

141f,w. Power Plant Engineering. Theory, practice, and economics relating to prime movers and steam generating equipment of the modern power plant, including auxiliary units such as condensers, heaters, purifiers, pumps, fans, piping, etc. Prerequisite: Course 32. 3 credits. Mr. Shoop.

144w. Steam Turbines. Theory and practice applied to various types. Thermodynamics and mechanical analysis of problems involved in the design of nozzles, blades, rotors, etc. Condition of operation, systems of transmission; lubrication; economy; field of service. Laboratory investigation. Prerequisite: Course 32. 3 credits. Mr. Shoop.

145w. Applied Thermodynamics. Laws of heat transmission, mean temperature difference in condensers, boilers, brine coils, feed water heaters. Treatment of cooling towers, accumulators, multiple stills, stage evaporators, vapor refrigeration; air compressors, multi staging, intercooling, etc. Prerequisites: Courses 32, 35. 3 credits. Mr. Shoop.

146s. Fuels and Combustion. Fuels: classification and analysis. Hand and stoker treatment; regulation. Pulverized and liquid fuels. Types of burners, controls. Combustion: generation of heat; furnace gases; stratification; flame way; smoke prevention. Furnaces. Prerequisite: Course 141. 3 credits. Mr. Shoop.

147w. Design of Steam Machinery. Piping systems, furnaces and gas passage dimensions, stokers, oil, gas, and pulverized fuel burners, super-heaters, feed water heaters and pumps, air preheaters, automatic controls, chimneys, etc. Prerequisite: Course 141 or registration in 141. 2 credits. Mr. Shoop.

148s. Design of Power Plant Units. Treatment of condensers, air pumps, cooling towers, stage evaporators, reheaters, etc. Prerequisite: Course 147. 2 credits. Mr. Shoop.

149f,w,s. Advanced Steam Laboratory. Tests of steam turbines, uniflow and compound steam engines, condensers, evaporators, and vacuum pumps. Tests of compound steam pump. Air compressors, boiler, superheater, and power plant. Studies of fluid flow meters and air conditioning apparatus. Prerequisites: Courses 32, 35, and 141 or registration in 141. 2 credits. Mr. Shoop.

COURSES PRIMARILY FOR GRADUATE STUDENTS

241s. Advanced Thermodynamics. Reversible changes of state and efflux of wet and superheated vapors. Flow of compressible fluids in mains, moving channels, into receivers, and communicating vessels. Gas mixtures, critical points, liquefaction. Power plant cycles: regenerative, reheating, and bleeding. Prerequisite: Course 145. 3 credits. Mr. Shoop.

242f-243w. Power Plant Design. Problems, designs, and estimates for power plants and central stations. Selection of motive powers, relative advantages of steam, producers, and gas plants. Choice of engines and boilers; pumps, piping, and accessories. Prerequisite: Course 148. 2 credits per quarter. Mr. Shoop.

244s. Power Plant Management. Operation and maintenance of boilers, engines, steam turbines, and accessory apparatus. Smoke prevention, lubricants and lubrication. Power plant finance. Daily logs and power costs. Study of recent power researches. Prerequisite: Course 141. 3 credits. Mr. Shoop.

Internal Combustion Engines

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

150f,w. Internal Combustion Engines. Study of real gas cycles, combustion fuels. Construction and performance. Characteristics of Otto, Diesel, and compression-ignition engines. Carburetion, fuel injection, cooling, lubrication. Auxiliary systems. Prerequisite: Course 31. 3 credits. Mr. Robertson.

151w. Advanced Internal Combustion Engines. Special reference to automobile, truck, and airplane engines. Theoretical consideration of fuels, combustion, detonation, lubrication, etc. Prerequisite: Course 150. 3 credits. Mr. Robertson.

152f,s. Diesel Engines. An advanced course in the theory, design, operation, and economics of the Diesel engine. Lectures and assigned readings. Prerequisite: Course 150. 3 credits. Mr. Robertson.

153w. Automobile Fleet Maintenance. Study of available types of motor coaches and trucks, their design features from a maintenance viewpoint, a survey of service depot requirements with a study of fleet service methods and maintenance practice. Prerequisite: Course 150. 3 credits. Mr. Robertson.

154w,s. Design of Airplane Engines. Study of the designs of radial and inline aircraft engines. Drawing room problems, including graphical and analytical calculations of stresses in moving parts. Combined polar diagrams of bearing loads, etc. Prerequisites: Courses 27, 150. 2 credits. Mr. Robertson, Mr. Ford.

155s. High Speed Engine Testing. Use of modern research instruments and methods of testing. Experiments showing effect of fuel mixture, distribution, spark timing, etc., upon general engine performance. Prerequisite: Course 159. 2 credits. Mr. Robertson.

156w,s-157s. Design of Internal Combustion Engines. Detailed study of design of automotive and stationary engines. Problems, including calculation of cylinders, bearing loads, stresses in moving parts, and valve mechanisms. Prerequisites: Courses 121, 150 for 156, 154 or 156 for 157. 2 credits. Mr. Robertson, Mr. Ford.

158f,s. Aero Engine Testing. The use of modern instruments for testing gasoline and Diesel aircraft engines. The use of dynamometers and torque stands in determining engine performance. Prerequisite: Course 150. 2 credits. Mr. Robertson.

159f,w,s. Internal Combustion Engine Laboratory. Test of gasoline, semi-Diesel, and Diesel engines. Power plant units and automotive engines. Prerequisite: Course 150 or registration in 150. 2 credits. Mr. Robertson, Mr. Ford.

COURSES PRIMARILY FOR GRADUATE STUDENTS

250f,w,s. Dynamics of High Speed Engines. Advanced study of inertia forces; balancing high speed multi-cylinder engines; engine torque analysis; torsional vibration, etc. Conferences, assigned readings, and problems. Prerequisites: Courses 121, 150. 3 credits. Mr. Robertson, Mr. Ford.

251f-252w-253s. Automotive Vehicles. A study of transmission systems, running gears, chassis, bodies, riding qualities of vehicles, and current developments; lecture and problems. Credits arranged. Mr. Robertson, Mr. Ford.

254s. Engine Service Management. Instruments and methods used in servicing or reconditioning automobile and airplane engines. Causes of mechanical failure and wear. Permissible tolerance in worn parts. Lubrication and ignition service. Prerequisite: Course 151. 3 credits. Mr. Robertson, Mr. Ford.

255f-256w-257s. Automobile Testing Research. Dynamometer and road tests including over-all efficiency of cars at various speeds, fuel consumption, effect of road surface on traction, efficiencies, and general performances. Special research problems. Prerequisite: Course 55 or 159. 2 credits per quarter. Mr. Robertson.

258s. Motor Truck and Bus Transportation. Problems involving motor truck transportation, capacity of trucks, trailers, drawbar pull. Efficiencies. Effect of road surfaces. Freight handling. Analysis of cost of truck operation and maintenance. Relative cost of transportation. Prerequisite: Course 152. 3 credits. Mr. Robertson.

Heating, Ventilation, and Refrigeration

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

160f. Heating and Ventilation. Principles of heating, ventilation, and air conditioning. Warm air, steam, hot water, vapor, vacuum, and fan systems of heating; pipe systems; heat regulation. Ventilation and air conditioning, synthetic air chart, central station heating. Prerequisites: Course 31 and M.&M. 127, 129. 3 credits. Mr. Rowley.

161w-162s. Heating, Ventilation, and Air Conditioning Design. Design, selection, and arrangement of equipment for various types of heating and ventilating systems. Prerequisite: Course 160. 2 credits per quarter. Mr. Algren.

164s. Heating and Ventilation. (Arch.) Principles of heating, ventilation, and air conditioning. Heating systems; furnaces, steam, hot water, vapor, vacuum, and fan blast. Piping systems. Ventilation and air conditioning and methods of control. Prerequisite: Course M.&M. 92. 2 credits. Mr. Rowley.

165w. Advanced Heating, Ventilation, and Air Conditioning. Requirements for comfort and health and industrial processes. Thermodynamics of air vapor mixtures. Heating, cooling, humidification, dehumidification. Atmospheric impurities, sources, classifications, methods of elimination. Air supply and distribution. Methods of control and application. Prerequisite: Course 160. 3 credits. Mr. Rowley.

166s. Refrigeration. Principles of refrigeration. Various types of refrigerating machines, refrigerants, applications to ice making, cold storage, and air conditioning. Prerequisite: Course 32. 3 credits. Mr. Rowley, Mr. Algren.

167s. Advanced Heating, Ventilation, and Air Conditioning. Special problems including air conditioning, heat transfer, heating and cooling loads, solar radia-

tion, etc. Equipment and test methods. Prerequisite: Course 160. 3 credits Mr. Rowley.

169f,w,s. Heating and Ventilation Laboratory. Tests of heating, ventilating, and air conditioning equipment. The determination of air qualities as required for comfort and for specific industries. Tests and studies of complete installation. Prerequisites: Courses 35, 160 or registration in 160. 2 credits. Mr. Algren.

COURSES PRIMARILY FOR GRADUATE STUDENTS

265f,w,s. Advanced Heating, Ventilation, and Air Conditioning. Taken in connection with research work in the laboratory. Prerequisite: Course 160. Credits arranged. Mr. Rowley.

Industrial Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

170s. Tool Design and Construction. Tools, jigs, dies, and fixtures for manufacturing interchangeable parts. Prerequisites: Courses 17, 171. 3 credits. Mr. Koepke.

171f,w. Production Control. Principles and practice involved in economical production. Standardization. Requirements for uniformity and interchangeability. Jigs, fixtures, and special equipment; gauges and inspection systems. Divisions of labor. Conveying, handling, and stores control. Fatigue elimination. Prerequisite: Course 17. 3 credits. Mr. Koepke.

172w. Industrial Plants. Factory organization and construction for economical manufacture. Organization of the industry. Location and type of buildings, power development. Layout of plant. Routing systems and machine layout. Heating and ventilating requirements. Lighting. Sanitation. Distribution of power. Welfare features. Lectures, recitations, and laboratory. Prerequisite: Course 171. 3 credits. Mr. Koepke.

173s. Industrial Management. General principles. Taylor system; wage, bonus, and profit sharing systems. Maintenance and depreciation. Purchasing. Allocation of cost, overhead, and machine burden. Graphical representation. Prerequisite: Course 172. 3 credits. Mr. Koepke.

174f,w,s. Industrial Management Laboratory. Planning department. Time and motion studies; rate setting. Instruction cards. Production control. Shop practice with investigations in local factories. Lectures, assigned reading, practice, and reports. Prerequisites: Courses 17, 171 or registration in 171. 2 credits. Mr. Koepke.

175w. Materials Handling. Equipment and facilities necessary for economical transportation and storage of materials and parts during the process of manufacture; factors affecting capital invested in inventory, hand and power trucks, conveyors, elevators, hoists, cranes, arrangement of stores, checking and issuing materials. Prerequisite: Course 172 or registration in 172. 2 credits. Mr. Koepke.

179s. Industrial Relations. Labor administration. Foreman training. Training the worker; job analysis. Employment and turnover; the human element, service departments. Stabilization of labor. Lectures, reading, shop visits, and reports. Prerequisite: Course 171. 3 credits. Mr. Koepke.

COURSES PRIMARILY FOR GRADUATE STUDENTS

277f-278w-279s. Industrial Engineering Problems. Special investigations of practical problems and suggested methods of procedure. Lectures, assigned reading, shop visits, and reports. Prerequisites: Courses 173, 174. 3 credits per quarter. Mr. Koepke.

GENERAL

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

131w,132s. Thermodynamics. A critical study of the properties of gases and vapors and the fundamental laws for conversion of heat energy into mechanical energy in steam engines, gas engines, air compressors, refrigeration machines, steam turbines, etc. Prerequisites: Course 43, M.&M. 25. 3 credits per quarter. Mr. DuPriest, Mr. Easton, Mr. Summers.

189s. Hydraulic Machinery. Theory of operation, design, construction, and regulation of water turbines. Turbine testing; characteristics, selection of type. Cost of turbines and water power. Prerequisite: Course M.&M. 129. 3 credits.

190f-191w-192s. Seminar. Reading of assigned articles in current technical press. Classroom presentation of principal features of assigned articles. 1 credit per quarter. Mr. DuPriest.

193s. Engineering Economics. The cost factor in engineering problems as affected by plant location, kinds of products, size of industry, transportation, marketing, class of labor, etc. Allocation of costs, sunk costs, excess production costs, break even cost, ultimate economy, estimating, specifications and contracts. 3 credits. Mr. DuPriest.

194w,s. Advanced Engineering Problems. Opportunity will be offered for carrying on special investigations in the various fields of mechanical engineering. 2 credits. Registration by permission of division chief in charge of work.

COURSES PRIMARILY FOR GRADUATE STUDENTS

282f-283w-284s. Locomotive Design and Construction. Locomotive details. Design of boiler, cylinders, frame, springs, trucks, axles, wheels, running gear, equalizing arrangements, valve gears, lubrication. Lectures, assigned reading, and drafting. Prerequisite: Course 281. 3 credits. Mr. Martenis.

290f-291w-292s. Mechanical Engineering Research. Investigations in connection with lubrication, fuels, furnaces, boilers, steam engines, turbines, gas engines, heating and ventilation, industrial and other engineering problems. Credits arranged. Mr. DuPriest, Mr. Koepke, Mr. Rowley, Mr. Shoop, Mr. Martenis, Mr. Robertson, Mr. Summers.

MEDICAL SOCIAL WORK

For statement of prerequisites and of graduate courses and staff, see Sociology and Social Work, page 155.

MEDICINE

(Including Divisions of General Medicine, Dermatology and Syphilology, and Neurology and Psychiatry)

The graduate work in the Department of Medicine is designed to offer opportunities for gifted men and women to prepare themselves for the practice of internal medicine or any of its subdivisions as a specialty. It also aims to guide

its fellows in research in these fields and to give them a start in university teaching. Prospective fellows who have had no special orientation in addition to that of the ordinary undergraduate courses will profit greatly from some special work. While any of the preclinical subjects might be of value, physiology, biochemistry, pharmacology, bacteriology, and pathology at the present are of the greatest importance. Work in any of these subjects might be further continued during the major studies in medicine to meet the requirements for a minor subject. For fellows specializing in nervous and mental diseases, anatomy, pathology, physiology, or psychology might be of special value as a minor. In dermatology, first year fellows are residents at the Minneapolis General Hospital; the last two years are outlined by arrangement.

For staff and courses of study offered, see the Graduate Medical Bulletin.

METALLOGRAPHY

Professor Ralph L. Dowdell; Assistant Professor Henry S. Jerabek; Instructor Arthur C. Forsyth.

Prerequisites.—For major work, adequate preparation in the sciences fundamental to metallography (chemistry, physics, geology, technical subjects), the general requirements being fulfilled. For minor work, the prerequisites to the course to be pursued.

Language requirement.—Exemption from the language requirement for the Master's degree may be made in individual cases.

Master's degree.—Offered only under Plan A.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

150f. Metallography for Electrical Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; study of typical alloys with special reference to electrical resistance, conductivity, magnets, etc. Laboratory work and demonstrations. Two lectures, three laboratory hours per week. 3 credits. Mr. Forsyth.

152f. Metallography for Aeronautical Engineers. Principles of metallography; metallography of iron and steel with special reference to alloy steels, and light alloys used in airplane construction. Laboratory work and demonstrations. 3 credits. Mr. Dowdell, Mr. Jerabek.

153f-154w-155s. Metallography. (Long course for metallurgical engineers.) Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallography. Three lectures, four laboratory hours per week each quarter. Prerequisites: Chem. 9, Phys. 8. 4 credits per quarter. Mr. Forsyth.

156w. Metallography for Mechanical, Mining, and Petroleum Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; metallography and heat treatment of iron and steel. Laboratory work. 3 credits. Mr. Dowdell.

157s. Advanced Metallography for Mechanical, Mining, and Petroleum Engineers. Metallography of alloy steels, tool steels, high speed tool steels, and important nonferrous alloys; metallography applied to engineering practice and specifications. Outside reading and special reports. Laboratory work. Prerequisite: Course 156, 152, or 160. 3 credits. Mr. Jerabek.

160f,w. Metallography for Chemical Students. Metallography, including constitution diagrams, preparation and standardization of thermocouples, preparation and thermal analysis of alloys, their microscopic examination and photomicroscopy; typical alloy systems such as iron-carbon (steel and cast iron); some nonferrous alloys. Two lectures and three laboratory hours per week. 3 credits. Mr. Jerabek.

161w. Advanced Metallography for Chemical Students. Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. Two lectures and three laboratory hours per week. Prerequisite: Course 160, 152, or 156. 3 credits. Mr. Jerabek.

162s. Advanced Metallography for Chemical Students. Metallography of the nonferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. Two lectures and three laboratory hours per week. Prerequisite: Course 160, 152, or 156. 3 credits. Mr. Jerabek.

163f. Advanced Metallography. Work on recent advances in metallography. Lectures and recitations, with outside reading and special reports. May be accompanied by laboratory work. Prerequisite: 6 credits in metallography. Credits arranged. Mr. Dowdell.

164w. Advanced Metallography. Advanced consideration of the structures, properties, and uses of metals and alloys. May be accompanied by laboratory work. Prerequisite: 6 credits in metallography. 3 credits. Mr. Dowdell.

165s. Advanced Metallography. Technical metallography as applied to industry. Lectures and special reports. May be accompanied by laboratory work. Prerequisite: 6 credits in metallography. 3 credits. Mr. Dowdell.

166f-167w-168s. Laboratory. Laboratory work on special problems in ferrous, nonferrous, and X-ray metallography. Prerequisite: Course 155. 3 credits per quarter. Mr. Dowdell.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Advanced Metallography. Credits arranged. Mr. Dowdell.

204f-205w-206s. Metallographic Research. Special research problems in metallography. Credits arranged. Mr. Dowdell.

210f-211w-212s. Thesis Courses. Intended primarily for research work. Credits and hours arranged. Mr. Dowdell.

METALLURGY

Professors Thomas L. Joseph, Levi B. Pease.

Prerequisites.—Elements in physics and chemistry.

Language requirement.—Exemption from the language requirement may be made in individual cases.

Master's degree.—Offered only under Plan A.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

104w. Metallurgy of Pig Iron. Raw materials, furnace construction, and basic principles of the blast furnace process. Fluxes and slags. Principles for controlling operation and products. Four lectures per week. Prerequisite: Chem. 5 or equivalent. 3 credits. Mr. Joseph.

105s. Metallurgy of Steel. Principles of steel producing processes. Modern furnace construction, chemistry of refining processes, shaping of steel, and the application of protective metallic coatings. Four lectures per week. Prerequisite: Course 104. 3 credits.

110f. Ore Dressing. A study of jaw and gyratory crushers, ball mills, rod mills, tube mills, volumetric sizing, gravimetric sizing. Concentration by tables, jigs, bowl classifiers, log washers, and miscellaneous devices used in ore dressing. Three lectures per week. Prerequisite: Geology 23. 2 credits.

111f. Ore Dressing Laboratory. A practical examination of ores and use of ore dressing machinery as outlined in Course 110. Four laboratory hours per week. Prerequisite: with Course 110. 1 credit.

112w. Ore Dressing. A study of the principles involving flotation. Special attention to chemical and physical action of the different reagents used such as frothing, collecting, depressing, activating, conditioning, etc. Also a study of liberation and particle size, grinding circuits, and flotation machinery. Three lectures per week. Prerequisite: Course 110. 2 credits.

113w. Ore Dressing Laboratory. A practical examination of ores by flotation. This course involves the grinding, use of proper reagents, and examination of products. Four laboratory hours per week. Prerequisite: registration in Course 112. 1 credit.

114s. Ore Dressing. An advanced course designed primarily for nonferrous metallurgists. A continuation of Course 112 giving more detailed study to ore dressing problems. Three lectures per week. Prerequisite: Course 112. 2 credits.

115s. Ore Dressing Laboratory. Special problems in ore dressing involving the use of the microscope. A study of polished sections to determine the minerals present, grain size, and association of minerals. Four laboratory hours per week. Prerequisites: Course 114, Geology 165. 1 credit.

127f. Metallurgy of Base Metals. Consideration of principles, methods, and appliances used in beneficiation, smelting, and refining of lead, copper, zinc, and other nonferrous metals. Four lectures per week. 4 credits. Mr. Pease.

128w. Metallurgy of Base Metals. Continuation of Course 127. Four lectures per week. 4 credits. Mr. Pease.

129s. Metallurgy of Precious Metals. Principles, methods, and appliances used in amalgamation, concentration, cyanidation, smelting, and refining of gold, silver, and other precious metals. Four lectures per week. 4 credits. Mr. Pease.

133w. Electrometallurgy. Application of electricity to thermometallurgy. Design and operation of electric furnaces and their use in smelting of metals and in the production of ferro alloys. Three lectures and 4 laboratory hours per week. Prerequisite: Course 12. 3 credits.

134f. Advanced General Metallurgy. Refractories, fuels, and principles of combustion. Thermochemistry of important reactions in process metallurgy. Three lectures and 4 laboratory hours per week. Prerequisite: Course 12. 4 credits. Mr. Joseph.

135w. Advanced Metallurgy of Iron and Steel. Detailed study of the blast furnace process. Economics of raw materials, their size, preparation, and physical properties. Control of slag-metal reactions. Trend in furnace design and practice. Three lectures and 4 laboratory hours per week. Prerequisite: Course 134. 4 credits. Mr. Joseph.

136s. Advanced Metallurgy of Iron and Steel. A detailed study of steel processes and current problems in controlling quality of product. The physical chemistry of steel making and its application to production problems. Three lectures and 4 laboratory hours per week. Prerequisite: Course 135. 4 credits.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. Field Course in Metallurgy. Detailed study of the actual operations at one or more smelters. To be arranged with individual students upon application to the department. This may be carried on during summer vacations and detailed written reports will be required.

204f-205w-206s. Thesis Course for Graduate Students. Intended primarily for research work. Credits arranged. Mr. Joseph, Mr. Pease.

207-208-209. Special Problems in Metallurgy. Seminar work on metallurgical problems. Credits arranged. Mr. Joseph, Mr. Pease.

210-211-212. Special Problems in Advanced Metallurgy. Intended primarily for research work. Credits arranged. Mr. Joseph, Mr. Pease.

MINING AND PETROLEUM ENGINEERING

Professors Elting H. Comstock, Edward W. Davis, Walter H. Parker, Levi B. Pease.

Prerequisites.—Candidates for the degree of master of science in mining or petroleum engineering must have completed an undergraduate course of study, the substantial equivalent of that required for graduation in the School of Mines and Metallurgy of the University of Minnesota. The basic courses in mathematics through calculus; mechanics; strength of materials; hydraulics; general and mine surveying; a geologic sequence including general geology, mineralogy, rock study, petrography, economic geology, and ore deposits; chemistry through quantitative analysis; assaying and general metallurgy must be included. In addition candidates for the degree of master of science in mining engineering must have included in their undergraduate course, ore dressing, exploration, development and mining methods. Candidates for the degree of master of science in petroleum engineering must have included additional geology so as to have a foundation in sedimentation, structural and metamorphic geology and paleontology, oil field exploration, development and production methods. In all cases, before registering for advanced courses the necessary prerequisites will be required.

Language requirement.—Exemption from the language requirement may be made in individual cases.

Master's degree.—Offered only under Plan A.

MINING

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

111f-112w-113s. Exploration. Prospecting and filing on mineral lands, boring, drill steel, drill bits. Exploration and development. Explosives and blasting; timbering and timber treating; tunneling and drifting. Development and production. Shaft sinking, raising, stoping, mining methods; support of excavations. 9 credits. Mr. Parker, Mr. Heilig.

121f-122w-123s. Mine Plant. Discussion of the machinery and appurtenances employed in the equipment of mines. Air compression, rock drills, mechanical features of hoisting, pumping, ventilation, underground transportation. Electricity applied to mining. Prerequisites: M.&M. 33, Phys. 9. 3 credits per quarter. Mr. Comstock.

138. The Stone Industries. Monumental and building stones, crushed stone, sand and gravel plants and operations. Prerequisite: Course 112. 2 credits. Mr. Parker.

139. Practical Mining (Field Trip). Study of mining operations, mine plant, and mining in one or more mining camps. 6 credits. September 5 to 26.

141f. Mine Examination and Administration. Examinations and mining reports; valuation and amortization; depletion and depreciation; taxation; corporations; capitalization; stocks and bonds; contracts and specifications. 3 credits. Mr. Parker.

142w. Coal Mining and Mining Law. Coal mining methods. Mechanization and coal preparation. Mine gases. Accident prevention. State mining codes. Compensation laws. Mining law and court interpretation. 3 credits. Mr. Parker.

143s. Placer Mining, Quarries, and Open Pits. Dredging and hydraulic mining of placers. Quarries and open pit mining. 3 credits. Mr. Parker.

146. Nonmetallic Minerals. Mining and preparation of cement, lime, gypsum, refractories, ceramic materials, fillers, pigments. 2 credits. Mr. Parker.

147. Earth Handling and Excavation. Excavation by shovels, draglines, dredges; handling materials by railroad, trucks, conveyors, and sluices. 2 credits. Mr. Heilig.

151-152-153. Special Problems in Mining. Seminar work on mining problems. Credits arranged. Mr. Parker.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202-203. Special Problems in Mining. Seminar work on mining problems. Credits arranged. Mr. Parker.

204. Advanced Mine Examinations. Mathematical principles necessary for a complete evaluation of a mine. Mathematical and economic principles involved in the valuation of mine plants involving obsolescence, replacement of equipment and structures, etc. Mathematical, economic, and ore dressing principles involved in the valuation of an ore deposit. 5 credits. Mr. Comstock, Mr. Parker.

205. Gold Mine Valuation. Application of the principles and methods developed in Course 204 to the valuation of a gold mine. 5 credits. Mr. Parker, Mr. Pease.

206. Copper Mine Valuation. Application of the principles and methods developed in Course 204 to the valuation of a copper mine. 5 credits. Mr. Parker.

207. Iron Mine Valuation. Application of the principles and methods developed in Course 204 to the valuation of an iron mine. 5 credits. Mr. Parker.

208. Lead-Zinc Mine Valuation. Application of the principles and methods developed in Course 204 to the valuation of a lead-zinc mine. 5 credits. Mr. Parker, Mr. Pease.

209. Valuation of Mine of Nonmetallics. Application of the principles and methods developed in Course 204 to the valuation of a mine of nonmetallics. 5 credits. Mr. Parker.

210. Field Course in Mining. Detailed study of the actual operations, accounts, ore treatment, etc. of a mine. To be arranged with individual students upon application to the department. This may be carried on during a summer. A detailed written report will be required.
211. Applied Ore Testing. Ore testing as applied to mine production of some particular ore deposits. 5 credits. Mr. Parker, Mr. Pease.
212. Applied Ore Dressing. Ore dressing as applied to yearly production and segregation of ore shipments of some particular mine. 5 credits. Mr. Davis, Mr. Parker.
213. Applied Ore Estimating. Estimating ore reserves with the object of determining life and value of mine. 5 credits. Mr. Parker.
214-215-216. Special Problems in Mining Economics. Intended primarily for research. Credits arranged. Mr. Parker.

Petroleum Engineering

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

111f-112w. Exploration. Prospecting and filing on oil lands, drilling methods, drill steel and bits. Oil field development. Explosives, blasting, timber preservation, aerial surveys, geophysical prospecting, oil and gas production. 6 credits. Mr. Parker, Mr. Heilig.
131s. Petroleum Refining. Distillation and purification processes used in making commercial products from crude petroleum. 2 credits.
134s. Petroleum Plant. Mechanical features of drilling equipment, gas lift, pumping, natural gasoline extraction. Special devices for abnormal conditions. Oil emulsions. Mechanical features of transmission lines for oil and gas. Flow formulas, soil corrosion and prevention. 2 credits. Mr. Comstock.
135. Field Work. Study of equipment and operations in one or more oil fields. 6 credits. September 5 to 26.
138s. Oil Field Mapping. Oil and gas well logs, peg models, records, contour and subsurface maps, cross sections. 2 credits.
141f. Oil Field Examination and Administration. Reports, amortization, corporations, capitalization, stocks and bonds, leases, contracts and specifications. 3 credits. Mr. Parker.
152f-153w-154s. Petroleum Production Technology. Special problems in oil and gas production. Mud fluids; formation-correlations, electric coring and miscellaneous production problems. Mr. Comstock, Mr. Parker.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202-203. Seminar Work on Petroleum Problems. Credits arranged. Mr. Comstock, Mr. Parker.
204. Advanced Oil Lease Valuation. Mathematical principles necessary for a complete evaluation of an oil lease. Mathematical and economic principles involved in the evaluation of plant and equipment involving obsolescence, replacement of equipment and structures, etc. Mathematical economics and refining principles involved in the valuation of a pool. 5 credits. Mr. Comstock, Mr. Parker.
205. Applied Lease Valuation. Application of the principles and methods developed in Course 204 to the valuation of a specific oil lease. 5 credits. Mr. Comstock, Mr. Parker.

206. Field Course in Petroleum Engineering. A detailed study of the actual operations, accounts, crude oil treatment, etc., of an oil field lease. To be arranged with individual students upon application to the department. This may be carried on during a summer. A detailed written report will be required.
207. Crude Oil Emulsions. A study of the methods of dehydration. Lectures and laboratory work. 5 credits. Mr. Comstock.
208-209-210. Special problems in petroleum economics intended primarily for research. Credits arranged. Mr. Comstock, Mr. Parker.

MUSIC

Professors Donald N. Ferguson, Abe Pepinsky.

Master's degree.—Offered under Plan A with thesis; under Plan B, a musical composition may be offered as fulfilling the nine credits in the field of concentration where an acceptable paper based on research is normally required.

COURSES PRIMARILY FOR GRADUATE STUDENTS

200f-201w-202s. Basis of Musical Expression. An analytical study of those factors and aspects of the substance of music which convey other impressions of emotional character than those attributable to the elements of structure. Application of the analytical process to the work of one composer, selected by the student with the consent of the instructor. The results are to be presented in a final critical study of the composer's work as literature. · Prerequisite: Course 56-57-58. 9 credits. Mr. Ferguson.
205f-206w-207s. Composition in Larger Forms. Composition in fugal, symphonic, and choral forms. Prerequisite: Course 83-84-85 or equivalent. 9 credits. Mr. Ferguson.
209f-210w-211s. Advanced Topics in Musical Analysis. A psycho-physical treatment of music materials, usually considered under the generic term "musicology." Problems in tone-psychology and their relations to the physical phenomena underlying music. Esthetics and trends in modern music. Prerequisite: Course 76. 9 credits. Mr. Pepinsky.

OBSTETRICS AND GYNECOLOGY

For staff and courses of study offered see the Graduate Medical Bulletin.

OPHTHALMOLOGY AND OTOLARYNGOLOGY

For staff and courses of study offered see the Graduate Medical Bulletin.

PATHOLOGY

A. Courses Offered at the Medical School

Professors Elexious T. Bell, Benjamin J. Clawson; Associate Professors James S. McCartney, Jr., John F. Noble.

Prerequisites.—Graduate students who desire to take their major work in pathology must present credits for the equivalent of the first two years' work of the Medical School of this University. They must also have a reading knowledge of German.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

104f,w,s,su. Autopsies. The average number of post-mortems available is about 2,500 per year. Graduate students take part in post-mortems, prepare post-mortem records, and make microscopic examinations of various organs and tissues. The student may attend as many post-mortems as his other work allows.

107f. Surgical Pathology. Diagnosis of tumors.

107aw. Surgical Pathology.

107bw. Diseases of the Heart.

107as. Surgical Pathology.

107bs. Diseases of the Kidneys.

109f,w,s,su. Clinical Pathologic Conference. The students are provided one week in advance with the clinical history of a case. The case is fully discussed clinically. The students are expected, in so far as possible, to predict the post-mortem findings from the clinical data. A full post-mortem report is then given. One hour per week. Dr. Bell.

110f,w,s. Seminar in Pathology. Prerequisite: Pathology 102. Dr. Bell.

111su,f,w,s. Conference on Autopsies. Prerequisite: Pathology 102. Dr. Bell and staff.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s,su. Research. Graduate students with the necessary preliminary training may elect research, either as majors or minors, in pathology. Hours and credits arranged.

B. Courses Offered in the Mayo Foundation

Professors Albert C. Broders, James W. Kernohan, William C. MacCarty, Thomas B. Magath, Frank C. Mann, Harold E. Robertson, Arthur H. Sanford; Associate Professors Jesse L. Bollman, William H. Feldman, Carl F. Schlotthauer; Instructors Richard W. Cragg, John R. McDonald.

Opportunities for advanced work in pathology are offered in four different sections of the Mayo Foundation, as follows:

Clinical Pathology. Work in this section includes diagnostic work in the laboratories of gastrology, urinalysis, serology, bacteriology, parasitology, and clinical chemistry. Graduate students in these clinical laboratories may learn the technique of accepted diagnostic procedure. Special attention is called to the opportunity for experience and research in serology under the direction of Dr. Sanford, and for training and research in parasitology under the direction of Dr. Magath. This work may be taken either as a major, or as fulfilling the conditions of a minor.

Pathologic Anatomy. Post-mortem examinations are made in sufficient numbers to provide active work for approximately ten fellows at a time.

The service is designed to permit the laying of a thoro foundation in the general principles of pathologic anatomy. Each fellow serves as junior assistant three months and senior assistant three months, during which time he takes part in the routine of post-mortem examinations and studies the microscopic sections of these post-mortems, and engages in weekly conferences and seminars concerned with general and special subjects in pathologic anatomy. Each fellow is expected to take up some special line of work upon which he reports to the group. Microscopic and gross demonstrations are held at frequent intervals and the work

throughout is intimately supervised. Collateral reading and study are encouraged and oftentimes the foundation may be laid for thesis studies or special lines of research.

Surgical Pathology. The laboratories of surgical pathology receive immediately all tissue removed at operation. It is studied both grossly and microscopically. The minimum residence in this service is six months, during which time opportunity is given to study a large amount of operative material in conjunction with clinical histories. Besides the routine diagnostic experience, fellows are expected to begin to carry along in these laboratories some piece of pathologic research.

Experimental Pathology and Comparative Pathology. Work in this section consists of research in problems of pathology involving the use of experimental animals. Seminars arranged for fellows in pathology are held regularly.

COURSES PRIMARILY FOR GRADUATE STUDENTS

M280f,w,s,su. Clinical Pathology. Making and examining of cultures, preparation and administration of autogenous vaccines, Wassermann tests, special clinical and laboratory methods including hematology and serology and opportunity for research. Dr. Magath, Dr. Sanford.

M281f,w,s,su. Parasitology. Routine clinical and special research in parasitology, examination of stools, study of internal parasites. Dr. Magath.

M282f,w,s,su. Clinical Hematology. Dr. Sanford, Dr. Watkins, Dr. Heck.

M283f-w,w-s,s-su,su-f. Necropsy Service. Junior assistant three months; senior assistant three months; demonstrations in clinico-pathologic conferences; microscopic examination of fixed tissues removed at necropsy. Bacteriology and necropsy material. Research problems. Weekly seminars. Dr. Kernohan, Dr. Robertson, Dr. Cragg.

M284f-w,w-s,s-su,su-f. Surgical and Fresh Tissue Pathology. The diagnosis of surgical specimens (gross and microscopic) with immediate correlation with all clinical data. Bacteriology of surgical material. Research problems. Daily demonstrations and discussions. Dr. Broders, Dr. MacCarty, Dr. McDonald.

M285f,w,s,su. Research Work on Selected Problems in Experimental Pathology. Dr. Mann, Dr. Bollman.

M286f,w,s,su. Research Work on Selected Problems in Comparative Pathology. Dr. Feldman, Dr. Schlotthauer.

In addition to the above, students majoring in pathology may do research work in biophysics, physiological chemistry, experimental physiology, and bacteriology. For details, see these departments.

PEDIATRICS

For staff and courses of study offered, see the Graduate Medical Bulletin.

PHARMACEUTICAL CHEMISTRY

Courses Offered in the College of Pharmacy

Professors Charles H. Rogers, Glenn L. Jenkins; Assistant Professor Ole Gisvold.

Graduate work, leading to the M.S. and Ph.D. degrees, is offered to a limited number of students properly prepared for advanced work in pharmaceutical chem-

istry and pharmacognosy. Work leading to the master of science degree is offered under Plan A. In exceptional cases, Plan B may be offered by petition.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

161f-162w-163s. Organic Medicinal Products. This course treats of the sources, methods of production, classification, properties, reactions, and uses of the natural and synthetic organic compounds used as therapeutic agents. Prerequisite: Organic Chemistry 2. 9 credits. Dr. Jenkins.

164w-165s. Drug and Food Analysis. A study of the processes of manufacture and of the composition of drug and food products. This course includes a detailed consideration of the legal requirements of the Food, Drug, and Cosmetic Act, and of the official analytical methods of the United States Pharmacopoeia, National Formulary, and the Association of Official Agricultural Chemists. Registration in this course is limited to available instructional facilities. Prerequisites: Organic Chemistry 2 and Course 56f. 6 credits. Dr. Gisvold.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s. Pharmaceutical Chemistry Seminar. Required of all students majoring in pharmaceutical chemistry. 1 credit per quarter. Dr. Jenkins.

202f-203w-204s. Advanced Food, Drug, and Cosmetic Analysis. The analyses of complex food, drug, and cosmetic products. Identification of colors, perfumes, flavoring agents, digestants, adulterants, etc. Special precision instruments. Prerequisite: Course 165s. 3 to 5 credits per quarter. Dr. Rogers.

205f-206w-207s. Chemistry of Medicinal Products. A study of the chemistry and of the relationships between constitution and physiologic action of organic compounds. Isolation of active principles and syntheses of medicinal compounds. Prerequisites: Organic Chemistry 2 and Course 163s, or consent of instructor. 3 to 6 credits per quarter. Dr. Jenkins. (Not offered in 1941-42.)

208f. Carbohydrates and Glycosides. A consideration of the origin, isolation, characterization, and chemistry of the carbohydrates and glycosides. Prerequisite: Course 163s, or consent of the instructor. 3 to 5 credits. Dr. Gisvold.

209f. Alkaloids. A discussion of the chemistry and experiments on the methods used to isolate, purify, and characterize the alkaloids. Prerequisite: Course 163s, or consent of instructor. 3 to 5 credits. Dr. Jenkins. (Not offered in 1940-41.)

210f. History of Pharmaceutical Chemistry. 3 credits. Dr. Jenkins.

211w. Terpenes. A discussion of the chemistry and an experimental investigation of the methods of isolation and characterization of the volatile oils and their constituents. Prerequisite: Course 163s, or permission of the instructor. 3 to 5 credits. Dr. Jenkins. (Not offered in 1940-41.)

212s. Sterols and Related Compounds. A consideration of the origin, isolation, characterization, and chemistry of the sterols and related compounds. Prerequisite: Course 163s, or consent of the instructor. 3 to 5 credits. Dr. Gisvold.

213f,w,s,su. Special Problems. A study and experimental investigation of one or more topics, e.g., complex drug and cosmetic products, carotinoids, enzymes, fats, oleoresins, pigments, proteins, resins, vitamins, waxes, etc. Prerequisite: Course 163s, or consent of the instructor. Credits arranged. Dr. Rogers, Dr. Jenkins, Dr. Gisvold.

214f,w,s,su. Research in Pharmaceutical Chemistry. Credits arranged. Dr. Rogers, Dr. Jenkins, Dr. Gisvold.

PHARMACOGNOSY

Courses Offered in the College of Pharmacy

Professor Charles H. Rogers.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

162w-163s.‡ Biological Assay of Drugs. This course includes didactic and laboratory considerations of the biological assays of the vegetable and animal drugs of the U.S.P. and N.F. Important nonofficial assay methods are also studied. Registration in this course is limited to available instructional facilities. Prerequisites: Course 57s and Pharm. Chem. 56f. 6 credits. Dr. Fischer.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f. Advanced Pharmacognosy. A study of the important constituents of vegetable and animal drugs. Laboratory work includes the microscopic study of cell contents as they occur in those drugs, and their isolation and identification by microscopical and microchemical means. Constituents studied include alkaloids, calcium carbonate, calcium oxalate, carbohydrates, fixed oils, glycosides, mucilages and gums, oleoresins, resins, silica, tannins, volatile oils, etc. Prerequisites: Courses 55f, 56w, 57s. 3 to 5 credits. Dr. Fischer.

202w. Advanced Pharmacognosy. A lecture and laboratory course dealing with microscopic characteristics, structure, and function of the various cell forms found in vegetable and animal drugs and the tissues which they constitute. Important microscopical accessories such as the micropolariscope, microphotographic camera, staining reagents, etc., are used in this work. Prerequisites: Courses 55f, 56w, 57s. 3 to 5 credits. Dr. Fischer.

203s. Advanced Pharmacognosy. A systematic study of the pharmacognosy and pharmaco-histology of the official, and a few important nonofficial, vegetable and animal drugs. Information concerning the microscopic and microchemical properties of cell contents and cell forms and the arrangement of the latter in the plant is applied to the identification, determination of purity, evaluation, and detection of the adulteration of these drugs. The order of presentation is based upon the taxonomic classification of plant families. Prerequisites: Courses 55f, 56w, 57s. 3 to 5 credits. Dr. Fischer.

204f,w,s,su. Research in Pharmacognosy. Credits arranged. Dr. Rogers, Dr. Fischer.

PHARMACOLOGY AND THERAPEUTICS

A. Courses Offered at the Medical School

Professors Arthur D. Hirschfelder, Raymond N. Bieter; Associate Professor Harold N. G. Wright.

The laboratories of the Department of Pharmacology are excellently equipped for the study of both the chemical properties of drugs and their actions upon the functions of the living organs and tissues. They are well equipped with chemical apparatus for the synthesis of new medicinal compounds, for studies upon the detection, isolation, and estimation of poisons in toxicology, for the isolation of medicinal plant constituents, and for experimental chemotherapy. By the co-operation of the clinical departments, special studies may be made of the action of drugs, old and new, upon patients in the University Hospitals and allied hospitals.

‡ A fee of $5 per quarter is charged for this course.

Opportunities are afforded for the special study of the actions of drugs which are used in each of the clinical specialties and the literature bearing upon them. As the needs of each graduate student are individual in this regard, these studies are taken up by conference, seminar, and experiments specially devised to meet each case.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101w.§ Introduction to Pharmacology. The principles underlying the structure, physiochemical properties, physiologic, therapeutic, and toxic action of substances, natural or synthetic, used as medicines. At least one quarter of physiology is prerequisite. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

102s.§ General Pharmacology. A study of the most important drugs used in medicine with consideration of their chemical properties, actions on the normal and abnormal body, modes of administration, preparation, dosages, etc. 132 hours; 6 credits. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

103w,su. General Pharmacology, in continuation. Lectures on narcotic, soporific, analgesic, antipyretic drugs; remedies used for the treatment of arthritides, etc. Writing of prescriptions for the drugs used. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

104s,su. General Pharmacology, in continuation. Lectures on the salts of the metals, antiseptic, antisyphilitic drugs, chemotherapy, etc. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

108f,su. Prescription Writing. The principles of prescription writing. 11 hours; 1 credit. Dr. Wright.

109f,w,s,su. Pharmacological Problems. Special investigations and experimental study of one or more of the following topics: anesthetics; circulatory stimulants and depressants; drugs acting upon the kidneys; urinary antiseptics; poisons and antidotes; effects of common harmless drugs; internal secretions; action of drugs upon parasites, tumors, etc. Hours and credits by arrangement. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

110f,w,s. Poisons. Their detection, actions, and antidotes. 66 hours; 2 credits. Dr. Bieter, Dr. Wright.

Courses 101, 102, 103, 104 are not acceptable for the minor in the case of graduates of medical colleges who are candidates for the degree of master of science.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s. Seminar in Physiology and Pharmacology. Reviews of recent literature. 11 hours; 1 credit. Staff.

203su,f,w,s. Research in Pharmacology. Hours and credits arranged. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

204f,w,s. Advanced Pharmacology. With collateral readings. Limited to six advanced students. 11 hours; 1 credit. Hours arranged. Staff.

205f,w. General Discussions in Pharmacology. With collateral readings. Hours and credits arranged. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

B. Courses Offered in the Mayo Foundation

All opportunities for advanced work in pharmacology and therapeutics offered in the Mayo Foundation are in connection with the Departments of Medicine, Pediatrics, and Surgery. See announcements of these departments.

§ In the Summer Session, Courses 101 and 102 are combined and offered as 115su.

PHILOSOPHY

Professors George P. Conger, Herbert Feigl; Associate Professor Theodore Brameld; Assistant Professors Alburey Castell, Millard S. Everett, Kristofer S. Norborg.

Prerequisites.—For a major, 18 credits; for a minor, 9 credits.
Master's degree.—Offered only under Plan A.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

106w-107s. Philosophy of Plato. Prerequisite: 6 credits. 6 credits. Mr. Norborg.
111f. Empiricism. Prerequisite: 6 credits. 3 credits. Mr. Oliver.
112f. Kant. Prerequisite: 6 credits. 3 credits. Mr. Castell. (Not offered in 1940-41.)
113. Scandinavian Philosophy. Prerequisite: 6 credits. 3 credits. (Not offered in 1940-41.)
114f. American Philosophy from Puritanism to Pragmatism. Prerequisite: 6 credits. 3 credits. Mr. Castell.
115w. Contemporary Philosophy. Prerequisite: 6 credits. 3 credits. Mr. Oliver.
116s. Philosophy of John Dewey. Prerequisite: 6 credits. 3 credits. Mr. Oliver.
123s. Comparative Philosophy. Prerequisite: 6 credits. 3 credits. Mr. Conger.
147s. Advanced Logic. Prerequisite: 6 credits. 3 credits. Mr. Feigl.
153w. Philosophy of Science. Prerequisite: 6 credits. 3 credits. Mr. Feigl.
154w. Logic of Science. Prerequisite: 6 credits. 3 credits. Mr. Feigl. (Not offered in 1940-41.)
165f. Political and Social Ethics. Prerequisite: 6 credits. 3 credits. Mr. Brameld, Mr. Everett. (Not offered in 1940-41.)
170f. Philosophy of History. Prerequisite: 6 credits. 3 credits. Mr. Norborg.
180f. History of Religions. Prerequisite: 6 credits. 3 credits. Mr. Conger.
181w. Psychology of Religion. Prerequisite: 6 credits. 3 credits. Mr. Conger.
182s. Philosophy of Religion. Prerequisite: 6 credits. 3 credits. Mr. Conger.
191f-192w-193s. Seminar in Philosophy. Individual investigation, with topics to be determined after consultation with the department. Prerequisite: 20 credits in philosophy and consent of instructor. 9 credits. Mr. Conger, Mr. Feigl, Mr. Castell.

COURSES PRIMARILY FOR GRADUATE STUDENTS

250f-251w-252s. History of Philosophy, Ancient, Medieval, and Modern. An orientation course in the history of human thought, for those who do not major in philosophy, but who are interested in acquiring a general background for special studies. No prerequisites. 3 credits per quarter. (Not offered in 1940-41.)

PHYSICS

Professors J. William Buchta, Louallen F. Miller, John T. Tate; Associate Professors Edward L. Hill, Alfred O. C. Nier, Lynn H. Rumbaugh, Joseph Valasek, John H. Williams; Assistant Professors John Bardeen, Wilford W. Wetzel.

Prerequisites.—For major work, differential and integral calculus and two years of physics of college grade. For minor work, one year of college physics.

Major.—A student majoring in physics is required to take Course 101-103-105 unless excused by the department upon satisfactory evidence at entrance.

Language requirement.—For the Master's degree a reading knowledge of French or German is required. It is desirable that the language requirement be fulfilled before graduate work is begun. For the Ph.D. degree a reading knowledge of both French and German is required.

Master's degree.—Offered in general under Plan A. By petition Plan B may be offered.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100f-102w-104s. Intermediate Physics. Discussion of selected topics in classical physics. Solution of problems. Three lectures per week. Prerequisites: calculus and 15 credits in physics. Three credits per quarter. Mr. Buchta.

101f-103w-105s. Theoretical Physics. An analytical survey of fundamental principles of mechanics, sound, heat, light, electricity, and magnetism designed to supplement the general courses and to prepare students for more specialized courses. Five lectures a week. Prerequisites: 15 credits in physics, Math. 106 or registration in 106. 5 credits per quarter. Mr. Rumbaugh.

107f*-109w*†-111s.* Modern Physics. A survey of the newer development in physics. Prerequisites: Math. 50, 15 credits in physics. 3 credits per quarter. Mr. Nier.

110w*-112s.*‡ Modern Experimental Physics. An experimental study of various topics in modern physics. Prerequisite: Course 144. 3 or 4 credits per quarter. Mr. Williams.

113w. Intermediate Acoustics. The mechanics of vibrating systems and wave motion. The production, propagation, analysis, and reception of sound. Prerequisites: Math. 51, 15 credits in physics. 3 credits. Mr. Buchta. (Not offered in 1940-41.)

114f*-116w*-118s.* Elementary Physical Investigation. The experimental or theoretical study of physical phenomena, the nature of laws of which are not as yet understood. Prerequisites: Course 144, Math. 51. A written report on the work accomplished is required. 3 credits. Staff.

117w-119s. History of Physics. A chronological study of the discoveries and generalizations in physics from early historical times to the present. Prerequisite: a general course in physics. 3 credits per quarter. (Not offered in 1940-41.)

124w.‡ Pyrometry. A theoretical and experimental study of different principles involved in temperature measurement, covering standardization and calibration with some practical considerations. Prerequisite: 15 credits in physics. 3 credits. Mr. Miller.

126s.‡ Advanced Heat. A theoretical and experimental study of heat phenomena such as comparative calorimetric methods, temperature regulators, ratio of specific heats of gases, conductivities and radiation. Prerequisite: 15 credits in physics. 3 credits. Mr. Miller.

131f. Geometrical and Physical Optics. Lens systems, refraction, diffraction, polarization and interference phenomena. Prerequisites: 15 credits in physics, Math. 51. 3 credits. Mr. Valasek.

134f,w.*‡ Experimental Optics. Special experimental work in spectrometry, optical instruments, photometry, absorption, polarized light. Two three-hour laboratory periods a week. Prerequisite: 15 credits in physics. 3 credits. Mr. Valasek.

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

136w,s.*‡ Spectrum Analysis. An experimental course dealing with the measurement of wave lengths, intensities, and absorption coefficients in the infra-red, visible, and ultra-violet regions of the spectrum. Two three-hour laboratory periods a week. Prerequisite: 15 credits in physics. 3 credits. Mr. Valasek.

137s. Crystal Physics. Optical and electrical properties of crystals. Prerequisites: 15 credits in physics, Math. 51. 3 credits. Mr. Valasek. (Not offered in 1940-41.)

144f.‡ Electricity Measurements. Devoted mainly to the study of potentiometer methods, capacity, inductance, magnetic flux. Prerequisites: 15 credits in physics, Math. 51. See the Bulletin of the Institute of Technology. 3 credits. Mr. Rumbaugh.

146w.*‡ Advanced Electricity Measurements. Precision measurements of electromotive force, current, resistance, capacity, inductance, and magnetic flux. Use of apparatus of higher precision. Three two-hour laboratory periods a week. Prerequisite: Course 144. 3 credits. Mr. Rumbaugh.

152s. X Rays. A study of the nature and production of X rays. Prerequisite: 15 credits in physics. 3 credits. Mr. Valasek.

154w.*‡ X-Ray Spectroscopy. Theory of diffraction of X rays by crystals. Emission and absorption spectra. Theory and systemization of X-ray spectra. Satellites of diagram lines. Effects of chemical combination. Lectures combined with laboratory work. Prerequisites: Courses 44, 152, Math. 51. 3 credits. Mr. Valasek. (Not offered in 1940-41.)

161f-162w. Principles of Geophysical Prospecting. Quantitative discussions of theory, instruments, field practice, and interpretation of seismic, electric, gravitational, and magnetic geophysical methods. Prerequisites: 15 credits in physics, Math. 51. 3 credits per quarter. Mr. Wetzel.

164f-165w-166s. Special Problems in Geophysics. Prerequisite: permission of instructor. Credits arranged. Mr. Wetzel.

181f*-183w*-185s.* Atomistics and Elementary Quantum Mechanics. Atomic structure, X rays, spectrum analysis, and an introduction to wave mechanics. Prerequisite: Course 101-103-105 or registration in that course. 3 credits per quarter. Mr. Bardeen.

COURSES PRIMARILY FOR GRADUATE STUDENTS

Theoretical Physics (101-103-105) and Advanced Calculus are prerequisites for all of the courses listed below. A reading knowledge of German is highly desirable and will be presumed in certain phases of the work. Candidates for the Ph.D. degree will be expected to pass qualifying examinations in the following fields before admission to the preliminary examination:

1. Mechanics, Hydrodynamics, and Elasticity.
2. Kinetic Theory, Statistical Mechanics, and Thermodynamics.
3. Electromagnetic Theory and Optics.
4. Atomistics and Elementary Wave Mechanics.

201f-202w-203s. Analytical Dynamics, Hydrodynamics, and Elasticity. Lagrange's equations, variational principles, fluid motion, wave propagation in fluid and solid media, theory of small vibrations, specification of elastic properties of materials. 3 credits per quarter. Mr. Hill, Mr. Bardeen.

204f-205w-206s. Kinetic Theory, Statistical Mechanics, and Thermodynamics. Kinetic theory and statistical mechanics. Specific heats of gases and solids.

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

Laws of thermodynamics, phase rule, equations of state, potentials, statistical interpretation of thermodynamics. 3 credits per quarter. Mr. Hill, Mr. Bardeen.

207f-208w-209s. Electrodynamics and Theoretical Optics. General field equations, electron theory, and the special theory of relativity. Dielectric and magnetic properties of matter. Mathematical theory of the optical behavior of isotropic, anisotropic, and metallic media. 3 credits per quarter. Mr. Bardeen.

210f-211w-212s. Quantum Mechanics. Fundamentals of wave mechanics and matrix theory. Application to spectra, atomic structure, nucleus, and theory of the electron. 3 credits per quarter. Mr. Hill.

213f*-214w*-215s.* Seminar in Contemporary Experimental Physics. Discussions and presentation of reports on fields of major interest and importance. Various subjects may be selected such as radioactivity, nuclear physics, solid state, molecular or atomic spectra, X rays, crystal structure, cosmic rays, etc. 3 credits per quarter. Staff members.

216f*-217w*-218s.* Seminar in Contemporary Theoretical Physics. Discussions and reports on fields of major interest in theoretical physics, particularly quantum mechanics and its applications in chemistry and physics. 3 credits per quarter. Mr. Hill, Mr. Bardeen.

233w-235s. Theoretical Optics. Mathematical theory of interference, diffraction, and polarization. Crystal optics. Thermal radiation and luminescence. Geometrical optics. 3 credits per quarter. Mr. Valasek.

The following courses will be offered whenever there is sufficient demand for them:

The Partial Differential Equations of Mathematical Physics.
Advanced Topics in Electron Theory and the Special Theory of Relativity.
General Theory of Relativity.
Advanced Quantum Theory.
Advanced Hydrodynamics and Theory of Sound.
Advanced Thermodynamics and Statistical Mechanics with Applications to Chemical Physics.
Theory of Electrical Circuits.

PHYSIOLOGY AND PHYSIOLOGICAL CHEMISTRY (BIOCHEMISTRY)

A. Courses Offered at the Medical School

The Department of Physiology is well equipped for the various types of physiological investigation. The library facilities are good.

For a major or minor in physiology, courses in general zoology, general chemistry, organic chemistry, and college physics are prerequisite. Physical chemistry is desirable.

For a major or minor in physiological chemistry, physics, general chemistry, organic chemistry, and physical chemistry are prerequisite; quantitative chemistry, physiology, and zoology are desirable.

Students majoring in clinical subjects who desire a minor in physiology or physiological chemistry must have had the courses in these branches usually required of medical students.

A reading knowledge of German or French is required of candidates for the Master's degree in this department, and a reading knowledge of both French and German, of candidates for the Doctor's degree.

Physiology

Professors Maurice B. Visscher, Head, Ancel Keys, Frederick H. Scott, K. Wilhelm Stenstrom; Assistant Professors Allan Hemingway, Joseph T. King.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

103su,f. Physiology of Circulation, Respiration, Digestion, Metabolism, Nutrition, and Excretion. Prerequisites: organic chemistry and zoology. 132 hours; 9 credits. Dr. Visscher, Mr. Scott, Mr. Hemingway, and others.

104w,su. Physiology of the Endocrines, Nervous System, and Special Senses. Prerequisite: Course 103 or organic chemistry and neurology. 88 hours; 6 credits. Dr. Visscher, Mr. Scott, Dr. King, and others.

105f. Roentgen Rays, Light, and Radium. The physical and physiological basis of physical therapy. 11 hours; 1 credit. Mr. Stenstrom.

113su,f,w,s. Problems in Physiology. Arranged by instructors with qualified students. Each student will be assigned a topic for special laboratory study, leading in some cases to original investigation. Conferences and reading. May be taken one or more quarters. Prerequisites: Courses 103, 104, or equivalent. 66 hours; 3 credits each quarter or arranged. Dr. Visscher, Mr. Keys, Mr. Scott, Mr. Hemingway, Dr. King.

114w. Physiology of Muscular Activity. Prerequisites: Course 51 with grade of A or B or Course 103; reading knowledge of German recommended. 11 hours conference and term paper. 2 credits. Mr. Keys.

115w. Methods in Human Physiology. Prerequisite: Course 114 (which may be taken concurrently). Limited to 8 students. 33 hours laboratory. 1 credit. Mr. Keys.

116f. Tissue Culture Theory. Two lectures. Hours arranged; 2 credits. Dr. King.

117w. Tissue Culture Laboratory. Limit 4 students. Prerequisite: 116f. Hours arranged; 3 credits. Dr. King.

135f,w,s. Conference on Physiology, with qualified students. 11 hours; 1 credit. Dr. Visscher, Mr. Keys, Mr. Scott.

163f,164w,165s. Physical Chemistry and Biophysics in Biology and Medicine. Prerequisite: Course 100-101 or Biochemistry 112. 3 credits per quarter. Mr. Hemingway.

166f,167w,168s. Laboratory Work Related to Courses 163, 164, 165. Credits arranged. Mr. Hemingway.

170f,w,s,su. Problems in Biophysics. Special work arranged with qualified students. Mr. Stenstrom. (See Biophysics 170.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s,su. Seminar in Physiology and Pharmacology. For instructors and advanced students. 11 hours; 1 credit. Dr. Visscher, Dr. Hirschfelder, and staff.

202f,w,s,su. Readings in Physiology. Topics will be selected for each student and written reviews will be prepared and discussed. 1 to 3 credits arranged. Dr. Visscher, Mr. Keys, Mr. Scott, Mr. Hemingway, Dr. King.

203f,w,s,su. Research in Physiology. Hours and credits arranged. Dr. Visscher, Mr. Keys, Mr. Scott, Mr. Hemingway, Dr. King.

204f,w,s,su. Research in the Physics and Physiology of Radiation. Hours and credits arranged. Mr. Stenstrom.

206s. Seminar in History of Physiology and Related Sciences. 11 hours; 1 credit. Dr. Visscher.

Physiological Chemistry

Professors George O. Burr, Head, Herbert Freundlich; Assistant Professors Wallace D. Armstrong, Leo T. Samuels.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100f,su-101w,su. Physiological Chemistry. The components of the animal body; foods, digestion, excreta, and metabolism. Prerequisites: physics, organic chemistry. 222 hours; 13 credits. Mr. Burr, Dr. Armstrong, Mr. Samuels.

153f,w,s,su. Problems in Physiological Chemistry. Special work arranged with qualified students. May be taken one or more quarters. Prerequisites: Courses 100, 101. Hours and credits arranged. Mr. Burr, Dr. Armstrong, Mr. Samuels.

154f,w,s. Conference in Physiological Chemistry. 11 hours; 1 credit. Mr. Burr, Dr. Armstrong, Mr. Samuels.

155f,w,s. Seminar and Conference on Dental and Oral Biochemistry. Reports on assigned topics and discussions of current literature. Prerequisites: Physiol. 100-101, Physiol. 56-57 taken in 1939 or later, or registration for these courses. Hours and credits arranged. Dr. Armstrong.

180f. General Survey of Colloid Chemistry. Prerequisite: Phys. Chem. 103. 3 credits. Mr. Freundlich.

182s. Colloids in Biology and Medicine. Prerequisite: Phys. Chem. 180. Mr. Freundlich.

COURSES PRIMARILY FOR GRADUATE STUDENTS

200s. Seminar in Physiological Chemistry. Mr. Burr.

205f,w,s,su. Research in Physiological Chemistry. Hours and credits arranged. Mr. Burr, Dr. Armstrong, Mr. Samuels.

Experimental Physiology

B. Courses Offered in the Mayo Foundation

Professor Frank C. Mann; Associate Professors Jesse L. Bollman, Hiram E. Essex, George M. Higgins; Assistant Professors Eunice V. Flock, Julia F. Herrick.

Many of the opportunities for graduate work in physiology in the Mayo Foundation are in connection with the Departments of Medicine and Surgery. In addition to these, advanced work is offered in the department to a limited number of well-prepared students majoring in physiology.

M290f,w,s,su. Research Work on Selected Problems in Experimental Physiology. Dr. Mann, Dr. Bollman, Dr. Essex, Dr. Higgins, Dr. Flock, Dr. Herrick.

Biochemistry

B. Courses Offered in the Mayo Foundation

Professors Edward C. Kendall, Walter M. Boothby; Associate Professors Harold L. Mason, Arnold E. Osterberg, Marschelle H. Power; Instructors Bernard F. McKenzie, Frank H. Stodola.

Many of the opportunities for graduate work in biochemistry in the Mayo Foundation are in connection with the Departments of Medicine, Pediatrics, and Clinical Pathology, for which see announcements under these several departments in the Graduate Medical Bulletin. In addition to these, advanced work is offered in the Department of Biochemistry to a limited number of well-prepared students majoring in biochemistry.

M257f,w,s,su. Nutrition. (See Department of Medicine.)

M290f,w,s,su. Biochemistry. Research work in problems related to metabolism and the chemistry of the blood; includes training in the use of methods of organic and inorganic analysis. Dr. Kendall, Dr. Boothby, Dr. Mason, Dr. Osterberg, Dr. Power, Mr. McKenzie, Dr. Stodola.

In addition to the above, students majoring in biochemistry may carry on research work in experimental physiology. For details, see that department.

PLANT PATHOLOGY AND BOTANY

Professors Elvin C. Stakman, Jonas J. Christensen, Edward M. Freeman, Rodney B. Harvey; Assistant Professors Clyde M. Christensen, Louise Dosdall, Carl J. Eide, Helen Hart, Eric G. Sharvelle; Instructor Raymond H. Landon.

Prerequisites—

Plant Pathology major: The minimum requirement is (a) three years (27 credits) in the basic plant sciences; (b) one year (9 credits) in plant pathology—preferably two years (18 credits), including mycology.

Plant Pathology minor: The minimum requirement is (a) three years (27 credits) in the basic biological sciences; (b) five credits in plant pathology (not including mycology).

Plant Physiology and Agricultural Botany major: The minimum requirement is (a) three years (27 credits) in the basic plant sciences; (b) one year (9 credits) in plant physiology.

Plant Physiology and Agricultural Botany minor: The minimum requirement is (a) three years (27 credits) in the basic plant sciences; (b) five credits in plant physiology.

Master's degree.—Offered under both Plan A and Plan B. Master's degree offered under Plan A, foreign language required; Master's degree offered under Plan B, a reading knowledge of French or German strongly advised but not required.

NOTE.—For courses in botany, including plant physiology, see also Botany.

PLANT PATHOLOGY

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

105f-106w-107s. Mycology. Morphology and taxonomy of fungi. Lectures, laboratory, and field work. Prerequisite: Course 1 or 10, or equivalent. 9 to 15 credits. Miss Dosdall.

110w. Principles of Pathology. A systematic consideration of the basic factors governing the development of plant diseases. Prerequisites: Course 1 or 10 and Bact. 53. 3 credits. Mr. Stakman, Mr. Eide.

111w. Diseases of Field Crops. Symptomatology, etiology, and practical methods of control. Laboratory, lecture, and greenhouse work. Prerequisite: Course 1 or 10. 3 credits. Mr. J. J. Christensen.

112s. Diseases of Fruit and Vegetable Crops. Especially those important in Minnesota. Laboratory, lecture, and field work. Prerequisite: Course 1 or 10. 3 credits. Mr. Eide, Mr. Sharvelle. (Given in alternate years; offered in 1940-41.)

114w. Advanced Forest Pathology. Wood rots, including a study of the deterioration of wood products caused by fungi. Lectures and laboratory work. Prerequisite: Course 1 or 10. 3 credits. Mr. C. M. Christensen.

118f. Bacterial Diseases of Plants. Bacteria as plant pathogens; representative types with particular reference to the technique used in studying bacterial diseases of plants. Prerequisite: Course 1 or 10. 3 credits. Mr. Eide.

119s. Principles of Plant Disease Control. A general consideration of principles and practices in controlling plant diseases. Prerequisite: Course 1 or 10. 3 credits. Mr. Sharvelle.

141f-142w. 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 vectors. Prerequisite: 8 credits in entomology or plant pathology. 6 credits. Mr. J. J. Christensen, Mr. Granovsky.

143f. Methods. Theoretical and practical consideration of methods used in mycological and pathological research. Prerequisite: Course 1 or 10. 3 credits. Miss Hart.

COURSES PRIMARILY FOR GRADUATE STUDENTS

203f-204w-205s-206su.* Research in Plant Pathology. Special assignment of work in laboratory and field problems in pathological research. Mr. Freeman, Mr. Stakman, Mr. J. J. Christensen, Mr. C. M. Christensen, Miss Dosdall, Mr. Eide, Miss Hart.

207f-208w-209s-210su.* Research in Mycology. Research work along following suggested lines: taxonomy of natural groups, fungus flora of particular regions, localities, or habitats; investigation of fungi involved in special industrial or natural processes; morphology or physiology of special forms. Prerequisite: Course 105-106-107. For minor or major. 3 credits per quarter. Mr. Stakman, Mr. C. M. Christensen, Miss Dosdall.

211w. History of Plant Pathology. Historical development of plant pathology. 2 credits. Mr. Stakman.

213.* Seminar. Assigned topics with special reference to current pathological problems. Historical review of literature on special problems and critical study of current literature. 2 credits. Mr. Stakman, Mr. J. J. Christensen, Mr. Eide, Miss Hart.

215f. Genetics of Plant Pathogens. A study of physiologic specialization, sexuality, hybridization, mutation, and similar phenomena in plant pathogens, with particular emphasis on practical implications. Prerequisites: Course 1 or 10 and Agron. and Pl. Gen. 131. Mr. Stakman, Mr. J. J. Christensen.

216f. Physiology of Plant Pathogens. The physical requirements and effects of plant pathogens in relation to their parasitism. Mr. Eide. (Given in alternate years. Not offered in 1940-41.)

Plant Physiology and Agricultural Botany

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

160f. Plant Histochemistry. The localization, identification, and function of plant constituents. Lecture, demonstration, and laboratory. Prerequisite: organic chemistry and elementary plant physiology. 3 credits. Mr. Landon.

161w. Transport, Storage, and Ripening of Fruits and Vegetables. The effects of temperature, respiration, packing, etc., on storage life. Prerequisite: Plant Physiol. 5 credits. 3 credits. Mr. Harvey.

162w. Physiological Relations of Crop Plants to Temperature. Covering in detail hardiness and general temperature effects. Readings and translation. Prerequisite: Plant Physiol 22. 3 credits. Mr. Harvey.

163s. Applied Plant Physiology. A general discussion of plant physiology as applied to the food industries and to agriculture and forestry. Lectures and demonstrations. Prerequisites: Plant Physiol. 3 credits and Chem. 5 credits. 3 credits. Mr. Landon.

COURSES PRIMARILY FOR GRADUATE STUDENTS

250s.* Research Methods in Applied Plant Physiology. Advanced research methods of analysis and physical measurements applied in physiology. Laboratory and lecture. 3 to 5 credits. Mr. Harvey, Mr. Landon.

251f-252w-253s.* Seminar in Applied Plant Physiology. 1 credit. Mr. Harvey.

254f-255w-256s-257su.* Research Problems in Applied Plant Physiology. Special assignment of work in applied plant physiology. Mr. Harvey.

258f-259w.* Growth Factors in Crop Plants. A lecture and reading course covering genetic physiology, the initiation of growth, growth rate, and effect of the environment on growth. Prerequisites: cytology and genetics. 3 credits per quarter. Mr. Harvey.

POLITICAL SCIENCE

Professors William Anderson, Harold S. Quigley, Lloyd M. Short; Associate Professors Benjamin E. Lippincott, Clarence C. Ludwig, Lennox A. Mills; Assistant Professors Evron M. Kirkpatrick, Joseph R. Starr.

REQUIREMENTS FOR THE M.A. DEGREE

Master's degree.—Offered under both Plan A and Plan B.

For requirements not stated here, see pages 12-16.

Prerequisites.—For major work, 18 credits; for minor work, 12 credits, or their equivalent, in political science.

Course requirements.—Plan A: Eighteen credits in major subjects in addition to Course 231 (Scope and Methods of Political Science); 9 credits in minor subjects. Plan B: see pages 15-16.

A candidate with a major in political science is expected to choose two fields from among the following:

1. American Government, Politics, and Administration
2. Public Law
3. Comparative Modern Government and Politics
4. Political Theory (including the history of theory)
5. Local Government and Administration
6. International Law, Organization, and Relations

For a minor a student should choose one field outside of political science. The minor field should be related to the major or be calculated to support it. A reading knowledge of French or German is required.

Examinations.—Final written examinations will be given upon the major, also an oral examination upon the thesis and the major and minor fields.

REQUIREMENTS FOR THE PH.D. DEGREE

For requirements not stated here, see pages 19-22.

Prerequisites.—For major work, 18 credits; for minor work, 12 credits, or their equivalent, in political science.

Major and minor.—The character of the work for the doctorate requires that a candidate exhibit a grasp of fields of knowledge rather than of specific courses. A candidate will choose, in consultation with his major advisers, four major fields among those listed above, and such minor fields as may be acceptable to his major and minor advisers. Course 231 (Scope and Methods of Political Science) is required of all majors. The division of work between the major and the minor may be adjusted somewhat to suit individual cases. A reading knowledge of French and German is required.

Examinations.—The preliminary examinations will cover the minor fields, and the major fields other than the field of the thesis. Except in unusual circumstances, no general written examination will be required in the minor fields. The final examination will, as a rule, be limited to the thesis and the field in which it is written. The candidate will be expected in the preliminary examinations to show a comprehensive knowledge of facts and principles, and of the literature of his chosen field; in the final examination he will be expected to defend his thesis and to show a detailed knowledge of his special field of research.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-102w-103s.† Constitutional Law. I. Constitutional amendment; national-state relations; national judiciary; powers of Congress; taxation; interstate commerce. II. The executive; foreign relations; military affairs; territories; interstate relations. III. Government and the individual; freedom of speech; *ex post facto* laws; obligation of contracts; due process of law; equal protection of laws. 9 credits.

104f-105w-106s.† American Constitutional Development. An examination of the origin and development of the American constitutional system coupled with a critical analysis of its present structure and operation. The study covers such things as the formation of the written constitution of 1787; the role of the legislative, executive, and judicial branches of government in constitutional change; and the origin, nature, and results of judicial review. 9 credits. Mr. Kirkpatrick.

108w. Legislative Organization and Procedure. A study of the structure and functioning of legislative bodies, including such topics as bicameralism, the committee system, party leadership, the caucus, parliamentary procedure, limitations on debate, legislative councils, bill drafting bureaus, and reference services. 3 credits. Mr. Short.

116f-117w†-118s. Local Government. A survey of local government, urban and rural, in the United States and selected foreign countries. Status, organization, powers, and methods. Finances, and such services as police, health, education, housing, city planning, and public utilities. 9 credits. Mr. Anderson.

119. Jurisprudence. See announcement of Law School.

120f. Municipal Functions. A general survey of "line" functions: safety, health, welfare, works, utilities, etc. 3 credits. Mr. Ludwig.

121w. Municipal Administration. A general survey of overhead administration, with special emphasis upon such topics as administrative organization, personnel, purchasing, contracting, budgeting, accounting, reporting. 3 credits. Mr. Ludwig.

122s. Municipal Problems. Intensive consideration of selected topics: public works, police, public relations, etc. 3 credits. Mr. Ludwig.

125f. Recent Social Legislation. A survey of governmental policies in the field of social welfare and social security. Historical development and comparative analysis of old age security measures, unemployment compensation, and other forms of social insurance. Detailed discussion of American social security legislation and its constitutional, administrative, and political problems. 3 credits.

126w-127s.† Government and the Economic Order. An examination of the powers of national, state, and local governments in the United States to regulate the various forms of business enterprise. A survey of the policies with reference to selected topics such as the trust problem, public utilities, communication agencies, food and drug legislation, and others. Emphasis on the legislative background, legal and administrative problems, and judicial interpretation of the statutes. 6 credits.

131f-132w-133s.† Public Administration. A study of theory and practice in public administration, national and state, with special reference to problems of organization, areas, intergovernmental relationships, planning and research, budgeting, purchasing, accounting and auditing, personnel, and control. 9 credits. Mr. Short.

144f. American Political Parties. The policies, composition, organization, activities, and functions of the political parties of today; suffrage; elections, and related subjects; evaluation of the political party as a force in American government. 3 credits. Mr. Starr.

145f-146w.† British Government and Politics. The modern constitution; political parties, and elections; structure, powers, and procedure of Parliament, executive, civil service, and courts; special problems. 6 credits. Mr. Starr.

147s. French Government and Politics. The modern constitution; political parties and elections; structure, powers, and procedure of Parliament, executive, civil service, and courts; special problems. 3 credits. Mr. Starr.

148w. European Dictatorships. Description and evaluation of contemporary absolute government, especially in Soviet Russia, Italy, and Germany; organization and policies of political parties. 3 credits. Mr. Starr.

149f-150w.† Government and Politics of the British Empire. Structure and powers of the Dominion governments and the evolution of Dominion status; Dominion relations with Great Britain and trends of Empire constitutional development. Constitutional, economic, administrative, and political development of India and the tropical dependencies. 6 credits. Mr. Mills.

151s. Problems of the British Dominions. The joint formation and control of Empire foreign policy together with its political and strategic elements. Problems of federalism in the British Dominions, constitutional, economic, and fiscal. 3 credits. Mr. Mills.

153f. Japanese Government and Politics. Constitutional and political development in Japan; government, political parties, and problems. 3 credits. Mr. Quigley.

154. Chinese Government and Politics. Constitutional and political development in China; government, political parties, and problems. 3 credits. (Not offered in 1940-41.)

160f. American Political Thought. Readings in, and discussion of, some of the main trends and writers from colonial times to the present. 3 credits. Mr. Lippincott.

161w-162s.† Recent Political Thought. Readings in, and discussion of, modern schools of political thought: conservative, liberal, anarchist, syndicalist, socialist, communist, and fascist. 6 credits. Mr. Lippincott, Mr. Kirkpatrick.

164f-165w-166s.† Development of Political Thought. I. The Greek and Roman writers. II. Medieval to Early Modern. III. From the seventeenth to the early nineteenth century. 9 credits. Mr. Lippincott, Mr. Kirkpatrick.

167f-168w-169s.† Readings in the Classics of Politics. Reading and discussion of some of the classical writers in political theory; includes such men as Plato, Aristotle, Machiavelli, Hobbes, Locke, Marx, and Lenin. 9 credits. Mr. Lippincott, Mr. Kirkpatrick.

170s. Problems of Democracy. An intensive examination of the main criticisms of democracy: intellectualist, including Plato, Carlyle, Stephen, Main; scientific; psychological and biological; Marxist, Fascist. 3 credits. Mr. Lippincott.

171s. Political Psychology. (Identical with Psy. 141.) 3 credits. Mr. Bird.

180f-181w-182s.† International Law. Nature, sources, and sanctions of international law. The laws of peace, war, and neutrality. 9 credits. Mr. McLaughlin.

184w. International Organization. The structure of the older international community and of the League of Nations; procedure in the formation of international policy; international legislation and administration, the settlement of international disputes; sanctions. 3 credits. Mr. Quigley.

185s. Theories of International Relations. Internationalism and competing theories of international relations; national theories and policies that condition the application of internationalism; armaments and war; conditions of peace; international planning. 3 credits. Mr. Quigley.

191f-192w-193s.*† International Relations in the Far East. The international relations of China from the earliest period; early contacts between Japan and China; the policy of exclusion gradually overcome by western powers; the opening of the Far East in the nineteenth century; the "open door" policy; the Great War and the revision of treaties; the present situation. 9 credits. Mr. Quigley.

195-196.† Colonial Government and Administration. The economic and political factors in colonization; forms of government; administrative organization, personnel, and problems; commercial policies; mandates under the League of Nations. 6 credits. (Not offered in 1940-41.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

204f-205w-206s.† Topics in Administrative Law. Appointment, status, compensation, and discharge of civil officers and employees of government; official powers; construction of powers; discretion; enforcement of administrative orders; judicial remedies against abuse of official authority. 9 credits.

210f-211w-212s. Special Seminar in Public Administration. (Registration only with consent of staff.) Mr. Anderson, Mr. Short, Mr. Ludwig.

231w. Scope and Methods of Political Science. The field of political science; relation to other studies; types of approach; research methods and technique; bibliography. Problems of teaching at the college level. Required of all candidates for postgraduate degrees in political science. 3 credits. Mr. Anderson.

232s. Problems of Public Planning. A consideration of city and regional planning, natural resources planning, and social and economic planning; organization and powers of planning authorities; planning surveys and research. 3 credits. Mr. Anderson.

242f-243w-244s.*† Topics in Colonization. A series of essays and discussions on the American, British, Dutch, and French colonies, forming a comparative study of their twentieth century political, administrative, and economic problems. 9 credits. Mr. Mills.

COURSES STRICTLY FOR GRADUATE STUDENTS

The following seminars offer opportunities for research and directed individual study:

251f-252w-253s.† Constitutional and Administrative Law.
254f-255w-256s.† National and State Government and Administration. Mr. Short.
261f-262w-263s.† Local Government. Mr. Anderson.
264f-265w-266s.† Municipal Administration. Mr. Ludwig.
271f-272w-273s.† Comparative European Government and Parties. Mr. Starr.
281f-282w-283s.† Political Theory. Mr. Lippincott, Mr. Kirkpatrick.
291f-292w-293s.† Far Eastern Diplomacy and Government. Mr. Quigley.
294f-295w-296s.† Colonization and Imperialism. Mr. Mills.
297f-298w-299s.† International Law and Relations. Mr. Quigley, Mr. McLaughlin.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

Professors Gaylord W. Anderson, Frederic H. Bass, Ruth E. Boynton, Harold S. Diehl, Charles A. Mann, J. Arthur Myers; Clinical Professor Albert J. Chesley; Associate Professor Alan E. Treloar; Clinical Associate Professors Orianna McDaniel, Harold A. Whittaker; Clinical Assistant Professor Lucy S. Heathman.

Committee on Curriculum for Physicians.—Gaylord W. Anderson, Albert J. Chesley, Harold S. Diehl.

Committee on Curriculum for Engineers.—Gaylord W. Anderson, Frederic H. Bass, Harold A. Whittaker.

Committee on Curriculum for Nurses.—Gaylord W. Anderson, Margaret G. Arnstein, Mellie Palmer.

Master's degree.—Offered under both Plan A and Plan B. All candidates for a Master's degree must take basic courses in (1) public health administration, (2) epidemiology, (3) statistics, (4) sanitation, and (5) public health nursing, unless specifically excused by the department.

Inquiries concerning other work in public health should be addressed to the director, Dr. G. W. Anderson, Millard Hall, University of Minnesota.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102f. Environmental Sanitation—General. Public health supervision of water supplies; production, processing, and distribution of milk and other foods; treatment and disposal of sewage, excreta, garbage, and other wastes; bathing places; control of occupational health hazards and of animals and insects

involved in the spread of disease. Lectures, field and laboratory demonstrations. Prerequisites: Bact. 53, Courses 53, 100 or equivalent or consent of instructor. 5 credits. Mr. Whittaker, Mr. Pierce, and associates.

103f,w,s.* Public Health Bacteriology. For graduates. Bacteriologic and serologic diagnosis, public health laboratory and administration methods. Prerequisites: Bact. 101-102, 116 and permission of instructor. By arrangement. Dr. Heathman.

104w.* Epidemiology I. For physicians and others by permission. Factors underlying the spread of infectious diseases, with detailed discussion of selected diseases; statistical and epidemiologic methods in the study of diseases. Lectures, laboratory, and seminars. Credits arranged. Dr. Anderson, Dr. Diehl, Mr. Treloar.

105s. Epidemiology II—Special. For physicians. Epidemiology of certain diseases of public health importance; study of selected source material. Prerequisite: Course 104. Credits arranged. Dr. Anderson.

106f,w.* Public Health Administration—General. For physicians, engineers, nurses, social workers, and others by arrangement. Structure, basic functions, and activities of public health agencies; public health laws and regulations; administrative procedures in public health practice; relationship to other governmental and social activities. 3 credits. Dr. Anderson and guest lecturers.

107f. Child and Adult Hygiene. For physicians and graduate students in medical social work. Promotion of hygiene through public health and community effort; maternal, infant, preschool, school, college, industrial, and adult. Lectures and field trips. Prerequisite: Course 53 or 100. 4 credits. Dr. Boynton, Dr. Ellis, and staff.

108f. Care of the Handicapped Child. Extent of problem; history and development of program for care; types of physical defects, means of prevention and correction; medical social aspects; mental and emotional aspects; vocational training and placement. Prerequisite: Course 53, 57, 58, or 100. 2 credits. Dr. Hilleboe and associates.

109w.* Environment and Disease. For engineers. Epidemiology of certain important diseases with special consideration of the conditions under which certain diseases of man are transmitted by water, milk, and other foods, by air with especial reference to dusts, by insects, and by animals; their relationship to occupation and their administrative control. 3 credits. Dr. Anderson.

110f,s. Biometric Principles. See Biostatistics courses.

111f,s.‡ Biostatistics Laboratory. See Biostatistics courses.

112w. Environmental Sanitation—Water Supplies. Sanitary problems associated with the location, construction, and operation of water supplies, purification works, and distribution systems including a consideration of plumbing installations and fixtures; methods of public health supervision. Lectures, field and laboratory demonstrations. Prerequisites: Course 109, and Course 102 or C.E. 165 or C.E. 162. 4 credits. Mr. Whittaker, Mr. Pierce, and associates.

113w. Environmental Sanitation—Pollution of Water; Sewage, Excreta, and Waste Disposal. Methods for the study and control of stream and lake pollution; public health supervision of, and methods for treatment and disposal of, sewage, excreta, garbage, and other wastes. Lectures, field and laboratory demonstrations. Prerequisites: Course 109, and Course 102 or C.E. 165 or C.E. 163. 2 credits. Mr. Whittaker, Mr. Pierce, and associates.

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

115w. Environmental Sanitation—Milk and Other Foods. Sanitary problems associated with the production, processing, and distribution of milk and other foods; methods of public health supervision. Lectures, field and laboratory demonstrations. Prerequisites: Course 109, and Course 102 or D.H. 51. 2 credits. Mr. Whittaker and associates.

116w.* Environmental Sanitation—Problems, Organization, and Methods. Sanitary problems of urban and rural communities; the control of occupational health hazards and of diseases involving insect vectors and animal hosts. Environmental sanitation in activities of federal, state, and local government. Lectures, seminars, field and laboratory demonstrations. Prerequisites: Courses 106, 112, 113, and 115. 3 credits. Mr. Whittaker, Mr. Pierce, associates, and guest lecturers.

120w. Correlation Analysis. See Biostatistics courses.

121w.‡ Correlation Laboratory. See Biostatistics courses.

122w.* Public Health Administration Problems. Conference discussion of selected problems; relative values of different public health procedures and activities. Prerequisite: Course 106 or may be taken concurrently. 3 credits. Dr. Anderson or guest lecturer.

123f,w,s. Topics in Public Health. Selected readings in public health with discussion based on those readings. Credits arranged. Prerequisite: permission of instructor. Dr. Anderson and staff.

130s. Statistical Inference. See Biostatistics courses.

131s.‡ Sampling Laboratory. See Biostatistics courses.

140.‡ Topics in Biostatistics. See Biostatistics courses.

150.‡ Life Tables. See Biostatistics courses.

COURSES PRIMARILY FOR GRADUATE STUDENTS

200f,w,s. Research. Opportunities will be offered by the University and by the various co-ordinated organizations for qualified students to pursue research work. Dr. Anderson, Dr. Diehl, and staff.

210f,w,s. Seminar in Preventive Medicine and Public Health. By arrangement. Staff.

Public Health Nursing

Margaret G. Arnstein, Director, Course in Public Health Nursing.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

170s. Supervision of Public Health Nursing. Nature of supervision, historical survey, classification of activities; methods of supervision, including field visitation, individual counseling, group conferences, staff education programs, administrative functions of supervisors, preparation and selection of supervisors. Prerequisites: Courses 53, 61, 63, or permission of instructor. 3 credits. Miss Arnstein.

171w,s.* Advanced Problems in Public Health Nursing. For advanced students who wish to work on special problems in public health nursing. Prerequisite: Course 170 or permission of instructor. Credits arranged. Miss Arnstein and associates.

173f,w,s. Advanced Field Work in Public Health Nursing. For public health nurses only. Prerequisite: Course 170 or permission of instructor. Credits arranged. Miss Arnstein.

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

ADDITIONAL COURSES

Other courses offered in this and the Graduate Medical Bulletin which contribute to work in public health:

Department	Course No.	Title	Instructor
Anatomy	160	Seminar in Human Growth	Dr. Boyd
Bacteriology	114	Molds, Yeasts, and Actinomycetes	Dr. Henrici
Bacteriology	116	Immunity	Dr. Larson
Bacteriology	120	Diseases of Animals Transmissible to Man	Dr. Green
Bacteriology	124	Filterable Viruses	Dr. Green
Child Welfare	130-131	Child Development	Mr. Anderson
Child Welfare	190	Principles of Mental Measurement of Young Children	Miss Goodenough
Hydraulic Engineering	161	Power	Mr. Bass
Medicine	205	Tuberculosis	Dr. Myers
Municipal Engineering	162-163	Water Supply and Sewerage	Mr. Bass
Pediatrics	108	Contagious Diseases	Dr. Platou
Political Science	120	Municipal Functions	Mr. Ludwig
Political Science	121	Municipal Administration	Mr. Ludwig
Political Science	122	Municipal Problems	Mr. Ludwig
Psychology	144-145	Abnormal Psychology	Mr. Bird
Sanitary Engineering	261-262	Water and Sewage Purification	Mr. Bass
Zoology	107-108	Protozoology	Mr. Turner
Zoology	144-145-146	Animal Parasites and Parasitism	Mr. Riley

PSYCHOLOGY

Professors Richard M. Elliott, John E. Anderson, Charles Bird, Donald G. Paterson; Associate Professors Starke R. Hathaway, William T. Heron, Miles A. Tinker; Assistant Professor B. Frederic Skinner.

Prerequisites.—For major work, 18 credits; for minor, 15 credits.
Master's degree.—Offered only under Plan A.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-102w†-103s. Experimental Psychology. The theory and technique of the leading methods of experimental investigation in human psychology. Individual research problems in the second and third quarters. One lecture, four laboratory hours per week. 3 credits per quarter. Mr. Tinker.

108f. Systems of Psychology. A comparative study of the problems, methods, and viewpoints of modern psychology. Tutorially directed reading. 3 credits. Mr. Elliott.

114w. Human Behavior. An analysis of the background, development, and organization of human behavior. Consciousness and purpose are treated as properties of the living body. 3 credits. Mr. Elliott.

118s. Psychology of Language. The nature and forms of verbal behavior; motivational and emotional influences in the emission of speech; the problem of reference or meaning; internal language processes; etc. Emphasis upon experimental data and analyses of written material. 3 credits. Mr. Skinner.

125f-126w†-127s. Psychology of Individual Differences. Experimental and statistical study. Influence of sex, race, immediate ancestry, environment, and maturity in the causation of individual differences. Investigation of definite problems and analysis of results. Individual research problems in third quarter. 3 credits per quarter. Mr. Paterson.

130s.‡ Vocational Psychology. Psychology of individual differences in intelligence, aptitudes, interests, and training, with special reference to vocational guidance. 3 credits. Mr. Paterson.

140w. Social Psychology. A study of experimental investigations of group behavior. Special emphasis will be put upon the place of emotions, drives, and personality traits in the adjustment of individuals to the demands of modern societies. 3 credits. Mr. Bird.

141s. Political Psychology. A consideration of problems and points of view falling within the area of both political science and psychology. The importance of deriving techniques for the identification of political attitudes. The part played by psychological factors in the determination of belief, propaganda, and public opinion. 3 credits. Mr. Bird.

144f-145w.† Abnormal Psychology. Normal and abnormal behavior contrasted. Varieties of maladjustment as illustrated in criminality, deficiency, fanaticism, and insanity. Stress will be laid on the inadequacies of personality as shown in everyday life. 6 credits. Mr. Bird.

148w. Physiological Psychology. The topics treated and illustrated by demonstrations will include the elements of neural anatomy and physiology, tonus, neuromuscular set, integration, and the neural basis of learning. The treatment of these topics will stress their importance for psychology. 3 credits. Mr. Hathaway.

151f-152w-153s. Animal Psychology. Vertebrate behavior is emphasized. A critical study of the literature, and of the relationship between animal and human psychology. Individual investigation of special problems in the third quarter. 3 credits per quarter. Mr. Heron.

160f. Psychology in Personnel Work. Psychology as applied to the selection and retention of a stabilized personnel. The standardized interview; principles and technique of employment tests; methods of judging character qualities; the rating scale; personnel classification methods. 3 credits. Mr. Longstaff.

COURSES PRIMARILY FOR GRADUATE STUDENTS

200f-201w-202s.† History of Psychology I. Origin and development of scientific psychology. Men, schools, and methods. Emphasis on the experimental period, 1860 to the present. Open to advanced students with permission of instructor. 1 credit per quarter. Mr. Tinker. (Offered in 1941-42 and alternate years thereafter.)

203f-204w-205s.† History of Psychology II. Psychology in America. Development of laboratories, departments, apparatus, texts, and journals. Present status. Open to advanced students with permission of instructor. 1 credit per quarter. Mr. Tinker. (Offered in 1940-41 and alternate years thereafter.)

206f-207w-208s. Research in Animal Behavior. Mr. Heron.

210f-211w-212s. Research Problems. Laboratory investigations. Open to graduate students only. Mr. Anderson, Mr. Bird, Mr. Elliott, Mr. Paterson, Mr. Hathaway, Mr. Heron, Mr. Tinker, Mr. Skinner.

215f-216w-217s.† Seminar in Psychology. A basic seminar required of every candidate for the Ph.D. degree with a major in psychology unless excused in writing by his major adviser. Program based on a syllabus of required and optional readings prepared during the previous year. Lectures, reports of

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

reading and research, and discussions. 3 credits per quarter. Mr. Bird, Mr. Elliott, Mr. Paterson, Mr. Hathaway, Mr. Heron, Mr. Tinker, Mr. Baker, Mr. Skinner.

225f,w,s.† Seminar in Contemporary Research. Discussion of the problems of psychology and related sciences and reports of research projects. Monthly meetings attended by the department staff and graduate students majoring in psychology. Open for credit to candidates for the Ph.D. degree who have completed one year of graduate study. Other graduate students are urged to attend. 2 credits. Mr. Elliott and others.

230f-231w-232s. Field Work in Psychometrics. For properly qualified students. Written permission of instructor required to register for this course. Credits arranged. Mr. Paterson.

250f-251w-252s. Topics in Psychology. Independent reading, tutorial conferences, and reports in any field of psychology, such as the psychology of sensation, reaction time, perception of space, Gestalt psychology, differential psychology, social and political behavior, personnel psychology, esthetics, human and animal learning, etc., which meets the approval of one of the listed instructors. The chairman of the department will, if requested, assist the student in selecting the most appropriate instructor to guide reading in a particular field. Credits arranged. Mr. Bird, Mr. Elliott, Mr. Paterson, Mr. Hathaway, Mr. Heron, Mr. Tinker, Mr. Baker, Mr. Skinner.

260f-261w-262s. Seminar in the Application of Psychological Methods to the Study of Nervous and Mental Diseases. Recent experimental literature and interpretations in terms of clinical practice. Discussion and experimentation in the field of personality evaluation. Permission of instructor required before registering. 1 credit per quarter. Mr. Hathaway.

270f-271w-272s. Seminar in the Recent Literature of Psychology. 1 credit per quarter. Mr. Cook, Mr. Harris.

295f-296w-297s. Seminar in Individual Differences. Advanced students meet for reports and discussion of contemporary trends in the psychology of individual differences and applied psychology. 1 credit per quarter. Mr. Paterson.

RADIOLOGY

For staff and courses of study offered, see the Graduate Medical Bulletin.

ROMANCE LANGUAGES

Professors Francis B. Barton, Chairman, Irville C. LeCompte, Colbert Searles, Edward H. Sirich; Associate Professors Raymond L. Grismer, Walter T. Pattison; Assistant Professors Herbert E. Clefton, Emilio C. LeFort, Elizabeth Nissen.

Prerequisites.—For major work, 27 Senior College credits or equivalent; for minor work, 18 Senior College credits or equivalent. Candidates for the Master's degree must also have a reading knowledge of at least one other modern language. Candidates for the Doctor's degree must have a knowledge of Latin equivalent to at least two years of high school Latin; a reading knowledge of a second Romance language; and, by the end of the first year of graduate work, a reading knowledge of German.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

French

103f-104w-105s.† French Syntax and Composition. Special studies in characteristic problems of French syntax. 3 credits. Mr. Barton.

115f.* French Literature: Seventeenth Century: Formation of the Classic Ideal. 4 credits. Mr. Searles.

116w.* French Literature: Seventeenth Century: Molière, Racine, La Fontaine. 4 credits. Mr. Searles.

117s.* French Literature: Seventeenth Century: Moral and Didactic Literature. 4 credits. Mr. Searles.

118f-119w-120s.* French Literature: Eighteenth Century. First quarter, beginnings of the philosophic movement, Bayle, Montesquieu, Diderot; second quarter, Voltaire; third quarter, Rousseau, the theater, the novel. 9 credits. Mr. Sirich.

121f-122w-123s.* French Literature: Sixteenth Century. First quarter, the Rhétoriqueurs, Marot, Rabelais; second quarter, the Pléiade; third quarter, Montaigne, Amyot. 9 credits. Mr. Searles. (Not offered in 1940-41.)

130. French Romantic Poetry: Victor Hugo. 3 credits. Mr. Clefton. (Not offered in 1940-41.)

131f. Parnassian Poetry. 3 credits. Mr. Clefton. (Not offered in 1940-41.)

132w. Baudelaire, Verlaine, and the Symbolists. 3 credits. Mr. LeCompte. (Not offered in 1940-41.)

145f.* French Drama, 1890-1915. 2 credits. Mr. Barton. (Not offered in 1940-41.)

146w-147s.* Contemporary French Dramatic Literature. 4 credits. Mr. Barton. (Not offered in 1940-41.)

153. Contemporary French Lyric Poetry. 3 credits. Mr. LeCompte. (Not offered in 1940-41.)

156. French Realistic Novel. 3 credits. Mr. Minault. (Not offered in 1940-41.)

157w. French Novel, 1880-1915. 3 credits. Mr. Minault.

158s. Contemporary French Novel. 3 credits. Mr. Minault.

171f-172w-173s.*† History of French Language. Lectures and illustrative texts giving the development of the French language from its origins to the nineteenth century. Especially intended for prospective teachers. 3 credits. Mr. LeCompte.

Italian

159f-160w. Dante. The *Divina Commedia.* (Alternates with 161-162.) 6 credits. Miss Nissen.

161f-162w. The Sixteenth Century. Reading of texts and study of literary influences. 6 credits. Miss Nissen. (Not offered in 1940-41.)

164. Dante (in English). Lectures, reading, and discussion of the *New Life,* and parts of the *Divine Comedy.* 3 credits. Miss Nissen. (Not offered in 1940-41.)

Spanish

110f-111w-112s. Spanish Literature: Nineteenth Century. 9 credits. Mr. Pattison.

115f-116w-117s.* Spanish Literature: Seventeenth Century. First quarter, the drama; second quarter, the novel; third quarter, lyric and epic poetry. Alternates with 155-156-157. 9 credits. Mr. Grismer.

120w. The Ballad. 3 credits. (Not offered in 1940-41.)

130s. Cervantes: Don Quijote. 3 credits. Mr. Grismer.

131s. The Picaresque Novel. 3 credits. Mr. Grismer. (Not offered in 1940-41.)

140w. Rubén Darío and the Contemporary Movement in Spanish American Literature. 3 credits. Mr. LeFort. (Not offered in 1940-41.)

155-156-157.* Spanish Literature: Sixteenth Century. First quarter, the drama; second quarter, Cervantes and the novel; third quarter, poetry, the mystics. Alternates with 115-116-117. 9 credits. Mr. Grismer. (Not offered in 1940-41).

174f-175w-176s. Contemporary Spanish Literature. First quarter, the drama; second quarter, the novel; third quarter, poetry. 9 credits. Mr. Pattison. (Not offered in 1940-41.)

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f-202w-203s. Old French Phonology and Morphology. Lectures on the origin and development of the French language, with practical exercises and reports on assigned topics. 6 credits. Mr. LeCompte.

204f-205w-206s. Reading in Old French Literature. An introductory course in the reading of Old French. Different types of literature will be read and their origin and development discussed. A certain amount of collateral reading required. 6 credits. Mr. LeCompte.

207f-208w-209s. Old Provençal. Reading in early Provençal literature with special attention to the poetry of the troubadours. 6 credits. Mr. LeCompte.

222f-223w-224s.* French Seminar. Classical period. 6 credits. Mr. Searles, Mr. Sirich. (Not offered in 1940-41.)

225-226-227.* French Seminar. Modern period. 6 credits. Mr. Clefton.

230-231-232. Research Methods and Material. 3 credits.

241f-242w-243s.* Old Spanish Philology. 6 credits. (Not offered in 1940-41.)

244f-245w-246s.* Old Spanish Literature. Every year a different genre is studied, such as the epic. Subject to be decided by arrangement with students. 6 credits. Mr. Grismer.

250f-251w-252s.* Spanish Seminar. 6 credits. Mr. Pattison.

259f-260w-261s.* Research in Romance Languages. Credit depends upon amount of work accomplished.

SCANDINAVIAN

Professors Martin B. Ruud, Chairman, Konstantin Reichardt; Assistant Professor Alrik Gustafson.

Prerequisites.—For major work, 27 credits in language and literature, 18 of which must be in Scandinavian; for minor work, 18 credits in language and literature, 12 of which must be in Scandinavian. Candidates for the Master's degree must have a reading knowledge of one foreign language in addition to any one of the Scandinavian languages.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

161s. The Modern Scandinavian Novel. Prerequisites: Courses 4-5-6 or 10-11-12 or 8 credits in literature. Knowledge of Scandinavian not required. 2 credits. Mr. Gustafson.

171s. The Modern Scandinavian Drama. Prerequisites: Courses 4-5-6 or 10-11-12 or 8 credits in literature. Knowledge of Scandinavian not required. 2 credits. (Not offered in 1940-41.)

180. Old Norse Literature. Prerequisites: 8 credits in literature. 3 credits. (Not offered in 1940-41.)

182s. Germanic Philology. (Identical with German 119.) 3 credits. Mr. Reichardt.

185. History of the Scandinavian Languages. Prerequisites: Courses 4-5-6 or 10-11-12 or at least one Old Germanic language. 3 credits. (Not offered in 1940-41.)

192f. Gothic. Introduction to Germanic linguistics. (Identical with German 192.) 4 credits. (Not offered in 1940-41.)

195w. Introduction to Old Norse Language and Literature. (Identical with German 195.) 4 credits. Mr. Reichardt.

196s. Eddic Poetry. (Identical with German 196.) 3 credits. Mr. Reichardt.

FOR GRADUATE STUDENTS ONLY

215f-216w-217s. Studies in Scandinavian Romanticism. 9 credits. (Not offered in 1940-41.)

218f-219w-220s. Studies in Late Nineteenth-Century Scandinavian Literature. 9 credits. Mr. Gustafson.

221f-222w-223s. Biographical Problems in Strindberg. 9 credits. Mr. Gustafson.

SOCIOLOGY AND SOCIAL WORK

Professors F. Stuart Chapin, Clifford Kirkpatrick, Lowry Nelson, George B. Vold, Malcolm M. Willey; Associate Professors Anne F. Fenlason, Elio D. Monachesi, Alice Leahy Shea, Raymond F. Sletto, Gertrude Vaile; Assistant Professor Monica K. Doyle; Lecturer Helen U. Phillips.

Prerequisites.—In *sociology:* for major work, 18 quarter credits; for minor work, 12 credits.

In *social work:* for a major, at least 12 credits in sociology, which are to be included within a total of 39 credits in social science. Admission is granted on the recommendation of the department with a limit of 50 beginning students. Admission of beginning students is approved for fall or winter quarters only, with preference for the fall quarter entrance. The master of arts degree in social work is offered under Plan A, or Plan B with a minimum of 90 credits required.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

SOCIOLOGY

Master's degree.—Offered only under Plan A.

100f. Social Psychology. Primarily for sociology students. The social attitudes; their development and modification under social pressure; the interactions of individuals and groups. 3 credits. Mr. Kirkpatrick.

101f. Social Organization. The organization and structure of social groups; the basic culture patterns of economic, political, and social institutions. Integration and disintegration of social groups and institutions. Essentials of social dynamics. 3 credits. Mr. Chapin.

102s. Contemporary Penology. An analysis of some of the more important developments in recent attempts at the treatment of criminals and the prevention of crime. 3 credits. Mr. Vold.

103w. Sociology of Conflict. Types of social conflict and their role in social life. 3 credits. Mr. Vold.

105f. Criminological Theories—Historical and Contemporary. 3 credits. Mr. Vold.

110f. Rural Organization. A study of social organization as it affects living conditions in small towns and rural districts. Especially designed for rural social workers and specialists in rural sociology or agricultural economics. 3 credits. Mr. Nelson.

112s. Methods of Rural Social Research. A course dealing with the methods and content of rural social research. All methods of investigation are analyzed. Especially designed for those interested in social research under Purnell or similar funds. 2 credits. Mr. Nelson.

114w. Rural Social Institutions. A detailed study of the problems of organization and efficiency of selected rural institutions, especially religious, educational, civic, and recreational. For advanced students. Lectures, discussions, reports. 3 credits. Mr. Nelson.

115w. Religion As a Social Institution. The origin and function of religion viewed as a culture pattern in relation to social processes and social organization. 3 credits. Mr. Kirkpatrick.

116w. The Newspaper As a Social Institution. A study of the social role of the newspaper in the United States, with special reference to the social changes that have influenced the press, and the corresponding influences of the press upon social life. 3 credits. (Not offered in 1940-41.)

119f,s. The Family. The evolution of the family; development of family unity or disunity; the roles of the several members of the family; methods of investigation of the family. 3 credits. Mr. Kirkpatrick.

120f. Social Life and Cultural Change. A history of the theories of progress and a critique of the idea of progress. 3 credits. Mr. Schneider.

122s. Statistical Methods. Selected problems of social relationship described, analyzed, and interpreted by means of the common statistical methods. 3 credits. Mr. Chapin.

123s. Methods of Social Research. The nature of scientific method; the problems of sociology; specific methods of investigation of social phenomena. 3 credits. Mr. Sletto.

132f. Juvenile Courts and Probation. The historical, legal, and social aspects of juvenile courts and probation. A critical survey of juvenile courts and probation work based upon a consideration of the nature of delinquent behavior; its "causes," its modification, and its prevention. 3 credits. Mr. Monachesi.

140w. History of Social Theory. A rapid survey of the leading social theories from the time of the Greeks with special reference to the more recent developments of sociology. The theories are related to their social backgrounds. 3 credits. Mr. Schneider.

145s. Contemporary Sociological Theory. A survey of sociological theory from the French Revolution to the World War. Attention will be given to both the Utopian and scientific aspects of modern sociological thought. 3 credits. Mr. Schneider.

146w. Community Organization and the Social Setting of Recreation. A study of objectives, methods, and program material. 3 credits. Mrs. May.

147s. Group Leadership and Organization. A study of program material, objectives, and procedures. 3 credits. Mrs. May.

148s. Supervisory Problems in Recreation. A seminar for professional students with emphasis on organization and supervision. 3 credits. Mrs. May.

160w. Population Problems. The major quantitative and qualitative problems of population in our contemporary society, including: population theories and doctrines since Malthus; the growth and distribution of population; changes in population composition and their social consequences; problems of human migration; urbanization and the ecology of the city; trends in mortality and morbidity; the quality of the population, significance of differential birth rates, heredity, and environment. 3 credits. Mr. Sletto.

161w. Social Aspects of Housing and Standards of Living. An analysis of the housing of the masses in relation to the problems arising in urban overcrowding, population distribution, and standard of living as affected by the distribution of national income, and the factors related to personal and social disorganization. 3 credits. Mr. Chapin.

Social Work

Master's degree.—Offered under both Plan A and Plan B.

109f,w,s. The Field of Social Work. A study of the historical development of social work, including fields of specialization, functions of agencies, and contributions made by outstanding leaders. 2 credits. Mrs. Doyle.

125f,w. Principles of Group Work. An analysis of the group work process including the study of group behavior, the use of the group in terms of individual development and social usefulness, and leadership techniques in working toward those ends. 3 credits. Miss Phillips.

126s. Problems of Supervision in Group Work. A study of the methods of supervision of groups and group leaders with special emphasis on the use of individual and group conference, group records, and observation as supervisory tools; an analysis of the administrative functions of the group work supervisor. 3 credits. Miss Phillips.

127s. Legal Aspects of Social Work. A selected group of legal problems treated from the viewpoint of the social worker; the court system; legal process; protection and enforcement of the legal rights of indigent persons; problems of the small wage earner—garnishment, small loans, eviction; problems in domestic relations. Not designed to teach technical law, but to furnish background for understanding social problems having legal implications. 3 credits. Mr. Finke.

128s. Principles of Administration, Publicity, and Finance Applied to Social Work. A technical study of methods of organizing social agencies, of financing them, and of making the public aware of their work. Lectures and practice work. 3 credits.

129f-130w.† Principles of Social Case Work. A study of the purposes, problems, and processes of generic social case work, including a study of the relationships between the individual and the social worker and community as contributory to the treatment of the problems presented. 6 credits. Mrs. Fenlason.

129w-130s.† Principles of Social Case Work. (See 129f-130w.)

131s. Rural Social Work. A study of the relation of the attitudes and social resources of the community to the problems and processes of social work especially in rural comunities. 3 credits. Miss Vaile.

133s. Social Case Work in Health Problems. Discussion of the meaning of illness in a case work situation with a correlation of the medical and social needs of an individual and his family. 3 credits.

134s. Legal Protection of the Child. A study of the relation of law to child welfare. A survey of existing children's protective legislation, of its administration, and its future development. 3 credits. (Not offered in 1940-41.)

135f. Field of Social Work for Children. A course dealing with social movements and social agencies which have developed as a response to the needs of children. Public and private programs of care will be presented and evaluated. Case materials are used extensively. 2 credits. Mrs. Shea.

136aw-136bs. Essentials of Medicine for Social Workers. A discussion of diseases most often encountered in social work, with a consideration of their social implications. 2 credits per quarter.

137f. The History and Theory of Social Work. A consideration of the historical backgrounds of the modern social work movement and the evolution of the theory underlying it. 3 credits. (Not offered in 1940-41.)

138f. Case Work with Children. This course deals with substitute parental care. Principles and methods of child placement, including the selection of foster home or institution, are considered. Case materials reflecting current theories and practices are used throughout the course. 3 credits. Mrs. Shea.

139w. Psychiatric Problems in Social Case Work. A course presented through case discussion; evaluation of cause and effect relationships as they are reflected in the symptomatic behavior of the individuals within a treatment situation; critical analysis of the physical, psychological, and social elements which have contributed to the adjustment or maladjustment of the individuals involved; formulation of treatment plans; integration of the diagnostic and treatment processes; the therapeutic interview. 3 credits. Mrs. Shea.

151f-152w†,151w-152s.† Public Welfare. First quarter deals with the history and functions of public welfare administration, with special emphasis on public assistance. Second quarter deals with special problems of state and county administration of public welfare activities. 6 credits. Miss Vaile.

153f,w,s‡-154f,w,s‡-155f,w,s.‡ Field Training in Case Work. First year students are placed in special training centers under university instructors. 5 credits. Mrs. Doyle.

156f,w,s‡-157f,w,s‡-158f,w,s.‡ Field Training in Group Work. 2 to 6 credits per quarter to be determined by the adviser in social work. Miss Phillips.

170f. Introductory Psychiatry. (Identical with Med. 130.) A lecture course the subject-matter of which includes a discussion of: mental hygiene, mental mechanisms, psychiatric history-taking; review of schools of psychiatry; classification of mental diseases. 3 credits. Dr. Hinckley.

171w. Decriptive Neuropsychiatry. (Identical with Med. 131.) A study of the general plan of the nervous system and its functions; a consideration of some of the more common functional and nervous system diseases. 3 credits. Dr. Baker.

172s. Advanced Considerations in Psychiatry. (Identical with Med. 132.) A case discussion course designed to give the advanced student an opportunity to study and discuss cause and effect relationships in human behavior; the approach and methods of treating maladjusted individuals; society's provision for their study and care. 1 credit. Dr. Clarke.

‡ A fee of $3.50 per quarter is charged for this course.

173f. Behavior Problems. (Identical with C.W. 140.) Nature and origin of behavior difficulties in children and the relation between early behavior trends and later maladjustment. 2 credits. Miss Goodenough.
174s. Seminar in Psychiatric Social Work. 2 credits. Dr. Hinckley.
197f-198w-199s. Special Topics in Social Work. Credits arranged. Staff.

COURSES FOR GRADUATE STUDENTS ONLY

Sociology

200f-w-s. Seminar: Topics in Criminology. Mr. Vold.
201f-w-s. Seminar: Topics in Social Psychology. Mr. Kirkpatrick.
202f-w-s. Seminar: Topics in Urban Sociology. Mr. Sletto.
203f-204w-205s. Seminar in Social Theory. Staff.
206f-207w-208s. Seminar: Statistical Theory in Relation to Social Theory and Practice. Mr. Chapin.
209f-210w-211s. Seminar: The Theory of Social Evolution. Staff.
215f-216w-217s. Seminar in Rural Sociology. Mr. Nelson.
234w-s. Seminar in Juvenile Delinquency and Treatment. Mr. Monachesi.
238w-239s. Principles of Sociology. 6 credits. Mr. Monachesi.

Social Work

218f-w-s. Seminar in Family Case Work. Mrs. Fenlason.
219f-w-s. Seminar in Case Work with Children. Mrs. Shea.
220f-w-s. Seminar in Medical Social Work.
221f‡-222w‡-223s.‡ Graduate Field Training. Staff.
224f-225w-226s. Advanced Medical Social Work. 3 credits per quarter.
227f‡-228w‡-229s.‡ Advanced Field Training. Staff.
230f-w-s. Seminar in Public Welfare. Miss Vaile.
231f-w-s. Seminar in Group Work. Miss Phillips.
232f-w-s. Seminar in Rural Social Work. Miss Vaile.
233f-w-s. Seminar in Social Agencies and Social Institutions. Mrs. Doyle.

Thesis and Research Topics

235f-w-s. Thesis Preparation. Staff.
236f-w-s.* Research Topics in Social Work. Staff.
237f-w-s. Recent Research in Social Work. Mrs. Shea.

SOILS

Professors Frederick J. Alway, Clayton O. Rost; Assistant Professor Paul R. McMiller.

Prerequisites.—For major work, at least two years of work in chemistry, including both quantitative analysis and organic chemistry, and one year of work in general physics. A reading knowledge of French or German is required for the Master's degree. In certain cases where some other modern foreign language would be more valuable in connection with the thesis it may be substituted.

Master's degree.—Offered only under Plan A.

‡ A fee of $3.50 per quarter is charged for this course.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f. Chemical Analysis of Soils. A laboratory course in the chemical analysis of soils including the determination of replaceable bases. Prerequisites: Course 6 and quantitative analysis. 3 to 5 credits. Mr. Rost.

103s. Soil Erosion. Causes and types of erosion; relation of erosion to soil type; principles of control of erosion by tillage, contour cultivation, strip farming, choice of crops, and terracing; conservation of moisture and plant nutrients; relation of forest to erosion control. Lectures and field observation. Prerequisite: Course 6. 3 credits. Mr. Rost.

104s. Soil Mapping. Principles of soil mapping and classification with field practice in the preparation of soil maps. Lectures and field work. Prerequisite: Course 108. 3 credits. Mr. McMiller.

107f. Fertilizers. Development of the use of commercial fertilizers. Their sources, preparation, composition, combination, and uses. Lectures and laboratory work. Prerequisite: Course 6. 3 credits. Mr. Rost.

108w. Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. Lectures and laboratory work. Prerequisite: Course 6. 3 credits. Mr. McMiller.

COURSES PRIMARILY FOR GRADUATE STUDENTS

202f,w,s,su. Research Problems in Soils. Individual laboratory or field work upon some special problem in soil physics, soil chemistry, or soil erosion other than the student's major thesis. Arrangements must be made in advance. 2 to 5 credits. Mr. Alway, Mr. Rost.

203f,w,s. Seminar in Soils. Review of current literature; presentation and discussion of papers on research. Required of graduate students. 1 credit. Mr. Alway.

SPEECH

Professor Frank M. Rarig; Associate Professors Bryng Bryngelson, C. Lowell Lees; Assistant Professor Howard Gilkinson.

Prerequisites.—For major work, 18 quarter credits in speech, including fundamentals of speech, speech correction, phonetics, interpretative reading, and theater.

Master's degree.—Offered under both Plan A and Plan B. Under Plan B, the candidate must earn from 21 to 27 credits in graduate courses in speech and the remaining credits in related graduate courses selected, with the approval of his adviser, from English, psychology, history, foreign languages, sociology, philosophy, and child welfare.

Doctor's degree.—In consultation with his major adviser the candidate will elect three of the following areas of study: dramatics, oral interpretation of literature, rhetoric, general speech, speech pathology. The choice of a minor is subject to the approval of the major and minor advisers. A written comprehensive examination in the three phases of speech elected by the student is required for formal admission to candidacy for the Ph.D. degree.

For other requirements, see pages 19-22 of this bulletin.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101f-102w.† Persuasion. Psychology of persuasion. Experiments. Critical study of models. Written speeches. Reports. Prerequisites: Courses 1-2-3 or 5-6, Psy. 1-2, 10 credits in social science. 6 credits. Mr. Rarig.

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

105s.* Theory of Reading and Acting. The forms of literature; literature regarded as art; psychology of creative imagination; speech elements in literature; technique governing use of auditory and visual symbols. Collateral readings, speech problems, reports, term papers. Prerequisites: Courses 1-2-3 or 5-6, 81-82-83, Psy. 1-2. 3 credits. Mr. Rarig. (Offered in alternate years. Offered in 1940-41.)

107s.‡ Platform Reading. An advanced course in the oral reading of selected plays of Shakespeare. Speech melody, rhythm, platform technique. Problems in esthetic analysis. Lecture recitals. Prerequisite: Course 81-82-83 with grade of B in 83. 3 credits. Mr. Rarig.

109.* Classical Rhetoric. Prerequisites: Course 101-102, Psy. 140. 3 credits. (Offered in alternate years. Not offered in 1940-41.)

111f‡‡-112w‡‡-113s.‡‡ Stage Direction. An advanced course in the practice and theory of stage direction, including esthetics of the theater, analysis of the play, casting, centering attention, rhythm, reading, climaxes, organization for production, the unified whole. Prerequisites: Courses 91, 92, 93. 9 credits. Mr. Lees.

115f‡‡-116w‡‡-117s.‡‡ Playwriting and Production. Theory and practice of writing and producing plays. Composition of the play from the elementary scenario to the completed dialog. Prerequisites: Course 31 and permission of instructor. 3 to 9 credits. Mr. Lees.

121w‡-122s.‡ Advanced Speech Problems. Introduction to research methods in the general field. Critical survey of studies. Special projects and reports. Mr. Gilkinson.

131su.‡‡ Community Dramatics. The cultural values of community and children's theaters. Dramatic, educational, and critical literature of the field. Specimen projects, reports, term papers. Prerequisites: Courses 78-79, 111-112-113, Psy. 1-2 or permission of instructor. 3 credits. Mr. Lees.

141-142-143. Voice Science. The study of the voice mechanism and of vocal sound; methods of analysis and synthesis. The study of hearing. Experimental methods applied in individual research projects. Readings, reports, experiments. Prerequisites: Course 1-2-3, Psy. 1-2 and 4-5 or 7. 9 credits. (Not offered in 1940-41.)

151su. The Teaching of Speech. Orientation in problems of speech education. History, applications of psychology; objectives, programs, and methods; direction of extracurricular activities; evaluation of texts. 3 credits. Mr. Gilkinson.

162w‡-163s.†‡ Speech Pathology. The physiological and psychological aspects of organic and functional speech problems. Theories of stuttering. Diagnosis, case histories, and treatment of speech cases. Observation of clinical diagnosis and treatment. Prerequisites: Course 1-2-3 or 5-6, 61, 67, Psy. 1-2 and permission of instructor. 6 credits. Mr. Bryngelson.

164f-165w-166s.* Clinical Methods and Practice in Speech Pathology. Study of cases and practice in clinical diagnosis and remedial treatment. Prerequisites: Courses 61, 67, 162-163. 9 credits. Mr. Bryngelson.

171f‡‡-172w‡‡-173s.*‡‡ History of the Theater. A study and an analysis of the arts and crafts of the theater over a period of 3000 years. Special reports and projects. Prerequisites: Courses 1-2-3 or 5-6; 31, courses in dramatic literature highly recommended. 9 credits. Mr. Lees. (Offered in alternate years. Not offered in 1940-41.)

‡ A fee of $1 per quarter is charged for this course.
‡‡ A fee of $2 per quarter is charged for this course.

174f‡‡-175w‡‡-176s.*‡‡ Theater Backgrounds. A study and analysis of the play structure and content as limited and evolved through production practices. Materials to be selected from the various dramatic epics of the theater. Special reports and projects. Prerequisites: Courses 1-2-3 or 5-6, 31. 9 credits. Mr. Lees. (Offered in alternate years. Offered in 1940-41.)

181f-182w-183s. Readings in Speech. Directed reading and the preparation of reports on selected subjects. Prerequisites: Courses 1-2-3 or 5-6 and 6 additional credits, consent of instructor. Credits arranged. Mr. Rarig, Mr. Bryngelson, Mr. Lees, Mr. Gilkinson.

191f‡‡-192w‡‡-193s.‡‡. Technical Stage Problems. Advanced problems in design and construction; stage management, color effects, and wiring. Special problems assigned to individual students. Prerequisite: 111-112-113. 9 credits. Mr. Lees.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201f,w,s.* General Seminar. A survey and analysis of current literature and general problems in the field of speech. Theory and methods of research in speech education. Reports of reading and research projects by students and members of the staff. Required of all graduate majors in speech. 1 credit. Staff.

207f-208w-209s.* Seminar in Rhetoric and Persuasion. Study of English and American orators. Critical examination of the literature on rhetoric and persuasion. Methods in the study of persuasion. Prerequisites: Courses 1-2-3 or 5-6, 101-102, Psy. 1-2, 140, 10 credits in social science. 9 credits. Mr. Rarig.

211f-212w-213s.* Seminar in Dramatic Theory. An evaluation and an analysis of the critical theory of theatrical arts. A study of the major trends in drama as related to dramatic production. Prerequisites: Courses 111-112-113, 171-172-173, or 174-175-176; 9 credits in English, French, or German drama. 9 credits. Mr. Lees.

221-222-223.* Seminar in the Oral Interpretation of Literature. Problems of silent and oral reading. Theories of speech in relation to language and types of literature. Prerequisites: Courses 1-2-3 or 5-6, 81-82-83, 105, 121-122, Psy. 74. 9 credits. Mr. Rarig.

261f-262w-263s.* Seminar in Speech Pathology. A study and critical analysis of current literature in the field of speech pathology. Thesis problems. New theories and clinical procedures. Specific cases for group study. Prerequisites: Courses 1-2-3 or 5-6, 61, 67, 121-122, 162-163, Psy. 1-2. 9 credits. Mr. Bryngelson.

291f-292w-293s.* Research. Open to graduate students who are engaged in research on special problems. Credits arranged. Mr. Rarig, Mr. Bryngelson, Mr. Gilkinson, Mr. Lees.

SURGERY

(Including Divisions of General Surgery, Neurosurgery, Experimental Surgery, Orthopedic Surgery, Urology, Proctology, Anesthesiology, and Dental Surgery)

For staff and courses of study offered, see Graduate Medical Bulletin.

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

VETERINARY MEDICINE

Professor Willard L. Boyd; Associate Professor Howard C. H. Kernkamp; Assistant Professor Martin H. Roepke.

Prerequisites.—For major work, 12 credits; for minor work, 6 credits in the department.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

105f-106w. Immunological Chemistry. A study of the antigenic structure of microorganisms and the chemistry of serological reactions. Lectures, reference work, and discussions. Prerequisites: Bact. 53, Ag. Biochem. 119, or their equivalents. Mr. Roepke.

COURSES PRIMARILY FOR GRADUATE STUDENTS

205f-206w-207s-208su.§ Veterinary Pathology and Bacteriology. Advanced problems. Specially adapted to meet the needs of graduate students. Offered as major or minor work. Credits arranged. Mr. Boyd, Mr. Kernkamp.

ZOOLOGY

Professors Dwight E. Minnich, William A. Riley, Jerry E. Wodsedalek; Associate Professors Samuel Eddy, Clarence E. Mickel, Clarence P. Oliver, Adolph R. Ringoen; Assistant Professors Alexander C. Hodson, John P. Turner.

Prerequisites.—For major work, Course 1-2-3, and at least 18 credits of advanced work approved by the department; for minor work, Course 1-2-3, or the equivalent.

Master's degree.—Offered under both Plan A and Plan B.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100f‡,101w‡,102s.‡ Zoological Techniques. The content of this course is subject to the direction of the major adviser. Credits arranged, not to exceed 9.

107f‡-108w.‡ Protozoology. A survey of the Protozoa, with special reference to their structure and life histories. Lectures, laboratory, reading. 6 credits. Mr. Turner.

109f‡-110w‡-111s.‡ General Physiology of Animal Reactions. A survey of animal behavior from the physiological viewpoint including the physiology of sense organs, nervous systems, muscles, glands, etc. Lectures, laboratory, reading. 9 credits. Mr. Minnich.

112f. General Physiology of Absorption and Secretion. General and comparative physiology of absorption, distribution, and secretion of salts, fluids, and some nutrients. Lectures, reference, reports. 3 credits. Mr. Clark.

113w.‡ Laboratory Methods in General Physiology of Absorption and Secretion. Original problems assigned under supervision to capable graduate students. 3 to 5 credits. Mr. Clark.

117f‡-118w-119s‡¶ Animal Ecology. Ecology of animals with special reference to insects. Lectures, laboratory, assigned reading, and field excursion. 9 credits. Mr. Eddy, Mr. Hodson.

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

§ Prerequisite: graduation from a recognized and approved veterinary college with the degree of D.V.M. or its equivalent.

¶ Either 119s or 120s or both may be taken to complete Course 117f-118w.

120s.¶ General Ecology of Insects. General ecology with special emphasis on its application in insect control. 3 credits. Mr. Hodson.

121f.‡ Ichthyology. A study of the taxonomy and habits of the fishes of the upper Mississippi drainage. Lectures, laboratory. 3 credits. Mr. Eddy.

125f‡-126w‡-127s.‡ Advanced Entomology. Morphology and classification of insects, with lectures on the history of entomology. 9 credits. Mr. Mickel.

132w. General Physiology of Development. A general survey of physico-chemical aspects of fertilization, cleavage, differentiation, growth, and development of form. Particular emphasis is placed on the energy exchanges and chemical kinetics involved in the phenomena of organic development. Lectures and laboratory. 3 credits. (Not offered in 1940-41.)

133s. Genetics of Development. Contributions to theories on the function, time of action, and manner of action of genes, and on the nature of the gene. Lectures, assigned readings, and discussions. 3 credits. Mr. Oliver.

144w‡-145s‡-146s.‡ Animal Parasites and Parasitism. Lectures and laboratory work. Origin and biological significance of parasitism; the structure, life history, and economic relations of representative parasites. Second term devoted primarily to the relation of insects to diseases of man and animals. 9 credits. Mr. Riley.

149w‡-150s‡. Histology and Organology. Comparative study of the microscopic structure of tissues and organs. Textbook, lectures, demonstrations, and laboratory. 6 credits. Mr. Ringoen.

155w. Physiology in Relation to Physics. Application of the principles of physics to the investigation and interpretation of physiological phenomena. Lecture and demonstration. 3 credits. Mr. Schmitt.

160f‡-161w.‡ Cytology. A survey of cell structure and behavior with special reference to genetic cytology. Lectures, reading, and laboratory work. 6 credits. Mr. Wodsedalek.

170f‡-171w.‡ Advanced Genetics. General laws involved in heredity and variation, with deviations from the practical applications of the laws. Textbooks, lectures, laboratory. 6 credits. Mr. Oliver.

180f.‡ Comparative Embryology. A study of the embryological development of invertebrate and vertebrate forms, including fertilization, cleavage, formation of germ cells, parthenogenesis, polyembryony, hermaphroditism, growth, and differentiation. Attention is given to mammalian reproductive cycles, implantation, placentation, twinning and monster formation. Lectures, reference, and laboratory. 3 credits. Mr. Ringoen.

181w. Endocrines and Reproduction. Lectures and readings on the endocrines with special reference to those concerned with the physiology of reproduction. 3 credits. Mr. Ringoen.

182s. Experimental Embryology. Lectures and discussions of the more recent investigations in developmental mechanics. 3 credits. Mr. Ringoen.

197f-198w-199s.* Problems. Advanced work in some special line. 5 or more credits. Mr. Minnich, Mr. Riley, Mr. Wodsedalek, Mr. Eddy, Mr. Mickel, Mr. Oliver, Mr. Ringoen.

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

¶ Either 119s or 120s or both may be taken to complete Course 117f-118w.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-204.* Research in Entomology. Mr. Riley.
205-208,* 209-212, 265-268. See Entomology and Economic Zoology.
211-213.* Research in Ecology. Mr. Eddy.
217-219.* Research in Physiology. Mr. Minnich.
229-231.* Research in Animal Histology. Mr. Ringoen.
233-235.* Research in Embryology. Mr. Ringoen.
237-239.* Research in Animal Cytology. Mr. Wodsedalek.
241-243.* Research in Protozoology. Mr. Turner.
251-253.* Research in Animal Genetics. Mr. Oliver.
261-263.* Research in Animal Parasitology. Mr. Riley.

INDEX

The Bulletin of the University of Minnesota

Minnesota School of the Air

First Semester 1940-41

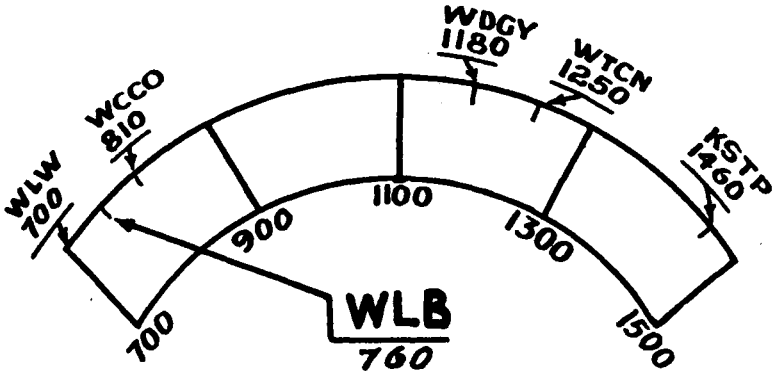
RADIO STATION WLB
760 Kilocycles—5000 Watts

Announcement

This year many Minnesota School of the Air features will be available in areas never before reached by University programs. Through the co-operation of the North Central Broadcasting System, school broadcasts will be heard over these stations at the regularly scheduled hours:

Station	Location	Frequency
KWNO	Winona	1200
KATE	Albert Lea	1420
KGDE	Fergus Falls	1200
KVOX	Moorhead-Fargo	1310
KRMC	Jamestown	1370
KDLR	Devils Lake	1210
KGCU	Bismarck-Mandan	1240
KLPM	Minot	1360
KABR	Aberdeen	1390
WDSM	Duluth-Superior	1200

In addition to the Minnesota School of the Air series, WLB, through the co-operation of the Blue Network of the National Broadcasting Company and WTCN, will bring to its listeners several NBC programs of special interest to schools. These will include the Damrosch Music Appreciation broadcasts which are scheduled on Fridays from 1:00 to 2:00, beginning October 18.



VOL. XLIII NO. 57 SEPTEMBER 4, 1940

Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minn. Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 12, 1918.

"There is not the slightest doubt in my mind that radio will become one of the most powerful constructive forces for the education of our people if we devote adequate attention to the development of truly educational programs."

JOHN W. STUDEBAKER
United States Commissioner of Education and
Chairman, Federal Radio Education Committee

Minnesota School of the Air

The Minnesota School of the Air consists of the formally organized broadcasts for classroom reception presented by WLB. Ten programs are included in this series. More than fifty thousand Minnesota students listened to these broadcasts in classrooms during each week of the past semester.

The Minnesota School of the Air is organized on a semester basis, in order to best meet the demands of elementary and high school teachers. The broadcasts run for fifteen weeks during the first semester, beginning with the week of September 23, with two weeks vacation during the Christmas season. The broadcasts will begin at 11:00 (central standard time) each morning, with the exception of Tuesday when there is no morning program, and at 2:00 each afternoon.

With a frequency of 760 kilocycles and 5,000 watts power, WLB may be heard in most of Minnesota as well as in parts of Iowa, Wisconsin, and the Dakotas. If WLB cannot be tuned in satisfactorily, one of the stations listed on the preceding page may afford better reception.

UNIVERSITY OF MINNESOTA
General Extension Division—RICHARD R. PRICE, Director
Radio Station WLB—BURTON PAULU, Manager
Minnesota School of the Air—E. W. ZIEBARTH, Program Director

Suggestions to Teachers

Conditions insuring good reception must be a part of every successful classroom listening project. Preparation for the broadcast involves several activities on the part of the teacher. She must be familiar with the objectives of the program and should know what visual aids and other supplementary materials are available in connection with each program. The attitude of the teacher is one of the most important elements in determining the effect of the broadcasts upon the children. If she makes apparent her interest in the program, if she looks forward with enthusiasm to each broadcast, it is obvious that the children will be similarly motivated. It is the aim of the organizers of the Minnesota School of the Air to provide programs which will, as far as possible, fit into the approved state courses of study, and if maximum results are to be obtained, the teacher should try to correlate other class work with the radio broadcasts.

Many teachers designate a pupil familiar with the mechanical adjustments on radio sets to act as the official class monitor, whose duty it is to tune the set from two to five minutes before the program begins. He should be warned to avoid using the tone control as a means of reducing static or interference, since turning to the bass position tends to cut out many of the frequencies which are an important part of speech and music. If there is a good deal of local interference, it may be necessary to use a shielded lead-in wire and to ground the set before it is used. If it is impossible to eliminate noise and interference, however, the radio should be turned off and the program missed, rather than listened to with a great deal of difficulty and annoyance.

Experience and careful research have demonstrated that it is preferable for students to listen in ordinary sized classes. Large groups of students in assembly rooms will probably not benefit greatly from broadcasts designed for classroom reception. All factors tending to distract the attention of the listeners should be eliminated. In most cases, visual aids, the use of maps, pictures, and writing material should be confined to the period preceding or succeeding the broadcast. Taking notes during broadcasts has been shown by researchers to be an undesirable activity, especially in the case of younger children whose note-taking is apt to be laborious and unskillful.

The suggestions of superintendents, principals, teachers, and all persons interested in education by radio are invited. Repeat broadcasts, arranged at times convenient to schools which cannot hear the programs during their regularly scheduled periods, will be arranged at the request of teachers whenever possible. Additional copies of this bulletin are available free upon request.

These programs have been prepared with the co-operation and approval of the following organizations and individuals:

State Department of Education
Radio Committee of the Minnesota Education Association
National Vocational Guidance Association
United States Office of Education
Minnesota State Medical Association
Minnesota Public Health Association
American Association of Teachers of French
American Association of Teachers of German
Minnesota Band Masters Association
Gerald R. Prescott, Director of Bands
William A. O'Brien, M.D., Professor of Preventive Medicine and Public Health
Edmund G. Williamson, Co-ordinator of Student Personnel Services
Department of French
Department of German
Miss Neith E. Headley, Instructor in Child Welfare
Institute of Child Welfare
} University of Minnesota

Old Tales and New

Monday, 11:00-11:15 a.m.—Primary Grades

The stories in this series have been chosen to appeal to the interests and imagination of pupils in the primary grades. They have been selected with the advice of Neith E. Headley, head kindergarten teacher and instructor in Child Welfare at the University of Minnesota. The starred programs will be dramatized, and the others will be narrated by Marion Latta.

September	23	*Gone Is Gone*
September	30	*The Three Pigs**
October	7	*Tooky*
October	14	*Singing Fever**
October	21	Story Poems
October	28	*A Hallowe'en Story*
November	4	*One Little Indian Boy*
November	11	*The Painted Pig**
November	18	*Nicodemus and the Houn' Dog*
November	25	*Liang and Lo**
December	2	Story Poems
December	9	*The Little Engine That Could**
December	16	*Mother Christmas**
January	6	*Ola*
January	13	*Petunia Be Keerful**

Guidance for the Future Worker

Monday, 2:00-2:15 p.m.—Junior and Senior High Schools

In this guidance program for high school students there is no attempt to give specific vocational information. The series is designed to help the student avoid the errors of haphazard job selection. Many of these programs will be dramatized, and others will be presented as interviews and round table discussions. The series is under the direction of Milton H. Hahn, co-ordinator of vocational orientation for the General College of the University of Minnesota, assisted by Harold Pepinsky, counselor and research assistant in the General College, and is prepared with the additional co-operation of the National Vocational Guidance Association, and Edmund G. Williamson, co-ordinator of student personnel services at the University of Minnesota.

September	23	Introduction
September	30	Human Abilities
October	7	Social Abilities on the Job
October	14	Scientific Ability on the Job
October	21	Use of Language on the Job
October	28	Matching Human Patterns with Job Patterns
November	4	Finding and Choosing a Vocation
November	11	Making Sure of Your Choice
November	18	Getting a Job
November	25	Working on the Job
December	2	The Job Holder and His Job
December	9	Satisfaction with Your Job
December	16	Work Hazards
January	6	Employment Opportunities for Youth
January	13	Request Program and Summary

Current Events

Tuesday, 2:00-2:15 p.m.—Grades Six to Eight

The panorama of international events is changing so quickly today that it is almost impossible for younger students to understand the development of affairs which puzzle even the most discerning adults. It is especially important during times such as these for the younger students to have an opportunity to hear objective analyses of the significant news of the week. This program will help pupils take an active interest in the news of the state, the nation, and the world, and will encourage careful evaluation of current news. Up-to-the-minute news dispatches will be included on these broadcasts when they are of sufficient interest and importance.

Your Health and You

Wednesday, 11:00-11:15 a.m.—Grades Six through Nine

This program is planned by Dr. William A. O'Brien, professor of preventive medicine and public health at the University of Minnesota. Many questions concerning the health and hygiene of students will be authoritatively answered in this series of talks. Dr. O'Brien has had many years of radio experience, and his discussions will give to the students of the Northwest health information which will be of permanent value. The program is endorsed by the Minnesota State Medical Association, and the Minnesota Public Health Association.

September	25	Health Ideas and Practices
October	2	Foods We Eat
October	9	Nutrition of Body
October	16	Weight and Health
October	23	Mind and Body
October	30	Rest and Sleep
November	6	Feet and Posture
November	13	Play—the Business of Childhood
November	20	Cleanliness and Godliness
November	27	Air and Sun
December	4	Eyes and Ears
December	11	Mouth—Gateway to Health
December	18	Fads and Fallacies
January	8	Prevention versus Cure
January	15	Community Health

German and French

Wednesday, 2:00-2:15 p.m.—High School and College

An authentic example of German and French pronunciation will be made available in these programs. The series includes readings, songs, and plays in these languages, and a limited number of the French and German texts are available at cost to schools and to adult listeners. The price of the complete set of texts for either series is only fifteen cents. These programs are prepared and presented with the co-operation of the American Association of Teachers of French, the American Association of Teachers of German, and the Departments of French and German at the University of Minnesota.

September	25	German:	Selected Lieder (music)
October	2	French:	Molière, *Le Médecin Malgré Lui* (play)
October	9	German:	Wilhelm Busch, Humorous Poem (reading)
October	16	French:	Moinaux, *Les Deux Sourds* (play)
October	23	German:	Humperdinck, *Hänsel und Gretel* (opera)
October	30	French:	Labiche and Martin, *Le Voyage de M. Perrichon* (play)

November	6	German:	Folk Songs
November	13	French:	Fifteenth Century, *La Farce du Cuvier* (play)
November	20	German:	Poems and Ballads (reading)
November	27	French:	Daudet, *La Chèvre de Monsieur Sequin* (reading)
December	4	German:	*Schneewittchen* (reading)
December	11	French:	Hugo, *Les Miserables* (dramatized reading)
December	18	German:	Schiller, *William Tell* (play)
January	8	French:	Folk Songs
January	15	German:	Thoma, *Die kleinen Verwandten* (play)

Band Clinic

Wednesday, 4:15-4:45 p.m.—All School Bands

The Band Clinic presentations, planned especially for school bands, are helpful in preparing the year's contest numbers, and are also beneficial in general band instruction and performance. As a basis for the discussions and performances, selections have been chosen from the 1941 Selective Competition List for the State and National School Music Festivals.

The broadcasts will present the Minnesota Symphonic Band in compositions for full band, chamber selections, and instrumental solo performances. During every program, comments will be given on the selections, and suggestions for interpretation will be made.

The clinics are approved by the Minnesota Bandmasters' Association and Gerald R. Prescott, director of bands at the University of Minnesota, who is a member of the Music Committee of the National School Band Association.

The selections for the broadcasts are listed below. Those marked with an asterisk (*) are published with full score. When chamber and solo selections are to be played, announcement of titles will be made several weeks in advance, thus enabling band members and directors to have the compositions by the time of the broadcast.

The programs are presented in co-operation with the Minnesota Music Project of the Work Projects Administration, and are prepared by Leland B. Sateren of the WLB staff.

Date		Composition	Composer	Class
September	25	**Prince and Pauper Overture*	Johnson	D
October	2	*"Dream Pantomime" from *Hänsel und Gretel*	Humperdinck	B
		**Crusaders Overture*	Buchtel	C
October	9	**Prelude and Fugue in B♭ Minor*	Bach	C
		**King John*	Moehlmann	D
October	16	**Onward, Ye People*	Sibelius	C
		**Coriolan Overture*	Beethoven	A

Date		Composition	Composer	Class
October	23	*Chapel Shrine Reverie*	Leoni	D
		**Transcendence Overture*	Frangkiser	B
October	30	**If Thou Be Near Me* Chamber Selection	Bach	C
November	6	*Intermezzo*	Coleridge-Taylor	C
		Rosmarin Overture	Thomas	D
November	13	**King Orry Rhapsody* Selected Contest March	Wood	A
November	20	Clarinet Demonstration and Solo *Zanthian Overture*	Desmond	D
November	27	**Adoremus Te* and *Sanctus* Chamber Selection	Palestrina	D
December	4	**Maleguena*	Lecuona	B
December	11	*Regal Overture*	Johnson	C
December	18	*Balaton Overture*	Buchtel	D
January	8	**Il Guarany Overture*	Gomez	A
January	15	**In Modo Classico* Chamber Selection	Mohaupt	C

The following selections, which are to be offered during the second semester, are listed here for your convenience. The dates will be found in the second semester bulletin.

Composition	Composer	Class
**Il Guarany Overture* Chamber Selection	Gomez	A
Lisha Overture Drum Demonstration and Solo	Holmes	D
*"Invocation of Alberich" from *The Rhinegold* Selected Contest March	Wagner	B
**Castle Ruins Overture* Trombone Demonstration and Solo	Yoder	C
**Maid of Pskov Overture*	Rimsky-Korsakow	A
*Finale from *First Symphony*	Saint-Saëns	B
**Bartered Bride* (Selection) Bass Horn Demonstration and Solo Cornet Demonstration and Solo Chamber Selection	Smetana	C
Premier Overture	Olivadoti	C
*"Dream Pantomime" from *Hänsel und Gretel* Flute Demonstration and Solo	Humperdinck	B
**Maleguena* French Horn Demonstration and Solo	Lecuona	B
**Eroïca* Chamber Selection	Skornicka	B
**Maid of Pskov Overture* Selected Contest March	Rimsky-Korsakow	A
**Coriolan Overture* Saxophone Demonstration and Solo	Beethoven	A
**Prelude and Fugue in B♭ Minor* Chamber Selection	Bach	C
The Courtier	North	C

Music Appreciation

Thursday, 11:00-11:30 a.m.—Junior and Senior High Schools

The music appreciation programs, now in their tenth consecutive year, are the oldest educational feature originated by any Minnesota radio station. The programs for this season illustrate different ways of listening to music. Since this series is complete in itself, it is recommended to schools which do not have music courses, but it may also be used to supplement organized music curricula. As in past years, a bulletin containing song texts, musical themes, program notes, and other information concerning the selections played, is available free of charge, for use by teachers and students. These programs are prepared and presented by Burton Paulu of the WLB staff.

Introduction

September 26 How Much Do You Know about Music?

Listening to Stories and Descriptions in Music

October 3 The *Invitation to the Dance*, by Carl Maria von Weber, and the *Sorcerer's Apprentice*, by Paul Dukas

October 10 The *Enigma Variations*, by Sir Edward Elgar

October 17 The *Tannhäuser Overture and Venusberg Music*, by Richard Wagner

October 24 The *Petrouchka Ballet*, by Igor Strawinsky

Listening to Themes

October 31 Popular Tunes Drawn from the Classics

November 7 The *Enigma Variations*, by Sir Edward Elgar

November 14 The *Concerto in A Minor*, by Edvard Grieg

November 21 The *Symphony in E♭*, by W. A. Mozart

Listening to Vocal Music

November 28 The Human Voice

December 5 The Most Famous of Tenors, Enrico Caruso

December 12 Art Songs

December 19 Christmas Carols

December 26 Oratorios

Listening to Instruments

January 2 The Organ

January 9 The Stringed Instruments

January 16 The String Quartet

Representative Authors

Thursday, 2:00-2:30 p.m.—Junior and Senior High School English Classes

This program provides students with an opportunity to hear dramatizations and readings from the recommended and supplementary lists provided in the State Course of Study. The majority of these programs will be presented in dramatic form, and will therefore be slightly longer than most Minnesota School of the Air broadcasts; the average time will be twenty-five minutes. The two programs marked with an asterisk (*) will be readings, all others will be dramatizations.

Date		Author	Title
September	26	T. B. Aldrich	*Marjorie Daw*
October	3	H. G. Wells	*The Door in the Wall*
October	10	R. H. Davis	*Gallegher*
October	17	M. E. W. Freeman	*Revolt of Mother*
October	24	Edgar Allan Poe	**Metzengerstein*
October	31	Edgar Allan Poe	*The Tell-Tale Heart*
November	7	Henry Van Dyke	*The Other Wise Man*
November	14	Whit Burnett	**Sherrel*
November	21	Rudyard Kipling	*Wee Willie Winkie*
November	28	Willa Cather	*Wagner Matinee*
December	5	William Shakespeare	*Julius Caesar*
December	12	Anton Chekhov	*The Boor*
December	19	O. Henry	*Gift of the Magi*
January	9	Francois Coppée	*The Violin-Maker of Cremona*
January	16	Washington Irving	*The Stout Gentleman*

Let Freedom Ring!

Friday, 11:00-11:30 a.m.—All Social Studies Classes

In these programs the student will find evidence of the courage, the struggle, and the triumph of men and women who fought to win and safeguard the civil liberties expressed in the Bill of Rights. This series was presented originally by the Educational Radio Project of the Office of Education, and John W. Studebaker, United States commissioner of education, says: "The purpose of *Let Freedom Ring!* is the promotion of a study of our civil liberties as they were formulated in the Constitution of the United States. The scripts add to the clear statements of the Constitution a background of history and drama, and a foreground of current applications, which will, we hope, arouse and maintain school and community interest in that essential spirit of democratic freedom which was written so

directly and vigorously into the Constitution of the United States by the founders of our Nation."

September	27	Bill of Rights
October	4	Trial by Jury
October	11	Freedom of Speech
October	18	Freedom of the Press
October	25	Freedom of Worship
November	1	Right of Petition
November	8	Free Assembly
November	15	Right of Suffrage
November	22	Women's and Children's Rights
November	29	Right to Patent
December	6	Right to Habeas Corpus
December	13	Right of Freedom in the Home
December	20	Right of Racial Equality
January	10	Democracy in the Past
January	17	Democracy Today

Following Congress

Friday, 2:00-2:30 p.m.—All Social Studies Classes

This prize-winning program, the script for which is being made available through the co-operation of WHA, the University of Wisconsin Radio Station, will dramatize what goes on in the legislative halls in Washington. The student will learn what his representatives and senators are doing and saying about important matters. The program, "Following Congress," dramatizes scenes from the *Congressional Record*, the official transcript of the activities of the United States Senate and House of Representatives.

During those periods when Congress may not be in session, re-enactments of discussions which were carried on in Congress many years ago on problems currently facing the country will be presented. This series is prepared by Mrs. Jennie M. Turner, of the Wisconsin State Board of Vocational and Adult Education, with the assistance of several teachers of social studies.

Since timely topics are selected, an advance listing of specific subjects is not possible. However, programs will be presented each Friday beginning September 27.

NOTE.—Other programs of interest to school and adult listeners are listed in the WLB program schedule for the fall and winter quarter. These schedules will be sent free upon request.

The Bulletin of the
UNIVERSITY *of* MINNESOTA

Military Science and Tactics
Announcement for the Year 1940-1941

Volume XLIII, Number 58 September 17, 1940

Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota. Accepted for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 12, 1918

FACULTY

Guy Stanton Ford, Ph.D., LL.D., Litt.D., L.H.D., President

Charles A. French, Lieutenant Colonel, Coast Artillery Corps, B.S. (E.E.), Professor of Military Science and Tactics

Kent Nelson, Colonel, U.S.A., Retired, M.D., Associate Professor of Military Science and Tactics

Thomas H. Maddocks, Major, Signal Corps, M.S., Associate Professor of Military Science and Tactics

Charles E. Calverley, Captain, Coast Artillery Reserve, Ph.D., Assistant Professor of Military Science and Tactics

Eugene L. Hess, First Lieutenant, Coast Artillery Reserve, B.Chem., Assistant Professor of Military Science and Tactics

William C. Rindsland, First Lieutenant, Coast Artillery Reserve, B.C.E., Assistant Professor of Military Science and Tactics

Kenneth Cruse, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics

Leslie V. Closson, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics

Carl Cihos, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics

Roger R. Roush, Sergeant, Detached Enlisted Men's List, B.S.(E.E.), Instructor in Military Science and Tactics

GENERAL INFORMATION

The Department of Military Science and Tactics is a federally subsidized and supervised part of the Reserve Officers' Training Corps. Satisfactory completion of the four-year course qualifies the enrollee for a reserve commission in the Army of the United States. The general object of the courses of instruction of the Reserve Officers' Training Corps is to qualify students for positions of leadership in time of national emergency.

Courses in all units are elective. A member of the R.O.T.C. is not in the Army of the United States and membership in the R.O.T.C. carries no legal obligation to serve in the Army or any of the armed forces either in peace or in war.

Three units are maintained:

Coast Artillery Corps (Anti-Aircraft)
Signal Corps
Medical Corps

All students electing these courses are given the instruction prescribed for the Basic and Advanced Courses, Coast Artillery Corps, Signal Corps, or Medical Corps, Reserve Officers' Training Corps, as the case may be, and are governed by the following conditions:

BASIC COURSES

The Basic Courses consist of six quarters of three hours of work per week, for which one credit per quarter is accepted towards graduation. The Signal Corps Course is open to physically qualified male students in Electrical Engineering, or those whose programs will qualify them for enrolment in the Signal Corps Advanced Course in the supply, cryptographic, or photographic specialties. (See "Signal Corps," page 5.) The Medical Corps Course is open to physically fit male students enrolled in the Medical School only. The Basic Coast Artillery Course is open to all physically qualified male students registered in the Institute of Technology and the Division of Forestry, without additional prerequisites. Students in all other colleges may register for the Basic Coast Artillery Course, provided they have had the prerequisite advanced algebra and plane trigonometry, or provided they agree to take and complete these subjects some time during their freshman year (Science, Literature, and the Arts, Math. 1, Higher Algebra, and Math. 6, Trigonometry). For those who are planning to take the Advanced Coast Artillery Course, a course in college algebra is recommended (Science, Literature, and the Arts, Math. 7, College Algebra, or Math. 8, Commerce Algebra). Foreign students are not eligible for enrolment in the Coast Artillery or Signal Corps units.

ADVANCED COURSES

The Coast Artillery and Medical Corps Advanced Courses consist of six quarters of five hours of work per week, for which a total of eighteen credits is allowed and accepted towards graduation. The Signal Corps

Advanced Course consists of four hours of classroom and laboratory work per week, for which a total of fifteen credits is allowed and accepted towards graduation. In addition, completion of certain other academic courses is required. (See "Signal Corps," page 5.) Under provisions of paragraph 45, Army Regulations 145-10, admission to the Advanced Courses is subject to recommendation of the professor of military science and tactics and the approval of the president of the University, selection being made from students who have completed the corresponding Basic Course. Selection is limited to 120 in the Coast Artillery, 25 in the Signal Corps, and 24 in the Medical Corps. No student may be selected for an Advanced Course who has not the equivalent of two years in residence at the University of Minnesota remaining before graduation.

Students enrolled in an Advanced Course receive from the Federal Government a fixed allowance per day while pursuing the course, and with the exception of those of the Medical Unit are also furnished the regulation uniform of an Army officer, which they may retain after graduation. The total government compensation received by an Advanced Course student during his two years of training amounts to approximately two hundred dollars.

Advanced Course students are required to enter into an agreement to continue in the course during their time at the University until completion of same and to attend a six weeks' summer training camp, preferably at the end of the junior year, as prescribed by the Secretary of War. All expenses incident to training camp attendance are borne by the government. The university degree will be withheld until this contract is discharged. Upon the successful completion of an Advanced Course, students are, upon the recommendation of the president of the University and the professor of military science and tactics, eligible for appointment as second lieutenants in the Officers' Reserve Corps of the Army of the United States, in the branch of service to which they are assigned.

EQUIPMENT

All instructional equipment except textbooks, and including the basic uniform, are furnished gratis. Textbooks represent the only expense to the student.

The cost of all textbooks used in the Basic Courses varies with the unit in which enrolled, but in no case exceeds five dollars per student. The cost of all textbooks used in the Advanced Courses varies likewise but in no case exceeds seven dollars. The resale of Advanced Course textbooks is not encouraged, due to constant changes in equipment, tactics, and technique.

The Coast Artillery and Signal Corps units are equipped with the latest available types of artillery weapons, fire control and position finding instruments, field radio, telephone and telegraph equipment, etc., while the small bore indoor rifle range is recognized as one of the finest in the United States.

DESCRIPTION OF COURSES

COAST ARTILLERY CORPS

Open to physically fit male students (other than foreign students) enrolled in *any* college of the University except students of Electrical Engineering.

Prerequisites.—Higher algebra, geometry, and plane trigonometry. Students who do not possess these prerequisites at the time of registration may be accepted if they agree to complete these subjects sometime during their freshman year.

Objective.—To train qualified battery officers for the direction of anti-aircraft fire.

SUBJECTS

First Year Basic Course.—Leadership; artillery subjects; Army organization; military history and policy; national defense; obligations of citizenship; military courtesy and discipline; military sanitation and first aid; map reading; rifle marksmanship.

Second Year Basic Course.—Leadership; weapons and materiel; fire control and position finding; identification of aircraft; naval targets; motor transportation.

First Year Advanced Course.—Aerial photograph reading; signal communications; leadership; position finding; conduct of fire; gunnery for seacoast and anti-aircraft artillery; orientation; rifle marksmanship; administration.

Second Year Advanced Course.—Military law; military history; leadership; field engineering; combat orders; tactics and technique of seacoast and anti-aircraft artillery; orientation.

SIGNAL CORPS

Open to physically fit male students (other than foreign students) enrolled in the Department of Electrical Engineering, or whose programs will qualify them for commission in the supply, cryptographic, or photographic specialties, as follows:

Supply: engineering; engineering and business; science; law (pretraining in arts and science).

Cryptographic: languages; chemistry.

Photographic: photography; chemical engineering; general physics (sound, to include optics and photography); sound recording methods.

NOTE.—Enrolment in the Advanced Course is limited to not less than 75 per cent combat (E.E. students with requisite of E.E. 64,65,66) and not more than 25 per cent specialists (E.E. students or others with programs approved by instructor).

Objective.—To train qualified combat communications officers, and officers for the supply, cryptographic and photographic specialties.

SUBJECTS

First Year Basic Course.—Orientation, to include the relationship of the citizen and his government and United States military history and policy; military discipline and courtesy; military sanitation and first aid; Army organization; map reading; field telephone and telegraph systems and methods of installation, operation, and maintenance; leadership.

Second Year Basic Course.—Field radio systems and equipment; radio code practice; radio procedure; table net and field radio set operation; signal communication for all arms; leadership.

First Year Advanced Course.—Administration; division organization; combat orders; situation and operations maps; signal communication tactics; message center procedure; codes and ciphers; homing pigeons; field telephone and telegraph testing, plant, and traffic; field radio installation, operation, and maintenance; aerial photograph reading; defense against chemical warfare; leadership.

Second Year Advanced Course.—Duties of the signal corps officer; military law; military history and policy; military motor transport; training management; handling of government property and funds; elementary and advanced military cryptography; common battery telephony; leadership; orientation for commission in the Officers' Reserve Corps.

MEDICAL CORPS

Open to physically fit male students enrolled in the Medical School.

Objective.—To train qualified officers of the Medical Reserve Corps.

SUBJECTS

First Year Basic Course.—Military fundamentals; leadership; map and aerial photograph reading; technical medical instruction.

Second Year Basic Course.—Combat training; military sanitation and first aid; technical medical instruction.

First Year Advanced Course.—Military preventive medicine; administration; supply and mess management; handling of government property and funds; technical medical instruction.

Second Year Advanced Course.—Military law; military hospitals; medical and surgical diseases peculiar to war; the medical service of large forces; defense against chemical warfare; technical medical instruction.

PROGRAM

COAST ARTILLERY CORPS

No.	Title	Hour	Day	Bldg.	Instructor
	Basic Courses				
1f	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	III	MWF	A	Lieut.
	2	VI	MWF	A	Rindsland
	3	VIII	MWTh	A	

No.	Title	Hour	Day	Bldg.	Instructor
2w	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	III	MWF	A	Lieut.
	2	VI	MWF	A	Rindsland
	3	IX	MWF	A	
3s	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	I	M	A	Lieut.
		V, IX	T	A	Rindsland
	2	I, V, IX	T	A	
	3	V, VII, IX	T	A	
4f	Second Year Basic Course (1 cred.; prereq., 1, 2, 3, higher algebra, and trigonometry)				
	Sec. 1	IV	MWF	A	Capt.
	2	VIII	MWTh	A	Calverley
	3	II	TThS	A	
5w	Second Year Basic Course (1 cred.; prereq., same as 4f)				
	Sec. 1	IV	MWF	A	Capt.
	2	IX	MWF	A	Calverley
	3	II	TThS	A	
6s	Second Year Basic Course (1 cred.; prereq., same as 4f)				
	Sec. 1	I	M	A	Capt.
		V, IX	T	A	Calverley
	2	I, V, IX	T	A	
	3	V, VII, IX	T	A	

Advanced Courses

151f-152w	First Year Advanced Course (3 cred. per quarter; prereq., 4, 5, 6)				
	Sec. 1	II	MTWThF	A	Lieut. Hess
	2	IV	MTWFS	A	
	3	VI	MWF	A	
		VII	MW	A	
153s	First year Advanced Course (3 cred.; prereq., 4, 5, 6)				
	Sec. 1	II	MWF	A	Lieut. Hess
		V, IX	T	A	
	2	IV	MWF	A	
		V, IX	T	A	
	3	VI	MWF	A	
		V, IX	T	A	
154f	Second Year Advanced Course (3 cred.; prereq., 151, 152, 153) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VIII-IX	W	A	Lt. Col.
	2	VIII-IX	F	A	French
		One of the three-hour sections:			
	Sec. 1	I	MWF	A	
	2	IV	MWF	A	
	3	VI	MWF	A	
155w	Second Year Advanced Course (3 cred.; prereq., 154) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VIII-IX	W	A	Lt. Col.
	2	VIII-IX	F	A	French
		One of the three-hour sections:			
	Sec. 1	III	MWF	A	
	2	IV	MWF	A	
	3	IV	TTh	A	
		II	S	A	
156s	Second Year Advanced Course (3 cred.; prereq., 155)				
	Sec. 1	I	MWF	A	Lt. Col.
		V, IX	T	A	French
	2	IV	MWF	A	
		V, IX	T	A	
	3	VI	MWF	A	
		V, IX	T	A	

NOTE.—Students may register for Courses 1 to 6 and substitute playing in the band for regular military work, with the understanding that this choice renders them ineligible for the Advanced Course. Premedical students should take First Year Basic Course outlined above; Second Year Basic Course and Advanced Courses in the Medical Unit are given in the Medical School.

SIGNAL CORPS

Basic Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	First Year Basic Course (1 cred.; prereq., registration in E.E. or by arrangement with instructor)				
	Sec. 1	III	MWF	A	Lieut.
	2	VI	MWF	A	Rindsland
	3	VIII	MWTh	A	
2w *	First Year Basic Course (1 cred.; prereq., same as 1f)	VI or ar.	MWF	321EE	Major Maddocks
3s	First Year Basic Course (1 cred.; prereq., same as 1f)	V, VII, IX	T	A	Major Maddocks
4f-5w*	Second Year Basic Course (1 cred. per qtr.; prereq., 1, 2, 3)	III	MWF	321EE	Major Maddocks
6s	Second Year Basic Course (1 cred.; prereq., 1, 2, 3)	II, V, IX	T	A	Major Maddocks

Advanced Courses

151f-152w	First Year Advanced Course (2 cred. per qtr.; prereq., 4, 5, 6 and registration in E.E. 64, 65, 66 or by arrangement with instructor)	IV	MTWF	321EE	Major Maddocks
153s	First Year Advanced Course (2 cred.; prereq., same as 151f)	III, V, VI, IX	T	A	Major Maddocks
154f*	Second Year Advanced Course (3 cred.; prereq., 151, 152, 153 and E.E. 64, 65, 66 or equiv.)	VI†	T	321EE	Major Maddocks
155w	Second Year Advanced Course (3 cred.; prereq., same as 154f)	VII	MWF	321EE	Major
		V	T	321EE	Maddocks
156s	Second Year Advanced Course (3 cred.; prereq., same as 154f)	I, V, VIII, IX	T	A	Major Maddocks

MEDICAL CORPS

Premedical students see note at bottom of page 7. Medical unit hours are arranged immediately prior to the opening of the fall quarter and posted on the bulletin boards of the Medical School.

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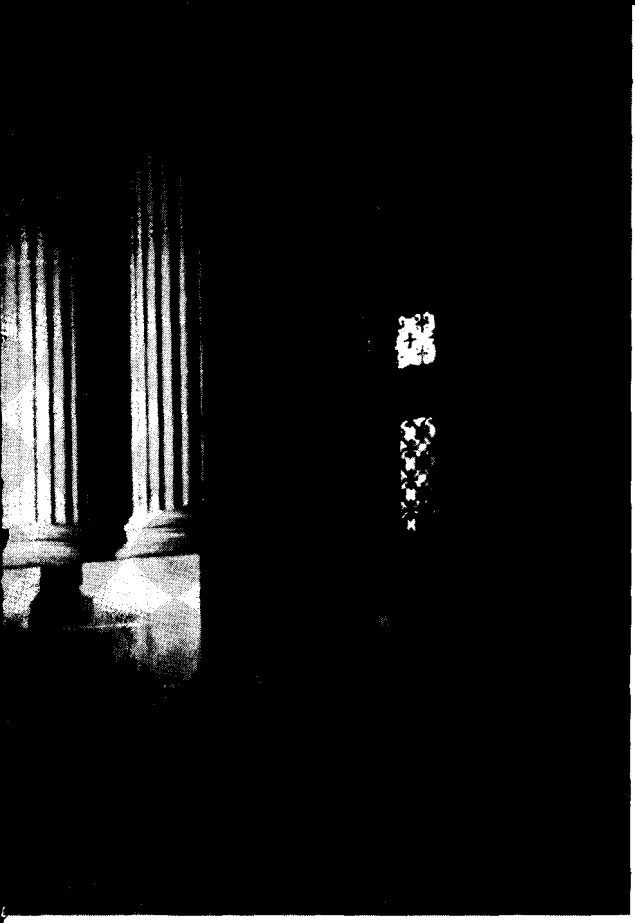
* Students must also be able to meet one of the corresponding C.A.C. unit's section schedules for the same quarter.

† Three remaining hours with corresponding C.A.C. sections.



SUMMER SESSION *Courses*

1941 PRELIMINARY ANNOUNCEMENT

THE *Bulletin* OF THE UNIVERSITY OF MINNESOTA

This is a preliminary announcement of the courses which will be offered in the 1941 Summer Session at the University of Minnesota. This announcement is subject to possible revision and change without notice. We hope that you will read this bulletin and pass it on to any of your friends who may be interested.

The complete Summer Session Bulletin will be issued in March, and copies of that bulletin or additional copies of the preliminary bulletin may be obtained by addressing the Registrar of the University of Minnesota, Minneapolis.

Vol. XLIII No. 68 December 14 1940

Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minn. Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 12, 1918.

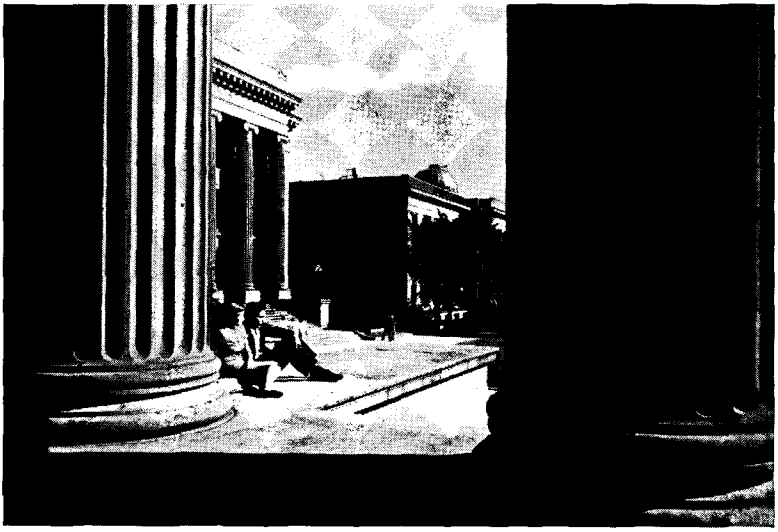
THE SUMMER SESSION FOR 1941

GENERAL INFORMATION

The University of Minnesota, located midway between the Twin Cities of Minneapolis and St. Paul, yet easily accessible to the vast outdoor playground of northern Minnesota, provides an ideal place to enjoy a profitable summer of study and healthful relaxation.

On its Main campus situated on the north bank of the Mississippi River in Minneapolis, the University places at the disposal of the Summer Session student the unexcelled facilities of a great educational institution—its libraries, laboratories, observatory, and museums—and in addition the recreational resources of its several swimming pools, golf course, and tennis courts. These factors, plus the added cultural advantages of two large metropolitan centers, combine to offer attractions for the Summer Session students that are unique with the University of Minnesota.

Courses in agriculture and home economics are given on the University Farm campus in St. Paul, three miles from the



Vista from Colonnade of Northrop Memorial Auditorium

Exterior of Library

Main campus in Minneapolis. The Farm campus offers all of the advantages of the Main campus, being connected with the latter by an intercampus trolley line which gives regular service free to students enrolled for classes on both campuses. The Como-Harriet interurban line also connects the campus with the two cities, thus making available all their advantages. The College of Agriculture, Forestry, and Home Economics has its own library, laboratories, and recreational facilities.

DATES OF THE SUMMER SESSION

The Summer Session consists of two terms. The first term, of six weeks, will begin with registration, Monday and Tuesday, June 16-17. Classes will begin Wednesday, June 18, at 8:00 a.m. The first term will close Friday, July 25. Registration and payment of fees for the second term will close at 4:00 p.m. on Monday, July 28. Classes for this term will open Monday, July 28, and the Summer Session will be brought to a close on Friday, August 29.

FACULTY

The instructional staff for the 1941 Summer Session numbers more than four hundred members, some of whom are eminent visiting professors. The University of Minnesota takes for granted the fact that the students planning to attend its classes expect to become acquainted with, and study under, the regular faculty and therefore many of its most outstanding scholars will be present to teach and to direct research.

LIBRARIES

Students in the Summer Session enjoy all of the library privileges of regular session students. The University of Minnesota Library is one of the finest college libraries in existence today. It includes over 1,140,000 volumes and many periodicals and pamphlets and in scope takes in every subject in the university curriculum. Its large, airy reading rooms provide an excellent place to study and in addition there is a separate floor with rooms for seminars and discussion groups for graduate students and faculty.

On the University Farm campus the library of the Department of Agriculture houses an outstanding collection of material on agriculture and home economics. There are also branch libraries and special collections of value to the students available in several of the schools and colleges at University Farm.

The Minneapolis Public Library, the St. Paul Public Library, the Minnesota Historical Society, and the James Jerome Hill Memorial Library of St. Paul, also are within convenient distance of either campus by street car, bus, or automobile.

The Library Handbook, copies of which may be had gratis upon application at the library, contains all necessary information regarding library hours, rules, and other matters essential to the profitable use of the library.

Biological-Medical Room, Main Library

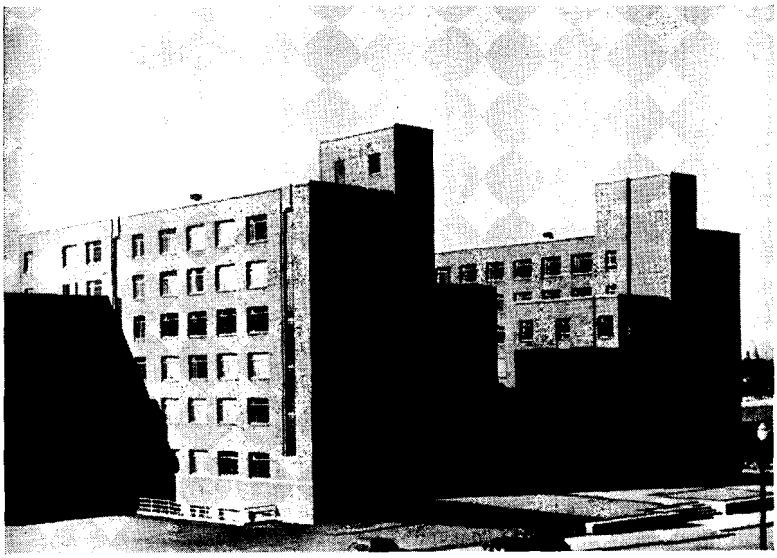
LIVING QUARTERS

Ada Comstock Hall.—Excellent living accommodations are provided in Ada Comstock Hall, a residence hall for women opened in September, 1940. The building, which is modern in every way, faces the Mississippi River and is adjacent to the new Coffman Memorial Union. It accommodates 274 students. The individual rooms as well as the various lounges and dining rooms are most attractive and convenient.

The rates during the Summer Session are *with* board in the first term and *without* board in the second term, and are as follows, payable at the time of registration:

	First Term (with board)	Second Term (without board)
Double or single room	$60.00	$20.00

Reservations should be made as far in advance as possible. Applications, accompanied by a deposit of $2, should be sent direct to Ada Comstock Hall, University of Minnesota. No application will be recorded until a deposit fee of $2 is received. Checks should be made payable to the University of Minnesota. This deposit will hold the room until the day after the opening of the Summer Session and is refunded when the regular charge is paid.



Ada Comstock Hall

Department of Agriculture dormitories.—Women taking regular work during the first term of the Summer Session, either on the Minneapolis or on the University Farm campus, may obtain rooms in the Department of Agriculture dormitories. There is convenient street car service to the Main campus. The dormitories contain a few single rooms; other rooms are intended to accommodate two persons. Necessary bedding and hand towels are furnished.

The rates during the summer are as follows: single rooms, $2.50 per week; other rooms, $2.25 per week per occupant.

Applications for rooms, accompanied by a $2 deposit, should be made to the office of the superintendent, School of Agriculture, University Farm, St. Paul.

Assignment of rooms will be made at the time of registration in the University Farm College Girls' Dormitory. Fee statements may be obtained in Room 205, Administration Building, University Farm, and payment for the first term of the Summer Session must be made to the cashier, at the time of assignment. Dormitories will be open Monday, June 16. They will not be available during the second term.

A cafeteria with reasonable charges is maintained on the University Farm campus.

For those women who prefer living off the campus there are numerous private residences and sorority houses adjacent to the University.

Pioneer Hall.—Men will find attractive quarters in this modern dormitory, located on the East River Drive, overlooking

Courtyard of Pioneer Hall

the Mississippi River, one block east of the medical buildings. The building, quadrangular in form, is divided into sixteen houses, each having a separate entrance. Approximately thirty-two students are accommodated in each house. Most of the rooms are arranged in three-room suites for two students altho a few single and double rooms are provided.

Pioneer Hall will be open for room but not for board during the Summer Session.

The following rates for Pioneer Hall are for *room only:*

	First Term	Second Term
Fourth floor rooms	$15.00	$12.50
Double rooms, per man	20.00	16.50
Single rooms	22.50	18.50
Three-room suites for two men, per man	25.00	21.00

Students interested in residence in the hall should write to the director of Pioneer Hall, University of Minnesota, for a copy of the special bulletin and an application form. A $2 deposit fee must accompany applications. Assignments will be made in the order of application.

Again, those men who prefer living off the campus will be able to find numerous private residences and fraternity houses available in the immediate vicinity of the University.

The Start of a Summer Session Excursion

SUMMER RECREATION

The University of Minnesota is ideally situated for a program of healthful recreation. A definite program is planned each year to give the Summer Session student a maximum of recreational activity for a minimum of expense. As previously stated, the Twin Cities, with their parks, lakes, art and music centers, libraries, and museums, offer many fine attractions for the summer visitor.

As a gateway to the countless resorts on Minnesota's famed 10,000 lakes, the Twin Cities also provide an advantage for the summer visitor seldom found anywhere else. Many students will find it convenient and pleasant to spend week ends at some of these resorts and centers for recreation.

Included in the recreational program are regularly arranged informal social evenings in the new Coffman Memorial Union where students are given the opportunity of becoming better acquainted with each other and with members of the faculty. A regular series of these programs, including dancing and other entertainment, is planned for the session.

A number of excursions to points of historical, industrial, educational, or purely recreational interest in the vicinity of the Twin Cities also are made each summer. These tours are usually arranged for Mondays, Fridays, and Saturdays, with the cost only the necessary street car or bus fare.

Clubhouse, Recreation Field

The physical education plant at the University of Minnesota is one of the finest in the United States. Its facilities for healthful exercise are many and varied. These may be summarized briefly as follows: Recreation Field, an eighteen-hole golf course; three gymnasiums containing five swimming pools—Cooke Hall (the athletic building for men), the Women's Gymnasium, and the Farm Gymnasium; Northrop Field, which contains facilities for baseball, track, diamond ball; 25 tennis courts, and space for other sports, such as badminton, horseshoes, handball, squash, table tennis, and archery.

A program of tennis and golf tournaments as well as other competitive sports is arranged each summer.* In addition, the swimming pools with attendants and instructors in charge are available for men at all times, and at scheduled times for women. All of these facilities are available for both men and women and most of them with no extra charge except for towel service.

Tennis and golf tickets.—Tennis tickets will be issued to regularly enrolled students of the Summer Session, upon payment of a fee of $1 and presentation of the bursar's receipt for fees. Such tickets entitle the holder to 15 sessions of play. Without tickets, a charge of 25 cents per session of play is made for the use of the tennis courts. Golf tickets are issued in the same manner without charge, but a greens fee of 50

* A daily sports hour is arranged at the Women's Gymnasium for the enjoyment of women students; activities such as aerial darts, badminton, and table tennis will be available.

Scene from "Romeo and Juliet"

cents is charged for a single round, or ten rounds for $4.50. Before 10:30 a.m., except Sunday, and after 5:00 p.m. the charge will be 35 cents per round. Application should be made at the golf course clubhouse.

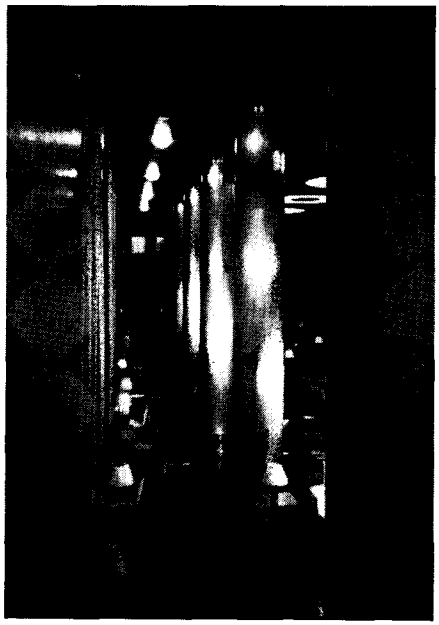
SPECIAL FEATURES

One of the principal features of the Summer Session program is the series of weekly convocation addresses by speakers of more than usual prominence. Scientists, literary figures, artists, observers of national and international affairs are among those who visit the campus to address the Summer Session audiences. In addition, an almost daily series of lectures by faculty members and invited guests adds to this feature of the program.

Each week those who enjoy good music will find opportunity to hear a musical program or a lecture-recital in the concert hall of the Music Building or in Northrop Memorial Auditorium. These programs are free to students.

Performances of legitimate drama also have become an outstanding feature of the Summer Session. The University Theatre, a university dramatic student organization, functions throughout the summer and demonstrates the success attainable with student actors. For these offerings the very best of stage equipment and facilities is provided.

Another feature which has proved increasingly popular is the Newsreel Theater, under direction of the Visual Education Department of the University. Motion pictures of current events, travel pictures, and educational films of various kinds form the subject matter of the theater. Its weekly showings have been well attended in the past.



Union Lounge

STUDENTS' HEALTH SERVICE

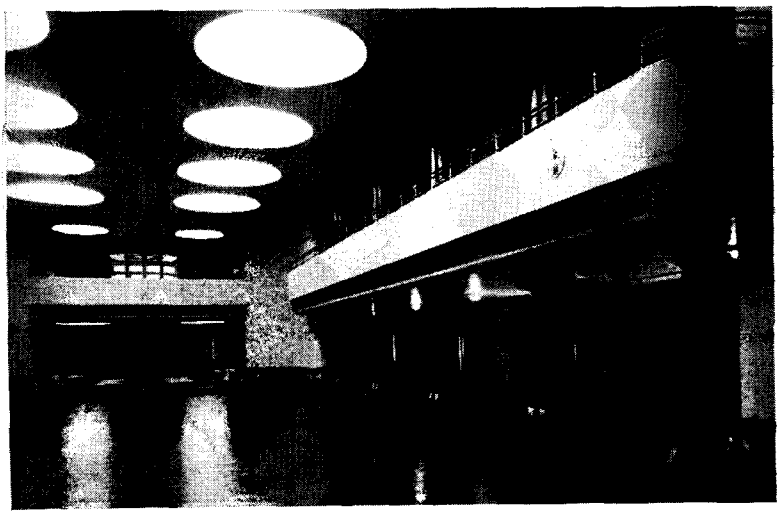
The Students' Health Service conducts a dispensary during the Summer Session on the same basis as any other quar-

ter of the year, the same staff of physicians, dentists, and nurses being on duty. This dispensary maintains, exclusively for students, clinics in medicine, surgery, dermatology, ophthalmology, otolaryngology, and dentistry. Hospitalization, whenever necessary for students, is provided in the "private patient" section of the University of Minnesota Hospitals. Home calls are not made during the Summer Session.

COFFMAN MEMORIAL UNION

The Coffman Memorial Union building houses the student union organization. It is designed to furnish facilities to both men and women for a great many activities not only campus-wide, but state-wide, in their scope and importance. From the student viewpoint, the Union undertakes to perform four distinct tasks: (1) to provide social facilities; (2) to provide a cultural setting and program; (3) to provide recreational and extra-curricular activities; and (4) to provide suitable and adequate dining facilities and services.

The building is well equipped to provide these opportunities for Summer Session students. The spacious terrace which dominates the central court of the building and looks out over the Mississippi River offers a pleasant setting for informal social and recreational experiences. Popular recreational centers are the bowling alleys, the billiard room, and the game room. In the building are a bookstore, the University Post Office, a Fine Arts Room, and many conference rooms.



Union Ballroom

Union program.—A program of social, recreational, and cultural events will be scheduled for the Summer Session by the Union Program Consultants. Among these will be music hours, the music lending library, dancing classes, community sings, bowling and billiard classes and tournaments, and many other similar activities. These are open to all Summer Session students.

Dining facilities.—The Union also provides many interesting dining facilities. The spacious cafeteria seats 632 and the fountain grill seats 150 in booths and at tables; the luncheonette features speed of service; the lovely restaurant accommodates 175. In addition to the above, 12 private dining rooms, including a small ballroom, are available for luncheon and dinner groups.

The cafeteria, the luncheonette, and the fountain grill will all be open during the Summer Session, and you are cordially invited to make the fullest possible use of their facilities.

ADMISSION AND REGISTRATION

ADMISSION

The courses of the Summer Session are open to all qualified high school graduates. Persons of maturity whose preparation does not meet the entrance requirements, may be admitted as unclassed students on approval of the dean of the college or school concerned. Those who desire college credit for their work, and those who desire advanced standing for college work done elsewhere, should submit their credentials, consisting of official transcripts of their high school, normal school, or college work.

Students should consult the statements in the respective college bulletins of the University of Minnesota for detailed information concerning admission to a given college. General information may be found in the General Information Bulletin. Any of these bulletins may be obtained by calling upon or writing to the registrar, University of Minnesota, Minneapolis.

Courses to be given during the 1941 Summer Session are listed on pages 31 to 61.

REGISTRATION

In order that the short terms may prove of maximum value, and that the work of the courses may not be interfered with by late entrants, students are urged to complete their registration, including payment of fees, on the days set aside for registration.

The regular registration days are:

For the first term,	Monday, June 16, 8:30 a.m. to 4:00 p.m.
and	Tuesday, June 17, 8:30 a.m. to 4:00 p.m.
For the second term,	Monday, July 28, 8:30 a.m. to 4:00 p.m.

Late registration fees are charged for the first term as follows for registration or payment of fees on:

Wednesday, June 18	$2.00
Thursday, June 19	3.00
Friday, June 20	4.00
Monday, June 23	5.00

No registrations are allowed for the first term after Monday, June 23, without the special permission of the dean of the school or college concerned, and the payment of the late registration fee of $5.

The late fees for the second term are as follows for registration or payment of fees on:

Tuesday, July 29	$2.00
Wednesday, July 30	3.00
Thursday, July 31	4.00
Friday, August 1	5.00

No registrations will be accepted for the second term later than Friday, August 1, without the special permission of the dean of the school or college concerned, and the payment of the late registration fee of $5.

No provision is made for allowing exemption from the late registration fees to those who are unable to reach the University during the regular registration days.

The University of Minnesota reserves the right to cancel any and all courses in which the registration is insufficient to warrent continuation of the course.

Candidates for admission to all colleges except the College of Agriculture, Forestry, and Home Economics will register in the Armory. Candidates for admission to the College of Agriculture, Forestry, and Home Economics will register at University Farm, 205 Administration Building.

CHANGES IN REGISTRATION

After a student's registration has been accepted by the registrar any change must be approved by the Students' Work Committee or the dean of the college in which the student is registered. *Only in exceptional cases will any change be made after classes have begun.*

FEES

The following fees are payable each term by each full-time student at the time of registration and must be paid before registration is complete:

Tuition fee (per term)	$25.80
Incidental fee‡ (per term)	4.20
Total fee (per term)	$30.00
Part time (4 credits or less) (per term)	$15.80
Incidental fee‡ (per term)	4.20
Total fee (per term)	$20.00
General deposit	$ 2.00

In addition certain courses carry a fee as indicated in the description of those courses, in the regular bulletin.

Graduate students who have completed all their graduate work with the exception of their theses will be allowed to register in the Summer Session for *thesis work only* upon the payment of $5 tuition and $2 deposit.

Charges for lockers, laboratory breakage, library fines, etc., will be deducted from the $2 deposit and the balance will be refunded by mail after the close of the term.

AUDITORS

Fees for auditors are the same as for students registered for credit. Permission to attend classes as auditors may be granted by the dean of the college or school with the consent of the department concerned. The procedure for registration as auditor is the same as for registration for credit, except that "auditor" should be indicated on both registration sheet and class card. It is expected that auditors will be registered in at least one course for credit, but this regulation may be waived in exceptional cases.

CREDIT

Credit is administered on the following basis: One quarter credit usually requires not less than 10 lecture or recitation periods (2 per week for a summer term) requiring two hours of preparation each or not less than 20 periods of laboratory work requiring one-half hour of preparation each; or not less than 30 hours of laboratory work with no preparation. Courses carrying two or more units of credit require corresponding multiples of these amounts.

‡ An incidental fee of $4.20 per term is charged each student for which the student receives the privileges of the Coffman Memorial Union, the Health Service, the *Summer Session Daily* including the Official Daily Bulletin, and the university post-office service.

AMOUNT OF WORK

A maximum of 9 credits or two 5-credit courses is considered a full program for either term. Registration for a greater number requires special permission from the Students' Work Committee or the dean of the school or college in which the student is registered.

Examinations are held at the last scheduled class hour for each course.

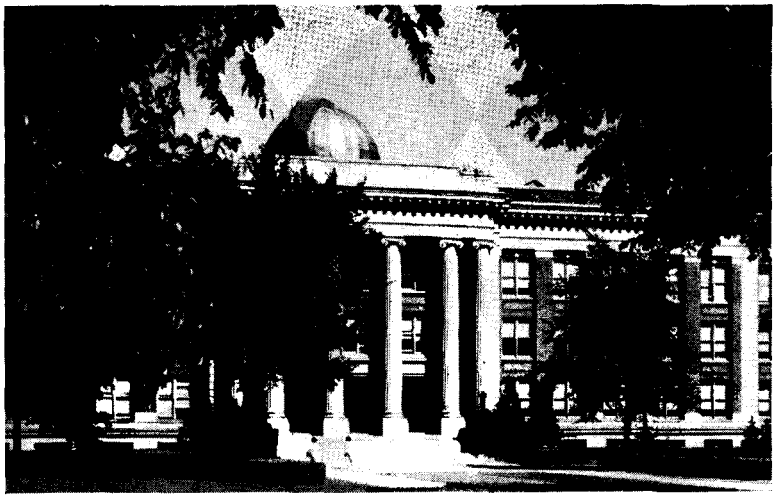
Courses of Study

More than 750 courses covering a wide range of subjects will be offered during the two terms of the 1941 Summer Session. In a number of fields new courses are being prepared, more detailed announcements of which will be given in the regular Summer Session Bulletin.

GRADUATE SCHOOL

The Graduate School of the University of Minnesota presents unusual opportunities for research in all the fields in which the school is concerned. The University's libraries, laboratories, and clinics, supplemented by the libraries, hospitals, and other centers in the Twin Cities, offer facilities for the graduate worker seldom found under ordinary conditions.

In itself the Graduate School combines in a single organization all the activities of the schools and colleges of the Uni-



Physics Building

versity in so far as they relate to advanced instruction offered for the second or higher degrees, namely master of arts, master of science, electrical engineer, mechanical engineer, civil engineer, chemical engineer, and doctor of philosophy.

The privileges of this school are in general open to all who have received Bachelor's degrees from accredited colleges and universities, based on courses substantially equivalent to those at this University.

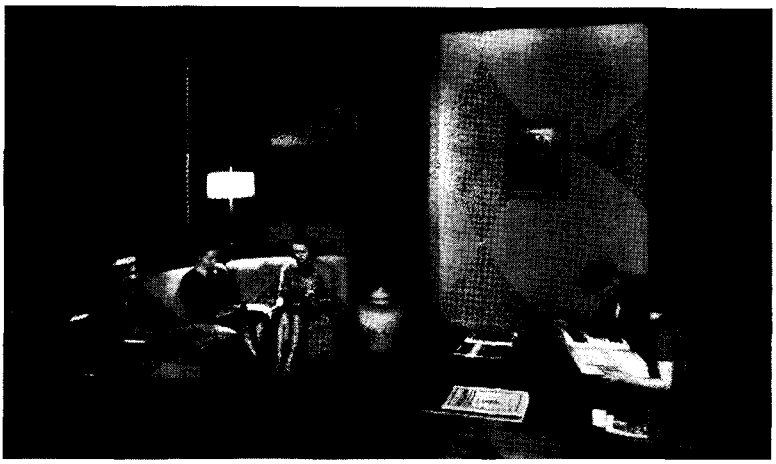
Students must make application for admission to the Graduate School at least two weeks before the opening of the Summer Session which they expect to attend, in order to avoid delay and possible penalty for late registration. All applications for admission, except for graduates of the University of Minnesota, must be accompanied by an *official transcript* in duplicate of all undergraduate work, including degrees earned, and by a single official transcript of all graduate work completed. In certain departments, such as those conducting clinical or laboratory work, it will be necessary for students to check individually with the head of the department concerned as well as with the Graduate School office before their application for admission may be approved. In any case, admission to the Graduate School does not necessarily imply admission to a given major department, and students, therefore, before their arrival at the University, should secure from the chairmen of their major departments assurance that they are adequately prepared and will be accepted as majors in their chosen field.

A more detailed statement of the requirements and work in the Graduate School will be found in the regular Summer Session Bulletin and the Bulletin of the Graduate School, copies of which may be obtained by writing to the registrar, University of Minnesota, Minneapolis, Minnesota.

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

The College of Science, Literature, and the Arts offers a wide range of selection to the Summer Session student. Courses have been selected from the regular curriculum with especial attention to the needs and interests of the college and for preprofessional students.

The Department of English will offer next summer a particularly attractive program. In addition to members of the department, three distinguished visiting professors will be in residence, Professor William Henry Irving and Professor Newman I. White, both of Duke University, and James Gray, novelist and journalist.



Fine Arts Room, Northrop Auditorium

The course of study in the College of Science, Literature, and the Arts leads to the degree of bachelor of arts.

For general information regarding requirements for admission as regular or unclassed students, for general rules and regulations, and for the requirements for degrees in the different curricula offered by the college, students should consult one of the administrative officers or the complete Bulletin of the College of Science, Literature, and the Arts, copies of which may be obtained by writing to the registrar, University of Minnesota, Minneapolis, Minnesota.

THE CREATIVE ARTS

The University offers a rich and varied program of courses in many different fields of the creative arts. Depending on the particular interests of the student, practical or theoretical work may be taken in the several departments specializing in those problems.

Courses in architectural design and construction and in practical drawing and painting may be had in the School of Architecture.

The Department of Art Education offers courses in design and studio practice, with particular emphasis on the development of individual abilities and teaching skills.

Introductory courses in art appreciation and also more specialized work in the history and criticism of art are offered by the Department of Fine Arts, with a view toward integrating the creative arts with the student's general cultural and historical background.

In the Division of Home Economics, courses in related art are planned to integrate art with home economics training, and to develop discriminating taste in connection with the home and family life.

Practical skill in drawing and representation, particularly in technical and scientific work, may be developed in a number of courses offered by the Department of Drawing and Descriptive Geometry.

The University Gallery offers a number of important exhibits during the Summer Session, and its extensive reference and pictorial material will be available for individual and class use.

INSTITUTE OF TECHNOLOGY

The Institute of Technology, established in 1935, embraces the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy. For the Summer Session student interested in these fields the resources of its laboratories and the services of some of its ablest faculty members will be available.

Included in the curriculum of the College of Engineering and Architecture will be courses in aeronautics, architecture and the fine arts, civil engineering, drawing and descriptive geometry, geology, mathematics and mechanics, and mechanical engineering. In the School of Chemistry, inorganic chemistry, analytical chemistry, organic chemistry, physical chemistry, and chemical engineering will be offered again this summer. Sufficient graduate courses in chemistry are now offered in the Summer Session so that students may acquire a Master's degree in this field by attending in the summer only. Students entering the Institute of Technology with a deficiency in solid geometry (Drawing 10) have an opportunity to remove this deficiency during either term of the Summer Session preceding their entrance into the University in the fall.

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

Agriculture offers a limited number of courses to college undergraduates interested in this field and a larger number of courses from most of the agricultural divisions for graduate students. For high school teachers of agriculture special agricultural courses are arranged which are supplementary to the courses offered by the Department of Agricultural Education (see College of Education).

The offerings in home economics are designed primarily for advanced undergraduate students and qualified graduate students. The courses listed represent the fields of foods and nutrition, related art, personal and family relationships, textiles and clothing, consumer problems, shelter problems, and home economics education. The results of recent studies and investigations and methods of attack on selected problems in each field will be discussed.

Graduate study.—Opportunity is offered in many divisions of agriculture for graduate study either for the first six-week term of the Summer Session or for the entire session of eleven weeks. In some divisions both courses and thesis work may be carried for the entire session. In other divisions thesis or course work only may be pursued through the Summer Session. Information concerning graduate work during the summer in any division may be obtained from the head of the division. Thesis and problem work is correlated in most divisions with the work in the Experiment Station, and the facilities offered during the summer are in most divisions especially attractive because of the field work possible only at that time.

Students intending to register for any phase of the graduate work and who expect to obtain credit in the Graduate School should make arrangements through the proper committees and with the dean of the Graduate School.

BIOLOGICAL STATION OF THE UNIVERSITY OF MINNESOTA

During the second term of the Summer Session an excellent opportunity for the study of terrestrial and fresh-water biology in its most fundamental aspects is presented by the Biological Station of the University of Minnesota, located in Itasca Park.

Conducted co-operatively by various departments in the College of Agriculture, Forestry, and Home Economics and the College of Science, Literature, and the Arts, classes at the station will be held beginning July 28, ending August 29.

Courses are designed to provide opportunity for instruction and research and to train scientific investigators in biology. An excellent opportunity for study of the rich flora and fauna found in the midwestern and Lake States region is afforded at the station.

Elementary courses in field botany, field entomology, wildlife conservation, field mycology, etc., of special interest to high school teachers and others interested in conservation and the teaching of conservation, are available.

Field trips and indoor laboratory work are given on alternate days. In the field the student visits typical habitats and gathers specimens for laboratory study, supplemented by informal lectures by instructors in charge of each tour. The same scholastic standards are maintained at the station as on the campus of the University of Minnesota and college credit is given for work satisfactorily accomplished.

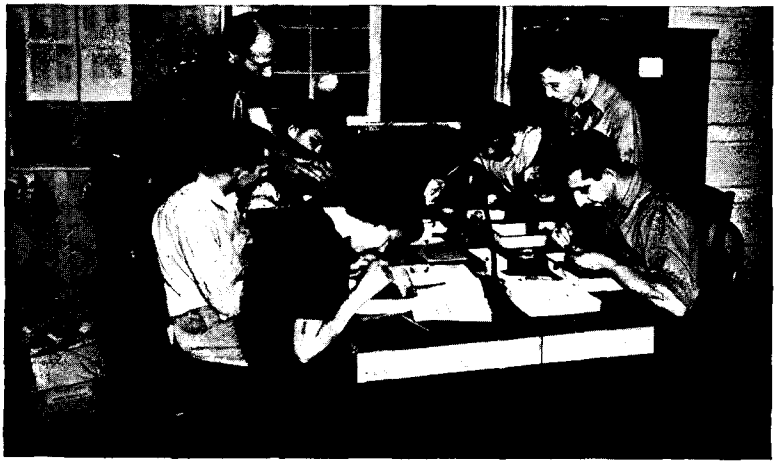
Fees and expenses.—Registrations will be accepted during June and July but not later than July 28. The following fees are payable by each registrant on or before July 28 and must be paid before registration is completed:

Tuition fee	$25.80
Health fee	1.00
Total tuition fee	$26.80
General deposit fee	2.00
Equipment fee	10.00
Total fees for the term	$38.80

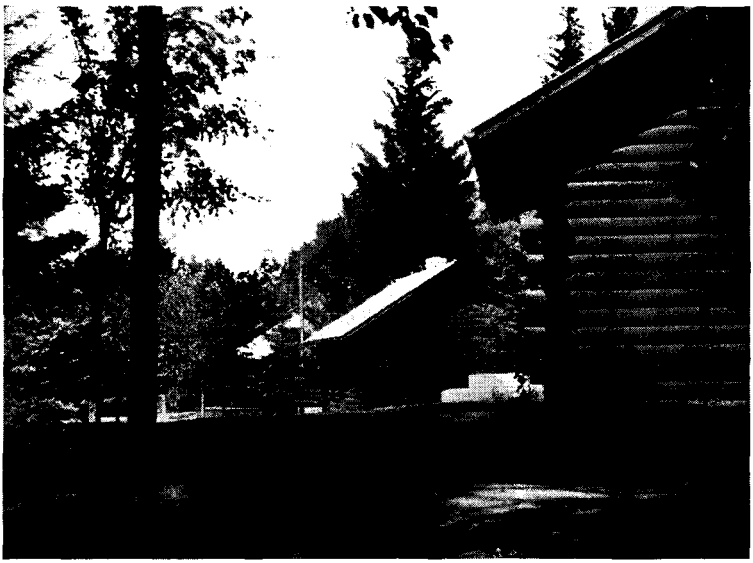
In addition it is estimated on the basis of the experience of other groups of students that the cost of board will not exceed a total of $30 for the five weeks.

Charges for lockers, laboratory breakage, library fines, etc., will be deducted from the $2 deposit and the balance will be refunded by mail after the close of the term.

Equipment fees include the use of microscopes, nets, boats, various class supplies, and accessories.



Laboratory Class in Limnology, Biological Station, Itasca Park



Women's Dormitories, Biological Station, Itasca Park

The estimated cost of $68.80 for the five-week session does not include traveling expenses, clothing, laundry, and minor incidental personal expenses.

Admission.—The courses in the Biological Station are open to all qualified graduate and undergraduate students who have had the usual preliminary courses in biological subjects, as well as to qualified high school graduates. Certain courses are especially designed for the teachers of biological subjects in colleges, high schools, and public schools and others interested in plant and animal life. Graduate registrations must be approved by the major department and these submitted to the Graduate School for final approval.

For the 1941 session not more than one hundred (100) applicants can be admitted, and the priority of registration will govern admission.

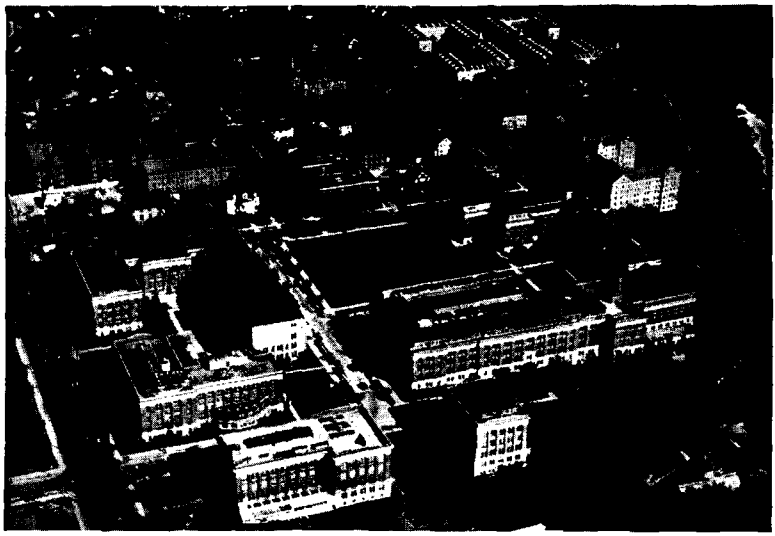
For further information write to the director of the Biological Station, University Farm, St. Paul, Minnesota, or to the registrar of the University of Minnesota, Minneapolis, Minnesota, for special folder describing the Biological Station.

MEDICAL SCHOOL

The University of Minnesota Medical School is known as one of the leading centers for medical instruction and training in the United States. Because of its affiliation with the Mayo

Foundation and because of its location in the Twin Cities, one of the principal medical centers of the Northwest, the University of Minnesota Medical School offers opportunities for the Summer Session student that are seldom found in any other place.

In the 1941 Summer Session the Department of Preventive Medicine and Public Health will offer a broad program of study for professional personnel at both the undergraduate and graduate level extending through both terms of the Summer Session. Courses will be available for public health nurses and for physicians or other graduate personnel who are studying toward a special professional degree or certificate in public health work. The basic courses for public health nurses will again be divided between the two summer terms but with a reversal of the order so that those courses offered last year in the second term will be available this year in the first term and vice versa. A special attempt will be made to bring an outside lecturer for each of the summer terms. If possible, a special course will be offered for school nurses and school teachers covering the health problems of the school and the co-ordination of the health service with the teaching of health. A special course in sight-saving will be offered under an arrangement with the National Society for the Prevention of Blindness.



Air View of Medical Group, Minneapolis Campus

Three principal courses are offered in the Medical School: one for physicians, one for nurses, and one for medical technologists. The medical course proper leads to the degree of doctor of medicine, while the School of Nursing offers a course leading to the degrees of bachelor of science and graduate in nursing. The course for medical technologists leads to the degree of bachelor of science. Courses in all of these fields are offered during the Summer Session. For more detailed information regarding fees, courses, etc., consult the regular Summer Session Bulletin.

SCHOOL OF DENTISTRY

Courses in the School of Dentistry are offered during the first and second terms of the Summer Session. For complete detailed information regarding the work offered and fees charged see the regular Summer Session Bulletin.

COLLEGE OF EDUCATION

Service to teachers and to other educational workers is the first consideration of the College of Education in planning the summer program. For the 1941 Summer Session the offering is wide and varied. Nearly all of the regular staff members will be in residence, and several visiting lecturers will offer additional courses for both graduate and undergraduate students. Adequate provision has been made in both terms for advisory work with graduate students.

Many public and private school staff members wish to work in the Summer Session on particular problems of importance to their own schools. Such individual work, with competent assistance, will be available through registration in problems courses listed in the main areas of education. The Curriculum Laboratory will serve as a workshop in both sessions for people concerned with problems of curricular reorganization. All staff members will schedule office hours for individual conferences.

In the elementary field an exceptional offering will be provided for teachers, supervisors, and administrators, with visiting instructors supplementing the work of the regular staff. The core of courses required for the elementary education major will be given in both summer terms. A special work shop for elementary teachers has been planned for the Tuttle Demonstration Elementary School.

High school teachers and administrators, also, will find an expanded offering for the 1941 session. Advanced courses

Burton Hall

will provide discussions of current problems of the junior and senior high school, as well as consideration of materials and methods of teaching in the fields of science, mathematics, English, and social studies.

Among the courses last year which were of particular value to elementary and secondary school teachers were Visual Education and Radio in Education. These courses will be given again in the 1941 Summer Session.

The College of Education is aware of the desire of both teachers and administrators for observation of actual school processes. Many courses will provide for discussion of school problems based on observation in the Institute of Child Welfare, the Tuttle Demonstration Elementary School in Minneapolis, and the University High School.

The summer offering in school administration at the University of Minnesota is always strong. The regular staff and several visiting instructors will provide the courses desired by the principals and superintendents of the state. Special provision has been made for advisory work on graduate research studies in this field.

For many years there has been a demand for extended offerings in philosophy and history of education and in the social problems of education. Dr. Theodore Brameld will offer courses in the social problems and philosophy of educa-

Demonstration Class, Tuttle Elementary Demonstration School

tion, and history of education courses will provide background for the consideration of modern educational problems.

In guidance and personnel work, emphasis will be placed on organization problems, individual diagnosis, group guidance, and clinical practice. Courses in personnel work will be offered in both terms of the Summer Session.

Last summer courses were initiated in the field of education for distributive occupations. This work, jointly planned by the School of Business Administration, the State Department of Education, and the College of Education, will be repeated in the first term of the Summer Session this year. These courses will be of value to teachers, co-ordinators, and supervisors of distributive occupations classes and programs established in the public schools under the provisions of the George-Deen Act for the further extension of vocational education. Related courses will be offered in the School of Business Administration.

A strong offering in educational psychology has been planned to meet the needs of teachers for better understanding of their students. Courses will be given in the application and evaluation of test materials, personality development, problems of learning, individual differences, and the psychology of elementary school subjects.

The Home Economics Education courses are so planned as to provide for student participation in setting up problems upon which the discussions and reports are based. Capable leadership is provided. It is expected that the experience will orient the student to present problems of the home economics

teacher and suggest methods of attack. Special courses are offered for those interested in adult education.

An expanded program has been arranged for the first term in physical education and agricultural education, and for both terms in art education, music education, and industrial education. Five-year programs leading to the master of education (M.Ed.) degree have been approved in art education, industrial education, music education, and physical education. The work for these degrees is administered by the College of Education, and the offerings in the 1941 Summer Session will make it possible for many teachers in these fields to study for advanced professional degrees.

CENTER FOR CONTINUATION STUDY

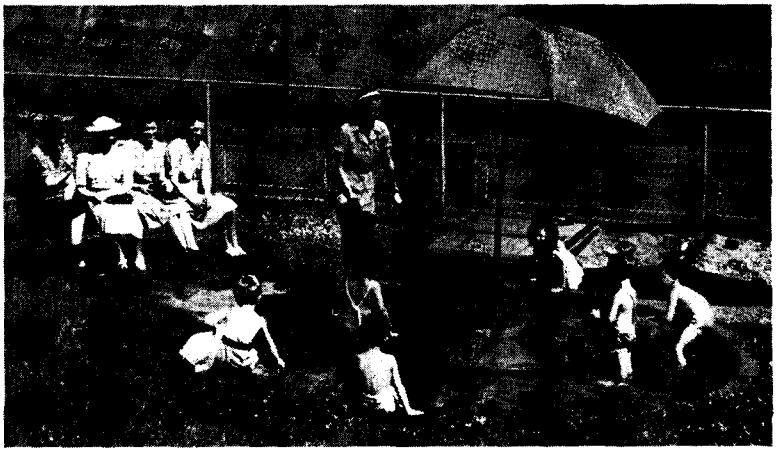
A number of special short-period institutes have been arranged for the 1941 Summer Session. These institutes will be noncredit conferences arranged for those who cannot attend the regular Summer Session. Further information may be secured from Mr. Julius M. Nolte, director of the Center for Continuation Study.

PHYSICAL EDUCATION FOR WOMEN

The Department of Physical Education for Women offers courses which carry credit toward:

1. A master of education degree. The entire curriculum of forty-five credits may be taken in summer sessions. A necessary prerequisite is the equivalent of an undergraduate major.
2. A major in physical education. Courses essential to the four-year major which leads to the degree of bachelor of science are offered in both terms of the Summer Session.

Archery Tournament, Farm Campus



Observation Class in the Nursery School, Institute of Child Welfare

3. A minor in physical education. The State Department of Education may shortly require a minor in physical education to replace the present nine-credit endorsement for part-time teachers of physical education. Courses leading to the minor are offered in both terms of the Summer Session.

4. A nine-quarter-credit state teaching endorsement. It is possible to meet this endorsement entirely in the first term.

The University of Minnesota has featured flexibility of graduate work in relation to individual professional interests and needs. Work leading to the degree of master of arts is administered by the Graduate School; work leading to the degree of master of education is administered by the College of Education.

All particulars relating to these curricula may be secured by writing to the Department of Physical Education for Women.

PHYSICAL EDUCATION FOR MEN

MASTER OF EDUCATION DEGREE

The University offers an opportunity for students to take graduate work in physical education and to earn a master of education degree in this field. A five-year curriculum designed to prepare students for administrative and teaching positions in the various phases of physical education, upon satisfactory completion of which the master of education degree is received, is now in operation.

Transfer students and those who have taken work in physical education at the University of Minnesota may obtain this degree by completing a minimum of forty-five credits of work,

provided their undergraduate training in physical education is comparable to that offered at the University at the present time. A very liberal number of courses that can be applied toward this advanced degree will be offered during both terms of the Summer Session.

BACHELOR OF SCIENCE DEGREE

The Department of Physical Education for Men also offers a four-year curriculum which leads to a bachelor of science degree. This course prepares men to teach physical education in elementary and secondary schools and offers a good background for athletic coaching and other related activities. Courses applying toward this degree and toward fulfillment of the state requirements for teaching physical education will be offered in both terms of the Summer Session.

For details of these courses, correspondence should be addressed to the Department of Physical Education for Men, University of Minnesota, Minneapolis, Minnesota.

INSTITUTE OF CHILD WELFARE

The Institute of Child Welfare, an organization for the scientific study of children, for the training of workers in the field of child development, and for the dissemination of information through a program of parent education, is offering a full program including both graduate and undergraduate courses in the first term of the Summer Session, and several courses in the second term.

SCHOOL OF BUSINESS ADMINISTRATION

Admission.—For admission to the School of Business Administration a student must have satisfied the requirements of one of the two-year prebusiness courses, either in the College of Science, Literature, and the Arts, the College of Agriculture, Forestry, and Home Economics, or the Institute of Technology. A student must have a minimum of 90 credits, with one honor point per credit or a smaller number of credits determined as follows: For every five honor points in excess of one per credit, the number 90 is diminished by one.

Special students.—High school graduates who have reached the age of twenty-four and can furnish evidence to the effect that they have had business experience in an executive capacity may be admitted as special students.

Students in other schools or colleges of the University.—Regularly enrolled students in other schools or colleges of the University may be admitted to such courses in the School of

Vincent Hall

Business Administration as are authorized by the faculties of the School of Business Administration and the school or college concerned.

Courses in the field of education for distributive occupations are being offered again this year. The work is planned jointly by the State Department of Education, the College of Education, and the School of Business Administration.

LIBRARY INSTRUCTION

Academic credit is given only to students with at least two full years of approved work of collegiate grade. Candidates for a degree in library instruction must have had at least *three* years of work of collegiate grade approved by the assistant dean of the College of Science, Literature, and the Arts or a corresponding approval by the College of Education, in addition to a full year (45 quarter credits) in the Division of Library Instruction. "No-credit" students will be admitted only with the approval of the Library Division of the Minnesota State Education Department (in the case of residents of Minnesota) or of the director of the Division of Library Instruction (in the case of those not residents of Minnesota). Admission of "no-credit" students will be limited to candidates under appointment or promise of appointment to definite library positions.

Program

This program is subject to change without notice.

EXPLANATION OF COURSE NUMBERS

Courses 1 to 49 carry credit in the Junior College.
Courses 50 to 99 carry credit in the Senior College.
Courses 100 to 199 carry Senior College credit and graduate credit for those registered in the Graduate School.
Courses 200 and above are open only to those registered in the Graduate School.

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

ANTHROPOLOGY

FIRST TERM

41su	Introduction to Anthropology	Mr. Cline
118su	Indian Civilizations of Mexico and Peru	Mr. Cline

ASTRONOMY

FIRST TERM

11su	Descriptive Astronomy	Mr. Luyten
13su	Stellar and Practical Astronomy	Mr. Luyten
140su	Least Squares and Statistics	Mr. Luyten

BOTANY

FIRST TERM

1su	General Botany	Mr. Huff
2su	Elementary General Morphology of Plants	Mr. Abbe
119su	Cytology II—Nuclear Phenomena	Mr. Abbe
229su	Research Problems in Cytology	Mr. Abbe

Courses To Be Given at the Biological Station, Itasca Park

FIRST TERM*

3su	Forest Botany	Mr. Gordon
For.2su	Field Dendrology (see under College of Agriculture, Forestry, and Home Economics, Forestry)	

SECOND TERM

8su	Elements of Field Taxonomy	Mr. Buell
11su	Field Botany	Mr. Buell
20su	Elementary Field Ecology	Mr. Gordon
62su	Bryophytes and Pteridophytes	Mr. Rosendahl
116su	Advanced Field Taxonomy	Mr. Rosendahl
135su	Field Research Methods in Ecology	Mr. Gordon
196su	Special Problems in Ecology or Taxonomy	Mr. Rosendahl, Mr. Gordon

CLASSICS

FIRST TERM

17su	Greek and Latin Elements in English	Mr. Cram
42su	Greek Mythology	Mr. Heller
73su	Prose Composition	Mr. Cram
141su	Problems in Teaching of Latin	Mr. Heller
171su	Independent Reading	Mr. Cram
221su	Graduate Seminar in Lyric Poetry	Mr. Heller

* Open only to students in Forestry.

ENGLISH

FIRST TERM

Courses in Literature

23su	Introduction to Literature	Mr. Hessler
55su	Elementary Shakespeare	Mr. Bouvier
56su	Elementary Shakespeare	Mr. Briggs
62su	Milton	Mr. Dunn
73su	American Literature	Mr. McDowell
75su	Chaucer	Mr. Clark
100su	Elementary Old English	Mr. Clark
108su	Eighteenth-Century Prose	Mr. Irving
110su	Romantic Poets	Mr. White
112su	Seventeenth-Century Prose	Mr. Dunn
129su	Modern Drama	Mr. Hillhouse
155su	American Novel	Mr. McDowell
168su	English Literary Criticism	Mr. Brown
170su	Elizabethan Drama	Mr. Brown
182su	Pro-Seminar in Pope	Mr. Irving
184su	Pro-Seminar in Shelley	Mr. White
190su	Pro-Seminar in the Victorian Novel	Mr. Hillhouse

Courses in Composition

4su	Freshman Composition	Mr. Briggs
5su	Freshman Composition	Miss Armstrong
6su	Freshman Composition	Mr. Bouvier
27su	Advanced Writing	Miss Armstrong
101su	Creative Writing	Mr. Gray

SECOND TERM

Courses in Literature

56su	Elementary Shakespeare	Mr. Flanagan
74su	American Literature	Mr. Flanagan
109su	Romantic Poets	Miss Jackson
127su	English Drama, 1728-1880	Mr. Nichols
151su	Recent Poetry	Miss Jackson
156su	American Drama	Mr. Nichols

Courses in Composition

6su	Freshman Composition	Mrs. Phelan
28su	Advanced Writing	Mrs. Phelan

FINE ARTS

FIRST TERM

1su	Introduction to Modern Art	Mr. Schmeckebier
155su	Great Masters of Italian Renaissance Painting	Mr. Schmeckebier

GEOGRAPHY

FIRST TERM

11su	Human Geography	Mr. Davis
53su	Historical Geography	Mr. Brown
71su	Geography of North America	Mr. Dicken
102su	Trade Routes and Trade Centers	Mr. Dicken
110su	Geography of South America	Mr. Brown

GEOLOGY

FIRST TERM

1su	General Geology	Mr. Stauffer
85su	Field Work in Northern Minnesota (July 15-30, approximately)	Mr. Gruner, Mr. Thiel
150su	Field Geology in the Black Hills (June 14-July 12)	Mr. Gruner, Mr. Schwartz

GERMAN

FIRST TERM

1su	Beginning A	Mr. Downs
4su	Intermediate German	Mr. Pfeiffer
114su	The Golden Age of Medieval German Literature	Mr. Reichardt
183su	Heinrich Heine	Mr. Pfeiffer

SECOND TERM

2su	Beginning B	Mr. Meessen

HISTORY

FIRST TERM

1su	European Civilization	Arrange
22su	American History (formerly History 9)	Mr. Osgood
51su (102su)	Greek History	Mr. Jones
53su (104su)	Renaissance	Mr. Krey
66su (109su)	Twentieth-Century Europe	Mr. Deutsch
75su (110su)	Nineteenth-Century England	Mr. Willson
85su(118su)	American Economic History from 1860	Mr. Loehr
151su	Readings in Ancient History	Mr. Jones
153su	Readings in Renaissance	Mr. Krey
156su	Readings in European Expansion: Eighteenth Century	Mr. Willson
158su	Readings in Twentieth-Century Europe	Mr. Deutsch
183su	Readings in American Economic History	Mr. Loehr
190su	Readings in American History (Colonial West)	Mr. Osgood

SECOND TERM

20su	American History (formerly History 7)	Mr. Stephenson
61su (109su)	Europe in Later Nineteenth Century	Mr. Steefel
67su (131su)	United States since Reconstruction (to 1900)	Mr. Stephenson
87su(134su)	American Colonies in the Eighteenth Century	Mrs. Tyler
156su	Readings in Nineteenth-Century Europe	Mr. Steefel
190su	Readings in American History	Mrs. Tyler

JOURNALISM

FIRST TERM

11su	Newswriting and Editing	Mr. Nafziger
55su	Advertising and Newspaper Typography	Mr. Barnhart
73su	Magazine Writing and Editing	Mr. Ford
82su	Supervision of School Publications	Mr. Barnhart
113su	The Press and Foreign Affairs	Mr. Nafziger
116su	Representative American Newspapers, 1900-1940	Mr. Ford
210su	Research in Newspaper Problems	Mr. Nafziger

SECOND TERM

103su	Literary Aspects of Journalism	Mr. Ford

MATHEMATICS

FIRST TERM

1su	Higher Algebra	Mr. Munro
6su	Trigonometry	Mr. Swanson
7su	College Algebra	Mr. Olmsted, Mr. Munro
50su	Calculus I	Miss Gibbens, Mr. Swanson
90su	A Tutorial Course in Senior College Mathematics	Mr. Underhill, Miss Gibbens, Mr. Olmsted
105su	Intermediate Calculus	Mr. Underhill
110su	A Tutorial Course in Advanced Mathematics	Mr. Jackson, Mr. Underhill, Miss Gibbens
113su	Mathematics of Exterior Ballistics	Mr. Jackson
124su	Modern Analytic Geometry	Miss Gibbens
143su	Fourier, Legendre, and Bessel Series	Mr. Jackson

SECOND TERM

6su	Trigonometry	Mr. Gilbert
51su	Calculus II	Mr. Campaigne, Mr. Gilbert
90su	A Tutorial Course in Senior College Mathematics	Miss Carlson, Mr. Campaigne
109su	Theory of Numbers	Miss Carlson
110su	A Tutorial Course in Advanced Mathematics	Miss Carlson

MUSIC

FIRST TERM

1su	Ear Training	Miss Kendall
4su	Harmony	Mr. Scott
11su	Piano	Mr. Scott, Miss Kendall, Mr. Stephens
12su	Voice	Mr. Killeen, Miss Hull, Mrs. Snyder
13-26su	Instruments of the Orchestra	Arrange
27su	Organ	Mr. Jennings
32su	Music Appreciation	Mr. Killeen
36su	History of Music	Mr. Ferguson
40su	Orchestra	Mr. Pepinsky
43su	Chorus	Mr. Killeen
59su	Technique of Voice	Mr. Killeen
70su	Normal Piano	Miss Kendall
76su	Form and Analysis	Mr. Pepinsky
93su	Music for Two Pianos	Mr. Scott
200-201-202su	Basis of Musical Expression	Mr. Ferguson
205-206-207su	Composition in Larger Forms	Mr. Ferguson
209-210-211su	Advanced Topics in Musical Analysis	Mr. Pepinsky

SECOND TERM

60su	Ensemble (Instrumental)	Mr. Pepinsky
209-210-211su	Advanced Topics in Musical Analysis	Mr. Pepinsky

PHILOSOPHY

FIRST TERM

1su	Problems of Philosophy	Mr. Conger
2su	Logic	Mr. Castell
108su	Philosophy in Modern Literature	Mr. Castell
115su	Contemporary Philosophy	Mr. Conger

SECOND TERM

3su	Ethics	Mr. Everett
20su	Social Philosophy	Mr. Everett
63su	Principles of Mature Thinking	Mr. Feigl
153su	Philosophy of Science	Mr. Feigl

PHYSICS

FIRST TERM

1-2-3su	Introduction to Physical Science, Part I	Mr. Miller
1A-2A-3Asu	Introduction to Physical Science, Part I (with laboratory)	Mr. Miller
4su	General Physics (Mechanics and Heat) (primarily for premedical students)	Mr. Schmitt
6su	General Physics (Electricity and Modern Physics) (primarily for premedical students)	Mr. Hill
7su	General Physics (Mechanics and Heat) (for majors in physics and engineers)	Mr. Schmitt
8su	General Physics (Electricity and Elementary Modern Physics) (for majors in physics and engineers	Mr. Hill
29su	Introduction to Meteorology	Mr. Miller
107su	Modern Physics	Mr. Hill
114su	Elementary Physical Investigation	Mr. Miller, Mr. Hill, Mr. Schmitt
144su	Electrical Measurements	Mr. Schmitt

SECOND TERM

1-2-3su	Introduction to Physical Science, Part II	Mr. Nier
1A-2A-3Asu	Introduction to Physical Science, Part II (with laboratory)	Mr. Nier
5su	General Physics (Optics–Sound) (primarily for premedical students)	Mr. Williams
9su	General Physics (Optics–Sound) (for majors in physics and engineers)	Mr. Williams
52su	Laboratory Arts	Mr. Valasek
104su	Intermediate Electricity and Magnetism	Mr. Williams
116su	Elementary Physical Investigation	Mr. Nier, Mr. Valasek, Mr. Williams
131su	Geometrical and Physical Optics	Mr. Valasek
146su	Vacuum Tube Circuits	Mr. Nier

POLITICAL SCIENCE

FIRST TERM

1su	American Government and Politics, Part I	Mr. Christensen
3su	American Government and Politics, Part III	Mr. Latham
25su	World Politics	Mr. McLaughlin
100su	The Constitution and Social Change	Mr. Latham
120su	Municipal Functions	Mr. Ludwig
125su	Recent Social Legislation	Mr. Christensen
143su	American Political Campaigns and Elections	Mr. Starr
148su	European Dictatorships	Mr. Starr
183su	International Law in the Modern World	Mr. McLaughlin
201su	Seminar	Staff

SECOND TERM

2su	American Government and Politics, Part II	Mr. Kirkpatrick
109su	National Defense: Organization and Law	Mr. Latham
127su	Government and the Economic Order	Mr. Latham
161su	Recent Political Thought	Mr. Kirkpatrick
186su	International Planning	Mr. Quigley
193su	International Relations in the Far East	Mr. Quigley
202su	Seminar	Mr. Kirkpatrick, Mr. Latham
297su	Seminar	Mr. Quigley

PSYCHOLOGY

FIRST TERM

1-2su	General Psychology	Mr. Heron, Mr. Crook
111su	Frontiers of Psychology	Mr. Heron
113su	Abnormal Psychology	Mr. Conklin
119su	Psychology of Personality	Mr. Conklin
121su	Psychology of Observation and Perception	Mr. Crook

SECOND TERM

1-2su	General Psychology	Mr. Tinker
3su	Psychology Applied to Daily Life	Mr. Clark
107su	Vocational and Employment Psychology	Mr. Clark
136su	Psychology of Motivation and Conflict	Mr. Carlson
140su	Social Psychology	Mr. Carlson

ROMANCE LANGUAGES

FIRST TERM

French

1su	Beginning French	Mr. Brackney
54su	French Conversation and Phonetics	Mr. Fermaud
106su	French Syntax and Composition	Mr. Fermaud
116su	Molière	Mr. Searles
118su	French Literature: Eighteenth Century—Voltaire	Mr. Sirich
259su	Direction of Graduate Work	Mr. Searles, Mr. Sirich

Spanish

1su	Beginning Spanish	Mr. Spiegel
3su	Intermediate Spanish	Mr. Embry
54su	Spanish Composition and Conversation	Mr. Pattison
140su	Rubén Dario and the Contemporary Movement in Spanish American Literature	Mr. Pattison
259su	Direction of Graduate Work	Mr. Pattison

SECOND TERM

French

1su	Beginning French	Mr. Clefton
131su	Parnassian Poetry	Mr. Clefton
259su	Direction of Graduate Work	Mr. Clefton

Spanish

1su	Beginning Spanish	Mr. Grismer
2su	Beginning Spanish	Mr. Grismer
259su	Direction of Graduate Work	Mr. Grismer

SOCIOLOGY AND SOCIAL WORK

FIRST TERM

Sociology

1su	Introduction to Sociology (3 sections)	Mr. Monachesi, Mr. Quackenbush, Mr. Tannous

6su	Social Interaction	Mr. Quackenbush
14su	Rural Sociology	Mr. Tannous
49su	Social Pathology	Mr. Sletto
102su	Contemporary Penology	Mr. Vold
103su	Sociology of Conflict	Mr. Vold
132su	Juvenile Courts and Probation	Mr. Monachesi
160su	Population Problems	Mr. Sletto
200su	General Seminar	Staff

Social Work

130su	Principles of Social Case Work	Mrs. Fenlason
153-154-155su	Field Training in Case Work	Miss Phillips, Miss Fisk, Miss Harney, Miss Merrill
156-157-158su	Field Training in Group Work	Miss Phillips
170su	Introductory Psychiatry (identical with Medicine 20)	Dr. Hinckley
171su	Descriptive Neuropsychiatry (identical with Medicine 21)	Dr. Hutchinson
197su	Community Organization	Miss Phillips
218su	Seminar in Family Case Work	Mrs. Fenlason
221-222-223su	Graduate Field Training	Mrs. Fenlason, Miss Phillips
236su	Research Topics in Social Work	Staff

SECOND TERM

Sociology

1su	Introduction to Sociology (2 sections)	Mr. Tannous, Miss Williamson
6su	Social Interaction	Mr. Schneider
14su	Rural Sociology	Mr. Tannous
100su	Social Psychology	Mr. Kirkpatrick
101su	Social Organization	Mr. Chapin
119su	The Family	Mr. Kirkpatrick
120su	Social Life and Cultural Change	Mr. Schneider
200su	General Seminar	Staff

Social Work

133su	Social Case Work in Health Problems	Visiting Lecturer
136su	Essentials of Medicine for Social Workers	Visiting Lecturer
153-154-155su	Field Training in Case Work	Mrs. Doyle, Miss Fisk, Miss Merrill
221-222-223su	Graduate Field Training	Mrs. Doyle
236su	Research Topics in Social Work	Staff

SPEECH

FIRST TERM

	Speech Clinic	Mr. Bryngelson, Miss Hull, Mrs. Chapman, Miss Cochran
1su	Fundamentals of Speech	Mr. Gilkinson
31su	Introduction to Theater	Mr. Whiting

32su	Acting	Mr. Erekson
61su	Speech Hygiene	Mr. Bryngelson
65su	Radio Speech	Mr. Ziebarth
66su	Radio Dramatics	Mr. Erekson
67su	Phonetics	Miss Hurd
81su	Interpretative Reading	Mr. Rarig
92su	Stagecraft (Stage Lighting)	Arrange
101-102su	Persuasion	Mr. Rarig
105su	Theory of Reading and Acting	Mr. Rarig
111su	Stage Direction	Mr. Whiting
115su	Play-writing	Mr. Lees
121-122su	Advanced Speech Problems	Mr. Gilkinson
131su	Community Dramatics (Children's Theater)	Mr. Lees
151su	The Teaching of Speech	Mr. Gilkinson
162su	Speech Pathology	Mr. Bryngelson
164-165-166su*†	Clinical Methods and Practice in Speech Pathology	Mr. Bryngelson, Miss Hull, Mrs. Chapman
174su	Theater Backgrounds	Mr. Lees
181su	Readings in Speech	Staff
211su	Seminar in Dramatic Theory	Mr. Lees
221su	Seminar in Interpretation	Mr. Rarig
261su	Seminar in Speech Pathology	Mr. Byngelson
291-292su	Research in Special Problems	Staff

SECOND TERM

1su	Fundamentals of Speech	Mr. Brown
2su	Fundamentals of Speech	Arrange
3su	Fundamentals of Speech	Arrange
33su	Beginning Acting	Mr. Whiting
112su	Stage Direction	Mr. Whiting
163su	Speech Pathology	Mr. Brown
181su	Readings in Speech	Mr. Brown
291su	Research in Special Problems	Mr. Brown

ZOOLOGY

FIRST TERM

1su	General Zoology	Mr. Olson
21su	Histology	Mr. Ringoen
181su	Endocrines and Reproduction	Mr. Ringoen
197su	Problems	Mr. Ringoen

SECOND TERM

2su	General Zoology	Mr. Wodsedalek
198su	Problems	Mr. Wodsedalek

Courses To Be Given at the Biological Station, Itasca Park

SECOND TERM

54su	Parasitology	Mr. Wallace
55su	Natural History of Invertebrates and Fishes	Mr. Eddy
115su	Advanced Natural History of Invertebrates and Fishes	Mr. Eddy
116su	Limnology	Mr. Eddy
147su	Helminthology	Mr. Wallace
198su	Problems in Parasitology, Limnology, or Protozoology	Mr. Riley, Mr. Eddy, Mr. Wallace

* Carries credit only in the College of Education.

† Students should register for this course for eight weeks. They may take any two quarters. Listed in Education as Ed.C.I. 174-175-176.

INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING AND ARCHITECTURE

AERONAUTICS*

FIRST TERM

AE-1asu	Elementary Meteorology	Mr. Serebreny

ARCHITECTURE AND FINE ARTS

FIRST TERM

GD-I	Theory of Design	Mr. Huchthausen
DP-Isu	Drawing and Painting, Grade I	Mr. Burton
DP-IIsu	Drawing and Painting, Grade II	Mr. Burton
DP-IIIsu	Drawing and Painting, Grade III	Mr. Burton
DP-IVsu	Drawing and Painting, Grade IV	Mr. Burton
DP-Vsu	Drawing and Painting, Grade V	Mr. Burton
M-Isu	Modeling, Grade I	Mr. Burton
M-IIsu	Modeling, Grade II	Mr. Burton
M-IIIsu	Modeling, Grade III	Mr. Burton

CIVIL ENGINEERING

FIRST TERM

31su	Stresses in Structures	Mr. Hughes, Mr. Brinker
32su	Stresses in Structures	Mr. Hughes, Mr. Brinker
33su	Elementary Structural Design	Mr. Hughes, Mr. Brinker
38su	Stresses in Structures (Arch.)	Mr. Hughes, Mr. Brinker
39su	Structural Design (Arch.)	Mr. Hughes, Mr. Brinker
41su	Reinforced Concrete (Arch.)	Mr. Hughes, Mr. Brinker
131su	Bridge Analysis and Design	Mr. Hughes, Mr. Brinker
132su	Bridge Analysis and Design	Mr. Hughes, Mr. Brinker
134su	Statically Indeterminate Structures	Mr. Hughes, Mr. Brinker
137su	Structural Laboratory	Mr. Hughes, Mr. Brinker
141su	Reinforced Concrete	Mr. Hughes, Mr. Brinker
142su	Reinforced Concrete Design	Mr. Hughes, Mr. Brinker

DRAWING AND DESCRIPTIVE GEOMETRY

FIRST TERM

1-2su	Engineering Drawing	Mr. Schuck
3su	Descriptive Geometry	Mr. Eggers
7-8su	Engineering Drawing and Descriptive Geometry	Mr. Eggers
10su	Solid Geometry	Mr. Eggers
11,12, 13su	Engineering Drawing (Mines)	Mr. Eggers
14su	Descriptive Geometry (Mines)	Mr. Eggers
21,22, 23su	Drafting	Mr. Schuck

* This course is subject to cancellation in case of an emergency.

26su	Drafting	Mr. Schuck
28-29su	Drafting	Mr. Schuck
34su	Lettering	Mr. Schuck
41-42-43su	Technical Drawing	Mr. Doseff
81-82-83su	Advanced Drawing	Mr. Doseff
86-87su	Anatomical Drawing	Mr. Doseff

SECOND TERM

1-2su	Engineering Drawing	Mr. Quaid
3su	Descriptive Geometry	Mr. Levens
7-8su	Engineering Drawing and Descriptive Geometry	Mr. Quaid
10su	Solid Geometry	Mr. Quaid
11,12, 13su	Engineering Drawing (Mines)	Mr. Quaid
14su	Descriptive Geometry (Mines)	Mr. Levens
21,22, 23su	Drafting	Mr. Levens
26su	Drafting	Mr. Levens
28-29su	Drafting	Mr. Levens
34su	Lettering	Mr. Levens

MATHEMATICS AND MECHANICS

FIRST TERM

13su	Analytical Geometry	Mr. Miller
25su	Integral Calculus	Mr. Peebles
26su	Technical Mechanics: Statics	Mr. Siler

SECOND TERM

9su	Higher Algebra	Mr. Loye
13su	Analytical Geometry	Mr. Turrittin
26su	Technical Mechanics: Statics	Mr. Loye
127su	Technical Mechanics: Dynamics	Mr. Doeringsfeld

MECHANICAL ENGINEERING

FIRST TERM

1su	Elementary Woodworking	Mr. Richards
2su	Machine Woodworking	Mr. Richards
3su	Wood Finishing	Mr. Richards
4su	Furniture Construction	Mr. Richards
5su	Pattern Practice and General Woodwork	Mr. Richards
6su	Pattern Practice and General Woodwork	Mr. Richards
7su	Advanced General Woodwork	Mr. Richards
8su	Foundry Practice	Mr. Holtby
9su	Foundry Practice	Mr. Holtby
11su	Forging and Metal Working	Mr. Hughes
11asu	Welding Principles and Practice	Mr. Hughes
11bsu	Art Metal Work	Mr. Hughes
11csu	Art Metal Work	Mr. Hughes
11dsu	Art Metal Work	Mr. Hughes
12su	Forging, Heat Treating, and Welding	Mr. Hughes
13su	Advanced Welding	Mr. Hughes
14su	General Metal Work	Mr. Hughes
15su	Machine Shop Practice	Mr. Crowder
15asu	Elementary Machine Shop Practice	Mr. Crowder
15bsu	Advanced Machine Shop Practice	Mr. Crowder
16su	Machine Shop Practice	Mr. Crowder
17su	Machine Shop Practice	Mr. Crowder
18su	Advanced Machine Shop Practice	Mr. Crowder
71su	Machine Shop Practice	Mr. Crowder
72su	Machine Shop Practice	Mr. Crowder
110su	Advanced Foundry Practice	Mr. Holtby
111su	Advanced Foundry Practice	Mr. Holtby

INSTITUTE OF TECHNOLOGY

SCHOOL OF CHEMISTRY

INORGANIC CHEMISTRY

FIRST TERM

1su	General Inorganic Chemistry	Mr. Maynard
4su	General Inorganic Chemistry	Mr. Sneed
6su	General Inorganic Chemistry	Mr. Maynard
9su	General Inorganic Chemistry	Mr. Sneed
11su	Qualitative Chemical Analysis	Mr. Heisig
12su	Qualitative Chemical Analysis	Mr. Heisig
12asu	Semimicro Qualitative Analysis	Mr. Barber
14su	General Inorganic Chemistry	Mr. Maynard
102su	Semimicro Qualitative Analysis (Advanced)	Mr. Barber
103su	Advanced Inorganic Chemistry	Mr. Maynard
105su	Advanced Inorganic Chemistry	Mr. Sneed
109su	Synthetic Inorganic Chemistry	Mr. Heisig
115su	Commercial Products and Their Analysis	Mr. Barber
301su	Research in Inorganic Chemistry	Mr. Sneed, Mr. Heisig, Mr. Barber, Mr. Maynard

SECOND TERM

2su	General Inorganic Chemistry	Mr. Klug
5su	General Inorganic Chemistry	Mr. Klug
7su	General Inorganic Chemistry	Mr. Klug
10su	General Inorganic Chemistry	Mr. Klug
11su	Qualitative Chemical Analysis	Mr. Taylor
12su	Qualitative Chemical Analysis	Mr. Taylor
15su	General Inorganic Chemistry	Mr. Klug
104su	Advanced Inorganic Chemistry	Mr. Taylor
120su	Crystal Analysis	Mr. Klug
302su	Research in Inorganic Chemistry	Mr. Klug, Mr. Taylor

ANALYTICAL CHEMISTRY

FIRST TERM

1su	Quantitative Analysis (Gravimetric)	Mr. Geiger
7su	Quantitative Analysis for Premedics	Mr. Geiger
96su	Senior Thesis	Mr. Geiger
123-124su	Advanced Analytical Chemistry	Mr. Geiger
203su	Selected Topics in Analytical Chemistry	Mr. Geiger
301su	Research in Analytical Chemistry	Mr. Geiger

ORGANIC CHEMISTRY

FIRST TERM

1su	Elementary Organic Chemistry	Mr. Lauer
110su	Organic Qualitative Analysis	Mr. Koelsch
130su	Organic Quantitative Analysis	Mr. Lauer
141su	Reagents in Organic Chemistry	Mr. Koelsch
301su	Research in Organic Chemistry	Mr. Lauer, Mr. Koelsch

SECOND TERM

2su	Elementary Organic Chemistry	Mr. Arnold
139su	Advanced Organic Laboratory Work	Mr. Arnold
302su	Research in Organic Chemistry	Mr. Arnold

PHYSICAL CHEMISTRY

FIRST TERM

107su	Elementary Physical Chemistry	Mr. Livingston
141su	Special Topics in Physical Chemistry	Mr. Livingston
211su	Advanced Physical Chemistry Laboratory	Mr. Livingston
301su	Research in Physical Chemistry	Mr. Livingston

SECOND TERM

108su	Elementary Physical Chemistry	Mr. Crawford
142su	Special Topics in Physical Chemistry	Mr. Crawford
212su	Advanced Physical Chemistry Laboratory	Mr. Crawford
302su	Research in Physical Chemistry	Mr. Crawford

CHEMICAL ENGINEERING

FIRST TERM (JUNE 16 TO JULY 18)

151su	Chemical Manufacture (Inorganic)	Mr. Pike
152su	Chemical Manufacture (Organic)	Mr. Montonna

SECOND TERM (JULY 21 TO AUGUST 22)

151su	Chemical Manufacture (Inorganic)	Mr. Stoppel
152su	Chemical Manufacture (Organic)	Mr. Mann

THIRD TERM (AUGUST 25 TO SEPTEMBER 26)

151su	Chemical Manufacture (Inorganic)	Mr. Montillon
152su	Chemical Manufacture (Organic)	Mr. Grove

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

AGRICULTURAL BIOCHEMISTRY

FIRST TERM

4su	Introduction to Organic and Biochemistry	Mr. Reitz
205su	Research Problems	Staff

SECOND TERM

205su	Research Problems	Staff

AGRICULTURAL ECONOMICS

FIRST TERM

3su	Principles of Economics	Mr. Lowe
105su	Advanced Farm Management	Mr. Pond, Mr. Engene
206su	Agricultural Policy	Mr. Jesness

SECOND TERM

131su	Market Prices	Mr. Waite

AGRICULTURAL EDUCATION

For list of courses in Agricultural Education, see courses listed elsewhere in this bulletin under the College of Education.

AGRICULTURAL ENGINEERING

FIRST TERM

40su	Mechanical Training	Mr. Dent
41su	Metal Work	Mr. Dent
104su	The Soil Moisture Relation in Agriculture	Mr. Roe

AGRONOMY AND PLANT GENETICS

FIRST AND SECOND TERMS

Agronomy

201su	Research in Farm Crops	Mr. Wilson, Mr. Arny

Plant Genetics

241su	Research in Plant Genetics	Mr. Hayes, Mr. Immer, Mr. Burnham
244su	Laboratory Methods in Plant Breeding	Mr. Immer

ANIMAL AND POULTRY HUSBANDRY

FIRST TERM

119su	Livestock Management (offered for the first four weeks)	Mr. Peters

FIRST AND SECOND TERMS

213su	Research in Animal Husbandry	Mr. Peters, Mr. Ferrin, Mr. Winters, Mr. Harvey, Mr. Johnson
214su	Research in Poultry Husbandry	Mr. Sloan

DAIRY HUSBANDRY

FIRST TERM

208su	Research in Dairy Husbandry	Mr. Fitch, Mr. Petersen, Mr. Gullickson
209su	Research in Dairy Manufacturing	Mr. Combs, Mr. Coulter
215su	Research in Dairy Bacteriology	Mr. Macy

SECOND TERM

210su	Research in Dairy Husbandry	Mr. Fitch, Mr. Petersen, Mr. Gullickson
211su	Research in Dairy Manufacturing	Mr. Combs, Mr. Coulter
216su	Research in Dairy Bacteriology	Mr. Macy

ENTOMOLOGY AND ECONOMIC ZOOLOGY

FIRST TERM

55su	Entomological Techniques	Mr. Mickel

FIRST AND SECOND TERMS

197su	Introduction to Research	Mr. Riley and others
204su	Research in Entomology	Mr. Riley and others

Courses To Be Given at the Biological Station, Itasca Park

FIRST TERM*

13su	Field Zoology	Mr. Mickel, Mr. Hodson

* Open only to students in Forestry.

SECOND TERM

59su	Field Entomology	Mr. Granovsky
62su	Wildlife Conservation Principles and Administration	Mr. Swanson
68su	Natural History of the Higher Vertebrates	Mr. Swanson
76su	Techniques of Field Biology	Mr. Granovsky
168su	Advanced Natural History of the Higher Vertebrates	Mr. Swanson
196su	Special Problems in Entomology or Economic Zoology	Mr. Granovsky, Mr. Swanson

FORESTRY

Courses To Be Given at the Biological Station, Itasca Park

FIRST TERM

(Open only to students who have completed at least one year of forestry in the University or one year in a junior college or other college.)

2su	Field Dendrology	Mr. Gordon
5su	Field Silviculture	Mr. Cheyney
6su	Field Mensuration	Mr. Brown
11su	Camp Management	Mr. Brown
Bot. 3su	Forest Botany (see under College of Science, Literature, and the Arts, Botany)	
Ent. 13su	Field Zoology (see under Entomology and Economic Zoology)	

SECOND TERM

12su	Field Dendrology	Mr. Buell
145su	Conservation of Natural Resources	Mr. Schantz-Hansen

HOME ECONOMICS

FIRST TERM

85su	Home Management Lectures	Arrange
86su	Home Management Laboratory	Miss Studley
142su	Experimental Cookery	Miss Noble
146su	Special Food Problems	Miss Noble
150su	Textile Problems	Miss Brew
170su	Nutrition of the Family	Miss Donelson
179su	Readings in Nutrition	Miss Donelson
185su	Family Relationships	Miss Studley
295su	Home Economics Problems (Clothing)	Miss Brew

SECOND TERM

85su	Home Management Lectures	Miss Jeary
86su	Home Management Laboratory	Miss Jeary

HORTICULTURE

FIRST AND SECOND TERMS

190-191-192su	Special Problems	Mr. Alderman and others
247su	Report on Special Horticultural Topics	Mr. Alderman and others

PLANT PATHOLOGY AND BOTANY

FIRST AND SECOND TERMS

206su	Research in Plant Pathology	Mr. Stakman and others
210su	Research in Mycology	Mr. Stakman, Miss Dosdall
257su	Research Problems in Applied Plant Physiology	Mr. Harvey, Mr. Landon

Courses To Be Given at the Biological Station, Itasca Park

SECOND TERM

50su	Field Mycology	Mr. C. M. Christensen
210su	Research in Mycology	Mr. C. M. Christensen

BIOLOGICAL STATION

The courses to be given at the Biological Station will begin July 28 and close August 29. Special arrangements will be made for those whose school or other duties make it impossible to remain through the final week of the session.

The following courses are offered in the Biological Station for the year 1941 at Itasca Park during the second term of the Summer Session:

SECOND TERM

BOTANY

8su	Elements of Field Taxonomy	Mr. Buell
11su	Field Botany	Mr. Buell
20su	Elementary Field Ecology	Mr. Gordon
62su	Bryophytes and Pteridophytes	Mr. Rosendahl
116su	Advanced Field Taxonomy	Mr. Rosendahl
135su	Field Research Methods in Ecology	Mr. Gordon
196su	Special Problems in Ecology or Taxonomy	Mr. Rosendahl, Mr. Gordon

ENTOMOLOGY AND ECONOMIC ZOOLOGY

59su	Field Entomology	Mr. Granovsky
62su	Wildlife Conservation Principles and Administration	Mr. Swanson
68su	Natural History of the Higher Vertebrates	Mr. Swanson
76su	Techniques of Field Biology	Mr. Granovsky
168su	Advanced Natural History of the Higher Vertebrates	Mr. Swanson
196su	Special Problems in Entomology or Economic Zoology	Mr. Granovsky, Mr. Swanson

FORESTRY

12su	Field Dendrology	Mr. Buell
145su	Conservation of Natural Resources	Mr. Schantz-Hansen

PLANT PATHOLOGY AND BOTANY

50su	Field Mycology	Mr. C. M. Christensen
210su	Research in Mycology	Mr. C. M. Christensen

ZOOLOGY

54su	Parasitology	Mr. Wallace
55su	Natural History of Invertebrates and Fishes	Mr. Eddy
115su	Advanced Natural History of Invertebrates and Fishes	Mr. Eddy
116su	Limnology	Mr. Eddy
147su	Helminthology	Mr. Wallace
198su	Problems in Parasitology, Limnology, or Protozoology	Mr. Riley, Mr. Eddy, Mr. Wallace

MEDICAL SCHOOL

ANATOMY

FIRST TERM

59su	Systematic Anatomy	Dr. Miller
61su	Histology and Embryology	Dr. Rasmussen
65su	Hematology	Miss Sundberg
100su	Gross Human Anatomy	Dr. Boyden, Dr. Wells
103su	Human Histology	Dr. Rasmussen
111su	Human Neurology	Dr. Rasmussen
156su	Advanced Anatomy	Dr. Boyden, Dr. Rasmussen, Dr. Wells, Dr. Miller
204su	Research in Anatomy	Dr. Boyden, Dr. Rasmussen, Dr. Wells

SECOND TERM

60su	Anatomy of Head and Neck	Dr. Blount
101su	Gross Human Anatomy	Dr. Blount
156su	Advanced Anatomy	Dr. Blount
204su	Research in Anatomy	Dr. Blount

BACTERIOLOGY AND IMMUNOLOGY

FIRST TERM

53su	Principles of Bacteriology	Dr. Larson
116su	Immunity	Dr. Larson
201su	Research in Bacteriology	Dr. Larson

SECOND TERM

102su	Medical Bacteriology	Dr. Skinner
114su	Yeast, Molds, and Actinomycetes	Dr. Skinner
201su	Research in Bacteriology	Dr. Skinner

MEDICINE

FIRST TERM

Required

110su	Class Clinic in Medicine	Dr. Fahr and staff
111su	Clinical Clerkship in Medicine	Dr. Watson and staff
111xsu	Clinical Clerkship in Medicine (Minneapolis General Hospital)	Dr. Fahr and staff
111ysu	Admissions Clerkship	Dr. Wetherby and staff
118su	Clinical Clerkship in Neuropsychiatry	Dr. McKinley and staff
124su	Physical Diagnosis and Therapy—Dermatology	Dr. Michelson and staff

Elective

20su and 170su	Introductory Neuropsychiatry Social Work	Dr. Hinckley
21su and 171su	Descriptive Neuropsychiatry Social Work	Dr. Hutchinson

106su	Physical Diagnosis and Therapy	Dr. Wetherby
131su	Advanced Physical Diagnosis of the Chest	Dr. Weisman
136su	The Respiratory Organs in Health and Disease	Dr. Myers
143su	Problems in Neuropathology	Dr. Baker
144su	Neuropathology	Dr. Baker
149su	Resident Clerkship in Psychiatry	Dr. Freeman, Dr. Patterson, and staffs
150su	Resident Clerkship in Tuberculosis	Dr. Mariette and staff
159su	Assistantship, Dermatology and Syphilis	Dr. Winer
160su	Assistantship and Conference in Dermatology	Dr. Michelson and staff
163su	Treatment of Syphilis	Dr. Michelson and staff

SECOND TERM

Required

110su	Class Clinic in Medicine	Dr. Fahr and staff
111su	Clinical Clerkship in Medicine	Dr. Watson and staff
111xsu	Clinical Clerkship in Medicine (Minneapolis General Hospital)	Dr. Fahr
111ysu	Admissions Clerkship	Dr. Wetherby and staff
118su	Clinical Clerkship in Neuropsychiatry	Dr. McKinley and staff
124su	Physical Diagnosis and Therapy—Dermatology	Dr. Michelson and staff

Elective

106su	Physical Diagnosis and Therapy	Dr. Wetherby
131su	Advanced Physical Diagnosis of the Chest	Dr. Weisman
136su	The Respiratory Organs in Health and Disease	Dr. Myers
143su	Problems in Neuropathology	Dr. Baker
144su	Neuropathology	Dr. Baker
149su	Resident Clerkship in Psychiatry	Dr. Freeman, Dr. Patterson
150su	Resident Clerkship in Tuberculosis	Dr. Mariette
159su	Assistantship, Dermatology and Syphilis	Dr. Winer
160su	Assistantship and Conference in Dermatology	Dr. Michelson and staff
163su	Treatment of Syphilis	Dr. Michelson and staff

FIRST AND SECOND TERMS

Graduate Courses

201su	Clinical Medicine	Dr. Watson and staff
202su	Diseases of the Cardiovascular Apparatus	Dr. Fahr
203su	Research in Medicine	Dr. Watson, Dr. Fahr, Dr. Spink
205su	Tuberculosis	Dr. Myers
226su	Problems in Pathological Physiology	Dr. Fahr
227su	Problems in Clinical Physiology	Dr. Fahr
208su	Clinical Neurology	Dr. McKinley, Dr. Baker
208xsu	Clinical Psychiatry	Dr. McKinley, Dr. Clarke, Dr. Hathaway

209su	Research in Neurology and Psychiatry	Dr. McKinley, Dr. Hathaway, Dr. Baker
214su	Psychiatric Disorders of Childhood	Dr. Clarke
216su	Research in Neuropathology	Dr. Baker
267su	Dermatology and Syphilology	Dr. Michelson and staff
268su	Histopathology	Dr. Michelson and staff
269su	Syphilis Therapy	Dr. Michelson and staff
270su	Dermatology and Syphilology	Dr. Sweitzer and staff
271su	Dermatology in Students' Health Service	Dr. Michelson and staff
272su	Allergy in Dermatology	Dr. Michelson, Dr. Sweitzer, and staff
273su	Dermatology and Syphilology	Dr. Michelson and staff

OBSTETRICS AND GYNECOLOGY

FIRST AND SECOND TERMS

130su	Obstetrics and Gynecology Clinic	Dr. McKelvey, Dr. Dippel, Dr. Solhaug, Dr. McLennan
135su	Clinical Clerkship in Obstetrics and Gynecology (University Hospitals)	Dr. McKelvey, Dr. Dippel, Dr. LaVake, Dr. Solhaug, Dr. McLennan
135xsu	Clinical Clerkship in Obstetrics and Gynecology (Minneapolis General Hospital)	Dr. Lang, Dr. Simons, and staff
155su	Prenatal Clinic (Wells Memorial)	Dr. Abramson
155asu	Prenatal Clinic (Margaret Barry)	Dr. Abramson
204su	Graduate Work in Hospital	Dr. McKelvey and staff
208su	Graduate Work in Hospital (Advanced)	Dr. McKelvey and staff
212su	Graduate Work in Hospital (Advanced)	Dr. McKelvey and staff
219su	Research Work	Dr. McKelvey and staff
224su	Dispensary Service (Graduate)	Dr. McKelvey, Dr. LaVake, Dr. Simons, and staff

OPHTHALMOLOGY AND OTOLARYNGOLOGY

FIRST AND SECOND TERMS

Required

103su	Clinic in Diseases of the Eye	Dr. Burch and staff
104su	Clinic in Diseases of the Ear	Dr. Newhart and staff
105su	Clinic in Diseases of the Nose and Throat	Dr. Boies and staff

Elective

106su	Operative Clinic in Eye	Dr. Burch and staff
116su	Operative Clinic in Ear, Nose, and Throat	Dr. Newhart and staff
117su	Clinical Otorhinolaryngology	Staff

A didactic course in ophthalmology can be given (Dr. Macnie) during the Summer Session, if sufficient students desire it.

PATHOLOGY

FIRST TERM

107su	Surgical Pathology	Dr. McCartney

FIRST AND SECOND TERMS

104su	Autopsies	Dr. Bell and staff
109su	Clinical Pathological Conference	Dr. Bell and staff
111su	Conference on Autopsies	Dr. Bell and staff
201su	Research in Pathology	Dr. Bell and staff

PEDIATRICS

FIRST TERM

130su	Pediatrics—Amphitheater Clinic	Dr. McQuarrie
135su	Pediatrics—Clinical Clerkship	Dr. McQuarrie and others
208su	Pediatric Research	Dr. McQuarrie and others

SECOND TERM

130su	Pediatrics—Amphitheater Clinic	Dr. Hansen, Dr. Stoesser, and others
135su	Pediatrics—Clinical Clerkship	Dr. Hansen, Dr. Stoesser, and others
208su	Pediatric Research	Dr. Hansen, Dr. Stoesser, and others

PHARMACOLOGY

FIRST TERM

8su	Elementary Pharmacology	Dr. Wright
108su	Prescription Writing	Dr. Wright
109su	Pharmacological Problems	Dr. Hirschfelder, Dr. Wright
115su	General Pharmacology for Medical Students	Dr. Hirschfelder, Dr. Wright
115xsu	General Pharmacology for Dental Students	Dr. Hirschfelder, Dr. Wright
203su	Research in Pharmacology	Dr. Hirschfelder, Dr. Wright

SECOND TERM

8su	Elementary Pharmacology	Dr. Wright
103su	General Pharmacology	Dr. Wright
104su	General Pharmacology	Dr. Wright
109su	Pharmacological Problems	Dr. Wright
203su	Research in Pharmacology	Dr. Wright

PHYSIOLOGY

FIRST TERM

4su	Elementary Human Physiology	Dr. King
58su	Human Physiology for Dental Students	Dr. Scott

100su	Physiological Chemistry for Medical and Other Students	Dr. Burr, Dr. Barnes
103su	Physiology Advanced Course for Medical, Graduate, and Other Qualified Students	Dr. Scott
113asu	Seminar on the Heart and Circulation	Dr. Visscher
113bsu	Seminar on Aviation Physiology	Dr. Visscher
203su	Research in Physiology	Dr. Visscher
205su	Research in Physiological Chemistry	Dr. Burr

SECOND TERM

59su	Human Physiology for Dental Students	Dr. Hemingway
101su	Physiological Chemistry, Continuation of Course 100su	Dr. Arnow, Dr. Samuels
104su	Physiology of Nervous System and Special Senses	Dr. Hemingway
203su	Research in Physiology	Dr. Hemingway

PREVENTIVE MEDICINE AND PUBLIC HEALTH

FIRST TERM

53su	Elements of Preventive Medicine and Public Health	Dr. Anderson
67su	Field Practice with Family Health Agency	Miss Draper, Mrs. Lyons
81su	School Health Problems	Dr. Derryberry
91su	Community Sanitation	Mr. Olson, Mr. Pierce
101su	Public Health Administration and Field Work	Dr. Anderson
102su	Environmental Sanitation—General	Mr. Whittaker, Mr. Olson, Mr. Pierce
106su	Public Health Administration	Dr. Anderson
200su	Research	Dr. Anderson

Courses in Biometry

110su	Biometric Principles	Mr. Treloar
111su	Biostatistics Laboratory	Mr. Treloar
140su	Topics in Biostatistics	Mr. Treloar

SECOND TERM

60su	Tuberculosis and Its Control	Dr. Myers
61su	Mental Hygiene	Miss Shalit
62-63su	Principles of Public Health Nursing	Miss Parker
67su	Field Practice with Family Health Agency	Miss Draper, Mrs. Lyons
70su	Special Methods and Supervised Practice in Health Education for Public Health Nurses	Miss Palmer
101su	Public Health Administration and Field Work	Dr. Anderson
170su	Supervision in Public Health Nursing	Miss Kahl
171su	Advanced Problems in Public Health Nursing	Miss Kahl
200su	Research	Dr. Anderson

RADIOLOGY

FIRST AND SECOND TERMS

Required

135x,y,zsu is offered as part of the clerkships in Medicine, Pediatrics, and Surgery (see Bulletin of the Medical School).

Elective

85su	Plate Reading	Dr. Rigler and others
88asu	X-Ray Diagnosis	Dr. Ude

88bsu	X-Ray Diagnosis	Dr. M. B. Hanson
95su	Clinic in X-Ray Therapy	Dr. Stenstrom
101su	Surgical-Roentgenological Conference	Dr. Rigler
103su	Physical Therapy Clinic	Dr. Knapp
107su	Medical-Roentgenological Conference	Dr. Rigler
108su	Pediatric-Roentgenological Conference	Dr. Rigler
200su	Research in Roentgen Diagnosis	Dr. Rigler
205su	Research Related to Radiation Therapy	Dr. Stenstrom
207su	Roentgen and Radium Therapy	Dr. Stenstrom

SURGERY

FIRST AND SECOND TERMS

Required

135su	Clinical Clerkship	University Hospital Surgery staff
135asu	Clinical Pathology of Tumors	Dr. Rea, Dr. Ritchie
135bsu	Reading Course	Dr. Ritchie
135csu	Surgical-Pathological Conference	Dr. Rea, Dr. Bergh
135dsu	Roentgenological-Surgical Conference	Radiology and Surgery staffs
135esu	Surgical Conference	Surgery staff
135gsu	Outpatient Surgical Clinic	University Hospital Surgery staff
135hasu	Laboratory Surgery	Surgery staff
135isu	Anesthetics	Dr. Knight
135ysu	Clinical Clerkship	Minneapolis General Hospital staff
145su	Orthopedic Clinic (Part of Course 135)	Orthopedics staff
149su	Urology Clinic (Part of Course 135)	Urology staff

Elective

153su	Problems in Clinical Investigation	Dr. Wangensteen and others
154su	Proctology: Assistantship in Proctology	Dr. Fansler, Dr.J.K.Anderson
156su	Bedside Diagnostic Clinic	Dr. Robitshek
161su	Urology Clinic	Dr. Foley
167su	Problems in Experimental Surgery	Dr. Wangensteen and others

SCHOOL OF NURSING*

FIRST TERM

60su†	Ward Administration for Instructional Purposes	Miss Olcutt
61su	Personnel Work in Schools of Nursing	Miss Schneidler
63su	Motion Study	Mr. Koepke
72su†	Teaching and Supervision in Schools of Nursing	Miss Harrington

SCHOOL OF DENTISTRY

Medical Science Subjects

FIRST TERM

41su	Principles of Bacteriology	Dr. Larson
58su	Human Physiology	Dr. King
59su	Systematic Anatomy	Dr. Miller

* For Courses in Public Health Nursing see page 50.

† A limited amount of observation can be arranged by Miss MacDonald.

61su	Histology and Embryology	Dr. Rasmussen
115xsu	General Pharmacology for Dental Students	Dr. Hirschfelder

SECOND TERM

59su	Human Physiology	Dr. Code
60su	Anatomy of the Head and Neck	Dr. Miller

Clinical Practice

FIRST AND SECOND TERMS

Crown and Bridge Work	Dr. Wells
Operative Dentistry	Dr. Green
Orthodontia	Dr. Rudolph
Prosthetic Dentistry	Dr. Flagstad
Oral Surgery	Dr. Griffith
Major Oral Surgery of the Mouth and Jaws	Dr. Waldron

COLLEGE OF EDUCATION

AGRICULTURAL EDUCATION

FIRST TERM

Agr.Ed.141su	Supervised Practice in Vocational Agriculture	Mr. Ekstrom
Agr.Ed.145su	Integrated Course of Study in Agriculture	Mr. Field
Agr.Ed.224su	Graduate Problems	Mr. Field, Mr. Ekstrom
Agr.Ed.232su	Research in Agricultural Education	Mr. Field, Mr. Ekstrom
Agr.Ed.238su	Planning and Evaluating Programs in Agricultural Education	Mr. Ekstrom

ART EDUCATION

FIRST TERM

ArtEd.2su	Fundamental Experiences in Design with Especial Reference to Crafts	Miss Ross
ArtEd.19su	Art for Elementary Teachers	Mr. Gayne
ArtEd.31su	Orientation in Handcraft Processes	Miss Ross
ArtEd.84su	Teaching of Art in the Elementary Grades	Mr. Gayne
ArtEd.153su	The Scandinavian Home as an Expression of Northern Art	Miss Lien
ArtEd.284su	Tutorials in Reading and Research in Art Education	Miss Lien
ArtEd.290E, 291E, or 292Esu	Tutorials in Special Problems in Art Education	Miss Lien
ArtEd.295su	Tutorials in Special Problems in Art Education	Miss Lien

SECOND TERM

ArtEd.15su	Introduction to Art Education	Miss Fisher
ArtEd.17su	Art for Elementary Teachers	Miss Fisher
ArtEd.4,29, or 30su	Studio Practice Selected from Blackboard and Quick Sketch	Mr. Ziegfeld
ArtEd.24,26, or 28su	Studio Practice Selected from Water Color	Mr. Ziegfeld
ArtEd.124E,125E, or 126Esu	Studio Practice Selected from Advanced Painting	Mr. Ziegfeld

CURRICULUM AND INSTRUCTION

Courses Offered

Students reading this section of the bulletin should note that under each main division in Education the courses are grouped for those interested in elementary, secondary, and higher education fields. Under each division courses of general interest are listed General Courses and these are followed by the offerings in Elementary Education, Secondary Education, and Higher Education.

FIRST TERM

General Courses

Ed.C.I.107su	Radio in Education	Mr. Tyler
Ed.C.I.129su	Principles and Problems of Teaching Social Hygiene	Mr. Griffiths
EdC.I.136su	Organization and Supervision of Part-time and Evening Distributive Education Programs	Arrange
Ed.C.I.137su	Instructional Materials and Problems of Teaching Distributive Education Classes	Arrange
Ed.C.I.145su	Remedial Reading	Arrange
Ed.C.I.171su	Curriculum Laboratory Practice	Mr. Bossing
Ed.C.I.174-175-176su*	Clinical Methods and Practice in Speech Pathology	Mr. Gilkinson
Ed.C.I.271su	Problems in Curriculum Construction	Mr. Bossing, Mr. Cook
Ed.C.I.273su	Problems in Reading	Mr. Bond

Elementary Education

Ed.C.I.102su	Contents and Activities of the Social Studies in the Elementary Grades	Mr. Wesley
Ed.C.I.103su	The Teaching of Science in the Elementary School	Arrange
Ed.C.I.119su	Elementary School Curriculum	Mr. Cook
Ed.C.I.130su	A World View of Childhood and Nursery Education	Miss Gutteridge
Ed.C.I.143su	Teaching of Reading in the Elementary School	Mr. Bond
Ed.C.I.150su	Supervision and Improvement of Instruction	Mr. Brueckner
Ed.C.I.151su	Diagnosis and Remedial Instruction	Arrange
Ed.C.I.153su	Supervision and Teaching of English in the Elementary Schools	Mr. Archer
Ed.C.I.160su	Supervision of Elementary Subjects	Mr. Brueckner, Miss Smith, Mr. Wesley, Mr. Bond
Ed.C.I.186su	Laboratory in Elementary Instructional Practices	Mr. Staudenmaier
Ed.C.I.187su	Laboratory in Elementary Instructional Practices	Mr. F. Miller
Ed.C.I.224su	Seminar in Elementary School Problems	Mr. Brueckner, Mr. Bond, Mr. Cook, Mr. Archer
Ed.C.I.261su	Special Problems in School Supervision	Mr. Brueckner

* Students should register for this course for eight weeks. They may take any two quarters. Listed in Speech as 164-165-166su.

Secondary Education

Ed.C.I.113su	High School Curriculum	Mr. Bossing
Ed.C.I.122su	Literature for Adolescents	Miss Smith
Ed.C.I.168su	Current Developments in the Social Studies	Mr. McCune
Ed.C.I.169su	Extra-curricular Activities	Mr. Cooper
Ed.C.I.170Bsu	Curriculum and Course of Study Construction	Mr. Bossing
Ed.C.I.191su	Advanced Course in the Teaching and Supervision of Secondary School Mathematics	Mr. Walker
Ed.C.I.204su	Social Studies Curriculum	Mr. Wesley
Ed.C.I.266su	Supervision of High School Instruction	Mr. Boardman
Ed.C.I.284su	Advanced Course in the Teaching of Science	Arrange
Ed.C.I.294su	Special Problems in Techniques of Secondary School Instruction	Miss Smith

Higher Education

Ed.C.I.228su	Problems of College Education	Mr. McConnell, Miss Eckert
Ed.C.I.250su	Higher Education in the United States	Miss Eckert

SECOND TERM

General Courses

Ed.C.I.105su	Visual Aids in Teaching	Mr. Archer
Ed.C.I.107su	Radio in Education	Mr. Tyler
Ed.C.I.129su	Principles and Problems of Teaching Social Hygiene	Mr. Griffiths
Ed.C.I.145su	Remedial Reading	Mr. Bond
Ed.C.I.171su	Curriculum Laboratory Practice	Miss Cutright
Ed.C.I.271su	Problems in Curriculum Construction	Mr. Umstattd
Ed.C.I.273su	Problems in Reading	Mr. Bond

Elementary Education

Ed.C.I.119su	Elementary School Curriculum	Mr. Cook
Ed.C.I.150su	Supervision and Improvement of Instruction	Mr. Brueckner
Ed.C.I.160su	Supervision of Elementary Subjects	Mr. Brueckner, Mr. Wesley, Mr. Bond, Mr. Archer
Ed.C.I.170Asu	Curriculum and Course of Study Construction	Miss Cutright
Ed.C.I.225su	Seminar in Elementary School Problems	Mr. Brueckner, Mr. Bond, Mr. Cook, Mr. Archer
Ed.C.I.261su	Special Problems in School Supervision	Mr. Brueckner

Secondary Education

Ed.C.I.135su	Teaching of Occupations and Group Guidance	Miss Wright
Ed.C.I.168su	Current Developments in the Social Studies	Mr. Wesley
Ed.C.I.169su	Extra-curricular Activities	Mr. Carlson
Ed.C.I.170Bsu	Curriculum and Course of Study Construction	Mr. Umstattd
Ed.C.I.201su	Problems in Teaching the Social Studies	Mr. Wesley
Ed.C.I.266su	Supervision of High School Instruction	Mr. Boardman

EDUCATIONAL ADMINISTRATION

FIRST TERM

General Courses

Ed.Ad.104su	Minnesota School Laws and Regulations	Mr. Caldwell
Ed.Ad.124su	Public School Administration	Mr. Oppenheimer
Ed.Ad.125su	Techniques in Administration	Mr. Schweickhard
Ed.Ad.210su	Financial Aspects of Public School Business Administration	Mr. Reeder
Ed.Ad.226su	School Plant Planning and Management	Mr. Neale
Ed.Ad.228su	Special Problems in Educational Administration	Mr. Neale
Ed.Ad.230su	Public Relations for Schools	Mr. Reeder
Ed.Ad.234su	Research in Educational Administration	Mr. von Borgersrode
Ed.Ad.235su	Seminar in Educational Administration	Mr. Neale

Elementary Education

Ed.Ad.115su	Organization of the Elementary School	Mr. von Borgersrode

Secondary Education

Ed.Ad.133su	Guidance in Secondary Schools	Mr. Hahn
Ed.Ad.167su	Junior High School	Mr. Cooper
Ed.Ad.264su	High School Administration	Mr. Boardman
Ed.Ad.270su	Special Problems in Secondary Education	Mr. Boardman

Higher Education

Ed.Ad.274su	The Junior College	Mr. Oppenheimer

SECOND TERM

General Courses

Ed.Ad.124su	Public School Administration	Mr. Schweickhard
Ed.Ad.125su	Techniques in Administration	Mr. von Borgersrode
Ed.Ad.210su	Financial Aspects of Public School Business Administration	Mr. Schweickhard
Ed.Ad.226su	School Plant Planning and Management	Mr. Neale
Ed.Ad.228su	Special Problems in Educational Administration	Mr. Neale
Ed.Ad.235su	Seminar in Educational Administration	Mr. Neale

Elementary Education

Ed.Ad.115su	Organization of the Elementary School	Mr. von Borgersrode

Secondary Education

Ed.Ad.133su	Guidance in the Secondary Schools	Miss Wright
Ed.Ad.167su	Junior High School	Mr. Umstattd
Ed.Ad.265su	High School Administration	Mr. Boardman
Ed.Ad.270su	Special Problems in Secondary Education	Mr. Boardman

EDUCATIONAL PSYCHOLOGY

FIRST TERM

General Courses

Ed.Psy.60su	Introduction to Statistical Methods	Mr. Fattu
Ed.Psy.120su	Basic Principles of Measurement	Mr. Cook
Ed.Psy.159su	Personality Adjustments in Education	Mr. Conklin
Ed.Psy.208su	Methods in Educational Research	Mr. Johnson
Ed.Psy.216su	Statistical Methods in Education	Mr. Johnson
Ed.Psy.225su	Diagnosis and Counseling in Guidance	Mr. Darley
Ed.Psy.233su	Problems in Guidance and Personnel Work	Miss Edwards
Ed.Psy.253su	Research Problems	Mr. Johnson, Mr. McConnell, Mr. Cook, Mr. Van Wagenen
Ed.Psy.281su	Practice in Personnel Work	Mr. Darley
Ed.Psy.294su	Psychology of Learning	Mr. McConnell

Elementary Education

Ed.Psy.115su	Psychology of Elementary School Subjects	Mr. Van Wagenen
Ed.Psy.182su	Education of Handicapped Children	Mr. Rockwell
Ed.Psy.183su	Education of Gifted Children	Mr. Van Wagenen

Secondary Education

Ed.Psy.133su	Guidance in the Secondary Schools	Mr. Hahn
Ed.Psy.140Ssu	Tests and Measurements for Secondary Schools	Miss Eckert

SECOND TERM

General Education

Ed.Psy.60su	Introduction to Statistical Methods	Mr. Fattu
Ed.Psy.120su	Basic Principles of Measurement	Mr. Cook
Ed.Psy.141su	Group Aptitude Testing	Mr. Van Wagenen
Ed.Psy.217su	Statistical Methods in Education	Mr. Johnson
Ed.Psy.233su	Problems in Guidance and Personnel Work	Miss Edwards
Ed.Psy.253su	Research Problems	Mr. Johnson, Mr. Cook, Mr. Van Wagenen
Ed.Psy.291su	Individual Differences	Mr. Ryans
Ed.Psy.293su	Psychology of Learning	Mr. Ryans

Elementary Education

Ed.Psy.140Esu	Tests and Measurements for Elementary Schools	Mr. Van Wagenen

Secondary Education

Ed.Psy.133su	Guidance in the Secondary Schools	Miss Wright
Ed.Psy.158su	Psychology of Adolescence	Miss Edwards

GENERAL EDUCATION

FIRST TERM

Ed.51Asu	Introduction to Secondary School Teaching	Mr. Dugan
Ed.51Bsu	Introduction to Secondary School Teaching	Mr. Fattu

Ed.51Csu	Introduction to Secondary School Teaching	Mr. Curtis
Ed.61Asu	Introduction to Elementary School Teaching	Mr. Dugan
Ed.Wsu	Professional Preparation for Teaching	Arrange

SECOND TERM

Ed.51Asu	Introduction to Secondary School Teaching	Mr. Anderson
Ed.51Bsu	Introduction to Secondary School Teaching	Mr. Curtis
Ed.51Csu	Introduction to Secondary School Teaching	Mr. Curtis
Ed.61Asu	Introduction to Elementary School Teaching	Mr. Anderson

HISTORY AND PHILOSOPHY OF EDUCATION

FIRST TERM

H.Ed.176su	Conflicting Issues in Modern Education	Mr. Brameld
H.Ed.179su	Critical Thinking for Teachers	Mr. Brameld

SECOND TERM

H.Ed.102su	History of Modern Secondary and Higher Education	Miss Alexander
H.Ed.103su	History of Modern Elementary Education	Miss Alexander

HOME ECONOMICS EDUCATION

FIRST TERM

H.E.Ed.192su	Educational Measurement in Home Economics	Miss Brown
H.E.Ed.194asu	Adult Education Problems	Miss Krost
H.E.Ed.194bsu	Adult Education Problems	Miss Krost
H.E.Ed.293su	Special Problems in Home Economics Education	Miss Brown

INDUSTRIAL EDUCATION

FIRST TERM

Ind.40su	Analysis	Mr. Fryklund
Ind.61su	Practices in Vocational Education	Mr. Widdowson
Ind.101su	Tests in Industrial Subjects	Mr. Fryklund
Ind.102su	The General Shop	Mr. Micheels
Ind.107su	Co-ordination	Mr. Widdowson
Ind.110su	Guidance in the Schools	Mr. Smith
Ind.200su	Research Problems (Independent Papers)	Mr. Smith, Mr. Fryklund
Ind.250su	Problems in Vocational Education	Mr. Smith

SECOND TERM

Ind.103su	Instructional Aids	Mr. Fryklund
Ind.108su	Apprenticeship	Mr. Widdowson
Ind.115su	Supervision of Industrial Education	Mr. Fryklund
Ind.172su	Part-time Education	Mr. Widdowson
Ind.200su	Research Problems (Independent Papers)	Mr. Fryklund

METHODS AND DIRECTED TEACHING*

FIRST TERM

Ed.T.52su	Directed Teaching	Mr. Carlson
Ed.T.55su	Principles of Early Childhood Education	Miss Peterson
Ed.T.56su	Permanent Play Materials	Miss Peterson

* See Institute of Child Welfare, page 60, for additional courses.

Ed.T.59su	Story Telling	Miss Headley
Ed.T.66Amsu	Special Methods and Directed Teaching in English	Miss Handlan
Ed.T.69Am,Bmsu	Special Methods and Directed Teaching in the Social Studies	Arrange
Ed.T.73A,Bsu	Special Methods and Directed Teaching in German	Arrange
Ed.T.76Asu	Methods and Observation, Nursery School	Miss Gutteridge, Miss Peterson
Ed.T.76Csu	Methods and Observation, Kindergarten	Miss Headley

MUSIC EDUCATION

FIRST TERM

Mu.Ed.4su	Applied Instrumental Technique	Mr. Pepinsky
Mu.Ed.5 or 6su	Applied Instrumental Technique	Mr. Prescott
Mu.Ed.50Asu	Primary Music Methods	Mr. Silverthorne
Mu.Ed.53su	High School Music Methods	Mr. Silverthorne
Mu.Ed.54su	Operetta Production	Mrs. Nohavec
Mu.Ed.63su	Band Conducting	Mr. Prescott
Mu.Ed.65su	Instrumentation	Mr. Pepinsky
Mu.Ed.68su	Conducting of Instrumental Music and Survey of Materials	Mr. Pepinsky
Mu.Ed.101Esu	Tests and Measurements in Music	Mrs. Nohavec
Mu.209, 210, or 211su	Advanced Topics in Musical Analysis	Mr. Pepinsky
Mu.Ed.220Esu	Survey and Evaluation of Recent Research in Music Education	Mrs. Nohavec
Mu.Ed.224Esu	Seminar and Individual Research Problems in Music Education	Mr. Pepinsky, Mrs. Nohavec

SECOND TERM

Mu.Ed.104su	Advanced Applied Instrumental Technique	Mr. Pepinsky
Mu.Ed.165su	Advanced Instrumentation	Mr. Pepinsky
Mu.209, 210, or 211su	Advanced Topics in Musical Analysis	Mr. Pepinsky
Mu.Ed.224Esu	Seminar and Individual Research Problems in Music Education	Mr. Pepinsky

See also courses offered in the Music Department of the College of Science, Literature, and the Arts.

PHYSICAL EDUCATION AND ATHLETICS

PHYSICAL EDUCATION FOR MEN*

FIRST TERM

1su	Beginning Swimming	Arrange
5A,B,Csu	Physical Education Activities	Mr. Piper, Mr. Beise
6A,Csu	Intramural Sports	Mr. Bartelma
7A,B,Csu	Recreational Games and Sports	Mr. Bartelma, Mr. Beise
8su	Golf and Tennis	Mr. Smith
50su	Human Anatomy	Dr. Hauser, Mr. Osell
51su	Mechanics of Movement	Mr. Osell
53,54,55su	Methods and Materials in Physical Education	Mr. Bartelma

* Courses marked "E" carry credit toward the degree of master of physical education.

57su	Operation and Conduct of Play Centers	Mr. Haislet
60su	Care and Prevention of Injuries	Mr. Stein
67su	Football Coaching	Dr. Hauser, Mr. Beise
101Esu	Principles of Physical Education	Mr. Haislet
103Esu	Physical Examination and Adaptation Activities	Dr. Hauser, Mr. Osell
105Esu	Safety Procedures in Physical Education	Mr. Piper
133Esu	Special Administrative Problems in Physical Education in Secondary Schools	Mr. Nordly
135Esu	Tests and Measurements in Physical Education	Mr. Keller
136Esu	Leadership in Community Recreation	Mr. Haislet
137Esu	Recent Literature and Research in Physical Education	Mr. Nordly
138Esu	Administration of Physical Education in Colleges and Universities	Mr. Keller
237Esu	Problems in Physical Education	Mr. Nordly

SECOND TERM

1su	Beginning Swimming	Arrange
5B,Csu	Physical Education Activities	Arrange
6Csu	Intramural Sports (Swimming)	Mr. Piper
7A,B,Csu	Recreational Games and Sports	Arrange
57su	Operation and Conduct of Play Centers	Mr. Haislet
101Esu	Principles of Physical Education	Mr. Gibson
105Esu	Safety Procedures in Physical Education	Mr. Piper
133Esu	Special Administrative Problems in Physical Education in Secondary Schools	Mr. Nordly
134Esu	The Curriculum in Physical Education	Mr. Nordly
135Esu	Tests and Measurements in Physical Education	Mr. Gibson
136Esu	Leadership in Community Recreation	Mr. Haislet
237Esu	Problems in Physical Education	Mr. Nordly

PHYSICAL EDUCATION FOR WOMEN*

FIRST TERM

4su	Fundamentals of All Rhythm	Miss Schloz
5su	Methods of Coaching and Conducting Team Games for the Junior and Senior High School	Miss Snell
7su	Tennis for Beginners	Miss Thomas
8su	Golf for Beginners	Miss Thomas
10su	Teachers Course in Fundamentals of Physical Education	Miss Thomas
13su	Tumbling, Stunts, and Pyramids for Junior and Senior High School	Miss Snell
18su	Elementary Folk Dancing and Games	Miss Schloz
32su	Elementary Swimming	Miss Thomas
33su	Intermediate and Advanced Swimming	Miss Starr
37su	Individual and Dual Games	Miss Schloz
51su	School Health and Safety Education	Miss Starr
52su	Principles and Curriculum of Physical Education	Miss Baker
53su	Organization and Administration of Physical Education	Miss Snell

* Courses marked "E" carry credit toward the degree of master of physical education.

113Esu	Physical Education in the Elementary School	Miss Baker
114Esu	The Administration of the Health Education Program	Miss Starr

SECOND TERM

18su	Elementary Folk Dancing and Games	Miss Graybeal
37su	Individual and Dual Games	Miss Graybeal
111Esu	An Advanced Course in Methods of Teaching Physical Education	Miss Graybeal

SCHOOL OF BUSINESS ADMINISTRATION

FIRST TERM

Econ.3su	Elements of Money and Banking	Mr. Graves
Econ.5su	Elements of Statistics	Mr. Graves
Econ.6su	Principles of Economics	Mr. Boddy
Econ.20su	Elements of Accounting	Arrange
Econ.25su	Principles of Accounting	Mr. Reighard
B.A.101su	Advanced General Economics	Mr. Mudgett, Mr. Boddy
B.A.112su	Business Statistics	Mr. Mudgett
B.A.134su	Income Tax Accounting	Mr. Reighard
B.A.146su	Investments	Mr. Stehman
B.A.155su	Corporation Finance	Mr. Stehman
B.A.165su	Economics of Public Utilities	Mr. Garver
Econ.176su	International Commercial Policies	Mr. Blakey
Econ.178su	Consumer Economics	Mr. Vaile
Econ.185su	Economics of Marketing	Mr. Vaile
Econ.189su	Principles of Taxation	Mr. Blakey
Econ.203su	Seminar in Economic Theory	Mr. Garver

SECOND TERM

Econ.7su	Principles of Economics	Mr. Stigler
Econ.26su	Principles of Accounting	Mr. Heilman
B.A.89su	Production Management	Mr. Filipetti
B.A.102su	Advanced General Economics	Mr. Stigler
B.A.139su	Advanced General Accounting	Mr. Heilman
B.A.142su	Advanced Money and Banking	Mr. Marget
Econ.149su	Business Cycles	Mr. Marget
Econ.161su	Labor Problems and Trade Unionism	Mr. Yoder
B.A.167su	Personnel Administration	Mr. Yoder
B.A.184su	Administration of Industrial Enterprises	Mr. Filipetti

INSTITUTE OF CHILD WELFARE

FIRST TERM

C.W.80su	Child Psychology	Arrange
C.W.131su	Personality, Emotional, and Social Development of the Child	Mr. Anderson
C.W.132su	The Development of the Elementary School Child	Miss Gutteridge
C.W.140su	Behavior Problems	Mr. Harris
C.W.150su	A World View of Childhood and Nursery Education	Miss Gutteridge
C.W.170su	Parent Education	Mr. Harris
C.W.270su	Readings in Child Development	Mr. Anderson

Courses Ed.T. 55su, 56su, 59su, 76Asu, and 76Csu under Methods and Directed Teaching and Ed.C.I. 130su under Curriculum and Instruction in the College of Education are also offered by the institute.

SECOND TERM

C.W.40su	Child Training	Mrs. Cummings
C.W.70su	Home, School, and Family Relations	Mrs. Cummings
C.W.130su	Motor, Linguistic, and Intellectual Development of the Child	Mrs. Maurer
C.W.140su	Behavior Problems	Mrs. Maurer
C.W.270su	Readings in Child Development	Mrs. Maurer

LIBRARY INSTRUCTION

FIRST TERM

Lib.Meth.51su	Bibliography	Mr. Settelmayer
Lib.Meth.52su	Cataloging	Miss Brainard
Lib.Meth.55su	Advanced Classification	Mr. Settelmayer
Lib.Meth.57su	Secondary School Library Administration	Miss Ersted
Lib.Meth.62su	Reference	Miss Fraser
Lib.Meth.71su	Library Work with Children	Miss Scott

SECOND TERM

Lib.Meth.60su	Binding	Mr. Shove
Lib.Meth.63su	Advanced Reference	Miss Hutchinson
Lib.Meth.68su	Circulation Work	Mr. Wheeler
Lib.Meth.73su	Adult Book Selection (Part I)	Miss Hutchinson

PARTIAL LIST OF VISITING FACULTY

Brainard, Edith M., M.A., Librarian, Southwestern College, Winfield, Kansas

Buell, Murray F., Ph.D., Assistant Professor of Botany, North Carolina State College of Agriculture and Engineering, University of North Carolina, Raleigh, North Carolina

Caldwell, A. B., Ed.D., Deputy Commissioner, Minnesota State Department of Education

Conklin, Edmund S., Ph.D., Chairman of the Department of Psychology, University of Indiana, Bloomington, Indiana

Derryberry, Mayhew, Ph.D., Chief, Health Education Studies, United States Public Health Service, Washington, D.C.

Ersted, Ruth M., B.S., Supervisor of School Libraries, Minnesota State Department of Education

Fraser, Irene, B.S., Circulation Assistant, Minneapolis Public Library

Gray, James, B.A., Novelist and Journalist, St. Paul, Minnesota

Graybeal, Elizabeth, Ph.D., Lecturer in Physical Education, State Teachers College, Duluth, Minnesota

Griffiths, William, M.A., Social Hygienist, Minnesota State Board of Health

Irving, William Henry, Ph.D., Professor of English, Duke University, Durham, North Carolina

Kahl, Ruth, B.A., Regional Public Health Nursing Consultant, United States Public Health Service, Chicago, Illinois

Miller, Fred A., M.A., Resident Director, Kellogg Foundation Camp, Clear Lake, Michigan

Olcutt, Virginia, M.S., Assistant Professor of Nursing Education, University of Washington, Seattle, Washington

Oppenheimer, J. J., Ph.D., Dean, School of Liberal Arts, University of Louisville, Louisville, Kentucky

Reeder, Ward G., Ph.D., Professor of Education, Ohio State University, Columbus, Ohio

Ryans, David, Ph.D., Executive Secretary, Co-operative Test Service, American Council on Education, New York, New York

Schloz, Esther, B.S., Instructor in Physical Education, Public Schools, Detroit, Michigan

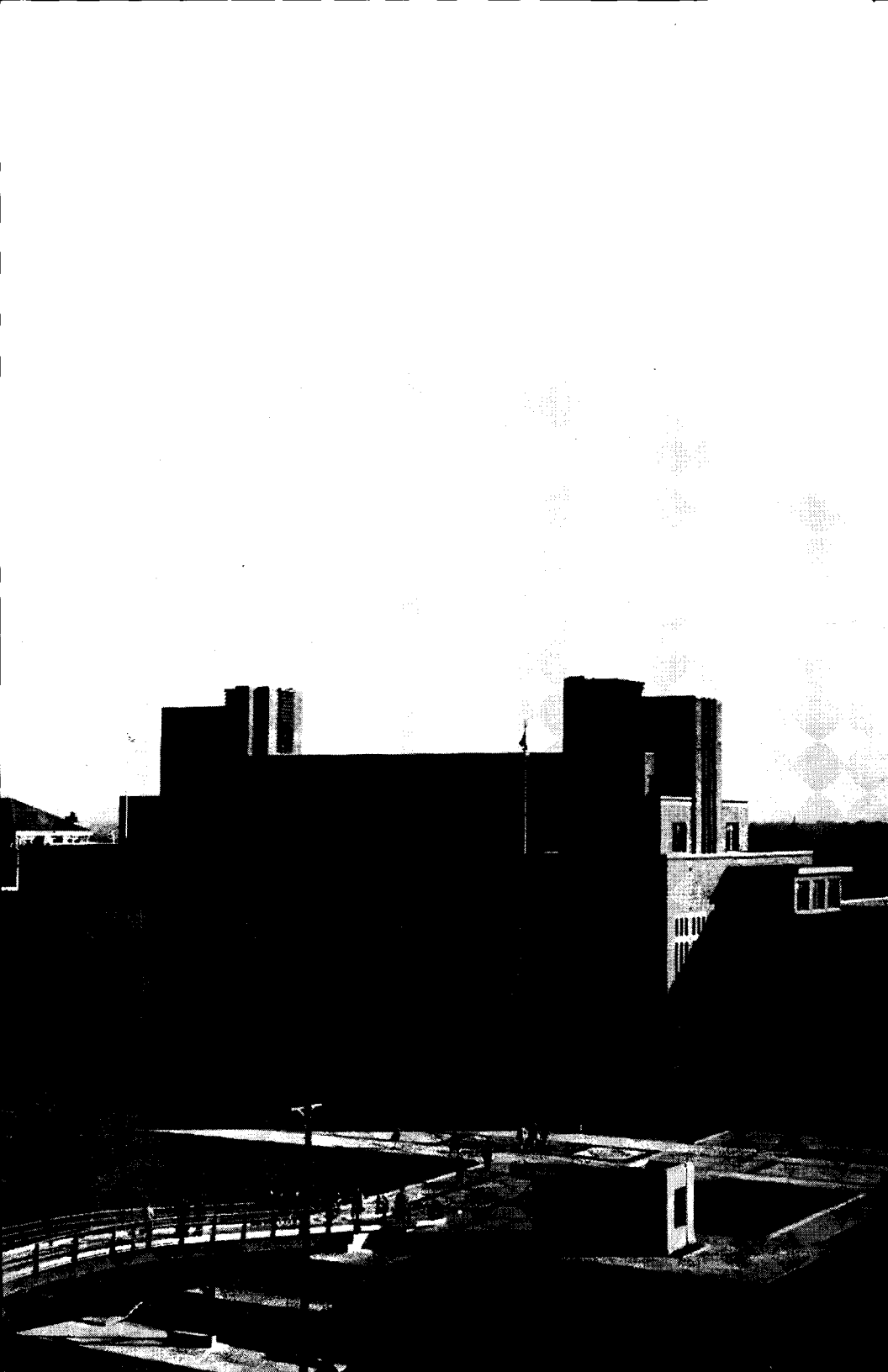
Scott, Carrie E., B.A., New York State Library School Certificate, Supervisor of Children's Work, and Director of Training Class, Indianapolis Public Library, Indianapolis, Indiana

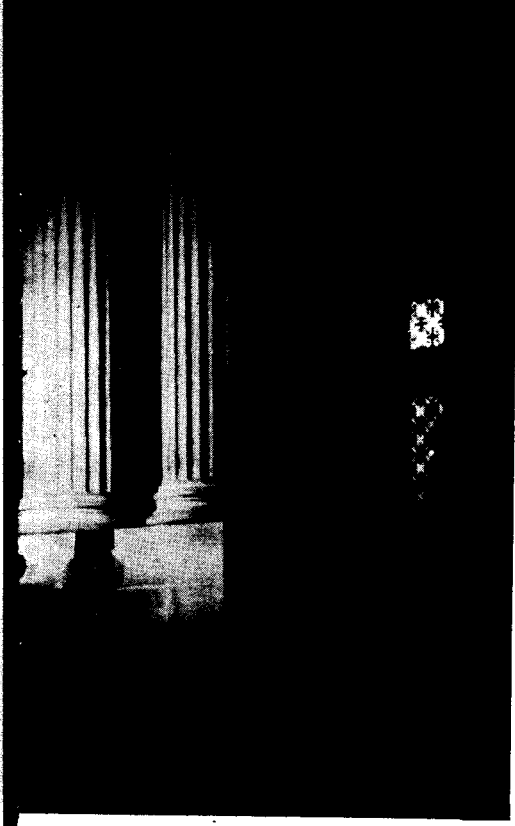
Settelmayer, John C., M.S., Late Librarian, Hibbing Junior College Library, Hibbing, Minnesota

Umstattd, James G., Ph.D., Professor of Secondary Education, University of Texas, Austin, Texas

von Borgersrode, Fred, Ph.D., Director of Research, Minnesota Education Association, St. Paul, Minnesota

White, Newman I., Ph.D., Professor of English, Duke University, Durham, North Carolina





Learn for Living

THE·BULLETIN·OF THE·UNIVERSITY·OF·MINNESOTA

EXTENSION·CLASSES

SECOND·SEMESTER 1940·1941

Supplementary Information

Announcement

(Classes begin week of February 10)

Read through the following list of new, changed, and cancelled classes. Note carefully the time, place, and instructor—many of which represent changes from or additions to the schedule announced in the regular bulletin.

Many extension classes start new in the second semester, being repetitions rather than continuations of first semester classes. Numerous others can be entered in the second semester with the consent of the instructor. Register for any class or classes which seem likely to satisfy your aims, attend the first meeting, and confer with the instructor. If you decide to make a change, you may transfer with little trouble and no expense. Simply notify the campus office of any change in your original registration as soon as you make such a change.

If you are in doubt on any point, or want a copy of the regular bulletin, call at or phone one of the extension offices. Business hours of these offices for the second semester are listed on page 4 of this announcement.

NEW CLASSES

(Not announced in the regular bulletin)

Alternating Current Machinery. 3 credits for certificate. $10.

T 7:30 Campus Elec. Eng. 237, Caverley

A continuation of the class taught during the first semester.

B.A. 170: Work Simplification, Time Standards, and Cost Control. 3 credits. $10.

Th 6:20 Campus Vincent 301, Cummins

A continuation of B.A. 89 Business Organization and Management. Principles and laboratory practice in simplifying manual tasks, reducing fatigue, and increasing productivity; stop watch and motion picture techniques of developing time standards for cost control and production organization; simplified budgetary control. Latest textbook and motion picture materials useful in giving a modern foundation for effective planning of office, store, and factory operations. Emphasis on cost reduction, as demonstrated in practical cases. Students should keep the entire class evening open for laboratory practice. Prerequisite: B.A. 89, M.E. 171, M.E. 174, or consent of instructor.

Cartooning. No credit. $10.

M 8:05 St. Paul Ext. Center 200, Kleis

Covers drawing technique and use of various materials. Body poses and backgrounds are analyzed; lettering and engraving requirements are studied. Titles and "gags" are given attention, as are such special types of cartoons as the political cartoon and motion picture animation. Career problems such as free lancing and selling are discussed. No prerequisite.

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Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota. Accepted for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 12, 1918

Ed. Psy. 88: Guidance Problems for Workers in Adult Education Agencies. 3 credits but see below. $10.

W 8:05 Campus Eddy 106, Darley

Discussion of studies of age in relation to abilities; occupational adjustment of adults, including job satisfaction studies; adult interests, survey of reasons for taking adult training, studies on the Strong Vocational Interest Form; adjustment problems of adults; illustrative cases from the files of the University Testing Bureau. The course will count toward a College of Education degree but not as one of the controlled electives for the teaching certificate. Prerequisite: consent of instructor.

History 95a: Latin America in the Twentieth Century. 3 credits. $10.

M 8:05 Campus Burton 221, Jones

A survey of the recent history of the Latin American countries with special attention to their internal problems and policies; their relations with Europe and the United States; their economic, social, and cultural development, especially as related to Pan-Americanism. Lectures, discussions, and assigned readings. No prerequisite.

Sociology 146: Community Organization and the Social Setting of Recreation. 3 credits. $10.

M 6:20 Campus Jones 2, May

This course is designed primarily for social workers, teachers, group workers, and other persons who are interested in promoting programs of recreation and adult education. It aims to help the student to understand some of the social and economic trends that influence the leisure-time problems in a community. It offers opportunity for the discussion of basic principles of community organization and of their application to specific local situations. The major emphasis will be on the solution of practical problems involved in the organization of programs of recreation and education. Each student will have an opportunity to work on a problem of his own choosing. Prerequisite: for Arts College students, 3 courses in sociology; for Education students, 3 courses in social sciences including Soc. 57; or consent of instructor.

CHANGES

Aero. II: Elementary Navigation and Meteorology	T	7:30	Campus Armory 105, Akerman
Anthrop. 107: American Anthropology	Th	8:05	Campus Wesbrook 6, Wilford
Art Ed. 4-5-6: Drawing from Still Life and Pose	T	4:20	Campus Jones 207, Lewis
Art Ed. 15: Interior Decorating	M	6:20	Campus Jones 203, Lewis
Art Ed. 22: Advanced Interior Decorating	T	7:00	Campus Jones 203, Lewis
B.A. 180F: Senior Topics: Statistics	T	8:05	Campus Vincent 2, Kozelka
Bact. 102: Special Bacteriology	T Th	7:30	Campus Millard 214, Hoyt
C.W. 82: Later Childhood and Adolescence	M	6:20	St. P. Ext. Center 200, Cummings
Econ. 25L: Principles of Accounting and Accounting Laboratory	T	6:20	Campus Vincent 1, Ostlund
Econ. 25L: Principles of Accounting and Accounting Laboratory	Th	6:20	Campus Vincent 307, Henwood
Econ. 149: Business Cycles	W	6:20	Campus Vincent 211, Marget
Eng. 28: Advanced Writing II	T	6:20	Campus Folwell 203, Avery
Fr. 4: Intermediate French	T	6:20	Campus Folwell 227, Fermaud
G.C. 25B: Film and Drama Today	Th	8:05	Campus Nat. Hist. Museum 3, Hamilton
Math. 13: Analytical Geometry	T	7:00	Campus Main Eng. 106, Edwards
M.E. 66ex: Air Conditioning, First Year	W	7:30	Campus Exp. Eng. 110, Jordan
M.E. 174: Production Management—Time and Motion Studies	T	6:20	Campus Mech. Eng. 202, Laitala
M.&M. 129b: Hydraulics. 2 credits. $7	M	7:00	Campus Main Eng. 107, Teeter
Salesmanship	W	8:05	St. P. Ext. Center 208, Faragher
Soc. 110: Rural Organization	M	6:20	Campus Folwell 109, Tannous
Soc. 152: Public Welfare	T	6:20	Campus Jones 2, Hayden
Sp. 2-3: Fundamentals of Speech	T	6:20	Campus Folwell 5, Hurd

N.B.—Correction of Lines 17-18, Page 22, of the regular bulletin: "To be acceptable toward the Junior College certificate, credits must be earned in Junior College classes—that is, numbered **below** 50."

CANCELLATIONS

Eng. 53: The English Novel
G.C. 22B: Art Today
Hist. 81-82: Introduction to Economic History (Campus class)
Retail Advertising
Scan. 5: Introduction to Norwegian Literature
Soc. 85: Principles of Case Work
Span. 54: Composition and Conversation

SPECIAL NOTICES

English Placement Tests

The placement tests required of all who plan to register for English Composition IV will be given according to the following schedule:

7:00 Thursday, February 6	Room 110, Folwell Hall, Campus
7:00 Thursday, February 13	Room 110, Folwell Hall, Campus
7:00 Thursday, February 6	Room 206, St. Paul Extension Center

How To Study Institute

(Free of charge)

This institute will consist of five lectures designed to inform students how best to use time and energy in an economical process of study. The lectures will be given by Professor Charles Bird and will take place Monday through Friday, February 3 to 7, 7:00 to 9:00 p.m., in Burton Hall Auditorium on the campus.

Where To Register

Minneapolis: (Campus)	402 Administration Building, University of Minnesota, Main 8177, Richard R. Price, Director
Minneapolis: (Downtown)	690 Northwestern Bank Building, Marquette Ave. and Sixth St. South, Main 0624, A. H. Speer, Resident Manager
St. Paul:	500 Robert St., Extension Center, Cedar 6175, C. H. Dow, Resident Manager
Duluth:	504 Alworth Building, Melrose 7900, John L. Macleod, Resident Manager

(Note: Registrations made later than Saturday, February 15, are subject to a late registration fee.)

Office Hours

All Offices

General: 8:30 a.m. to 5:00 p.m.; Saturday, to 12:00 noon.
February 3 to 15: 8:30 a.m. to 8:30 p.m., except Sunday.

Additional Hours for Campus Office

January 20 to March 1: 8:30 a.m. to 8:30 p.m.; Saturday, to 12:00 noon.
(Note: Extension offices are closed on Wednesday, February 12, a legal holiday.)