

# CORNELL UNIVERSITY

## COLLEGE OF ARTS & SCIENCES



1944-45

PUBLISHED BY THE UNIVERSITY  
ITHACA, NEW YORK

# The University Calendar for 1944-45

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*Under the accelerated program of instruction, the University will offer three terms of sixteen weeks each during the course of the year 1944-45, as follows:*

## 1944

### SUMMER TERM

|      |     |            |  |
|------|-----|------------|--|
| July | 3,  | Monday,    | Registration, Navy students.                             |
| July | 4,  | Tuesday,   | Registration, civilian students.                         |
| July | 5,  | Wednesday, | Instruction begins at 8 A.M.                             |
| July | 27, | Thursday,  | Last day for the payment of tuition for the Summer Term. |
| Oct. | 24, | Tuesday,   | Instruction ends at 4 P.M.                               |

### FALL TERM

|      |     |            |  |
|------|-----|------------|--|
| Nov. | 1,  | Wednesday, | Registration, civilian students.                       |
| Nov. | 2,  | Thursday,  | Registration, Navy students.                           |
| Nov. | 3,  | Friday,    | Instruction begins at 8 A.M.                           |
| Nov. | 23, | Thursday,  | Last day for the payment of tuition for the Fall Term. |
| Dec. | 25, | Monday,    | Christmas, a holiday.                                  |

## 1945

|      |     |           |                            |
|------|-----|-----------|----------------------------|
| Feb. | 22, | Thursday, | Instruction ends at 4 P.M. |
|------|-----|-----------|----------------------------|

### SPRING TERM

|       |     |           |  |
|-------|-----|-----------|--|
| March | 2,  | Friday,   | Registration, Navy students.                             |
| March | 3,  | Saturday, | Registration, civilian students.                         |
| March | 5,  | Monday,   | Instruction begins at 8 A.M.                             |
| March | 29, | Thursday, | Last day for the payment of tuition for the Spring Term. |
| June  | 23, | Saturday, | Instruction ends at 12:50 P.M.                           |

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## CORNELL UNIVERSITY OFFICIAL PUBLICATION

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# COLLEGE OF ARTS AND SCIENCES

## FACULTY

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HARRY DARKES ALBRIGHT, Ph.D., Assistant Professor of Speech and Drama.

ARTHUR AUGUSTUS ALLEN, Ph.D., Professor of Ornithology.

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\*Leave of absence.

## ARTS AND SCIENCES

THE COLLEGE OF ARTS AND SCIENCES offers instruction in classical and modern languages and literatures, in history and the social studies, in psychology, philosophy, and music, in mathematics, and in the natural sciences. The student is expected first to pursue certain courses which will complete his basic preparation in English, in a foreign language, in history, and in a laboratory science. During his second year he may select a major field of study for the remainder of his course. This requirement is broadly conceived to include a sequential and a related group of courses by means of which the student is enabled to secure a certain mastery of one non-technical field of knowledge. The remainder of his course of study is largely elective under the supervision of a faculty adviser whom he chooses, and who will assist him in making a reasonable and appropriate selection of courses. Many of the course offerings of the other colleges are available to him, not only as electives but also as related subjects in the fulfillment of his major requirements.

The general purpose of the College of Arts and Sciences is liberal and non-technical. The definition of a liberal college is found in the subjects which make up its curriculum, namely those subjects which in the history of human civilization have differentiated themselves as the means whereby man has come to understand himself and the world in which he lives. The meaning of a liberal education as thus conceived is a special knowledge of some general field of human understanding erected upon a fundamental training in science and the humanities and spreading into such related subjects as will give breadth as well as concentration of knowledge.

The facilities of the college are adequate in staff, housing, and equipment to give personal attention to the varying needs of individual students, especially those of a pre-vocational and pre-professional nature. Advanced courses and opportunities for research are available even in the undergraduate years to those who are qualified to make use of them, for in addition to his regular courses, a student may also work informally under the supervision of his major adviser, and thus in part complete his education in ways more flexible than the usual courses of study will permit. A student is expected to accept a large degree of personal responsibility for shaping his own courses of study, but the student's adviser stands ready to assist him in all possible ways to make the most of his opportunities.

## REQUIREMENTS FOR ADMISSION

An applicant for admission to the College of Arts and Sciences must have completed a secondary school course giving satisfactory preparation for the work of the College. Fifteen units of entrance credit are required, representing at least four years' work in a high or preparatory school. The fifteen units should, in the main, be made up of English, foreign language (ancient or modern), mathematics, science, and social studies (including history). Each candidate for admission is required to write the Scholastic Aptitude Test of the College Entrance Examination Board and request the Board to report the result to the Director of Admissions, Cornell University.

Usually the number of applicants exceeds the limited number admissible. A Committee on Admissions selects those to be admitted in any year after a comparative study not only of formal preparation but also of evidences bearing on each applicant's character, seriousness of purpose, and fitness to undertake the work of the College.

Applicants for admission should consult the *General Information Number* issued by the University. That publication contains useful notes on expenses, scholarships, loan funds, and matters of general student interest. The *General Information Number* and all other official publications of Cornell University may be obtained on application to the Secretary of the University, Morrill Hall, Ithaca, New York. Application forms are to be had from the University Director of Admissions in Morrill Hall.

### ADMISSION TO ADVANCED STANDING

A student admitted to the College of Arts and Sciences from another college of Cornell University, or from any other institution of collegiate rank, including certain programs of study offered to members of the military services, will receive credit toward the degree of Bachelor of Arts for the number of hours to which his records may, in the judgment of the Faculty, entitle him. In order, however, to obtain the degree of Bachelor of Arts, he must, as a candidate for that degree, have been in residence at least two terms in the College of Arts and Sciences, and in that college only, and he must have completed a minimum of thirty hours while thus enrolled.

Credit toward a degree for work done in a preparatory school, upon subjects which may be offered for entrance to the University, may be given only to those students who, in addition to satisfying all entrance requirements, pass separate examinations in the subjects for which they seek college credit. Inquiry regarding such examinations should be addressed to the Office of Admissions, Morrill Hall.

To freshmen in the College of Arts and Sciences these college-credit examinations are open at the end of their first term as well as at entrance. Moreover, freshmen of this College may take college-credit examinations in subjects for which no entrance credits have been offered provided they furnish the department concerned with evidence of preparation warranting the examination.

### CREDIT FOR SUMMER SESSION

Credit for work done in summer sessions at Cornell or elsewhere may be granted to the extent of thirty hours. Applications for such credit must be filed in the Dean's office, where they will be considered and acted upon in accordance with their merits.

### REGISTRATION

At the time of registration a student will prepare a program of studies with the aid of an adviser. With the consent of the Dean and the approval of his adviser, a student may alter his list of courses within the first ten days of instruction; thereafter, no student will be permitted to cancel his registration in any course unless he shall previously have obtained from the Dean authorization to do so on the ground of ill health, or for other reasons beyond the student's control.

REGISTRATION IN TWO COLLEGES OF THE UNIVERSITY. A student who has completed at least ninety hours in courses given in the College of Arts and Sciences may, with the permission of the Faculties concerned, be registered both in the College of Arts and Sciences and also in the Medical

College or the Law School. (See MAJOR SUBJECTS, Section IIb.) It should be noted, however, that admission to the Medical College is closely restricted, and that in recent years the Medical College has been able to grant this privilege of double registration to only a small proportion of the fourth-year students of the College of Arts and Sciences who applied and who were formally eligible for it.

COMBINED COURSES are offered in Arts and Sciences and Engineering whereby the student may obtain the two degrees in a six-year course. Suggested programs for such six-year courses in Arts and Sciences combined with Civil Engineering, Electrical Engineering, and Mechanical Engineering are published in the *Announcement of the College of Engineering*.

A combined course also leads to the degree A.B. and the degree Master of Fine Arts in a six-year course—see page 32 under Fine Arts.

Students who may be interested in these combined courses should consult the Dean's office as early as possible.

## REQUIREMENTS FOR GRADUATION

The College of Arts and Sciences offers one course only, leading to the degree of Bachelor of Arts. This degree will not be conferred upon any student who has not been in residence at Cornell during the last two terms preceding graduation, nor upon any student who has not been in residence during at least two terms in this College and in this College only.

### THE DEGREE OF BACHELOR OF ARTS

For graduation with the degree Bachelor of Arts a candidate must meet the following requirements:

1. Credit for one hundred and twenty hours, of which at least ninety hours must be for courses given in the College of Arts and Sciences. Courses in Hygiene, Military Science and Tactics, and Physical Training, all of which are offered under the jurisdiction of the University but not of any College, may be counted as part of the thirty hours which a student may elect outside the College of Arts and Sciences, but may not be counted as part of the ninety hours required in the College.
2. A grade of 70 or better in at least sixty of the required one hundred and twenty hours. At least one-half of the major requirements, including related subjects (see page 13) must be passed with grades of 70 or better.
3. Election of courses in accordance with Sections I-II, Courses of Study.
4. Completion of the work in Military Science and Physical Training as prescribed by the University Faculty. (See page 64.)

### BACHELOR OF ARTS WITH DISTINCTION

The degree of Bachelor of Arts with Distinction in the field of a student's major subject will be conferred upon those students who, in addition to having completed the requirements for the degree of Bachelor of Arts, shall (1) have received a grade of 85 or better in at least sixty hours of the courses for which they have been enrolled and an average of 85 in the courses for which they have been enrolled in the field of their major subject and its related courses; 2) have, at the option of the department, taken and passed with distinction a comprehensive examination in the major

subject; (3) have been recommended for the said degree by the department representing their major subject.

The degree of Bachelor of Arts with Distinction in all subjects will be conferred upon those students who, in addition to having completed the requirements for the degree Bachelor of Arts, shall (1) have received the grade of 80 or better in at least ninety hours of courses, and of 90 or better in at least sixty of these; (2) not have received a grade below 70 in more than one course; (3) have received no marks lower than 60. To qualify for the degree of Bachelor of Arts with Distinction in all subjects, a candidate must have completed at least sixty hours at Cornell in courses taught in the College of Arts and Sciences; and if he has received credit towards his degree for work done in another institution, the requirement of grades shall be prorated for the residue of work which must be completed in Arts and Sciences at Cornell.

## COURSES OF STUDY

### I. PRESCRIBED SUBJECTS.

Before graduation a student must satisfy a requirement in each of the following four groups either by completing the prescribed course or by passing a college-credit examination in its equivalent (see ADMISSION TO ADVANCED STANDING, page 10, and COURSES OPEN TO FRESHMEN, paragraph d).

1. *English*, by completing English 2 or NE 1 and 2. Freshmen who elect Social Science A, B may substitute for English 2 the interdepartmental course *Oral and Written Expression*, described on page 62.

This course must be begun in the first year of residence. Students excused from the second term of English 2 may complete the requirement by other courses in English approved by the department, or by Public Speaking 1.

2. *Foreign Languages*, by completing one of the following:—Greek 2a and 2b; Latin 1a; Latin 1; German 4; German 5; French 4a and 5a; French 6; Spanish 6; Italian 5; any more advanced six-hour course in these subjects.

A course in a foreign language must be included in the schedule of courses for the first year of residence.

Failure to meet or make satisfactory progress towards the fulfilment of the requirements in English and foreign languages by the end of the sophomore year will be followed by faculty action placing the student on probation or excluding him from the College.

3. *History*, by completing six approved hours.

4. *Laboratory Science*, by completing one of the following:—Astronomy 180 and 181; General Biology 1; General Botany 1; Chemistry 102 a and b, or 104 a and b, or 110 a and b, or 115; Geology, six approved hours; Physics 3 and 4, or the equivalent; Zoology 1a and 1b.

A normal schedule for a freshman will include courses in at least one of groups 3 and 4.

### II. MAJOR SUBJECTS.

a. *Selection of major subject and adviser.* After the first year of residence and before registering for the first term of the third year, a student must

select his major subject from options offered by the departments listed below. He must at the same time select as major adviser a designated representative from the department in which he has selected his major subject. During the remainder of his residence he will consult with his major adviser in arranging his course and must obtain his signature to the study card before filing it in the Dean's office.

|               |  |
|---------------|--|
| Astronomy     | Mathematics                            |
| Botany        | Music                                  |
| Chemistry     | Philosophy                             |
| The Classics  | Physics                                |
| Economics     | Psychology                             |
| English       | Romance Languages                      |
| The Fine Arts | Scandinavian Languages and Literatures |
| Geology       | Slavic Languages and Literatures       |
| German        | Sociology and Anthropology             |
| Government    | Speech and Drama                       |
| History       | Zoology                                |

b. *Major Requirements.* Before graduation, a student must complete courses in satisfaction of the requirement in his major subject. A statement of this requirement, indicating courses and total hours required, appears before the list of courses in each of the departments. He must also complete courses in satisfaction of a requirement in related subjects. A statement of this requirement, with a list of courses from which selection is to be made, appears at the same place. Selection of courses to be offered in satisfaction of these requirements is subject to the restriction that twenty-four hours of the total must be chosen from courses not marked by asterisks. If a comprehensive examination is included in the requirements of the major subject, this must be passed before graduation.

Courses completed before the selection of the major subject, including those offered in satisfaction of requirements in prescribed subjects, may be accepted in satisfaction of these requirements.

Upon recommendation of the major adviser, the Dean may excuse a student registered in this College and in another college of the University from not more than eighteen hours of his major requirements.

c. *Informal Study.*

The major requirements in certain subjects may be satisfied in part by informal study. A statement to this effect appears before the list of courses in those subjects in which informal study is arranged. Departments may require informal study of some or all of their major students, or may admit them to it upon application.

Informal study will consist of reading, reports, experimentation, senior theses, or other work intended to require from the student the expression of initiative in his major subject or in a related field approved by his adviser. This work will be supervised by the major adviser or by a member of the instructing staff approved by him, and may be tested by examination at the option of the department.

A student who has credit for sixty hours of courses is eligible for informal study. He may earn credit by this means to the amount of six hours in the junior year, and of twelve hours in the senior year.

## III. COURSES OPEN TO FRESHMEN.

a. The following are the courses in the College of Arts and Sciences open to freshmen, except that (1) a student may not register for any of these courses for which he has not satisfied the prerequisites, if any are specified (see announcement under each course); (2) a student may not register for any of these courses for which he has presented an acceptable equivalent at entrance:

Astronomy 180, 181  
 Biology 1  
 Botany 1  
 Chemistry I and II, 102, 104, 110, 115, 203  
 English NE 1 and 2, 2, 2a, 15  
 The Fine Arts 1a, 1b, 10a, 10b, 309  
 French 1, 3a, 4a, 5b, 6, 10, 16  
 Geology 100  
 German 1, 1a, 3, 3a, 4, 5, 6, 8  
 Government 1, 2  
 Greek 1a, 1b, 2a, 2b, 5  
 History NH 1 and 2, 2b, 22, 61b, 82  
 Italian 1, 5  
 Latin A, 1a, 1, 4  
 Mathematics 1, 5, 10, 15, 16, 20, 55, 65  
 Music 1, 13, 15  
 Oral and Written Expression A and B  
 Philosophy 1a, 1b, 2  
 Physics 3, 4, 7, 8, 11, 12  
 Physiology 303  
 Portuguese 1  
 Slavic 1  
 Social Science A and B  
 Spanish 1, 3, 6, 8  
 Speech and Drama, 30, 40  
 Zoology 1a, 1b, 9

b. Subject to the permission mentioned in Section IV, NUMBER OF HOURS, required courses in other colleges in the regular freshmen schedule of those colleges may be selected by a freshman in the College of Arts and Sciences, but only after the approval of the Dean of his College and of his adviser has been obtained.

c. Under exceptional circumstances, a freshman may by petition secure permission from the Advisory Board for Underclassmen to take courses (including freshman electives in other colleges) in addition to those allowed under a and b.

d. With the permission of the department concerned, a freshman at the end of the first term of a year-course may take a credit examination covering also the work of the second term. This provision applies not only to year-courses but also to such second-term courses as are natural continuations of first-term courses (e.g. Physics 4, following Physics 3, French 4b, following French 4a). The privilege is limited to students of high standing as defined by the department.

## IV. NUMBER OF HOURS.

A freshman will ordinarily register in his first term for fifteen hours of work, in addition to the required hours in Physical Training and Military Science.

Every student must register in each term for at least twelve hours; no student may register for more than eighteen hours in any term except by permission of the Dean. A student who has not attained in an academic year a grade of 70 or better in a total of fifteen hours of work will not be permitted to elect more than fifteen hours in either term of the subsequent academic year. In addition to the required work in Physical Training and Military Science, a student on probation may not register for more than fifteen hours a term. For registration in a course not in the College of Arts and Sciences, the permission of the Dean of this College and of the professor in charge of the course must be obtained.

## ADVISERS

Freshmen and sophomores are under the jurisdiction of the Advisory Board for Underclassmen. Each freshman will be assigned to a member of the Faculty who will act as his adviser until he has selected his major adviser. (See page 12, MAJOR SUBJECTS a.) The function of the freshman adviser is to assist the student in his choice of studies, to advise him during the term regarding his work, and generally to give him friendly counsel. The approval of the study card and the signature of the adviser must be obtained before the study card is filed at the office of the Dean.

Special advisory committees have been set up to assist members of the College intending to teach in secondary schools and those intending to study medicine. Interested freshmen are urged to consult early with the proper chairman: for prospective teachers, Associate Professor M. L. HULSE, Goldwin Smith 251; for pre-medical students, Associate Professor L. L. BARNES, Rockefeller 356.

## MARKS AND SCHOLASTIC DISCIPLINE

The passing grade is 60; *abs* represents a course left incomplete by a student's absence from the final examination; *inc* represents a course left incomplete for other reasons acceptable to the instructor; *z*, a course dropped without official cancellation.

No credit towards graduation will be given for a course in which a mark of less than 60 or a mark of *z* is recorded, unless the course be repeated and a passing mark received. A student who has received a mark between 50 and 59, inclusive, in any course that is a prerequisite of any other course may, at the discretion of the department concerned, be regarded as having satisfied the prerequisite; or the department concerned may, before regarding him as having satisfied the prerequisite, require him, by re-examination or otherwise, to secure a passing grade.

A student who, in any course, has received a term mark of "incomplete" or of "absent" may, with the consent of the Dean, and upon payment of the fee required by the University, be permitted to remove the mark, by examination or otherwise, as the department concerned may direct. A mark of incomplete or of absent may not be removed later than registration

day of the third term of attendance in the University, dating from the time the course was taken in the class, and no more than one attempt at removal will be allowed.

A student who in any term does not pass twelve hours (excluding courses in hygiene, military science, and physical training), with a grade of 70 or better in at least six of the twelve hours, will be either dropped or placed upon probation. The same penalties may be imposed on students of the College who, having registered in the Summer Session, do not pass a proportionate part of their Summer Session registration with satisfactory grades. Students on probation may not register in any Summer Session other than the Cornell Summer Session with the expectation of receiving credit in this College.

A student's general record may be so unsatisfactory that the Faculty will refuse him permission to continue in the College even though he has passed twelve hours in the preceding term.

A student failing in the last term, or summer session, of his senior year to meet the requirements in hours and grades which is described above, will ordinarily be expected to return for another term, or summer session, wherein he will be held to make a satisfactory record before he will be graduated.

### SCHOLARSHIPS

Scholarships open to students of Arts and Sciences as members of the University are listed in the *General Information Number* (see page 32 ff.). Only students of Arts and Sciences are eligible for the four scholarships described below.

#### THE GEORGE C. BOLDT MEMORIAL SCHOLARSHIPS

Mr. George C. Boldt, jr., has created three scholarships, each of them worth four hundred dollars in 1943, as a memorial to his father. These scholarships will be awarded at the close of the junior year to the three men students of the College who shall be considered most deserving of this aid. Applications for these scholarships must be filed in the Office of the Dean before March 15 of the academic year preceding the year for which they are awarded. Students enrolled both in this College and in the Law School, the Medical College, or the Graduate School are not eligible.

#### THE CORNELIA L. HALL SCHOLARSHIP

A gift of the late Mary F. Hall has established the Cornelia L. Hall Scholarship, worth one hundred and twenty dollars, "open to any meritorious young woman of this State, who is pursuing the studies of the A.B. course and who is in need of financial assistance." Under the terms of the bequest preference must be given to a suitable candidate from Tioga, Tompkins, or Chemung County; within this preferred class, women of senior or junior standing will be regarded as entitled to first consideration. Applications for the scholarship must be filed in the Office of the Dean before March 15 of the academic year preceding the year for which it is awarded.

### THE STUDENT'S EXPENSES

For the amount of tuition, fees, board, room, and other student expenses, see *The General Information Number*, pages 27-31.

## COURSES OF INSTRUCTION

The following list of courses may be offered in the academic terms of 1944-45. The list does not include the special programs of the Army and Navy at Cornell. For information concerning time and place of meeting and staff assignments, consult the Supplementary Announcement which will be issued at the beginning of each term.

### ASTRONOMY

Mr. R. W. SHAW, *Chairman*; Messrs. D. A. MACRAE AND R. E. WILLIAMSON.

*For a major in Astronomy, the following courses must be completed: (1) in Astronomy, 180, 181, 182 or 183, 187, 189; (2) in related subjects, at least eighteen hours selected from approved courses in Physics, Chemistry, Mathematics, and Geology.*

**180. Introduction to Astronomy.** One term. Credit three hours. One two-hour laboratory or observation period to be arranged.

The course is designed to give the student an understanding of the fundamentals of Astronomy. Emphasis will be placed on the astronomy of the solar system and on the contributions of Astronomy to the sciences, philosophy, and general culture. Opportunity for observations of the celestial bodies with the great telescope will be offered.

**181. Introduction to Astronomy.** One term. Credit three hours. Prerequisite, Astronomy 180.

A continuation of course 180 with emphasis on the astronomy of the sidereal universe.

**182. Field Astronomy.** One term. Credit two hours. Primarily for engineering students.

**M-8. Navigation and Nautical Astronomy I.** One term. Credit three hours.

Instruments, compass corrections, charts, the sailings, dead reckoning, piloting.

**M-9. Navigation and Nautical Astronomy II.** One term. Credit three hours. Prerequisite M:8.

Altitude, azimuth, time, astronomical triangle, latitude, longitude, lines of position, H.O. 203, 208, 211, 214, star altitude curves.

**192. Galactic Astronomy.** One term. Credit three hours. Prerequisite, Mathematics 65. Open to qualified upperclassmen as well as graduate students.

A study of the structure of our Galaxy and its relation to the universe. Attention will be given to the observations, which are the source of our information, and to the application of statistical mathematics to the solution of the problems presented.

### BIBLIOLOGY

Mr. OTTO KINKELDEY

**Bibliology 1.** (Bibliography.) One term. Credit two hours.

The book as a source of information: the reference book; the handbook; book lists, general and special; catalogues and trade lists, their use.

**Bibliology 2.** One term. Credit two hours.

The Book: its origin and evolution. Not a literary course, but a study of the book as a means of the conservation of thought, a manifestation of civilization and culture, its relation to the arts and crafts.

### BOTANY

Mr. LEWIS KNUDSON, *Chairman*; Messrs. H. W. BLASER, D. G. CLARK, R. T. CLAUSEN, O. F. CURTIS, V. M. CUTTER, A. J. EAMES, E. S. FORD, R. A. LAUBENGAYER, W. C. MUENSCHER, L. C. PETRY, L. F. RANDOLPH, and L. W. SHARP.

*For a major in Botany the following courses must be completed: (1) in Botany, course 1, 31, 117, 123 or 124 or 126; one additional course of three or more hours credit; (2) in related subjects, eighteen hours selected from approved courses in Chemistry, Biochemistry, Entomology, Zoology, Bacteriology, Plant Pathology, and Geology. The course in genetics may be offered either as a course in Botany or in the related subjects.*

*For a major in Botany with advanced work in Bacteriology, the following courses must be completed: (1) in Botany, courses 1, 31, 117; in Bacteriology, eight hours of advanced courses approved by the Department of Botany; (2) in related subjects, eighteen hours to be selected from the list given in the paragraph above.*

*Provisions are made for a limited number of students to undertake informal study.*

**1. General Botany.** Two terms. Credit three hours a term. If taken after Biology 1, credit two hours a term.

A survey of the fundamental facts and principles of plant life. The work of the first term deals with the structures and functions of the higher plants, with special emphasis on their nutrition. The work of the second term traces the evolution of the plant kingdom, as illustrated by representatives of the principal groups, and concludes with a brief introduction to the principles of classification of the flowering plants. Laboratory fees, \$3.50 a term.

**13. Trees and Shrubs.** One term. Credit four hours. Prerequisite, course 1 or its equivalent.

The identification of trees and shrubs in summer and in winter conditions. During the first part of the term the work on identification is done largely in the field. The work of the latter part of the term is a study of the classification of woody plants. Laboratory fee, \$4; deposit, \$5.

**31. Plant Physiology.** One term. Credit four hours. Prerequisite, course 1 and introductory Chemistry.

This course is designed to acquaint the student with the general principles of plant physiology. Topics such as water relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, growth and reproduction are studied in detail. Particular emphasis is placed, both in laboratory and in classroom, on discussion of principles and their application to plants. Laboratory fee, \$4; deposit, \$3.

**115. Aquatic Plants.** One term. Credit three hours. Prerequisite, course 1 or its equivalent.

A study of the taxonomy and ecology of fresh-water plants, beginning with the algae and concluding with the aquatic angiosperms. Laboratory fee, \$4.

**117. Taxonomy of Vascular Plants.** One term. Credit four hours. Prerequisite, course 1 or its equivalent.

A study of the kinds of seed plants and ferns, their classification into genera, families, and orders, and field work on the local flora. Emphasis is placed on wild plants, but the more common cultivated plants receive some attention. The course is planned to follow course 1 and to furnish an introduction to the knowledge of field botany and classification of the higher plants, in preparation for special work in various departments, and as an aid in teaching. Instruction is given in the preparation of an herbarium and of keys. Laboratory fee, \$4; deposit, \$5.

Several afternoon and one or two all-day field trips are scheduled in May. Students completing this course may arrange, under course 171, to pursue special advanced work in taxonomy.

**Comparative Morphology of Fungi.** Given in the Department of Plant Pathology.

**123. Plant Anatomy.** One term. Credit four hours. Prerequisite, course 1 or its equivalent, and permission to register.

This course is designed to give a working acquaintance with the internal morphology of vascular plants, and emphasis is placed on practice in interpretation and determination of material. The course is planned primarily for students in applied fields of botany, such as pathology, pomology, or genetics. Students desiring a less detailed training in this subject should take course 126. Laboratory fee, \$5.

**124. Cytology.** One term. Credit four hours. Prerequisite, course 1 or Zoology 1 or its equivalent.

The principal topics considered are protoplasm, cells and their components, nuclear and cell division, meiosis and fertilization, and the relation of these to the problems of development, reproduction, taxonomy, and heredity. Both plant and animal materials are used. Microtechnic is not included. Laboratory fee, \$5.

**126. Morphology of Vascular Plants.** Two terms. First term is prerequisite to second. Credit three hours a term. Prerequisite, course 1 or its equivalent, and permission to register.

An advanced course in the comparative morphology, life histories, and phylogeny of vascular plants. Laboratory fee, \$5.

**161. History of Botany.** One term, without credit.

A course of lectures by various members of the staff with the purpose of acquainting advanced students of botany with the historical development of their science.

**171. Special Problems in General Botany, Taxonomy, Morphology, Anatomy, Paleobotany, Economic Botany, Cytology, and Physiology.** Two terms. Credit not less than two hours a term.

Students engaged in special problems or making special studies may register in this course. They must satisfy the instructor under whom the work is taken that their preparation warrants their choice of problem. The laboratory fee depends on the nature of the work and on the number of credit hours.

**219. Advanced Taxonomy of Vascular Plants.** One term. Credit two hours. Prerequisite, course 117 or its equivalent and training in cytology and genetics.

A course designed particularly for students majoring in taxonomy. Emphasis is placed on the three phases of taxonomic study: floristics, experimental taxonomy, and monographing. The work of the first part of the term is done largely in the field. In the latter part of the term, each student does practical work on some group of plants. Laboratory fee, \$1.

**224. Advanced Cytology.** One term. Credit two hours. Prerequisite, course 124, Plant Breeding 101, and permission to register.

An advanced course dealing mainly with the physical basis of heredity and with recent research in cytogenetics and cytotaxonomy.

**231. Plant Physiology, Advanced Lecture Course.** Two terms. Credit three hours a term. Limited to seniors and graduate students. Prerequisite, training in botany and chemistry, to be determined in each case by the department.

**232. Plant Physiology, Advanced Laboratory Course.** Two terms. Credit three hours a term. Prerequisite or parallel, course 231. Laboratory fee, each term, \$10; breakage deposit, \$5.

## CHEMISTRY

Mr. P. DEBYE, *Chairman*; Messrs. SIMON H. BAUER, ALFRED T. BLUMQUIST, T. R. BRIGGS, A. W. BROWNE, WILLIAM F. BRUCE, JAMES L. HOARD, JOHN R. JOHNSON, A. LETCHER JONES, JOHN G. KIRKWOOD, A. W. LAUBENGAYER, FRANKLIN A. LONG, WILLIAM T. MILLER, MELVIN L. NICHOLS, J. PAPISH, RICHARD M. ROBERTS, THOR RUBIN, CHARLES RUSSELL, and HENRY TAUBE.

*All courses listed below are to be given in the Baker Laboratory of Chemistry.*

*For a major in Chemistry, the following courses must be completed: (1) in Chemistry, courses 102 a and b or 104 a and b, 205 and 206, or 210; or preferably 110 a and b, 115, and 203; 220 and 221, or 225; 305 a and b, 310a; 406 a and b, 410a; and six hours of electives; (2) and related subjects, Mathematics 55 a and 55b, or 65a, 65b and 65c, physics 3 and 4 or 3 and 6, German 1 or 1a unless two units have been offered for entrance.*

## INORGANIC CHEMISTRY

*Students exceptionally well prepared in chemistry should read the section on page 10, in regard to College Credit Examinations.*

*Examinations for those who were unavoidably absent from the final examination in Courses 102 and 104 will be held at 2 p. m. on the day before the instruction begins in the fall.*

**I and II. General Chemistry.** (Navy Chemistry I and II). Credit four hours each.

Chemistry I and II deal with the fundamental laws and theories of chemistry and the properties of the more common elements and their compounds. Deposit, \$13.50. Chemistry II will include an introduction to qualitative analysis.

**1a and 2a. General Chemistry.** (Navy Chemistry 1a and 2a). Credit three hours each. Deposit, \$13.50.

This course is open only to men in the Navy College Training Program and to civilian students in the College of Engineering. The two courses deal with the fundamental laws and theories of Chemistry and the properties of the more common elements and their compounds. Chemistry 2a will include a brief introduction to qualitative analysis.

**102 a and b. General Chemistry.** Credit three hours a term. First term prerequisite to second. Open only to those students who do not offer entrance chemistry. Deposit, \$11 a term.

This course deals with the fundamental laws and theories of chemistry and the properties of the more common elements and their compounds.

104 a and b. **General Chemistry.** Credit three hours a term. First term prerequisite to second. Open to those students who offer entrance chemistry. Deposit, \$11 a term. This course deals with the fundamental laws and theories of chemistry and the properties of the more common elements and their compounds.

110 a and b. **Introductory Inorganic Chemistry.** Credit three hours first term, two hours second term. Prerequisite, entrance credit in chemistry, or course 102.

Required of candidates for the degree of B. Chem. Eng., and recommended for candidates for the degree of A.B. who intend to major in Chemistry.

115. **Introductory Inorganic Chemistry.** Recitations and laboratory practice. Credit three hours. Must be taken with the first term of Chemistry 110. Deposit, \$20.

130 a and b. **Advanced Inorganic Chemistry.** Credit three hours a term. Prerequisite or parallel courses, Chemistry 405 a and b or 406 a and b.

The elements are discussed in the order in which they appear in the Periodic System, with special attention to the bearing of atomic structure on the properties of elements and their compounds and on the relations between the group. The less familiar elements are treated in detail and the stereochemistry of inorganic substances is treated.

135. **Advanced Inorganic Chemistry.** One term. Credit two to six hours. Prerequisite, Chemistry 305 and 310. Deposit variable.

Laboratory practice. The preparation, purification, properties, and reactions of inorganic compounds, including those of the rarer elements.

Chemistry 135 is designed to accompany Chemistry 130, but either course may be taken separately.

140. **Selected Topics in Advanced Inorganic Chemistry.** One term. Credit two hours. Prerequisite, Chemistry 405 and 410, or special permission.

165. **Chemistry of the Rare Elements.** One term. Credit two or more hours. Prerequisite, Chemistry 130. Deposit variable.

Laboratory practice. Extraction, recovery, and purification of the rare elements, and preparation of their salts. Chemical analysis of the rare elements.

195. **Research for Seniors.** Two terms. Credit two or more hours a term. Deposit variable.

#### ANALYTICAL CHEMISTRY

201. **Introductory Analytical Chemistry.** One term. Credit four hours. Prerequisite, Chemistry 102 or 104. Deposit, \$25. Primarily for students majoring in the biological sciences.

A study of the fundamental principles of qualitative and quantitative analysis.

203. **Introductory Qualitative Analysis.** One term. Credit five hours. Prerequisite, Chemistry 115 and Chemistry 110a, or special permission. Deposit, \$30. Must be taken with Chemistry 110b. Required of candidates for the degree of B. Chem. Eng. and recommended for candidates for the degree of A.B. who intend to major in Chemistry.

205. **Introductory Qualitative Analysis.** One term. Credit three hours. Prerequisite, Chemistry 102 or 104. Must be taken with Course 206.

A study of the application of the theories of general chemistry to the systematic separation and detection of the common elements and acid radicals.

206. **Introductory Qualitative Analysis.** One term. Credit three hours. Prerequisite, Chemistry 102 or 104. Deposit, \$25. Must be taken with Course 205. Laboratory practice.

A study of the properties and reactions of the common elements and acid radicals; the qualitative analysis of a number of solutions and solid compounds.

210. **Introductory Qualitative Analysis.** Shorter course. One term. Credit three hours. Prerequisite, Chemistry 102 or 104. Deposit, \$20.

A study of the properties and reactions of the common elements and acid radicals, and their detection in various solutions.

220. **Introductory Quantitative Analysis.** One term. Credit three hours. Prerequisite, Chemistry 203, or 205 and 206, or special permission. Must be taken with Chemistry 221.

A study of the fundamental principles of gravimetric and volumetric analysis with practice in stoichiometry. Students in science and majors in Chemistry are advised to take this course together with Chemistry 221 instead of Chemistry 225.

**221. Introductory Quantitative Analysis.** One term. Credit three hours. Prerequisite, Chemistry 203, or 205 and 206, or special permission. Must be taken with Chemistry 202. Deposit, \$25.

Laboratory practice in the preparation and standardization of various volumetric solutions and the analysis of a variety of substances by volumetric and gravimetric methods.

Students in science and majors in Chemistry are advised to take this course together with Chemistry 220 instead of Chemistry 225.

**225. Introductory Quantitative Analysis.** Shorter course. One term. Credit three hours. Prerequisite, Chemistry 210. Deposit, \$25.

A study of the fundamental principles of gravimetric and volumetric analysis, and the analysis of various substances by these methods.

**230. Advanced Quantitative Analysis.** One term. Credit three hours. Prerequisite, Chemistry 220 and 221 or special permission. Deposit, \$20.

Students will be assigned to a combination of laboratory periods that will total seven and one-half hours a week.

The calibration of weights and volumetric apparatus; the analysis of ferrous and non-ferrous alloys, silicates, and organic substances by various gravimetric, volumetric, and combustion methods.

**235. Advanced Quantitative Analysis.** One term. Credit two hours. Prerequisite, first term of Chemistry 405a or 406b.

A discussion of selected topics in quantitative analysis, and the development and present status of various analytical methods.

**250. Gas and Fuel Analysis.** One term. Credit three hours. Prerequisite, Chemistry 220 and 211. Deposit, \$15.

The complete analysis of coal gas, flue gas, and air, the determination of the heating power of gaseous, liquid, and solid fuels; the analysis of coal; standard methods of testing various petroleum and coal-tar products; the analysis of various substances by methods involving the use of different types of gas evolution apparatus. Problems are assigned which afford practice in the calculation and interpretation of results.

**270. Special Methods of Quantitative Analysis.** One term. Credit two or more hours. Prerequisite, Chemistry 230 and 405. Deposit variable.

Laboratory practice in the application of special methods such as indirect analysis, conductometric and potentiometric titrations, etc., to quantitative analysis and the analysis of special materials. Electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, zinc, iron, etc.; the analysis of alloys and ores. The study of the important methods and special forms of apparatus used in scientific gas analysis.

Within certain limits the work may be selected to suit the requirements of the individual student.

**275. Quantitative Microanalysis.** One term. Credit three or more hours. Prerequisite, Chemistry 230 and special permission. Deposit, \$20.

Laboratory practice in typical methods of both organic and inorganic quantitative microanalysis.

**280. Emission Spectroscopy in Chemical Analysis.** One term. Credit variable. Prerequisite, special permission. Deposit, \$15.

The construction and use of spectroscopic equipment; spectrum excitation; qualitative and quantitative spectrochemical analysis.

**295. Research for Seniors.** Two terms. Credit two or more hours. Deposit variable.

#### ORGANIC CHEMISTRY

**305 a and b. Introductory Organic Chemistry.** Credit three hours a term. Prerequisite, qualitative analysis. Open to those who are taking Chemistry 220.

Lectures and written reviews. The more important compounds of carbon, their occurrence, methods of preparation, relations, and uses.

Students who have completed Chemistry 375 may register for Chemistry 305b in the second term and receive two hours credit.

**310 a and b. Introductory Organic Chemistry.** Credit three hours a term. Prerequisite or parallel course, Chemistry 305. Deposit, \$40.00 a term.

Laboratory practice and oral reviews. The student prepares a large number of typical compounds of carbon and familiarizes himself with their properties, reactions, and relations.

**315 a and b. Advanced Organic Chemistry.** Credit two hours a term. Prerequisite, Chemistry 305, 310, and 340, or the consent of the instructor.

Lectures, First term, survey of the more important classes of organic compounds and their reactions. Second term, discussion of general topics (tautomerism, molecular rearrangements, stereochemistry). Students may register for either term separately.

**320. Advanced Organic Chemistry.** One term. Credit two to six hours. Prerequisite, Chemistry 305 and 310. Deposit, variable.

Laboratory practice. An advanced course in the preparation of organic compounds. The original literature is consulted, and the student is required to repeat some extended and important piece of work, and to compare his results with those published.

**325. Special Topics in Organic Chemistry.** One term. Credit two hours. Prerequisite, Chemistry 315 or 340. Primarily for graduate students; open to undergraduates by special permission.

Lectures. A presentation and discussion of special fields and current theories of organic chemistry. The topics will be: Organic Chemistry of nitrogen and sulfur, and Heterocyclic Compounds.

**330. Chemistry of High-polymers.** One term. Credit two hours. Prerequisite, Chemistry 315 or 340 and 405 or 406.

The mechanism of kinetics of polymerization processes and the chemical structure and reactions of high-polymers will be discussed, with examples chosen from the more significant natural and synthetic high molecular weight materials.

**335. Physical Aspects of Organic Chemistry.** One term. Credit two hours. Prerequisite, Chemistry 215 or 340; open to undergraduates only by special permission.

**340. Identification of Organic Compounds.** One term. Credit three hours. Prerequisite, Chemistry 305 and 310 at grades of 75. Deposit, \$25.

The classification reactions of organic compounds and the preparation of solid derivatives are applied to the identification of unknown organic substances.

**345. Biochemical Aspects of Organic Chemistry.** One term. Credit two hours. Prerequisite, Chemistry 315 or 340; open to undergraduates only by special permission.

A discussion of the organic chemistry of natural products, including plant and animal pigments, vitamins, hormones, etc.

**375. Elementary Organic Chemistry.** One term. Lectures and laboratory, six hours credit. For students in the pre-medical and biological curricula. Prerequisite, general chemistry; qualitative analysis is desirable but not required. Deposit, \$25.

The student should determine the entrance requirement in Organic Chemistry for the particular medical school he wishes to enter. If more than six hours credit is required, he should register in Chemistry 305 and 310. Students may obtain 9 hours credit by taking Chemistry 305 a and b (6 hours) and Chemistry 310a (3 hours). See Chemistry 305 announcement. By special permission students may register for five hours credit, with only one laboratory period a week.

**395. Research for Seniors.** Two terms. Credit two or more hours a term. Deposit variable. Students are advised to complete Chemistry 340 before registering in this course.

#### PHYSICAL CHEMISTRY

**405 a and b. Introductory Physical Chemistry.** Credit three hours a term. Prerequisite, Chemistry 305 a and b, Mathematics 60a, 60b, 60c, and 60d, and Physics 11 and 12 (or their substantial equivalent). Required of candidates for the degree of B. Chem. Eng.

A systematic presentation of the principles of physical chemistry. The topics include: the properties of gases, liquids, and solids; physical and chemical equilibrium in homogeneous and heterogeneous systems; the Mass Law, theorem of Le Chatelier, and the Phase Rule; thermochemistry and elementary thermodynamics; the theory of solutions; ionic equilibria; Chemical Kinetics and catalysis; problems in physical chemistry.

**406 a and b. Physical Chemistry.** Credit three hours a term. Prerequisite, Chemistry 305 a and b, which may be taken simultaneously; Mathematics 65a, 65b, and 65c or their equivalent; Physics 3 and 4 (or 6) or 11 and 12. Required of candidates for the degree of A.B. majoring in chemistry and open to other qualified students by permission.

A study of the more fundamental principles of physical chemistry from the standpoint of the laws of thermodynamics, and of the kinetic theory. A unified treatment of the properties of matter, thermochemistry, the properties of solutions, and of equilibrium in homogeneous and heterogeneous systems. Chemical kinetics and catalysis are included.

**410 a and b. Introductory Physical Chemistry.** Laboratory and informal recitations. Credit three hours a term. Prerequisite or parallel course, Chemistry 405 or 406. Deposit, \$20 a term.

Qualitative and quantitative experiments illustrating the principles of physical chemistry and practice in performing typical physico-chemical measurements. Recitations on the general principles of physical chemistry, based upon the lectures.

**420. Advanced Physical Chemistry.** One term. Credit three hours. Prerequisite, Chemistry 405.

Short course in chemical thermodynamics with applications to thermochemistry and physico-chemical equilibria. Emphasis on the solution of simple problems.

**425. Application of the Phase Rule.** One term. Credit two hours. Prerequisite, Chemistry 405 a and b or an elementary knowledge of the phase rule as applied to systems of one and two components.

The study and interpretation of typical phase diagrams, especially in systems of two and three components, followed by a brief treatment of systems containing four or more components. Special attention will be given to metal alloy diagrams, to equilibria in saturated salt solutions, and to the problem of indirect analysis.

**430 a and b. Colloid Chemistry.** Credit two hours a term. Prerequisite, Chemistry 405 a and b or 406 a and b.

First term: the properties of surfaces, including the adsorption of gases by solids, adsorption from solutions, liquid films, and contact catalysis. Second term: general properties of colloidal solutions and suspensions.

**435. Chemistry of Solids.** One term. Credit three hours. Prerequisite or parallel courses, Chemistry 405 a and b or 406 a and b, or special permission.

A general discussion of the formation and growth of metallic and chemical crystals, their physical and chemical behavior, and the relationships between lattice structure and chemical constitution.

**440. Molecular Spectra.** One term. Credit three hours. Open to qualified students by permission.

Brief review of atomic spectra. Description of the various types of molecular spectra; the rotation and vibration of diatomic molecules, electronic states and electronic transitions. A résumé of continuous and diffuse molecular spectra with reference to the subject matter considered in photochemistry. Normal coordinate treatment of the vibrations of polyatomic molecules and the analysis of their Raman and infrared absorption spectra. Discussion of the relation between molecular structure and molecular constants.

**445. Introductory Electrochemistry.** One term. Credit three hours. Lectures and laboratory. Prerequisite, Chemistry 405 a and b or 406 a and b. Deposit, \$15.

Theory of electrolysis and of the voltaic cell, including theory and practice of electromotive force measurements, transference, ion activities, and oxidation-reduction.

**450. Applied Electrochemistry.** One term. Credit three hours. Prerequisite, Chemistry 405 a and b or 406 a and b.

Elementary theory of electrolysis and electromotive force. Electrolytic refining and extraction of metals; electroplating; electrolytic preparation of organic and inorganic compounds; electrothermal electrolysis; storage cells; brief survey of electrothermics.

By electing Course 465 (one or more hours), the student may obtain laboratory practice in many of the subjects which are presented in the lectures.

**455. Kinetics of Chemical Reactions.** One term. Credit two hours. Prerequisite Chemistry 405 a and b.

A general discussion of rates of reactions including: types of reactions, methods of measurement, theories of reaction rates, application to problems.

**460. Chemical Physics.** One term. Credit three hours. Open to seniors and graduate students majoring in chemistry or physics.

An elementary presentation of the principles involved in describing the structure

and behavior of matter; atomic structure and the periodic table; inter-atomic forces; structure of solids; electrons in metals; temperature equilibrium and statistics.

**465. Advanced Laboratory Practice in Physical Chemistry.** One term. Credit variable, but not to exceed six hours a term. Prerequisite, determined in each case by the Professor in charge. Deposit variable.

**470 a and b. Thermodynamics.** Credit three hours a term. Prerequisite, Chemistry 405 a and b and 420, or special permission.

Development of the general equations of thermodynamics from the first and second laws. Exposition of the concepts of entropy and free energy. Applications to the study of physico-chemical equilibria in gases, liquids, solids, and liquid solutions. Problems.

**475. Theory of Solutions.** One term. Credit three hours. Prerequisite, Chemistry 470 a and b.

Exposition of modern theories of electrolyte and non-electrolyte solutions. Presentation of the Debye-Hückel theory and the calculation of the thermodynamic functions of electrolyte solutions from inter-ionic forces. The Bjerrum theory of ion association. Correlation of the properties of non-electrolyte solutions with molecular distribution and intermolecular forces. Discussion of transport phenomena in solution including electrolytic conductance, diffusion, and viscous flow.

**480. Statistical Mechanics.** One term. Credit three hours. Prerequisite, Chemistry 470a.

Exposition of the equilibrium theory of statistical mechanics from the standpoint of the Gibbs canonical ensemble. Mechanical interpretation of the principles of thermodynamics, with application to simple thermodynamic systems.

**490. Introductory Quantum Mechanics with Chemical Applications.** One term. Credit three hours. Open to qualified students by permission.

Elementary presentation of the principles of quantum mechanics. The basic ideas underlying the quantum mechanical theory of the chemical bond.

**495. Research for Seniors.** Two terms. Credit two or more hours. Deposit variable.

### THE CLASSICS

Mr. HARRY CAPLAN, *Chairman*; Messrs. JAMES HUTTON, HORACE L. JONES, FRIEDRICH SOLMSEN, FREDERICK O. WAAGÉ, and RALPH L. WARD.

*Those whose major study is in the Classics must complete twenty hours of non-starred courses in the Department, and fifteen hours, selected after conference with the adviser, in related subjects. Related subjects for this purpose are Ancient History, modern foreign languages, particularly French and German, and Ancient Philosophy.*

### ARCHAEOLOGY, ANCIENT ART

**1a. History of Painting and Sculpture.** Two terms. Credit three hours a term. Only the first term's work will count for credit in Classics.

**History of Greek Sculpture.** (See Fine Arts 2).

**Art of the Roman Empire.** (See Fine Arts 3).

**6. History of Coins.** One term. Credit two or three hours. Open to students whose major work is in the Classics or History, and to other students by special permission.

The coins will be treated as material for the study of the history of the Mediterranean states from the sixth century B. C. to the Byzantine Empire, with reference to the politics, economics, and art of the period. The students will work with coins from the University collection.

**7. Problems in Archaeology.** One term. Credit two or three hours. Open to students whose major work is in the Classics, and to other students by special permission.

### GREEK

**\*1a. Greek for Beginners.** Introduction to Homer's Iliad. One term. Credit three hours.

**\*1b. Homer's Iliad.** Continuation of Greek 1a. One term. Credit three hours. Prerequisite, Greek 1a.

\*2a. **Attic Greek.** Xenophon: *Anabasis*; Plato: *Selected Dialogues*. One term. Credit three hours. Prerequisite, Greek 1b.

\*2b. **Euripides: Iphigenia in Tauris, and Alcestis; New Testament: Selections.** One term. Credit three hours. Prerequisite, Greek 2a.

5. **Greek Composition.** Two terms. Credit one hour a term. Prerequisite, Greek 1b or its equivalent.

17. **Aristophanes; Clouds; Sophocles: Oedipus Rex, Antigone.** Two terms. Credit three hours a term. Prerequisite, Greek 2a.

20. **Lyric Poetry; Aeschylus: Prometheus Vincetus; Theocritus; Demosthenes: Philippics.** Two terms. Credit three hours a term. Prerequisite, Greek 17.

22. **Plato: the Republic; Pindar: Selected Odes; Thucydides.** Two terms. Credit three hours a term. Prerequisite, Greek 20. For graduates and qualified undergraduates.

25. **Advanced Greek Composition.** Two terms. Credit one hour a term. Prerequisite, Greek 5.

30. **Lectures: The History of Greek Literature.** (Based on translations.) Two terms. Open to sophomores and upperclassmen. Credit two hours a term.

52. **Greek Dialects.** For graduate students and qualified upperclassmen. One term. Credit two hours.

#### LATIN

*Prospective teachers of foreign languages in the secondary schools whose interest is primarily in Latin will ordinarily choose Latin as their major subject. For these students, the requirements will be courses 16, 17, 21, 26, with prerequisites, and in addition such courses in Latin, and in related subjects in Classics and in other departments, as may be determined after conference with the adviser.*

*For those who desire to teach Latin in addition to another foreign language which has been chosen as a major subject, the minimum requirements in Latin will be courses 16, 17, 21, 26, with prerequisites.*

*The most frequent combination of foreign languages for secondary teachers at the present time is Latin and French, and for this combination the departments concerned have arranged a special schedule of required and recommended courses which will satisfy the requirement of each language as a major subject.*

\*A. **Freshman Course:** For Students Offering Two Units of Entrance Latin. Two terms. Credit three hours a term. Cicero: *Selected Orations*; Virgil: *Aeneid*.

\*1a. **Freshman Course.** For Students Offering Three Units of Entrance Latin. Two terms. Credit three hours a term. Ovid; Virgil; Horace: *Odes and Epodes*.

\*1. **Freshman Course:** For Students Offering Four Units of Entrance Latin. Two terms. Credit three hours a term. Cicero, *De Senectute*; Martial: *Epigrams*; Horace: *Odes and Epodes*.

\*4. **Latin Language Review.** For freshmen. Two terms. Credit one hour a term.

\*8. **Terence; Catullus; Horace: Satires and Epistles; Virgil: Georgics; Livy.** Two terms. Credit three hours a term. Prerequisite, Latin 1a or 1.

11. **Ovid.** Open to those who have taken or are taking course 8 or course 16. One term. Two hours credit.

12. **Early Christian Writers.** Open to those who have taken or are taking course 8 or course 16. One term. Two hours credit.

16. **The Greater Republican Writers.** Two terms. Credit three hours a term. Prerequisite, Latin 8, 11, or 12. Plautus; Cicero; Lucretius.

17. **Literature and History of the Early Empire.** Two terms. Credit three hours a term. Prerequisites, Latin 8, 11, or 12. Tacitus: *Annals*; Juvenal; Pliny's *Letters*; Suetonius; Seneca's *Letters*.

21. **Latin Writing, Elementary Course.** Two terms. Credit one hour a term. Prerequisite, Latin 1 or 1a.

26. **Teachers' Training Course.** One term. Credit two hours.

45. **Latin Writing, Advanced Course.** Two terms. Credit one hour a term. For graduates, and for undergraduates who have taken Latin 21.

47. **History of the Latin Language.** One term. Credit two hours. Primarily for graduates.

49. **Comparative Grammar of Greek and Latin: Indo-European Linguistics.** Two terms. Credit two hours a term. For graduate students and qualified upperclassmen. For graduate courses, see *Announcement of the Graduate School*.

#### CLASSICS

10. **English Translations of Greek and Latin Classics.** Two terms. Credit three hours a term. Open to sophomores and upperclassmen.

Rapid reading in the best translations, with emphasis upon Greek masterpieces; for example, the *Iliad* and the *Odyssey*, the tragedies of Sophocles, and several dialogues of Plato. Translations from the Latin will be chosen for the bearing of the original works upon modern literature.

#### ECONOMICS

Mr. P. M. O'LEARY, *Chairman*; Messrs. G. P. ADAMS, DONALD ENGLISH, M. S. KENDRICK, R. E. MONTGOMERY, and H. L. REED.

*For a major in Economics the following courses must be completed: (1) in Economics, course 1, or 2a and 2b, or the equivalent; twenty hours of advanced courses; (2) in related subjects, fifteen hours in the following departments: (a) History (in addition to the six hours in Prescribed Subjects); (b) Government (except courses 1-7); (c) Sociology (as approved by adviser); (d) Philosophy 3, 4, 5, 10; (e) Mathematics (Calculus, courses prerequisite to Calculus provided a course in calculus is included); (f) Geology 200, 206.*

*Students who intend to register in Arts and Sciences and in the Law School will be required to complete twelve hours of advanced courses in Economics and nine hours of related courses.*

\*1. **Modern Economic Society.** One term. Credit five hours. Not open to freshmen. A survey of existing economic order, its more salient and basic characteristics, and its operation.

\*2a. **Modern Economic Society.** One term. Credit three hours. Not open to freshmen. This course and course 2b cover the same subject matter as course 1.

\*2b. **Modern Economic Society.** One term. Credit three hours. Prerequisite, course 2a.

\*3. **Introduction to Economics.** For students in Engineering and Chemistry. One term. Credit three hours.

An introduction to the more essential economic features of contemporary American society.

11. **Money, Currency, and Banking.** One term. Credit three hours. Prerequisite, Economics 1 or its equivalent.

An introductory study of the history and theory of money, currency, and bank credit. Enrollment limited.

12. **Commercial Banking.** One term. Credit three hours. Prerequisite, Economics 11. Problems of bank administration.

15. **Trade Fluctuations.** One term. Credit three hours. Prerequisite, Economics 11. A study of the causes and effects of trade recessions and revivals, with an introduction to the methods of general forecasting.

21a. **Accounting.** One term. Credit three hours. Prerequisite, Economics 1 or its equivalent. May, with permission of instructor, be taken by students registered for course 2b.

Theory of debit and credit; the journal and ledger; the development of books of original entry; preparation of income statements and balance sheets.

21b. **Accounting.** One term. Credit three hours. Prerequisite, Economics 21a. Capital stock accounts; bonds and their valuation; amortization, reserves and reserve funds, analysis of income statements and balance sheets.

31. **Corporation Finance.** One term. Credit three hours. Prerequisite, Economics 21a or its equivalent.

A study of the financial practices of business corporations in the United States; types of corporate securities; sources of capital funds; determination and administration of corporate incomes; financial difficulties and corporate reorganizations; the relation of corporate practices to the functioning of the American economic system; and the regulatory activities of the Securities and Exchange Commission.

**Taxation.** (Agricultural Economics 138). One term. Credit three hours. Open to juniors and seniors who have credit for Economics 1 or its equivalent.

A study of the principles and practices of public finance, with emphasis on taxation. Among the topics examined are: the growth of public expenditures; the changing pattern of federal, state, and local taxation; the incidence of taxation; and the problem of war finance.

Fee for materials furnished, \$2.

**52. Federal Taxation.** One term. Credit three hours. Prerequisite, Agricultural Economics 138 or its equivalent.

An examination of the principles and practices followed in obtaining federal revenue, with emphasis on the problems of individual and corporation income taxation.

**41. Labor Conditions and Problems.** One term. Credit three hours. Prerequisite, Economics 1 or its equivalent.

An introduction to the field of Labor Economics and survey of the more basic labor problems growing out of modern economic arrangements.

**42. Trade Unionism and Collective Bargaining.** One term. Credit three hours. Prerequisite, Economics 41 or the consent of the instructor.

A study of the origins, philosophic basis, aims, and policies of trade unions, of the economic implications of trade unionism in modern economic life, and of collective bargaining in selected industries.

**44. Public Policy and Industrial Relations.** One term. Credit three hours. Prerequisite, Economics 41 or consent of the instructor.

An analysis of some of the more important problems of employer-worker relations and of the impact of government policy toward labor and industry upon these relations.

**46. Legal and Constitutional Aspects of Labor Problems and Social Insurance.** One term. Credit three hours. Consult the instructor before registering.

A study of the legal aspects of trade union objectives and methods and types of social insurance. Among the topics treated: legal theories underlying labor law; statutory enactments affecting trade unions; injunctions, damage suits, criminal prosecutions, restrictions upon employers; conciliation, arbitration, mediation, unemployment insurance, health insurance, workmen's compensation, old age pensions, the legal minimum wage.

**47. Labor's Risks and Social Insurance.** One term. Credit three hours. Consult the instructor before registering.

A study of risks of labor in contemporary economic life and of the theory and practical operation of the various types of social insurance.

**Introduction to Statistics.** (Sociology and Anthropology 70). One term. Credit three hours. Open to sophomores, juniors, and seniors; enrollment limited to fifty.

**Methods of Statistical Analysis.** (Sociology and Anthropology 71). Two terms. Credit three or four hours a term.

**81. Economics of Enterprise.** One term. Credit three hours. Prerequisite, Economics 1 or its equivalent.

A course in economic theory with emphasis on the price aspect of the economic order. Among the topics treated are: the nature and meaning of the economic process; the relation of that process to social welfare; the significance of the cost of production; distribution; the rent of land; interest, and the problem of combining the factors of production.

## ENGLISH

Mr. G. H. SABINE, *Acting Chairman*; Messrs. J. C. ADAMS, K. O. E. ANDERSON, R. C. BALD, A. G. DELMARSH, C. W. DUNN, SCOTT ELLEDGE, F. B. FREEMAN, W. H. FRENCH, ALFRED GROMMON, W. R. IRWIN, C. W. JONES, H. A. MYERS, EDWIN NUNGEZER, W. M. SALE, J. C. SHERWOOD, R. P. SIBLEY, E. J. SIMMONS, E. A. TENNEY, H. W. THOMPSON, R. M. WARDLE, and CHARLES WEIR.

*For major work in English the student is required to complete (1) six hours of English 2 (or its equivalent); (2) thirty hours of advanced work, six hours of work which will normally be chosen from courses 20, 21, 22, 23, 24, 26; and (3) eighteen hours in related subjects. The choice of these courses is subject to the following restrictions:*

*a. A student must take a minimum of three hours' work in each of Groups I, II, III, and IV; and so plan his program that he will have completed a total of nine hours' work in one period and nine hours' work in one form or type of literature.*

*The periods and forms are set out below:*

## Periods

1. Before 1500 (Courses 31, 56, 60, 81)
2. 1500-1660 (Courses 32, 33a, 45, 61, 63)
3. 1660-1800 (Courses 33b, 34a, 34b, 43, 44 first term, 55 second term, 66)
4. 1800-1880 (Courses 35, 36, 42, 44 second term, 70, 71, 72, 76)
5. 1880-the present (Courses 37, 40a, 40b, 48, 53, 54, 79)
6. American Literature (Courses 39, 40b, 41, 54, 58, 78a, 78b)

## Forms

1. Poetry (Courses 15, 22, 53, 54 and any courses in Group IV devoted to the study of a poet)
2. Drama (Courses 23, 24, 45, 48, 61)
3. Prose fiction (Courses 26, 40a, 40b, 41, 42, 43, 44)
4. Prose, critical and reflective (36 first term, 55, 60, 78a)
  - b. The eighteen hours in related courses must be chosen from the Classics, the Modern Languages (after the College requirements are satisfied), Speech and Drama, Philosophy, History, Music, and the Fine Arts. In general, the student will be expected to complete twelve of these hours in one department.

The Department of English strongly recommends that students who intend to choose English as their major subject take English History in their first or second year.

A student desiring to become a candidate for Honors in English should consult his adviser not later than May of his junior year, and preferably earlier. At the close of his junior year he will be given an oral examination by his adviser on the scope of his reading. If this examination is passed, he should then make arrangements with some member of the Department for a program of informal study in his senior year, leading to the writing of an essay, which he will submit to the Department not later than May 1. Early in May of his senior year the student will be given a comprehensive written examination. Sample copies of this examination may be seen at any time.

Students preparing for the teaching of English in secondary schools should consult Professor Hulse of the Department of Education in their freshman year, or as soon afterward as they reach a decision. They should include in their programs at least fifteen hours of Speech and Drama, including courses 1, 10, 32, and 41.

## FOR FRESHMEN

\*NE 1 and 2. **Composition and Speech** (in the V-12 program of the Navy). Two terms. Credit three hours a term.

\*2. **Introductory Course in Reading and Writing**. Two terms. Credit three hours a term.

The aim of the course is to increase the student's ability to communicate his own thought and to understand the thought of others. The first term will be devoted primarily to the study of good diction, effective sentences, and the logic of paragraphs, the second to whole compositions. Assignment to sections will be made in *Barton Hall* the first term, and in *Goldwin Smith C* the second. Mr. SALE is in charge of the course.

Sections will be arranged for a limited number of students of more than average ability, especially those who expect to major in one of the humanities.

With the written recommendation of his freshman instructor, a freshman may be admitted to English 20 in the second term in place of the second term of English 2. With similar recommendation and the consent of the sophomore instructor concerned, a freshman may elect English 22 or 23 in the second term, in addition to the second term of English 2.

Freshmen who elect Social Science A, B may substitute for English 2 the interdepartmental course, **Oral and Written Expression**, described on page 62.

\*2a. **Introductory Course in Composition and Literature**. One term. A repetition of the first term of English 2.

\*2b. **Introductory Course in Composition and Literature**. One term. A repetition of the second term of English 2. May be entered by those who have passed the work of the first term.

\*4. **English for Foreigners**. Two terms. Credit three hours a term. A student, when recommended by his college, may take this course in lieu of English 2.

**\*15. The Study of Poetry.** One term. Credit three hours.

Open to freshmen who have passed the first term of English 2 with a grade of 80 or better. Freshmen who have received a grade of 90 or better in the first term of English 2 may substitute this course for the second term of English 2 to satisfy the requirement in English, but they will be expected in addition to write a formal library paper. Those who pass course 15 may not take course 22 for credit.

FOR SOPHOMORES AND UPPERCLASSMEN

*Note: Courses preceded by an asterisk are designed primarily for sophomores (see first courses listed in Groups I, II, III, IV). They may not be taken to satisfy the required number of hours in English by a student majoring in the department, after he has junior or senior standing.*

*Courses preceded by a dagger are intended for upperclassmen and may be elected by sophomores only with the consent of the instructor.*

*All other courses are strictly limited to upperclassmen.*

*Consult the description of the course for any special prerequisite.*

GROUP I

*Courses in composition and in the history and early literature of the language.*

**\*19. Composition.** One term. Credit three hours. Prerequisite, credit for both terms of English 2, or the equivalent.

A course designed for those who have completed the required work in English 2 without distinction, and who at any stage in their college course want additional drill in writing clear and accurate English. Attention will be given to spelling, punctuation, sentence-structure, grammar, vocabulary, and composing paragraphs. Frequent practice in writing. Class discussion of elementary matters in composition will be supplemented by conferences upon individual difficulties.

Students who have passed English 2 with a grade of 70 or better should ordinarily take course 20, not 19.

**\*20. Prose and Composition.** Given in all terms.

A course in writing open to those who have received credit for both terms of English 2, or the equivalent. Twenty periods will be devoted to the criticism of themes and to the study of special topics in composition; the rest of the time to reading good prose, frequent practice in writing, and personal conferences.

**21. Prose and Composition.** One term. Credit three hours.

A continuation of English 20, which is prerequisite. Twenty periods will be devoted to the study of usage, the sentence, effective wording, and types of writing; the rest of the time to reading good prose, frequent practice in composition, and personal conferences.

**81. Old and Middle English.** Two terms. Credit three hours a term.

**82. The English Language.** One term. Credit two hours.

The development of the English language, with consideration of language in general, including elementary phonetics. The course does not require previous knowledge of Old and Middle English.

**†84. Advanced Composition.** Two terms. Credit three hours a term.

For qualified students who wish to develop a prose style of distinction. Constant practice, subject to rigorous criticism. Attention is focused on artistic narrative. Inasmuch as the number enrolled is necessarily limited, the instructor should be consulted before registration.

**†85. English Style and Usage.** Two terms. Credit three hours a term.

For upperclassmen who wish to study and practice the art of writing. Before registering in this course, consult the instructor.

**86. English Syntax.** Two terms. Credit three hours a term; the first term is prerequisite to the second.

For juniors preparing to teach English. The history and theory of the English sentence, with an analysis of English prose forms and practice in writing.

**89. Literary Criticism.** One term. Credit three hours. The consent of the instructor must be secured before registration.

A study of certain modern critical opinions and their bearing on the practice of literary criticism. Considerable writing of a critical nature will accompany the study.

## GROUP II

*Courses in periods, emphasizing important themes, interests, and forms.*

\*25. **Great English Writers.** Two terms. Credit three hours a term.

Studies in the chief poets, critics, novelists, and dramatists (excluding Shakespeare) designed as an introduction to the range of literary achievement in England. First part: Chaucer to Burns. Second part: Wordsworth to Yeats.

†31. **Medieval Literature.** Two terms. Credit three hours a term.

A study of English translations of European literature from the introduction of Christianity to the fourteenth century, designed to trace the transmission of learning and the development into modern literature of subjects and forms. Lyric, dramatic, and narrative poetry; prose writings and legends; Dante's *Commedia*.

32. **The English Renaissance.** Part I. One term. Credit three hours.

Studies in non-dramatic literature from Wyatt to Drayton.

†33a. **The English Renaissance,** Part II. One term. Credit three hours.

Studies in the poets and prose-writers of the period 1600-1660.

33b. **Restoration Literature.** One term. Credit three hours.

Studies in Dryden and his contemporaries and in Restoration Drama.

†34a. **Eighteenth Century Literature: Swift, Pope, and their Contemporaries.** One term. Credit three hours.

A study of the prose and poetry characteristic of the first half of the eighteenth century, with some consideration of its relation to the social, political, and philosophical movements of the period.

†34b. **Eighteenth Century Literature: The Age of Johnson.** One term. Credit three hours.

A course similar in intent to English 34a, but concerned with the literature of the latter half of the century.

†35. **The Romantic Revival.** Two terms. Credit three hours a term.

General literary tendencies and thought of the period. A study of the poetry, letters, and literary theories of Wordsworth, Coleridge, Byron, Shelley, Keats, and others.

36. **The Victorian Age.** Two terms. Credit three hours a term.

First term: a study of the main currents and masterpieces in prose; second term: a study of the principal poets with special emphasis on Matthew Arnold.

†37. **The Twentieth Century.** One term. Credit three hours.

The literature of the past forty years will be studied primarily as a reflection of currents in English thought and life.

39. **American Literature.** Two terms. Credit three hours a term.

First term: Colonial days to the Civil War; second term: from 1865 to the present.

## GROUP III

*Courses in important types and forms of literature.*

\*22. **Introduction to Poetry.** One term. Credit three hours. Not open to those who have credit for English 15.

Emphasis is upon form and upon the enjoyment of oral reading. Those who care to do so may write verse.

\*23. **Introduction to the Drama.** One term. Credit three hours.

An introduction to the drama as a form of literature, and to the distinguishing qualities of tragedy, comedy, melodrama, and farce. Reading of fifteen representative classical and modern plays.

\*26. **Introduction to Prose Fiction.** One term. Credit three hours.

A study of representative types of the novel, both English and American, and of the past and present.

†40a. **The Modern English Novel.** One term. Credit three hours.

A critical study of the fiction of England since Hardy.

†40b. **The Modern American Novel.** One term. Credit three hours.

A critical study of American fiction beginning with the work of Mark Twain.

41. **American Prose Fiction before 1850.** One term. Credit two hours.  
Studies in early American prose fiction.
- †42. **Early Nineteenth Century Novel.** One term. Credit three hours.  
A survey of fiction from the advent of the Gothic novel to the beginnings of the Victorian. Extensive readings in the works of Jane Austen, Maria Edgeworth, Sir Walter Scott, and others.
43. **The English Novel in the Eighteenth Century.** One term. Credit three hours.  
The consent of the instructor must be secured before registration.  
A study of the representative novels of Defoe, Richardson, Fielding, and Sterne with some attention to the minor novelists.
- †44. **European Fiction.** Two terms. Credit three hours a term.  
Lectures and reading. Selected English, French, German, and Russian novels of the eighteenth and nineteenth centuries will be read. Special attention will be paid to the transmission of ideas and the development of trends in European fiction. All foreign novels will be read in English translation.
45. **The English Drama to 1642.** Two terms. Credit three hours a term.  
First term: the origin of the drama; mysteries, saint plays, moralities; folk plays, interludes; the rise of professional actors; the development of stagecraft; the court plays; the academic drama. Second term: the erection of permanent playhouses; the contemporaries and successors of Shakespeare; the suppression of acting.
48. **Modern Drama.** One term. Credit three hours. Open only to seniors who have completed course 23 and one other term of drama.  
A study of modern English, Continental, and American plays. Reading at the rate of three plays a week.
50. **Literature and Society.** One term. Credit three hours.  
A study of a few authors whose work reveals a more than ordinary concern with the problems of the society of their own times.
53. **Recent English Poetry.** One term. Credit three hours.  
A study of English poets of this century: Yeats, Masefield, Stephens, Auden, and others.
54. **Recent American Poetry.** One term. Credit three hours.  
A study of American poets of this century: Robinson, Frost, Sandburg, MacLeish, Eliot, and others.
- †55. **Biography.** Two terms. Credit three hours a term.  
A study of Carlyle's theory of biography in *Heroes and Hero-Worship* precedes the study of Plutarch's *Lives* and of ancient and medieval biography. In the second term, a study of Boswell's *Johnson* precedes the reading of other modern biographies.
56. **Middle English Metrical Romances.** One term. Credit three hours.  
A study of Early English fiction.
- †58. **American Folk-Literature.** One term. Credit three hours.  
Backgrounds of American literature and life revealed in traditional tales, ballads, proverbs, games, customs, and place-names. Emphasis upon ballads, and upon methods of collecting and classifying folklore.

#### GROUP IV

*Courses presenting a considerable body of the work of major figures in English and American literature.*

- \*24. **Introduction to Shakespeare.** One term. Credit three hours.  
A reading of representative plays.
60. **Chaucer and his Age.** Two terms. Credit three hours a term. The first term is not prerequisite to the second.  
First term: Chaucer's life; his contemporaries; *Troilus and Criseyde*; the minor poems; second term: *The Canterbury Tales* and Chaucer's successors in the fifteenth century.
61. **Shakespeare.** Two terms. Credit three hours a term.  
Open to juniors and seniors in the College of Arts and Sciences; to others by permission.
63. **Milton.** One term. Credit three hours.  
A study of Milton's poetry and of selections from his prose.

66. **Swift.** One term. Credit three hours. Mr. SALE.

70. **Wordsworth.** One term. Credit three hours.  
A study of Wordsworth's poetry and prose.

71. **Coleridge and Keats.** One term. Credit three hours.

72. **Byron and Shelley.** Two terms. Credit three hours a term.  
The first term will be devoted mainly to Byron's poems and letters; the second to Shelley.

†76. **Carlyle and Browning.** One term. Credit three hours.  
A study of imaginative literature in the Victorian age, illustrated in the earlier major works of Carlyle and Browning.

78a. **Emerson, Thoreau, and Whitman.** One term. Credit three hours. Prerequisite, English 39.

An intensive study of the American classics with special attention to transcendentalism and prophecy.

78b. **Poe, Hawthorne, and Melville.** One term. Credit three hours. Prerequisite, English 39.

An intensive study of the American classics with special attention to romance and tragedy.

79. **T. S. Eliot.** One term. Credit three hours.

A study of the poetic and critical writings of Mr. Eliot with some attention to international influences in recent literature. The permission of the instructor must be secured before registration.

†**Introduction to Russian Literature and Culture.** (See Slavic 5.) Two terms. Credit three hours a term.

## THE FINE ARTS

Mr. F. O. WAAGÉ, *Chairman*; Mr. D. L. FINLAYSON.

*Students who wish to do their major work in the Fine Arts will choose one of these three options:*

1. *General Course.* For major work in this option the following courses must be completed: (1) nine hours in Aesthetics, namely Philosophy 8a, 8b, and 19. (2) (a) Music, two approved courses; (b) nine hours in the History of Architecture, Painting, and Sculpture; (c) nine hours of literature, to be elected from approved courses in Classics, English, German, Speech and Drama, and Romance Languages. (3) Twelve hours of approved advanced courses in one of three fields: (a) Literature (literary history, criticism, writing, and dramatics); (b) Art and Architecture (history, composition, and design); (c) Music (theory, composition, and application).

2. *History of Art.* For a major in the History of Art 1a, 1b, 10a, 10b and eighteen other hours in the History of Art must be completed. In addition, there must be completed fifteen hours of related courses, including Philosophy 8a and 8b.

3. *History and Practice of Art.* For a major in this option the student will include in his course of study thirty hours in courses offered by the College of Architecture in the practice of art. The major work of this option will be in the history of art. Students who elect this option will be admitted to the Graduate School as candidates for the degree Master of Fine Arts with a program in the practice of art which may be completed in two years of graduate study.

*The courses which follow are those offered by the Department of Fine Arts, together with certain courses open to students of this College in the College of Architecture.*

*The courses listed from the College of Architecture may not be counted in the ninety hours required in the College of Arts and Sciences.*

## GENERAL

**Aesthetics: Psychology of Art.** (See Psychology 8a).

**Aesthetics: Philosophy of Art.** (See Philosophy 8b).

## HISTORY OF ART

1a. **History of Painting and Sculpture: Ancient and Medieval.** One term. Credit three hours.

1b. **History of Painting and Sculpture: Renaissance and Modern.** One term. Credit three hours.

2. **History of Greek Sculpture.** One term. Credit three hours,

3. **Art of the Roman Empire.** One term. Credit three hours.

After a sketch of Etruscan and Republican art, the evolution of Hellenistic sculpture and painting will be traced through the Empire to the sixth century. A few lectures will be devoted to the minor arts.

4. **Primitive Art: the Art of Early Societies.** One term. Credit three hours.

The study of the relation between culture and art in early societies where sculpture and painting were indispensable elements in everyday life; the shaping and use of art forms to satisfy the group needs of the culture of Old Stone Age Europe, ancient Egypt and Mesopotamia and Central and South America (Mayan, Aztec, and Incan cultures), with some consideration of the influence of these primitive and archaic forms on modern art.

5. **Renaissance and Modern Sculpture.** One term. Credit three hours.

A study of the evolution of sculpture in Europe and America, and of the changes in taste from the fifteenth century to the present day, by means of an analysis of the works of representative sculptors and the use, where necessary, of parallels in painting and architecture.

6. **Italian Painting of the Renaissance.** One term. Credit three hours.

The history of painting in the principal centers of Italy. Among the major figures whose lives and works will be studied are Giotto, Fra Angelico, Massaccio, Botticelli, the Bellinis, Leonardo, Giorgione, Titian, Michelangelo, Tintoretto.

8. **Introduction to Chinese and Japanese Art.** One term. Credit three hours.

Chinese art, in its more important media, from the Bronze Age to the Manchu dynasty. Some account is taken of the influences of Buddhist India and the West. The art of Japan is viewed both in its relation to that of China and in its more independent aspects.

9. **The Methods and Materials of the Art of Painting.** Two terms. Credit three hours each term. Fee, \$3 a term.

A survey of the styles of painting as they have been affected by the materials and techniques of the various epochs. Lectures and readings are supplemented by studio work in which the student executes designs in mosaic, egg tempera, fresco, and the various methods of oil painting. Previous experience in drawing is not required.

10a. **History of Architecture: Ancient and Medieval.** One term. Credit three hours. Open to freshmen with the permission of the instructor.

10b. **History of Architecture: Renaissance and Modern.** One term. Credit three hours.

11. **American Painting.** One term. Credit three hours.

Painting in the United States from colonial days to the present.

26a. **Seventeenth and Eighteenth Century Painting.** One term. Credit three hours. Painting of the Baroque and Rococo periods in the major European countries.

26b. **Modern Painting.** One term. Credit three hours, Nineteenth century painting in France, England, and Germany, and the major movements in twentieth century painting.

28a. **Romanesque and Gothic Sculpture.** One term. Credit three hours.

Sculpture in the major European countries from 1000 A. D. through the Gothic period.

28b. **Gothic Painting.** One term. Credit three hours.

Painting in Italy in the fourteenth century, and in France, Germany, and the Netherlands in the fourteenth and fifteenth centuries.

29, 30. **Historical Seminar in Painting and Sculpture.** Two terms. Credit two hours a term. Registration limited. Open to graduate students and qualified undergraduates. Ten hours of the History of Art or their equivalent are prerequisite.

## COURSES IN THE COLLEGE OF ARCHITECTURE

Open to election by students in the College of Arts and Sciences.

*History of Architecture*

**Ancient Architecture.** (See Architecture 410.) One term. Credit three hours. Egyptian, Western Asiatic, Greek, Roman, and Early Christian architecture.

**Medieval Architecture.** (See Architecture 411.) One term. Credit four hours. Prerequisite, Architecture 410.

Byzantine, Mohammedan, Romanesque, and Gothic architecture.

**Renaissance Architecture.** (See Architecture 412.) One term. Credit four hours. Prerequisite, Architecture 411.

Architecture of the Renaissance in the principal European countries.

**American and Contemporary Architecture.** (See Architecture 413.) One term. Credit three hours. Prerequisite, Architecture 412.

The architecture of the United States in the seventeenth and eighteenth centuries and of Europe and the United States from 1800 to the present.

*Composition*

*These courses consist of the study and application of the underlying principles of Composition. They are presented by means of series of problems in pictorial and decorative design in line, tone, and color, or in sculptural groups. Special study is made of design appropriate to architectural settings for contemporary use. Collaborative problems are given from time to time which require the combined efforts of painter, sculptor, architect, and landscape architect. Criticism periods in all courses in composition are held Tuesday and Thursday afternoons, 1:40-4; other periods will be arranged.*

*In Courses 300 to 304 the number of credit hours a term is based upon one credit hour per laboratory period of two and one-half hours. Credit hours to be arranged upon registration in consultation with instructor in charge.*

**Elementary Composition.** (See Architecture 300.) Two terms. Credit three hours each term. Fee, \$3.

**Intermediate Composition.** (See Architecture 301.) Two terms. Credit three to six hours each term as arranged. Fee, \$5.

**Advanced Composition.** (See Architecture 304.) Two terms. Credit four to six hours each term as arranged. Fee, \$5.

*Drawing and Painting*

*This sequence of courses deals with the study of form and its representation by means of line, tone, and color. Emphasis is given to the drawing and painting of forms in their spatial relationships. Geometric objects, casts, and still-life and landscape materials are used in the first year's work. In the intermediate and advanced courses, studies of the nude and draped model and of portraiture are added.*

*In courses 311 and 314 the number of credit hours per term is based upon one credit hour per laboratory period of two and a half hours. Credit hours to be arranged upon registration in consultation with instructor in charge.*

**Elementary Drawing and Painting.** (See Architecture 309.) Two terms. Credit three hours each term. The beginning course for all students except architects and landscape architects. An introduction to the principles and methods of decorative and pictorial design and of representational drawing and painting, using various media. The principles of color harmony and of the pictorial use of color. Discussion of historical and contemporary examples, lectures, readings, examinations, and analytical and creative exercises in the studio. Fee, \$3.

**Intermediate Drawing and Painting.** (See Architecture 311.) Two terms. Credit three to six hours each term as arranged. Fee, \$5.

**Advanced Drawing and Painting.** (See Architecture 314.) Two terms. Credit four to ten hours each term as arranged. Fee, \$5.

## Sculpture

The courses in modeling begin with a study of the basic relationships of forms to voids. Architectural ornament and the human figure are studied from casts. Beginning in the second year, nude and costumed models are used. Portraiture is studied. The work closely parallels that in Composition. Studies made in these modeling courses may be used as material for problems in Composition. Instruction is given in casting in plaster, in direct carving, and in the use of the pointing machine.

In courses 331 and 333 the number of credit hours per term is based upon one credit hour per laboratory period of two and a half hours. Credit hours to be arranged upon registration in consultation with instructor in charge.

**Elementary Sculpture.** (See Architecture 330.) Two terms. Credit two to four hours each term as arranged. Prerequisite, Architecture 310. Fee, \$5.

**Intermediate Sculpture.** (See Architecture 331.) Two terms. Credit three to six hours each term as arranged. Fee, \$5.

**Advanced Sculpture.** (See Architecture 333.) Two terms. Credit four to ten hours each term as arranged. Fee, \$5.

## GEOLOGY

Mr. O. D. VON ENGELN, *Chairman*; Messrs. A. L. ANDERSON, J. D. BURFOOT, JR., and C. M. NEVIN.

Those who are planning a career in geology or will seek the recommendation of the department for continuation of their studies in graduate work must complete the following courses for a major: Geology 100, 102, 103, 107, 200, 205, 311, 317, either 318 or 319, 402, 403, 500. In related subjects, fifteen hours, which should include Chemistry 102 or 104; Mathematics 15; Physics 3, 4, or 3, 6; and a selection from the following: Astronomy 180, 181; Meteorology 1, 2; Zoology 1, 16; Philosophy 15; Mathematics 20; Botany 1; Soils 1. Such students should if possible organize their schedules for the major at the beginning of the sophomore year.

Those who choose geology and geography as a major in a general cultural program may satisfy the requirements by completing not less than twenty-four hours in any of the advanced courses in geology and geography, and fifteen hours of related subjects selected from the list in the preceding paragraph and from these added items: Economics 1, 61a, 61b, 81, 83; Sociology 2, 3; History 25, 42, 82, 83, 93.

Those who have special interest in fields closely connected with some one branch of geology may also have approved by the professor in charge of that branch any of the following courses: Chemistry 130, 135, 205, 206, 210, 220, 221, 225, 405, 410, 530; Mathematics 5, 10, 65a, 65b, 65c; Physics 60, 61, 62; Biology 1; Zoology 8.

**\*100. Introductory Geology.** One term. Credit three hours. Laboratory fee, including field trips, \$4.25.

Students must register for laboratory assignment. The fundamental principles of this branch of science. This course, followed by another three-hour course in Geology, will satisfy the underclass requirement in laboratory science.

**102. Structural Geology.** One term. Credit three hours. Prerequisite, Geology 100.

A study of geologic structures and their causes. Part of the laboratory periods will be spent in the field. Laboratory fee, \$3.

**106. Special Work in Sedimentation, Structural, and Petroleum Geology.** Two terms. Credit variable. Prerequisites, variable.

For advanced students and graduates. Original investigation adapted to the needs of the student.

**311. Elementary Mineralogy.** One term. Credit three hours. Prerequisite, Chemistry 102 or 104. Fee, \$4.50.

Registration with the Department before the beginning of the course is required. For beginners who desire a general knowledge of crystallography and of the commonest minerals, the properties by which they are recognized, their uses, and their significance as constituents of the crust of the earth. In the laboratory, various determinative methods are used for identifying the minerals.

**318. Petrology.** One term. Credit three hours. Prerequisite, Geology 317. Fee, \$3.

Registration with the Department before the beginning of the course is required. A consideration of the commoner kinds of igneous rocks, of various classifications used,

and of the general principles of petrology, including the origin of and the conditions under which igneous rocks are formed.

**\*401. Ancient Life** (History of Life). One term. Credit three hours. A résumé of organic development during the course of early history, with emphasis on evolution of vertebrate life from primitive fish to man.

The course is designed for the general student who desires a fundamental but not too technical knowledge of evolution and distribution of life, and an understanding of the geologic background from which the human group has emerged.

**500. General Economic Geology.** Two terms. Credit three hours a term. Prerequisite, Geology 100 and 311. Laboratory fee, \$3 a term.

The origin, nature, distribution, uses, and economics of mineral products. First term, non-metallics, including coal, oil, gas, fertilizers, etc.; second term, the ore deposits of the different metals.

**\*501. Engineering Geology.** One term. Credit four hours. For engineering students. Others only by permission. Not the equivalent of Geology A or 100. Laboratory fee, including field trips, \$4.50.

A discussion of the practical application of geologic principles to engineering work, and of the occurrence of such economic materials as are of importance to engineering students.

**502. Petroleum Geology.** One term. Credit three hours. Prerequisite, Geology A or 100 by permission.

A course on the geology and distribution of petroleum. Laboratory fee, \$3.

**511. Advanced or Special Work in Economic Geology.** Two terms. Credit variable. Prerequisite dependent on the nature of the work. Laboratory fee, \$3 a term.

## GERMAN

MR. VICTOR LANGE, *Chairman*; MESSRS. A. L. ANDREWS, P. R. POPE, HEINRICH SCHNEIDER, and ALFRED VON der HEYDT.

*For a major in German the following courses must be completed: (1) in German, courses 1-5 or their equivalent, and at least twenty-one hours of advanced courses, including 15, 21, and at least one course each in Lessing, Goethe, and Schiller; (2) in related subjects, at least fifteen hours selected from Bibliology, the Classics (Archaeology, Greek, Latin), English, History, Philosophy, Romance Languages, Russian Language and Literature, Scandinavian Languages and Literatures.*

**\*1. Course for Beginners: Oral Training, Grammar, Composition, Translation.** One term. Credit six hours.

This course is equivalent to first and second year German of the entrance requirements (credit two units). It may be elected for three hours' credit by students who have entrance credit for only one unit of German (first year German).

**\*1a. Course for Beginners: Oral Training, Grammar, Composition, Translation.** Two terms. Credit three hours a term.

This course is equivalent to first and second year German of the entrance requirements (credit two units). It may be elected in the second term by students who have had first year German (one unit).

**\*1g. Course for Graduates.** See Announcement of the Graduate School.

**\*3. Intermediate Course, Oral Training, Grammar, Composition, Translation.** One term. Credit six hours. Prerequisite, German 1, 1a, or entrance credit for two units of German (first and second year German).

This course is equivalent to third year German of the entrance requirements.

**\*3a. Intermediate Course, Oral Training, Grammar, Composition, Translation.** Two terms. Credit three hours a term. Prerequisite, German 1, 1a, or entrance credit for two units of German (first and second year German).

This course is equivalent to third year German of the entrance requirements.

**\*4. Elementary German Composition and Conversation.** Two terms. Credit three hours a term. Open to those who are taking or have taken German 3, or its equivalent. Exercises conducted in German. Course 4 may be combined with courses 3 or 5.

**\*5. Modern German Texts.** Two terms. Credit three hours a term. Prerequisite, German 3, or its equivalent.

Extensive reading and discussion.

\*7. **German Literature from Goethe to the Present.** Two terms. Credit two hours a term. Open to sophomores and upperclassmen.

A survey of German literature in its relation to general European thought. Lectures in English with assigned reading in available translations. No requirements in German. May not be offered in fulfillment of the requirement in foreign language.

\*8. **Scientific German.** One term. Credit three hours. Prerequisite, German 1-3, or three years of German in high school.

10. **Advanced German Composition and Conversation.** Two terms. Credit three hours a term. Prerequisite, German 1-4, or the equivalent.

Exercises conducted in German. This course must be completed by students who desire to be recommended as teachers of German.

11. **Schiller's Life and Works.** One term. Credit three hours. Prerequisite, German 1-3, or the equivalent.

13. **Goethe's Life and Works including Faust.** Two terms. Credit three hours a term. Prerequisite, German 1-3, or the equivalent.

15. **Survey of German Literature.** Lectures in English, collateral reading in German. Two terms. Credit three hours a term. Prerequisite, German 1-3, or the equivalent.

16. **Contemporary German Literature.** Two terms. Credit three hours a term. Prerequisite, German 1-5, or the equivalent.

A study of the literature of modern Germany, including foreign influences. Lectures in German, recitations, and collateral reading.

17. **Nineteenth Century Drama.** Kleist, Grillparzer, Hebbel, Hauptmann. One term. Credit three hours. Prerequisite, German 1-3, or the equivalent.

18. **Lessing's Life and Works.** One term. Credit three hours. Prerequisite, German 1-3, or the equivalent.

19. **German Lyric Poetry from Goethe to George.** Lectures in English, with assigned reading. One term. Credit three hours. Prerequisite, German 1-3, or the equivalent.

20. **The German Novel from 1800 to the Present.** Lectures in English, with assigned reading. One term. Credit three hours. Prerequisite, German 1-3, or the equivalent.

21. **Introduction to the Study of the History of German Literature.** Lectures and practical assignments in bibliography. One term. Credit three hours.

25. **Wagner's Life and Works.** One term. Credit three hours.

Lectures in English on Wagner's theory of the music drama, the sources of his operas, his place in German literature, and his influence on modern culture. The texts of the principal operas will be read in class, and occasional illustrative recitals will be given.

A knowledge of German is not required. The textbook contains the German and English texts in parallel columns. May not be offered in satisfaction of the requirement in foreign language.

35. **German Romanticism.** One term. Credit two hours. Open to qualified undergraduates and graduates.

Lectures in English on the main currents of feeling and the chief literary figures between 1780 and 1840. Discussion of texts and collateral reading.

36. **Friedrich Nietzsche.** One term. Two hours a week. Open to qualified undergraduates and graduates.

37. **Middle High German.** One term. Credit three hours. Prerequisite, German 1-5.

40. **Teachers' Course in Methods.** One term. Credit two hours. Prerequisite, German 1-5, 10, and twelve hours of advanced work in German literature or philology.

42. **Gothic.** One term. Credit three hours.

43. **Old High German.** One term. Credit three hours. Prerequisite, German 37.

49. **Seminary in German Literature.** One term. Credit two hours. Primarily for graduates.

52. **Seminary in Germanic Philology.** One term. Credit two hours. Primarily for graduates.

## GOVERNMENT

Mr. R. E. CUSHMAN, *Chairman*; Mr. H. W. BRIGGS and Assistants.

*For a major in Government the following courses must be completed: (1) either course 1 and course 2 or 3, or Social Science A and B; (2) eighteen additional hours in the department; (3) in related subjects, at least twenty-four hours of unstarred courses to be selected from the following, of which twelve hours must be in History—any course in History; any unstarred course in Economics or Sociology; Philosophy 4, 5; Architecture 710, 711, 712, 713, 714. Juniors and Seniors who have a grade of 85 or better in one-half the hours they have passed may take informal study in Government.*

*Candidates for honors in Government will be required to take three hours of informal study during each semester of the senior year. They will also be required to pass a comprehensive examination.*

*Students registered in the combined Arts-Law course with a major in Government will be required to complete a minimum of twelve hours of upperclass courses in Government and fourteen hours from the list of courses in related fields printed above.*

**1. American National Government.** One term. Credit three hours.

American national government, its historical development, organization, powers, and practical working. Attention will be given to governmental problems arising from the war.

**2. Comparative Government.** One term. Credit three hours.

Government and politics of England, France, Germany, Russia, and Italy.

**9. Introduction to International Relations.** One term. Credit three hours.

A Survey of nationalism, internationalism, imperialism, and the racial, political, economic, and geographical factors in modern international relations.

**10. Contemporary Political Theory.** One term. Credit three hours.

The nature and origins of contemporary political thought, with particular reference to the doctrines of liberalism, communism, and fascism.

**11a. Comparative Constitutional Government.** One term. Credit three hours.

A comparative study of political institutions and processes, as exemplified in the liberal governments of contemporary Europe.

**11b. Comparative Dictatorial Government.** One term. Credit three hours.

A comparative study of political institutions and processes, as exemplified in the dictatorial governments of contemporary Europe.

**14a and b. International Law.** Credit three hours a term.

A systematic study of the nature, development, and judicial application of the principles of international law. Cases, readings, discussions.

**15. International Organization.** One term. Credit three hours.

An analysis of international governmental procedures and institutions: international administration; international legislation; collective efforts to establish world order; the organization, operation, and failure of the League of Nations; the International Labor Office; the Permanent Court of International Justice; an analysis of proposals for the post-war world.

**16a. Contemporary American Foreign Policy: The Latin American Policy of the United States.** One term. Credit three hours. Not open to students who have credit for Government 16.

The relations of the United States with Mexico, Cuba, Panama, Santo Domingo, Haiti, Nicaragua and the larger South American States; Dollar Diplomacy; Pan Americanism; the Good Neighbor Policy; the relation of our Latin American policy to European developments.

**16b. Contemporary American Foreign Policy: The Far Eastern Policy of the United States.** One term. Credit three hours. Not open to students who have credit for Government 16.

An analysis of the relations of the United States with China, Japan, and the European Powers with Far Eastern interests, primarily since 1898.

**20. Constitutional Law: The American Federal System.** One term. Credit three hours. Open to upperclassmen.

Judicial interpretation of the constitution: the nature of judicial review; separation

of governmental powers; relations between state and national government; construction of national powers.

21. **Constitutional Law: Fundamental Rights and Immunities.** One term. Credit three hours. Open to upperclassmen.

Privileges and immunities of citizenship; protection of civil and political rights; the obligation of contracts; due process of law and the equal protection of the law.

22. **Seminary in Constitutional Problems.** Two terms. Credit two hours a term. Open to graduate students and qualified seniors.

24. **Seminary in International Law and International Organization.** Two terms. Credit two hours a term. Open to graduate students and qualified seniors.

## HISTORY

Mr. M. L. W. LAISTNER, *Chairman*; Messrs. KNIGHT BIGGERSTAFF, C. W. DE KIEWIET, P. W. GATES, F. G. MARCHAM, CURTIS NETTELS, and CARL STEPHENSON.

*For a major in History the following courses must be completed: (1) in History, at least thirty hours; (2) in related subjects, at least eighteen hours which shall be determined by the student in consultation with his adviser. Of the hours in related subjects, at least six shall be in unstarred courses.*

NH 1 and 2. **American History** (in the V-12 program of the Navy). Two terms. Credit two hours a term.

2b. **Roman History and Civilization.** One term. Credit three hours.

5. **The Roman Republic, 146-30 B.C.** One term. Credit three hours. Not open to freshmen.

18a. **Modern History of the Far East: Nineteenth Century.** One term. Credit three hours. Not open to freshmen.

18b. **Modern History of the Far East: Twentieth Century.** One term. Credit three hours. Not open to freshmen.

22. **Medieval History.** One term. Credit three hours.

42. **History of Modern Europe, 1500-1815.** One term. Credit three hours. Not open to freshmen who have not passed History 22.

61b. **History of England, 1660 to the present.** One term. Credit three hours.

68. **England and the British Empire in the Nineteenth and Twentieth Centuries.** One term. Credit three hours. Not open to freshmen.

82. **American History, 1607-1850.** One term. Credit three hours.

83. **American History, 1850 to the present.** One term. Credit three hours. Not open to freshmen who have not passed History 82.

89. **The Settlement of the Middle West.** Two terms. Credit two hours a term. Not open to freshmen.

## MATHEMATICS

Mr. R. P. AGNEW, *Chairman*; Messrs. W. B. CARVER, W. W. FLEXNER, W. A. HURWITZ, B. W. JONES, MARK KAC, G. K. KALISCH, A. M. PEISER, and A. R. TURQUETTE.

*For a major in Mathematics, the following courses must be completed: (1) in Mathematics, at least fifteen hours of unstarred courses; (2) in related subjects, at least fifteen hours to be selected from approved courses in Astronomy, Chemistry, Economics, Education, French, German, Italian, Philosophy, and Physics.*

*Students planning to teach Mathematics in secondary schools should make themselves familiar with the New York State requirements. They should bear in mind that the teaching of Mathematics is frequently combined with teaching of physical science or general science. The Department of Mathematics recommends, as minimum preparation for teaching the subject, Mathematics 65a, 65b, and six additional hours selected from the following list: Mathematics 65c, 70, 130, 140, 200, 215, 310. Students planning to teach primarily Mathematics should meet the requirements for a major in the subject.*

*For students in those colleges permitting removal of condition grades by examinations, such examinations will be given in courses 5, 10, 15, 50, 55, 60, 65 just before registration.*

*For further information regarding the time and place of these examinations students should apply at White 223. No student may take more than one examination in any one term.*

*Students wishing to take any of the courses numbered above 65 are invited to confer with the teachers concerning these courses.*

*Of courses 1 to 65, not more than six hours may be taken simultaneously without the special permission of the department.*

**\*1. Elementary Concepts of Mathematics.** Two terms. Credit three hours a term. This course is intended primarily for students who are not planning to continue the study of mathematics. Primary emphasis will be placed on the fundamental ideas common to all mathematics rather than on the technique of any one part of the subject. The student will be encouraged to apply the logical processes of mathematics to problems arising in every-day experience. Extensive skill in the manipulation of mathematical symbols will not be emphasized. Although this course is not designed to satisfy prerequisites for courses in Analytic Geometry and Calculus, a student who has passed it with sufficiently high credit may be admitted to such courses.

**\*2. Cryptanalysis.** One term. Credit three hours. The study of the standard forms of ciphers and codes, and the methods used for their decipherment. Although no secret methods or very recent procedures of deciphering will be treated, the course should be useful to students who contemplate cryptographic employment (commissioned or civilian) in the naval or military service of the United States; opportunities for such employment may be available to women as well as men. There is no definite mathematical prerequisite; no student should take the course unless he has some facility at precise reasoning, as well as some natural feeling for the ways in which letters tend to combine to form words. With reference to future employment, acquaintance with one or more foreign languages may be helpful. Students who contemplate taking the course should previously consult the teacher.

**\*5. Solid Geometry.** One term. Credit three hours except for students offering Solid Geometry for entrance.

**\*10. College Algebra.** One term. Credit three hours.

**\*15. Plane Trigonometry.** One term. Credit three hours except for students offering Trigonometry for entrance.

**\*16. Spherical Trigonometry and Map Projections.** One term. Credit three hours. Designed primarily for students planning to enter war services.

**\*20. Elementary Course in Higher Mathematics.** Two terms. Credit three hours a term. Prerequisites, Mathematics 5, 15, or the equivalent.

**\*30. Mathematics for Students of Economics and Statistics.** One term. Credit three hours.

Some preliminary training in dealing with mathematical symbolism is first given. The student is then introduced to the concepts of the differential and integral calculus most frequently encountered in statistics and in mathematical treatments of the social sciences. There are no stated prerequisites for the course.

**\*50. Analytic Geometry and Calculus.** Open only to students in the College of Architecture. Two terms. Credit three hours a term. Prerequisite, the same as for Mathematics 65.

**\*55a, \*55b. Analytic Geometry and Calculus.** Credit five hours for each course. Primarily for students in the College of Engineering; the prerequisites for such students are Mathematics 15, and Mathematics 5 or 10, or the equivalent. For students in the College of Arts and Sciences the prerequisites for Mathematics 55a are the same as those stated below for Mathematics 65a.

**\*60a, \*60b, \*60c, 60d. Analytic Geometry and Calculus.** Credit three hours for each course. Primarily for students in the College of Engineering; the prerequisites for such students are Mathematics 15 and Mathematics 5 or 10 or the equivalent. For students in the College of Arts and Sciences, the prerequisites for Mathematics 60a are the same as those stated below for Math. 65a.

**\*65a, \*65b, \*65c. Analytic Geometry and Calculus.** Credit three hours for each course. Primarily for students in the College of Arts and Sciences. Prerequisites, Mathematics 15 or the equivalent and a thorough preparation in Intermediate Algebra. Students without thorough preparation in Intermediate Algebra are advised to take Mathematics NM1, NM3 (courses in the Navy curriculum) or 10 before taking Mathematics 65a. Either Mathematics 10 or 15, but not both, may be taken simultaneously with Mathe-

maths 65a. Some students interested in Mathematics or allied subjects will be expected to take 65a, 65b, and 65c.

**70. Calculus.** One term. Credit three hours. Prerequisite, Mathematics 65c or 55b.

The course will treat certain topics in advanced calculus, such as improper integrals, multiple integrals, line integrals, partial derivatives, and Taylor's theorem for functions of several variables. Special emphasis will be placed upon the physical applications.

**75. Topics in Topology.** One term. Credit three hours. Prerequisite, Mathematics 65c or the equivalent. Students who contemplate taking the course should previously consult the teacher.

Introduction to combinatorial topology and topological spaces.

**90. Teachers' Course.** One term. Credit three hours. Prerequisite or parallel course, Mathematics 65b or the equivalent.

This course will treat certain selected topics in the mathematics taught in the secondary schools with a view to contribute to the enrichment of such teaching, and to give a clearer understanding of the meanings of certain of the concepts and processes involved.

**133. Determinants and Matrices.** One term. Credit three hours. Prerequisite, Mathematics 65b or the equivalent.

A treatment of such topics as determinants, matrices, linear dependence, linear equations, and linear transformations.

**142. Analytic Theory of Numbers.** One term. Credit three hours. Prerequisites, Mathematics 240 or 260.

The course will stress the great diversity of methods which can be applied to the solution of problems in the theory of numbers. Topics will be selected from the following: Bernoulli numbers and polynomials, prime number theorem, partitions, lattice-point problem, Goldbach's theorem. No knowledge of number theory is required.

**160. Groups, Rings, and Fields.** One term. Credit three hours. Prerequisite, Mathematics 65b or the equivalent.

An elementary course dealing with the simpler theorems of group theory and their extension to rings and fields.

**200. Elementary Differential Equations.** One term. Credit three hours. Prerequisite, Mathematics 65c or the equivalent.

**215. Advanced Calculus.** Two terms. Credit three hours each term. Prerequisite, Mathematics 65c or the equivalent.

A careful study of limits, continuity, derivatives, and Riemann integrals. Functions of several variables. Multiple and line integrals. The course is designed to furnish necessary preparation for advanced work in analysis and applied mathematics.

**221. Measure and Integrals.** One term. Credit three hours. Prerequisite, Mathematics 215 or the equivalent.

Elements of Lebesgue's theory of measure and integration, Riemann-Stieltjes and Lebesgue-Stieltjes integrals. Applications to orthogonal series, functional equations and statistical independence.

**260. Infinite Series.** One term. Credit three hours. Prerequisite, Mathematics 65c.

The classical theory of convergent infinite processes, with an introduction to the theory of summability.

**270. Integral Equations.** One or two terms. Credit three hours a term. Prerequisites, Differential Equations, and Advanced Calculus or the equivalent.

Volterra and Fredholm integral equations. The Hilbert-Schmidt theory. Special integral equations occurring in applied mathematics.

**310. Projective Geometry.** Two terms. Credit three hours a term.

A first course in projective geometry, including both synthetic and analytic methods.

**361. Differential Geometry.** One term. Credit three hours. Prerequisite, Mathematics 65c or the equivalent.

The theory of curves and surfaces in Euclidean space of three dimensions, developed with the use of tensor calculus.

**362. Riemannian Geometry.** One term. Credit three hours. Prerequisite, Mathematics 361.

The theory of spaces with a metric defined by a definite or indefinite quadratic differential form. This course and Mathematics 361 will include an adequate treatment of tensor analysis.

**400. Statistics.** Two terms. Credit three hours a term. Prerequisite, Mathematics 30 or the equivalent.

A study of the theory underlying modern statistical analysis, and of practical applications of this theory. The course is designed to furnish a background for the various courses in applied statistics given in other departments.

**410. Numerical and Graphical Methods.** One term. Credit three hours. Prerequisites, Mathematics 60d or 200 or the equivalent, or Mathematics 215.

Graphs, scales and alignment charts; analytical approximations to empirical curves; interpolation and extrapolation; mechanical quadratures; numerical and graphical solutions of algebraic, transcendental, and differential equations. Applications to problems in chemistry, physics, and engineering will receive special attention.

**470. Exterior Ballistics.** One term. Credit three hours. Prerequisite, a course in differential equations (such as 60d or 200) or the equivalent.

A survey of the general principles of the theory of exterior ballistics followed by consideration of special topics. Considerable emphasis will be laid on numerical aspects such as computation of trajectories, etc.

**480. Partial Differential Equations of Mathematical Physics.** Two terms. Credit three hours a term. Prerequisite, Mathematics 215.

The derivation of the differential equations, with appropriate boundary conditions, which arise in certain problems of mathematical physics; the mathematical properties of solutions, and the physical meanings of these properties.

**500. Problems, Research, and Informal Study.** For properly qualified students, members of the department will direct reading and research not necessarily associated with any course.

The following courses are offered frequently, but not every year: Foundations of Mathematics, Modern Algebra, Algebraic Numbers, Theory of Equations, Linear Algebras, Symbolic Logic; Theory of Almost Periodic Functions, Calculus of Variations, Real Functions, Complex Variables; Analytic Geometry of Space, Geometry of Hyper-space, Theory of Lattices, Non-Euclidean Geometry, Tensor Analysis, Algebraic Curves; Orthogonal Functions, Potential Functions, Mechanics, Hydrodynamics, Vector Analysis, Fourier Series, and Elasticity.

## MUSIC

MR. JOHN M. KUYPERS, *Chairman*; MESSRS. ERIC DUDLEY and RICHARD T. GORE; MISS CLAIRE JAMES, MESSRS. OTTO KINKELDEY, ROBERT PALMER, EGON PETRI, and PAUL J. WEAVER.

*For a major in music, the following courses must be completed: (1) a minimum of twenty hours of advanced courses, the sequence of courses emphasizing either critical and historical work or theoretical and creative work; (2) in related subjects, a minimum of fifteen hours to be chosen with the approval of the adviser. Students who wish to major in music should consult the chairman of the department at the beginning of their freshman year or as soon thereafter as possible.*

*A large collection of recorded music and scores is housed in the Music Building at 320 Wait Avenue, where a number of phonograph listening rooms are available. These facilities may be used by any member of the student body on week-days between 9 A.M. and 5 P.M. and between 7 and 10 P.M., and on Sundays between 1:30 and 4:30 P.M.*

*Choral and instrumental ensembles are trained and directed by members of the departmental staff each term, and all students who are interested are invited to join these groups. Announcements of try-outs will be made at the beginning of each term. These ensembles include the Sage Chapel Choir, the Cornell Chorus, the Men's and Women's Glee Clubs the Bands, the Symphony Orchestra and Chamber Music Groups.*

## MUSIC THEORY

**1. Theory I.** Two terms. Credit three hours a term. Assignment to sections must be approved by the instructor in advance of registration.

An elementary course in the theory of music, with no prerequisites, open to all students irrespective of their background. The course is designed to develop facility in the hearing, reading, and writing of vocal and instrumental melody, and to afford the student a perspective of melodic styles from early times to the present day. This course is

prerequisite to all other courses in the theory of music, and is recommended as a background for all other courses in music.

**101. Theory II.** Two terms. Credit three hours a term. Prerequisite, Music I or its equivalent.

This course is designed to develop facility in the hearing, reading, and writing of simple harmonic materials.

**201. Theory IIIa.** Two terms. Credit two hours a term. Prerequisite, Music 101 or its equivalent.

A continuation of Music 101, this course deals with more advanced harmonic materials.

**203. Theory IIIc.** Two terms. Credit two hours a term. Prerequisite, Music 101 or its equivalent. Students majoring in music should take this course simultaneously with Music 201.

This course is designed to develop facility in the hearing, reading, and writing of simple contrapuntal materials.

**303. Theory IVc.** Two terms. Credit two hours a term. Prerequisite, Music 203 or its equivalent.

A continuation of Music 203, this course deals with more advanced contrapuntal materials.

**305. Theory IVe.** Two terms. Credit two hours a term. Prerequisite, Music 201 and 203 or their equivalent.

This course is designed as a study of form and analysis and as a survey of the materials of composition. Emphasis will be placed on score reading.

#### MUSIC APPRECIATION, ETC.

**11. The Art of Music.** Two terms. Credit three hours a term. Open to sophomores and upperclassmen.

An approach to the rational understanding and enjoyment of the art of music, offered especially for students who have had no technical training in the subject. The first term is given to a study of the smaller forms used in various types of vocal and instrumental music, especially as they are found in suites, operas, and oratorios. The second term is given to a study of larger forms used in vocal and instrumental music, especially as they are found in symphonic and choral music. Either term of this course may be taken without the other.

**13. The Orchestra.** One term. Credit two hours. Open to all students.

This course is offered for students who have no technical background in music. It deals with the capacities and functions of the instruments of the orchestra, singly and in combination, with the orchestra as a whole, and with various types of music written for orchestra.

**15. Choral and Instrumental Ensemble, First Year.** Two terms. Credit one hour a term. Either term may be taken without the other. Open to all students who are active members of the Sage Chapel Choir or the Cornell Chorus or the University Orchestra.

An approach to the understanding of choral and instrumental music, partly through performance of music, and partly through study of the music performed and of comparable music. The aim of this course is an appreciation of the art as intensified through performance itself. In addition to one weekly lecture, the rehearsals of the organization to which the student belongs will serve as laboratory periods for this course.

**19. Conducting, First Year.** Two terms. Credit two hours a term. Prerequisite, Music I or its equivalent.

This course provides basic training in conducting, starting with simple song-leading and proceeding to choral and orchestral conducting. The content of the course will be adapted to the needs of the individual students. No previous conducting experience is required.

**115. Choral and Instrumental Ensemble, Second Year.** Two terms. Credit one hour a term. Prerequisite, Music 15 or its equivalent. Open to students who are active members of the Sage Chapel Choir or the Cornell Chorus or the University Orchestra.

This course is a continuation of Music 15.

**119. Conducting, Second Year.** Two terms. Credit, two hours a term. Prerequisite, Music 19 or its equivalent.

This course is a continuation of Music 19.

## MUSIC HISTORY

**21. History of Music.** Two terms. Credit two hours a term. Open to sophomores and upperclassmen, and to freshmen by permission.

A survey of the evolution of the art of music, with special reference to the development of musical styles from period to period, and to the position of music in the social and artistic life of nations. The first term covers the period from the beginning of the Christian era through the time of Bach and Handel (approximately 1750). The second term covers the period from then until the present day. Either term of this course may be taken without the other.

**121. The Opera.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of operatic music from its beginnings to the present time.

**122. Organ Music.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of organ music from its beginnings to the present day.

**123. Orchestral Music.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of orchestral music from its beginnings to the present day.

**124. Chamber Music.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of chamber music from its beginnings to the present day.

**125. Piano Music.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of piano music from its beginnings to the present day.

**126. Choral Music.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of choral music from the Renaissance period to the present day.

**127. String Music for Solo Instruments.** One term. Credit three hours. Prerequisite, Music 21 or its equivalent.

A survey and study of the development of solo music for violin and other string instruments from its beginnings to the present day.

**221. Bach.** One term. Credit two hours. Prerequisites, at least one course from the group music 121-127 and at least two terms of Music Theory.

A study of the life and works of Bach. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**222. Haydn and Mozart.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the life and works of Haydn and Mozart. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**223. Beethoven.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the life and works of Beethoven. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**224. Brahms.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the life and works of Brahms. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**225. Wagner.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the life and works of Wagner. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**226. Debussy.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the life and works of Debussy. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**228. Modern European Composers.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the works of the most significant modern European composers. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

**229. Modern American Composers.** One term. Credit two hours. Prerequisites, at least one course from the group Music 121-127 and at least two terms of Music Theory.

A study of the works of the most significant modern American composers. Special topics will be assigned to each student, related to the field covered by his prerequisite courses.

#### APPLIED MUSIC

**401. First Year. Individual instruction in voice, organ, piano, string, woodwind, and brass instruments.** Two terms. Credit, two hours a term in the case of qualified students who are majoring in music; for other students, no credit.

This course is offered primarily for students who are majoring in music, and for such students the work is correlated with other courses in music being taken. Whenever the facilities of the department permit, other students may take this work without credit. Permission to register, whether with or without credit, should be secured from the chairman of the department.

Students should consult the instructor at the beginning of each term as to hours for instruction, and the secretary of the department as to hours for the use of practice rooms.

A fee of \$2 a half-hour is charged for this instruction, except in the case of vocal instruction, the fee for which is \$50 for the term. A fee of \$7.50 is charged for a daily one-hour assignment to a practice room equipped with piano. A term fee of \$30 is charged for a daily one-hour assignment for the use of a pipe organ in Bailey Hall or the Sage Chapel.

**402. Second Year. Individual instruction.**

A continuation of Music 401, open to students who have completed that course. The credits, conditions, and regulations applying to Music 401 apply also to this course.

**451. Piano Master Class.**

A limited number of advanced piano students will be accepted for this course. Those interested should consult the chairman of the department.

#### COURSES FOR GRADUATES

**501. Seminar in Composition.** Two terms. Credit two hours a term.

A limited number of graduate students (and, by permission, seniors) will be admitted to this course who have (1) facility in the hearing, reading, and writing of melody, harmony, and counterpoint, (2) a working knowledge of the soprano, alto, tenor, and brass clefs, and (3) facility in score reading.

The work is intended to make the student acquainted with compositional practices in various styles, and to develop the student's creative abilities.

**521. Seminar in Musicology.** Two terms. Credit two hours a term.

This course is primarily for graduates (and, by permission, seniors) who have (1) the requisite knowledge of one or more of the important foreign languages, (2) a fair knowledge of music theory, and (3) some skill in practical music.

The work is intended to make the student acquainted with the accomplishments of the past and with modern methods in all fields, scientific, aesthetic, and historical, of musical research and investigation. Special topics or fields of study will be selected for each term after consultation with the class.

#### PHILOSOPHY

MR. G. WATTS CUNNINGHAM, *Chairman*; MESSRS. E. A. BURTT, RICHARD ROBINSON, GEORGE H. SABINE, and HAROLD R. SMART.

*For a major in Philosophy, the standard requirement is as follows: (1) in Philosophy twenty-one hours, including courses 1b and 5 and one advanced course, all to be chosen with the approval of the student's adviser; (2) in related subjects, eighteen hours, to be chosen with*

the approval of the adviser. This requirement, however, will be diminished by six hours to allow for a final comprehensive examination, if the student elects to take such an examination. The courses thus to be omitted will be determined by the adviser. The major may emphasize aesthetics, social studies, history, logic, or religion. In each case an integrated program of studies must be selected, subject to the approval of the adviser.

Students registered in the combined Arts-Law course with a major in philosophy will be required to complete 12 hours in philosophy, including course 5, and 9 hours in related subjects.

*Courses open to underclassmen:*

\*1a. **Philosophical Classics.** One term. Credit three hours. Open to freshmen and sophomores. Registration in *Goldwin Smith 224*.

A careful study of Lucretius *On the Nature of Things*, Plato's *Republic*, and J. S. Mill *On Liberty*. In studying Plato and Mill, special attention is paid to the philosophy of democracy.

1b. **Philosophical Classics** (second course). One term. Credit three hours. Prerequisite, Philosophy 1a.

Reading and discussion of somewhat more advanced texts than those used in Philosophy 1a, including Plato, Hume, and Descartes.

\*2. **Logic.** One term. Credit three hours. Registration in *Goldwin Smith 224*.

An elementary study of the laws of valid reference and the causes of fallacy.

**Symbolic Logic.** (See Mathematics 110).

3. **Problems in Philosophy.** One term. Credit three hours. Open to sophomores, juniors, and seniors.

Fundamental problems of philosophy and the most important types of philosophical theory, with emphasis on social and political problems.

4. **Ethics.** One term. Credit three hours. Open to sophomores, juniors, and seniors.

A study of theories of the good life, and of human nature as it bears on the good life.

5. **History of Philosophy.** Two terms. Credit three hours a term. Open to sophomores, juniors, and seniors.

Philosophical thought from its origin among the Greeks to the present time; the most important systems in their cultural context and their application to social, religious, and educational problems.

8a. **Aesthetics: Psychology of Art.** One term. Credit three hours. Open to sophomores, juniors, and seniors. (See Psychology 8a).

8b. **Aesthetics: Philosophy of Art.** One term. Credit three hours. Prerequisite, three hours of philosophy.

An introduction to several modern theories of art. Emphasis is laid on the underlying principles of the aesthetic experience with particular reference to painting and sculpture.

*Courses for Upperclassmen and Graduates:*

10. **Modern Political Theory.** One term. Credit three hours. Open to juniors and seniors.

The theory of the national state and especially the development of the liberal tradition in the seventeenth and eighteenth centuries.

[**Contemporary Political Theory.** See Government 10.]

13. **The Philosophy of Religion.** One term. Credit three hours. Open to juniors and seniors; to sophomores by special permission.

A study of the major types of religious belief in the modern world in relation to their philosophical background. Special attention is given to the interaction between religion and democratic ideals.

14. **History of Religions.** One term. Credit three hours. Open to juniors and seniors; to sophomores by special permission.

A general survey of the development of ritual, practice, and belief in religions of selected cultures.

19. **Advanced Readings in Aesthetics.** One term. Credit three hours. Permission of the instructor.

Readings to be selected in accordance with the interests and preparation of the student.

20. **Contemporary Philosophy.** Two terms. Credit three hours a term. Prerequisite, six hours in philosophy.

Main tendencies of contemporary philosophy, especially British and American.

25. **Plato and Aristotle.** Two terms. Credit three hours a term. Open to upperclassmen and graduates.

A philosophical study of the two greatest ancient thinkers, based on a reading of substantial parts of their works in translation.

28. **Ethical Theory.** One term. Credit three hours.

A rapid reading of examples of the main types of modern ethical theory.

29. **The Philosophy of Value.** One term. Credit three hours.

A study of Naturalist, Realist, and Idealist theories of value.

## PHYSICS

Mr. R. C. GIBBS, *Chairman*; Messrs. L. L. BARNES, W. A. BOWERS, J. R. COLLINS, R. FEYNMAN, C. W. GARTLEIN, G. E. GRANTHAM, C. T. HIBDON, H. E. HOWE, H. HURWITZ, JR., J. M. JAUCH, E. L. JOSSEM, JOHN G. MOORHEAD, C. C. MURDOCK, H. F. NEWHALL, L. P. SMITH, D. H. TOMBOULIAN, and J. W. TRISCHKA.

*For a major in Physics, the following courses must be completed: (1) in Physics, twenty-four hours of unstarred courses, which shall include at least three hours of Course 105, and nine hours selected from classroom credit in courses NPH7-13; (2) in related subjects, Mathematics 200, and one of the following groups; Astronomy 187; Chemistry, twelve hours chosen with the approval of the major adviser; Philosophy 5 or 3 and 15; Psychology 1 and 3.*

*Subject to the rules of the student's college, examinations for those who were unavoidably absent from a term examination and for those who have a condition to make up in Courses 3 to 22 inclusive will be held in Rockefeller B at 9 A.M. on the Friday preceding registration for a new term. A permit (Registrar's copy) to take such an examination should be presented at the time of the examination. Application for the permit should be made at the Office of the Dean or Director of the student's college or school.*

*Attention is called to the Physics Major curricula described in the Navy V-12 Bulletin No. 2, issued on June 1, 1943. These curricula provide for a program of eight terms, including two terms of basic studies and six terms of advanced work in physics and related subjects. The courses described below that are designated with the letters NPH are similar in content to the corresponding physics courses in the Navy V-12 Physics Major program.*

\*3. **Introductory Experimental Physics.** One term. Credit three hours. Two lectures and one laboratory period a week. Laboratory fee, \$5.

Demonstrations, discussions, problems, and experiments covering the subjects of mechanics, properties of matter, sound, and heat.

\*4. **Introductory Experimental Physics.** One term. Credit three hours. Prerequisite, course 3 or entrance physics. Two lectures and one laboratory period a week. Laboratory fee, \$5.

Demonstrations, theory, problems, and experiments covering the subjects of electricity, magnetism, and light.

\*7. **Introductory Experimental Physics.** One term. Credit four hours. Prerequisite, Trigonometry or simultaneous registration in Mathematics 15. Two lectures (lectures of course 3), two recitations, and one laboratory period a week. Laboratory fee, \$5.

A treatment of the topics of mechanics, properties of matter, sound, and heat more extended than that given in course 3. Emphasis is placed upon problem solving and discussion of principles. Laboratory work as in course 11.

\*8. **Introductory Experimental Physics.** One term. Credit four hours. Prerequisite, Trigonometry or simultaneous registration in Mathematics 15. Two lectures (lectures of course 4), two recitations, and one laboratory period a week. Laboratory fee, \$5.

A treatment of the topics of electricity, magnetism, and light more extended than that given in course 4. Emphasis is placed upon problem solving and discussion of principles. Laboratory work as in course 12.

\*11. **Introductory Experimental Physics.** One term. Credit four hours. Prerequisite, Calculus or simultaneous registration in Mathematics 55a, 60a, or 65b. Entrance physics desirable but not required. Two lectures, two recitations, and one laboratory period a week. Laboratory fee, \$5.

Demonstrations, theory, problems, and experiments covering subjects of mechanics, wave motion, sound, and heat.

Required of candidates for the degrees of B.C.E., B.Chem.E., B.E.E., and B.M.E.

**\*12. Introductory Experimental Physics.** One term. Credit four hours. Prerequisite, Calculus or simultaneous registration in Mathematics 55a, 60a, or 65b. Entrance physics desirable but not required. Two lectures, two recitations, and one laboratory period a week. Laboratory fee, \$5.

Demonstrations, theory, problems, and experiments covering the subjects of electricity, magnetism, and light.

Required of candidates for the degrees of B.C.E., B.Chem.E., B.E.E., and B.M.E.

**NEE1. Electricity and Magnetism.** One term. Credit three hours. Prerequisites, Physics NPH2 and (or in parallel) Mathematics NM5 as scheduled in the Navy V-12 program. Two lecture-recitation periods and one laboratory period a week. Laboratory fee, \$2.50.

A survey of electricity and magnetism on a more advanced level than in Physics NPH2, involving the use of Calculus. Topics covered: electrostatics, electric fields and potential; the electronic charge; motion of ions and electrons in simple static fields; magnetic fields; analysis of direct current circuits; induced e. m. fs.; inductance and capacitance.

The laboratory work is designed to acquaint the student with the fundamentals of electrical measurements dealing primarily with direct current circuits. Experiments on thermoelectricity, magnetization of ion and inductance are also included.

**21. General Physics.** One term. Credit three hours. Prerequisites, Physics 11, 12, and differential and integral calculus. Two recitation periods a week and one laboratory period in alternate weeks. Laboratory fee, \$2.50.

Required of candidates for degrees of B.Chem.E., B.E.E., and B.M.E.

A study of the fundamental laws of electric and magnetic fields and their applications to elementary circuit phenomena. Topics covered: the electrostatic field; potential; Gauss's Law; study of direct current circuits; Kirchhoff's rules; the magnetic field of steady currents; induced e. m. fs.; inductance; capacitance; simple transients. The laboratory work deals with the fundamentals of electrical measurements in direct current circuits.

**22. General Physics.** One term. Credit three hours. Prerequisites; Physics 11, 12, differential and integral calculus. Two recitation periods a week and one laboratory period in alternate weeks. Laboratory fee, \$2.50.

Required of candidates for degrees of B.Chem.E., B.E.E., and B.M.E.

Selected topics in thermionics, photoelectricity; elementary geometrical optics; physical optics; heat radiation; simple spectra. The laboratory work covers certain phases of electronics such as, the measurement of work function, study of gas filled photocell; characteristic curves of the magnetron. Other experimental work deals with photometric measurements, resolving power; polarization of light.

**55. Introductory Physical Experiments.** One term. Credit three hours. Prerequisites, one year of introductory college physics. One lecture and two laboratory periods a week. Laboratory fee, \$10.

Fundamental experiments in properties of matter, heat, light, and electricity.

Intended primarily for students preparing for Medicine or majoring in Biology.

**60. Physical Experiments.** Credit three hours a term. Prerequisites, introductory college physics including two semester hours of laboratory, Trigonometry. Selected experiments available for those who have completed introductory calculus. Two three-hour laboratory periods a week. Laboratory fee, \$10, each term.

Laboratory work in mechanics, properties of matter, heat, light, and electricity. Experiments selected to meet the needs of the individual student, and designed to give an understanding of fundamental principles.

**64. Mechanics and Heat.** One term. Credit five hours. Prerequisites, Physics 11 and 12 and (or in parallel) Mathematics 55b, or the equivalents. Three classroom periods, one computing period, and one laboratory period a week. Laboratory fee, \$5.

Linear and plane kinematics of a mass point; Newton's laws; linear plane dynamics; work and energy; simple harmonic motion; dynamics of a system of particles; statics and dynamics of rigid bodies; hydrostatics; fluid dynamics; elasticity; wave motion and sound; temperature and thermometry; heat conduction; thermodynamics and

kinetic theory of an ideal gas; properties of real gases and of vapors; thermal radiation; first and second laws of thermodynamics.

**NPH3. Mechanics.** One term. Credit three hours. Prerequisites, Physics NPH1 and 2, and (or in parallel) Mathematics NM5 as scheduled in the Navy V-12 program, or the equivalents. Three classroom periods a week.

Linear and plane kinematics of a mass point; Newton's laws; linear plane dynamics; work and energy; simple harmonic motion; dynamics of a system of particles; statics and dynamics of rigid bodies; hydrostatics; fluid dynamics; elasticity; and wave motion and sound.

**NPH4. Heat.** One term. Credit four hours. Prerequisites, Physics NPH3 and (or in parallel) Mathematics NM6 as scheduled in the Navy V-12 program, or the equivalents. Three classroom periods and one laboratory period a week. Laboratory fee, \$5.

Temperature and thermometry; heat conduction; thermodynamics and kinetic theory of an ideal gas; properties of real gases and of vapors; thermal radiation; first and second laws of thermodynamics.

**NPH5. Theory of Electrical Measurements.** One term. Credit four hours. Prerequisites, Physics NPH1 and 2 and (or in parallel) Mathematics NM5 as scheduled in the Navy V-12 program, or the equivalents. Three classroom periods and one laboratory period a week. Laboratory fee, \$5.

Direct current circuits and networks, bridges, potentiometers, characteristics of galvanometers and meters; variable current phenomena, mutual and self inductance, capacitance, growth and decay of currents, oscilloscopes, ballistic galvanometer, fluxmeter, measurement of magnetization and hysteresis curves; alternating current circuits, power, and impedance bridges.

**NPH6. Electrical Measurements.** One term. Credit one hour. Prerequisite, Physics NPH 5. One laboratory period a week. Fee, \$5.

A continuation of the laboratory work as described under Physics NPH5.

**105. Advanced Laboratory.** Credit three hours. Prerequisites, NPH3, 4, 5 and 6, or their equivalents. Two laboratory periods and one discussion period a week. Fee, \$10 each term.

Experimental work in a wide variety of fields is offered to meet the needs of the individual student. Considerable time may be spent on a relatively few topics or many experiments may be performed to gain acquaintance in several fields. The work is individual and stress is laid on independent work on the part of the student. Among the topics for which facilities are available are: mechanics, acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, heat and temperature measurements, and x-rays.

**NPH7. Electricity and Magnetism.** One term. Credit three hours. Prerequisites, Physics NPH5 and (or in parallel) Mathematics NM6 and 7 as scheduled in the Navy V-12 program, or the equivalents. Three classroom periods a week.

Electrostatic and electromagnetic fields, laws of Gauss, Ampere, and Faraday; equations of Poisson, Laplace, and Maxwell; displacement current; plane electromagnetic waves in a vacuum; electronic conduction in vacuum and metals; dielectric polarization; magnetic media; plane waves in material bodies.

**NPH8. Electricity and Magnetism.** One term. Credit five hours. Prerequisite, Physics NPH7. Three classroom periods and two laboratory periods a week. Laboratory fee, \$10.

Electrostatic field problems, Laplace's equation in spherical and cylindrical coordinates, electric images, coefficients of potential, capacity, and induction; contact potential; thermoelectricity; metallic conduction; thermionic and photoelectric emission; gaseous conduction; oscillatory circuits, resonance, methods of frequency measurement, frequency characteristics of transformers and meters; oscillators, wave filters, wave guides; amplification, modulation.

**NPH9. Electricity and Magnetism.** One term. Credit one hour. Prerequisite, Physics NPH8. One laboratory period a week. Fee, \$5.

A continuation of the laboratory work as described under Physics NPH8.

**NPH10. Wave Motion and Sound.** One term. Credit five hours. Prerequisites, Physics NPH3 and 4 and Mathematics 200. Three lecture-recitation periods and two laboratory periods a week. Laboratory fee, \$10.

Elasticity, hydrodynamics, elastic waves in solids and fluids; electromagnetic wave propagation; vibrations of mechanical systems, bars, thin plates, simple acoustical

systems; electronic oscillating systems, piezo-electric oscillators; characteristics of sound sources; measurement devices for sound intensity; simple acoustic filters, mechanical and acoustic impedance; frequency characteristics of microphones; architectural acoustics.

**NPH11. Analytical Mechanics and Thermodynamics.** One term. Credit four hours. Prerequisites, Physics NPH4 and Mathematics 200 or the equivalents. Four classroom periods a week.

Analytical mechanics of material particles, systems of particles, and rigid bodies; Lagrange's equations; first and second laws of thermodynamics, entropy, thermodynamic potentials, and the entropy constant.

**NPH12. Electron Physics.** One term. Credit three hours. Prerequisites, Physics NPH8 and 11. Three classroom periods a week.

An introductory survey of atomic physics, primarily preparatory to applications in electronics but fundamentally important in other fields; properties of fundamental particles (electron, proton); photons and electron waves; atomic energy levels; vibration states of simple molecules, excitation and emission phenomena; atomic and x-ray spectra; periodic arrangements of atoms; radioactivity; isotopes, nuclear structure.

**NPH13. Optics.** One term. Credit five hours. Prerequisites, Physics NPH8, 9 and 10. Three lecture-recitation periods and two laboratory periods a week. Laboratory fee, \$10.

Geometrical optics, lens systems, Gauss points, aberrations, stops, photometry of optical systems; interference, applications of various forms of interferometers; diffraction, Fresnel and Fraunhofer diffraction patterns and their applications to optical measurements; polarized light, production, detection, measurement and applications of plane and elliptically polarized beams; reflection and transmission at optical boundaries; emission and absorption spectra; application of thermal radiation to temperature measurements.

**NPH14. Electronics.** One term. Credit two hours. Prerequisites, Physics NPH8-12, or the equivalents. One classroom and one laboratory period a week. Laboratory fee, \$5.

High vacuum technique; motion of ions and electrons in static and magnetic fields; electron optics; space charge effects and phenomena in dense electron beams; electron-atom collision phenomena including scattering, atom excitation, and ionization cross-section; behavior of electrons in metals, conduction, and thermionic emission.

For more advanced courses in Physics (generally for graduate students) see the bulletin board in Rockefeller Hall or consult the Department of Physics.

## PSYCHOLOGY

Mr. H. P. WELD, *Chairman*; MESSRS. O. D. ANDERSON, F. S. FREEMAN, H. S. LIDDELL, F. S. MARCUSE, R. M. OGDEN, T. A. RYAN, R. K. WHITE, and A. L. WINSOR.

*For a major in psychology, the following courses must be completed: (1) in Psychology, twenty-four hours including courses 1 and 3; (2) in related subjects, fifteen hours to be selected in consultation with the adviser from courses in Biology, Chemistry, Mathematics, Music, Philosophy, Physics, and Social Science.*

*Students who wish to take course 1 or 2, should go, on one of the registration days, to Morrill Hall, north entrance, third floor, for assignment to sections.*

**1. Elementary Psychology.** One term. Credit three hours. Not open to freshmen.

This course is a prerequisite for all later courses in psychology. It deals with the basic problems and principles of human psychology and is designed as a general foundation for the study of experimental, social, animal, and child psychology, for psychotechnology, and for the psychology of the abnormal. Class demonstrations will supplement the lectures and recitations. Textbook: Boring, Langfeld and Weld. *Introduction to Psychology*.

**2. The Special Psychologies.** One term. Credit three hours. Prerequisite, Psychology 1. A survey of the fields of differential, abnormal, animal, genetic, and social psychology.

**3. Introductory Laboratory.** One term. Credit three hours. Prerequisite, Psychology 1. Laboratory fee, \$2.

This course is required for all further laboratory work in psychology. It provides elementary training in the methods of experimentation. A representative series of experiments drawn from the field of psychology will be performed by every student.

**4. Intermediate Course in Psychology.** One term. Credit three hours. Prerequisite, Psychology 1 and the consent of the instructor.

Intended for students who wish to continue the study of psychology at a more advanced level of presentation. Lectures, textbook assignments, and demonstrations.

**5. Perception.** One term. Credit three hours. Prerequisite, Psychology 1 and consent of the instructor.

The place of perception in psychology and its relation to every-day living. A review of the important experiments with special emphasis upon recent developments and upon modern theories of perception.

**6. Memory and Thinking.** One term. Credit three hours. Prerequisite, Psychology 1 and consent of the instructor.

Rote and logical memory, factors influencing memory; relationships between language and thought; repression, wishful thinking, artistic thinking, group thinking, creative thinking, and critical scientific thinking.

**7. Animal Psychology.** One term. Credit three hours. Prerequisite, Psychology 1.

A comparative psychology of the animals based upon a descriptive and experimental account of representative forms.

**8a. Aesthetics: Psychology of Art.** One term. Credit three hours. Open to sophomores, juniors, and seniors.

A study of the aesthetic experience as criterion of art and skill. Special consideration will be given to the underlying principles of music, poetry, and the visual arts. Designed for students interested in the fine arts as well as for those interested in the philosophical theory of values.

**11. Physiological Psychology.** One term. Credit three hours. Prerequisite, Psychology 1.

Lectures and demonstrations on the experimental psychology of behavior, together with a study of the nervous structures involved.

**12. Legal Psychology.** One term. Credit three hours. Prerequisite, Psychology 1.

Intended for upperclassmen preparing for law.

Psychological aspects of the origin and growth of the law, and of legal theory; psychological problems of evidence and responsibility.

**13. History of Experimental Psychology.** One term. Credit three hours. Prerequisite, senior standing and consent of the instructor.

**14. Contemporary Psychology.** One term. Credit three hours. Prerequisite, upperclass standing and consent of the instructor.

A comparative study of current psychological theory; existential psychology, behaviorism, Gestalt psychology, psychoanalysis, and hormic psychology.

**15. The Normal and the Abnormal.** One term. Credit three hours. Prerequisite, Psychology 1.

The hazards to sanity throughout the life-course. An introduction to the psychological defects and disorders.

**19. Minor Research Problems.** Two terms. Credit three hours a term. Prerequisite, Psychology 1, 3 and special courses required by the instructor.

Research of informal study in general, abnormal, animal, applied, physiological, and social psychology. The course is designed for students majoring in psychology who are prepared to undertake original investigation.

**121. Technique of Experimentation.** One term. Credit three hours. Primarily for graduate students. Hours to be arranged.

**122. Research Methods in Social Psychology.** Two terms. Credit two hours a term. Prerequisite, permission of the instructor.

Primarily a training course, with emphasis on actual research and field experience; individual and group projects. In 1943-44 the work will center around wartime problems: public opinion sampling, case-study analysis as related to attitude-formation, experimental work on factors related to national morale, etc.

A study of the principles and processes of psychological research.

**129. Seminar in Psychology.** One term. Credit three hours. Primarily for graduate students. Hours to be arranged.

**Social Psychology.** See INTERDEPARTMENTAL COURSES, p. 63.

## PSYCHOBIOLOGY

**133. Informal Study and Research in Psychobiology.** One term. Credit hours to be arranged. Prerequisite, Psychology 1.

Recent advances in the investigation of the interrelationship of mind and body.

## EDUCATIONAL PSYCHOLOGY

**Educational Psychology.** (Education 100. See *Announcement of the School of Education*.) One term. Credit three hours. Primarily for prospective teachers. Prerequisite, Human Growth and Development. Other qualified students may be admitted on consent of the instructor.

This course is counted among the 30 hours allowed outside the College of Arts and Sciences.

The major facts and principles of psychology bearing on educational practice and theory.

**Mental Measurements.** (Education 7). One term. Credit three hours. Prerequisite, a course in general or educational psychology, or Human Growth and Development.

Development of individual and group tests of intelligence and personality; principles underlying their construction and use; their use in schools, psychological clinics, the armed services, and in other fields. The nature of mental abilities. Demonstrations in administering and interpreting tests.

**Experimental Educational Psychology.** (Education 8). One term. Credit and hours to be arranged. Consent of the instructor is required. Education 7 or its equivalent should precede this course.

The application of psychological and statistical methods to problems in education.

**Individual Differences.** (Education 18). One term. Credit three hours. Prerequisite, a course in general or educational psychology, or Human Growth and Development.

The nature, causes, and implications of individual differences in abilities and behavior. Study and observations of atypical groups.

**Seminar in Human Development and Behavior.** (Education 20). One term. Credit two hours. Primarily for graduate students in Education. Seniors may be admitted with permission of the instructor.

Recent experimental and clinical materials and theories. Educational implications.

## APPLIED PSYCHOLOGY

**50. Psychology of Inefficiency.** One term. Credit three hours. Prerequisite, Psychology 1.

A survey of the external and internal factors which affect the efficiency, speed, and accuracy of human work. Consideration will be given to sedentary or 'mental' work as well as to physical work, in relation to fatigue, monotony, rest, sleep, and the effects of noise, light, temperature, narcotics, incentives, and social factors.

**51. Psychotechnology in Business and Industry.** One term. Credit three hours. Prerequisite, Psychology 1 and junior standing. Fee, \$1.

A study of experimental and statistical analyses of psychological problems in vocational selection, industrial production, personnel, advertising, selling, and market research.

**Personnel Administration.** (Hotel Administration 119). One term. Credit three hours. Prerequisite, Psychology 1.

**Seminar in Personnel Administration.** (Hotel Administration 219). One term. Credit two hours. Prerequisite, course 119. Open to qualified seniors and graduate students.

## ROMANCE LANGUAGES

Mr. G. I. DALE, *Acting Chairman*; Messrs. L. H. GORDON, EMERSON HINCHLIFF, J. F. MASON, LAURENCE PUMPELLY, B. L. RIDEOUT, and P. J. THOMAS.

*For a major in French, the following courses must be completed: (1) in French, twenty-one hours of unstarred courses; (2) in related subjects, eighteen hours to be selected from courses in English, History of Art, German, Greek, Ancient and European History, Italian, Latin, Music 21, Philosophy 5, 8, 19, Portuguese, Russian, and Spanish.*

*For a major in Spanish, the following courses must be completed: (1) in Spanish, twenty-one hours of unstarred courses; (2) in related subjects, eighteen hours to be selected from*

*courses in English, History of Art, French, German, Greek, Ancient and European History, Italian, Latin, Music 21, Philosophy 5, 8, 19, Portuguese, and Russian.*

*For a major in French and Italian, Spanish and Italian, French and Spanish, Spanish and French, the following courses must be completed: (1) in the first language of each pair, fifteen hours of unstarred courses, and in the second language, nine hours of unstarred courses; (2) in related subjects, eighteen hours to be selected from courses in English, History of Art, German, Greek, Ancient and European History, Latin, Music 21, Philosophy 5, 8, 19, Portuguese, Russian, and the Romance language not included in the major.*

#### FRENCH

*Students desiring the recommendation of the Department for teaching French are required to take the following courses: 7, 9 (one term), 16, 22, 23, 30.*

*Students planning to teach French in the secondary schools will find it useful to prepare a second subject of specialization. Latin is particularly recommended. French may be combined with Latin in a course which will fulfill the New York State requirements for teachers of those subjects. The announcement of the Department of Classics and members of the two departments should be consulted.*

**\*1. First Course for Beginners.** Two terms. Credit three hours a term.

Students with first-year entrance French should enter the course the second term.

**\*1g. First Course for Graduate Students.** Two terms. The emphasis is chiefly on the attainment of a reading knowledge of French.

**\*3a. Second Course.** Two terms. Credit three hours a term. Prerequisite, French 1, or second year entrance French.

**\*4a. Reading of French.** One term. Credit three hours. Prerequisite, French 3a, or third year entrance French.

Translation and rapid reading.

For the satisfaction of the Prescribed Subjects, must be taken with or subsequent to French 5a. Courses 4a and 5a together are roughly equivalent to course 6.

**4b. Reading of French.** One term. Credit two hours. Prerequisite, French 4a, or fourth year entrance French.

Designed to inculcate an extensive and exact reading knowledge of the language.

**\*5a. Written and Spoken French.** One term. Credit three hours. Prerequisite, French 3a, or third year entrance French.

**5b. Written and Spoken French.** One term. Credit three hours. Prerequisite, fourth year entrance French, or French 5a or 6.

**5c. Written and Spoken French.** One term. Credit three hours. Prerequisite, French 5b.

**\*6. Freshman French: Reading and Composition.** Two terms. Credit three hours a term. Prerequisite, French 3a, or third year entrance French. Designed primarily for the satisfaction of the Prescribed Subjects in foreign languages.

**7. Written and Spoken French.** Two terms. Credit three hours a term. Prerequisite, French 5b.

Composition, conversation, and discussion of selected topics in French grammar. The course is conducted in French.

**9. Written and Spoken French.** Two terms. Credit three hours a term. Prerequisite, French 7.

Rapid translation from English; themes and talks by students on literary and historical topics. The course is conducted in French.

**10. French Civilization.** One term. Credit two hours. Prerequisite, three years of entrance French or its equivalent. Open to Freshmen. Not accepted in fulfillment of the Prescribed Subjects.

Lectures in English, translation, and outside reading in French, on the general aspects of French civilization.

**16. History of French Literature.** Two terms. Credit three hours a term. Prerequisite, fourth year entrance French, French 4a, or French 6.

Lectures on French literature since the Middle Ages.

**17. Literature of the Seventeenth Century.** Two terms. Credit three hours a term. Prerequisite, French 16.

Lectures and outside reading. This course is conducted in French.

18. **Literature of the Eighteenth Century.** Two terms. Credit three hours a term. Prerequisite, French 16.

Lectures and outside reading. This course is conducted in French.

19. **The Romantic Movement in French Literature.** Two terms. Credit three hours a term. Prerequisite, French 16.

20. **Modern French Literature.** Two terms. Credit three hours a term. Prerequisite, French 16.

21. **Contemporary French Literature.** Two terms. Credit three hours a term. Prerequisite, French 16.

22. **French Phonetics.** One term. Credit two hours.

23. **French Historical Grammar.** One term. Credit two hours. Prerequisite, one year of Latin.

Lectures on the historical development of French from its origins to the present. Primarily for students intending to teach French.

24. **French Philology.** Two terms. Credit three hours a term. Prerequisite, French 5a, 23, and entrance Latin.

Lectures on the historical development of the French language, with a detailed phonological and morphological study of the *Chanson de Roland*.

30. **French for Teachers.** One term. Credit three hours.

Recommended especially for candidates for the examination for the approval of Oral Credit in New York State. Open to seniors who have received an average grade of at least 80 in their composition courses in French.

31. **Literature of the Sixteenth Century.** Two terms. Credit two hours a term. Prerequisite, French 16.

This course is conducted in French.

35. **Contemporary France.** Lectures in French. Two terms. Credit two hours a term.

41. **Old French Texts.** One term. Credit two hours. Primarily for graduates.

43. **Old Provençal Philology and Literature.** One term. Credit two hours.

47. **Modern French Seminary.** Two terms. Credit two hours a term.

Primarily for graduates.

#### ITALIAN

\*1. **Elementary Course.** Two terms. Credit three hours a term.

5. **Second year Italian.** Two terms. Credit three hours a term. Prerequisite, Italian 1 or its equivalent.

Reading of modern texts, and practice in the written and spoken language.

15. **Dante.** Two terms. Credit three hours a term. Prerequisite, Italian 5 or its equivalent.

#### SPANISH

\*1. **First Course for Beginners.** Two terms. Credit three hours a term.

Students entering the University with one unit in Spanish should take the second term of Course 1.

\*3. **Second Course.** Two terms. Credit three hours a term. Prerequisite, Spanish 1, or second year entrance Spanish.

\*6. **Freshman Spanish.** Translation and composition. Two terms. Credit three hours a term. Prerequisite, Spanish 3, or third year entrance Spanish.

7a. **Intermediate Composition.** One term. Credit three hours. Prerequisite, Spanish 6.

7b. **Intermediate Composition.** One term. Credit three hours. Prerequisite, Spanish 7a. Courses 7a and 7b are conducted in Spanish. Special emphasis is placed on the attainment of accuracy and fluency in both written and oral expression.

8. **Spoken Spanish.** Two terms. Credit one hour a term. Discussion of assigned topics. Prerequisite, consent of the instructor.

10. **History of Spanish Literature.** Two terms. Credit three hours a term. Prerequisite, Spanish 6 or equivalent.

Lectures and assigned reading.

15. **Drama of the Golden Age.** One term. Credit three hours. Prerequisite, Spanish 6 or equivalent.

17. **Cervantes.** One term. Credit three hours. Prerequisite, Spanish 6 or equivalent.
18. **The Spanish-American Novel.** Two terms. Credit three hours a term. A study of the novel from 1850 to the present day. Lectures in Spanish. Reports. The reading of representative novels. Prerequisite, Spanish 6 or equivalent.
19. **The Nineteenth Century Spanish Novel.** Two terms. Credit three hours a term. Prerequisite, Spanish 6 or equivalent.
20. **Latin-American Culture.** Two terms. Credit two hours a term. Prerequisite, Spanish 3, or the consent of the instructor.
- The geography, ethnology, history, politics, and culture of Latin America.
41. **Old Spanish.** Two terms. Credit two hours a term. Primarily for graduates.
42. **Calderón and Alarcón.** Two terms. Credit two hours a term. Primarily for graduates.
43. **The Picaresque Novel.** Two terms. Credit two hours a term. Primarily for graduates.

## PORTUGUESE

1. **First Course for Beginners.** Two terms. Credit three hours a term.  
May not be taken at the same time as Spanish 1 or Italian 1.

## SCANDINAVIAN LANGUAGES AND LITERATURES

Mr. HALLDOR HERMANNSSON

*For a major in Scandinavian Languages and Literatures, the following courses must be completed: (1) in Scandinavian Languages and Literatures, courses 1 and 3 or 4, and six other hours; (2) related subjects, twenty-two hours to be selected from approved courses in German, English, History, Greek, Latin, and Sociology and Anthropology.*

1. **Old Icelandic.** Two terms. Credit three hours a term.
2. **Modern Icelandic.** One term. Credit three hours.
3. **Danish and Dano-Norwegian.** One term. Credit three hours.
4. **Swedish.** One term. Credit three hours.
5. **Old Norse-Icelandic Literature.** One term. Credit two hours.
6. **Modern Scandinavian Literature.** One term. Credit two hours.
7. **Early Scandinavian Civilization and History.** One term. Credit two hours.

## SLAVIC

Mr. ERNEST J. SIMMONS, *Chairman*, and assistants

*For major work in Slavic, a student is required to complete forty-eight hours, twelve of which may be in related subjects. Slavic 1, 2, 3, and 5 are required. History 51a and 51b (Russian history) count for credit in the field, and students are urged to take these courses. Related courses should be selected, in consultation with an adviser, from the general field of the humanities.*

*Tutorial work will be a regular part of major study in Slavic. At the end of the senior year a comprehensive examination on the field must be taken.*

*For Honors in Slavic, a student must elect twelve more hours, part of which should include credit in either Slavic 20 or Slavic 30 and 31. The candidate must submit a thesis in his senior year and take a special comprehensive examination on the field at the end of that year. Required courses not described here will be given in alternate years.*

1. **Elementary Russian.** Two terms. Credit three hours a term.

Grammar, reading, writing, elementary composition. The course is primarily designed to give the student a reading knowledge of the language.

5. **Introduction to Russian Literature and Culture.** Two terms. Credit three hours a term.

Lectures on the principal literary and artistic monuments of Russia. A series of illustrated lectures on Russian art and architecture will be a regular part of the course. All reading will be in English translations.

6. **Pushkin.** One term. Credit three hours.  
Representative readings of Pushkin's poetry and prose. Prerequisite, second-year Russian or the consent of the instructor.
7. **Dostoevski.** One term. Credit three hours.  
An analysis of Dostoevski's principal novels and a study of their influence in foreign literatures. No knowledge of Russian is required.
10. **Soviet Literature.** One term. Credit three hours.  
A study of the development of socialist realism in the works of the principal Soviet poets, novelists, and dramatists.
25. **Intensive Introductory Course in Russian.** Fifteen hours a week; twelve-week course. Credit twelve hours.
35. **Intensive Advanced Course in Russian.** Fifteen hours a week; twelve-week course. Credit twelve hours. Prerequisite, Russian 25 or two years of college Russian.

### SOCIOLOGY AND ANTHROPOLOGY

Mr. R. L. SHARP, *Acting Chairman*; Messrs. LOUIS GUTTMAN, E. W. NOLAND, and SVEND RIEMER.

*For a major in Sociology and Anthropology the following courses must be completed: (1) twenty-one hours in Sociology and Anthropology, in addition to Sociology 2, Social Science B, or equivalent; (2) twenty-one hours in related subjects, to be chosen with the approval of the adviser. The major may emphasize social and personnel work, social psychology, community organization and planning, statistics, or anthropology.*

2. **Introduction to Sociology and Anthropology.** One term. Credit three hours. Not open to freshmen or to those who have credit for Social Science B.

The role of cultural factors in shaping personality; the behavior of crowds, races, nations, social classes, and publics; the social organization of rural and urban communities. Fee, in lieu of textbook, \$2.

3. **Man and Culture.** One term. Credit three hours.

An introduction to physical and cultural anthropology. Topics include: human origins, evolution, and racial differentiation; the prehistoric development of cultures; factors involved in long-term cultural change.

10. **The Family.** One term. Credit three hours. Prerequisite, Social Science B, Sociology 2, or equivalent.

The development of the family as a social institution in modern society; the relation between cultural changes and changes in the family pattern; the social psychology of intra-family relationships.

20. **Social Pathology.** One term. Credit three hours. Prerequisite, Sociology 2, Social Science B, or equivalent.

Social and personal disorganization in modern urban society; programs and agencies that aim at social reorganization.

21. **Criminology.** One term. Credit three hours.

A study of the various factors making for law violation and of society's methods for dealing with the criminal and the juvenile delinquent.

**Social Psychology.** Two terms. Credit three hours a term. Prerequisite, Sociology 1, Sociology 2, Social Science B, or permission of the instructor.

See Inter-Departmental courses.

40. **Population Problems.** One term. Credit three hours. Prerequisite, Sociology 2, Social Science B, or equivalent.

Population growth, distribution, and migration; the problem of population quality; problems of race relations; population changes resulting from the war.

41. **Urban Society.** One term. Credit three hours. Prerequisite, Sociology 2, Social Science B, or equivalent.

A study of the city as a social organization. History and present patterns of city developments. Urban attitudes and customs.

42. **Social Planning.** One term. Credit three hours. Prerequisite, consent of instructor. Sociological aspects of home, neighborhood, city, and regional planning.

60. **Social Anthropology.** Two terms. Credit three hours a term.

Problems in the comparative and historical study of cultures, both primitive and complex; environments and technologies; social structures, familial, political, economic, religious, and associational; ritual and symbolic behavior; culture and personality; cultural interests and the problems of divergent interests within and between cultures.

**64. Cultures of Asia.** One term. Credit three hours.

A study of the cultures of representative ethnic groups in eastern Asia, including India and Indonesia, their origins, relationships with each other, and reactions to Western Civilization.

**70. Introduction to Statistics.** One term. Credit three hours. Not open to freshmen.

A descriptive course on elementary principles and methods for the systematic collection, presentation, and interpretation of statistics. For students who desire only one course in statistics, this course will provide an acquaintance with the principal sources of statistics, a knowledge of the major uses of statistics, and a critical understanding of elementary methods of analysis and statistical reasoning.

**71. Methods of Statistical Analysis.** Two terms. Credit four hours a term. Prerequisites: for the first term, Mathematics 65a, 30, or equivalent, or enrollment therein; for the second term, Mathematics 65b, or equivalent, or enrollment therein.

The analysis of frequency distributions of qualitative and quantitative variables: graphic representation, averages, dispersion, sampling and tests of significance, analysis of variance, regression, correlation, elementary multivariate analysis—including the problem of index numbers in economics and of scale construction in sociology and psychology. Fee for materials, \$2 each term.

**100. Informal Study.** Hours and credit to be arranged. Open to senior Sociology majors.

**160. Research Seminar in Anthropology.** Hours and credit to be arranged.

**172. Seminar: Advanced Statistical Methods.** Two terms. Credit two hours a term. Prerequisite, Sociology 71 or equivalent.

The topic or topics for the seminar will be decided by a consensus of the students. The theory of statistical inference (fundamental sampling problems), multiple factor analysis; reliability and validity of scales, the theory of statistical prediction, and other topics are among those that might be chosen.

## SPEECH AND DRAMA

Mr. H. A. WICHELS, *Chairman*; Messrs. H. D. ALBRIGHT, R. R. CARSON, A. M. DRUMMOND, G. B. MUCHMORE, C. B. OWENS, C. K. THOMAS, and R. H. WAGNER.

*Students may elect a general major, or a major with emphasis on (1) Rhetoric and Public Speaking, (2) Phonetics and Speech Training, (3) Dramatic Production. The following courses must be completed: (1) in the Department, twenty-one hours including nine hours from courses 1, 2, 10 (or 40), 32; (2) in related subjects, six hours of courses not taken in the freshman year in each of the following groups—(a) English (b) History, Government, Economics, Sociology; (c) Philosophy. Of this total of thirty-nine hours, twenty-four must be in unstarred courses.*

*Students planning to teach Speech should satisfy the basic requirements for teachers of English. For those preparing to teach English the Department recommends fifteen to eighteen hours in Speech and Drama including courses 1, 10 (or 40), 32, 41.*

### PUBLIC SPEAKING: ORAL READING

**\*1. Public Speaking.** One term. Credit three hours. Not open to freshmen.

Planned to give the fundamentals of speech preparation and to develop simple and direct speaking. Study of principles; constant practice; conferences.

Foreign students and others whose pronunciation of English falls below the normal standard, and students with special vocal problems, are advised to confer with Mr. THOMAS before registering.

**\*2. Public Speaking.** One term. Credit three hours. Prerequisite, Public Speaking 1.

Practice in the composition and delivery of speeches for various occasions, in parliamentary procedure, and in group discussion; study of problems of interest and persuasion.

**7. Discussion.** One term. Credit three hours. Open to sophomores and upperclassmen by consent of the instructor.

Principles and practice of group thinking: an introduction to systematic investigation and reflective thinking, with application to current questions; practice in various types of group discussion: committee, panel, symposium, forum; opportunity will be given to plan and conduct discussions.

**\*10. Oral Interpretation of Literature.** One term. Credit three hours. Not open to freshmen.

Training in interpretative reading of prose and poetry; study of principles; constant practice; conferences for drill.

**11. Oral Interpretation of Literature.** One term. Credit three hours. Prerequisite, course 10.

A continuation of course 10, with emphasis on the reading of poetry and of plays.

**12. Argument and Debate.** One term. Credit three hours. Prerequisite, Public Speaking 1.

Practice in debate on public questions; study of principles of argument; conferences.

**13. Argument and Debate.** One term. Credit three hours. Prerequisite, Public Speaking 12.

Advanced study of principles, methods, and noted examples; practice in cross-examination and other special forms of argument.

**16. Forms of Public Address.** Two terms. Credit three hours a term. Open to upperclassmen by consent of the instructor.

Practice in composing and delivering various types of public address.

**21. History of Public Address.** Two terms. Credit three hours a term. Open to upperclassmen by consent of the instructor.

A survey of ancient and modern oratory: Greek and Latin (in translation), English and American. Lectures, readings, and reports.

**23. Theories of Public Address.** Two terms. Credit three hours a term. Open to upperclassmen by consent of the instructor.

Representative theories of rhetoric: Greek and Latin (in translation), English and American.

**24. Public Opinion and the Method of Argument.** One term. Credit three hours. Open to upperclassmen.

Current controversies on public questions studied in the light of modern theories of public discussion, mass persuasion, and opinion control. Lectures, discussions, and reports.

**25. British Orators.** One term. Credit three hours. Open to upperclassmen by consent of the instructor.

A study of leading British orators. Lectures, readings, and reports on selected speeches.

#### SPEECH IMPROVEMENT AND PHONETICS

**\*30. Voice Training.** One term. Credit two hours. Open to freshmen.

An elementary course for the improvement of the speaking voice, with attention to the principles of voice production.

Students with special vocal problems are advised to take this course before taking course 1.

**32. Phonetics and Speech Training.** One term. Credit three hours. Open by consent of the instructor.

Principles of phonetics; study of English pronunciation, based chiefly on contemporary American usage; practice in phonetic analysis and, where necessary, drill for the improvement of individual speech.

Foreign students and others whose pronunciation of English falls below the normal standard are advised to take this course before taking course 1.

**33. Regional and Historical Phonetics.** One term. Credit three hours. Prerequisite, course 32.

**36. Principles of Speech Correction.** Two terms. Credit three hours a term. Prerequisite, course 32.

Study of principles correlated with supervised practice in the Speech Clinic.

**Speech Clinic.** For students working under the direction of the Department.

## DRAMATIC PRODUCTION

**\*40. Dramatic Interpretation.** One term. Credit three hours. For freshmen and sophomores.

Analysis and interpretative reading of various types of dramatic prose and poetry; principles of stage presentation; reports, individual exercises, and group rehearsal.

**41. Dramatic Production: Direction.** One term. Credit three hours. Open by consent of the instructor; not open to freshmen.

Dramatic interpretation and the related principles of stage direction and production. Lectures, readings, reports, and drill.

**42. Advanced Dramatic Interpretation.** Two terms. Credit three hours a term. Primarily for graduates; open by consent of the instructor to upperclassmen majoring in the Department.

**45. Dramatic Production: Stagecraft.** One term. Credit three hours. Open by consent to the instructor; not open to freshmen.

The theory and practice of stage production; planning of small theatres; stage arrangement; problems and practice in scene construction, design, and elements of lighting. Lectures, demonstrations, reports.

**45a. Dramatic Production: Stage lighting.** One term. Credit two hours. Open by consent of the instructor to graduates and upperclassmen.

**46. Stage Design and Theatre Crafts.** One term. Credit three hours. Especially for juniors. Not open to freshmen.

Elementary principles of design applied to architecture, decoration, and furniture for the theatre; laboratory practice in two- and three-dimensional design.

**47. History of Theatrical Costume.** Two terms. Credit three hours a term. Especially for juniors. Not open to freshmen.

A historical survey of theatrical costuming, and of related period costumes, modes and manners. First term: from Greece of classical times through the continental Renaissance. Second term: from Tudor England to the present.

**48. History of the Theatre.** One term. Credit three hours. Open by consent of the instructor; not open to freshmen.

Lectures on the development of the theatre, with special attention to the period theatres and theatrical styles which influence modern stage presentation; complementary to a text-book and individual reports.

**49. Playwriting.** Two terms. Credit three hours a term.

Dramatic theory and practice; four one-act plays will be written each term.

**49b. Advanced Playwriting.** One term. Credit three hours.

**66. Theories of Dramatic Production.** One term. Credit three hours. Open to seniors by consent of the instructor.

**90. Theatre Practice.** Two terms. Credit two hours a term. Open by consent of the instructor to juniors majoring in the department who have taken or are taking course 41 or 45.

Projects in the productions of the University Theatre.

**91. Theatre Practice.** Two terms. Credit two hours a term. Open by consent of the instructor to seniors who have taken one of the following courses: 41, 45, 46, 47. Hours to be arranged.

Projects in the productions of the University Theatre.

The Department calls the attention of students interested in Dramatic Production to the courses listed under THE FINE ARTS, and to ENGLISH 23, 24, 150.

## ZOOLOGY

Mr. H. B. ADELMANN, *Chairman*; Messrs. A. A. ALLEN, Miss ANNA L. DUNHAM, Messrs. P. W. GILBERT, F. B. HUTT, S. L. LEONARD, Miss AMY G. MEKEEL, Messrs. J. W. PAPEZ, A. H. WRIGHT, and B. P. YOUNG.

*For a major in Zoology there must be completed: (1) Zoology I and eighteen other hours selected from Zoology 8, 9, 11, 16, 30, 101, 104, 223, and Physiology 303, and (2) fifteen hours in related fields selected from Zoology, Chemistry, Biochemistry, Physics, Psychology, Entomology, Botany, Geology, Plant Breeding 101, and Bacteriology.*

*Choice of all courses should be made at a conference with the adviser.*

*Students who are planning to study medicine should make sure that they select a major that will include the entrance requirements of the medical school of their choice. Information as to advisers and entrance requirements to medical schools may be obtained at the Office of Professor L. L. Barnes, Rockefeller Hall.*

*Provisions are made for a limited number of students to undertake informal study.*

Courses 1a and 1b, or their equivalent, are a prerequisite for all other courses in the department except 9.

**1a, 1b. Introductory Zoology.** Two terms. Credit three hours a term. If taken after General Biology I, credit two hours a term.

**1a: a survey of invertebrate animals.** Consideration of how each of the different body plans possessed by animals without backbones provides for the essential life activities. Also a discussion of the phylogenetic relationships existing between such groups of animals.

**1b: a survey of the anatomy and physiology of the vertebrate organ systems, biological principles, and evolution.** Laboratory fee, \$3 a term.

**1aI. Biology** (in the V-12 program of the Navy). One term. Credit four hours. Protoplasm, single-celled plants and animals; methods of classification; the environment; plant morphology, growth, and reproduction; plant physiology, including photosynthesis, CO<sub>2</sub> and N cycles, growth and development, plant products including foods and drugs; viruses; pathogenic bacteria, parasitic protozoa; immunity; parasites, insect vectors and their control.

**8. Elementary Taxonomy and Natural History of Vertebrates.** Two terms. Credit three hours a term.

Lectures on fishes, amphibia, reptiles, birds and mammals, dealing with the principles of classification and nomenclature, characteristics, relationships, and bionomics of these groups. The laboratory gives practice in the identification of North American species. Field studies of the local fauna are undertaken during the fall and spring. During May, field trips will be taken at 5:30 A.M. Laboratory fee, \$4, not including cost of transportation on field trips.

**9. General Ornithology.** One term. Credit three hours.

Introduction to the study of birds, particularly the local species; their songs and habits; designed to give a working knowledge to those wishing to study birds as an avocation, and fundamental to those planning advanced work in ornithology. Laboratory work with bird skins is based on the field work. Laboratory fee, \$3.

**11. Comparative Anatomy of Vertebrates.** Two terms. Credit three hours a term.

A thorough study and dissection of representative vertebrate types including a fish, amphibian, reptile, bird, and mammal, together with demonstrations on species other than the types dissected. Laboratory fee, \$4.50 a term.

**22. Ichthyology.** One term. Credit three hours.

An amplification of the prerequisite course 8. In the lectures, special emphasis is laid on the principal phases of fish life; the taxonomy, origin, and evolution of fossil and living groups; geographical distribution; and the literature and institutions of zoology. Laboratory periods are devoted to the identification of exotic and indigenous forms. Laboratory fee, \$4, not including cost of transportation on field trips.

**25. Mammalogy.** One term. Credit three hours.

Discussion of principal phases of mammalian life; origin, distribution, habits, and literature. Laboratory periods are devoted to methods of field collecting, census taking, life history studies, preparation of skins and skeletons, and identification of North American species. Laboratory fee, \$4, not including cost of transportation on field trips.

**30. Heredity and Eugenics.** One term. Credit two hours.

The laws of heredity; a survey of inherited characters in man; biological principles applicable to betterment of the human race.

**67. Seminar in Systematic Vertebrate Zoology.** Two terms. Credit one hour.

Life-zone plans of North America, 1817-1937. Distribution and origin of life in North America. Zoogeography of the Old World. Animal coloration. Other topics, to be announced.

**101. The Tissues: Histology and Histogenesis.** One term. Credit four hours.

A general survey of the structure and development of the tissues. The treatment is general, designed to provide students of biology with a basis for the understanding

of normal and abnormal structure of the vertebrate. Each student will prepare and receive a series of typical microscopic preparations. Laboratory fee, \$6.

**102. The Organs: Histology and Development.** One term. Credit four hours. Prerequisite, course 101 or its equivalent.

A continuation of course 101. Courses 101 and 102 together give the fundamental facts of the microscopic structure and development of the body. There is also offered opportunity to gain knowledge of technique in the fixing, embedding, and sectioning of selected organs. Laboratory fee, \$6.

**104. Vertebrate Embryology.** One term. Credit five hours.

An introduction to general vertebrate embryology designed to provide a basis for the appreciation of biological problems. The material is treated comparatively with particular emphasis on the development of the amphibian, the bird, and the mammal. A few invertebrate forms are used where desirable for illustration. Laboratory fee, \$6.50.

**126. Advanced Ornithology.** One term. Credit three hours. Prerequisite, permission to register.

The structure and classification of birds; geographical distribution; the literature and institutions of ornithology; identification of representative birds of the world. The first part of the term is devoted to field work on the fall migration, and to the identification of birds in winter plumage. Designed primarily for students specializing in ornithology or animal biology. Laboratory fee, \$3.

**136. Seminar in Ornithology.** Two terms. Without credit.

**221. Structure of the Human Body.** One term. Credit three hours. Prerequisite, six or more hours of Animal Biology and consent of the instructor.

For students interested in nursing, dentistry, etc., or those wishing to obtain a knowledge of the structure of their own bodies. Illustrated by specimens and lantern slides.

**400. Research Problems.** Ordinarily limited to seniors only. Credit to be arranged. Problems may be undertaken in any phase of zoology, but the consent of the instructor concerned is a prerequisite.

## ADDITIONAL COURSES IN BIOLOGICAL SCIENCE

### GENERAL BIOLOGY

**1. General Biology.** Two terms. Credit three hours a term; both terms of the course must be completed to obtain credit, unless the student is excused by the department. First term not prerequisite to second. Not open to students who have had both Zoology I and Botany I. If Biology I is taken after either Zoology I or Botany I, credit two hours a term.

An elementary course planned to meet the needs of students majoring outside of the plant and animal sciences; particularly adapted as the first year of a two-year sequence in biology for the prospective teacher of general science in the secondary schools. The course deals with the nature of life, life processes, the activities and origin of living things. It covers the organization of representative plants and animals, including man as an organism, and the principles of nutrition, growth, behavior, reproduction, heredity, and evolution. Fee, \$3.50 a term.

**5. Laboratory Methods in Biology.** One term. Credit two or three hours. Prerequisite, Biology I or Zoology I and permission to register.

For students who intend to teach or to follow some phase of biology as a profession. This course includes such subjects as: laboratory equipment; collection, preservation, and storage of materials; sectional and non-sectional preparations of animal tissues for histological study; injection of blood vessels and embalming; preparation of bird and mammal skins for study; chart making; introduction to photography, including the preparation of lantern slides; use of micro-projector; theory and use of 16-millimeter sound and silent projection apparatus. Laboratory fee, \$5 or \$7.50.

### BIOCHEMISTRY

*For a major in Biochemistry, the following courses must be completed: (1) in Biochemistry, courses 320 and 321, or 322 and 323; (2) in related subjects, Physiology 303, Chemistry 102 or 104, 210, 375, and nine hours of electives.*

**314. Elementary Biochemistry.** One term. Credit three hours. Prerequisite, Chemistry 375 or the equivalent.

The substances met with in living things, and the chief facts of digestion, metabolism, and nutrition.

**314a. Laboratory Work in Biochemistry.** One term. Credit three hours. Prerequisite or parallel, course 314.

Laboratory fee, \$10.00; Breakage deposit, \$3.00.

**320. Biochemistry, Advanced Lecture Course.** One term. Credit three hours. Prerequisite, one term of Chemistry 305 and one term of Chemistry 310, or the equivalent, including introductory courses in qualitative and quantitative analysis.

The biological and physical chemistry of lipids and carbohydrates.

**321. Biochemistry, Advanced Laboratory Course.** One term. Credit two hours. Prerequisite, or parallel, course 320 or 322.

Laboratory experiments with lipids and carbohydrates.

**322. Biochemistry, Advanced Lecture Course.** One term. Credit three hours. Prerequisite, one term of Chemistry 305 and one term of Chemistry 310, or the equivalent, including introductory courses in qualitative and quantitative analysis.

The biological and physical chemistry of proteins, enzymes, and related substances.

**323. Biochemistry, Advanced Laboratory Course.** One term. Credit two hours. Prerequisite, or parallel, course 320 or 322.

Laboratory experiments with proteins and enzymes. Laboratory fee, \$15; breakage deposit, \$5.

**325. Biochemistry, Research work.** Two terms. Credit to be arranged. Prerequisite, courses 321, 322 and 323.

Laboratory fee, \$3 a credit hour; breakage deposit, \$3.

#### ENTOMOLOGY

**12. General Entomology.** One term. Credit three hours. Prerequisite, General Biology I, Zoology I, or Botany I.

Lectures on the characteristics of orders, suborders, and the more important families, and on the habits of representative species; practical exercises in studying the structure of insects, their biology, their habits, and their classification. Laboratory fee, \$2.50.

**51. Parasites and Parasitism.**

**52. Medical Entomology.**

For details of these courses and of others in economic zoology, entomology, and limnology offered in the College of Agriculture, see the announcement of that college.

#### PHYSIOLOGY

**\*303. Human Physiology.** One term. Credit three hours.

An introductory course designed particularly for those students who intend to take only one course in physiology, for those who expect to teach biology in the secondary schools, and for those who desire a general knowledge of the physiological processes of the human body.

**305. Endocrinology and Metabolism.** One term. Credit three hours. Prerequisite, six or more hours each of biology and chemistry.

Study of digestion, metabolism, endocrinology, and reproduction.

**306. Laboratory in Physiology.** One term. Credit three hours. Registration by permission.

Selected experiments to parallel course 305. Laboratory fee, \$10.

#### INTERDEPARTMENTAL COURSES

*The course listed below is offered cooperatively by the Department of English and the Department of Speech and Drama.*

**A, B. Oral and Written Expression.** Two terms. Credit three hours a term. Open only to freshmen who are taking Introduction to Social Science A,B.

Training in reading, writing, and speaking. The greater part of the exercises will develop subjects drawn from assigned essays, from current events, and from Introduction to Social Science A,B. Students who pass the course will have satisfied group I of

the prescribed subjects and may elect sophomore courses in English and courses in Public Speaking which follow Public Speaking I.

*The following course is offered cooperatively by the Department of Zoology and the School of Education.*

**A, B. Human Growth and Development.** Two terms. Credit three hours a term. Prerequisite, a laboratory science, preferably general biology or introductory zoology. Course A is prerequisite to Course B. Fee, \$1 a term.

The aim of this course is to integrate information about structural, physiological, behavioral, and intellectual aspects of growth and development. Emphasis is placed on those aspects of growth and development that will help educators to understand human individuals as functioning organisms in a social environment. The materials of the course are selected from pertinent fields, including anatomy, embryology, genetics, neurology, physiology, hygiene, sociology, cultural anthropology, developmental psychology, and education.

*Social Science. The courses A, B, C, D listed below are offered cooperatively by the Departments of Economics, Government, and Sociology and Anthropology. They are designed for students who desire a general introductory course in social science. On the completion of a part or all of these courses, students may be admitted to advanced courses in anthropology, economics, government, and sociology under conditions set by the departments concerned.*

*Courses A and B are prescribed for those who expect to become candidates for the degree Master of Education. Courses C and D are additionally required of prospective teachers of the social studies.*

**A, B. Introduction to Social Science.** Two terms. Open to freshmen. Course A is a prerequisite for Course B. Credit six hours on completion of Course B.

A study of the social organization of communities and of nations, designed to introduce the students to the fields of economics, government, sociology, and anthropology. Attention will be directed successively toward (1) a primitive community, (2) the New England town of the seventeenth century, (3) modern communities, urban and rural, and (4) the nation as a form of social organization. Fee for materials furnished, \$3 each term.

**C. Introduction to Social Science.** One term. Credit three hours. Prerequisite, Social Science B.

A continuation of course B. Further study of the economic, social, and political organization of national states. Fee for materials furnished, \$2.

**D. Introduction to Social Science.** One term. Credit three hours. Prerequisite, Social Science, C.

A continuation of course C. National and supra-national social organization. Fee for materials furnished, \$2.

*The course listed below is offered cooperatively by the Department of Psychology and the Department of Anthropology and Sociology.*

**Social Psychology.** Two terms. Credit three hours a term. Prerequisite, one of the following: Psychology 1, Sociology and Anthropology 2, Social Science B, or permission of the instructors.

(An interdepartmental course. Given in place of courses formerly listed as: Psychology 9 and 10 and Sociology and Anthropology 30.)

The first term is devoted to the study of the human personality, its development, functioning, and social adjustment. Detailed case studies are used. The second term is devoted to the study of the psychological processes in collective behavior: group solidarity and disintegration, public opinion, race prejudice, class conflict, nationalism, war, etc. The course is designed for students interested in the applied fields of social work, clinical and personnel work, political psychology and public opinion as well as for those interested in teaching and research in the psychological and social sciences. Terms may be elected separately. Fee for materials, \$2 each term.

*The course listed below is offered cooperatively by the Departments of Botany, Extension Teaching, Forestry, Rural Education, and Zoology.*

**\*100. The Conservation of Wild Life.** One term. Credit two hours.

An introduction to the wild-life resources of North America; the importance of the flora and fauna in our economic and cultural life; the history of its decimation, the present need for conservation, and the methods employed to reestablish the various species.

## HYGIENE

**8. Mental Hygiene.** Two terms. Credit three hours a term.

The relationship of the structure of the total personality to environmental maladjustment as evidenced by physical and social behavior; a discussion of the more common personality difficulties and the role of insight in the prevention of these.

## UNIVERSITY REQUIREMENTS FOR THE DEGREE A.B.

## MILITARY SCIENCE AND TACTICS

**1. Basic Course.** Required. Throughout the year. The complete course covers two years. Three hours a week. Barton Hall. Credit one hour a term.

The course of training is that prescribed by the War Department for Senior Division Units of the Reserve Officers Training Corps for basic students. The Basic Course comprises the instruction required for Basic Training common to all arms and services of the Army. For details concerning the course, see the *Announcement of the Department of Military Science and Tactics*.

Required of all able-bodied first-year and second-year male students of the College of Arts and Sciences who are American citizens and candidates for a baccalaureate degree. The requirements of Military Science and Tactics must be completed in the early terms of residence; otherwise, the student will not be permitted to register again in the University without the consent of the faculty.

**Advanced Standing:** With the approval of the Department of Military Science and Tactics, credit may be allowed a student for all or part of the Basic Course, upon presentation of evidence that the work has been satisfactorily completed at an approved institution.

## PHYSICAL TRAINING FOR MEN AND WOMEN

All men undergraduate students, unless officially excused, are required to follow a program of physical training, for the satisfactory completion of which one hour of credit a term will be allowed.

All women undergraduate students, unless officially excused, are required to follow a program of physical education during the first four terms of their course of study. For the satisfactory completion of this requirement one hour of credit a term will be allowed.

These requirements are administered by the Dean of the University Faculty, 201 Morrill Hall.

## FOR MEN

**1. For Freshmen Excused from Military Science.** Activities, squad work, and prescribed exercises.

**2. For Sophomores Excused from Military Science.** Activities, squad work, and prescribed exercises.

**3. For Juniors and Seniors.** Building up and corrective exercises as prescribed by the Medical Examiners as a result of the physical examination required of all students in the University.

**4. Wrestling, Boxing, Fencing, Swimming.**

## FOR WOMEN

**6. Physical Education for Women (Freshmen).** Two terms. Three periods a week.

Required of all freshmen: fundamentals.

Required of all students: a course in rhythmic.

Other activities: archery, badminton, baseball, basketball, canoeing, folk and square dancing, field hockey, golf, individual gymnastics, modern dance, outing, riding, riflery, skiing, soccer, tennis, and recreation leadership.

See department bulletin.

**7. Physical Education for Women (Sophomores).** Two terms. Three periods a week. For description, see course 6.