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THE UNIVERSITY CALENDAR FOR 1936-37

1936

FIRST TERM

Sept. 21,	<i>Monday,</i>	Entrance examinations begin.	
Sept. 28,	<i>Monday,</i>	Registration and assignment of new students.	
Sept. 29,	<i>Tuesday,</i>	Registration and assignment of old students.	
Oct. 1,	<i>Thursday,</i>	Instruction begins at 8 A.M.	
Oct. 22,	<i>Thursday,</i>	Last day for payment of tuition for the first term.	
Nov. 25,	<i>Wednesday,</i>	Instruction ends at 6 P.M.	} Thanksgiving Recess
Nov. 30,	<i>Monday,</i>	Instruction resumed at 8 A.M.	
Dec. 19,	<i>Saturday,</i>	Instruction ends at 1 P.M.	

1937

Jan. 4,	<i>Monday,</i>	Instruction resumed at 8 A.M.	} Christmas Recess
Jan. 11,	<i>Monday,</i>	Founder's Day.	
Jan. 30,	<i>Saturday,</i>	Instruction ends.	
Feb. 1,	<i>Monday,</i>	Term examinations begin.	
Feb. 10,	<i>Wednesday,</i>	Term ends.	
Feb. 11,	<i>Thursday,</i>	A holiday.	

SECOND TERM

Feb. 12,	<i>Friday,</i>	Registration of all students.	
Feb. 15,	<i>Monday,</i>	Instruction begins at 8 A.M.	
Mar. 8,	<i>Monday,</i>	Last day for payment of tuition for the second term.	
April 3,	<i>Saturday,</i>	Instruction ends at 1 P.M.	} Spring Recess
April 12,	<i>Monday,</i>	Instruction resumed, 8 A.M.	
May —	<i>Saturday,</i>	Spring Day: a holiday.	
June 7,	<i>Monday,</i>	Term examinations begin.	
June 15,	<i>Tuesday,</i>	End of term examinations.	
June 21,	<i>Monday,</i>	COMMENCEMENT.	

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COURSES AND REQUIREMENTS

Regarding admission to the College of Arts and Sciences, the General Information Number should be consulted.

Two courses are offered in the College of Arts and Sciences, one leading to the degree of Bachelor of Arts, the other leading to the degree of Bachelor of Chemistry.

Neither degree will be conferred upon any student who has not been in residence at Cornell University during the last two terms preceding graduation, nor upon any student who has not been in residence at least two terms in this College, and in this College only.

For the degree of Chemical Engineer, see p. 20.

A student who does not pass twelve hours in any term, 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 four hours of their Summer Session registration with a grade of 70 or better in at least two hours.

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 requirement 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.

REGISTRATION

Students will file their study cards at the office of the Dean in accordance with instructions issued at the time of registration.

With the consent of the Dean and the approval of his adviser, a student may alter his list of courses during the first six days of instruction. Thereafter, no student will be permitted to cancel his registration for any course in which he is registered, 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.

THE GEORGE C. BOLDT MEMORIAL SCHOLARSHIPS

Mr. George C. Boldt, jr., has created three scholarships, each of them worth four hundred dollars in 1937, as a memorial to his father. These scholarships will be awarded at the close of the junior year to the three male 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. Candidates for either the A.B. or the B.Chem. degree are eligible, but not students

enrolled both in this College and in the Law School, the Medical College, or the Graduate School.

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 DEGREE OF BACHELOR OF ARTS

I. REQUIREMENTS FOR GRADUATION

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. Military Science 2 and Hygiene 1, 2, 3, 4, 5, and 8 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. (See Section IV: Marks.)

3. Election of courses in accordance with Section III, Course of Study.

4. Completion of the work in Hygiene and Preventive Medicine, and in Military Drill or in Physical Training prescribed by the University Faculty. (See pages 84-86.)

II. SPECIAL PROVISIONS REGARDING CREDITS TOWARD GRADUATION

5. **In Summer Session.** To obtain credit by means of work done in summer sessions, a student must previously have satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. Credit for a maximum of thirty hours, but no more, may be secured in this way.

Credit will be allowed, under the same restrictions, for work done in summer sessions of other universities belonging to the Association of American Universities, by a student regularly registered in this College, but permission to offer such credit must be obtained in advance from the Dean of this College.

6. **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, 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.

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. These examinations will cover substantially the same ground as the University courses in the corresponding subjects. An applicant who desires a college-credit examination of this kind must apply to the Office of Admissions as early as possible and in no case later than the day preceding the beginning of the entrance examinations, specifying which fifteen units he intends to offer in satisfaction of the entrance requirements, and upon what other entrance subjects he wishes to be examined for college credit.

In case he fails to satisfy the entrance requirements in any one or more of the subjects which he has offered for entrance, but passes the college-credit examination in any other subject or subjects, he may use the latter for satisfying the entrance requirements, but in that case he cannot also receive college credit therefor. The college-credit examinations will be held on the date set for the entrance examinations in the same subjects, and, unless otherwise arranged, only at Ithaca.

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.

7. 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 paragraph 13, division b). 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. Students who contemplate obtaining the A.B. and an Engineering degree by a combined six-year course, are urged to consult the Dean's Office.

Students entering the course which leads to the degree, Chemical Engineer, are required to register both in the College of Arts and Sciences (Department of Chemistry) and in the College of Engineering. They should consult the Dean's Office in this College for further directions.

8. Registration in the College and in the Graduate School. A student who has satisfied all the academic requirements for graduation may, with the permission of the Graduate School, register both in the College of Arts and Sciences and in the Graduate School.

III. COURSE OF STUDY

9. Number of Hours.

A student must register in each term for at least twelve hours of work. 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 any 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 of work in either term of the subsequent academic year. A student on probation may not register for more than fifteen hours in the term of his probation. 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. (See also paragraph b under 11 below.)

10. Freshman 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 paragraph a under 13 below.) 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.

11. 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 A

Botany 1

Chemistry 101, 105, 110, 115, 201, 203, 210, 825, 830

English 3, 15

Entomology 15, 21a

French 1, 3, 3a, 4a, 4b, 5a, 5b, 6, 16

Geology A, 100, 101, 201, 203, 311, 401

German 1, 1a, 3, 3a, 4, 5, 7, 8

Government 1

Greek 1a, 1b, 2a, 2b

History 21, and (in 1936-37) History 1, 82, 83

Italian 1, 4

Latin 1a, 1, 3

Mathematics 1, 2, 3, 4, 5

Music 1 (not open to students offering Music for entrance)

Philosophy 1, 2

Physics 3, 4, 7, 8, 11, 12

Physiology 303

Public Speaking 8

Spanish 1, 3, 4, 5, 6

Zoology 1, 1a, 9

b. Subject to the permission mentioned in paragraph 9, required courses in other colleges in the regular freshman 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 the 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 the work of the second term of the course also. 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 8 following Physics 7, French 4b following French 4a). The privilege is limited to students of high standing as defined by the department.

12. Prescribed Subjects.

Before graduation a student must satisfy a requirement in each of the following four groups:

1. *English*, by completing English 3.

This course must be begun in the first year of residence. Students excused from the second term of English 3 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; German 7; French 4a and 5a; French 6; Spanish 4 and 5; Spanish 6; Italian 4; 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.

3. *History*, by completing one of the following:—History 1; History 21; History 42; History 61; History 82 and 83; History 86 and 87.

4. *Laboratory Science*, by completing one of the following:—Astronomy 180 and 181; Biology A; Botany 1; Chemistry 101 and 105; Geology A; Physics 3 and 4, or 7 and 8; Zoology 1.

5. Before graduation a student must also complete the equivalent of a year's work (normally six hours) in one of the following subjects: Philosophy, Psychology, Economics, Government, Mathematics.

A normal schedule for a freshman will include courses in at least two of groups 3, 4, and 5.

13. 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	Government
Biology (including Botany)	History
Chemistry	Mathematics
The Classics	Music
Comparative Study of Literature	Philosophy
Economics	Physics
Education	Psychology
English	Public Speaking
The Fine Arts	Romance Languages
Geology	Scandinavian Languages and Literatures
German	

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.

14. 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 readings, 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.

IV. MARKS

15. 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.

16. 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 another 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.

17. 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 class, and no more than one attempt at removal will be allowed.

BACHELOR OF ARTS WITH HONORS

The degree of Bachelor of Arts or Bachelor of Chemistry with Honors 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 or Bachelor of Chemistry 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 Honors in General Studies 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) have received a grade below 70 in not more than one course; (3) have received no marks lower than 60. To qualify for the degree of Bachelor of Arts with Honors in General Studies, 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 pro-rated for the residue of work which must be completed in Arts and Sciences at Cornell.

THE DEGREE OF BACHELOR OF CHEMISTRY

The degree of Bachelor of Chemistry will be awarded to those who have satisfactorily completed either of the following curricula, and the requirements prescribed by the University in Hygiene and Preventive Medicine and in Military Drill or in Physical Training. The completion of Curriculum No. 2, or its substantial equivalent, is required for admission to the fifth year of study leading to the degree of Chemical Engineer (see page 19). Since the first two years of work are identical in the curricula, the student is afforded ample time to discover whether his interests lie chiefly in the field of pure chemistry or in the field of chemical engineering before he is compelled to decide upon his further course of study.

Students who intend to complete the curriculum leading to the degree of Chemical Engineer are registered throughout the five years of this course in the College of Arts and Sciences and also in the College of Engineering.

CURRICULUM NO. 1

FIRST YEAR

	<i>Course</i>	<i>First Term</i>	<i>Second Term</i>
Introductory Inorganic Chemistry Chemistry	110	3	2
Inorganic Chemistry Laboratory Chemistry	115	3	—
Introductory Qualitative Analysis Chemistry	203	—	5
Analytic Geometry and Calculus Mathematics	5a, 5b	5	5
English English	1	3	3
Introductory Experimental Physics Physics	11, 12	4	4
		18	19

SECOND YEAR

Introductory Organic Chemistry Chemistry	305	3	3
Organic Chemistry Laboratory Chemistry	310	3	3
Introductory Quantitative Analysis Chemistry	220	3	—
Quantitative Analysis Laboratory Chemistry	221	3	—
Gas and Fuel Analysis Chemistry	250	—	3
General Physics Physics	21, 22	3	3
German German	1b	3	3
Drawing Engineering	125	—	3
		18	18

THIRD YEAR

Introductory Physical Chemistry Chemistry	405	3	3
Physical Chemistry Laboratory Chemistry	410	3	3
Advanced Inorganic Chemistry Chemistry	130	3	3
Introductory Chemical Microscopy Chemistry	530	—	3
Advanced Quantitative Analysis Chemistry	230	3	—
Elementary Mineralogy Geology	311	3	—
Introduction to Economics Economics	3	—	3
Electives (at least)		2	2
		17	17

COURSES AND REQUIREMENTS

19

FOURTH YEAR

	<i>Course</i>	<i>First Term</i>	<i>Second Term</i>
Unit Operations of Chemical Engineering . Chemistry	705	3	3
Chemical Engineering Laboratory Chemistry	710	2	2
Advanced Physical Chemistry Chemistry	420	3	—
Special Topics in Chemistry Chemistry	910	1	—
Electives		8	12
		17	17

CURRICULUM NO. 2

(This curriculum is prerequisite to the degree of Chemical Engineer)

FIRST AND SECOND YEARS

As in Curriculum No. 1

THIRD YEAR

	<i>Course</i>	<i>First Term</i>	<i>Second Term</i>
Introductory Physical Chemistry Chemistry	405	3	3
Physical Chemistry Laboratory Chemistry	410	3	3
Introductory Chemical Microscopy Chemistry	530	—	3
Elementary Mineralogy Geology	311	3	—
Mechanics Engineering	3M21	5	—
Strength of Materials Engineering	3M22	—	3
Hydraulics Engineering	3M23	—	2
Materials of Construction Engineering	3X21	3	—
Materials of Construction Engineering	3X22	—	3
		17	17

FOURTH YEAR

Unit Operations of Chemical Engineering . Chemistry	705	3	3
Chemical Engineering Laboratory Chemistry	710	2	2
Advanced Inorganic Chemistry Chemistry	130	3	3
Advanced Physical Chemistry Chemistry	420	3	—
Special Topics in Chemistry Chemistry	910	1	—
Advanced Quantitative Analysis Chemistry	230	3	—
Heat Power Engineering Engineering	3P33	3	—
Heat Power Engineering Engineering	3P34	—	3
Mechanical Laboratory Engineering	3X33	3	—
Mechanical Laboratory Engineering	3X32	—	3
		18	17

Students who present 2 or 3 units of German at entrance will not be required to take the first term of German 1b. Students who present 3 units of German may, on recommendation of the Department of German substitute German 8 for the second term of German 1b. The equivalent number of hours of electives will be substituted for the first term of German 1b, in the above cases.

The elective courses required in the curriculum may be chosen by the student, in each case with the approval of his adviser, from the advanced courses in Chemistry, or from courses in other departments of the College of Arts and Sciences, or in other colleges of the University.

Students in the Courses in Chemistry may not register for more than 19 hours a term (not including Hygiene) without first securing the consent of the Department.

A student who does not pass at least twelve hours in any term, with a grade of 70 or better in at least six of the twelve hours, may be dropped from the University or placed upon probation. The same penalty may be imposed upon students in the Summer Session, who do not pass four hours, with a grade of 70 or better in at least two hours.

If, in the opinion of the Staff of the Department of Chemistry, a student's general record is unsatisfactory the Staff may recommend that he be refused permission to continue as a candidate for the degree of Bachelor of Chemistry, even though he has passed twelve hours or more in the preceding term. In general, a scholastic record which does not show the completion of at least twelve hours a term of the prescribed studies and a grade of 70 or better in at least half of the hours in Chemistry, will not be considered satisfactory.

Students in the courses in Chemistry who receive a grade of 50-59 may remove it by examination or other requirement set by the Department.

THE DEGREE OF CHEMICAL ENGINEER

A holder of the degree of Bachelor of Chemistry who has completed Curriculum No. 2, as given above, may obtain the degree of Chemical Engineer by completing a fifth year of study offered jointly by the College of Engineering and the Department of Chemistry of the College of Arts and Sciences. The curriculum for this fifth year leading to the degree of Chemical Engineer is as follows:

	<i>Course</i>	<i>First Term</i>	<i>Second Term</i>
Electrical Engineering Lectures	Engineering 405	4	—
Electrical Engineering Lectures	Engineering 406	—	4
Machine Design	Engineering 3D34	2	—
Machine Design	Engineering 3D36	1	—
Mechanical Engineering Laboratory	Engineering 3X43	2	—
Industrial Organization	Engineering 3I31	2	—
Chemical Plant Design	Chemistry 730	3	3
Introduction to Economics	Economics 3	—	3
Electives (hours per term variable)		3	7
		<hr/> 17	<hr/> 17

The course of study leading to the degree of Chemical Engineer is intended primarily to prepare the graduate for technical work involving the development and supervision of the operation of industrial chemical processes and plants. It comprises instruction not only in the theoretical principles of chemistry and engineering, but also in the methods of applying these principles to the solution of the problems that arise in the industries.

COURSES OF INSTRUCTION

ASTRONOMY

For a major in Astronomy, the following courses must be completed: (1) in Astronomy, courses 181, 184, 185, 186, and practical work as arranged with the Department; (2) in related subjects, at least twenty-four hours selected from Physics 21, 22, 60, 105, 110, 213, 132, 233, 571, 581, 591, and 592; Chemistry 101 and 105; Mathematics 41, 42, 61, 62, and 85; Geology 100.

180. Introduction to Astronomy. Either term. Credit three hours. Lectures, recitation, and laboratory. *Rockefeller* 322, 328. M W F 8 plus seven two-hour evening observing periods at the *Observatory* to be arranged. Primarily for students who do not offer physics for entrance and who have not had trigonometry. Professor BOOTHROYD.

181. The Solar System. Second term. Credit three hours. Prerequisite, Astronomy 180 (or Physics 3 and 4). Lectures, recitation, and laboratory. *Rockefeller* 322, 328. T Th S 8 plus eight two-hour laboratory periods and four two-hour evening observing periods at the *Observatory* to be arranged. Professor BOOTHROYD.

182. The Elements of Field Astronomy. Either term. Credit two hours. Prerequisites, Astronomy 180 and Mathematics 3 (or Surveying 110). Required of students in Civil Engineering. For hours and rooms see Schedule of Courses, Sections and Rooms for School of Civil Engineering. Professor BOOTHROYD.

184. The Sun, Stars, and Nebulae. First term. Credit three hours. Prerequisites, Astronomy 181, Mathematics 4a and 4b, and Physics 61 and 62. Lectures, recitations and assigned reading with participation in six meetings of the Astrophysics Seminar. *Rockefeller* 322. T Th 8. Professor BOOTHROYD.

185. Special Topics in Astrophysics. Throughout the year. Credit three hours. Prerequisites, Astronomy 184 and Physics 130. Professor BOOTHROYD.

186. Geodetic Astronomy. Throughout the year. Credit three hours. Prerequisites, Astronomy 182, Advanced Surveying 212 and Mathematics 4a and 4b or equivalents. Professor BOOTHROYD.

BIBLIOLOGY

Bibliology 1. (Bibliography). First 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 and their use. Open to upperclassmen but registration with the instructor is required. Professor KINKELDEY. T Th 12. *University Library*.

Bibliology 2. Second 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. Open to upperclassmen, but registration with the instructor is required. Professor KINKELDEY. T Th 12. *University Library*.

BIOLOGY

For a major in the Animal Sciences there must be completed: (1) Zoology 1 and eighteen other hours chosen from Anatomy, Biochemistry, Embryology, Histology, Physiology, and Zoology; and (2) fifteen hours in related fields selected from Bacteriology, Botany, Chemistry, Entomology, Geology, Philosophy, Physics, Psychology, and the Social Sciences.

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 the Medical College in Stimson Hall.

For a major in Biochemistry, the following courses must be completed: (1) in Biochemistry, courses 314, 314a, 320, 317, 317a; (2) in related subjects, Physiology 300 or 303, Chemistry 101, 105, 210, 225, 375, and nine hours of electives.

For a major in Botany the following courses must be completed: (1) in Botany, courses 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: any courses in Chemistry and Biochemistry; Physiology 300 and 301; Entomology 12, 15, 21; Zoology 1, 8, 11, 16; courses in Bacteriology approved by the Department of Botany; Plant Pathology 1; Geology A, 201, 205 and any courses in Paleontology. 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.

For a major in Entomology, the following courses must be completed: (1) in Entomology, course 12, 21a, 15a, 15b, and 15c (3 hours including assigned summer work), 31 (one term), and eight additional hours selected from the following with at least one course in each group—(a) 31 (three hours); 21c; (b) 21b, (c) 51, 52; (2) in related subjects, Botany 1, Zoology 1, and fourteen additional hours selected from the following and including at least two hours in each of three groups: (a) Zoology 8, 9, Geology 400; (b) Botany 117, Bacteriology 1; (c) Zoology 11, 16, 17, Histology 101, Botany 124; (d) Physiology 300, 301, 303, 314, Botany 31; (e) Chemistry 305 and 310, or 375.

Students majoring in Entomology should have a reading knowledge of German and French.

For other majors in Animal Biology, consult the advisers.

GENERAL BIOLOGY

***A. General Biology.** Throughout the year. Credit three hours a term. Professor CLAASSEN, Dr. NEVIN, and assistants. Lectures, M W 9 or 11, *Roberts* 392. Laboratory, one period of two and one-half hours a week. *Roberts* 301 and 302.

Not open to students who have had both Zoology 1 and Botany 1. If Biology is taken after either Zoology 1 or Botany 1, credit two hours a term. Students must report to the biology laboratory, *Roberts Hall* 302, at the time of registration, for assignment to laboratory section.

An elementary course designed for those who do not wish to specialize further in the biological sciences. The main ideas of biology shown through selected practical studies of the phenomena on which biological principles are based. Laboratory fee, \$3.50 a term.

5. Laboratory Methods in Animal Biology. Second term. Credit two hours. Prerequisite, major work in biology. Professor CLAASSEN. F 10-12; 1:40-4. *Roberts* 301.

For seniors and graduates whose major work is in biology and who expect to teach or to follow some phase of zoology as a profession. This course includes such subjects as laboratory equipment; collecting, preservation, and storage of materials; rearing of cultures; modeling in wax; injection of blood vessels and embalming; chart making; and photography of animals including the preparation of lantern slides. Laboratory fee, \$4.

***100. The Conservation of Wild Life.** First term. Credit two hours. Professors ALLEN, HOSMER, WIEGAND, ADAMS, WARREN, EMBODY, PALMER, A. H. WRIGHT, and CLAASSEN, and Assistant Professor YOUNG, Drs. SUTTON and HAMILTON, Mr. KELLOGG, and cooperating specialists. Lectures T Th 11 and occasional evenings, *Fernow* 122.

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.

ZOOLOGY

***1. Introductory Zoology.** Throughout the year. Credit three hours a term. Professor REED, Dr. MEKEEL, Miss PHELPS, and Mr. HEMING. Lectures: T Th 9 or 11. Laboratory: M T W Th F 1:40-4; S 8-10:20. Forenoon laboratory sections may be organized if desirable. Lectures, *Goldwin Smith B.* Laboratory, *McGraw 104.*

A comprehensive introduction to the subject of Zoology. Fee, \$3 a term.

***1a. General Zoology.** First term. Credit four hours. Assistant Professor YOUNG. Lecture, W 9; recitation, F 9, *McGraw 203.* Laboratory, T Th 8:00-10:20, *McGraw 203.* Primarily for veterinary students.

A foundation course planned to introduce a special group of students to the field of zoology. Laboratory fee, \$4.

8. Elementary Taxonomy and Natural History of Vertebrates. Throughout the year. Credit, three hours a term. Not normally open to freshmen. Professor WRIGHT and Dr. HAMILTON. Lecture, M 8; Laboratory, M W 1:40-4 or T Th 1:40-4. *McGraw 7.*

Lectures on fishes, amphibians, 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. Several all-day field trips are taken during the year. Laboratory fee, \$4.50 a term.

Students completing this course may arrange under Zoology 99 to pursue advanced work in the taxonomy of Vertebrates.

9. General Ornithology. Second term. Credit three hours. Lecture W 11, *Fernow 122.* Field work and laboratory M W 1:40-4 or T Th 1:40-4, *Fernow 210.* Professor ALLEN, Mr. KELLOGG and Dr. SUTTON.

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.

Students completing this course may arrange, under course 300b, to pursue advanced work during their junior and senior years.

11. Comparative Anatomy of Vertebrates. Throughout the year. Credit three hours a term. Prerequisite, Zoology 1. Dr. SENNING, Mr. GARRETT, and Mr. BOURQUE. Lecture, Section I, M 9, Section II, M 10. *McGraw 203.* Laboratory, W F 8-10:30; M F 1:40-4; T Th 8-10:20; T Th 1:40-4; W 1:40-4; S 8-10:20. *McGraw 201.*

A thorough dissection and study of representative vertebrate types. The lectures are arranged to correlate and supplement the studies made in the laboratory.

16. Invertebrate Zoology. Throughout the year. Credit three hours a term. Prerequisite, Zoology 1 or its equivalent. Assistant Professor YOUNG. Lecture, M 12, *McGraw 203.* Laboratory, T Th 1:40-4, *McGraw 207.*

A comprehensive consideration of the morphology, classification, development, and phylogeny of the invertebrates. Laboratory fee, \$2.50.

[22. Ichthyology, Advanced Systematic and Field Zoology. Throughout the year. Credit three hours a term. Lectures, T Th 8. *McGraw 7.* Laboratory, F 1:40-4 or S 8-10:30. Professor WRIGHT and Dr. HAMILTON.

An amplification of the prerequisite course 8. Not given in 1936-37.]

[23. Herpetology (Amphibia). First term. Credit three hours. Professor WRIGHT and Dr. HAMILTON. Lectures, T Th 8. *McGraw 7.* Laboratory, F 1:40-4 or S 8-10:30.

An amplification of the prerequisite course 8. In the lectures special emphasis will be laid on the principal phases of animal life; the taxonomy, origin, and evolution of fossil and living groups; geographical distribution; and the literature and

institutions of zoology. Laboratory periods will be devoted to the identification of exotic and indigenous forms. Not given in 1936-37.]

[24. **Herpetology** (Reptilia). Second term. Credit three hours. See Announcement for course 23. Professor WRIGHT and Dr. HAMILTON. Not given in 1936-37.]

25. **Mammalogy**. Throughout the year. Credit three hours a term. Professor WRIGHT and Dr. HAMILTON. Lectures T Th 8. *McGraw* 7. Laboratory F 1:40-4 or S 8-10:30.

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, \$3.

67. **Seminary in Systematic Vertebrate Zoology**. First and second terms. Credit one hour a term. Life zone plans of North America, 1817-1920. Distribution and origin of life in North America. Zoogeography of the Old World. Animal coloration. Other topics to be announced. Hours to be arranged. Professor A. H. WRIGHT.

99. **Zoological Problems**. An introduction to research. Throughout the year. Credit hours variable. Admission to the course is by consent of the instructor.

For qualified juniors and seniors. Opportunity is afforded for the pursuit of special problems designed to offer practice in the method of research.

[126. **Advanced Ornithology**. First term. Credit three hours. Prerequisite, course 8 or 9. Lecture W 11, *Fernow* 122. Field work and laboratory T Th 1:40-4. Professor ALLEN, Mr. KELLOGG, and Dr. SUTTON. Not given in 1936-37.]

131. **Applied Ornithology**. First term. Credit three hours. Should be preceded by course 8 or 9, and presupposes an elementary knowledge of botany and entomology. Lecture W 11, *Fernow* 122. Field work and laboratory. T Th 1:40-4, *Fernow* 210. Professor ALLEN, Mr. KELLOGG, and Dr. SUTTON.

This course is intended primarily for students planning to teach biological science or to engage in professional work in ornithology or wild-life management. Field collecting, preparation of specimens, and natural history photography are emphasized, together with the food and feeding habits of birds; and classroom, museum, and Biological Survey methods. Laboratory fee, \$3.

ANATOMY

221. **Structure of the Human Body**. Second term. Credit three hours. Prerequisite, six or more hours of Animal Biology and consent of the instructor. Professor KERR. Lectures, M W F 11, and one demonstration at an hour to be arranged. *Anatomy Amphitheatre*. *Stimson*.

For students in the biological sciences and for others wishing to obtain a knowledge of the structure of their own bodies. Normal structures of the body, together with its variations and evolution based on developments in the individual and the race. Illustrated by specimens, lantern slides, and diagrams.

222. **Anatomical Methods**. First term. Credit three hours. Prerequisite, Zoology 1. Previous work in Comparative Anatomy also is recommended. Assistant Professor PAPEZ and instructors. The laboratory is open any morning except Saturday. Lecture, Th 12. *Stimson* 49; laboratory, *Stimson* 52.

One lecture and nine hours of laboratory a week are required.

225. **Comparative Neurology**. Second term. Credit three hours. Prerequisite, nine hours of Animal Biology. Assistant Professor PAPEZ. T Th 8-11. *Stimson* 52.

A comparative study of the vertebrate nervous system based on dissections of brains of shark and dog, and sections of cat brain stem; of the chief nerve systems and levels which determine the form and structure of the nervous systems, their evolution and functional significance. One recitation and two laboratory periods.

226. **Cerebral Mechanisms**. Second term. T Th 8-11. Credit three hours. Prerequisite, course 225. Assistant Professor PAPEZ.

A course of study of the cerebral cortex of lower mammals and the primates with special reference to the subcortical connections and functional significance of the various cortical areas of the human brain. Conference hour will be arranged later. By consent of the instructor.

229. Kinesiology. First term. Credit three hours. Assistant Professor PAPEZ and instructors. One lecture and six hours of laboratory a week. Anatomy laboratory. *Stimson*. Laboratory any morning except S. Lecture hour to be arranged. (See Physical Education Course 29).

250. Advanced and Research Work in Human Anatomy and Neurology. Throughout the year. Credit two or more hours a term. Professor KERR and Assistant Professor PAPEZ. Hours to be arranged. *Stimson* 52.

The laboratories are open to those who have taken the necessary preliminary courses and are otherwise prepared. Primarily for graduates, and for undergraduates properly qualified.

HISTOLOGY

101. The Tissues: Histology and Histogenesis. First term. Credit four hours. Prerequisite, Zoology 1 or General Biology A. Assistant Professor ADELMANN, Instructor ———, and assistants. Lectures, T Th 11. *Stimson* 8; Laboratory, Section I, T Th 8-11; Section II, T Th 1:40-4. *Stimson* 39.

For students of biology or those preparing for medicine. The cell and cellular origin of the body, and the structure and development of its component tissues. Each student will prepare or receive a series of typical microscopic preparations.

102. The Organs: Histology and Development. Second term. Credit four hours. Prerequisite, course 101 or its equivalent. Professor KINGSBURY and assistants. Lectures, W F 10, *Stimson* 8; laboratory, W F 1:40-4, *Stimson* 39.

A continuation of course 101. Courses 101 and 102 together give the fundamental facts of the microscopic structure and development of the body.

104. Vertebrate Embryology. Second term. Credit five hours. Prerequisite, course 101 or its equivalent. Assistant Professor ADELMANN, Instructor ———, and assistants. Lectures, T Th 11 and lecture or conference, S 11, *Stimson* 8; Laboratory, Section I, T Th 8-11; Section II, T Th 1:40-4. *Stimson* 39.

For students of biology or those who are preparing for the study of medicine. The course is designed to give the basis for understanding the development of the human body.

115. Experimental Embryology. First term. Credit two hours. Prerequisite, Course 104. Assistant Professor ADELMANN. For seniors and graduate students. The course will be conducted as a seminar. Lectures with reports by students dealing with the experimental analysis of development processes. Hours to be arranged. *Stimson*.

PHYSIOLOGY

[300. General Physiology. First term. Credit three hours. Professor LIDDELL. Lectures, T Th 9. Laboratory, Th 1:40-4. Prerequisite, Animal Biology 1 or A, or an equivalent satisfactory to the Department. *Stimson* 28.

The purpose of this course is to familiarize the student with the methods and point of view of physiology in the study of animal biology. An analysis of the fundamental functions of the animal organism. Not given in 1936-37.]

301. Behavior. First term. Credit two hours. Professor LIDDELL. T Th 9. Prerequisite, Zoology 1. *Amphitheatre*. *Stimson*.

This course is concerned with the fundamental biological problems of behavior. Its subject matter includes such topics as vigor, rhythm, integration, anticipation, adaptation, conflict, disorder, and hygiene.

***303. Human Physiology.** Repeated in second term. Credit three hours. Assistant Professor DYE. M W F 10. *Stimson Amphitheatre*.

An introductory course for students of the biological sciences, for those who expect to teach physiology in the secondary schools, and for those who desire a general knowledge of the physiological processes as applied to the human body. This course is designed primarily for students who are already familiar with the

first principles of biology and chemistry and who are in a position to understand the general physiological processes presented.

305. Physiology of the Vitamins, Ultra-Violet Radiations, and Internal Secretions. Second term. Credit three hours. Dr. MAUGHAN. M W F 9. Prerequisite, Chemistry 101 and 105; Physiology 303 or 300. *Stimson*.

This course includes (1) a study of the physiological importance of the vitamins, (2) the effects of radiations on metabolism and disease, and (3) the endocrine glands as related to development and health.

306. Laboratory Work in Human Physiology. First term. Credit two or three hours. Assistant Professor DYE and Dr. MAUGHAN. T Th 1:40-4. *Stimson* 28.

For three hours credit special readings and reports are required. This course is designed to parallel course 303, but may be elected separately by students majoring in biology.

307. The Physiology of the Conditioned Reflex. First term. Credit three hours. Professor LIDDELL. M W F 9. Prerequisites, Psychology 1 and Physiology 300 or 303. *Amphitheatre, Stimson*.

A systematic review, with demonstrations, of methods for establishing conditioned reflexes of glands and muscles. The development of the theory of behavior based upon the conditioned reflex method will be critically presented. A general survey of the work of the nervous system derived from conditioned reflex experiments. This course should be preceded or followed by Animal Biology 225.

308. Advanced Work and Research in Physiology. Throughout the year. Credit two or more hours. Prerequisite, previous courses in Physiology. Assistant Professor DYE. *Stimson* 31.

309. Physiology of Circulation, Respiration, and Metabolism. First term. Credit four hours. Assistant Professor DYE and Dr. MAUGHAN. Lecture, W F 11. Laboratory, W F afternoons. Open to upperclassmen who have completed course 300 or 303 or the equivalent, and who are otherwise qualified. *Stimson*.

310. Seminary in Physiology. Second term. Credit one hour. For graduate students and others properly qualified. Hour to be arranged. Members of the staff. *Stimson*. Reports on recent advances in physiology.

For additional courses see the Announcement of the Graduate School.

BIOCHEMISTRY

314. Elementary Biochemistry. First term. Credit three hours. Prerequisite, Chemistry 375 or the equivalent. Professor SUMNER and Dr. HOWELL. Lectures, M W 12; conferences, F 12. *Stimson* 4.

The substances met with in living things, and the chief facts of digestion, metabolism, and nutrition. (Courses 314 and 314a will not be accepted for the requirements of biochemistry in the Medical College. Chemistry students are advised to take Biochemistry for Medical Students. See the Announcement of the Medical College.)

314a. Laboratory Work in Biochemistry. First term. Credit two hours. Prerequisite or parallel course, Biochemistry 314. Professor SUMNER and Dr. HOWELL. M W 1:40-4. *Stimson* 34.

320. Advanced and Research Work in Biochemistry. Throughout the year. Credit two or more hours. Prerequisite, courses 314 and 314a. Professor SUMNER. Hours to be arranged. *Stimson* 34.

For additional courses see the Announcements of the Graduate School and the Medical College.

ENTOMOLOGY

12. General Entomology. First term. Credit three hours. Prerequisite, Biology A, Zoology 1, or Botany 1. Lectures, W F 9. *Comstock* 245. Professor MATHESON. Practical exercises, T W Th or F 1:40-4, or S 8-10:30. *Comstock* 200. Professor MATHESON and Messrs. MILLER and HURLBUT.

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, and their classification. The lectures only (two hours) may be taken by those who have had courses 15 and 21a. Laboratory fee, \$2.50.

15a, b, c. **Elementary Systematic Entomology.** Throughout the year. Credit one to five hours. (For details of hours and terms in which the work is given see courses 15, 30a, and 30b in Announcement of the Agricultural College.) *Comstock* 300. Professor BRADLEY and Mr. PATE.

(a) The first hour of this course may be taken either term, and consists of a laboratory study of evolutionary series as illustrated by the wings of insects.

(b) The second hour, given in the first half of the second term, consists of elementary practice in the determination of the orders and families of insects. These two hours are required of all students who plan to take advanced work in Entomology. Laboratory fee, \$2.25.

(c) An additional two or three hours, one in the second half of the second term followed by individual summer work, completed with one or two hours in first term following and devoted to matters of technique. There are no prerequisites for this part. Laboratory fee, \$2.25.

21. **Structure and Development of Insects.** (a) Laboratory. Either term. Credit three hours. No prerequisites. Professor JOHANNSEN and Dr. BUTT. *Comstock* 270. The required eight laboratory hours a week are by appointment. External and internal anatomy of common species of insects. The laboratory work is required of all students who plan to take advanced work in entomology. Laboratory fee, \$2.

(b) Lectures. Throughout the year. Credit two hours a term. Prerequisites, the laboratory work and course 12 or 15b. Professor JOHANNSEN. T Th 10. *Comstock* 145. Anatomy, histology, and embryology of insects. Lectures, assigned reading, and reports.

(c) Laboratory work in the technique of histological methods as applied to insect tissues may accompany or follow 21b. Either term. Credit two hours. Two periods by appointment. *Comstock* 265. Laboratory fee, \$3.

31. **Taxonomy of Insects.** Throughout the year. Credit three hours a term. Prerequisite, courses 12, 21, and 15a and b. Lecture, W 10, *Comstock* 300. Laboratory, T Th 1:40-4; *Comstock* 300. Professor BRADLEY and Mr. PATE.

A survey of the classification of insects. The complete course occupies three consecutive terms, but the work of each may be taken independently. The orders treated will be: Fall of 1936, Coleoptera, Lepidoptera; Spring of 1937, Orthoptera. Laboratory fee, \$4.50.

[51. **Parasites and Parasitism.** Second term. Credit two hours. Prerequisite, Biology A or Zoology 1. Lecture, T 9. *Comstock* 245. Practical exercises, T W or Th 1:40-4. *Comstock* 200. Professor MATHESON, Messrs. MILLER and HURLBUT.

A consideration of the origin and biological significance of parasitism, and of the structure, life, and economic relations of representative parasites. Laboratory fee, \$2. Not given in 1936-37.]

52. **Medical Entomology.** Second term. Credit two hours. Prerequisite, Zoology 1 or Biology A. Lecture, T 9. *Comstock* 245. Practical exercises, T W or Th 1:40-4. *Comstock* 200. Professor MATHESON and Messrs. MILLER and HURLBUT.

This course deals with insects and other arthropods that are the causative agents of disease in man and animals, or are the vectors, or intermediate hosts, of disease-producing organisms. Laboratory fee, \$2.

[70. **Animal Ecology.** First term. Credit three hours. Prerequisite, Zoology 1 or Biology A, and Entomology 12. Th 9, Th 1:40-4, and one period by appointment.

The lives of animals in relation to their environment; the relation between their structures and instincts and the situations in which they live. Laboratory fee, \$2.50. Not given in 1936-37.]

[71. **General Limnology.** First term. Credit three hours. Prerequisite or parallel courses, Biology A, or Zoology 1 and Entomology 12, or the equivalent. Lecture, Th 9; Laboratory, Th 1:40-4 and one period by appointment. *Comstock* 110, 145.

The life of inland waters: aquatic organisms in their qualitative, quantitative, seasonal, and ecological relations. Laboratory fee, \$2.50. Not given in 1936-37.]

99. **Problems.** An introduction to research. Throughout the year. Credit hours variable. Admission to the course is by consent of the instructor.

For qualified juniors and seniors. Opportunity is afforded for the pursuit of special problems designed to offer practice in the method of research.

118. **The Technics of Biological Literature.** First term. Credit three hours. Professor BRADLEY. See Announcement of Graduate School.

119. **Entomological Reading in Foreign Languages.** Throughout the year. Professor JOHANNSEN. See Announcement of the Graduate School.

BOTANY

*1. **General Botany.** Throughout the year. Credit three hours a term; both terms of the course must be completed to obtain credit, unless the student is excused by the department. If taken after Biology A, credit two hours a term. Professor PETRY, Doctors LAUBENGAYER, KOCH, and SCHAPPELLE, Messrs. PALMQUIST, REECE, LINDSEY, SPENCER, and Miss BELK. Lectures, T Th 9 or 11. *Plant Science* 233. Laboratory, one period of two and one-half hours. *Plant Science* 240, 242, and 262.

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 fee, \$3.50 a term.

13. **Trees and Shrubs.** First term. Credit three hours. Prerequisite, course 1 or its equivalent. Assistant Professor MUENSCHER and Mr. HUNT. Lecture, T 8. *Plant Science* 143. Laboratory or field work, M W or T Th 1:40-4. One all-day field trip is required. *Plant Science* 211.

The identification of trees and shrubs, in summer and in winter conditions. During the first part of the term the work covering identification is done largely in the field. The work of the latter part of the term is a study of the taxonomy of woody plants. Laboratory fee, \$3; deposit, \$5.

21. **Advanced General Botany.** First term. Credit four hours. Prerequisite, course 1 or its equivalent. Lectures, T Th 9. *Plant Science* 141. Laboratory, T Th 10-12:30 or W F 1:40-4. *Plant Science* 228. Professor EAMES.

A course dealing broadly with vascular plants, their morphology, life histories, classification, distribution, and relation to their surroundings. With *Plant Physiology* (Botany 31) this course forms a general second year course in botany. Registration limited to two sections. Laboratory fee, \$5.

31. **Plant Physiology.** First or second term. Credit four hours. Prerequisite, course 1 and introductory chemistry. Professor KNUDSON, or Professor O. F. CURTIS, Assistant Professor HOPKINS, and Messrs. CLARK and SCOFIELD. Lectures, T Th 10. *Plant Science* 143. Laboratory, T Th 1:40-4 or W F 1:40-4. *Plant Science* 227.

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. In both laboratory and recitations emphasis is placed on discussion of the principles taught and their applications. Laboratory fee, \$4; deposit, \$3.

117. **Taxonomy of Vascular Plants.** Second term. Credit four hours. Prerequisite, course 1 or its equivalent. Professor WIEGAND. Lecture, M 9. *Plant Science* 233. Laboratory, M W F 1:40-4. *Plant Science* 211.

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.

Students completing this course may arrange, under course 145, to pursue special advanced work in taxonomy.

101. Genetics. First term. Credit four hours. (Given in the Department of Plant Breeding.) Professor FRASER and Dr. DORSEY. Lectures, M W F 8. *Plant Science* 143. Laboratory, M T W or F 1:40-4.

[**123. Plant Anatomy.** Second term. Credit four hours. Prerequisite, course 1 or its equivalent, and permission to register. Professor EAMES. Not given in 1936-37.]

124. Cytology. First term. Credit four hours. Prerequisite, course 1 or Zoology 1 or its equivalent. Professor L. W. SHARP and Miss DAWSON. Lectures, M W 9. *Plant Science* 233. Laboratory, M W or T Th 10-12:30 or T 1:40-4, F 10-12:30. *Plant Science* 219. Assignment to laboratory section must be made at the time of registration.

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 and the life cycles in various groups of plants. Both plant and animal materials are used. Microtechnique is not included. Laboratory fee, \$5.

125. Microtechnique. Second term. Credit three hours. Prerequisite, permission to register. Professors EAMES and L. W. SHARP and Mr. QUIMBY. Lectures and demonstrations, T 11-1; other periods to be arranged. *Plant Science* 219.

A course for advanced students who require training in the preparation of plant materials for histological or cytological study. Laboratory fee, \$5. The cost of additional supplies is likely to be from \$10 to \$20.

126. Morphology of Vascular Plants. Second term. Credit three hours. Professor EAMES. Lectures, T 9. *Plant Science* 141. Laboratory, T Th 10-12:30. *Plant Science* 228. Prerequisite, courses 1 and 21 or their equivalent, and permission to register.

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

121. Comparative Morphology of Fungi. First term. Credit four hours. Given in alternate years. A synoptical course designed to introduce the beginner to the general field of mycology. See Announcement of the College of Agriculture.

141. History of Botany. Second term, without credit. Hour to be arranged.

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

145. Special Problems in General Botany, Taxonomy, Morphology, Anatomy, Economic Botany, Paleobotany, Cytology, and Physiology. Throughout the year. Credit not less than two hours a term. By appointment. Professors WIEGAND, KNUDSON, EAMES, L. W. SHARP, O. F. CURTIS, and PETRY, and Assistant Professors MUENSCHER and HOPKINS.

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. Second term. Credit two hours. Prerequisite, course 117 or its equivalent. Open only to major students

in Botany and graduate students. Professor WIEGAND. Hours to be arranged. *Plant Science* 211.

Special round-table discussion of topics of particular interest to the taxonomist. One hour is devoted to practical work on some group of plants.

224. Advanced Cytology. Second term. Credit two hours. Prerequisites, courses 124, Plant Breeding 101, and permission to register. Professor L. W. SHARP and Miss DAWSON. Lecture W 9. *Plant Science* 233. Laboratory, Th 9-11:30. *Plant Science* 228.

An advanced course dealing largely with the physical basis of heredity and with recent researches in cytogenetics. Laboratory fee, \$3.

231. Plant Physiology, Advanced lecture course. Throughout the year. Credit three hours a term. Prerequisite, training in botany and chemistry, to be determined in each case by the department. Limited to seniors and graduate students. Professors KNUDSON and O. F. CURTIS. Lectures, M W F 10. *Plant Science* 143.

232. Plant Physiology, Advanced laboratory course. Throughout the year. Credit three hours a term. Prerequisite or parallel, course 231. Professors KNUDSON, O. F. CURTIS, and Assistant Professor HOPKINS. Laboratory, M 1:40-4, S 8-12:30. *Plant Science* 241. Laboratory fee, each term, \$10; breakage deposit, \$5.

For other courses in Botany see the Announcement of the College of Agriculture.

BACTERIOLOGY

For courses in this subject, see the Announcements of the Colleges of Agriculture and Veterinary Medicine. These courses may be counted as part of the thirty hours which the student may elect outside the College of Arts and Sciences. For a major in Botany with advanced work in Bacteriology, see the statement of major requirements in Botany.

CHEMISTRY

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 101 and 105, 205 and 206, or 210; or preferably 110, 115, and 203; 220 and 221, or 225; 305, 310 (first term); 405, 410 (one term); and six hours of electives; (2) in related subjects, Mathematics 5a and 5b, Physics 3 and 4 or 7 and 8, German 1 or 1a unless two units have been offered for entrance.

INORGANIC CHEMISTRY

Entrance credit in chemistry does not carry with it University credit in Course 101 or 105. If a student entering the University from a preparatory school desires credit for these Courses, he must pass an examination set by the Department of Chemistry. This examination is held in Ithaca on the same day in September as the entrance examination. It may also be taken at the end of the first term of residence, by freshmen in the College of Arts and Sciences. University credit in Courses 101 and 105 that is obtained by passing this examination does not carry with it entrance credit in Chemistry.

Examinations for those who were unavoidably absent from the final examination in Courses 101 and 105 will be held at 2 p. m. on the day before instruction begins in the fall.

***101. General Chemistry.** Lectures. Repeated in the second term. Credit three hours.

Two sections: M W F 11; T Th S 11. *Main Lecture Room.* Professor BROWNE and Assistant Professor LAUBENGAYER.

Chemistry 101 and 105 must be taken simultaneously unless permission is obtained by the student from the Dean of his college and from the Department of Chemistry to take either course alone. These courses should not be taken by students who intend to major in chemistry.

***105. General Chemistry.** Recitations and laboratory practice. Repeated in the second term. Credit three hours. Deposit, \$20.

Recitations, one hour a week, to be arranged.

Laboratory sections: M F 1:40-4; T Th 1:40-4; W 1:40-4; S 8-10:30. *Room 150.* Assistant Professor LAUBENGAYER and assistants.

106a. General Chemistry. First term. Credit three hours. Limited to and required of students of Engineering. Deposit, \$11. Assistant Professor LAUBENGAYER, Dr. HOARD, and assistants.

One lecture, one recitation, and one laboratory a week, as assigned.

106b. General Chemistry. Second term. Credit three hours. Prerequisite, Chemistry 106a. Assistant Professor LAUBENGAYER, Dr. HOARD, and assistants.

One lecture, one recitation, and one laboratory a week, as assigned.

***110. Introductory Inorganic Chemistry.** Throughout the year. Credit three hours first term, two hours second term. Prerequisite, entrance credit in chemistry, or course 101. Required of candidates for the degree of Bachelor of Chemistry, and candidates for the degree of A.B. who intend to major in Chemistry.

Lectures: Assistant Professor LAUBENGAYER. First term, T Th S 11; second term, T Th 11. *Baker 107.*

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

Recitations: one hour a week, to be arranged.

Laboratory: W 1:40-4. S 8-10:30. *Baker 50.*

130. Advanced Inorganic Chemistry. Throughout the year. Credit three hours a term. Prerequisite or parallel courses, Chemistry 405 and 410. Assistant Professor LAUBENGAYER. M W F 11. *Baker 107.*

Lectures. The chemical elements are discussed in the order in which they occur in the Periodic Table of Mendeléeff, with special attention to the group properties of the elements and to the relations of the groups to one another. The rare elements are treated in as great detail as are the more common elements.

135. Advanced Inorganic Chemistry. Either term. Credit two to six hours. Prerequisite, Chemistry 305 and 310. Fee variable. Professor BROWNE, Assistant Professor LAUBENGAYER, and assistants. Day and hour to be arranged. *Baker 178 and 122.*

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. Second term. Credit two hours. Prerequisite, Chemistry 405 and 410, or special permission. Professor BROWNE. W F 9. *Baker 107.* Given in alternate years.

[150. The Chemistry of Glass. Second term. Credit one hour. Assistant Professor LAUBENGAYER. M 9. *Baker 107.* Open to students who have had or are taking course 405; and to others by special permission.

A discussion of the development and manufacture of glass and related ceramic ware, such as pottery and porcelain, with special emphasis on the relations between constitution and physical and chemical properties. Inspection trips to nearby ceramic plants will be arranged. Not given in 1936-37.]

160. Chemistry of the Rare Elements. Throughout the year. Credit two hours. Prerequisite, first term of Chemistry 130, or special permission. Professor PAPISH. T Th 9. *Baker 302.*

Lectures. Occurrence, distribution and associations of the rare elements; chemical reactions of the rare elements and of their salts, including analytical reactions.

165. Chemistry of the Rare Elements. Throughout the year. Credit two or more hours. Prerequisite or parallel course Chemistry 160. Fee variable. Professor PAPISH and assistant. Hours to be arranged. *Baker 318.*

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.** Throughout the year. Credit two or more hours a term. Fee variable. Professors BROWNE and PAPISH, and Assistant Professor LAUBENGAYER.

ANALYTICAL CHEMISTRY

*201. **Introductory Analytical Chemistry.** Repeated in the second term. Credit four hours. Prerequisite, Chemistry 101 and 105. Deposit, \$20. Primarily for students majoring in the biological sciences. Professor NICHOLS and assistants. Lectures: T Th 10. *Baker 177.*

Laboratory sections: W F 1:40-4; S 8-1. *Baker 252.*

A study of the fundamental principles of qualitative and quantitative analysis. Laboratory practice in gravimetric and volumetric quantitative methods.

*203. **Introductory Qualitative Analysis.** Second term. Credit five hours. Prerequisite, one term of Chemistry 110 or special permission. Deposit, \$30. Must be taken with the second term of Chemistry 110. Required of candidates for the degree of Bachelor of Chemistry and open to candidates for the degree of A.B. who intend to major in Chemistry. Professor NICHOLS, Mr. ———, and assistants.

Lecture or recitation: M 9. *Baker 177.* One other recitation, to be arranged.

Laboratory: M W F 1:40-4. *Baker 50.*

*205. **Introductory Qualitative Analysis.** First term only. Credit three hours. Prerequisite, Chemistry 101 and 105. Must be taken with Course 206. Professor NICHOLS, Mr. ———, and assistants. Lectures: M W 9. *Baker 177.*

Recitations: one hour a week, to be arranged.

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.** First term only. Credit three hours. Prerequisite, Chemistry 101 and 105. Deposit, \$25. Must be taken with Course 205. Professor NICHOLS, Mr. ———, and assistants.

Laboratory section: M W F 1:40-4. *Baker 50.*

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. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 101 and 105. Deposit, \$20. Professor NICHOLS, Mr. ———, and assistants.

Lecture: T 12. *Baker 207.*

Laboratory sections: T Th 8-10:30; T Th 1:40-4. *Baker 40.*

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

*220. **Introductory Quantitative Analysis.** Repeated in the second term. Credit three hours. Prerequisite, Chemistry 203, or 205 and 206. Must be taken with Course 221. Professor NICHOLS, Mr. ———, and assistants.

Lectures: T Th 9. *Baker 207.*

Recitations: one hour a week, to be arranged.

A study of the fundamental principles of gravimetric and volumetric analysis with practice in stoichiometry.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 221 instead of Course 225.

*221. **Introductory Quantitative Analysis.** Repeated in the second term. Credit three hours. Prerequisite, Chemistry 203, or 205 and 206. Must be taken with Course 220. Deposit, \$20. Professor NICHOLS, Mr. ———, and assistants.

Laboratory sections: F 1:40-4, S 8-1; T Th 10-12:30, Th 1:40-4 (first term only). *Baker 252.*

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 are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 220 instead of Course 225.

***225. Introductory Quantitative Analysis.** Shorter course. Repeated in the second term. Credit three hours. Prerequisite Chemistry 210. Deposit, \$20. Professor NICHOLS, Mr. ———, and assistants.

Lecture: Th 12. *Baker 207.*

Laboratory sections: T Th 8-10:30; M W 1:40-4; T Th 1:40-4. *Baker 252.*

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

230. Advanced Quantitative Analysis. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 220 and 221 or special permission. Deposit, \$20. Professor NICHOLS, Mr. ———, and assistants. Recitation: one hour a week, to be arranged. Laboratory periods; first term. T Th 1:40-4; T Th 8-12:30; second term, T Th 1:40-4; T Th 8-12:30; S 8-1. *Baker 294.*

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. Second term. Credit two hours. Prerequisite, first term of Chemistry 405. Professor NICHOLS. M W 12. *Baker 207.*

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

250. Gas and Fuel Analysis. Second term. Credit three hours. Prerequisite, Chemistry 220 and 221. Deposit, \$10. Professor NICHOLS and assistants. Lectures: F 10. *Baker 207.*

Laboratory sections: M W 1:40-4; T or Th 10-12:30, 1:40-4; S 8-1. *Baker 282.*

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. Either term. Credit two or more hours. Prerequisite, Chemistry 230 and 405. Fee variable. Professor NICHOLS. Mr. ———, and assistants. Day and hour to be arranged. *Baker 277.*

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. First term. Credit three or more hours. Prerequisite, Chemistry 230 and special permission. Fee, \$20. Professor NICHOLS. Day and hour to be arranged. *Baker 282.*

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

280. Emission Spectroscopy in Chemical Analysis. Either term. Credit three hours. Prerequisite, Chemistry 225 or 220, and Physics 21 and 22, or by special permission. Fee, \$15. Professor PAPISH and assistant. Laboratory hours to be arranged. *Baker 396.* Conference, hour to be arranged.

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

295. Research for Seniors. Throughout the year. Credit two or more hours. a term. Fee variable. Professors NICHOLS and PAPISH.

ORGANIC CHEMISTRY

305. Introductory Organic Chemistry. Throughout the year. Credit six hours on completion of the course. Prerequisite, qualitative analysis. Open to those who are taking Course 220. Professor JOHNSON and Dr. BRUCE. M W F 9. *Baker 200.*

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 305 in the second term and receive two hours credit.

310. Introductory Organic Chemistry. Throughout the year. Credit three hours a term. Prerequisite or parallel course, Chemistry 305. Deposit, \$35. Professor JOHNSON, Dr. BRUCE, and assistants. Laboratory sections, T Th 10-12:30, Th 1:40-4; F 1:40-4, S 8-1. *Baker 250.*

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. Advanced Organic Chemistry. Throughout the year. Credit two hours a term. Prerequisite, Chemistry 305 and 310. Professor JOHNSON and Dr. BRUCE. T Th 9. *Baker 177.*

Lectures. A presentation of important chapters of organic chemistry and a discussion of classical researches in this field.

Students may register for any term separately. Not given second term 1936-37; students are advised to substitute Chemistry 1000.

320. Advanced Organic Chemistry. Either term. Credit two to six hours a term. Prerequisite, Chemistry 305 and 310. Dr. BRUCE and assistants. Day and hour to be arranged. Conference, F 12. *Baker 206. Baker 208.*

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.

340. Identification of Organic Compounds. Second term. Credit four hours. Prerequisite, Chemistry 305 and 310. Deposit, \$20. Dr. BRUCE and assistants. Lectures and conferences, T Th 10. *Baker 206.* Three laboratory periods, M T W or Th 1:40-4. *Baker 350.* With the permission of the instructor, students may register for three hours credit (two laboratory periods.)

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

365. Elementary Organic Chemistry. Second term. Credit three hours. For students in the College of Home Economics and the Veterinary College. Prerequisite, Chemistry 101 and 105. Deposit, \$10. Dr. BRUCE and assistants. Lectures, M W 11, Conference, F 11, *Baker 207.* Laboratory, M or T 1:40-4, *Baker 250.*

375. Elementary Organic Chemistry. First term. Lectures and laboratory, six hours credit. For students preparing for the study of medicine. Prerequisite, qualitative analysis. Deposit, \$20. Dr. BRUCE and assistants.

Lectures and written reviews, M W F S 9. *Baker 207.*

Laboratory sections: M W 10-12:30, *Baker 250.* Conference, M 10. *Baker 207.* M W 1:40-4. T Th 1:40-4. *Baker 250.* Conference, M 1:40. *Baker 207.*

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 throughout the year (6 hours) and Chemistry 310 (3 hours) during the first term.

395. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professor JOHNSON and Dr. BRUCE.

Students are advised to complete Chemistry 340 before registering in this course.

PHYSICAL CHEMISTRY

401. Principles of Physical Chemistry. Throughout the year. Lectures and laboratory. Primarily for students in the biological sciences. Credit three hours a term. Prerequisite, Chemistry 375 and Physics 3 and 4 or 7 and 8. Deposit, \$15. Professor BRIGGS, Mr. ——— and assistants. Lectures: *Baker* 7. T Th 9. Laboratory: M T Th or F 1:40-4. *Baker* 1.

A presentation of the more important principles of physical chemistry, including such topics as the properties of gases, liquids, and solids; physical and chemical equilibrium; osmotic pressure, vapor pressure, and the elementary theory of solutions; ionization and ionic equilibria in solutions; electrolysis; chemical kinetics and catalysis; photochemistry; and colloid chemistry.

405. Introductory Physical Chemistry. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 305, Mathematics 5a and 5b and Physics 11 and 12 (or their substantial equivalent). Professor BRIGGS and assistants. Lectures, M W F 9. *Baker* 7.

A systematic presentation of modern 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 and the concept of activity; chemical kinetics and catalysis; photochemistry; written problems in physical chemistry.

410. Introductory Physical Chemistry. Throughout the year. Laboratory and recitations. Credit three hours a term. Prerequisite or parallel course, Chemistry 405. Deposit, \$20. Professor BRIGGS, Mr. ———, and assistants. Laboratory sections: M T 1:40-4; Th F 1:40-4; and S 8-1. *Baker* 1. Recitations to be arranged.

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 given in Course 405.

420. Advanced Physical Chemistry. First term. Credit three hours. Prerequisite, Chemistry 405. Required of candidates for the degree of Bachelor of Chemistry. Assistant Professor KIRKWOOD. Lectures and recitations, M W F 12. *Baker* 7.

Exposition of the principles of physical chemistry from the mathematical standpoint, with emphasis on the solution of simple problems.

[425. Applications of the Phase Rule. First term. Credit two hours. Prerequisite, Chemistry 405. Professor BRIGGS. Lectures: M W 11. *Baker* 7.

The study and interpretation of typical phase diagrams in systems of one, two, three and four components. Special attention will be paid to equilibria in saturated salt solutions and to the problem of indirect analysis. Given in alternate years, not 1936-37.]

430. Applied Colloid Chemistry. Throughout the year. Credit two hours a term. Open to candidates for the degree of Bachelor of Chemistry if they have completed Chemistry 405, to others only by special permission. Professor BANCROFT. T Th 10. *Baker* 7.

Lectures. The theory of colloid chemistry and its application in the arts.

435. Chemistry of Solids. First term. Credit two or three hours. Prerequisite or parallel courses, Chemistry 405, and 530 or 545 or special permission. Hours to be arranged. Professor MASON, Assistant Professor KIRKWOOD, and Dr. HOARD. *Baker* —.

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. In the last third of the course, the physical chemistry of crystal lattices is covered in some detail.

445. Introductory Electrochemistry. Second term. Lectures, informal recitations, and laboratory. Credit three hours. Prerequisite, Chemistry 405. De-

posit, \$15. Professor BRIGGS and assistants. Lectures: M W 12. *Baker* 7. Laboratory: T W Th or F 1:40-4. *Baker* 1A.

Theory of electrolysis and the voltaic cell, including the theory and practice of determining transference numbers, the activities of ions, oxidation-reduction potentials, solubility by electrometric methods, and similar subjects.

450. Applied Electrochemistry. First term. Credit two hours. Prerequisite, Chemistry 445. Professor BRIGGS. M W 11. *Baker* 7.

Lectures. The electrolytic refining and extraction of metals; the electrolytic manufacture of organic and inorganic compounds; the theory and practice of storage cells, the electric furnace. Given in alternate years.

By taking Course 465 (2 or more hours), the student may supplement this course with laboratory practice dealing with the various topics presented in the lectures. The experiments include the measurement and study of decomposition voltages; current and energy efficiencies in electrolysis; the deposition of metals; the preparation of chemical compounds by electrolysis; and the testing of storage cells.

465. Advanced Laboratory Practice in Physical Chemistry. Either term. Credit variable, but not to exceed six hours a term. Prerequisite, determined in each case by the Professor in charge. Fee variable. Professor BRIGGS, Assistant Professor KIRKWOOD, and assistants. Hour and place to be arranged.

Students may elect in mass law, reaction velocity, or efficiency measurements, with special reference to course 415; in photochemistry, photography, or colloid chemistry, with special reference to course 430; in conductivity, or electrometric determinations, with special reference to course 460; in electrolytic products, with special reference to course 450; or in the application of physico-chemical methods to organic chemistry.

470. Thermodynamics. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 405 and 420, or special permission. Assistant Professor KIRKWOOD. M W F 9. *Baker* 18.

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.

480. Statistical Mechanics. Second term. Credit three hours. Prerequisite, first term Chemistry 470. Assistant Professor KIRKWOOD. M W F 12. *Baker* 18.

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. Given in alternate years.

[490. Introductory Quantum Mechanics with Chemical Applications. Second term. Credit three hours. Open to qualified students by permission. Assistant Professor KIRKWOOD. Hours to be arranged.

Elementary presentation of the principles of quantum mechanics. The basic ideas underlying the quantum mechanical theory of the chemical bond. Given in alternate years, not 1936-37.]

495. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professors BANCROFT and BRIGGS, and Assistant Professor KIRKWOOD.

CHEMICAL MICROSCOPY AND METALLOGRAPHY

530. Introductory Chemical Microscopy. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 210 and 225 (or 205, 206, 220, and 221) and Physics 21 and 22, or by special permission. Fee, \$5. Professor MASON and assistants.

Lecture: M 10. *Baker* 377.

Laboratory sections: M T 1:40-4; T Th 9-11:30. *Baker* 378.

Lectures and laboratory practice. The use of microscopes and their accessories in chemical and technical investigations. Micrometry; quantitative estimations;

microscopical characteristics and physical chemistry of crystals; illumination, ultra-microscopy and photomicrography; study of industrial materials such as textile and paper fibers.

Graduate students are advised to take this course the first term.

535. Microscopic Qualitative Analysis (Inorganic). Either term. Credit two or more hours. Prerequisite, Chemistry 530. Fee, \$5. Professor MASON and assistants. Laboratory periods, to be arranged. *Baker* 378.

Laboratory practice in the examination and analysis of inorganic substances containing the more common elements with special reference to rapid qualitative methods and to the analysis of minute amounts of material.

540. Microscopical Methods in Organic Chemistry. Second term. Credit two or more hours. Prerequisite, Chemistry 530, and special permission. Fee, \$5. Professor MASON and assistants. Day and hour to be arranged. *Baker* 378.

Laboratory practice. General manipulative methods applicable to small amounts of material, crystallization procedures, determination of melting points and molecular weights; chemical tests and reactions for elements, radicals, and various types of organic compounds. Preparation of simple derivatives.

545. Introductory Metallography. First term. Credit two hours. Prerequisite or parallel course, Chemistry 405, or special permission. Fee, variable. Professor MASON and assistant. Th F 1:40-4; additional sections if warranted. *Baker* 384.

Laboratory practice, conferences and reports. An introduction to the principles and methods involved in the study of the structure of metals. The relation of microscopical appearances to thermal history and mechanical properties. Preparation of specimens for macroscopic and microscopic study. Metallographic microscopes and their use.

550. Advanced Metallography. Second term. Credit variable. Prerequisite, Chemistry 545, and consent of the instructor. Fee variable. Professor MASON. Hours to be arranged. *Baker* 384.

Laboratory practice and reports. The work may be selected in accordance with the interests of the student, from topics such as heat treatment and structures of various ferrous or non-ferrous alloys, special methods of polishing, etching, and photomicrography, or minor research problems.

565. Special Methods in Chemical Microscopy. Either term. Credit one or more hours. Prerequisite, special permission. Fee variable. Professor MASON. Day and hour to be arranged. *Baker* 378 and 382.

Laboratory practice may be elected in various fields such as photomicrography, ultramicroscopy, crystal studies, micro-manipulations, quantitative determinations, and the microscopy of industrial materials, textiles, papers, and foods.

595. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professor MASON.

CHEMICAL ENGINEERING AND INDUSTRIAL CHEMISTRY

705. Unit Operations of Chemical Engineering. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 405. Professor RHODES. W M F 10. *Baker* 177.

Lectures. A critical discussion of the important unit operations of chemical engineering: fluid flow, heat transfer, evaporation, distillation, filtration, gas absorption, crushing and grinding, etc. In these lectures, particular emphasis is placed on the fundamental theory upon which the various unit operations are based.

710. Unit Operations Laboratory. Throughout the year. Credit two hours a term. Prerequisite, Chemistry 405. Fee, \$10. Professor RHODES, Dr. WINDING and assistants. Laboratory period, day and hour to be arranged. *Baker* B-78. Conference period, Th 11. *Baker* 207.

The study in the laboratory, on a semi-plant scale, of the unit operations of chemical engineering, such as agitation, and mixing, filtration, fractional distillation, evaporation, drying, absorption of gases, and heat transfer.

715. Selected Topics in Chemical Engineering. Second term. Credit three hours. Prerequisite or parallel course, Chemistry 705. Professor RHODES. M W F 11. *Baker 177.*

Lectures. A discussion of the important typical unit processes of chemical engineering; as, for example, nitration, sulphonation, esterification, caustic fusion, chlorination, etc.

725. The Chemistry of Fuels. First term. Credit three hours. Prerequisite or parallel course, Chemistry 705. Professor RHODES. M W F 11. *Baker 177.*

Lectures. The chemistry of coal, coke, petroleum tars, and the fuel gases. Particular stress is laid upon the theoretical chemistry involved in the carbonization of coal, the gasification of coal, and the distillation and refining of petroleum and tar.

730. Chemical Plant Design. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 705. Fee, \$5. Professor RHODES. Day and hour to be arranged.

One conference and two laboratory periods. Practice in the calculation and design of chemical plant equipment.

735. Plant Inspections. Second term. Credit one hour. Prerequisite or parallel course Chemistry 705.

Visits to plants typical of various chemical industries. Conferences and reports. A trip during spring vacation will be a feature of this course. Fee, covering expenses, to be announced.

740. Chemical Engineering Computations. Throughout the year. Credit two hours. Prerequisite or parallel course, Chemistry 705. Dr. WINDING. Hours to be arranged.

Conferences and lectures. Problems in stoichiometric relationships, material balances and reaction rates, fluid flow and heat transfer, distillation, evaporation and drying, humidification and air conditioning, and filtration.

750. Furnace Metallurgy. Second term. Credit two hours. Prerequisite or parallel course, Chemistry 405. Professor RHODES. Hours to be arranged.

Lectures. A discussion of the reactions involved in the smelting of ores and the furnace refining of metals. The discussion is accompanied by problems dealing with the various subjects discussed.

795. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professor RHODES and Dr. WINDING.

AGRICULTURAL CHEMISTRY

Students will not be allowed to register in courses in Agricultural Chemistry until after they have taken and passed Chemistry 101 and 105 or their equivalent.

805. Introductory Agricultural Chemistry (Fertilizers, Insecticides, Soils). First term. Credit two hours. Prerequisite, Chemistry 305 (or 375). Professor CAVANAUGH. T Th 11. *Baker 302.*

Lectures. The relation of chemistry to agriculture; an introduction to the study of plant growth, the composition and chemical properties of soils, fertilizers, amendments, insecticides, and fungicides.

810. Introductory Agricultural Chemistry. First term. Credit three hours. Prerequisite, Chemistry 205 and 220 (or 210 and 225). Fee variable. Professor CAVANAUGH and assistant. *Baker 350.*

Laboratory practice: day and hour to be arranged. Recitation: day and hour to be arranged. Practice in the methods used by the chemist in the control laboratories of the factory, of the Government, and of the Experiment Stations, where fertilizers, insecticides, fungicides, and soils are examined.

815. Introductory Agricultural Chemistry (Foods and Feeds). Second term. Credit two hours. Prerequisite, Chemistry 305 (or 375). Professor CAVANAUGH. T Th 11. *Baker 302.*

Lectures. Discussion of the sources, chemical composition, and properties of the principal foods and feeds such as cereals, fruits, animal products, and dairy

products. Relation of methods of preservation and manufacture to the nutritive value of foods.

820. Introductory Agricultural Chemistry (Food Analysis). Second term. Credit three hours. Prerequisite, Chemistry 205 and 220 (or 210 and 225). Fee variable. Professor CAVANAUGH and assistant. *Baker* 350.

Laboratory practice T Th 1:40-4, or W F 1:40-4. Recitation: day and hour to be arranged. The methods of the Association of Official Agricultural Chemists are used in the examination and analysis of foods and feeding stuffs, such as milk and milk products, cereal products, canned vegetables, etc.

***825. Elementary Agricultural Chemistry.** Second term. Credit three hours. Prerequisite, Chemistry 101. Professor CAVANAUGH. M W F 12. *Baker* 377. Candidates for the degree of Bachelor of Chemistry may not receive credit for this course toward the degree.

Lectures. The relation of chemistry to agriculture, and an introduction to the study of the composition and chemical properties of plants, fertilizers, feed stuffs, insecticides, and fungicides.

***830. Elementary Chemistry of Food Products.** Second term. Credit two hours. Prerequisite, Chemistry 101. Professor CAVANAUGH. W F 10. *Baker* 377. Candidates for the degree of Bachelor of Chemistry may not receive credit for this course toward the degree.

Lectures. The chemical composition, physical and physiological properties, sources, and methods of manufacture of the principal food products.

835. Advanced Agricultural Chemistry (Fertilizers, Insecticides, Soils). Either term. Credit two or more hours. Prerequisite, Chemistry 810. Fee variable. Professor CAVANAUGH and assistant. Day and hour to be arranged. *Baker* 350.

Laboratory practice. Advanced work in the chemistry of soils, fertilizers, plant composition, insecticides, or fungicides. Special topics may be selected.

840. Advanced Agricultural Chemistry (Foods and Feeds). Second term. Credit two or more hours. Prerequisite, Chemistry 820. Fee variable. Professor CAVANAUGH. Day and hour to be arranged. *Baker* 350.

Laboratory practice. Special topics in the chemistry of foods and food preparations.

895. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professor CAVANAUGH.

SPECIAL TOPICS

910. Special Topics in Chemistry. First term. Credit one hour. Required of candidates for the degree of Bachelor of Chemistry. T 11. *Baker* 207.

The use of chemical literature; methods of research; administration of chemical laboratories; patent law; and other special topics.

1000. Non-Resident Lectures on the George Fisher Baker Foundation. Credit two hours. T Th 12. *Baker* 177. Open to seniors in the course in Chemistry, and to juniors on special permission.

First term: The Chemistry and Physics of Surfaces. Professor WILLIAM D. HARKINS, Andrew Mac Leish, Distinguished Service Professor, University of Chicago.

Second term: Stereochemistry. Dr. W. H. MILLS, Lecturer in Organic Chemistry, Cambridge University.

THE CLASSICS

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 considered to be: Ancient History, the Comparative Study of Literature, modern foreign languages, particularly French and German, Ancient Philosophy.

ARCHAEOLOGY, ANCIENT ART

1. History of Greek Sculpture. Repeated in second term. Credit three hours. Mr. WAAGÉ. First term, M W F 10; second term, M W F 11. *Goldwin Smith Museum of Casts.*

2. **Art of the Roman Empire.** Second term. Credit three hours. Mr. WAAGÉ. M W F 10. *Goldwin Smith Museum of Casts.*

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.

3. **Ancient Art.** First term. Credit three hours. Mr. WAAGÉ. M W F 11. *Goldwin Smith Museum of Casts.*

The history of art in the Mediterranean region from the Old Stone Age to the beginning of the Iron Age. Sculpture, painting, and the minor arts will be studied.

4. **Ancient Painting.** Second term. Credit two hours. Mr. WAAGÉ. T Th 11. *Goldwin Smith 35.*

5. **History of Ancient Coins.** First term. Credit two hours. Mr. WAAGÉ. T Th 11. *Goldwin Smith 35.* Open to a limited number of students with the permission of the instructor.

The coins will be treated as material for the study of the political, economic, and artistic history of the Mediterranean states. The students will work with coins from the University collection.

GREEK

*1a. **Greek for Beginners.** Introduction to Homer's Iliad. Repeated in second term. Credit three hours. Professor CAPLAN. M W F 12. *Goldwin Smith 124.*

*1b. **Homer's Iliad.** Continuation of Greek 1a. Professor JONES. Repeated in second term. Credit three hours. Prerequisite, Greek 1a. M W F 12. *Goldwin Smith 120.*

*2a. **Attic Greek. Plato: Selected Dialogues.** Repeated in second term. Credit three hours. Prerequisite, Greek 1b. First term: Assistant Professor HUTTON; second term: Dr. GREENE. T Th S 9. *Goldwin Smith 124.*

*2b. **Euripides: Iphigenia in Tauris, and Alcestis; New Testament: Selections.** Repeated in second term. Credit three hours. Prerequisite, Greek 2a. Professor JONES. M W F 10. *Goldwin Smith 120.*

5. **Greek Composition.** Throughout the year. Credit one hour. Prerequisite, Greek 1b or its equivalent. Dr. GREENE. T 2. *Goldwin Smith 124.*

*7. **Greek Myths.** Illustrated lectures. First term. Credit two hours. Professor JONES. Open to sophomores and upperclassmen who have had a year of Greek, Latin, or Ancient History. T Th 12. *Goldwin Smith 120.*

*8. **Lectures on Ancient Greece and Greek Life.** Second term. Credit two hours. Professor JONES. Open to sophomores and upperclassmen who have had a year of Greek, Latin, or Ancient History. T Th 12. *Goldwin Smith 120.*

17. **Aristophanes: Clouds; Sophocles: Oedipus Rex, Antigone.** Throughout the year. Credit three hours a term. Prerequisite, Greek 2b. First term. Dr. GREENE; second term: Professor JONES. T Th S 11. *Goldwin Smith 120.*

20. **Lyric Poetry; Aeschylus: Prometheus Vincit; Theocritus; Demosthenes: Philippics.** Throughout the year. Credit three hours a term. Prerequisite, Greek 17. Professor JONES. T Th S 10. *Goldwin Smith 124.*

[22. **Plato: the Republic; Pindar: Selected Odes; Thucydides.** Throughout the year. Credit three hours a term. Prerequisite, Greek 20. For graduates and qualified undergraduates. Not given in 1936-37.]

25. **Advanced Greek Composition.** Credit one hour. Prerequisite, Greek 5. Dr. GREENE. Throughout the year. Th 2. *Goldwin Smith 124.*

[30. **Lectures on Greek Literature.** Not given in 1936-37.]

LATIN

Those preparing to teach Latin in the secondary schools must take courses 16, 17, 21, 26, and prerequisites. For such students Greek and Archaeology may be counted as related subjects in addition to those listed above in this announcement under the heading, The Classics.

The required courses in Education should be begun in the sophomore year.

***1a. Freshman Course: For Students Offering Three Units of Entrance Latin.** Throughout the year. Credit three hours a term. Dr. GREENE. Section 1: M W F 10. *Goldwin Smith* 124. Section 2: T Th S 10. *Goldwin Smith* 120. Ovid; Virgil; Horace: Odes and Epodes.

***1. Freshman Course: For Students Offering Four Units of Entrance Latin.** Throughout the year. Credit three hours a term. Section 1. Professor DURHAM. M W F 10. *Goldwin Smith* 128. Section 2: first term, Professor CAPLAN. *Goldwin Smith* 124; second term, Dr. GREENE. *Goldwin Smith* 120. M W F 11. Cicero: De Senectute; Martial: Epigrams; Horace: Odes and Epodes.

***3. Sight Translation.** Throughout the year. Credit one hour a term. Professor DURHAM. Th 12. *Goldwin Smith* 128.

***8. Terence; Catullus; Horace: Satires and Epistles; Virgil: Georgics; Livy.** Throughout the year. Credit three hours a term. Prerequisite, Latin 1a or 1. First term, Assistant Professor HUTTON. Second term, Dr. GREENE. M W F 9. *Goldwin Smith* 124.

[11. Survey of Roman Literature, with interpretation of representative selections. Second term. Credit two hours. Open to those who have taken or are taking Course 8 or Course 16. Professor DURHAM. Not given in 1936-37.]

[12. Epic Poetry: Ennius; Virgil: Georgics, The Last Six Books of the Aeneid; Lucan: Pharsalia. Throughout the year. Credit two hours a term. Prerequisite, Latin 1 or 1a. Primarily for those who have taken or are taking Course 8. Professor DURHAM. Not given in 1936-37.]

16. The Greater Republican Writers. Throughout the year. Credit three hours a term. Prerequisites, Latin 8, 11, or 12. Plautus; Cicero; Lucretius. First term, Professor DURHAM. *Goldwin Smith* 128. Second term, Professor CAPLAN. *Goldwin Smith* 124. M W F 11.

[17. Literature and History of the Early Empire. Throughout the year. Credit three hours a term. Prerequisites, Latin 8, 11, or 12. Tacitus: Annals; Juvenal; Pliny's Letters; Suetonius. Not given in 1936-37.]

21. Latin Writing, Elementary Course. Throughout the year. Credit one hour a term. Prerequisite, Latin 1 or 1a. Dr. GREENE. M 12. *Goldwin Smith* 128.

26. Teachers' Training Course. Second term. Credit two hours. This course along with Education 4 and 4a will satisfy the requirement in Methods of the N. Y. State Provisional Professional Certificate. Professor DURHAM. W F 12. *Goldwin Smith* 128.

[27. Topography and Architectural Remains of Rome. First term. Credit two hours. Not given in 1936-37.]

[33. Classical and Mediaeval Rhetoric. Professor CAPLAN. Not given in 1936-37.]

45. Latin Writing, Advanced Course. Throughout the year. Credit one hour. First term, Assistant Professor HUTTON. M 2. *Goldwin Smith* 120. Second term, Dr. GREENE. T 12. *Goldwin Smith* 128. For graduates and for undergraduates who have taken Latin 21.

48. Vulgar Latin: Petronius: Cena Trimalchionis; Vulgar Latin Inscriptions, including Christian Inscriptions. First term. Credit two hours. Professor DURHAM. Primarily for juniors and seniors. W F 12. *Goldwin Smith* 128.

[50. Latin Epigraphy. Second term. Credit two hours. Professor DURHAM. Primarily for juniors and seniors. Not given in 1936-37.]

COMPARATIVE STUDY OF LITERATURE

For major work in the Comparative Study of Literature the following courses must be completed: (1) in the Comparative Study of Literature, a minimum of twelve hours in courses selected from 27, 28, 103, 104, and 105, to which may be added nine other hours in unstarred courses in English to be selected with the consent of an adviser;

(2) in related subjects, a minimum of twenty-four hours selected from courses in Greek, Latin, Ancient and Mediaeval History, Ancient and Mediaeval Philosophy, and, when the minimum of twelve hours mentioned above is adhered to, English (but not starred courses in English). With the authorization of an adviser in English, these requirements may be interpreted and adjusted in such fashion as to fulfil the requirements for major work in English.

27. **Modern Writers on Art: Tolstoy, Nietzsche, and Ruskin.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen with the permission of the instructor. Assistant Professor HUTTON. M W F 11. *Goldwin Smith* 134. A study of artistic principles and practice, with special attention to the art of prose.

28. **English Translations of Greek and Latin Classics.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen. Professor COOPER. T Th 10 and conferences. *Goldwin Smith* 127.

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. Students wishing to take the course must consult the instructor in advance.

103. **Old and Middle English.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen, and to graduate students by special permission. Professor COOPER. M W F 10. *Goldwin Smith* 127.

A study of the foundations of the English language and literature, with emphasis upon literary aspects so far as a proper acquisition of linguistic knowledge shall permit. The work of the second term deals partly with Chaucer. Students may be admitted at the beginning of either term after consultation with the instructor.

The course will be of service to prospective teachers in the secondary schools.

104. **Principles of Literary Criticism.** Throughout the year. Credit three hours a term. Primarily for graduate students; open to upperclassmen by permission. Professor COOPER. W 11-12:50. *Goldwin Smith* 127.

A study of the chief theories of poetry, and chief kinds of literature, with illustrations drawn from writers both ancient and modern.

This and the following course are mainly designed for prospective college and university teachers.

[105. **Dante in English.** Throughout the year. Credit three hours a term. Primarily for graduate students; open to upperclassmen by permission. Professor COOPER. Not given in 1936-37; to be given in 1937-38.]

ECONOMICS

For a major in Economics the following courses must be completed: (1) in Economics, course 1, or 2a and 2b, or the equivalent; twenty-four hours of advanced courses, including six in each of three groups; (2) in related subjects, fifteen hours in the following Departments: (a) History (in addition to the six hours in Prescribed Subjects); (b) Government (except course 1); (c) Philosophy (except courses 1, 2); (d) Mathematics (except courses 1, 2); (e) Psychology (except course 1); (f) Geology 206, 500. Of these fifteen hours twelve must be in not more than two departments.

Students particularly interested in Social Science are allowed an optional major of: (1) in Economics, course 1 or its equivalent, twenty-four hours of advanced courses of which a minimum of twelve hours shall be in the Social Science group, with six hours in a second group; (2) in related subjects, fifteen hours of which nine must be in Biology and Psychology (except Zoology 1, Biology A, Psychology 1).

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, of which six must be in one group, and nine hours of related courses (see paragraph 1 above) of which six must be in one department.

Certain courses in Agricultural Economics and in Rural Social Organization may be counted in partial fulfillment of the major requirements in Economics or Social Science, but in no case may more than six of the required twenty-four hours be allowed

for such courses. Students must secure the approval of their adviser, and the permission of the Dean and of the instructor in charge of the course, before they may register for courses given outside the College.

INTRODUCTORY COURSES

*1. **Modern Economic Society.** Repeated in second term. Credit five hours. Not open to freshmen. Professor O'LEARY. Daily except S 8, 9, 10, 11, 12.

A survey of the existing economic order, its more salient and basic characteristics, and its operation.

In the first term, the enrollment will be limited. Students should register, if possible, on the first day of registration. Assignment to sections will be made on registration days at *Goldwin Smith* 260.

*2a. **Modern Economic Society.** First term. Credit three hours. Not open to freshmen. Professor O'LEARY. M W F 8, 9, 11; T Th S 8, 9, 11.

This course and course 2b cover the same subject matter as course 1.

Enrollment will be limited. Students should register, if possible, on the first day of registration. Assignment to sections will be made on registration days in *Goldwin Smith* 260.

*2b. **Modern Economic Society.** Second term. Credit three hours. Prerequisite course 2a. Professor O'LEARY. M W F 8, 9, 11; T Th S 8, 9, 11.

*3. **Introduction to Economics.** For students in Engineering and Chemistry. Repeated in second term. Credit three hours. Professor O'LEARY. Hours to be announced.

An introduction to the more essential features of contemporary economic organization and to a number of economic problems about which a citizen in American society is required to formulate or express his opinion.

FINANCE

11. **Money and Banking.** Repeated in second term. Credit three hours. Prerequisite, Economics I or its equivalent. Professor REED. M W F 10. *Goldwin Smith* C.

A study of the history and the theory of money and banking.

Enrollment limited.

[12. **Financial History of the United States.** Second term. Credit three hours. Prerequisite, Economics 11. Assistant Professor O'LEARY. Not given in 1936-37.]

14. **The Federal Reserve System.** First term. Credit three hours. Prerequisite, Economics 11. For seniors majoring in Economics, and graduate students. Professor REED. M W F 11. *Goldwin Smith* 142.

15. **Trade Fluctuations.** Second term. Credit three hours. Prerequisites, Economics 11 and 14. For seniors majoring in Economics, and graduate students. Professor REED. M W F 11. *Goldwin Smith* 142.

A study of the causes and effects of trade recessions and revivals, with an introduction to the methods of general forecasting.

16. **Money and Credit.** Throughout the year. Primarily for graduate students. Professor REED.

ACCOUNTING

21a. **Accounting.** Repeated in second term. Credit three hours. Prerequisite, Economics I or its equivalent. May, with permission of instructor, be taken by students registered for course 2b. Professor ENGLISH. T Th 8, and S 8, or hour to be arranged. *Goldwin Smith* 142. One practice period. T or W 2-4. *Goldwin Smith* 329.

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

21b. **Accounting.** Repeated in second term. Credit three hours. Prerequisite, Economics 21a. Professor ENGLISH. M W F 8. *Goldwin Smith* 256.

The issue and transfer of capital stock, bonds and their valuation, depreciation, reserves and reserve funds, sinking funds, analysis of income sheets and balance sheets.

26. Accounting Theory and Problems. Throughout the year. Credit two hours a term. Prerequisite, Economics 21b, or its equivalent. Professor ENGLISH. T Th 10. *Goldwin Smith* 329.

A critical study of the fundamental principles underlying accounting procedure. The solution of typical problems in corporate consolidation, reorganization, and liquidation, and in other special fields.

For **Cost Accounting** see course 3147, College of Engineering.

ORGANIZATION AND CONTROL OF INDUSTRY

31. Corporation Finance. First term. Credit three hours. Prerequisite, Economics 21a. Professor O'LEARY. M W F 9. *Goldwin Smith* 142.

A study of the financial problems of the business corporation from the points of view of the management, of the investor, and of the public.

32a. Public Control of Business. First term. Credit three hours. Prerequisite, Economics 1 or its equivalent. Professor HOMAN. T Th S 10. *Goldwin Smith* 264.

An examination of the economic and legal foundations of public control, with special reference to the anti-trust laws and public utility regulation.

32b. Public Control of Business. Second term. Credit three hours. Prerequisite, course 32a or the consent of the instructor. Professor HOMAN. T Th S 10. *Goldwin Smith* 264.

A continuation of course 32a with special reference to recent developments in the field of public control.

Fee, in lieu of textbook, \$2.

34. Transportation. First term. Credit three hours. Open to upperclassmen who have credit for Economics 21a. Professor O'LEARY. T Th S 9. *Goldwin Smith* 256.

Public policy concerning methods of organization and administration of transportation.

36. Taxation. Second term. Credit three hours. Open to juniors and seniors who have credit for Economics 1 or its equivalent. M W F 11. *Agricultural Economics* 25. Assistant Professor KENDRICK.

The emphasis of the course is on state and local problems connected with rural taxation. Among the subjects considered are: the growth of expenditures; the rise of modern tax problems; how various governmental divisions of New York and other States get their tax revenues; the general-property tax and its administration, and the special cases of personal-property, farm, and forest taxation; mortgage taxes; taxation of cooperatives; income, inheritance, and gasoline taxes; proposals for tax reform; problem of a proper distribution of the tax burden among the various state and local governmental units.

Fee for materials furnished, \$2.

LABOR AND INDUSTRIAL RELATIONS

41. Labor Conditions and Problems. First term. Credit three hours. Prerequisite, Economics 1 or its equivalent. Assistant Professor MONTGOMERY. M W F 9. *Goldwin Smith* 256.

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

42. Trade Unionism and Collective Bargaining. Second term. Credit three hours. Prerequisite, Economics 41 or the consent of the instructor. Assistant Professor MONTGOMERY. M W F 9. *Goldwin Smith* 256.

A study of the origins, philosophic basis, aims, and policies of trade unions and of collective bargaining in selected industries.

43. Quantitative Measurements of Economic Phenomena. First term. Credit two hours. Consult the instructor before registering. Assistant Professor MONTGOMERY. T Th 10. *Goldwin Smith* 256.

A critical survey of the attempts that have been made to apply quantitative methods to the measurement of economic phenomena, with special reference to the labor field. Among the topics treated: estimates of the size and distribution of the national income; problems of measuring the trend of real earnings and of physical production; cost of living index numbers; attempts to apply inductive, statistical, and quasimathematical methods to the theory of value and distribution; budgetary studies and measurement of standards of living; unemployment statistics; computation of labor turnover rates.

44. Labor Management and Personnel Problems. Second term. Credit two hours. Prerequisite, Economics 41 or consent of the instructor. Assistant Professor MONTGOMERY. T Th 10. *Goldwin Smith* 256.

An analysis of the problems of labor management confronting the employer and of methods and policies that may be employed in meeting these problems. Among the specific topics treated: conditions making for ineffective work; evolution of employment policies; selection, training, transfer and promotion; job analysis and specification; wage policies and methods of remuneration; indirect-financial incentives; labor turnover; regularization of employment; joint relations with employees; organization and functions of a personnel department.

45. The Economics of Dissent. First term. Credit three hours. Open to upperclassmen with the consent of the instructor. Assistant Professor MONTGOMERY. W 2-4 and an hour to be arranged. *Goldwin Smith* 264.

A study of the literature of social protest; of unorthodox or dissenting economic doctrines; and of the various types of economic organization that have been proposed or attempted, including the Utopias, Marxian Socialism, Collectivism, Anarchism, the Single Tax, Syndicalism, Guild Socialism, Fabian Socialism, Communism and Fascism.

46. Legal and Constitutional Aspects of Labor Problems and Welfare Legislation. Second term. Credit two hours. Consult the instructor before registering. Assistant Professor MONTGOMERY. W 2-4. *Goldwin Smith* 264.

A study of the legal aspects of trade union objectives and methods and of the theory and practical operation of the more important 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. Special Studies in Industrial Relations. Studies in wage theory, international aspects of industrial relations, and other special topics. Second term. Credit two hours. Assistant Professor MONTGOMERY. Room and hours to be arranged. Primarily for graduate students.

SOCIAL SCIENCE

50a. Introduction to Social Science. Repeated in second term. Credit three hours. Assistant Professor WOODWARD and Mr. SHARP. First term, T Th 9 and an hour to be arranged. *Goldwin Smith* C. Second term, T Th S 10. *Goldwin Smith* 142.

A study of racial and cultural origins and of the factors determining organic evolution and cultural development.

Fee, in lieu of textbook, \$1.50.

50b. Introduction to Social Science. Second term. Credit three hours. Prerequisite, Economics 50a. Assistant Professor WOODWARD and Mr. SHARP. T Th 9 and an hour to be arranged. *Goldwin Smith* C.

The social development of human personality; the behavior of crowds, nations, social classes, and publics; social control and social progress.

51. Population Problems. First term. Credit three hours. Prerequisite, Economics 50b. Assistant Professor WOODWARD. T Th S 11. *Goldwin Smith* 264.

The problems of population numbers and population quality; the American immigration problem; the problem of race relations in America.

Given in 1936-37 and alternate years.

[52. **Delinquency and Crime.** First term. Credit three hours. Prerequisite, Economics 50b. Assistant Professor WOODWARD. Given in alternate years. Not given in 1936-37.]

54. **The Family.** Second term. Credit three hours. Prerequisite, Economics 50b. Assistant Professor WOODWARD. T Th S 11. *Goldwin Smith* 264.

The historical background of the modern American family; current disorganization of the American family as a social problem; the problem of individual adjustment to current family mores.

55. **Primitive Societies.** First term. Credit three hours. Prerequisite, Economics 50b or the consent of the instructor. Mr. SHARP. M W F 12. *Goldwin Smith* 264.

The social anthropology of a number of selected primitive communities, including a study of marriage and the family, associations, social control, economics, and religion.

INTERNATIONAL TRADE AND FINANCE

71. **International Trade and Finance.** Throughout the year. Credit three hours a term. Prerequisite, Economics I or its equivalent. Assistant Professor SOUTHARD. T Th S 11. *Goldwin Smith* 142.

The foreign trade of the United States; the balance of payments; gold standard exchange; gold movements; dislocated exchanges and exchange control; commercial policy and tariff making; international movement of capital; the theory of foreign trade.

ECONOMIC HISTORY AND THEORY

81. **Economics of Enterprise.** First term. Credit three hours. Primarily for seniors majoring in Economics. Assistant Professor KENDRICK. M W F 10. *Goldwin Smith* 256.

A course in economic theory with major emphasis on the economic contributions of Herbert Joseph Davenport.

[82. **The Distribution of Income.** Second term. Credit three hours. Primarily for seniors majoring in Economics. Professor HOMAN. Not given in 1936-37.]

[83a. **The Development of Economic Institutions.** First term. Credit three hours. Prerequisite, Economics I or its equivalent. Assistant Professor JOHNSON. Not given in 1936-37.]

83b. **The Development of Economic Institutions.** Second term. Credit three hours. Prerequisite, Economics I or its equivalent. Assistant Professor JOHNSON. M W F 10. *Goldwin Smith* 264.

A study of the evolution of economic institutions from the middle of the eighteenth century to the present day, together with an examination of the intellectual movements which helped to develop these institutions.

Fee, in lieu of textbook, \$2.

84a. **The Development of Economic Ideas.** First term. Credit three hours. Prerequisite, Economics I or its equivalent. Assistant Professor JOHNSON. M W F 11. *Goldwin Smith* 264.

A study of the evolution of economic ideas, devoted mainly to the eighteenth century and the first three quarters of the nineteenth century.

Fee, in lieu of textbook, \$2.

84b. **The Development of Economic Ideas.** Second term. Credit three hours. Prerequisite, 84a or the consent of the instructor. Professor HOMAN. M W F 11. *Goldwin Smith* 264.

A continuation of course 84a, with chief emphasis upon the content of contemporary economic thought.

Fee, in lieu of textbook, \$2.

85. **Problems in Economic Theory.** Second term. Primarily for graduate students. Professor HOMAN.

86. **History and Literature of Economic Thought.** Throughout the year. Primarily for graduate students. Assistant Professor JOHNSON.

INFORMAL STUDY AND HONORS IN ECONOMICS

The direction of informal study in Economics, and the assistance of candidates for the degree with Honors in Economics is in charge of Professor HOMAN.

EDUCATION

For a major in Education (which must comprise at least thirty-six hours), the following courses must be completed: (1) in Education, eighteen hours including courses 1, 2, and 3 or 13; (2) in related subjects fifteen hours selected according to the student's interests and needs from Philosophy, Psychology, Rural Education, teachers' courses in other departments, Physiology 303 and 307.

Students wishing to secure certificates for teaching in secondary schools should consult the Announcement of the Graduate School of Education.

1. Educational Psychology. Either term. Credit three hours. Lectures and recitations. Professor FREEMAN. First term, M W F 11; second term, M W F 10. *Goldwin Smith 234.*

A study of functional psychology with special reference to the learning process and its application to educational theory and practice.

2. Principles of Secondary Education. Either term. Credit three hours. Prerequisite, Education 1. Professor FREEMAN. First term, M W F 2; second term, T Th S 9. *Goldwin Smith 234.*

The nature and significance of education; biological and psychological foundations; the secondary school as a social institution; educational ideas and values; the curriculum.

History of Education. (a) (Greek, Roman, and Early Medieval). First term. Credit two hours. Open to upperclassmen and graduates only. Professor LAISTNER. (See History 7.) (b) (Late Medieval and Modern). Second term. Credit two hours. Open to upperclassmen and graduates only. Professor SMITH. (See History 36.)

4. Methods, Practice, and Extra-Instructional Problems. Credit nine hours. Assistant Professor HULSE in charge. For teachers of academic subjects.

For detailed information consult the Announcement of the Graduate School of Education. The nine hours offered under course 4 must be counted among the thirty hours allowed outside the College of Arts and Sciences (see I, 1, p. 12).

5. Theory of Behavior. Second term. Credit two hours. Primarily for graduate students; open to upperclassmen by permission. Professor OGDEN. T 4-6. *Goldwin Smith 248.*

The nature of behavior; learning, insight, personality and character; educational applications.

7. Mental Measurements. First term. Credit three hours. By permission of the instructor, candidates for the principal's certificate may enroll for two hours credit. Prerequisite, Education 1 or equivalent. Professor FREEMAN. T Th S 9. *Goldwin Smith 225.*

The nature of intelligence. History of the development of individual and group tests of intelligence; principles underlying their construction and application; the use of tests of intelligence in school problems with atypical children, and in fields outside the school. Theory, construction, and use of educational tests. Demonstration in administering tests.

8. Experimental Education. Either term. Credit and hours to be arranged. Consent of the instructor is required. Education 7 or its equivalent should normally precede this course. Professor FREEMAN.

Problems of experimental education; the application of psychological and statistical methods to problems in educational psychology; chief results and bearings.

[10. High School Administration. Second term. Credit two hours. For seniors, graduates, and other qualified students. Professor JORDAN. W F 3. *Goldwin Smith 236.* Not given in 1936-37.]

11. Extra-classroom Activities. First term. Credit two hours. For seniors and graduates. Professor JORDAN. M 4-6. *Goldwin Smith 236.*

A study of the place extra-classroom activities should assume in the school program. General principles involved, with special attention given to athletics, dramatics, publications, school finance, music, debate, and school clubs.

12. The Junior High School. First term. Credit two hours. For seniors, graduates and other qualified students. Professor JORDAN. M W 9. *Goldwin Smith* 248.

Psychological, biological, and pedagogical bases for the Junior High School; fundamental principles; organization and administration; curricular content in detail; methods of instruction.

13. History of American Education. First term. Credit three hours. Prerequisite, Education I or its equivalent. Assistant Professor HULSE. T Th S 10. *Goldwin Smith* 236.

A survey of educational change in the United States from the beginning of the seventeenth century to the present, with special emphasis on public schools, and consideration of the religious, economic, political, and social factors affecting education. European influences throughout the period will also be considered briefly.

[17. Mental Development. First term. Credit two hours. Prerequisite, Education I or its equivalent. Professor FREEMAN. T 4-6. *Goldwin Smith* 248. Not given in 1936-37.]

18. Individual Differences. Second term. Credit two hours. Prerequisite, Education I or its equivalent. It is desirable, though not required, that Education 7 precede this course. Professor FREEMAN. M 2-4. *Goldwin Smith* 248.

The nature, causes, and implications of individual differences in abilities, interests, and achievement. Graduate students desiring it will be given an opportunity to make a special study of problem cases.

20. Seminary in Education. First term. Credit two hours. Primarily for graduate students; open to upperclassmen by permission. Professor FREEMAN. T 4-6. *Goldwin Smith* 248.

Topics relevant to educational theory.

[21. Seminary in Education. Second term. Credit two hours. Admission by permission of the instructor. Professor JORDAN. M 4-6. *Goldwin Smith* 248. Not given in 1936-37.]

The attention of the student is called to the Announcement of the Graduate School of Education.

ENGLISH

For a major in English the following courses must be completed: (1) in English, course 3, six hours of sophomore courses, and twenty-one hours of advanced courses; (2) in related subjects, eighteen hours selected, with the approval of the adviser, from: Greek and Latin, all courses; French, German, Italian, all unstarred courses (but in particular cases starred courses may be accepted); Public Speaking 10, 11, 12, 23, 30, 31, 41, 49, 66; History 22, 43, 44, 66, 67, 68 (and for students of American Literature, 82, 83, 86, 89, 94); Philosophy 1, 1a, 4, 5, 8, 25, 30 (and for students of American Literature, 12); Music 10, 12, 13; Architecture 425; Scandinavian 1, 4 (for students of English Philology, whose attention is also called to German 42, 43, 48).

The Department will make provision, as a part of the work toward the major in English, for informal study for seniors who have maintained an average of 85 in their English courses.

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

The Department recommends that students who are planning to teach English take English 32 and 99.

***1. Elementary Composition and Literature.** Throughout the year. Credit three hours a term. Messrs. BALDWIN, ADAMS, FINCH, GUSTAFSON, LIPA, MAURER, MYERS, JONES, and WILSON. M W F 8, 9, 10, 11, 12; T Th S 8, 9, 10, 11. Rooms to be announced.

This course is open to underclassmen in Agriculture, Architecture, Chemistry, and Home Economics who have satisfied the entrance requirements in English.

A study of composition in connection with the reading of representative works in English literature. Students who have not taken the course in the first term may enter in the second term.

Students who elect English 1 must apply as follows for assignment to sections: in the first term, on September 28 or 29 at the *Drill Hall*; in the second term, on February 12 in *Roberts Hall*.

***3. Introductory Course in Composition and Literature.** Throughout the year. Credit three hours a term. Messrs. TENNEY, ADAMS, GUSTAFSON, MARX, MAURER, MYERS, SHORT, SMITH, TRACY, and JONES. M W F 9, 10, 11, 12; T Th S 9, 10, 11. Rooms to be announced.

Chaucer, Shakespeare, The Bible, Boswell, Browning; practice in composition, with conferences. Designed for freshmen who are candidates for the degree of Bachelor of Arts. Students who elect English 3 must apply at *Goldwin Smith A* on Monday, Tuesday, or Wednesday of registration week for assignment to sections. Registration is in charge of Assistant Professor TENNEY.

***15. Lyric and Narrative Poetry.** Second term. Credit three hours. Open to freshmen in lieu of English 1 or English 3 upon the recommendation of their instructor. Assistant Professor TENNEY. T Th S 10. *Boardman B*. Texts: Hubbell and Beaty, *An Introduction to Poetry*. Gay, *The College Book of English Verse*.

FOR SOPHOMORES

***20. Prose and Composition.** Throughout the year. Credit three hours a term. May be entered in either term. Prerequisite, credit for both terms of English 1, 3, 21, or the equivalent. M W F 9, Dr. GUSTAFSON, *Goldwin Smith 164*; M W F 10, Assistant Professor FRENCH, *Goldwin Smith 164*; M W F 11, Professor MONROE, *Goldwin Smith 164*; M W F 12, Dr. MARX, *Goldwin Smith 164*; T Th S 9, Professor MONROE, *Goldwin Smith 164*; T Th S 10, Dr. MYERS, *Goldwin Smith 164*. Reading of nineteenth century prose; instruction and practice in composition.

***21. Composition and Literature.** Throughout the year. Credit three hours a term. For students in the College of Engineering. Professor SIBLEY and Mr. WILSON.

A. For Administrative Engineers. Professor SIBLEY. M W F 12. *Goldwin Smith 221*.

B. For Civil Engineers. Mr. WILSON. Room and hours to be arranged.

C. For Electrical Engineers. Mr. WILSON. Room and hours to be arranged.

22. Nineteenth Century Poetry. Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen. Prerequisites, English 1 or 3. Professor BROUGHTON. M W F 11. *Goldwin Smith A*.

Wordsworth, Coleridge, Byron, Shelley, Keats, and others.

***25. History of English Literature.** Throughout the year. Credit three hours a term. Prerequisite, English 1 or 3. Professor DeVANE. T Th 10 and an hour to be arranged. *Goldwin Smith B*.

Two lectures a week and assigned readings to be discussed in recitation. First term: from *Beowulf* to 1700; second term, from 1700 to 1900.

Modern Writers on Art: Tolstoy, Nietzsche, and Ruskin. (See Comparative Study of Literature 27.) Assistant Professor HUTTON.

English Translations of Greek and Latin Classics. (See Comparative Study of Literature 28.) Professor COOPER.

FOR UPPERCLASSMEN AND GRADUATES

32. Old English. Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Professor MONROE. M W F 10. *Goldwin Smith 162*.

Old English grammar. Reading of selections from the *Old English Chronicle*, King Alfred, Aelfric, and other representative prose texts, and of the simpler poetry. A part of the second term is devoted to early Middle English, with supplementary reading on the growth of the language.

37. **Chaucer and his Age.** Throughout the year. Credit three hours a term. The first term is not prerequisite to the second. Open to upperclassmen and graduates. Assistant Professor FRENCH. M W F 12. *Goldwin Smith* 162.

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.

38. **Middle English Metrical Romances.** Second term. Credit two hours. Open to upperclassmen. Assistant Professor FRENCH. T Th 2:30-4.

A study of early English fiction.

42. **The English Drama to 1642.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Assistant Professor NUNGEZER. M W F 11. *Goldwin Smith* 156.

First term: the origin of the drama; mysteries, saint plays, moralities, folk plays, interludes; the rise of professional actors; the development of stage-craft; the court plays; the academic drama. Second term: the erection of permanent playhouses; the contemporaries and successors of Shakespeare; the suppression of acting.

44. **Sixteenth Century Literature.** Throughout the year. Credit three hours a term. Primarily for graduate students; open to seniors by permission. Assistant Professor NUNGEZER. M W F 12. *Goldwin Smith* 338.

A study of the non-dramatic literature of England from the beginning of the Renaissance to the close of the reign of Elizabeth.

46. **Shakespeare.** Throughout the year. Credit three hours a term. Prerequisite, twelve hours of English. First term, Professor STRUNK; second term, Dr. J. C. ADAMS. M W F 10. *Goldwin Smith* 156.

A study of the chief comedies and tragedies.

50. **Seventeenth Century Poetry.** First term. Credit three hours. Open to upperclassmen and graduates. Professor DEVANE. T Th S 11. *Goldwin Smith* 234.

A study of the poetry of the seventeenth century from Donne to Dryden.

52. **Milton.** Second term. Credit three hours. Open to upperclassmen after consultation with the instructor. Dr. SHORT. T Th S 11. *Goldwin Smith* 164.

A study of Milton's poetry and of selections from his prose.

54. **Eighteenth Century Poetry.** Throughout the year. Credit two hours a term. Open to upperclassmen. First term, Professor MONROE; second term, Professor PRESCOTT. T Th 10. *Goldwin Smith* 156.

English poets of the Restoration and the eighteenth century; Dryden, Pope, Thomson, Gray, Collins, Goldsmith, Cowper, and Burns; the lesser English and Scottish poets; beginnings of the English Romantic movement.

56. **Eighteenth Century Prose.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Professor BROUGHTON. M W F 9. *Goldwin Smith* 156.

A study of Defoe, Swift, Addison, Steele, Goldsmith, Johnson, Burke, and collateral reading in the works of others.

57. **The Eighteenth Century Novel.** Throughout the year. Credit three hours a term. Open to upperclassmen and graduates. Assistant Professor SALE. T Th S 9. *Goldwin Smith* 156.

An approach to some of the persistent problems of English prose fiction through a study of the novelists from Defoe to Jane Austen.

58. **Biography.** Throughout the year. Credit two hours a term. Open to upperclassmen. Professor SMITH. T Th 12. *Goldwin Smith* 156.

First term: Plutarch, St. Francis, Vasari, Franklin. Second term: Dr. Johnson and his circle.

64. **Byron and Shelley.** First term. Credit three hours. Open to upperclassmen. Professor PRESCOTT. T Th S 11. *Goldwin Smith* 162.

In 1936-37 the course will be devoted mainly to Byron.

66. Early Nineteenth Century Novel. Second term. Credit three hours. Open to upperclassmen and graduates. Professor BROUGHTON. M W F 2. *Goldwin Smith* 156.

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.

68. Victorian Literature. First term. Credit three hours. Open to upperclassmen and graduates. Professor NORTHUP. M W F 9. *Goldwin Smith* 134.

Lectures on the chief characteristics and literary tendencies of the period; studies of Browning, Tennyson, and the greater writers of prose.

69. Victorian Literature. Second term. Credit three hours. Open to upperclassmen and graduates. Professor NORTHUP. M W F 9. *Goldwin Smith* 134.

Studies of Arnold, Morris, Swinburne, and some other poets, and of the greater writers of fiction.

70. American Literature. First term. Credit three hours. Open to seniors and graduates. Professor PRESCOTT. M W F 12. *Goldwin Smith* 156.

American literature of the colonial and revolutionary periods; the growth of literary independence; Irving, Bryant, and Cooper.

72. American Literature. Second term. Credit three hours. Prerequisite, English 70. Open to seniors and graduates. Professor PRESCOTT. M W F 12. *Goldwin Smith* 156.

American prose and poetry of the nineteenth century.

74. The English Language. Second term. Credit two hours. Open to upperclassmen. T Th 12. Professor MONROE. *Goldwin Smith* 162.

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

76. English Usage and Style. Throughout the year. Credit three hours a term. Primarily for seniors taking English as a major subject; open by permission of the instructor to other seniors and to a limited number of juniors who have received a mark of 85 or better in English in the previous term. First term, Professor STRUNK; second term, Assistant Professor TENNEY. T Th S 9. *Goldwin Smith* 160.

The first term is devoted chiefly to composition. The second term includes, along with composition, the study of the theory of good English, the study of words, idioms, and pronunciation, and related topics.

78. Short Story Writing. Throughout the year. Credit three hours a term. Open to upperclassmen after consultation with the instructor. Professor SMITH. T Th S 10. *Goldwin Smith* 160.

80. Contemporary English and American Criticism. Second term. Credit three hours. Open to upperclassmen and graduates. Assistant Professor SALE. M W F 12. *Goldwin Smith* 134.

The contributions of representative critics from Arnold to the present day to the more important principles of critical theory. Practice in critical writing.

85. Modern Poetry. First term. Credit three hours. Open to upperclassmen. Assistant Professor FRENCH. T Th S 10. *Goldwin Smith* 162.

90. Dramatic Structure. Throughout the year. Credit three hours a term. Open to seniors and graduate students. First term, Professor STRUNK; second term, Dr. MYERS. T Th S 11. *Goldwin Smith* 156.

In the first term, reading of Greek, Elizabethan, and classical French plays; in the second term, of modern and contemporary plays; study of the principles of dramatic art.

95. The Myths in English Literature. Second term. Credit two hours. Open to upperclassmen and graduates. Professor NORTHUP. T Th 12. *Goldwin Smith* 227.

A study of the development of myths and the use made of them by authors of the English-speaking world. Lectures, readings, and reports.

Oral Expression for Teachers. (See Public Speaking 99.) Assistant Professor WAGNER.

Old and Middle English. (See Comparative Study of Literature 103.) Professor COOPER.

Principles of Literary Criticism. (See Comparative Study of Literature 104.) Professor COOPER.

THE FINE ARTS

For major work in the Fine Arts the following courses must be completed: (1) Nine hours in Aesthetics, namely Philosophy 8a, 8b, and either 19 or senior informal study with the adviser. (2) (a) Music, two approved courses; (b) Architecture 072, and six hours in the History of Architecture, Painting, and Sculpture to be elected from Archaeology 1, Architecture 401, 411, 412, and 425; (c) nine hours of literature, to be elected from approved courses in Classics, Comparative Study of Literature, English, German, Public Speaking, 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).

Students who desire major work in Fine Arts will apply to the Dean for advice.

The courses from which choice is to be made are listed under the departments indicated excepting those in the College of Architecture which follow.

ARCHITECTURE

The following courses are open to election by students in the College of Arts and Sciences:

072. Appreciation of Architecture. Second term. Credit two hours. Open to upperclassmen, and to sophomores who elect major work in the Fine Arts. Professor BOSWORTH. T Th 2. *White 28.*

300. First Year Composition. Throughout the year. Credit two hours a term. Professor STONE. T Th 1:40-4. Third floor *Franklin Hall.*

310. First Year Drawing. Throughout the year. Credit three hours a term. Professor ———. Section C, T Th S 10-12:30. Third floor *Franklin Hall.* Given especially for students not registered in the College of Architecture.

330. Elementary Modeling. Throughout the year. Credit two hours a term. Prerequisite, course 310. Professor CAMDEN. Sec. A: M W 1:40-4. Sec. B: Th S 10-12:30. *Morse Hall.*

340-341-342. Color. Throughout the year. Credit two hours a term in each course. One or two extra credit hours by special arrangement in courses 341 and 342. Professor STONE. Any of the three courses may be taken in either of two sections: First and second terms: Section A: M W 10-12:30. Section B: T Th 10-12:30. *Franklin 37.*

410. History of Architecture. First term. Credit three hours. Professor PHELPS. Egyptian, Western Asiatic, Greek, Roman, Early Christian, and Byzantine architecture. Lectures with assigned readings, sketches, and examinations. T Th S 9. *White 28.*

411. History of Architecture. Second term. Credit three hours. Prerequisite, course 410. Professor DUNBAR. Mohammedan, Romanesque, and Gothic architecture. Lectures with assigned reading, sketches, and examinations. T Th S 9. *White 28.*

412. History of Architecture. First term. Credit three hours. Prerequisite, course 411. Professor DUNBAR. Architecture of the Renaissance and to the beginning of the nineteenth century in the principal European countries. Lectures with assigned readings, sketches, and examinations. M W F 9. *White 28.*

425. History of Painting and Sculpture. Throughout the year. Credit three hours a term. Professor FINLAYSON. A general survey of painting and sculpture. This course is a prerequisite for all other courses in the history of painting and sculpture, with the exception of course 414. Registration is limited to 50. Stu-

dents taking this course must register with Professor FINLAYSON on registration day. M W F 2. *White 28.*

[426. **History of Northern Painting.** Throughout the year. Credit three hours a term. Professor FINLAYSON. Painting in the Netherlands and in Germany, first term. Painting in France and England, second term. Either term may be elected without the other. Prerequisite, course 425. M W F 11. *White 28.* Given in alternate years. Not given in 1936-37.]

428. **Historical Studies in Renaissance Art.** Throughout the year. Credit three hours a term. Professor FINLAYSON. Some phase of Renaissance art will be selected each year for more thorough consideration than is possible in the general survey course 425. Prerequisite, course 425. M W F 11. *White 28.* Given in alternate years.

429, 430. **Historical Seminary in Painting and Sculpture.** Throughout the year. Credit two hours a term. Professor FINLAYSON. Registration limited. Open to graduate students and qualified undergraduates. Ten hours of History of Art or their equivalent is prerequisite. By appointment. Students wishing to elect this course must register with Professor FINLAYSON by the Monday before review week preceding the opening of the course. Exception will be made only in the case of graduate students entering the University in September.

450. **History of Landscape Design.** Second term. Credit three hours. Professor MONTILLON. Lectures, sketches, and assigned reading. M W F 10. *White 28.*

[470. **Historic Ornament.** Second term. Credit three hours. Prerequisite, course 412. Professor PHELPS. Some of the great historic styles of decoration will be analyzed and studied in detail, and the development of furniture, stained glass, and other minor arts will be briefly outlined. Lectures, sketches, and examinations. Given in alternate years. Not given in 1936-37.]

GEOLOGY

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 A, 102, 103, 107, 200, 205, 311, 317, either 318 or 319, 400, 402, 403, 500. In related subjects, fifteen hours, which should include Chemistry 101, 105; Physics 3, 4 or 7, 8; and a selection from the following: Astronomy 180, 181; Meteorology 1, 2; Zoology 1, 16; Philosophy 15; Mathematics 15; 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, 45, 50a, 51, 82; History 82, 83, 86, 87, 89.

Those who have special interests 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, 505, 530; Mathematics 1, 2, 3, 4, 41a; Physics 60, 61, 62; Biology A; Zoology 8.

GENERAL COURSES

*A. **General Geology and Physiography.** Throughout the year. Credit three hours a term. Both terms of the course must be completed to obtain credit, unless the student is excused by the department. Professors RIES, VON ENGELN, NEVIN, Messrs. DYSON, BERTHIAUME, and RODGERS. Lectures, T Th 11. *McGraw.* Laboratory, M T W Th or F afternoons, 1:40. *McGraw.*

Students must register at the Geology office, *McGraw Hall*, for lecture and laboratory assignments. The course comprises an introduction to the various branches of geological science, lithologic, physiographic, structural, glacial, economic, and historic geology in their broader aspects. Methods of geological and physiographic study in the field and laboratory are emphasized.

*100. **Introductory Geology.** Repeated in the second term. Credit three hours. Professor RIES, Assistant Professor BURFOOT, Dr. CONANT, Messrs. BERTHIAUME and RODGERS. Lectures, T Th 9, both terms. *Sibley Dome*. Laboratory, M T W Th F afternoons, 1:40, or first term S 8 if necessary. *McGraw*.

Students must register for laboratory assignment at *Geology Laboratory, McGraw*, before beginning the course. The fundamental principles of this branch of science. The inorganic aspects of the subject are emphasized more than the organic. This course cannot be elected by Arts and Sciences students for satisfaction of the science group requirement.

*101. **Larger Aspects of Geology.** Second term. Credit three hours. Professor NEVIN. Lectures, M W 10, Th 2. *McGraw*. Designed especially for students who desire to become acquainted with some of the interesting problems of earth science, and their relation to the other sciences.

203. **Geography of North America.** Second term. Credit three hours. Professor VON ENGELN. M W F 2. *McGraw, Geology Lecture Room*.

Regional and economic geography of North America; discussion of the influence of the physiographic features and natural resources on the settlement and development of the various sections of the continent.

*401. **Ancient Life.** First term. Credit three hours. Dr. MERRIAM. A cultural résumé of the knowledge of organic development during former periods of the Earth's history. Lectures, M W F 9. *McGraw*.

This course is primarily designed for the general student of Humanities who desires some fundamental, but not too technical information on the evolution and distribution of life on the Earth.

DYNAMIC AND STRUCTURAL GEOLOGY

102. **Structural Geology.** First term. Credit three hours. Prerequisite, Geology A or 100 by permission. Professor NEVIN. Lectures, M W 11. Laboratory, W 1:40. *McGraw*.

A study of geologic structures and their causes. Part of the laboratory periods will be spent in the field.

103. **Sedimentation.** First term. Credit three hours. Prerequisite, Geology A, or 100 by permission. Professor NEVIN. Lectures, M W 9. Laboratory, M 1:40. *McGraw*.

Part of the laboratory periods will be spent in the field. This course is devoted to a study of the principles involved in the formation of sediments. Registration by permission.

106. **Special Work in Sedimentation, Structural, and Petroleum Geology.** Throughout the year. Credit variable. Prerequisites, variable. Professor NEVIN. Hours to be arranged. *McGraw*.

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

107. **Geologic Mapping.** Given in the Summer Field School.

A discussion of the fundamental methods used in geologic mapping, together with practical work in the field. For students majoring in Geology.

GEOMORPHOLOGY AND GEOGRAPHY

200. **Geomorphology.** First term. Credit three hours. Prerequisite, Geology A or 100 by permission. Professor VON ENGELN. Lectures, T Th 9. Laboratory, T 1:40. *McGraw, Physiography Laboratory*.

The interpretation of land forms with regard to process and stage and the adjustment of topography to structure. The technology of geomorphological description.

205. **Glaciers and Glaciation.** Second term. Credit three hours. Prerequisite, Geology A or 100 by permission. Professor VON ENGELN. Lectures, T Th 9. Laboratory, T 1:40. *McGraw*.

Living glaciers and the phenomena of the glacial period. Students are required to have one or more Saturdays free for all-day excursions in the Spring. Mapping and interpretation of glacial deposits.

206. Commercial Geography. Second term. Credit three hours. Professor VON ENGELN. Lectures, M W F 9. *McGraw, Geology Lecture Room.* Not open to freshmen.

The geographic factors affecting production and distribution of commodities, historically and in modern times. Natural geographic regions in relation to their past and prospective exploitation. Nature of city sites and the geographic conditions of city growth, organization, and functioning. It is desirable to have had an elementary course in Economics or in Geology before taking this course.

207. Geography of Europe. First term. Credit three hours. Professor VON ENGELN. M W F 2. *McGraw, Geology Lecture Room.*

No prerequisite, but not open to freshmen. Intended for students majoring in history, government, economics.

Physical configuration of the continent, its climatic differences, distribution of natural resources and their development, city locations. Lectures, text and map study.

208. Advanced Physiography, Experimental and Research Work. Credit variable. For advanced and post-graduate students. Registration by permission. Professor VON ENGELN.

209. Seminary. First or second term. Credit two hours. For post-graduate students and seniors with requisite preparation. Registration by permission. Professor VON ENGELN.

MINERALOGY AND PETROGRAPHY

311. Elementary Mineralogy. Repeated in second term. Credit three hours. Prerequisite, Chemistry 101 and 105. Assistant Professor BURFOOT, Dr. EDMUNDSON, and Mr. RODGERS. Lectures: first term: W F 10; second term: M W 12. Laboratory: first term: M, W, or Th 1:40; second term: W or Th 1:40. Additional hours if necessary. *McGraw, Geology Lecture Room.*

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.

[313. Advanced Mineralogy. First term. Credit three hours. Prerequisite, Mineralogy 311. Assistant Professor BURFOOT. Lectures, T Th 11. Laboratory, to be arranged. *Mineralogy Laboratory, McGraw.* Given in alternate years. Not given in 1936-37.]

316. Metamorphic Geology. First term. Credit two hours. For advanced students. Registration by permission only. Assistant Professor BURFOOT. T Th 11. The processes and criteria of rock metamorphism. This course alternates with course 313.

317. Optical Mineralogy. First term. Credit three hours. Prerequisite, Geology 311. Assistant Professor BURFOOT. Lectures, T Th 10. Laboratory, S 9-11:30. *Mineralogy Laboratory, McGraw.*

A brief study of principles, with emphasis on determination of minerals in sections and grains.

318. Petrography. Second term. Credit three hours. Prerequisite, Geology 317. Assistant Professor BURFOOT. Lectures, T Th 10. Laboratory, F 9-11:30. *Mineralogy Laboratory, McGraw.* This course alternates with course 319.

[319. Sedimentary Petrography. Second term. Credit three hours. Prerequisite, Geology 317. Assistant Professor BURFOOT. Lectures, T Th 10. Laboratory, F 9-11:30.]

The methods of investigating the mineral composition, texture, and other physical characteristics of sedimentary rocks, and some of the applications of these methods to geological problems. Given in alternate years. Not given in 1936-37.]

PALEONTOLOGY AND STRATIGRAPHIC GEOLOGY

400. Historic Geology. First term. Credit three hours. Prerequisite, Geology A, or 100 by permission. Dr. MERRIAM and Mr. BERTHIAUME. Lectures, T Th 10. Laboratory, M or F 1:40. *McGraw.*

A review of the geologic history of the earth and its inhabitants, with special emphasis on American geology. Field trips in laboratory periods, when weather permits. One all-day trip to Niagara Falls.

402. Principles of Stratigraphy. Second term. Credit two hours. Prerequisite, Geology A or 100. Dr. MERRIAM. Lectures, M W 11. Consideration of the fundamental factors upon which stratigraphic correlation and nomenclature are based.

403. Introductory Paleontology. (Emphasis on the invertebrate groups.) Throughout the year. Credit three hours each term. Prerequisite, Geology 400. Lectures, T Th 11. Laboratory, Th 1:40. Dr. MERRIAM. First term, biological development of organisms. Second term, key fossils of the several geologic periods.

406. Paleontologic and Stratigraphic Problems. Throughout the year. May be begun either term. Credit variable. For advanced and graduate students. Prerequisite, permission of the instructor. Dr. MERRIAM. Conference by arrangement. *McGraw* 28.

407. Paleobotany. Second term. Credit one hour. Dr. MERRIAM. W 10. A brief resumé of the history of the plants, with emphasis upon their stratigraphic distribution, their value as indicators of past climates, and their influence on the evolution of land-animal life.

ECONOMIC GEOLOGY

500. General Economic Geology. Throughout the year. Credit three hours a term. Prerequisite, Geology A or 100 by permission. Professor RIES and Dr. EDMUNDSON. Lectures, M W 10. Laboratory or field trip, F 1:40. *McGraw.*

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.** Repeated in second term. Credit four hours. For engineering students. Others only by permission. Professor RIES and Dr. EDMUNDSON. Lectures, M W 11. Two laboratory periods, T Th 1:40. *McGraw.* Not the equivalent of Geology A or 100.

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. Second term. Credit three hours. Prerequisite, Geology A or 100 by permission. Professor NEVIN. Lectures, M W 9. Laboratory, M 1:40. *McGraw.*

A course on the geology and distribution of petroleum. Geology 503 should, if possible, be taken first.

503. Petroleum Technology. First term. Credit two hours. Prerequisite, Geology A or 100 by permission. Professor NEVIN. Lectures, T Th 9. *McGraw.*

The geological factors affecting the location of wells, production technology, and valuation problems.

GERMAN

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 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), Comparative Study of Literature, English, History, Philosophy, Romance Languages, Scandinavian Languages and Literatures.

***1. Course for Beginners: Oral Training, Grammar, Composition, Translation.** Repeated in second term. Credit six hours. Professor POPE, Drs. HIEBLE and WOOD, and Mr. TREMPER. Daily 9; daily 10. *Goldwin Smith* 183.

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.** Throughout the year. Credit six hours on completion of the course. Drs. HIEBLE and WOOD, Messrs. TREMPER and DILKEY. M W F 8, 9, 10, 11; T Th S 9, 11. *Goldwin Smith* 177, 177; *White* 21; *Goldwin Smith* 183, 177, 183.

This course is continuous throughout the year, and no credit is allowed for the first term alone. It 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).

***1b. Course for Chemists: Grammar, Reading of Texts in Chemistry.** Throughout the year. Credit six hours on completion of the course, three hours for those taking it only the second term. Professor ANDREWS and Mr. DILKEY. First term: M W F 11, 12; second term: hours to be arranged. *Goldwin Smith* 177, 190.

A required course for candidates for the B.Chem. degree. May not be taken by candidates for the A.B. degree without special permission. For further details see Announcements of the Department of Chemistry.

***3. Intermediate Course. Oral Training, Grammar, Composition, Translation.** Repeated in second term. Credit five hours. Prerequisite, German 1, 1a, or entrance credit for two units of German (first and second year German). Dr. WOOD and Mr. DILKEY. M T W Th F 10. *Goldwin Smith* 190.

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

***3a. Intermediate Course. Oral Training, Grammar, Composition, Translation.** Throughout the year. Credit three hours a term. Prerequisite, German 1, 1a, or entrance credit for two units of German (first and second year German). Professor BOESCHE and Mr. TREMPER. M W F 11; T Th S 12. *Goldwin Smith* 190, 183.

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

***4. Elementary German Composition and Conversation.** Throughout the year. Credit three hours a term. Open to those who are taking or have taken German 3. Professor POPE and Dr. HIEBLE. M W F 12; T Th S 10; T Th S 11, first term only. *Goldwin Smith* 183; *White* 21; *Goldwin Smith* 177.

Exercises conducted in German. Course 4 may be combined with courses 3 or 5.

***5. Rapid Reading Course.** Throughout the year. Credit three hours a term. Prerequisite, German 3, or its equivalent. Professors POPE and ANDREWS and Dr. WOOD. T Th S 11, 12. *Goldwin Smith* 190.

Reading of modern German texts; oral exercises in German on the text; German grammar treated topically.

***7. Reading and Composition.** Second term. Credit six hours. Prerequisite, course 3, 3a, or the equivalent. Dr. HIEBLE. Daily 12. *Goldwin Smith* 177.

This course covers in part the work of courses 4 and 5. It is designed to succeed course 3 (first term).

***8. Scientific German.** Second term. Credit three hours. Prerequisite, German 1-3, or three years of German in high school. Professor ANDREWS. T Th S 10. *Goldwin Smith* 177.

9. German Pronunciation. Second term. Credit three hours. Prerequisite German 1-5, or the equivalent. Dr. WOOD. T Th S 11. *Goldwin Smith* 177.

A course in practical German phonetics including a study of sentence intonation.

10. Advanced German Composition and Conversation. Throughout the year. Credit three hours a term. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. M W F 10. *Goldwin Smith* 177.

Exercises conducted in German. Theme-writing. This course is essential for the pursuit of advanced work in the department, and must be completed by students who desire to be recommended as teachers of German.

11. Schiller's Dramas. First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor ANDREWS. T Th S 10. *Goldwin Smith* 177.

[12. **Schiller's Poems.** Second term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. Not given in 1936-37.]

13. **Goethe's Life and Works.** First term. Credit three hours. Prerequisite, German 1-4, or the equivalent. Professor BOESCHE. T Th S 9. *Goldwin Smith* 190.

14. **Goethe's Faust**, part I and selected portions of part II. Second term. Credit three hours. Not open to freshmen. Prerequisite, German 1-4, or the equivalent. Professor BOESCHE. T Th S 9. *Goldwin Smith* 190.

15. **Survey of German Literature.** Lessing to present time. Lectures in English, collateral reading in German. First term. Credit three hours. Prerequisite, German 1-4, or the equivalent. Professor FAUST. M W F 9. *Goldwin Smith* 190.

[16. **Contemporary German Literature.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor FAUST. Not given in 1936-37.]

17. **Nineteenth Century Drama.** Kleist, Grillparzer, Hebbel, Hauptmann. Second term. Prerequisite, German 1-5, or the equivalent. Professor POPE. M W F 9. *Goldwin Smith* 190.

[18. **Lessing's Life and Works.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor POPE. Not given in 1936-37.]

20. **German Lyrics and Ballads.** Second term. Lectures in German, collateral readings. Credit three hours. Prerequisite, German 1-4, or the equivalent. Dr. HIEBLE. M W F 11. *Goldwin Smith* 178.

[21. **Deutsche Kulturkunde.** Second term. Credit three hours. Prerequisite, German 1-4, or the equivalent. Not given in 1935-36.]

25. **Wagner's Life and Works.** First term. Credit three hours. Prerequisite, German 1-4; otherwise only by special permission. Professor POPE. T Th S 11. *Goldwin Smith* 134.

Lectures 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 biweekly illustrative recitals will be given throughout the term, in conjunction with the Department of Music.

30. **Der Deutsche Einschlag in der Bevölkerung der Vereinigten Staaten.** Geschichtliche Entwicklung und Bedeutung im Aufbau des amerikanischen Volkes. Kulturelle und literarische Beziehungen. First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor FAUST. M W F 11. *Goldwin Smith* 181.

Lectures in German, collateral reading in German. Alternating with course 16 in successive years.

37. **Middle High German.** Credit three hours. Prerequisite, German 1-5, 10, and six hours of literature. First term, Professor ANDREWS, M W F 3. *Goldwin Smith* 178. Second term, Professor POPE, M W F 3. *Goldwin Smith* 182.

40. **Teachers' Course in Methods.** First term. Credit two hours. Prerequisite, German 1-5, 10, and twelve hours of advanced work in German literature or philology. Professor FAUST. Th 3-5. *Goldwin Smith* 181.

42. **Gothic.** First term. Credit three hours. Professor BOESCHE. M W F 12. *Goldwin Smith* 188.

43. **Old High German.** Second term. Credit three hours. Prerequisite, German 37. Professor BOESCHE. M W F 12. *Goldwin Smith* 188.

[47. **Germanic Antiquities.** Second term. Credit one hour. Primarily for graduates. Professor ANDREWS.

A consideration of our sources of knowledge of the Germanic people up to and including the migrations. Not given in 1936-37.]

48. **Principles of Germanic Philology.** Second term. Credit two hours. Prerequisite, German 42. Professor ANDREWS. T 3-5. *Goldwin Smith* 177.

49. **Seminary in German Literature.** First term. Credit two hours. Primarily for graduates. Professor FAUST. T 3-5. *Goldwin Smith* 181.

[50. **Seminary in German Literature.** Second term. Credit two hours. Professor POPE. Not given in 1936-37.]

52. **Seminary in German Philology.** Topics in Historical German Syntax. Second term. Credit two hours. Professor BOESCHE. Th 3-5. *Goldwin Smith* 188.

GOVERNMENT

For a major in Government the following courses must be completed: (1) course 1, and a total of eighteen hours of unstarred courses in the department, of which three must be either course 10, 12a, or 12b; (2) in related subjects, at least eighteen hours to be selected from the following, of which twelve hours must be of unstarred courses and six must be in History—History 42, 82, 83, 86, 87, or any unstarred courses in History; any unstarred courses in Economics; Philosophy 4, 5; Architecture 710, 711.

Students 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 eight hours from the list of courses in related fields printed above.

*1. **American Government.** Throughout the year. Credit three hours a term. First term is prerequisite to second. Open to sophomores, juniors, and seniors, and to a limited number of freshmen, particularly those planning to study law. Professor CUSHMAN, Assistant Professor SHEPARD, and Mr. WALTER. Lectures, T Th 9. Quiz hours to be arranged. *Goldwin Smith* A.

A major part of the year will be spent in studying the American national government, its historical development, organization, powers, and practical working. Attention will be given to the structure, functions, and methods of political parties.

*1a. **Elementary American Government and Politics.** First term. Credit three hours. Open only to students in the colleges of Agriculture and Home Economics. Mr. WALTER. M W F 10. *Caldwell* 143.

*2. **Comparative Government.** First term. Credit three hours. Open to sophomores. Mr. WALTER. T Th S 10. *Boardman* B.

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

9. **Introduction to International Relations.** First term. Credit three hours. Open to sophomores. Assistant Professor BRIGGS. M W F 9. *Boardman* A.

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

10. **Recent and Contemporary Political Theory.** First term. Credit three hours. Open to sophomores with the consent of the instructor, and to upperclassmen. Assistant Professor SHEPARD. T Th S 12. *Boardman* A.

Recent and contemporary political theory; authority, liberty, and obedience; aristocracy and representative government; dictatorship; pluralistic, communistic, and fascistic theories.

11. **Comparative Political Institutions.** Second term. Credit three hours. Open to sophomores with the consent of the instructor, and to upperclassmen. Prerequisite, credit for Government 2, or the consent of the instructor. Assistant Professor SHEPARD. T Th S 10. *Boardman* C.

A functional study of various institutions and processes of government, such as administration and bureaucracy, legislative systems, functional representation and the corporate state. One-, two-, and multi-party systems.

History of Political Theory: Ancient. (See Philosophy 10a.) Professor SABINE.

History of Political Theory: Modern. (See Philosophy 10b.) Professor SABINE.

14. International Law. First term only in 1936-37. Credit three hours. Open to qualified upperclassmen. Assistant Professor BRIGGS. M W F 12. *Boardman D.*

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

15. International Organization. Second term. Credit three hours. Open to upperclassmen, and to sophomores who have completed Government 9. Assistant Professor BRIGGS. M W F 9. *Boardman A.*

The development of international administration, international legislation, collective political intervention, the origin, organization, and working of the League of Nations; the Permanent Court of International Justice. Not given in 1936-37.]

18. Introduction to Legal Philosophy. First term. Credit three hours. Open to upperclassmen. Assistant Professor SHEPARD. T Th S 10. *Boardman A.*

An analysis of various conceptions of the nature of law, historical, analytical, philosophical, and sociological; the problem of the relation between law and the state.

20. Constitutional Law: The American Federal System. First term. Credit three hours. Open to upperclassmen. Prerequisite, both terms of Government 1 or the consent of the instructor. Professor CUSHMAN. T Th S 11. *Boardman C.*

Judicial interpretation of the constitution: the nature of judicial review; separation of governmental powers; relations between state and national government; construction of national powers.

Government 20 and 21 are not designed primarily for pre-law students, but for those having a major interest in government, history, and economics. Attention is called to the fact that the Law School offers a course in constitutional law.

21. Constitutional Law: Fundamental Rights and Immunities. Second term. Credit three hours. Open to upperclassmen. Prerequisite, Government 20 or the consent of the instructor. Professor CUSHMAN. T Th S 11. *Boardman C.*

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. Throughout the year. Credit two hours a term. Open to graduate students and qualified seniors. Professor CUSHMAN. T 2-4. *Boardman 5.*

24. Seminary in International Law and International Organization. First term only in 1936-37. Credit two hours. Open to graduate students and qualified seniors. Assistant Professor BRIGGS. Hours to be arranged.

25. Seminary in Political Theory. Throughout the year. Credit two hours a term. Open to graduate students and qualified seniors. Assistant Professor SHEPARD. Hours to be arranged.

Problems of recent and contemporary political theory.

Legal and Constitutional Aspects of Labor Problems and Welfare Legislation. (See Economics 46.) Assistant Professor MONTGOMERY.

28. American Political and Constitutional Theory. Second term. Credit two hours. Open to qualified seniors and graduates. Consult the instructor before registering. Professor CUSHMAN. T Th 9. *Boardman D.*

The philosophical background and evolution of American constitutional doctrines.

Local Government. (See Agricultural Economics 135.) First term. Credit three hours. Lectures, M W 8. *Agricultural Economics Building 225.* Laboratory, Th 1:40-4. *Agricultural Economics Building 201.* Assistant Professor CATHERWOOD.

An analysis of the receipts, expenditures, and administration of local government. Particular attention is given to counties and towns (townships) with special emphasis on current proposals for change. Fee for materials, \$2.

Principles of Regional and City Planning. (See Architecture 710.) Throughout the year. Credit two hours each term. Professor CLARKE.

May be counted as a related subject for the major in Government.

Seminar in Regional and City Planning. (See Architecture 711.) Throughout the year. Credit one hour each term. Professor CLARKE.

May be counted as a related subject for the major in Government.

HISTORY

For a major in History the following courses must be completed: (1) in History, at least eighteen hours in unstarred courses; (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.

*1. **Outlines of Ancient History.** The Near Eastern Countries, Greece and Rome to A.D. 337. Throughout the year. Credit six hours on completion of the course. Open to freshmen in 1936-37. Professor LAISTNER. M W F 9. *Boardman B.*

Textbook, lectures, and collateral reading.

[3. **Greek History, 500 to 323 B. C.** First term. Credit three hours. Prerequisite, History 1 or the equivalent. Professor LAISTNER. M W F 11. *Boardman E.* Not given in 1936-37.]

[4. **The Hellenistic Age.** Second term. Credit three hours. Prerequisite, History 1 or 3 or a satisfactory equivalent. Professor LAISTNER. M W F 11. *Boardman E.* Not given in 1936-37.]

[5. **The Roman Republic, 133 to 30 B.C.** First term. Credit three hours. Prerequisite, History 1 or a satisfactory equivalent. Professor LAISTNER. M W F 11. *Boardman E.* Not given in 1936-37.]

6. **The Roman Empire, 30 B. C. to 180 A. D.** Second term. Credit three hours. Prerequisite, History 1 or 5. Professor LAISTNER. M W F 11. *Boardman E.*

7. **The History of Education.** Greek, Roman, and Early Medieval. First term. Credit two hours. For upperclassmen and graduates only. Professor LAISTNER. T Th 10. *Boardman E.* See Education 3.

17. **Chinese History.** Throughout the year. Credit two hours a term. Upperclassmen and graduates. Miss GASKILL. T 4-6. *Boardman D.*

A general survey of the history of China, with special attention to the history of the relations between China and the West during the Ch'ing dynasty (1644-1911). Consult the instructor (President White Historical Library) before registering.

*21. **Medieval History.** Throughout the year. Credit six hours on completion of the course. Professor STEPHENSON. M W F 10. *Goldwin Smith A.* Quiz sections will normally take the place of the third hour. Fee for materials, \$.75.

A general survey of Europe from the fourth to the fifteenth century. Lectures and discussion of text, with outside reading and map work.

[22. **Medieval Civilization.** Throughout the year. Credit two hours a term. Professor STEPHENSON. T Th 10. *Boardman D.* Prerequisite, History 21 or consent of instructor.

A study of European culture in the Middle Ages, with emphasis on intellectual development. The first term's work will cover the period to the year 1200. Not given in 1936-37.]

24. **English Constitutional History to 1485.** Throughout the year. Credit two hours a term. Prerequisite, History 21, History 61, or consent of instructor. Professor STEPHENSON. T Th 10. *Boardman D.*

The development of English institutions as revealed by the study of documentary sources. The work of the first term covers the Anglo-Saxon period, the Norman monarchy, and the reign of Henry II; that of the second term begins with Magna Carta and extends to the Tudor accession. This course will alternate with History 65.

32. **The Age of the Renaissance and Reformation.** Second term. Credit three hours. Professor SMITH. M W F 10. *Boardman C.*

The political, social, and religious history of Christendom during this age of transition, with special attention to the beginnings of modern life and thought.

[33. **The History of Christianity.** Second term. Credit two hours. Professor SMITH. Not given in 1936-37.]

34. **Historical Method.** Second term. Credit two hours. Prerequisite, a reading knowledge of either French or German. Professor SMITH. S 10-12. *Boardman 2.*

A study of the principles of historical investigation, criticism, and writing, a survey of the great modern historians, and an examination of recent works on the theory and practice of historiography.

[35. **Church History.** Second term. Credit two hours. Open to graduates and qualified seniors. Prerequisite, a reading knowledge of Latin. Professor SMITH. Not given in 1936-37.]

36. **History of Education (Late Medieval and Modern).** Second term. Credit two hours. Professor SMITH. T Th 10. *Boardman E.* See Education 3.

*42. **History of Modern Europe.** Throughout the year. Credit three hours. Not open to freshmen. Professor BECKER. M W F 3. *Goldwin Smith C.*

A survey of European history from the beginning of the 17th century to 1914. Political, economic, and intellectual movements emphasized in proportion to their international or European importance.

43. **French Revolution.** First term. Credit two hours. Prerequisite, first term of History 42, or the special permission of the instructor. Professor BECKER. T Th 3. *Boardman B.*

[44. **Napoleonic Era.** First term. Credit two hours. Prerequisite, first term of History 42, or the equivalent. Professor BECKER. T Th 3. *Boardman B.*

A study of the rise and fall of the Napoleonic Empire, 1795-1815. Not given in 1936-37.]

[*61. **English History.** Throughout the year. Credit six hours on completion of the course. Professor MARCHAM. T Th S 10. *Boardman A.*

A survey of English history from the Anglo-Saxon invasions to the present. Not given in 1936-37.]

[65. **English Constitutional History from 1485 to the present.** Throughout the year. Credit two hours a term. Prerequisite, History 24, or 61, or the consent of the instructor. Professor MARCHAM. M W 2. *Boardman F.*

A history of the English Constitution in modern times as it is shown in the evolution of the machinery of government and of ideas concerning government. This course alternates with History 24. Not given in 1936-37.]

66a. **History of England under the Tudors.** First term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor. A lecture course with readings in the literature of the time.

[66b. **History of England under the Stuarts.** Second term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor. A lecture course with readings in the literature of the time. Given in alternate years. Not given in 1936-37.]

[67. **History of England in the 18th Century.** First term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor. Given in alternate years; not given in 1936-37.]

68. **History of England in the 19th and 20th Centuries.** First term. Credit three hours. Professor MARCHAM. T Th S 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor.

*82. **American History, 1775-1850.** First term. Credit three hours. Professor ———. M W F 9. *Boardman C.*

A survey of the history of the United States from the American Revolution to the Compromise of 1850.

By special arrangement, this course will be open to freshmen, sophomores, and juniors in 1936-37. Assignment to sections will be made on registration days at *Boardman C*. Fee, in lieu of textbook, \$1.

***83. American History, 1850-1936.** Second term. Credit three hours. Professor ———. M W F 9. *Boardman C*.

A survey of the history of the United States from the Compromise of 1850 to the present.

By special arrangement, this course will be open to freshmen, sophomores, and juniors in 1936-37. Assignment to sections will be made on registration days at *Boardman C*. Fee, in lieu of textbook, \$1.

***86. Constitutional and Political History of the United States, 1878-1848.** First term. Credit three hours. Sophomores, juniors, and seniors. Professor BRETZ. M W F 10. *Boardman F*. Apply at *Boardman C* on registration day for seat assignment. Not open to students who have had History 82.

***87. Constitutional and Political History of the United States since 1848.** Second term. Credit three hours. Sophomores, juniors, and seniors. Professor BRETZ. M W F 10. *Boardman F*.

Apply to *Boardman 9* on registration day for seat assignment. Not open to students who have had History 83.

89. American History, 1750-1848: The Settlement of the Middle West. Throughout the year. Credit two hours a term. Prerequisite, History 82, 83, or the equivalent. Upperclassmen only. Professor BRETZ. T Th 9. *Boardman E*. Apply at *Boardman C* on registration day for seat assignment.

MATHEMATICS

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 the following list—Astronomy, any courses; Chemistry 405; Economics 21a, 21b; Education 1, 2, 3, 4, 4a, 5, 7, 13; French 1, 3, 3a, 4a, 5a, 5b, 6; Geology 312; German 1, 1a, 3, 3a, 4, 5, 7, 8; Italian 1; Philosophy 1, 2, 3, 5, 15; Physics, any courses.

Examinations for the removal of conditions in courses 1 to 8 are held in September just before registration. For further information regarding the time and place of these examinations, students should apply at White 20. No student may take more than one examination the same September.

Students wishing to take any of the courses numbered above 15 are invited to confer with the teachers concerning these courses.

Of courses 1-8, not more than six (6) hours may be taken simultaneously without the special permission of the department.

***1. Solid Geometry.** Repeated in second term. Credit three hours except for students offering Solid Geometry for entrance. First term, M W F 8, T Th S 10. Second term, M W F 10, T Th S 8.

***2. College Algebra.** Repeated in second term. Credit three hours. M W F 9, T Th S 9.

***3. Plane Trigonometry.** Repeated in second term. Credit three hours except for students offering Trigonometry for entrance. First term, M W F 10, T Th S 8. Second term, M W F 8, T Th S 10.

4a, 4b. Analytic Geometry and Calculus. Primarily for students in the College of Arts and Sciences. Prerequisites, Mathematics 1, 2, 3, or the equivalent.

***4a.** First term, daily except S, 11 and 12. Credit five hours. Repeated in second term, daily except S, 11.

***4b.** Continuation of 4a. First term, daily except S, 11. Credit five hours. Repeated in second term, daily except S, 11 and 12.

5a, 5b. Analytic Geometry and Calculus. Primarily for students in the College of Engineering and for candidates for the degree of B.Chem. Prerequisites, Mathematics 1 and 3, or the equivalent.

***5a.** Daily except S. Credit five hours. Repeated in second term.

*5b. Daily except S. Credit five hours. Continuation of course 5a. Repeated in second term.

*8. **Analytic Geometry and Calculus.** Open only to students in the College of Architecture. Throughout the year. Credit three hours a term. Prerequisites, Mathematics 1, 2, 3, or the equivalent.

[*15. **Elementary Course in Higher Mathematics.** Throughout the year. Credit three hours a term. Prerequisites, Mathematics 1, 2, 3, or the equivalent. Not given in 1936-37; to be given in 1937-38.]

18. **Foundations of Mathematics.** Second term. Credit three hours. Dr. ROSSER. T Th S 9. *White 1.*

Postulates for algebra and geometry, theory of sets, construction of the number system, paradoxes in theory of sets, intuitionism, formalism and freedom from contradiction. There are no stated prerequisites for the course; students who contemplate taking it are requested to consult the instructor.

20. **Teachers' Course.** First term. Credit three hours. Prerequisite or parallel course, Mathematics 4b or the equivalent. Assistant Professor JONES. T Th S 9. *White 2.*

A review of the principles involved in some of the arithmetic, algebra, and geometry taught in elementary and secondary schools. An attempt will be made to give the prospective teacher a broad view of these subjects and a deeper insight into the reasons for the formal manipulations involved.

23. **Modern Algebra.** First term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. Dr. MACLANE. T Th S 10. *White 9.*

Determinants, matrices, linear dependence, linear transformations, quadratic and bilinear forms.

31. **Introduction to Algebraic Numbers.** Second term. Credit three hours. Prerequisite, Mathematics 21. Assistant Professor JONES. T Th S 10. *White 2.*

Algebraic fields; ideals; cyclotomy and its relation to constructions with ruler and compasses; other applications.

41a. **Elementary Differential Equations.** Repeated in second term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. First term, Assistant Professor LAWRENCE. M W F 9. *White 1.* Second term, Professor SHARPE. T Th S 11. *White 27.*

41b. **Topics in Applied Mathematics.** Second term. Credit three hours. Prerequisite, Mathematics 41a or the equivalent. Assistant Professor LAWRENCE. M W F 9. *White 1.*

Selected work in topics such as elliptic integrals, complex variables, vector analysis, with applications to problems in engineering and physics.

42. **Advanced Calculus.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Assistant Professor AGNEW. M W F 11. *White 6.*

A study of the processes of the calculus, their meanings and applications. The course is designed to furnish a necessary preparation for advanced work in analysis and applied mathematics.

48. **Calculus of Variations.** Second term. Credit three hours. Prerequisite, Mathematics 42. Dr. LEWIS. T Th S 9. *White 21.*

The usual necessary and sufficient conditions for the occurrence of a minimum will be obtained for the parametric and non-parametric problems and for variable as well as fixed end-points. If time permits, a survey will be given of Morse's theory in the large.

61. **Projective Geometry.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Assistant Professor FLEXNER. M W F 9. *White 2.*

The elements of projective geometry treated synthetically.

62. **Analytic Projective Geometry.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Professor CARVER. M W F 10. *White 10.*

Projective geometry of one, two, and three dimensions treated by means of homogeneous coordinates.

63. **Analytic Geometry of Space.** Second term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. Professor SNYDER. T Th S 10. *White 24.*

Portions of the text by Snyder and Sisam: *Analytic Geometry of Space.*

66. **Algebraic Geometry of Curves and Surfaces.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 62. Dr. WALKER. M W F 10. *White 24.*

Linear series of points on an algebraic curve, birational transformations, and correspondences between curves. Systems of curves on surfaces, and the associated birational invariants.

80. **Differential Equations of Mathematical Physics.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 42 or the equivalent. Professor HURWITZ. T Th S 11. *White 6.*

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.

82. **Theory of Potential Functions.** First term. Credit three hours. Prerequisite, Mathematics 4b or the equivalent. Dr. LEWIS. T Th S 9. *White 21.*

The usual theory of the logarithmic and Newtonian potential functions will be presented with especial emphasis on their relation to mathematical physics and pure analysis. Dirichlet's problem will be considered for the logarithmic potential function.

83. **Probability and Statistics.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4b or the equivalent. Dr. CURTISS. T Th S 10. *White 9.*

The theory of probability and statistics, with applications.

100. **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: Theory of Numbers, Theory of Groups, Infinite Series, Functions of Real Variables, Functions of a Complex Variable, Fourier Series, Metric Geometry, Cremona Transformations, Geometry of Hyperspace, Differential Geometry, Non-Euclidean Geometry, Analysis Situs, Vector Analysis, Dynamics, Hydrodynamics, Elasticity, Relativity.

MUSIC

For a major in Music, the following courses must be completed: (1) in Music, twenty to twenty-four hours of advanced courses which students interested in critical and historical work may satisfy by a sequence selected from courses 5, 10, 12, 13, 22, 23, 60, 61 and 100, and which students interested in theoretical work may satisfy by a sequence selected from courses 10, 22, 23, 24, 25, 31, 40, 41, 60 and 61; (2) in related courses, at least fifteen hours to be selected from courses in Archaeology, Comparative Study of Literature, Education, English, French, German, History, Philosophy, Physics, Psychology, Public Speaking, and Fine Arts. Students who plan to major in music should consult Professor WEAVER at the beginning of their freshman year, or as soon thereafter as possible.

The University offers opportunities for choral training to students who have the ability to sing, through the Sage Chapel Choir, which rehearses in the choir loft of Sage Chapel on Sundays at 10 and on Monday evenings from 7:30 to 9, and which sings at the regular Sunday morning services and at especially scheduled vesper services. Applications for admission to the choir should be made to Professor WEAVER, at the office of the Music Department, 320 Wait Avenue, September 28-30, 9 a.m.-12 m.

The University offers opportunities for instrumental ensemble work to students who play band and orchestral instruments, through the University Orchestra and the University Bands, which are trained and conducted by Mr. GEORGE L. COLEMAN. The University Orchestra rehearses in Sibley Dome on Monday evenings from 7:30 to 9:00

and on Thursday afternoons from 4:30 to 5:30. The University Bands rehearse in the Drill Hall on Monday, Wednesday, and Friday afternoons from 4:30 to 5:30. Applications for admission to the Orchestra and Bands should be made to Mr. COLEMAN at the Drill Hall, Monday-Wednesday, September 28-30, 10 a.m.-4 p. m.

The University offers opportunities for chamber ensemble work in string quartets and other chamber music groups. Students who are interested should consult Assistant Professor INGALLS at his office at 320 Wait Avenue at the beginning of the term.

***1. Theory and Practice of Music.** One term only; given each term. Credit two hours. Primarily for underclassmen, but open to all students who have had little or no training in music. Students offering music for entrance credit may not take this course for credit. Assistant Professor NOSS. T 2-4, Th 2-3:30. 320 Wait Avenue.

An elementary course in the theory of music, including notation and terminology, scale, interval and chord structure, melody writing, ear training, sight reading, and the elements of musical design. This course or its equivalent is prerequisite to all courses in music theory and is recommended as a background for all other courses.

5. The Art of Music. Throughout the year. Credit three hours a term. Professor WEAVER. M W F 10. 320 Wait Avenue. Open to sophomores and upperclassmen.

An approach to the rational understanding and enjoyment of the art of music.

10. History of Music. Throughout the year. Credit two hours a term. Open to upperclassmen and graduates, and to underclassmen by permission. Professor WEAVER. T Th 11. 320 Wait Avenue.

A survey of the evolution of the art of music, with particular reference to questions of style and to the place of music in the artistic and social life of nations. First term, the music of primitive peoples, of early civilizations, of the middle ages, and up to approximately the year 1700. Second term, from approximately 1700 to the present day.

12. Historical Survey of Piano Music. Throughout the year. Credit three hours a term. Open to upperclassmen and graduates, and to underclassmen by permission. Assistant Professor HAIGH. M W F 11. 320 Wait Avenue.

An illustrated course giving a survey of piano music from its beginnings to the present time. First term, through the classic period; second term, the romantic and modern periods.

13. Historical Survey of Orchestral Music. Throughout the year. Credit three hours a term. Open to upperclassmen and graduates, and to underclassmen by permission. Assistant Professor INGALLS. M W F 2. 320 Wait Avenue.

An illustrated course giving a survey of orchestral literature from its beginnings to the present time. First term, through the work of Beethoven; second term, from Beethoven to the present time.

***20. Harmony.** Throughout the year. Credit three hours a term. Prerequisite, Music 1 or its equivalent. Assistant Professor NOSS. M W F 12. 320 Wait Avenue.

The construction and interconnection of triads and their inversions; chords of the seventh and their inversions; chords of the ninth, chromatic harmony, suspensions and ornamental tones; harmonizing both bass and soprano melodies.

22. Harmonic Analysis. First term. Credit three hours. Prerequisite, Music 20. Assistant Professor NOSS. M W F 9. 320 Wait Avenue.

Analysis of the harmonic structure of selected compositions of various composers.

23. Musical Form. Second term. Credit three hours. Prerequisite, Music 20. Assistant Professor NOSS. M W F 9. 320 Wait Avenue.

A study of the typical musical forms as illustrated by selected compositions of various composers.

24. Counterpoint. Throughout the year. Credit two hours a term. Prerequisite, Music 20 or its equivalent. Assistant Professor HAIGH. T Th 9. 320 Wait Avenue.

A course dealing with the principles of melodic combination.

25. Double Counterpoint, Canon and Fugue. Throughout the year. Credit three hours a term. Prerequisites, Music 20 and 24. Assistant Professor HAIGH. M W F 8. 320 *Wait Avenue*.

A course in advanced counterpoint, leading to fugal writing in the second term.

***30. Instrumentation.** One term only. Given each term. Credit three hours. Prerequisite, Music I or its equivalent. Assistant Professor INGALLS. M W F 8. 320 *Wait Avenue*.

A course dealing with the capacities of the instruments of the symphony orchestra. The work of the course is correlated with that of the University Orchestra, the orchestra rehearsals being applied on a laboratory basis.

31. Elementary Orchestration. One term only. Given each term. Credit two hours. Prerequisites, Music 20 and 30 and a fair degree of proficiency on an orchestral instrument or the piano. Assistant Professor INGALLS. Hours to be arranged. 320 *Wait Avenue*.

An elementary course dealing with the problems of practical orchestration. The work of the course is correlated with that of the University Orchestra, the orchestra rehearsals being applied on a laboratory basis.

[*38. Vocal Theory and Technique. Throughout the year. Credit three hours a term. Prerequisite, Music I or its equivalent.

A course dealing with the theory, history, and practice of vocal production as applied to speaking and singing. The work of the course is correlated with that of the Sage Chapel choir, the choir rehearsals being applied on a laboratory basis. Not given in 1936-37.]

40. Elementary Composition. Throughout the year. Credit six hours on completion of the course; no credit for the first term alone. Prerequisites, Music 20 and 24. Assistant Professor HAIGH. Hours to be arranged. 320 *Wait Avenue*.

41. Advanced Composition. Throughout the year. Credit six hours on completion of the course; no credit for the first term alone. Prerequisites, Music 25 and 40. Assistant Professor HAIGH. Hours to be arranged. 320 *Wait Avenue*.

A continuation of course Music 40, involving original composition in the larger forms.

60. Applied Music. Individual instruction in organ, piano, violin. Throughout the year. Credit two hours a term, in the case of students majoring in music; for other students, no credit. Hours to be arranged. Assistant Professors HAIGH, INGALLS, and NOSS. 320 *Wait Avenue*.

This course is offered primarily for students wishing to major in music; and in such cases the work of the course is definitely correlated with the theoretical courses being pursued by the student. Whenever the facilities of the department permit, other students are allowed to register for this course without credit. Permission to register for this course, whether with or without credit, should be obtained from Professor WEAVER.

Individual instruction in organ is offered under Professor NOSS, in piano under Professor HAIGH, and in violin under Professor INGALLS. Practice facilities are available in each case. Students should consult the instructor at the beginning of the term as to hours for instruction, and the secretary of the department as to hours for practice.

Special fees are charged for this instruction and for the use of practice facilities; information may be obtained from the secretary of the department.

61. Applied Music. Individual instruction in organ, piano, violin. Throughout the year. Credit two hours a term, in the case of students majoring in music or in fine arts; for other students, no credit. Hours to be arranged. Assistant Professors HAIGH, INGALLS and NOSS. 320 *Wait Avenue*.

A continuation of course Music 60, open to students who have completed that course or its equivalent. The conditions and regulations applying to Music 60 also apply to this course.

100. Seminary in Musicology. Throughout the year. Credit two hours a term. Primarily for graduates (and by permission to seniors) who have the requisite reading knowledge of one or more of the important foreign languages, a fair

knowledge of musical theory, and some skill in practical applied music. Hours to be arranged. Professor KINKELDEY.

The work is intended to make the student acquainted with the accomplishments of the past and with modern methods and aims 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

For a major in Philosophy, the following courses must be completed: (1) in Philosophy, twenty-one hours, including courses 1a or 5 and one advanced course, all to be chosen with the approval of the student's adviser; (2) in related subjects, eighteen hours. 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.

Courses open to underclassmen:

*1. **Philosophical Classics.** Throughout the year. First term prerequisite to second term. Credit three hours a term. Open only to freshmen. Registration in *Goldwin Smith 224*.

First term:

Sec. 1, T Th S 9. *Goldwin Smith 128*. Assistant Professor ROBINSON.

Sec. 2, M W F 9. *Goldwin Smith 225*. Assistant Professor SMART.

Sec. 3, M W F 12. *Goldwin Smith 227*. Assistant Professor CHURCH.

Second term:

Sec. 1, T Th S 9. *Goldwin Smith 227*. Assistant Professor ROBINSON.

Reading and discussion of some of the less difficult philosophical classics, selected from the works of Plato, Lucretius, Descartes, Berkeley, Hume, Mill, and Bergson.

1a. **Philosophical Classics** (second course). Throughout the year. Prerequisite Philosophy 1. Assistant Professor ROBINSON. T Th S 11. *Goldwin Smith 227*.

Reading and discussion of somewhat more advanced texts than those used in Philosophy 1, including Plato, Aristotle, and St. Augustine.

*2. **Logic.** Second term. Credit three hours. Open to freshmen. Registration in *Goldwin Smith 224*.

Sec. 1, T Th S 10. *Goldwin Smith 227*. Assistant Professor ROBINSON.

Sec. 2, M W F 9. *Goldwin Smith 225*. Assistant Professor SMART.

Sec. 3, M W F 10. *Goldwin Smith 227*.

Sec. 4, M W F 11. *Goldwin Smith 227*. Professor BURTT.

Sec. 5, M W F 12. *Goldwin Smith 227*.

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

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

Professor CUNNINGHAM. M W F 10. *Goldwin Smith 227*.

Fundamental problems of philosophy and the most important types of philosophical theory.

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

Professor SABINE. M W F 10. *Goldwin Smith 225*.

A study of morals and of theories of right and wrong.

5. **History of Philosophy.** Throughout the year. Credit three hours a term. Open to sophomores, juniors, and seniors. Professor CUNNINGHAM. T Th S 9. *Goldwin Smith 142*.

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. First term: Greek and medieval philosophy. Second term: modern philosophy to the middle of the nineteenth century; a brief sketch of contemporary tendencies.

8a. Aesthetics: Psychology of Aesthetic Perception. First term. Credit three hours. Open to sophomores, juniors, and seniors. Professor OGDEN. M W F 2. *Goldwin Smith. Museum of Casts.*

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

8b. Aesthetics: Philosophy of Art. Second term. Credit three hours. Prerequisite, Philosophy 8a or three hours of Philosophy. Assistant Professor CHURCH. M W F 2. *Goldwin Smith 225.*

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

9. Religious Problems in Contemporary Thought. First term. Credit two hours. Open to sophomores, juniors, and seniors. Professor BURTT. Th 2-4. First meeting in *Willard Straight A17.*

Reading and discussion of religious issues raised in the writings of Wieman, Santayana, Dewey, Fosdick, Lippmann, Krutch, and others.

Courses for upperclassmen and graduates.

10a. History of Political Theory: Ancient. First term. Credit three hours. Open to juniors and seniors. Professor SABINE. T Th S 10. *Goldwin Smith 225.*

The political philosophy of the city-state: Plato and Aristotle; natural law and the theory of church and state.

10b. History of Political Theory: Modern. Second term. Credit three hours. Open to juniors and seniors. Professor SABINE. T Th S 10. *Goldwin Smith 225.*

The theory of the modern state from Machiavelli to the mid-nineteenth century.

13. The Philosophy of Religion. Second term. Credit three hours. Not open to sophomores. Professor BURTT. M W F 12. *Goldwin Smith 225.*

A study of the major types of religious belief in the modern world in relation to their philosophical background.

14. History of Religions. First term. Credit three hours. Not open to sophomores. Professor BURTT. M W F 12. *Goldwin Smith 225.*

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

15. Philosophy of Science. Throughout the year. Credit three hours a term. Open to juniors, seniors, and graduates. Assistant Professor SMART. M W F 10. First term, *Goldwin Smith 225*; Second term, *Goldwin Smith 220.*

A study of the process of scientific reasoning, as illustrated by the historical development of important scientific conceptions, and a discussion of some of the more recent works on the philosophy of science.

19. Advanced Readings in Aesthetics. First term, repeated in the second term. Credit three hours. Permission of the instructor. Assistant Professor CHURCH.

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

20. Contemporary Philosophy. Throughout the year. Credit three hours a term. Prerequisite Philosophy 5. M W F 11. *Goldwin Smith 225.* First term, Professor BURTT; second term, Assistant Professor SMART.

Main tendencies of contemporary philosophy, especially British and American.

25. Plato and Aristotle. Throughout the year. Open to undergraduates by permission of the instructor. Credit three hours a term. First term prerequisite to second term. Assistant Professor ROBINSON. Hours to be arranged. *Goldwin Smith 220.*

[28. Ethical Theory. First term. Professor SABINE. T Th S 11. *Goldwin Smith 220.*

A rapid reading of examples of the main types of modern ethical theory. Not given in 1936-37.]

[29. **The Philosophy of Value.** Second term. Assistant Professor CHURCH. M W F 12. *Goldwin Smith* 220.

A study in Naturalist, Realist, and Idealist theories of value. Not given in 1936-37.]

PHYSICAL EDUCATION

The following courses are designed not only for the training of teachers and directors of physical education in public schools and colleges, but also to provide a general course of study which may have both a practical and a broad educational appeal. A four-year undergraduate course has been outlined, the first purpose of which is a well-rounded arts course in preparation for secondary school teaching, and the second to give a basic training in physical education. Copies of this may be secured upon application. To receive certification by New York State, an additional term's work, or two Summer Sessions, at an accredited institution will be necessary.

20. **History of Physical Education.** First term. Credit two hours. Professor YOUNG. T Th 8. *Goldwin Smith* 164.

For juniors and seniors. The distinguishing characteristics of various peoples, as to habits of living and forms of physical activity and the part these have played in their national development.

21. **Modern Developments in Physical Education.** Second term. Credit two hours. Professor YOUNG. T Th 8. *Goldwin Smith* 128.

A continuation of course 20, dealing with the history and various aspects of the physical education movement in Europe and present-day America.

22. **Theory of Physical Education and Methods of Teaching.** First term. Credit two hours. Professor YOUNG. M W 8. *Goldwin Smith* 248.

For juniors and seniors. The objects and scope of physical education; the principles and technique involved in its teaching, arrangement, classification, and progression of exercises.

23. **Organization and Administration of Play, Athletics, and Gymnastics.** Second term. Credit three hours. Professor YOUNG and instructors. M W F 8. *Goldwin Smith* 128.

For juniors and seniors. The social and educational value of play, with special emphasis upon management and supervision of athletic sports, recreation centers, scouting activities, etc.

24. **School Hygiene.** First term. Credit two hours. Professor YOUNG. T Th 12. *Goldwin Smith* 221.

For juniors and seniors. Sanitary aspects of school environment: methods and scope of health instruction and supervision.

25. **First Aid.** First term. Credit one hour. Dr. SHOWACRE. See Hygiene 4.

26. **Health Supervision of School Children.** Second term. Credit two hours. Dr. GOULD. See Hygiene 3.

28. **Physical Measurements.** Second term. Credit one hour. Professor YOUNG. F 12. *Goldwin Smith* 248.

Measurements of school children; their practical application to problems of growth and development, together with tests of physical ability and proficiency.

29. **Anatomical Methods and Kinesiology.** First term. Credit three hours. Assistant Professor PAPEZ. One lecture and six hours of laboratory a week are required. Lecture, Th 12. *Stimson* 49; laboratory *Stimson* 52 (open any morning except Saturday). For juniors and seniors. See Anatomy 229.

PHYSICS

For a major in Physics two alternative plans are offered. Under either plan there must be completed twenty-four hours of unstarred courses in Physics and the related subjects listed.

(A) *The following courses must be completed: (1) in Physics, twenty-one hours of unstarred courses of which at least nine hours shall be selected from courses 105, 110, 120, 132, 142, 170; (2) in related subjects, Mathematics 4a and 4b, or 5a and 5b, and one of the following—Astronomy 181 and 184, Chemistry 405, Philosophy 5 or 15, Psychology 1 and 3a or 3b.*

(B) *The following courses must be completed: (1) in Physics, eighteen hours of unstarred courses including courses 60, 61, 62, 105; (2) in related subjects, four of the following—(a) Astronomy 181 and 184; (b) Biology A or Geology A; (c) Chemistry 101 and 105; (d) Mathematics 15; (e) Psychology 1 and 3a or 3b.*

GENERAL COURSES

A student unusually well prepared in physics may find it desirable to undertake Courses 21 and 22 or 61 and 62 without having taken the prerequisite courses and without having taken the College Credit Examinations (p. 13) in these prerequisite courses. Before such a student may register for any one of these more advanced courses, he must demonstrate his fitness to pursue the course by passing a qualifying examination set by the professors concerned.

Examinations for those who were unavoidably absent from either term examination and for those who have conditions to make up in Courses 3 to 12 will be held on Monday, September 28, 1936, at 10 a. m. in Rockefeller A. Similar examinations in connection with Courses 21 to 62 will be held in Rockefeller A at 2 p. m. on the same day. Students expecting to take any of these examinations should notify the department not later than September 20, 1936.

***3. Introductory Experimental Physics.** First term. Credit three hours. Open only to students who do not offer entrance physics. Demonstration lectures, Assistant Professor HOWE. W F 9 or 11. *Rockefeller A.* One conference period and one laboratory period a week to be arranged. Dr. BACHER; Messrs. BAROODY, MESCHTER, MYERS, and WEEKES; Miss WITTERS. *Rockefeller 220.*

Properties of matter, sound, and light.

***4. Introductory Experimental Physics.** Second term. Credit three hours. Open only to students who do not offer entrance physics. A continuation of Course 3. It is recommended, but not required, that this course be preceded by Course 3.

Electricity, magnetism, and heat.

***7. Introductory Experimental Physics.** First term. Credit three hours. Prerequisite, entrance physics.

Two plans of study are offered, as follows:

(a) Lectures, Assistant Professor HOWE. W F 9 or 11. One laboratory period a week to be arranged. Staff as in course 3.

(b) One lecture, two recitations a week. Dr. BACHER. M W F 9 or 11. Laboratory as in (a).

Properties of matter, sound, and light.

***8. Introductory Experimental Physics.** Second term. Credit three hours. Prerequisite, entrance physics. A continuation of Course 7. It is recommended but not required, that this course be preceded by Course 7. Plans and staff as in Course 7.

Electricity, magnetism, and heat.

***11. Introductory Experimental Physics.** First term. Credit four hours. Prerequisite, Trigonometry. Entrance physics desirable but not required.

Lectures, Professor GRANTHAM. T Th 10 or 12. *Rockefeller A.* Two recitations and one laboratory period a week to be arranged. Professor GRANTHAM; Dr. GARTLEIN; Messrs. COOPER, CRITTENDEN, FERGUSON, GROVER, HOLLOWAY, MANN, MOORE, and SCOTT.

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

Courses 11 and 12 are required of students in Engineering and of candidates for the degree of B. Chem.

***12. Introductory Experimental Physics.** Second term. Credit four hours. A continuation of Course 11. May be taken before Course 11.

Electricity, magnetism, and heat.

21. General Physics. Either term. Credit three hours. Prerequisite, Physics 11 and 12 and Mathematics 5a and 5b. Two classroom periods a week and one laboratory period on alternate weeks as assigned. Professor GRANTHAM; Dr. TOMBOULIAN; Messrs. CRITTENDEN and GROVER. *Rockefeller.*

Theory, problems, and laboratory work covering selected topics in electricity and magnetism. Required of candidates for the degree of M. E., E. E., and B. Chem.

22. General Physics. Either term. Credit three hours. Prerequisite, Physics 11 and 12 and Mathematics 5a and 5b. Two classroom periods a week and one laboratory period on alternate weeks as assigned. Staff as in Course 21. *Rockefeller*.

Theory, problems, and laboratory work covering selected topics in thermionics, photoelectric effect, light and heat. Required of candidates for the degree of M. E., E. E., and B. Chem.

41. Modern Physics. First term. Credit two hours. Prerequisites, Physics 21 and 22. Professor GRANTHAM. Two recitations to be arranged. Open only to engineering students. Primarily for juniors.

Discussion and problems covering topics in modern physics.

***55. Introductory Physical Experiments.** Either term. Credit three hours. Prerequisite, Physics 3 and 4 or the equivalent. Professor GIBBS, Dr. BARNES, and Mr. RICHARDS. Lecture, T 10 or W 11. Laboratory, T Th 2-4 or W F 2-4. *Rockefeller* 352.

One lecture and two laboratory periods a week. Fundamental experiments covering properties of matter, heat, light, sound, magnetism, and electricity. Intended primarily for students preparing for Medicine.

60. Physical Experiments. Either term or throughout the year. Credit three hours a term. Prerequisite, Physics 3 and 4 and Mathematics 3. Selected experiments available for those who have also had Mathematics 4. Professor GIBBS, Dr. BARNES, and Mr. RICHARDS. Three hours of laboratory work T and Th, between 8 and 1. *Rockefeller* 352.

Laboratory work in mechanics, properties of matter, heat, sound, light, electricity, and magnetism. Experiments selected to meet the needs of the individual student. For those with little training in Physics and Mathematics, emphasis will be placed upon the illustration of physical principles. For those qualified, opportunity will be given to study methods of measurement, sources of error, the adjustment and use of instruments of precision, and graphical methods of interpreting results. Primarily for students in Arts and Sciences. Suitable to accompany Physics 61 or 62 or both, but may be taken separately.

61. General Physics. First term. Credit three hours. Prerequisite, Physics 4 or the equivalent. Professor GIBBS and Assistant Professor LIVINGSTON. M W F 8. *Rockefeller* 107.

Primarily for students in Arts and Sciences. Classroom work covering heat, magnetism, and electricity.

Physics 61 and 62 are designed to meet the needs of students who desire a somewhat detailed survey of the fundamentals of physics. Physics 60 may suitably accompany either or both of these courses. A course in Trigonometry should precede or accompany Courses 61 and 62.

62. General Physics. Second term. Credit three hours. Prerequisite, Physics 3 or the equivalent. Professor GIBBS and Assistant Professor LIVINGSTON. M W F 8. *Rockefeller* 107.

Primarily for students in Arts and Sciences. Classroom work covering properties of matter, sound, and light.

Course 62 may be taken either before or after Course 61.

91. The Teaching of Physics in Secondary Schools. Second term. Credit two hours. Prerequisite, Physics 60, 61, and 62. Assistant Professor HOWE. T Th 8. Given in alternate years, on sufficient demand. Not to be given in 1937-38.

105. Advanced Laboratory Practice. Either term. Credit three hours. Prerequisites, Physics 60, 61, and 62 and Mathematics 4, or their equivalents. Professor MURDOCK, Assistant Professor COLLINS, and Drs. PARRATT and SHAW. Laboratory, T W Th F afternoons as arranged. *Rockefeller* 324.

For undergraduates. Two laboratory periods and one seminar a week. Considerable time will be spent on each of a small number of experiments selected to

meet the requirements of the individual student. The work may include such topics as electron measurements, ionization potentials, spectroscopy, x-rays, radioactivity, photoelectric emission, alternating current measurements, electric oscillations, and high temperature measurements.

106. Advanced Laboratory Practice. First and second terms. Credit one to three hours. Prerequisite, Physics 105 or such special preparation as may be needed for the experiments undertaken. Admission only after consultation. Assistant Professor COLLINS, other professors cooperating in the direction of the work in certain fields, and Drs. PARRATT and SHAW. T W Th F afternoons. *Rockefeller 324.*

Considerable time is devoted to each of a small number of experiments selected to meet the requirements of the individual student. Groups of students will also be organized to perform series of related experiments in connection with which appropriate class room instruction will be offered at hours to be arranged. The following groups are planned for 1936-37: first term, Spectroscopy by Dr. SHAW, and Electronics and Conduction in Gases by Dr. PARRATT; second term, Advanced Spectroscopy by Dr. SHAW, and X-ray Diffraction and Crystal Structure by Professor MURDOCK.

110. Mechanics. Throughout the year. Credit three hours a term. Prerequisite, Physics 60, 61, and 62 and Mathematics 4, or their equivalents. Professor MURDOCK. T Th S 9. Given in alternate years.

Introductory analytical mechanics, oscillations, kinetic theory, deformable bodies, mechanics of fluids, surface phenomena, wave motion, sound.

[120. Electricity and Magnetism. Throughout the year. Credit three hours a term. Prerequisite, Physics 60, 61, and 62 and Mathematics 4, or their equivalents. Professor MURDOCK. T Th S 9. Given in alternate years, not in 1936-37.

A study of the laws of electrostatic and magnetic fields; electromagnetism and variable current phenomena; thermal and chemical electromotive forces; metallic, electrolytic, and gaseous conduction.]

[132. Light. Second term. Credit three hours. Prerequisite, Physics 60 and 62 and Mathematics 4, or their equivalents. Assistant Professor HOWE. T Th S 8. Given in alternate years, not in 1936-37.

An introductory study of lens systems, diffraction, interference, double refraction, and polarization.]

142. Heat. Second term. Credit three hours. Prerequisite, Physics 60 and 61 and Mathematics 4, or their equivalents. Professor GIBBS. T Th S 8. Given in alternate years.

Temperature scales, specific heats, thermal conductivity, thermodynamics, thermal radiation, high temperature measurement, kinetic theory.

170. Introduction to Modern Physical Theories. Throughout the year. Credit three hours a term. Prerequisite, six hours from Physics 105 to 142 inclusive, or the equivalent. Professor RICHTMYER. T Th S 10. Intended for seniors and for first year graduate students.

Early theories, a brief survey of the electromagnetic theory, photoelectricity, radiation and the quantum theory, atomic structure and atomic spectra including x-rays, the nucleus and nuclear disintegrations, radioactivity, matter waves, and other problems of modern physics.

200. Introduction to Theoretical Physics. Throughout the year. Credit five hours a term. This course must be preceded or accompanied by one term of Physics 110 and by Physics 120, or their equivalents. Lectures, Professor KENNARD. T Th S 8. Two hours of informal study, Assistant Professor BETHE. See Graduate School Announcement.

[213. Theoretical Mechanics. First term. Credit three hours. Prerequisite, Physics 200 or the equivalent. Professor KENNARD. T Th S 8. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

222. Electrodynamics. Second term. Credit three hours. Prerequisite, Physics 200 or the equivalent. Professor KENNARD. M W F 9. Given in alternate years. See Graduate School Announcement.

233. Theoretical Optics. First term. Credit three hours. Prerequisite, Physics 200 or the equivalent. Assistant Professor COLLINS. T Th S 8. Given in alternate years. See Graduate School Announcement.

271. Introductory Quantum Mechanics. First term. Credit three hours. Prerequisite, Physics 200 or the equivalent. Assistant Professor BETHE. M W F 9. See Graduate School Announcement.

SPECIAL TOPIC COURSES

[**405. Mathematical Methods in Physics.** Throughout the year. Credit three hours a term. Prerequisite, Mathematics 4 or the equivalent. Professor SMITH. T Th S 11. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

415. Special Topics in Physics. A reading course. See Graduate School Announcement.

431. The Physics of Soil Phenomena. First term. Credit three hours. Prerequisite, Physics 11-12 or the equivalent, and course work covering Calculus and Mechanics. Professor MURDOCK and Dr. BARNES. Two lectures and one laboratory or problem period a week as arranged. Designed primarily for students in Civil Engineering.

Surface phenomena at fluid-fluid and fluid-solid interfaces; viscous flow in porous materials; theory of solutions, osmotic pressure, electrolytes, colloids, and gels; capillary potential and hysteresis in finely divided materials.

451. Hydrodynamics. First term. Credit three hours. Prerequisite, Mathematics 5 or the equivalent, and suitable course work in Physics and Mechanics. Assistant Professor COLLINS. M W F 8. Primarily for Engineering students. See Graduate School Announcement.

452. Hydrodynamics. Second term. Credit three hours. Prerequisite, Physics 451 or the equivalent. Professor SMITH. M W F 8. Primarily for Engineering students. See Graduate School Announcement.

[**472. Quantum Mechanics of Spectra and Radiation.** Second term. Credit three hours. Prerequisite, Physics 271. Assistant Professor BETHE. T Th S 10. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

476. Quantum Mechanics of Solids. Second term. Credit three hours. Prerequisite, Physics 271. Assistant Professor BETHE. T Th S 10. Given in alternate years. See Graduate School Announcement.

[**477. Quantum Mechanics of Collisions.** First term. Credit three hours. Prerequisite, Physics 271. Professor SMITH. M W F 9. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

481. Advanced Quantum Mechanics. First term. Credit three hours. Prerequisite, Physics 271 and at least one of the courses 472, 476, 477, or their equivalents. Assistant Professor BETHE. Given on sufficient demand. See Graduate School Announcement.

[**571. Spectroscopy.** Throughout the year. Credit two hours a term. Prerequisite, Physics 132 or its equivalent. Professor GIBBS. W F 12. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

581. Atomic Structure. First term. Credit three hours. Professor GIBBS. M W F 10. See Graduate School Announcement.

[**591. X-Rays and the Structure of Matter.** First term. Credit three hours. Professor RICHTMYER. M W F 10. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

[**592. X-Rays and the Structure of Matter.** Second term. Credit three hours. Professor MURDOCK. M W F 10. Given in alternate years, not in 1936-37. See Graduate School Announcement.]

640. Alternating Currents and Electronics. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 41 and Physics 120, or their equivalents. Professors SMITH and BEDELL. Lectures and laboratory work. See Graduate School Announcement.

PSYCHOLOGY

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

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

1. **Elementary Psychology.** Repeated in second term. Credit three hours. Not open to freshmen. Assistant Professor JENKINS and assistants. Lectures, Goldwin Smith C. First term: T Th 11, M W 12. Second term: M W 12. Recitations, one hour a week, to be arranged.

2. **General Psychology.** Second term. Credit three hours. Prerequisite, Psychology 1. Professor WELD and assistants. Lectures, T Th 11. Goldwin Smith C. Recitations, one hour a week, to be arranged.

A survey of the fields of differential, abnormal, animal, genetic, and social psychology.

3a, 3b. **Introductory Laboratory.** May be entered either term. Credit three hours a term. Prerequisite, Psychology 1. Professor WELD (3a first term) and Dr. FELDMAN (3a second term and 3b). M W F 2-4. Morrill, Psychological Laboratory. Laboratory fee, \$2 a term.

4. **Intermediate course in Psychology.** First term. Credit three hours. Prerequisite, Psychology 1 and consent of the instructor. Dr. FELDMAN. M W F 9. Morrill 41.

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.** First term. Credit three hours. Prerequisite, Psychology 1 and consent of the instructor. Dr. FELDMAN. M W F 9. Morrill 41. Not given in 1936-37.]

[6. **Memory, Skill, and Work.** Second term. Credit three hours. Prerequisite, Psychology 1 and consent of the instructor. Professor DALLENBACH. M W F 9. Morrill 42.

A study of fundamental experiments and principles. Lectures and readings. Not given in 1936-37.]

[7. **Reading of German Psychology.** Second term. Credit three hours. Prerequisite, consent of the instructor. Hours to be arranged. Dr. FELDMAN. Morrill, Psychological Laboratory.

The accurate reading and translation of psychological texts and articles. The course presupposes a knowledge of grammar. Not given in 1936-37.]

9. **Experimental, Theoretical, and Historical Problems.** Either term or throughout the year. Credit three hours a term. Prerequisite, 1, 3a and either 3b or 4, and the consent of the instructor. Professors BENTLEY, WELD, and DALLENBACH, and Assistant Professor JENKINS. Morrill, Psychological Laboratory.

10. **Social Psychology.** Second term. Credit three hours. Prerequisite, senior standing and consent of the instructor. Professor WELD. M W F 11. Morrill 41.

11. **Physiological Psychology of the Senses.** First term. Credit three hours. Prerequisite, Psychology 1 and consent of the instructor. Professor DALLENBACH. M W F 11. Morrill 42.

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

12. **Legal Psychology.** First term. Credit three hours. Prerequisite, Psychology 1. Intended for juniors preparing for law. Professor WELD. M W F 11. Boardman Hall B.

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.** First term. Credit three hours. Prerequisite, senior standing and consent of the instructor. Dr. FELDMAN. T Th S 11. *Morrill* 41.

[14. **Contemporary Psychology.** First term. Credit three hours. Prerequisite, senior standing and consent of the instructor. Dr. FELDMAN. T Th S 11. Seminary Room, *Morrill*. Not given in 1936-37.]

15. **Psychology of the Abnormal.** First term. Credit three hours. Prerequisite, Psychology I, senior standing and consent of the instructor. Professor BENTLEY. M W F 10. *Morrill* 59.

An account of the deficiencies, excesses, and aberrations of the psychological functions. Psychological disorders of government.

16a. **Introduction to Psychotechnology.** First term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Assistant Professor JENKINS. T Th S 10. *Goldwin Smith* A.

A study of the results of experimental and statistical analyses of psychological problems in vocational guidance, medicine, law, athletics, and problems of everyday existence.

16b. **Psychotechnology in Business and Industry.** Second term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Designed for those who intend to enter industrial fields. Assistant Professor JENKINS. T Th S 11. *Goldwin Smith* A.

A study of experimental and statistical analyses of psychological problems in vocational selection, industrial production, personnel, advertising, selling, and market research.

[17. **Animal Psychology.** Second term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Professor BENTLEY. M W F 10. *Morrill* 41.

The comparative psychology of vertebrate and invertebrate forms. Lectures, discussions, and demonstrations. Not given in 1936-37.]

18. **Genetic Psychology.** Second term. Credit three hours. Prerequisite, Psychology I, upperclass standing, and consent of the instructor. Professor BENTLEY. M W F 10. *Morrill* 41.

A study of the individual life-career and the development of the psychological functions. Lectures and textbook assignments.

20. **The Correlational and Psychophysical Methods.** First term. Credit three hours. Prerequisite, Psychology 3a. Professor DALLENBACH. M W F 2-4. *Morrill*, Psychological Laboratory.

21. **Technique of Experimentation.** Second term. Credit three hours. Primarily for graduate students. Hours to be arranged. Professor BENTLEY. *Morrill*, Research Laboratory.

A study of the principles and processes of psychological research.

24. **Theory of Behavior.** (See Education 5). Professor OGDEN.

PUBLIC SPEAKING

For a major in Public Speaking, the following courses must be completed: (1) in Public Speaking, twenty-one hours including nine hours from courses 1, 2, 10, 30; (2) in related subjects, six hours of courses not taken in the freshman year in each of the following groups—(a) English, Comparative Literature; (b) History, Government, Economics; (c) Philosophy. Of the total of thirty-nine hours, twenty-four must be in unstarred courses. Students may elect a general major, or a major with emphasis on (1) Rhetoric and Public Speaking, (2) Phonetics and Speech Training, (3) Drama and the Theatre.

For prospective teachers: Students planning to teach Public Speaking should satisfy at least minimum requirements for a teacher of English, and should begin the required courses in Education in the sophomore year with Psychology I and Education I. For those preparing to teach English: either Public Speaking 99 or I and 10 and 30; additional preparation for the Oral English work required of teachers of English is offered in courses 12 and 41.

The Department calls the attention of students interested in Dramatic Production to the courses listed under The Fine Arts, and to English 42, 46, 53, 90.

Additional opportunities for training under the supervision of the department are provided by the University Prize Contests (the Woodford, the '86 Memorial, the '94 Memorial) in charge of Professor WICHELS, by the intercollegiate debate teams under the supervision of Assistant Professor WAGNER, by the Speech Clinic conducted by Assistant Professor THOMAS for students working under the supervision of the department, by the Cornell Dramatic Club and Laboratory Theatre under the direction of Professor DRUMMOND and Assistant Professor STANTON, and by the Verse Speaking Chorus under the direction of Professor DRUMMOND.

CORNELL UNIVERSITY THEATRE: *Director, A. M. DRUMMOND; Assistant Director, W. H. STANTON; Technical Director, J. COLBY LEWIS; Rural Drama, H. DAKES ALBRIGHT.*

***1. Public Speaking.** Repeated in second term. Credit three hours. Not open to freshmen. Professor WICHELS, Assistant Professors MUCHMORE and WAGNER, Mr. STINE, and Mr. MURPHY. First term: M W F 9, 10, 11, 12; T Th S 9, 10, 11. Second term: M W F 9, 10, 11, 12; T Th S 9, 10.

Planned to give the fundamentals of speech preparation and to develop simple and direct speaking. Study of principles, and constant practice; readings on public questions; 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 Assistant Professor THOMAS before registering for course 1.

Students must enroll on registration days at *Goldwin Smith 21.*

***2. Public Speaking.** Second term. Credit three hours. Prerequisite, Public Speaking 1. Three sections: Professor WICHELS, M W F 12; Assistant Professor WAGNER, M W F 9, 11.

Practice in the composition and delivery of speeches for various occasions, in forum discussion, and in parliamentary law; study of problems of interest and persuasion. The '86 Memorial Prize in original oratory is awarded in connection with this course.

Students must enroll on registration days at *Goldwin Smith 21.*

***8. Voice Training.** Second term. Credit one hour. Open to freshmen. Assistant Professor THOMAS. T Th 9. *Goldwin Smith 26.*

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.

Students must enroll on registration days at *Goldwin Smith 23.*

10. Oral Interpretation of Literature. First term. Credit three hours. Not open to freshmen. Assistant Professor THOMAS. Two sections: M W F 9, 10. *Goldwin Smith 26.*

Training in the interpretative reading of prose and poetry; study of principles; constant practice; conferences for drill.

Students must enroll on registration days at *Goldwin Smith 21.*

11. Oral Interpretation of Literature. Second term. Credit three hours. Prerequisite, Public Speaking 10. Assistant Professor THOMAS. M W F 9. *Goldwin Smith 26.*

A continuation of course 10, with emphasis on the reading of poetry and of plays.

Students must enroll on registration days at *Goldwin Smith 23.*

12. Argumentation. First term. Credit three hours. Prerequisite, Public Speaking 1. Three sections: Professor WICHELS, T Th S 10, *Goldwin Smith 26*; Assistant Professor WAGNER, M W F 11, 12. *Goldwin Smith 21.*

Training in reasoning, and in the composition of argument both written and spoken; practice in debate on public questions.

This course is recommended by the department to students preparing for the law.

Students must enroll on registration days at *Goldwin Smith 21.*

13. Argumentation. Second term. Credit three hours. Assistant Professor WAGNER. M W F 12. *Goldwin Smith* 21.

Advanced study of principles and methods; practice in cross-examination, group discussion, and special forms of debate.

Students must enroll on registration days at *Goldwin Smith* 237.

[15. Advanced Public Speaking. First term. Assistant Professor MUCHMORE. Not given in 1936-37.]

16. Forms of Address. Second term. Credit three hours. Prerequisite, Public Speaking 2 or 12. Professor WICHELS. T Th 10 and an hour to be arranged. *Goldwin Smith* 134.

Practice in composing and delivering various types of public address.

Students must enroll on registration days at *Goldwin Smith* 21.

[23. Classical Rhetoric and Literary Theory. First term. Professor WICHELS. Not given in 1936-37.]

24. Public Opinion and the Method of Argument. Repeated in second term. Credit three hours. Open to upperclassmen. Professor WICHELS. T 11, Th 11-1. First term, *Goldwin Smith* 225; Second term, *Goldwin Smith* 134.

Current controversies on public affairs studied in the light of modern theories of public discussion, mass persuasion and opinion control. Lectures, discussions, reports. Fee in lieu of textbook, \$2.

Students must enroll on registration days at *Goldwin Smith* 21.

[25. British Orators. Assistant Professor WAGNER. Not given in 1936-37.]

[27. American Orators. Not given in 1936-37.]

30. Phonetics and Speech Training. Second term. Credit three hours. Open by consent of the instructor. Assistant Professor THOMAS. M W F 10. *Goldwin Smith* 26.

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.

Students must enroll on registration days at *Goldwin Smith* 23.

[31. Advanced Phonetics and Speech Training. Second term. Assistant Professor THOMAS. Not given in 1936-37.]

41. Dramatic Production: Direction. First term. Credit three hours. Open to upperclassmen by consent of the instructor. Assistant Professor STANTON. M W F 12. *Morse*, Stage Laboratory.

Dramatic interpretation and the related principles of stage direction and production. Lectures, readings, reports, and drill.

42. Advanced Dramatic Interpretation. Throughout the year. Credit two hours a term. Primarily for graduates: open by consent of the instructor to seniors majoring in the Department. Professor DRUMMOND. Th 2-4. *Goldwin Smith* 242.

45. Dramatic Production: Stagecraft. Second term. Credit three hours. Open to upperclassmen by consent of the instructor. Assistant Professor STANTON. M W 12; T 1:40-4, or as arranged. *Morse*, Stage Laboratory.

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. Laboratory fee, \$5.

45a. Dramatic Production: Stage Lighting. First term. Credit two hours. Open by consent of the instructor to graduates and upperclassmen. Assistant Professor STANTON. T 1:40-4, or as arranged. *Morse*, Stage Laboratory.

46. Stage Design and Theatre Crafts. First term. Credit three hours. Not open to freshmen. Mr. LEWIS. T 7:40-10 or as arranged, Th S 12. *Morse*, Stage Laboratory.

An elementary course in the principles of design as applied to stage settings, theatrical ornament, properties and masks. Laboratory fee, \$2.

47. The History of Theatrical Costume. First term. Credit three hours. Not open to freshmen. Miss WORMAN. M W F 10. *Theatre Workshop*.

An historical survey of theatrical costumes, and of related period costuming, modes and manners.

[48. History of the Theatre. Second term. Professor DRUMMOND. Not given in 1936-37.]

49. Playwriting. Throughout the year. Credit three hours a term. Open to upperclassmen by consent of the instructor. Professor DRUMMOND. T Th 12. *Goldwin Smith* 242.

49b. Advanced Playwriting. Throughout the year. Credit three hours a term. Open by consent of the instructor to those who have taken Public Speaking 49. Professor DRUMMOND. T Th 12. *Goldwin Smith* 242.

[51. Problems and Methods. Not given in 1936-37.]

66. Theories of Dramatic Production. Second term. Credit two hours. Open to seniors by consent of the instructor. Professor DRUMMOND. W 2-4. *Goldwin Smith* 242.

A study of the chief theories of dramatic production in relation to aesthetic principles.

90. Theatre Practice. Throughout the year. Credit two hours a term. Open by consent of the instructors to juniors majoring in the department who have taken or are taking Public Speaking 41 or 45. Hours to be arranged. Professor DRUMMOND and Assistant Professor STANTON.

Individual projects in dramatic production correlated with the work of the prerequisite courses and of the University Theatre.

91. Theatre Practice. Throughout the year. Credit two hours a term. Open by consent of the instructors to seniors majoring in the department. Hours to be arranged. Professor DRUMMOND and Assistant Professor STANTON.

Individual projects in dramatic production correlated with the work of the courses and of the University Theatre.

99. Oral Expression for Teachers. Throughout the year. Credit three hours a term. Open to upperclassmen, and to others by consent of the instructor; may be entered in the second term only by permission of the instructor. Assistant Professor WAGNER. T Th S 9. *Goldwin Smith* 134.

Preparation for teaching Oral English in the secondary schools: exercises for improvement of voice and speech, practice in speech-making (expository, argumentative, persuasive, and for special occasions), in reading aloud, and in conducting discussion both informal and parliamentary; lectures, readings, and reports on aims and methods. The content of the course will be determined mainly by the requirements of the *New York State Syllabus in English for Secondary Schools*.

Students must enroll on registration days at *Goldwin Smith* 21.

ROMANCE LANGUAGES

For a major in French or Spanish, the following courses must be completed: (1) in French or Spanish, twenty-one hours of unstarred courses in the language; (2) in related subjects, eighteen hours to be selected from courses in Greek, Latin, Ancient and European History, German, History of Philosophy, English.

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 mentioned, 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 Greek, Latin, History, German, History of Philosophy, English, Fine Arts 411, 412, 425, Music 10.

FRENCH

Students desiring the recommendation of the Department for teaching French are required to take the following courses: 16, 22, 23, 30 and a minimum of six hours of composition above French 5b.

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of the course; upperclassmen, four hours. M W F 12, T Th S 9.

This course is continuous throughout the year and no credit is allowed for the first term alone. Students with first year entrance French should enter the course the second term.

*3. **Intermediate Course.** First term only. Credit six hours; upperclassmen, four hours. Prerequisite, French 1, or second year entrance French. Daily 8.

*3a. **Intermediate Course.** Throughout the year. Credit six hours on completion of the course; upperclassmen, four hours. Prerequisite, French 1, or second year entrance French. T Th S 12, M W F 10, 11.

This course is the same in content as French 3.

*4a. **Rapid Reading of French.** Repeated in second term. Credit three hours. Prerequisite, French 3, or third year entrance French. First term: M W F 9, M W F 12, T Th S 11. Second term: M W F 10.

Translation and rapid reading.

Designed primarily for students intending to continue the study of French. May not be taken except in conjunction with 5a.

*5a. **Elementary Composition.** Repeated in second term. Credit three hours. Prerequisite, French 3, or third year entrance French. First term: M W F 11, T Th S 9, T Th S 12. Second term: M W F 9, T Th S 10.

*5b. **Elementary Composition.** Repeated in second term. Credit three hours. Prerequisite, fourth year entrance French or French 5a or 6. First term: T Th S 10. Second term: M W F 11, T Th S 9, 10. *Goldwin Smith 283.*

*6. **Freshman French: Reading and Composition.** Throughout the year. Credit six hours on completion of course. Prerequisite, French 3 or third year entrance French. Designed primarily for the satisfaction of underclass requirements in foreign languages. M W F 8, 9, 10, 12; T Th S 9, 10.

7. **Intermediate Composition.** Throughout the year. Credit three hours a term. Prerequisite, French 5b. Professor PUMPELY. M W F 9, M W F 12. *Goldwin Smith 277.*

Composition, conversation and discussion of selected topics in French grammar. Course 7 is conducted in French.

9. **Advanced Composition.** Throughout the year. Credit three hours a term. Prerequisite, French 7. Assistant Professor ————. M W F 10. *Goldwin Smith 283.*

Rapid translation from English; themes and talks by students on literary and historical topics. The course is conducted in French.

16. **History of French Literature.** Throughout the year. Credit three hours a term. Prerequisite, fourth year entrance French, French 4a, or French 6. Professor MASON. M W F 11. *Goldwin Smith B.*

Lectures on French Literature since the Middle Ages.

[17. **Literature of the Seventeenth Century.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor BISHOP. M W F 11. *Goldwin Smith 281.*

Lectures and outside reading. This course is conducted in French. Not given in 1936-37.]

18. **Literature of the Eighteenth Century.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor BISHOP. M W F 11. *Goldwin Smith 281.*

Lectures and outside reading. This course is conducted in French.

19. **The Romantic Movement in French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith 290.*

[20. **Modern French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith 290.* Not given in 1936-37.]

[21. **Contemporary French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith* 290. Not given in 1936-37.]

22. **French Phonetics.** Second term. Credit two hours. Professor MASON. W F 8. *Goldwin Smith* 290.

[23. **French Historical Grammar.** First term. Credit two hours. Prerequisite, one year of Latin. Professor PUMPELLY. T Th 10. *Goldwin Smith* 277.

Lectures on the historical development of French from its origins to the present. Primarily for students intending to teach French. Not given in 1936-37.]

24. **French Philology.** Throughout the year. Credit six hours on completion of course. Prerequisite, French 5a, 23, and entrance Latin. Professor PUMPELLY. T 10, Th 2. *Goldwin Smith* 277.

Lectures on the historical development of the French language, with a detailed phonological and morphological study of the *Chanson de Roland*.

[30. **The Teaching of French.** Second term. Credit two hours. Professor MASON. W F 8. *Goldwin Smith* 290. Not given in 1936-37.]

[31. **Literature of the Sixteenth Century.** Throughout the year. Credit two hours a term. Prerequisite, French 16. Professor BISHOP. T Th 12. Not given in 1936-37.]

[35. **French Critics.** Lectures in French. First term. Credit two hours. Professor ————. T Th 11. *Goldwin Smith* 283. Not given in 1936-37.]

[36. **France of To-day.** Lectures in French. Second term. Credit two hours. Professor ————. T Th 11. *Goldwin Smith* 283. Not given in 1936-37.]

[41. **Old French Texts.** First term. Credit two hours. Primarily for graduates. Hours to be arranged. Professor HAMILTON. Not given in 1936-37.]

43. **Old Provençal Philology and Literature.** Second term. Credit two hours. Hours to be arranged. Professor HAMILTON.

47. **Modern French Seminary.** Throughout the year. Credit two hours a term. Professor MASON. T 2:30. *Library, French Seminary*. Primarily for graduates.

ITALIAN

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of course. Professor PUMPELLY. M W F 10. *Goldwin Smith* 277.

The course is continuous throughout the year and no credit will be allowed for the first term alone.

4. **Italian Poetry.** Throughout the year. Credit three hours a term. Prerequisite, Italian 14, or the equivalent. Professor HAMILTON. T Th S 9. *Goldwin Smith* 281.

Dante, *Divina Commedia*; Leopardi, *Rime*; Carducci, *Poesie*, will be read in class. Readings and reports for extra-class work.

14. **Nineteenth Century Literature.** Throughout the year. Credit three hours a term. Prerequisite, Italian 1, or its equivalent. Professor HAMILTON. T Th S 11. *Goldwin Smith* 281.

15. **The Literature of the Italian Renaissance.** Second term. Credit three hours. Prerequisite, Italian 14. Professor HAMILTON. Hours and room to be arranged.

Petrarch, *Rime*; Machiavelli, *Principe*; Ariosto, *Orlando Furioso*. Outside readings and reports.

SPANISH

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of the course; upperclassmen, four hours. M W F 12, T Th S 9.

The course is continuous throughout the year and no credit is allowed for the first term alone. Students entering the University with one unit in Spanish should take the second term of course 1.

[*3. **Intermediate Course.** Credit six hours; upperclassmen, four hours. Prerequisite, Spanish 1, or second year entrance Spanish. First term: daily 8. Not given in 1936-37.]

*3a. **Intermediate Course.** Throughout the year. Credit six hours on completion of the course; upperclassmen four hours. Prerequisite, Spanish 1, or second year entrance Spanish. Dr. ESPINOSA. M W F 10.

The course is the same in content as Spanish 3.

*4. **Advanced Translation.** First term. Credit three hours. Prerequisite Spanish 3, 3a, or third year entrance Spanish. Dr. ESPINOSA. T Th S 10.

Translation, outside reading of modern novels and plays.

*5. **Elementary Composition.** Second term. Credit three hours. Prerequisite, Spanish 3, 3a, or third year entrance Spanish. Dr. ESPINOSA. T Th S 10.

*6. **Freshman Spanish.** Translation and composition. Throughout the year. Credit six hours on completion of the course. Prerequisite, Spanish 3, 3a, or third year entrance Spanish. Designed primarily for the satisfaction of the underclass requirement in foreign language. M W F 9.

7a. **Intermediate Composition.** First term. Credit three hours a term. Prerequisite, Spanish 4 or 6. Dr. ESPINOSA. T Th S 11. *Goldwin Smith 277.*

7b. **Intermediate Composition.** Second term. Credit three hours a term. Prerequisite, Spanish 7a. Dr. ESPINOSA. T Th S 11. *Goldwin Smith 277.*

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.

10. **History of Spanish Literature.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 4 or 6. Professor DALE. M W F 12. *Goldwin Smith 283.*

One lecture period, two reading periods a week.

[15. **Drama of the Golden Age.** First term. Credit three hours. Prerequisite, Spanish 4 or 6. Professor DALE. T Th S 11. *Goldwin Smith 277.* Not given in 1936-37.]

[17. **Cervantes.** Second term. Credit three hours. Prerequisite, Spanish 4 or 6. Professor DALE. T Th S 11. *Goldwin Smith 277.* Not given in 1936-37.]

19. **The Nineteenth Century Spanish Novel.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 4 or 6. Professor DALE. T Th S 10. *Goldwin Smith 281.*

[20. **Spanish Poetry.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 4 or 6. Professor DALE. T Th S 10. *Goldwin Smith 281.* Not given in 1936-37.]

[41. **Old Spanish.** Throughout the year. Credit two hours a term. Professor DALE. Primarily for graduates. Th 2:15. *Library, Spanish Seminary.* Not given in 1936-37.]

[42. **Calderón and Alarcón.** Throughout the year. Credit two hours. Professor DALE. Primarily for graduates. Th 2:15. *Library, Spanish Seminary.* Not given in 1936-37.]

43. **The Picaresque Novel.** Throughout the year. Credit two hours a term. Professor DALE. Primarily for graduates. Th 2:15. *Library, Spanish Seminary.*

SCANDINAVIAN LANGUAGES AND LITERATURES

For a major in Scandinavian Languages and Literatures, the following courses must be completed: in Scandinavian Languages and Literatures, courses 1, and 3 or 4, and six other hours; (2) in related subjects, twenty-two hours selected from the following courses: German 15, 16, 17, 37, 42, 43, 47, 48; English 32, 38, 50, 54, 64, 74; History 23, 32, 36, 42; Comparative Study of Literature 3, 4; Classics—Latin 30.

1. **Old Icelandic.** Throughout the year. Credit three hours. Professor HERMANSSON. T Th S 11. *Library, Greek and Latin Seminary.*

2. **Modern Icelandic.** Second term. Credit three hours. Hours to be arranged. Professor HERMANSSON.

[3. **Danish and Dano-Norwegian.** First term. Credit three hours. Professor HERMANSSON. Not given in 1936-37.]

4. **Swedish.** First term. Credit three hours. Professor HERMANSSON. M W F 11. *Library, Greek and Latin Seminary.*

5. **Old Norse-Icelandic Literature.** First term. Credit two hours. Professor HERMANSSON. W F 12. *Boardman B.*

Lectures and reading of sagas in translations.

[6. **Modern Scandinavian Literature.** Second term. Credit two hours. Professor HERMANSSON. Not given in 1936-37.]

7. **Early Scandinavian Civilization and History.** Second term. Credit two hours. Professor HERMANSSON. W F 12. *Boardman B.*

Lectures and readings on the Viking Age and Old Norse Mythology, etc.

UNIVERSITY REQUIREMENTS FOR THE DEGREE A.B. AND B. CHEM.

HYGIENE AND PREVENTIVE MEDICINE

All entering students are required to report to the Medical Adviser's Office to make an appointment for a physical examination during the registration days of the first term. Such examination shall be repeated periodically thereafter as indicated by the results of the first or subsequent examination.

Seniors are required to make an appointment for a physical examination during the regular registration days of their last term of residence.

All students in the first year of undergraduate courses are required to attend a lecture-recitation course in Hygiene and Preventive Medicine given once a week throughout the college year. In the College of Arts and Sciences academic credit of one hour, each term, will be given for satisfactory completion of this work. The credit of two hours for Hygiene 1 and 2 will be included in the one hundred and twenty hours required for the A.B. degree, and added to the requirements for the B.Chem. degree (see page 18).

Hygiene 1 and 2, however, as well as Hygiene 3, 4, 5, and 8 may not be counted in the ninety hours required in the College of Arts and Sciences, but must be counted as part of the thirty hours of electives allowed outside the College (see paragraph 1, page 12).

1. **Hygiene.** First term. Required of all freshmen. Credit one hour. One lecture-recitation each week, with preliminary examination and final. The use of a text-book will be required.

Students must report for registration and assignment to section, the men at the *Old Armory*, the women at *Sage Gymnasium*.

Sections for Men: Professor SMILEY, Assistant Professors GOULD, SHOWACRE, YORK, and Drs. ROBINSON, TEAGARDEN, and HOOD.

Sections for Women: Assistant Professor EVANS, Dr. CUYKENDALL, and Dr. STELLE.

2. **Hygiene.** Second term. Required of all freshmen. Credit one hour. One lecture-recitation each week, with preliminary examination and final. The use of a text-book will be required.

Students must report for registration and assignment to section, the men at the *Old Armory*, the women at *Sage Gymnasium*.

Sections for Men: Professor SMILEY, Assistant Professors GOULD, SHOWACRE, YORK, Drs. ROBINSON, TEAGARDEN, and HOOD.

Sections for Women: Assistant Professor EVANS, and Drs. CUYKENDALL and STELLE.

[3. **Health Supervision of School Children.** Second term. Credit two hours. Assistant Professor GOULD. T Th 12. Histology lecture room, *Stimson*. Registration at Hygiene Office, *Old Armory*.

A practical course of lectures and demonstrations designed to familiarize the student with the facts and methods necessary for making an effective health supervision of school children. Prerequisites, suggested but not demanded: Human Physiology and Anatomy. Open to sophomores, juniors, and seniors.

4. **Hygiene: Advanced First Aid.** Credit one hour. First term. Not given in 1937. Prerequisites, Hygiene 1 and 2, and Human Anatomy or Human Physiology. Enrollment limited, and registration only after conference with the professor in charge. First term: F 9, *Anatomy Lecture Room, Stimson*. Assistant Professor SHOWACRE. This course includes the theory of the diagnosis and temporary treatment of the common emergencies with practical application of the essential fundamentals.

5. **Industrial Hygiene.** First term. Credit one hour. Assistant Professor GOULD. Th 12. Histology lecture room. *Stimson*. Registration at Hygiene Office, *Old Armory*. Prerequisites, Hygiene 1 and 2.

Factory sanitation, ventilation and illumination; occupational poisoning and disease; factory legislation; accident prevention; fatigue in industry; preventive medicine in industry under the N. R. A.

6. School Hygiene. Professor YOUNG. See Physical Education 24.

The following courses, Hygiene 7 and 8, may not be included in the one hundred and twenty hours required for the A. B. degree.

7. Hygiene: Rural Hygiene. Second term. Credit one hour. Prerequisites, Hygiene 1 and 2. W 12. Histology lecture room, *Stimson*. Registration at Hygiene office, *Old Armory*. Professor SMILEY.

A general consideration of the health problems peculiar to rural areas with the presentation of practical schemes for the solution of these problems as far as possible.

8. Hygiene: Mental Hygiene. First term. Repeated in second term. Credit two hours. Prerequisites, Hygiene 1 and 2. Section 1. M F 11. Histology lecture room, *Stimson*. Assistant Professor YORK. Section 2. T Th 11. Histology lecture room, *Stimson*. Dr. STELLE.

A study of the factors involved in the maintenance of mental health of the individual: i. e., satisfactory human relationships, attitudes, and behavior. Discussion of the causes and mechanisms underlying the more common personality deviations.

MILITARY SCIENCE AND TACTICS

1. Practical and Theoretical Training. Throughout the year. Every able-bodied male student (except aliens), a candidate for a baccalaureate degree, who is required to take five, six, seven, eight, or more terms in residence (or the equivalent in scholastic hours), must take in addition to the scholastic requirements for the degree, one, two, three, or four terms respectively in the Department of Military Science and Tactics. Three hours a week, either M T W or Th 1:40-4:10 p. m. *New York State Drill Hall*.

The requirements in Military Science and Tactics must be completed in the first terms of residence; otherwise the student will not be permitted to register again in the University without the consent of the University Faculty.

The course of training is that prescribed by the War Department as basic for Infantry and Field Artillery Branches of the Reserve Officers' Training Corps. The Infantry includes instruction in military courtesy, command and leadership, physical training, ceremonies, rifle marksmanship, automatic rifle, musketry, scouting and patrolling, machine guns, and the National Defense Act. The Field Artillery includes instruction in organization of the battery, customs of the service, military courtesy and discipline, dismounted drill, drill of the gun squad including service of the piece, gunner's examination, hippology, equitation and horsemanship, physical training, and topography.

2. Elective Military Training. Throughout the year. Credit two hours a term. Hours by assignment. *New York State Drill Hall*.

This is the advanced course prescribed by the War Department for units of the Reserve Officers' Training Corps, and includes five hours of practical and theoretical instruction a week and, in addition, the attendance at one summer camp training period of six weeks duration. *Normally this training is given in the summer following the completion of the first year of the advanced course. Those students who intend to accept a commission in the Officer's Reserve Corps upon the completion of the advanced course training, will be certified as eligible to receive commutation of subsistence from the United States government for the duration of their participation in the course.*

Course 2 may be elected only by permission of the Dean of the College of Arts and Sciences, and the Professor of Military Science and Tactics. Credit for the course may not be counted toward the ninety hours required in this College (see page 12).

PHYSICAL TRAINING FOR MEN

1. **For Freshmen Excused from Drill.** Throughout the year. Three periods a week. Class and squad work and prescribed exercises. Mr. O'CONNELL and assistants.

2. **For Sophomores Excused from Drill.** Throughout the year. Three periods a week. Class and squad work and prescribed exercises. Mr. O'CONNELL and assistants.

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. Mr. GROBIN.

4. **Boxing, Wrestling, and Fencing.** Instruction 3-6 daily except Saturday. Mr. O'CONNELL and Mr. COINTE.

PHYSICAL EDUCATION FOR WOMEN

6. **Physical Education for Women (Freshmen).** Throughout the year. Three periods a week. Misses BATEMAN, CANFIELD, ATHERTON, BARROW, and THORIN.

7. **Physical Education for Women (Sophomores).** Throughout the year. Three periods a week. Misses BATEMAN, CANFIELD, ATHERTON, BARROW, and THORIN.

The program consists of: six weeks of outdoor sports in fall and spring; indoor classes in gymnastics, folk and natural dancing, apparatus, games, swimming, riflery, fencing, and corrective exercises.

For further information as to the required work in physical education, see the handbook issued by the department.

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