COURSES OF INSTRUCTION
GENERAL STATEMENT OF THE COURSE OF STUDY
AMOUNT OF WORK REQUIRED FOR GRADUATION, AND ENROLLMENT

A candidate for the degree of Bachelor of Arts must successfully complete courses aggregating sixty hours per week through a year—Freshmen ordinarily taking fifteen hours per week; Sophomores and Juniors, from fifteen to eighteen hours (at least fifteen); Seniors, at least twelve hours, or, if entering at the beginning of Senior year, at least fifteen. He must also obtain sixty points of quality credit on the sixty hours which he has passed. Quality credits are awarded as follows: for each hour passed with an A grade (3.30 or above, on the scale of 4.00) 4 points; with a B grade (3.00-3.29) 3 points; with a C grade (2.60-2.99) 2 points; with a D grade (2.25-2.59) 1 point. No quality credit is given for hours passed with E grade (2.00-2.24). No student may take more than eighteen hours per week in any one year without special permission. Extra hours, in addition to the sixty ordinarily required for graduation, may be made necessary by absence, as specified in the College rules for attendance.

A student is enrolled in the Freshman class until he has completed at least eleven hours of work, has received eleven points of quality credit, and has removed all entrance conditions (concerning which see the College rules); he is then enrolled in the Sophomore class until he has completed at least twenty-six hours and has received twenty-six quality credits; then in the Junior class until he has completed at least forty-three hours and received forty-three credits; then in the Senior class.

In no other way can a student retain or regain enrollment with his original class than by passing satisfactorily in the required number of hours of work. A course that has not been satisfactorily passed is not counted as part

of the work for the degree, and the resulting deficiency can be made up only by taking in a later year, in addition to the amount of work otherwise required, a number of hours equal to that covered by the rejected course. *In general, a student may not repeat, in a later year, a course in which he has failed.* Upon satisfactory completion of the whole number of hours of work required to date, a student who has been separated from his class for deficiency of hours regains enrollment therein.

For every "extra" hour taken by students now in college a fee of ten dollars is charged.

For students entering in 1914 and thereafter, the regular charge for tuition will be forty dollars a year plus eight dollars per hour of instruction provided per year; so that the normal tuition fee for students taking fifteen hours of work will be $160.

DISTRIBUTION OF WORK THROUGH THE YEAR

In choosing his courses the student must, unless formally relieved of this restriction *in advance* by the Dean, so distribute his work through the year that the amount carried in either half-year shall not be less than fifteen hours per week (twelve in the case of Seniors) or more than eighteen.

ANTICIPATION OF COURSES

This is a privilege open only to more capable students. It is restricted to those who have an average scholarship standing of C grade or higher in the work of the previous year, and who, furthermore, have no deficiency due to failure in a course taken in the previous year and are not required to take extra hours for absence. A student who desires to anticipate a course must make application in writing to the Dean before September 1, pay the Bursar the fee for a special examination, and present himself for examination at the time of the entrance examination in

September. If the examination is satisfactorily passed, the student may take in place of the anticipated course an equal number of hours from the courses open to his own or the next higher class, if he is otherwise qualified to do so; and the anticipated course may, if a grade of C or higher is obtained therein, count as part of the sixty hours required for graduation. (Anticipation of Freshman courses is noticed on page 52 of the College pamphlet.)

COMPLETION OF THE COLLEGE COURSE IN THREE YEARS

As eighteen hours of work may be taken in Sophomore year and again in Junior year, and one or more courses may be anticipated at the beginning of a year, it is possible for a good student to have completed the required sixty hours at the end of his third year. This completion of the course in three years is open only to those who have taken a high rank in Freshman year, and only by special vote of the Faculty in each case.

GROUPING AND GRADING OF COURSES

(1) GROUPING

The individual courses are arranged in twenty-two numbered groups, in three main divisions, as follows:

(1) LANGUAGE, LITERATURE, AND THE ARTS: comprising (i) Latin; (ii) Greek; (iii) Classical Archæology; (iv) Biblical Literature and Semitic Languages; (v) French; (vi) Italian; (vii) Spanish; (viii) German; (ix) English (including English Literature and Composition and Public Speaking); (x) The Fine Arts; and (xi) Music.

(2) MATHEMATICS AND THE PHYSICAL AND NATURAL SCIENCES: comprising (xii) Mathematics; (xiii) Physics; (xiv) Chemistry; (xv) The Geological Sciences; and (xvi) The Biological Sciences.

(3) PHILOSOPHY, EDUCATION, HISTORY, AND THE SOCIAL SCIENCES: comprising (xvii) Philosophy; (xviii) Theory and Practice of Education; (xix) History; (xx) Anthropology; (xxi) Economics; and (xxii) Law.

(2) GRADING

Courses are, for the most part, definitely graded. The grade to which a course belongs is indicated by a letter (A, B, C, or D) prefixed to the number of the course. Courses of A grade are elementary in character; courses of B grade, intermediate; courses of C grade, more or less advanced; courses of D grade, distinctly advanced.

For specially qualified students work of D grade may be provided outside of the definitely announced and numbered courses, and such students may, under certain conditions, be relieved from the ordinary major and minor requirements. The conditions under which such special arrangements may be made are stated below, in the section on Junior and Senior Years.

CHOICE OF COURSES

The general principles on which the rules governing the choice of courses are based are (1) that each student should do a considerable amount of connected, graded work in some one group of studies, and (2) that this specialization should not be carried so far as to exclude a reasonable amount of training in other groups of studies. To secure these objects, (1) a certain amount of continuity of work done in the early years of the course is directly required; (2) the work of Freshman and Sophomore years is arranged in groups, of which each student must choose one, and (3) in Junior and Senior years each student must complete a major in some one group of studies, together with a minor in some related subject. These regulations are explained in detail in the following sections on Freshman Year, Sophomore Year, and Junior and Senior Years.

FRESHMAN YEAR

A student entering the Freshman class must choose one of the following three GROUPS of courses, specifying his choice of subject and course where alternatives are offered.

The only restriction on the choice is that three of the subjects chosen must continue subjects which the student has offered for admission to College. The anticipation (see the Yale College pamphlet) of a Freshman course that continues a subject offered for admission is considered as meeting this requirement for the subject.

Individual students of high scholarship, whose attainments satisfy the object of the grouping, may apply to the chairman of the Committee on Freshman Class Administration for exemption from the strict application of the rules. In particular, Freshmen who have passed with credit the entrance examination both in intermediate French and in intermediate German may apply for permission to substitute some other Freshman subject for French or German; and those who have passed with credit the examination in advanced Mathematics may apply for permission to take Chemistry or Physics in place of Mathematics in GROUP II.

A student who fails to pass a course in the Group which he has selected, must in a later year make good the deficiency by the satisfactory completion of a course in the same subject or in an alternate prescribed in the Group.

GROUPS

The Groups are:

GROUP I. 1, Latin or Greek; 2, French, German, or Spanish†; 3, Mathematics, Physics, or Chemistry; 4, the alternative ancient or modern language; 5, English or History.

For example, the combination Latin, Greek, French or German, English and Mathematics (the course required until recently in Freshman year) is included in this group.

GROUP II. 1, French, German, or Spanish†; 2, Mathematics; 3, Physics or Chemistry; 4, 5, English and History, or, in place of one of these, either Latin or Greek or the alternative modern language.

GROUP III. 1, Latin or Greek; 2, French, German, or Spanish†; 3, Mathematics, Physics, or Chemistry; 4, English; 5, History.

† See footnote on p. 161.

INDIVIDUAL COURSES

The individual courses open to Freshmen are:

Latin—
Livy, Tacitus, and Horace, Course A 1.

Greek—
Xenophon, Lysias, and Plato, Course A 3, or *Lysias, Plato, and Homer*, Course A 1 (the latter for those who have offered Xenophon, but not Homer, for admission), or *Elementary Greek*, Course A 0 (open only to those who enter college without Greek).

French—[One course only may be chosen.]
Elementary French, Course A 1.
Freshman Second-Year French, Course A 3.
Freshman Third-Year French, Course A 5.

Spanish—
Elementary Spanish, Course A 1.†

German—[One course only may be chosen.]
Elementary German, Course A 1.
Freshman Intermediate German, Course A 3.
Freshman Advanced German, Course A 5.

English—
Freshman English, Course A 1.

Mathematics—
Algebra, Plane Trigonometry, and Analytical Geometry, Course A 1, or *Analytical Geometry and Calculus*, Course B 7 (the latter for those who have anticipated Solid Geometry and Plane Trigonometry).

Physics—
Elementary Physics, Course A 1.

Chemistry—
Inorganic Chemistry, Course A 1, or (for those who have anticipated A 1) *Qualitative Analysis (Inorganic)* and *Qualitative Analysis (Organic)*, Courses B 3 and C 1, or *Organic Chemistry* and *The Rare Elements*, Courses B 5 and B 7, or *Organic Chemistry* and *Elementary Physical Chemistry*, Courses B 5 and B 9.

History—
European History, Course A 1.

† Elementary Spanish is open to Freshmen who have passed the entrance examinations in French *a* and *b* and German *a* and *b*; or to those who have passed both French examinations and German *a*, provided they continue the study of German in Freshman year. It counts towards the degree only if it is followed by Spanish B 3.

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GYMNASTICS

From November 1 until April 1 work in gymnastics is required of the members of the Freshman class, except those who are in regular training with the recognized athletic teams. All Freshmen not suffering from physical disability are expected to show their ability to swim or to avail themselves of the opportunities for instruction provided at the Carnegie Swimming Pool.

SOPHOMORE YEAR

A student entering the Sophomore class must choose one of the following three GROUPS of courses, specifying his choice of subject and course where alternatives are offered. A student admitted to the Sophomore class from another college must conform to the requirements as to grouping of courses, due allowance being made for courses taken elsewhere. The only restriction on the choice is that two of the subjects chosen must continue subjects which he has taken in Freshman year, of which both shall not be in a single one of the three main divisions of studies.

Individual students of high scholarship, whose attainments satisfy the object of the grouping, may apply to the chairman of the Committee on Freshman Class Administration for exemption from the strict application of the rules.

A student who fails to pass a course in the Group which he has selected, must in a later year make good the deficiency by the satisfactory completion of a course in the same subject or in an alternate prescribed in the Group.

GROUPS

The Groups are:

GROUP I. 1, 2, two of the following: Latin, Greek, French, German (or Italian† or Spanish†); 3, Mathematics, Physics, Chemistry, or Biology; 4, Logic-Psychology, History, or Economics; 5, English or any other Sophomore subject.

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† Open to Sophomores of C grade or better in Freshman-year standing, and counted as part of the sixty hours required for graduation only on condition that it is followed by Italian B 3 or B 5, or by Spanish B 3, respectively. No Sophomore may begin the study of two modern languages.

GROUP II. 1, French or German (or Italian† or Spanish†); 2, 3, two of the following subjects: Mathematics, Physics, Chemistry, and *either* Biology or Geology; 4, Logic-Psychology, History, or Economics; 5, English or any other Sophomore subject.

GROUP III. 1, Latin, Greek, French, German (or Italian† or Spanish†); 2, Mathematics, Physics, Chemistry, or Biology; 3, 4, two of the following: History, Economics, and *either* Logic-Psychology or History of Philosophy‡; 5, English or any other Sophomore subject.

Only those students whose average scholarship standing for the first half of Freshman year is 2.50 or above may choose more than the fifteen hours of work contained in each of the three Sophomore groups; such students may choose additional Sophomore work (from the detailed list of Sophomore courses below) to the extent of three hours but not more.

Only those Sophomores whose average scholarship standing for the first half of Sophomore year is 2.50 or above may continue to carry more than fifteen hours for the remainder of the year.

The student should make his choices for Sophomore year with due regard to the major and related minor which he expects to choose for Junior and Senior years. He should note that many of the subjects in which majors and minors are offered require certain Sophomore courses as a necessary preparation.

The prerequisites for the majors in the several subjects are as follows:

In **Latin:** Latin A 1 and B 3; for Major II, also Greek A 1, or A 3.
" **Greek:** Greek A 1 or A 3, and B 5.
" **French:** a B course in French.
" **German:** German A 1 and A 3.
" **English:** English A 1 and B 3.
" **Mathematics:** Mathematics A 1 and B 9 (or B 7) and Physics A 1.
" **Physics:** Mathematics A 1 and Physics A 1 and B 3.

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† See footnote on p. 162.

‡ Sophomores electing History of Philosophy must obtain the written consent of the instructor.

In Chemistry: Chemistry A 1.
" Geology: Chemistry A 1.
" Biological Sciences: Physics A 1, Chemistry A 1, and Biological Sciences A 1.
" Psychology: Philosophy A 1 or A 5.
" History: History A 1 or B 2.
" Economics: Economics A 1.

The majors and minors are defined in the introductory statements to the several groups in the Detailed Statement of Courses.

Each student must obtain the signature of his Freshman division-officer on the elective blank *before it is handed in.*

INDIVIDUAL COURSES

The individual courses open to Sophomores are:

Latin—
 Horace, Catullus, and Latin Comedy, Course B 3.
Greek—
 The Athenian Drama, Course B 5; or *Elementary Greek,* Course A 0 (the latter open only to those who entered College without Greek), or *Lysias, Plato and Homer,* Course A 1 (open only to those who entered without Homer).
Biblical Literature—
 The Founders of Christianity, Course B 2 (may be taken only outside of the required fifteen hours).
French— [One course only may be chosen.]
 Elementary French, Course A 1.†
 Second-Year French, Course A 7.
 Nineteenth Century Fiction, Course B 9.
 The Romantic School, Course B 11.
Italian—
 Elementary Italian, Course A 1.†
Spanish—
 Elementary Spanish, Course A 1.†
German— [One course only may be chosen.]
 Elementary German, Course A 1.†
 Second-Year German, Course A 7.
 German Drama, Course B 11.

† Italian and Spanish are open to Sophomores under the conditions stated on p. 162. No Sophomore may begin the study of two modern languages.

 Modern Historians and Critics, Course B 12.
 German Composition and Conversation, Course *B 15.‡
English—
 Sophomore English, Course B 3.
 Vocal Culture, etc., Public Speaking *1 (may be taken only outside of the required fifteen hours).
Mathematics—
 Analytical Geometry and Calculus, Course B 9, or *Advanced Calculus,* Course C 17 (the latter open as a Sophomore course only to those who have taken B 7 in Freshman year).
Physics—
 Elementary Physics, Course A 1, or *Second-Year Physics,* Course B 3 (the latter open as a Sophomore course only to those who have taken A 1 in Freshman year).
Chemistry—
 Inorganic Chemistry, Course A 1, or (for those who have had A 1) *Qualitative Analysis (Inorganic),* and *Qualitative Analysis (Organic),* Courses B 3 and C 11, or *Organic Chemistry,* Course B 5, and *Qualitative Analysis (Organic),* Course C 11, or *The Rare Elements,* Course B 7, or *Elementary Physical Chemistry,* Course B 9.
Geological Sciences—
 General Geology, Course B 3.
 Mineralogy, Course B 7 (may be taken only outside of the required fifteen hours).
Biological Sciences—
 General Biology, Course A 1.
 Physiology, Course 29 (may be taken only outside of the required fifteen hours).
Philosophy—
[One course only may be chosen as part of the required fifteen hours.]
 Logic and Psychology, Course A 1 (*a* and *b*).
 History of Philosophy, Course A 2 (*a* and *b*) with the written permission of the instructor.
History—
[One course only may be chosen as part of the required fifteen hours.]
 European History, Course A 1.
 American History, Course B 2.

‡ Open to Sophomores who have passed A 5 with distinction.

reading. For Seniors after Art 2. Four hours per week, to count as two hours. Professor KENDALL.

Art 7. Sculpture. Modeling from the antique and the living figure. For Seniors after Art 2. Four hours per week, to count as two hours. Mr. LAWRIE.

XI. MUSIC

In all the courses in Music a rudimentary knowledge of piano-playing is required.

GRADUATE COURSES OPEN TO UNDERGRADUATES

Properly qualified College students may, with the consent of the instructor, be admitted to the following advanced courses (beside those announced in detail below) and count them toward the B.A. degree: *Strict Composition, Free Composition,* and *Advanced Orchestration and Conducting* (Professor PARKER), and *Instrumentation* (Mr. HAESCHE). These courses are described in the pamphlet of the Graduate School.

Music 1. Harmony. The study of chords, progression, modulation, and non-harmonic notes. The work consists of exercises in figured-bass, the harmonization of melodies, and harmonic analysis. Two hours per week. Assistant Professor D. S. SMITH.

Music 3. History of Music. Lectures on the development of music from its earliest stages, with biographical sketches of composers, and practical illustrations at the piano. One hour per week. Professor PARKER.

Music 5. Practical Music. Private instruction in piano-, organ-, violin-, and violoncello-playing and in singing. Fees range from $50.00 to $100.00 for the College year. Taken with one of the theoretical courses, except in the case of violoncello-playing and singing. One hour per week. Professor JEPSON, Assistant Professors I. TROOSTWYK and KNIGHT, Mr. RABOLD, Mr. L. TROOSTWYK, Mr. S. D. BINGHAM, JR., and Mr. COWLES.

Music 7. Counterpoint. Practice in strict counterpoint, both simple and double, harmonization of chorales, composition of short pieces in a freer style and analysis of simple polyphonic forms. Taken after Music 1. Two hours per week. Assistant Professor D. S. SMITH.

(2) MATHEMATICS AND THE PHYSICAL AND NATURAL SCIENCES

XII. MATHEMATICS

MAJOR AND MINOR

Prerequisites:
1. *Algebra, Plane Trigonometry, and Analytical Geometry* (A 1)
2. *Analytical Geometry and Calculus* (B 7 or B 9)
3. *Elementary Physics* (A 1)

Major. (9 or 10 hours.) Both courses in Division I and two courses in Division II. If the student has taken C 17, three courses must be taken in Division II. A graduate course may, by permission, be substituted for any course in Division II.

DIVISION I.
1. *Advanced Calculus* (C 17) - - - - -	3 hrs.
2. *Mechanics* (C 15) - - - - -	2 "

DIVISION II.
3. *Algebra and Analytic Geometry* (C 19) - -	3 hrs.
4. *Modern Analytic Geometry* (D 23) - - -	2
5. *Theory of Functions of a Complex Variable* (D 25) - - - - - - - -	2

Minor. IN PHYSICS. (3 hours.)
Second-Year Physics (B 3)† - - - - 3 hrs.

Mathematics A 1. Algebra, Plane Trigonometry, and Analytical Geometry. For Freshmen. Three hours per week. Professor BEEBE, Assistant Professor WILSON, and Dr. TRACEY.

Mathematics 3. Descriptive Astronomy. This course is designed to meet the needs of students interested in Astronomy. It covers approximately the material in F. R. Moulton's *Introduction to Astronomy* or C. A. Young's *General Astronomy.* Two hours per week 1st half-year, to count as one hour for the year. Dr. T. H. BROWN.

† If B 3 has already been taken, the student will substitute *Introduction to Theoretical Physics* (C 5).

Mathematics B 7. Analytical Geometry and Calculus. Instead of Mathematics A 1 for Freshmen who have studied Plane Trigonometry.† Three hours per week. Assistant Professor WILSON and Dr. TRACEY.

Mathematics B 9. Differential and Integral Calculus. Should be taken by all who propose to take advanced courses in Pure and Applied Mathematics, Mathematical Physics, or certain courses in Chemistry, Economics, and Statistics. For Sophomores, Juniors, and Seniors after Mathematics A 1. Three hours per week. Professor BEEBE.

Mathematics C 15. Mechanics. The principles of Mechanics, founded on Newton's Laws of Motion; applications to the simpler physical problems of particles and bodies in equilibrium and in motion. Taken with or after C 17.§ Two hours per week. Professor PIERPONT the first half-year, Professor E. W. BROWN the second half-year.

Mathematics C 17. Advanced Calculus.§ This course is a continuation of Mathematics B 7 and B 9, and also treats differential equations and those parts of the Calculus which are especially useful in Applied Mathematics. For Sophomores,‡ Juniors, and Seniors. Three hours per week. Professor PIERPONT the first half-year, Professor E. W. BROWN the second half-year.

Mathematics C 19. Algebra and Analytical Geometry.§ This course treats those facts and methods of Algebra and Analytical Geometry which are most necessary for the pursuit of Pure Mathematics, Physics, or Engineering. Taken after Mathematics B 7 or B 9. Three hours per week. Professor BEEBE.

Mathematics D 23. Modern Analytical Geometry. Both the analytic and the synthetic method are used to develop the fundamental properties of points, lines, planes, conics, and quadric surfaces, and the linear transformation in the plane and in space. Two hours per week. Dr. TRACEY.

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† Mathematics B 7 or B 9 should be taken as early as possible and be followed by Mathematics C 17, C 15, or C 19.

§ Any of the following courses: Mathematics C 15, C 17, C 19, may be taken simultaneously, but C 15 may not precede C 17, the latter being the foundation for further work in Mathematics or Physics.

‡ Open as a Sophomore course only to those who have taken Mathematics P 7 in Freshman year.

Mathematics D 25. Theory of Functions of a Complex Variable.‡ An elementary treatment of analytic functions; infinite series and products; applications to hyperbolic, Gamma, Bessel's, and elliptic functions. Two hours per week. Professor PIERPONT the first half-year, Professor E. W. BROWN the second half-year.

XIII. PHYSICS

MAJOR AND MINORS

Prerequisites:

1. *Algebra, Plane Trigonometry, and Analytical Geometry* (Mathematics A 1)
2. *Elementary Physics* (A 1)
3. *Second-Year Physics* (B 3)

Major. (7 hours.)

1. *Introduction to Theoretical Physics* (C 5) - - - 3 hrs.
2. *Advanced Laboratory Physics* (C 7) - - - - 4 "

Minors.

a. IN MATHEMATICS. (5 hours.)

   1. *Analytical Geometry and Calculus* (B 7 or B 9)† 3 hrs.
   2. *Mechanics* (C 15) - - - - - - 2 "

b. IN CHEMISTRY. (6 hours.)

   1. *Qualitative Analysis* (B 3) and *The Rare Elements* (B 7) - - - - - - - 3 hrs.
   2. *Organic Chemistry* (B 5) and *Elementary Physical Chemistry* (B 9) - - - - - - 3 "

GRADUATE COURSES OPEN TO UNDERGRADUATES

Seniors who have completed C 5 and Mathematics C 17 may, with the consent of the instructor, be received into the following graduate courses and count them as D courses in Physics: *Theory of Errors* and *Physical Optics* (Professor HASTINGS); *Vectors* (Assistant Professor BEACH); *Radioactivity* (Professor BOLTWOOD); *Thermodynamics* (Assistant Professor L. P. WHEELER); *Spectroscopy* and *Kinetic Theory of Gases* (Assistant Professor

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‡ It is advisable that Mathematics D 25 should have precedence over D 23.

† In case *Analytical Geometry and Calculus* (B 7 or B 9) has already been taken, the student will substitute *Advanced Calculus* (C 17). If the former course is not taken until Junior year, both the C courses in Physics must be taken in Senior year.