

1906

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REQUISITES FOR THE DEGREE OF BACHELOR OF ARTS

As evidence that the collegiate course has been successfully completed, the degree of Bachelor of Arts is conferred at its close. The degree signifies, in the case of every recipient, such instruction in ancient and modern languages, in mathematics, in the physical and natural sciences, in literature, philosophy, and history, as is believed to be essential to a liberal education.

Twenty courses are required for graduation, and no combination of studies is accepted which does not include three courses in one subject and two courses in another subject.*

All candidates for a degree take the following prescribed courses, which are for one year unless otherwise noted :

Rhetoric.

English Literature.

French.

German.

History, or (in Groups iv and v) Political Economy.

Physics.

Mathematics—

In Groups I, II, and III, one-half year.

In Groups IV and V, one year.

Philosophy.

Vocal Training.

Forensics.

Physical Exercises.

A Laboratory Course—

In Groups I, II, and III, Natural History (one-half year).

In Groups IV and V, Chemistry and Physics.

The remaining courses necessary to complete the number required are chosen, subject to the approval of the Adviser, in accordance with the schemes outlined under the several groups.

* For the definition of a "course" see page 196.

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year courses

A student may be admitted to advanced standing, in accordance with the regulations given on page 203, but in all cases the candidate must pursue the last year of his undergraduate course in this institution.

In general, four years of residence are necessary for the completion of the courses required for a degree. A capable student may, however, complete this work in three years. Such a student may (1) anticipate certain of the courses by special examination at entrance ; (2) present himself, at the beginning of an academic year, for examination in a single course, provided the Committee on Admission, being satisfied that the student can obtain competent instruction, has authorized him, in advance, to prepare this course during the summer vacation ; (3) take, under certain conditions, in any year of residence except the first, a greater number of courses than is called for in the program ; (4) offer nineteen courses for graduation instead of twenty, in accordance with the following provision :

In case a student has an average of not less than 9 for the work of his third year, and has not received a mark as low as 7 for any of his courses since entrance to the university, he need offer only nineteen courses for graduation.

A student whose average in his studies for each of his last two years has not been less than 9, and who has not received a mark less than 7.5 in any of his courses during his last three years, shall receive his degree WITH HONOR.

Special students who have been in residence at least two years and who have completed their work in a satisfactory manner, shall receive a certificate stating the facts, and signed by the President of the University.

The principal subjects in which advanced instruction is now provided are these :

Mathematics.	Latin.
Physics.	Sanskrit and Comparative Philology.
Chemistry.	Semitic Languages.
Geology, Mineralogy, and Petrog- raphy.	Anglo-Saxon and English.
Zoology.	Romance Languages.
Botany.	German.
Physiology.	History.
Anatomy.	Political Economy.
Pathology.	Political Science.
Greek.	Philosophy and Psychology.
Classical Archæology.	

MATHEMATICS

The instruction in Mathematics is under the charge of Professor Morley, with the aid of Dr. Hulburt, Collegiate Professor of Mathematics, Dr. Cohen, Associate, and Dr. Coble, Instructor.

The less advanced subjects are nearly the same every year. The more advanced courses vary from year to year, and are so arranged that a student who remains here two or three years may receive continued and systematic guidance in the main lines of modern mathematical research. The subjects of the advanced courses may be broadly classified as follows :

Theory of Numbers, Theory of Finite Groups, Theory of Transformation Groups, Theory of Invariants.

Higher Plane Curves, Line Geometry, Geometry of Circles and Spheres, General Projective Geometry, Differential Geometry.

Theory of Functions of Real Variables, Theory of Functions of a Complex Variable, Theory of Functions of Two Complex Variables ; Elliptic Functions, Elliptic Modular Functions ; General Automorphic Functions, Abelian Functions, Ordinary Differential Equations, Partial Differential Equations ; Calculus of Variations.

Kinematics, Theoretical Dynamics, Theory of the Potential, Theory of Probabilities.

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The Mathematical Seminary meets weekly.

Undergraduates are annually instructed in Elementary Analytic Geometry, Theory of Equations, Elements of Projective Geometry, Differential and Integral Calculus, Differential Equations, Solid Analytic Geometry.

A large number of mathematical journals are regularly received, besides the publications of learned societies abroad and at home. Among the journals received are the following (the asterisk indicating full sets) :

Journal für die reine und angewandte Mathematik* (Crelle) ; Journal de Mathématiques pures et appliquées* (Liouville) ; Comptes Rendus ; Mathematische Annalen* ; Monatshefte für Mathematik and Physik* ; L'Intermédiaire des Mathématiciens* ; Bulletin des Sciences mathématiques* ; Journal de l'École Polytechnique ; Annales de l'École Normale ; American Journal of Mathematics* ; Annali di Matematica* ; Giornale di Matematica* ; Acta Mathematica* ; Archiv für Mathematik und Physik* (Grunert) ; Zeitschrift für Mathematik und Physik* ; Proceedings of the London Mathematical Society* ; Bulletin of the American Mathematical Society* ; Transactions of the American Mathematical Society* ; Bulletin de la Société mathématique de France* ; Rendiconti del Circolo Matematico di Palermo* ; Quarterly Journal of Mathematics* ; Messenger of Mathematics ; Annals of Mathematics.*

The university has a collection of about two hundred and thirty geometrical models, illustrating the forms of mathematical solids, surfaces, and curves, their singularities and varieties, and the method of descriptive geometry by which they are represented on a plane.

The American Journal of Mathematics, founded by Professor Sylvester, and edited successively by Professor Craig, Professor Newcomb, and Professor Morley, has completed its twenty-seventh volume. Beginning with volume X, there has been published in each volume the portrait of an eminent mathematician. Those so far published, in order of publication, are as follows: Sylvester, Hermite, Poincaré, Cayley, Klein, Halphen, Lie, Picard, Appell, Fuchs, Darboux, Newcomb, Mittag-Leffler, Salmon, Peirce, Cremona, Noether, Hill, G. Cantor.

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BARNES, PH. D.,
 tant in Physics.

B. COBLE, PH. D.,
 or in Mathematics.

FRENCH, PH. D.,
 utor in English.

. KENNAED, M. D.,
 Orthopedic Surgery.

. BAIRD, PH. D.,
 nt in Psychology.

B. BEAN, M. D.,
 nt in Anatomy.

P. COWLES, PH. D.,
 ant in Biology.

GUENTHER, PH. D.,
 it in Physiology.

> TINGLE, PH. D.,
 at in Chemistry.

SINGEWALD, M. D.,
 it in Neurology.

BRUSH, JR., M. D.,
 nt in Medicine.

. HOLDEN, M. D.,
 t in Gynecology.

ABERCROMBIE, M. D.,
 f the Gymnasium.

OLDSBOROUGH, M. D.,
 it in Obstetrics.

KIRK, PH. D.,
 Political Economy.

. MEYER, M. D.,
 it in Anatomy.

RAMSAY, PH. D.,
 nt in English.

RETZER, M. D.,
 it in Anatomy.

WHIPPLE, M. D.,
 in Pathology.

PROGRAMMES FOR 1905-1906

The following courses in literature and science are offered for the academic year which begins October 3, 1905. They are open to properly qualified young men, according to conditions varying in each department.

MATHEMATICS

Advanced Courses

Professor MORLEY offers the following courses :

1. Higher Geometry.
Two hours, through the year.
2. Vector Analysis.
Two hours, first half-year.
3. Theory of Functions.
Two hours, second half-year.
4. Classic Authors.
One hour, through the year.

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Dr. COHEN offers the following courses :

5. Elementary Theory of Functions.
Two hours, through the year.
6. Calculus of Variations.
Two hours, through the year.
7. The Differential Equations of Mechanics.
Two hours, through the year.

Dr. COBLE will give a course on

8. The Theory of Finite Groups.
Two hours, through the year.

Dr. FRANKLIN will give a short course on

9. The Theory of Probability.
Two hours, January and February.

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Undergraduate Courses

For Candidates for Matriculation

Algebra (special topics); Solid Geometry; Plane Trigonometry; Analytic Geometry (straight line and loci).

Four hours weekly, through the year.

Students who complete this course in a satisfactory manner, will not be required to pass any further examination in mathematics for matriculation.

Minor Course*

Plane Analytic Geometry.

Four hours weekly, until the Christmas recess. Professor HULBURT.

Differential and Integral Calculus.

Four hours weekly, from the Christmas recess until the end of the year. Professor HULBURT.

Practical Exercises.

Two hours weekly.

Major Course

Determinants; Differential and Integral Calculus (special topics).

Four hours weekly, until the Christmas recess. Professor HULBURT.

Elementary Theory of Equations.

Four hours weekly, during January. Professor HULBURT.

Elements of Projective Geometry.

Four hours weekly, during February and March. Professor HULBURT.

Analytic Geometry of Three Dimensions.

Four hours weekly, during April and May. Professor HULBURT.

Practical Exercises.

Two hours weekly.

The work designated as Practical Exercises consists, in both the Minor and the Major Course, of practice in the use of mathematical instruments, in the drawing of curves, in the graphical solution of problems, and in making mathematical computations. It is not designed to increase the amount of work required of students in these courses, but rather to facilitate their preparation of the class work. It is under the direction of Professor MORLEY, assisted by Professor HULBURT and Dr. COHEN.

*A "Minor Course" in any subject is the first year of instruction in it; a "Major Course" is the second year.

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Physics

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Elective Course

Differential Equations.

Two hours weekly, through the year. Dr. COHEN.

This course presents the elementary principles of Ordinary and Partial Differential Equations, and affords to students of Physics, Astronomy, and Electricity a necessary working knowledge of the subject. Much time is devoted to the solution of problems.

PHYSICS

The courses are designed (1) for those students prepared for advanced work who wish to devote themselves to some special research in Physics or Electrical Engineering, or to become candidates for the degree of Doctor of Philosophy in Physics; (2) for graduate and special students who wish to extend their knowledge of Physics, or to select it as one of their subordinate subjects for the degree of Doctor of Philosophy; (3) for undergraduate students who desire to study Physics for the purposes of general education.

Advanced Work for Graduate Students

Laboratory

Under the direction of Professors AMES and WOOD. *Daily, except Saturday, from 9 a. m. to 5 p. m.*

Advanced students are expected to give as much of their time as possible to laboratory work. This consists at first in carrying out experiments which familiarize the student with the use of instruments for exact measurement and with experimental methods. When sufficient experience of this kind has been acquired, the student undertakes, under the guidance of the instructors, some experimental research designed to be of permanent value.

Seminary and Journal Meetings

All advanced students are expected to meet with the instructors twice a week, once for the meetings of the Physical Seminary and