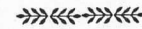


DEGREES



The program in Arts and Sciences is under the direction of the Faculty of Philosophy which awards the degrees of Bachelor of Arts, Master of Arts and Doctor of Philosophy. For this purpose the faculty is organized into departments and into the following four groups each of which supervises several departmental programs and interdepartmental or group programs:

Humanities
Social Sciences
Biological Sciences
Physical Sciences

BACHELOR OF ARTS

PLAN OF STUDIES

A student selects the subjects he will study in accordance with his intellectual interests in so far as that is made possible by his degree of preparation. This principle is applied to those entering from high school as well as to more advanced students, but the less advanced students have to spend more time on the basic disciplines related to their major interest. In following his curiosity and completing the training essential to pursuing it, a student discovers the subject or combination of subjects that he desires to investigate further and it becomes his "major." The planning of studies for the A. B. is there divided into two parts:

- 1) Before the choice of a major
- 2) After the choice of a major.

The major may be more or less specialized. More specialized interests are met by majoring under a Department or Interdepartmental committee. Less specialized interests are met by majoring in one of the Group Programs.

The number of majors offered is large. The purpose of this multiplicity is to enable students to fit their studies to their individual needs.

ADVISERS

At all stages of his program, the student is aided by a member of the faculty who is assigned to advise him. Students transferring from other colleges or universities may select their major at entrance, subject to the approval of the Department or Group concerned, and are then assigned an adviser in the field of their major. Students entering from high school

It does not appear as if the graduation requirement includes a number of hours or credits.

in another department. Courses in geography and geology which relate to the biological sciences may be substituted with the consent of the adviser.

At least 3 year courses (or 6 term courses) in the humanities and/or social sciences, as elected by the student with the guidance of his adviser.

The Biological Sciences Group Major is designed to lead to the A. B. degree after four years of residence, and the requirements listed above are minimum ones. A request for acceptance as a group major is initiated by the student at the end of the first, or during the second, year, with satisfactory grades being the only requirement for acceptance. There should remain ample time for the student to take elective subjects, either to broaden himself or to concentrate in areas of particular interest by taking additional advanced courses or by doing research under guidance. The number and type of elective courses will be determined by consultation with the student's adviser.

Some students may wish to complete their requirements for the A. B. degree in less than four years of residence. In addition to completing the requirements listed above, such students must have a high academic average, pass an oral examination to demonstrate their competence in their major field, and complete a research program under the guidance of a staff member. An application for graduation in less than four years must be filed through the adviser at least one term prior to the time of the awarding of the degree. The attention of those who may be interested in this program is called to the combined A. B.-M. A. Program, described below, which is in general to be preferred.

The program as outlined above does not necessarily meet the entrance requirements of medical or dental schools. The student who plans to enter these professions should therefore familiarize himself with the particular requirements of the various professional schools. The adviser is prepared to assist the student in the selection of suitable courses.

In arranging a schedule of courses for the first and second years of study, General Program I or II as listed on p. 47 would serve as a satisfactory introduction for Biological Sciences Group majors. Biology 1-2 and Introductory Psychology may be taken in either the first or second year, while Physics 1-2 would normally be a second or third year course. The particular arrangement of courses, however, is determined by the student in consultation with his adviser.

COMBINED A. B.-M. A. PROGRAM

This program is designed for qualified students who want to pursue a course of concentrated study in a particular area of interest, and who can do so in the normal time of four resident years. The requirements for the M. A. degree, in addition to those already stated for the A. B. degree, include 1) a thesis based upon original research, and 2) a greater pro-

iciency in the area of special interest to be tested by an oral examination. Other details of the program will be worked out with the student's adviser and with the approval of the Biological Sciences Group and of the department in which the thesis work is to be done.

INTER-DEPARTMENTAL OR INTER-GROUP PROGRAM

An occasional student, interested in the Biological Sciences, may find that the above programs do not meet his particular interests. For example, the student may wish to combine his interest in the Biological Sciences with programs available in the Departments of Chemistry, Geography, or Geology, or if his leanings are toward the humanities or social sciences, with programs available in the Department of Philosophy or History. When such overlapping interests are deemed reasonable, it is possible to provide the student with a committee to supervise and direct his program of study so that it will be meaningful and integrated.

PHYSICAL SCIENCES GROUP

SCOPE OF THE GROUP

The Group is composed mainly of members of the departments of Chemistry, Geology, Mathematics, and Physics. Members of the Isaiah Bowman Department of Geography, the Chesapeake Bay Institute, and the Department of Biophysics are affiliated with the Physical Sciences Group as well as with other groups. Some members of the faculty of the School of Engineering also belong to this Group. The purpose of this diversity of membership is to provide maximum flexibility in setting up courses of study and research programs for the students.

DEPARTMENTAL MAJORS

Students who have selected the department in which they wish to major will find the requirements and suggested programs of study listed under the appropriate departments in this catalogue. The following two year program * is suggested for entering students who plan to major in one of the physical sciences, but who have not yet decided upon a special field. (*Note:* Students who think that they might wish to major in geology should take Geology 1-2 in either the first or second year; students who might wish to major in chemistry should take Chemistry 7-8 or 23-24 and 25-26 as the second year elective.)

First year:

Mathematics 1-5 or 5-6
Chemistry 1-2
French or German

* Other programs of study are discussed on pp. 46-48.

MATHEMATICS (11)

Professor WINTNER	Associate Professor MAUTNER (On leave of absence.)
Professor LEWIS (On leave of absence.)	Assistant Professor EHRENFREIS (On leave of absence.)
Professor CHOW	Assistant Professor DYER
Professor HARTMAN	Dr. WASHNITZER, Lecturer
Associate Professor MORRILL	Dr. SCHWARTZMAN
Associate Professor HAVILAND	
Associate Professor MOSTOW	

All members of the Department of Mathematics belong to the Physical Sciences Group. Students who major in mathematics are presented to this group for degrees (see p. 45).

REQUIREMENTS FOR THE BACHELOR OF ARTS DEGREE

The formal requirements for acceptance by the Department of Mathematics as a major are a knowledge of the following:

- English Writing
- French or German (reading knowledge)
- Analytic Geometry and Differential Calculus

Evidence for the fulfillment of any of these requirements is either the satisfactory completion of appropriate courses or certification by the department involved.

After a student is accepted as a major in the department, his program of study is prepared in consultation with an adviser in the department. In order to obtain an A. B. degree, a major in the Department of Mathematics must satisfy the following minimal requirements:

MATHEMATICS. The candidate should have a knowledge of algebra and of the theory of functions of real and of complex variables, equivalent to that provided by Mathematics 303-304, 310, 325-326, and of one further topic of at least the same level of advancement.

PHYSICS. The candidate should have a knowledge of at least one topic, beyond General Physics, such as Atomic Physics or Thermodynamics and Kinetic Theory.

GENERAL. The candidate should have a knowledge in at least three of the following fields: English literature, philosophy, language (classical or modern in addition to that mentioned above), science (biological or physical, other than physics), social science, history.

M

303-304 3 yr - hrs 6
 310 3 sem - hours 3
 325-326 3 yr - hrs 6

J. Hopkins 1955-56

MATHEMATICS

87

GRADUATE PROGRAMS

[730]

Students who expect to study mathematics beyond the A. B. degree are advised to obtain a reading knowledge of both French and German. Information about advanced degrees, Master of Arts and Doctor of Philosophy, will be found in the circular on Graduate Programs, a copy of which will be mailed upon request.

MATHEMATICS (11)

- Associate Professor MAUTNER (On leave of absence.)
- Assistant Professor EHRENFREIS (On leave of absence.)
- Assistant Professor DYER
- Dr. WASHNITZER, Lecturer
- Dr. SCHWARTZMAN

Topics of Mathematics belong to the Physical Major in mathematics are presented to this

THE BACHELOR OF ARTS DEGREE

Acceptance by the Department of Mathematics of the following:

Reading knowledge) Differential Calculus

Any of these requirements is either the appropriate courses or certification by the de-

partment major in the department, his program of work with an adviser in the department. In a major in the Department of Mathematics minimal requirements:

Students should have a knowledge of algebra and of real and of complex variables, equivalent to Mathematics 303-304, 310, 325-326, and at least the same level of advancement.

Students should have a knowledge of at least one topic, such as Atomic Physics or Thermodynamics

Students should have a knowledge in at least three areas: English literature, philosophy, language (in addition to that mentioned above), science (other than physics), social science, history.

COURSES

Honor sections, as well as regular sections, will be offered in Mathematics 6, 7 and 8 for the benefit of qualified students desiring a deeper discussion of the topics involved.

Algebra and Trigonometry 1. Four hours weekly, first term. Review of high school algebra; trigonometry.

Intermediate Mathematics 3-4. Four hours weekly through the year. This course is for students in Business and Industrial Management. It includes algebra, trigonometry, analytic geometry and calculus.

Analytic Geometry 5.* Four hours weekly, one term. Analytic geometry of two and three dimensions, with the aid of vectors and vector notation. Prerequisite: Trigonometry.

Calculus 6.* Four hours weekly, one term. Differential calculus of the functions of one real variable. Prerequisite: Analytic Geometry.

Calculus 7.* Four hours weekly, one term. Integral calculus of the functions of one real variable. Prerequisite: Calculus 6 or its equivalent.

Calculus 8.* Four hours weekly, one term. Functions of two or more real variables, partial derivatives and multiple integrals. Prerequisite: Calculus 7 or its equivalent.

Elementary Differential Equations and Infinite Series 9.* Three hours weekly, one term. Prerequisite: Calculus 8 or its equivalent.

Introduction to Advanced Algebra 303-304. Three hours weekly through the year.

This course is designed to introduce the student to the abstract notions of modern algebra. The principal topics are: Groups, rings, fields, vector spaces, polynomials, elements of the theory of algebraic number fields, linear equations, determinants, characteristic roots and vectors of a matrix, reduction of quadratic forms, normal forms of matrices. Prerequisite: Consent of the instructor.

Vector Analysis and Related Topics 308.* Three hours weekly, one term. Prerequisite: Elementary differential equations.

C

T

6

6

J. Hopkins 1955-56
L.

88

UNDERGRADUATE PROGRAMS

[732]

3 **Functions of a Complex Variable 310.** Three hours weekly, second term.
Cauchy-Riemann differential equations, Cauchy's integral theorem and integral formulae, power series, analytic continuation, poles, essential singularities, residues and contour integrals, entire functions.
Prerequisite: Infinite series.

Projective Geometry 319. Professor CHOW. Three hours weekly, first term.
Principle of duality, theorems of Desargue and Pappus, collineations and correlations, conics and systems of conics, introduction of coordinates.

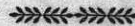
6 **Introduction to Basic Analysis 325-326.** Three hours weekly through the year.

+10¹⁰ The real number system, limits and continuity, derivatives, Riemann integrals, implicit functions, infinite series and products, uniform convergence, multiple limits, the elementary functions, definite integrals containing a parameter.

5.3 **Fourier Analysis for Physicists 327.** Professor WINTNER. Three hours weekly, first term.

Statistics for Physicists 328. Professor WINTNER. Three hours weekly, second term.

Courses numbered 601-699 will be found in the circular on Graduate Programs.



OCEANOGRAPHY (24)

Chesapeake Bay Institute

Associate Professor PRITCHARD, *Director*

Mr. KINSMAN

Associate Professor MONTGOMERY

Mr. POLLAR

Associate Professor CARRITT

The academic program of the Department of Oceanography is at the graduate level. Work in the Department is planned to prepare students for the M. A. and Ph. D. degrees. The program of the Department and requirements for degrees are given in detail in The Johns Hopkins University Circular—Graduate Programs in Arts and Sciences, Business and Industrial Management and Engineering.

The science of oceanography is a complex one. The oceans cover over seventy per cent of the earth's surface to an average depth of over two miles. Within the oceans processes are operating and events taking place that by themselves can be thought of as belonging within one of the basic science fields. The water is in continual motion, being acted upon by gravitational and wind forces. These aspects of the science are studied by workers whose training, both undergraduate and graduate, is in the physical sciences. Life processes, reproduction, growth and death go on in

Professor A

Members of
and the stude
(see page 37)

Courses are
the Bible, in
of the Ancier
Indology.

Each year
work of the
courses in re
demand for

Baltimore
The univers
Albright's la

Although
for advanc
to take any