

CURRICULUM

THE CURRICULUM at Reed College covers a program of liberal arts and sciences leading to the Bachelor of Arts degree. The faculty considers the normal length of time for the completion of requirements for graduation to be within the span of three to five years. This variation is established in order to allow greater flexibility of program. The preparation of entering students in particular subject matters is already affected by pre-college enrichment programs. As a result, a student, depending on his exposure to such courses, may have competences of quite different orders in different subject matters. And, equally, different students may vary radically from each other in their command of identical subject matters. With the increased incidence and improved quality of accelerated programs, some students may qualify for graduation in a period of less than four years, if command of subject is the criterion. On the other hand, many times there is a good reason for a student to take a longer period of time in which to qualify for graduation; students differ in motivation, preparation, etc., and for some of these a slower pace or more varied course may be the answer. Transfer students, or those who change their major late in their academic program, will find many advantages in taking an additional year.

The program of work is designed to answer students' needs for breadth of intellectual experience as well as for knowledge in chosen fields and to give a comprehensive grasp of the material studied, rather than merely technical or vocational training. The work of the underclass student is largely devoted to a study of society and its achievements by means of introductory courses in different fields, which are designed not only to aid students to discover their interests but also to furnish a background for later more specialized study. The upperclass student works largely in his chosen major field and related subjects, but he is encouraged to broaden this program with courses outside this area whenever possible.

A normal program for students will range from 3 1/2 to 4 1/2 courses (units) per semester. As an ordinary minimum, the quantity requirement for graduation is the successful completion of 30 units. The expectation is that most students will accumulate between 30 and 32 such units before graduation. However, students of exceptional preparation and ability may be recommended for graduation in three years by the faculty after the completion of

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27 units. In no case should the faculty be expected to recommend a student for graduation with less than this amount.

*Underclass Program*

In so far as is possible, the underclass program will contain introductory courses from each of the following groups:

(1) A selective two-year study of the society, thought and art of the western world from Greek beginnings to the present.

The two courses, Humanities 110 and Humanities 210 (or 220), treat civilization in a broad sense, including political and economic institutions, social change, and works of literature, art, and philosophy. The teaching staff is drawn from the fields of history, literature and philosophy. The first course (Humanities 110) studies ancient and early modern civilization. Humanities 210 in the second year introduces students to modern society and literature. The courses in Humanities attempt to furnish a background for a critical and appreciative understanding of man's social relations and of his thought and expression, and to provide insight into present problems by an understanding of the past. They also include practice in writing through regular papers and corrective criticism in frequent individual conferences.

(2) A study of present-day society in the fields of economics, politics, and sociology or anthropology.

Examination of the social scene is made in introductory courses in the social sciences. The courses in principles of economics (Economics 210), comparative government (Politics 210), and introduction to sociology and anthropology (Sociology and Anthropology 210) introduce students to fundamental features of economic, political, and social life and to methods and points of view of the social sciences. The modern emphasis in these courses is in keeping with that in Humanities 210 (or 220).

(3) Studies and analyses of basic issues in morals, politics, science and religion through courses in philosophy and religion.

The courses in Introduction to Philosophy (Philosophy 210) and Introduction to Religion (Religion 210) offer students a comprehensive introductory view of these fields.

(4) Study of mathematics and the natural sciences.

First-year courses in mathematics, biology, chemistry and physics (those numbered 110-120) and psychology (220) attempt to give

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students insight into principles of organic life and physical environment and some grasp of method and basic ideas of science. These courses aid students to obtain understanding of modern society through comprehension of science as a technique utilized by man in the mastery of nature. Second-year courses in the sciences are more specialized in character.

(5) Study of modern and ancient languages.

Beginning and advanced courses are offered in classical and modern languages. Instruction in foreign languages is intended to make available to the student a first-hand knowledge of the life and thought of another culture. Through experience in reading another language, together with elementary instruction in linguistic theory, he is expected to develop an insight into the nature of language itself.

(6) Introduction to the arts, through a course in the history and appreciation of the fine arts, courses in music, drama, and speech and in art studio practice.

REQUIREMENTS

Following are the group course requirements for the degree; these are to be taken in the underclass years, whenever possible.

Humanities 110 (must be taken by all freshmen)

Foreign language (see Note 6, page 19)

Physical Education through the first two years (see page 38)

One full year course, totaling 2 units, from Group A

One full year course, totaling 2 units, from Group B

Two full year courses, totaling 4 units, from Group C

GROUP A—*Literature, Philosophy and the Arts*—Minimum of one full year course, totaling 2 units, which may be selected from the following: Art 130, Art 240 if taken after 1962-63, Humanities 210, Humanities 220 (if not used in Group B), Music 110, Philosophy 210, Religion 210, Theater 210, or advanced subject-matter courses in any of these fields or in Literature and Foreign language courses of 310 or higher number. (See Notes 1 and 2 below.)

GROUP B—*History and the Social Sciences*—Minimum of one full year course totaling 2 units, which may be selected from the following: Economics 210, Humanities 210, Humanities 220 (if not used in Group A), Political Science 210, Sociology-Anthro-

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ology 210, or advanced courses in any of these fields, plus those in History. (See Note 1 below.)

GROUP C—*Mathematics and the Natural Sciences*—Minimum of two full year courses, totaling 4 units, which must be selected from two of the following groups: (1) Mathematics 110; (2) combination of Biology 110/120 or Psychology 220 if taken after 1964-65; (3) Chemistry 110, Physics 110, or Natural Science 110; or equivalent in advanced courses; or Chemistry-Physics 120 may be used to satisfy the whole Group C requirement.

Note 1: For majors in the fields of History, Literature and Philosophy, Humanities 210 or 220 will be considered as part of the major field of study and cannot be used to satisfy the college distribution requirements of A or B, above. For others, Humanities 210 may be counted for both A and B.

Note 2: Philosophy majors may not use philosophy or Religion 210 courses to meet the Group A requirement.

Note 3: Students who plan to take the required courses for teacher certification and have difficulty in fitting the Group A, B, and C requirements into their programs may submit petitions for adjustments, which upon recommendation by their faculty advisers and the Education Department will be given special consideration by the Administration Committee.

Note 4: All new transfer students are to be held to the general college requirements, except that transfers to sophomore or higher standing will not have to meet the Humanities 110 requirement. Appropriate work taken by these students at a previous institution may apply toward their fulfillment, with the proviso that freshman level courses may not be offered as substitutes for Groups A and B.

Note 5: The major division always can require additional work in any field it considers necessary over and above the general requirements. Consult with an adviser on this point.

Note 6: A requirement for graduation is the completion of two units of a second-year course in a foreign language—classical or modern—or demonstration through a written examination of proficiency equivalent to that required to pass such a course.

The second year of the foreign language requirement may be waived in certain cases for those students planning to meet the requirements for teaching certification who are majoring in the Division of History and Social Science.

Non-immigrant foreign students will not be required to show competence in a second language unless their mother tongue is English.

A student will receive credit for a first year language course only if he demonstrated first year competence in another language. This will apply to all students, beginning in the Fall of 1965.

Detailed descriptions of the courses will be found starting on page 61.

*Divisional, Interdisciplinary or Interdivisional Majors*

The administration of upperclass work shall normally be assumed by one of the following divisions: The Division of History

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and Social Science, the Division of Letters and Arts, the Division of Mathematics and Natural Science, the Division of Philosophy, Psychology and Education.

Kindred subjects are grouped in divisions to avoid the isolation of specialized fields of learning. In the work of each division the treatment of particular subjects is broadened by emphasis upon their mutual relationships. The student's major program of study is usually divisional in its scope and is supervised by the division as a whole as well as by the student's major professor.

In addition to the divisional program, Interdisciplinary Majors in the fields of Chemistry-Physics, History-Literature, Literature-Philosophy, Mathematics-Economics, Mathematics-Physics, Mathematics-Sociology, and Russian-History have been established. Separate standing committees shall be drawn from the faculty in the respective subject matters denominated by these majors. These committees shall exercise all the powers and privileges allocated elsewhere to the major divisions, including the supervision of the upperclass work of the students, the administration and evaluation of the Qualifying and Oral Examinations, and recommendation as a candidate for the degree.

Students may make application through the Registrar's Office to pursue an upperclass course of studies in one of these jurisdictions. Such students, upon approval of the application by the appropriate Interdisciplinary Committee, shall be classified as Interdisciplinary Majors.

In addition to the fields indicated above (and to such other cooperative major areas as may be designated at a later date) special programs that temporarily join different departmental disciplines can be drawn up when necessary to suit the needs of able students. Such programs will be under the jurisdiction of the Interdivisional Committee and applications should be addressed to that committee.

*Program of the Upperclass Years, taken under the jurisdiction of a division or Interdisciplinary Committee:*

Ordinarily a student will be eligible for admission into a division upon the completion of fifteen course units, with the proviso that no student will be accepted prior to the beginning of his fourth semester of college. Students taking the three-year program shall be asked to indicate the field of their major work at the close of

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the third semester; those taking the four or five year program are to do this by the end of the second year. Tentative choice by the end of the first year is often useful, since in some cases courses taken in the second year should be elected for their bearing on the major field. The divisions and Interdivisional Committees shall consider the students who apply for acceptance as major students and advise each student of their evaluation of his preparation and probable success. After this acceptance, the student should make out a tentative schedule for his entire upperclass program, in conjunction with his faculty adviser, who will be in the field of his indicated major interest. This program, which must include all general requirements not yet met, is subject to the approval of the division or Interdivisional Committee and remains open to subsequent revision, if necessary, to conform with changes in educational plan. No student will be classified as in his final year of work until he has passed the qualifying examination, which is given to test his general preparation, his grasp of his major subject and his ability to undertake a thesis in his chosen field of study. The eligibility of a student to take this examination will be determined by his major division, with the proviso that no student may take it unless he has satisfactorily completed the Physical Education requirement. Students unsuccessful in the first trial may take the qualifying examination a second time, but a second failure shall bar them from candidacy for a degree in that field. The examinations are, however, not a difficult barrier to any student of ability and adequate preparation. Entrance upon the final year of work depends in substantial part upon the results of this examination.

Satisfactory completion of the thesis, an independent project of research or of critical or creative work, is required of every graduating student. The thesis must be typed and bound according to specifications, the expense to be borne by the student. The oral examination at the close of the degree year is a discussion between the student and teachers in his major division (or in the case of Interdisciplinary Majors, a special committee) with the help of teachers from other fields and, when practicable, one or more persons from outside the faculty. Varying amounts of time are given to consideration of the thesis and to testing the student's grasp of his field and related subjects. The quality of performance in the thesis, the oral examination and the last two years of study



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are given particular consideration by the division or special committee in recommending candidates to the faculty for graduation. The college seeks in the degree year to emphasize the need for a coordination of interests proper to an educated and socially-minded person; and, in so far as the requirements of specialized work permit it, an attempt is made to bring students to recognize and evaluate the objectives and principles of the different fields of study they have engaged in, and to relate these to the individual's problem of living in society.

To this end, an Inter-Divisional Symposium has been designed to provide a common core of study for degree candidates of all divisions and to promote an exchange of experience in an effort to understand certain critical problems of our age. Each section of the course is limited to 12 students and is guided by three faculty members representing different divisions.

Using significant works written in the past 50 years by such men as Whitehead, Dewey, Bergson and Niebuhr as a basis of discussion, the course considers interpretation of current social, economic and political issues; the problem of the relation of science to society; and the nature of science and the limits of knowledge. The last and largest part of the course concerns itself with basic diagnosis of our age made in terms of differing fundamental points of view.

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BACHELOR OF ARTS

The requirements for the degree of Bachelor of Arts from Reed College may be completed regularly in a period of time ranging from three to five years. As an ordinary minimum, the quantity requirement for graduation is the successful completion of 30 full units. (A full course is considered to be the equivalent of approximately one-fourth of a student's load, a full course for one semester being designated as one unit and a full course carried through the year having the value of two units.) It is expected that most students will accumulate between 30 and 32 units before graduation. However, students of exceptional preparation and ability may be recommended for graduation by the faculty at the end of three years and upon the completion of a minimum of 27 units. Students in the three and four year program must complete seven units of work in their degree year, with not less than three being carried in either semester; a five year student shall take not less than six units in his degree year. Work taken at Reed College or elsewhere during the summer after the qualifying examination in the major field has been passed will not count toward the satisfaction of this unit requirement for the degree year unless approved in exceptional cases by the applicable division or Interdisciplinary Committee. Students transferring from other institutions may be permitted to take their degree year here, providing they have sufficient quantity credit, are accepted as a major student by the division concerned, pass the qualifying examination in their major field, and are certified as to their academic fitness to begin a thesis. In all cases, the work of the degree year is to be done while in attendance at Reed College, except as noted below.

Further requirements:

- (1) Fulfillment of the General Requirements, as listed on pages 18-19, including Humanities 110 (not required of second year or higher level transfer students), foreign language, two years of Physical Education, and satisfaction of Groups A, B and C.
- (2) Passing of the qualifying examination in the major field, in order to establish fitness to enter the senior year.
- (3) Satisfactory completion of the program of study approved by the major division or by the Interdisciplinary Committee.
- (4) Thesis, and comprehensive examination, under the supervision of a division of the Interdisciplinary Committee.
- (5) Satisfactory record of responsible conduct and good citizenship.

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Exceptions to the degree year resident requirement will be:

- (1) To students who participate in the combined pre-engineering and pre-forestry programs (see page 113).
- (2) To students who satisfactorily complete two years of work at a "Class A" medical school after three years' pre-medical study at Reed (see pages 114-115).
- (3) To students who participate in the joint five-year course with the Portland Museum Art School (see pages 77-78).

MASTER OF ARTS IN TEACHING

A program leading to an M. A. in Teaching is offered as part of the summer session and in connection with evening seminars offered during the academic year. This program permits teachers to fulfill fifth year requirements for the regular state certificate and to concentrate their graduate study in various areas such as the following: Behavioral Science, Education, Letters and Arts, Mathematics, Physical Science, and Social Science. (See page 125.)

Reed issues a special bulletin describing in more detail its program leading to the Master of Arts Degree in Teaching.



THE LIBRARY

THE ORIGINAL LIBRARY building was erected in 1930 with funds bequeathed by Eric V. Hauser. An east wing was added in 1946, and in 1963 an addition which more than doubled the space was completed. The library has a seating capacity of 450. The reference and the reserve rooms occupy the main floor of the original building and seat 106. The remainder of the seating spaces are at desks and carrels conveniently located near open shelves throughout the library. Places are reserved for students working on the thesis.

The Reed collection consists of over 165,000 books and periodicals and about 70,000 government publications. They are shelved in the open stacks of the main library. Separate collections are maintained in the biology, chemistry, physics and mathematics departments. These books are listed in the main card catalog and are available to all students.

Book collection has been built around the curriculum of the college. About 9,000 books are added each year and more than 800 periodicals are received. Reed has been a depository for United States government publications since 1912 and in 1959 the college became a depository for the Atomic Energy Commission publications. The library also has a global subscription to United Nation materials and receives the publications of Oregon State government and the Carnegie Institution of Washington. The library has been enriched by presentations of sets and collections representing special interest. Among these are first editions from C. F. Adams, graphic arts from the estates of Mrs. Helen Ladd Corbett and Mrs. W. M. Ladd, the *American Indian* from Mr. and Mrs. Edward Harper, and modern Russian literature from Thomas Donovan. Gifts, memorials and endowed funds also supplement the collection, such as the Armitage fund for Northwest Americana, the Eliot fund for books in religion, the Richard F. Scholz Jr. memorial fund for books about Russia and the Jean Hannay Logan fund for Canadiana as well as a number of others.

The library owns the Carnegie collection of framed reproductions and the International Graphic Arts Society gift of original prints for student rental.

Collections of the Multnomah County Public Library as well as that of the Oregon Historical Society are open to Reed students. Resources of other libraries in the Pacific Northwest are available

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DIVISION OF MATHEMATICS AND NATURAL SCIENCE

Professors Chrestenson, Cronyn, K. Davis, Delord, Hunt, Kleinholz, Lester, Parker, R. Reynolds, Roberts, Scott, Stafford, L. Williams, Youtz; Associate Professors Ayres, Bork, Brehm, Dennehy, Dudman, Grudin, Gwilliam, Haggis, Hancock, Hoffman, Leadley, Litt, Ruben, Shonle, Tabbutt, D. Williams; Assistant Professors Dunne, Edison, Karakashian, Oglesby, Wheeler, Young; Instructors Turner, Wieting.

INTRODUCTORY COURSES in the several fields provide the student with an opportunity to become familiar with elementary principles which form a basis for an understanding of each discipline. An effort is made to clarify the methods of observation, experiment, analysis and reasoning by which man has gained insight into the nature of the mathematical and physical worlds. Both the introductory courses and subsequent more intensive courses in mathematics and the natural sciences are planned as part of the student's broad education in the liberal arts rather than as technical training courses.

Upperclass courses in the different scientific fields are designed to broaden a student's knowledge of these fields and also to give him some training in specialized techniques characteristic of the individual sciences. These courses, like the introductory course, emphasize clarification of concepts, grasp of major principles, and the appreciation of scientific methods of investigation.

An important part of a science student's experience at Reed is his thesis which is an independent project of research or of critical or creative work carried out under the guidance of a member of the staff. For several years members of the faculty in mathematics, biology, chemistry, and physics have received grants from the American Philosophical Society, National Science Foundation, Research Corporation, Atomic Energy Commission, National Institutes of Health, Rockefeller Foundation, Tektronix Foundation, and the Petroleum Research Fund of the American Chemical Society in support of their research. These grants have greatly increased the equipment and resources available for senior thesis projects. A number of qualified seniors have been able to gain valuable experience by assisting in some of the work covered by these research grants.

Mathematics

The mathematics courses are planned to take their place in a program of general studies for the liberal arts students, and to

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provide a firm basis in the elements of the subject for the student who will specialize in mathematics or in a field which uses mathematics. The course Math 110 falls in both of these categories. It is built around a closely reasoned account of elementary calculus with related material introduced by the instructor as time permits. It is a prerequisite for the advanced courses which follow in the list below.

Math 210 and Math 320 are usually recommended for the physical science major. Math 470, the thesis for the mathematics major, may be an expository paper or a report of research. The usual sequence for a major in mathematics consists of the courses numbered 110, 210, 310, 330, two 400 courses each taken for a year, the thesis, and one course in physics.

110—Mathematical Analysis I.

Full course for a year (4 meetings weekly) This course is an introduction to calculus. Attention is centered on continuous functions on real number domains and their derivatives and integrals. The logarithm, the exponential function, and the trigonometric functions are defined and their properties studied. Other topics may be considered, at the option of the instructor, such as linear algebra, the structure of the real number field, and complex numbers. Prerequisite: high school algebra and geometry, or permission of the instructor. Staff.

210—Mathematical Analysis II.

Full course for a year (4 meetings weekly) A continuation of Math 110, including infinite series, ordinary differential equations, and an introduction to the calculus of functions of several variables. Prerequisite: Math 110. Staff.

260—Statistics: Intermediate.

Full course for a year (3 meetings weekly) An introduction to probability and mathematical statistics. Discrete probability distributions are studied in some detail, and continuous probability distributions are studied in the context of problems of estimation and tests of hypotheses. Primary emphasis is placed on the development and evaluation of probability models applicable to substantive problems in the physical and social sciences. Prerequisite: Math 110.

300—General Mathematics.

Full course for a year (3 meetings weekly) This course is open to juniors and seniors, and to sophomores with permission of the instructor. Topics will be chosen principally from the arithmetic of number systems, linear algebra, calculus and analytic geometry.

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310—Advanced Calculus and Differential Equations.

Full course for a year (4 meetings weekly)
A fuller treatment of details inherent in Math 210, such as infinite series, implicit function theorems, partial differentiation, line and surface integrals and differential equations. As time permits other topics are selected such as measure theory, Lebesgue and Stieltjes integrals, functions of a complex variable and calculus of variations. Prerequisite: Math 210.

320—Applied Mathematical Analysis.

Full course for a year (4 meetings weekly)
This course will deal with some topics in advanced calculus and differential equations which are frequently used in physics. Vector calculus will be included, and theorems such as those of Green and Stokes will be restated in vector form. Problem solving will be emphasized. Prerequisite: Math 210.

330—Linear Algebra and Geometry.

Full course for a year (3 meetings weekly)
A study of vector spaces, linear transformations and matrices with considerable attention to geometric interpretations and applications. Inner product spaces will also be studied. Prerequisite: Math 210 or permission of the instructor.

351—Mathematical Logic I.

Full course for one semester (3 meetings weekly)
Relations between Boolean algebra and the propositional calculus; first order predicate calculi and first order theories are studied. The Skolem-Lowenheim theorem, Godel's incompleteness theorem, and the completeness and undecidability of the pure predicate calculus of first order are discussed, and, as time permits, proved. Some set theory may be included. Prerequisites: Math 110 and upper division standing or permission of the instructor.

400—Statistics: Advanced.

Full course for a year (3 meetings weekly)
Probability theory is developed primarily in terms of random variables defined on discrete sample spaces. Continuous random variables are studied in the context of the theory of estimation and testing hypotheses. Prerequisite: Math 310, or Math 210 with permission of the instructor. Not offered 1965-66.

410—Function Theory.

Full course for a year (3 meetings weekly)
Topics will be selected at the option of the instructor. A student should consult the instructor before he registers.

421—Elementary Number Theory.

Full course for one semester (3 meetings weekly)
A study of the integers including topics such as divisibility, the theory

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of prime numbers, congruences, and solutions of equations in integers. Prerequisite: Senior standing in mathematics or permission of the instructor.

422—Advanced Number Theory.

Full course for one semester (3 meetings weekly)
A more detailed analysis of problems of the kind arising in Mathematics 421 but which require considerably greater mathematical background. Topics may be drawn, for example, from algebraic or analytic number theory. Prerequisite: Permission of the instructor.

430—Modern Algebra.

Full course for a year (3 meetings weekly)
Topics to be selected from group theory, theory of rings, field theory, Galois theory, Lattice theory, associative algebra, geometric algebra and algebraic geometry.

452—Mathematical Logic II.

Full course for one semester (3 meetings weekly)
A more detailed analysis of problems of the kind arising in Math 351 but which require greater mathematical background. Topics will be chosen from the following: model theory, algebraic logic, existence of decision procedures and related questions for first order theories, conditions under which the consistency of a first order theory can be proven within the theory. Prerequisite: Math 351 or permission of instructor.

470—Thesis.

One-half or full course for a year
Special Topics. One-half or full course for one semester or a year
Independent reading with the approval of the staff. Open only to upperclassmen.

Biology

The curriculum in biology is designed to establish first a broad base and understanding of biological fundamentals and then to permit the upper-division student to begin some specialization and research along the line of his interests. The aim is to furnish students who wish to specialize in biology both at the undergraduate and the graduate school level with a sound foundation in the subject matter, theory, and methods of contemporary biology, and at the same time to give them an opportunity to acquire a substantial background in the liberal arts. To this end, excessive specialization in courses within the Department of Biology is not encouraged. Requirements for a biology major are as follows: