

- 402A-402B. Bibliography. (3-3) Yr. Assistant Professor COULTER  
M W F, 9.

Dictionaries, encyclopedias, indexes, handbooks, directories, and general works of reference, subject and trade bibliographies, periodicals and society publications, atlases and maps, United States Government publications, and California state documents. Practice in the preparation of reading lists and bibliographies. Lectures, reports, and problems.

- 403A-403B. Library Administration and Extension. (3-3) Yr. Tu Th S, 9.  
Associate Professor MITCHELL, Mr. JOECKEL, and Assistants

Organization of different types of libraries, public, county, high school, and university. Library planning and furnishing. Library support and government; office management, care and filing of records and correspondence; library budgets and accounts; supplies. Loan department problems, charging systems, branches, stations, traveling libraries, interlibrary loans. Work with children and schools. Extension and publicity.

- 404A-404B. The Study and Selection of Books. (3-3) Yr.  
M W F, 3. Associate Professor MITCHELL

Selection of books for libraries of different types; study of guides and standard lists and of current book reviewing periodicals; evaluating books and making book notes; reading or critical examination of books from selected lists of new and standard publications. The acquisition of books and magazines. Publishers. Editions.

405. History of Libraries and of the Development of the Modern Library Movement. (1) I. Th, 8. Associate Professor MITCHELL

406. Book Arts. (1) I. Tu, 8. Miss SISLER

Printing, illustration, binding, their history and technique. Preparation of manuscript, proofreading. Indexing.

499. Special Study. (2) II. Associate Professor MITCHELL in charge  
Advanced work involving special reading, investigation and reports either in the field of bibliography or of administration will be offered in the second semester.

Each student will work under the direction of that member of the staff whose particular subject he elects.

1925-1926

Berkeley 1925-26

Mathematics

175

## MATHEMATICS

- FLORIAN CAJORI, Ph.D., Sc.D., LL.D., Professor of the History of Mathematics.  
MELLEN W. HASKELL, Ph.D., Professor of Mathematics (Chairman of the Department).  
DERRICK N. LEHMER, Ph.D., Professor of Mathematics.  
CHARLES A. NOBLE, Ph.D., Professor of Mathematics.  
THOMAS M. PUTNAM, Ph.D., Professor of Mathematics.  
GEORGE C. EDWARDS, Ph.B., LL.D., Professor of Mathematics, Emeritus.  
BENJAMIN A. BERNSTEIN, Ph.D., Associate Professor of Mathematics.  
THOMAS BUCK, Ph.D., Associate Professor of Mathematics.  
FRANK IRWIN, Ph.D., Associate Professor of Mathematics.  
JOHN H. McDONALD, Ph.D., Associate Professor of Mathematics.  
SOPHIA H. LEVY, Ph.D., Assistant Professor of Mathematics.  
PAULINE SPERRY, Ph.D., Assistant Professor of Mathematics.  
ANNIE D. B. ANDREWS, Ph.D., Instructor in Mathematics.  
RAYMOND H. SCIOBERETTI, Ph.D., Instructor in Mathematics.  
ARTHUR R. WILLIAMS, Ph.D., Instructor in Mathematics.  
BING C. WONG, Ph.D., Instructor in Mathematics.  
ELMER C. GOLDSWORTHY, A.B., Associate in Mathematics.  
ELEANOR GROWE, A.B., Assistant in Mathematics.  
E. W. PEHRSON, A.B., Teaching Fellow in Mathematics.  
EDWARD ROESSLER, A.B., Teaching Fellow in Mathematics.  
CHARLES H. SMILEY, A.B., Teaching Fellow in Mathematics.

*College of Letters and Science.*—It is essential that students who expect to take a major in mathematics should complete in the high school two years of algebra, plane and solid geometry, and plane trigonometry. For such students the basic courses leading either to further work in mathematics or to the mathematical treatment of any science are the elementary courses in analytic geometry (course 5) and in calculus (courses 9A-9B). These courses should therefore be elected as early as possible. The additional courses in preparation for the major are courses 6 and 8, which may be elected either at the same time with 5 and 9 or subsequently.

Students who have had only one and one-half years of algebra in the high school will be admitted to course 7, and those who have not had trigonometry must elect course C before they will be admitted to any further courses except course 2.

*Preparation for the Major.*—Courses 5, 6, 8, and 9A-9B. Students who have not taken plane trigonometry in the high school will need to elect Course C before undertaking course 5. It is very desirable that the

Berkely 1925-26

student of mathematics should have some acquaintance with the applications to physics and astronomy, and also a reading knowledge of French, Italian, and German.

The Major.—Mathematics 111, 112 and 119 must be included in every mathematics major.

Students who are preparing to teach mathematics in a high school will probably wish to elect courses 101, 102, 104A-104B, 106. With the approval of the department, Astronomy 107 and 108 or Economics 148A-148B may be accepted as part of the major.

College of Commerce.—Freshmen in this college are required to take course 2.

Colleges of Engineering and Chemistry.—The minimum requirements for admission to the freshman course (3A-3B, or 3AB) are one and one-half years of algebra, plane geometry, and plane trigonometry. Prospective engineering students are urged, however, to add another half-year of algebra, and solid geometry, to this minimum preparation.

Honors.—Candidates for honors at graduation must include courses 114A-114BH and 122.

LOWER DIVISION COURSES

- C. Trigonometry. (3) Either half-year. Tu Th S, 8, 9, 10.  
Dr. SCIOBERETTI, Mr. GOLDSWORTHY, Mr. PEHRSON, Mr. SMILEY, Mr. ROESSLER  
Prerequisite: the high school course in algebraic theory or Mathematics 7.  
Course C includes the high school course in plane trigonometry.
- 2. Mathematical Theory of Investment. (3) Either half-year.  
Associate Professor BERNSTEIN, Assistant Professors SPERRY, LEVY, Dr. WILLIAMS, Dr. WONG, Mr. GOLDSWORTHY  
Tu Th S, 9, 10, 11. Prerequisite: plane trigonometry and two years of high school algebra; or, one and one-half years of algebra in the high school and course 7. Prescribed in the College of Commerce.
- 3-4. Elements of Analysis, with Applications.  
A practical two-year course in algebra, analytic geometry, the differential and integral calculus, adapted particularly to the needs of students in engineering, architecture, and chemistry.
- 3A-3B. Plane Analytic Geometry and Differential Calculus. (3-3) Yr.  
Professor NOBLE, Assistant Professor LEVY, Dr. ANDREWS, Dr. SCIOBERETTI, Dr. WILLIAMS, Dr. WONG, Mr. GOLDSWORTHY, Mrs. GROWE, Mr. PEHRSON, Mr. SMILEY, Mr. ROESSLER  
Beginning either half-year. M W F, 9, 10; Tu Th S, 8.  
Prerequisite: high school algebra, geometry, and trigonometry.
- 3AB. Plane Analytic Geometry and Differential Calculus. (6) II.  
Daily, 10. For freshmen entering in January only.  
Dr. ANDREWS
- 4A-4B. Solid Analytic Geometry, Integral Calculus, and Infinite Series. (3-3) Yr. M W F, 8, 10.  
Professor LEHMER, Associate Professor BUCK, Assistant Professor LEVY, Dr. ANDREWS, Dr. SCIOBERETTI, Dr. WILLIAMS, Dr. WONG, Mr. GOLDSWORTHY

- 5. Analytic Geometry. (3) Either half-year. M W F, 9.  
Associate Professor IRWIN, Assistant Professor SPERRY  
Prerequisite: plane trigonometry.  
The straight line, the circle, and the conic sections, including a discussion of the general equation of the second degree.
- 6. Introduction to Projective Geometry. (3) Either half-year.  
Dr. ANDREWS, —  
M W F, 1. Prerequisite: plane geometry. Required of all candidates for the certificate of completion of the teacher-training curriculum in mathematics.
- 7. Intermediate Algebra. (2) Either half-year. Tu Th, 10, 11.  
Dr. ANDREWS  
Prerequisite: one and one-half years of high school algebra.  
The progressions and other simple series; elementary theory of logarithms, with practice in computation; theory of quadratic equations; the binomial theorem.
- 8. College Algebra. (3) Either half-year. I, M W F, 10; II, Tu Th S, 10.  
Associate Professor BERNSTEIN, Mr. GOLDSWORTHY  
For students in the College of Letters and Science.  
Prerequisite: two years of algebra in the high school or Mathematics 7.
- 9A-9B. Differential and Integral Calculus. (3-3) Yr. Beginning either half-year. M W F, 9. Prerequisite: course 5.  
Professor PUTNAM, Associate Professor IRWIN, Assistant Professor SPERRY.  
The elements of the differential and integral calculus, with applications to geometry and mechanics.

UPPER DIVISION COURSES

These courses are open to students in the lower division who have the necessary prerequisites. Course 9 is prerequisite to courses 117, 120.

- 101. Elementary Geometry for Advanced Students. (3) I. M W F, 10.  
Professor NOBLE  
Prerequisite: courses 5 and 6.  
Selected topics in elementary geometry, with particular emphasis on recent development.
- 102. Elementary Algebra for Advanced Students. (3) II. M W F, 10.  
Professor NOBLE  
Prerequisite: courses 8 and 9.  
Selected topics in elementary algebra, with particular reference to modern points of view.
- 104A-104B. History of Mathematics. (2-2) Yr. Tu Th, 11.  
Professor CAJORI  
A non-technical course, open to students who have some knowledge of the fundamental ideas of analytic geometry and calculus.
- 106. History of Physics. (2) II. M W, 11. Professor CAJORI  
Development of the experimental method, evolution of laboratories, critical periods in the history of hypotheses.

- 110A-110B. Advanced Calculus. (2-2) Yr. Tu Th, 8, 9.  
Associate Professor BUCK, Assistant Professor LEVY, Dr. SCIOBERETTI,  
Dr. WONG  
The differential equations, both ordinary and partial, which occur  
most frequently in the applications, with special stress on approximate  
numerical solutions. Definite integrals, multiple integrals, theory and  
use of infinite series, applications to practical problems. Primarily  
for students in engineering.
111. Theory of Algebraic Equations and of Infinite Series. (3) I.  
M W F, 2. Associate Professor BUCK  
Prerequisite: courses 8 and 9.
112. Analytic Geometry of Space. (3) Either half-year.  
Associate Professors McDONALD, IRWIN  
I (McDonald), M W F, 9. II (Irwin), Tu Th S, 9.  
Prerequisite: courses 5 and 9.
113. Synthetic Projective Geometry. (3) II. M W F, 1. Professor LEHMER  
Prerequisite: course 6.
- 114AH-114BH. Advanced Analytic Geometry. (3-5; 3-5) Yr. M W F, 3.  
Professor HASKELL  
Prerequisite: course 112. Restricted to honors students and graduates.  
Introduction to modern methods in analytic geometry. Lectures  
and outside reading, with frequent reports by the class.
- \*115. Theory of Numbers. (3) II. M W F, 1. Professor LEHMER
117. Calculus of Finite Differences. (3) I. M W F, 8. Dr. WILLIAMS
- 118A-118B. Algebra of Logic. (3-3) Yr. M W F, 9.  
Associate Professor BERNSTEIN  
Mathematical treatment of logic, with applications.
119. Differential Equations. (3) Either half-year. I, Tu Th S, 9. II,  
M W F, 9. Professor PUTNAM, Associate Professor IRWIN  
Prerequisite: course 9.
120. Theory of Probability. (3) II. M W F, 8.  
Associate Professor BERNSTEIN
122. Advanced Integral Calculus. (3) II. M W F, 9.  
Associate Professor McDONALD
- \*124A-124B. Vector Analysis. (2-2) Yr. Tu Th, 8.  
Associate Professor IRWIN
- 125A-125B. Analytic Mechanics. (3-3) Yr. M W F, 1.  
Prerequisite: course 119. Associate Professor BUCK

\* Not to be given 1925-26.

GRADUATE COURSES

Concerning conditions for admission to graduate courses see page 3 of  
this announcement.

203. Modern Foundations of the Calculus. (2) I. W F, 4.  
Lectures and seminar. Professor CAJORI
204. History of Algebra. Seminar. (2) II. W F, 4. Professor CAJORI
- \*211. Higher Plane Curves. (3) I. M W F, 3. Professor HASKELL
- \*212. Algebraic Curves and Surfaces in Three and Four Dimensions. (3) I.  
M W F, 1. Professor LEHMER
- \*213. Line Geometry. (3) II. M W F, 3. Professor HASKELL
- \*215. Non-Euclidean Geometry. (3) II. M W F, 2.  
Associate Professor McDONALD
216. Differential Geometry. (3) I. M W F, 1.  
Assistant Professor SPERRY
217. Projective Differential Geometry. (3) II. M W F, 1.  
Assistant Professor SPERRY
- 218A-218B. Logic of Mathematics. (2-2) Yr. Tu Th, 9.  
Associate Professor BERNSTEIN  
An analysis of the foundations of algebra and geometry. Designed  
especially for teachers and prospective teachers of mathematics.
220. Theory of Invariants. (3) I. Tu Th S, 10.  
Associate Professor IRWIN
221. Introduction to Modern Higher Algebra. (3) II. Tu Th S, 10.  
Associate Professor IRWIN
- \*222. Theory of Functions of a Real Variable. (2) I. Tu Th S, 11.  
Associate Professor IRWIN
- 223A. Partial Differential Equations. (3) I. M W F, 3.  
Professor PUTNAM
- 223B. Special Analytic Functions. (3) II. M W F, 3.  
Professor PUTNAM  
Definite integrals, gamma-function, hypergeometric function, Bes-  
sel's functions, elliptic integrals.
- 224A. Functions of a Complex Variable. (3) I. M W F, 8.  
Associate Professor McDONALD
- \*224B. Elliptic Functions. (3) II. Tu Th S, 8. Professor NOBLE
225. Theory of Differential Equations. (3) II. M W F, 8.  
Associate Professor McDONALD
- \*228. Seminar in the Foundations of Mathematics. (2) II. Tu Th, 10.  
Associate Professor BERNSTEIN  
Prerequisite: course 118 or course 218A-218B.
231. Theory of Numbers. (3) I. M W F, 9. Professor LEHMER

\* Not to be given 1925-26; to be given 1926-27.

- 232A-232B. Theory of Substitutions. (2-2) Yr. M W F, 11.  
Professor HASKELL  
Theory of groups of substitutions, with applications to the theory of algebraic equations.
234. Theory of Continuous Groups, I. (3) I. M W F, 2.  
Professor HASKELL  
Elements of continuous groups, with application to the theory of differential equations.
235. Theory of Continuous Groups, II. (3) II. M W F, 2.  
Professor HASKELL  
The geometry of contact transformations.
- \*236. Seminar in Group Theory. (3) II. M W F, 11. Professor HASKELL  
Geometry in the light of group-theory.
- 237A-237B. Calculus of Variations. (3-3) Yr. Tu Th S, 9.  
Professor NOBLE
- 238A-238B. Advanced Analytic Mechanics. (2-2) Yr. Tu Th, 8.  
Associate Professor McDONALD
251. Special Study and Research. Advanced students will be guided in their study by various members of the staff, as indicated:  
(a) Higher Geometry (Professor HASKELL); (b) Advanced Analysis (Associate Professor McDONALD); (c) Higher Algebra (Associate Professor IRWIN); (d) Theory of Numbers (Professor LEHMER); (e) History of Mathematics (Professor CAJORI).
- 300Ed. The Teaching of Mathematics in Secondary Schools. (3) I. M W F, 3.  
Professor CAJORI  
The importance of mathematics in the training of the mind. Methods of teaching mathematics. Critical inquiry into present-day tendencies. For seniors and graduate students. This course will be accepted in partial satisfaction of the requirement in education for the certificate of completion of the teacher-training curriculum.
- Mathematical Colloquium. Tu, 2. The STAFF  
Meetings for the presentation of original work by members of the staff and graduate students.

## COURSES IN OTHER DEPARTMENTS

- Method of Least Squares. (See Astronomy 107.)  
Interpolation. (See Astronomy 108.)  
Theoretical Astronomy. (See Astronomy 206.)  
Introduction to Celestial Mechanics. (Astronomy 208A-208B.)  
Actuarial Science. (See Economics 148A-148B.)

\* Not to be given 1925-26; probably to be given 1926-27.

## MECHANICAL AND ELECTRICAL ENGINEERING

- CLARENCE L. CORY, M.M.E., D.Eng., John W. Mackay, Jr. Professor of Electrical Engineering and Dean of the College of Mechanics (Chairman of the Department).
- JOSEPH N. LECONTE, M.M.E., Professor of Engineering Mechanics.
- BENEDICT F. RABER, B.S., Professor of Mechanical Engineering.
- BALDWIN M. WOODS, Ph.D., Professor of Aerodynamics.
- FLOYD H. CHERRY, B.S., Associate Professor of Electrical Engineering.
- ARTHUR B. DOMONOSKE, M.S., Associate Professor of Experimental Engineering and Director of Shops.
- HERBERT B. LANGILLE, A.B., Associate Professor of Machine Design and Mechanical Drawing.
- DONALD D. ATHERTON, B.S., E.E., Assistant Professor of Mechanical Engineering.
- LLEWELLYN M. K. BOELTER, M.S., Assistant Professor of Experimental Engineering.
- VINCENT C. GEORGE, B.S., Assistant Professor of Mechanical Engineering.
- GEORGE L. GREVES, M.S., Assistant Professor of Electrical Engineering.
- CHARLES F. GROSS, B.S., Assistant Professor of Marine Engineering and Naval Architecture.
- THOMAS C. MCFARLAND, M.S., Assistant Professor of Electrical Engineering.
- BLAKE R. VANLEER, M.E., Assistant Professor of Mechanical Engineering.
- DARYL D. DAVIS, M.S., Instructor in Electrical Engineering.
- LESTER E. REUKEMA, M.S., Instructor in Electrical Engineering.
- JOHN E. YOUNGER, M.S., Instructor in Mechanical Engineering.
- CARL W. HORACK, Associate in Mechanical Engineering.
- GEORGE E. COX, Assistant in Mechanics and Foreman of Woodwork.
- JAMES GEORGE, Assistant in Mechanics and Foreman of Ironwork.
- BERTRAM W. MEYER, B.S., Assistant in Mechanical Engineering.
- MAYNARD A. ROTERMUND, B.S., Assistant in Electrical Engineering.

*Laboratory Fees.*—Mechanical Engineering 8A-8B, 9A-9B, Electrical Engineering 111C-111D, \$6 per half-year; Mechanical Engineering 107, 109, 117A, 117B, 119A-119B, 124, Electrical Engineering 100C-100D, 110C, \$3 per half-year. These fees cover the cost of materials and equipment used by the careful student. The cost of materials and equipment used in excess of the estimated amount will be charged to the individual student.

*Honors.*—Students will be recommended for honors on the basis of the work done in the regular curriculum of the senior year. Particular emphasis will be placed on the thesis.