San Jose State

MATHEMATICS DEPARTMENT

Office: Building O, Room 1

Professors LANGE (Head), BIRD, DIECKMANN, GREER, HOGGATT, JAMISON, KRAMER, LOVAGLIA, MARKS, MYERS, OLDS, POST, PRESTON, SMART, WREDE; Associate Professors ANDERSON, BRISTOW, FELDMAN, FOWLER, LARSEN, RUGGLES, SCHWEITZER, THORO; Assistant Professors BILLIK, BRADSHAW, BRIAN, BRUNINGS, BYRD, DEVORE, DREW, EDGAR, KING, O'DONNELL, PRUITT, ROUSSAS, SIMONS, TROUTMAN, TRUMBO, WASEL, WHEELER; Instructor ANTOLOVICH; Lecturers FULLER, HALTEMAN, McLEOD, WARNER.

CURRICULUM OFFERED

Baccalaureate Major

Mathematics

The work required for a major in this department presupposes at least seven semesters of high school mathematics, including trigonometry. Some deficiencies can be made up by proper selection from courses in algebra and trigonometry.

MASTER'S DEGREE MAJORS

(See Graduate Division Bulletin)

Mathematics (M.A.)

1. Liberal Arts option
2. Teaching option

Applied Mathematics (M.S.)

Nondegree Credential Programs

Mathematics (Standard Teaching Credential with specialization in secondary teaching.)

MAJOR IN MATHEMATICS

B.A. Degree With Major in Mathematics

	Semester Units
General Education Program	45
Requirements in the Major	36
Math. 30, 31, 32; 113 or 115 or 116 or 118 or 142; 128 or 129; 134 and additional courses to total 24 units in upper division mathematics, not to include Math. 106, 121 and certain special courses, such as some institute courses, not listed in this bulletin.	
Supporting Courses Required	
One year of college physics and one year of college work in a language other than the student's native tongue or demonstrated competence in such a language. The procedure for demonstrating competence is prescribed by the head of the department in collaboration with the Foreign Language Department. (These units may be applied toward the General Education Program.)	
Electives	43
Total Units Required for Degree	124

1964-1965

MINOR IN MATHEMATICS

	Semester Units
For Baccalaureate Degrees	20
Math. 30, 31; 128 or 129; 113 or 115 or 116 or 142 and additional courses to total eight units in upper division mathematics, not to include Math. 106, 121 and certain special courses, such as some institute courses, not listed in this bulletin.	

Honors Programs in Mathematics

The Honors Program in Mathematics extends over a period of four semesters. The program places an emphasis on logical structure and perspective and provides some opportunity for independent study and undergraduate research. The students will receive formal credit for Mathematics 30, 31, 32, 133. Entry into this program is not restricted to mathematics majors and is determined by a departmental committee upon the basis of tests and letters of recommendation. Information about this program is available in the departmental office.

DESCRIPTION OF COURSES

3. Slide Rule. Use of the slide rule in calculations involving multiplication, division, powers, roots, logarithms, trigonometric functions, solution of right and oblique triangles and exponential equations. Prerequisite: Trigonometry. One unit; fall, spring

5. Algebra. Exponents, fractions, linear equations, radicals and quadratic equations. Reduced credit for students with more than 1 year algebra and 1 year geometry in high school. Five units; fall, spring

7. Intermediate Algebra. An intensive course in algebra covering exponents, fractions, radicals, linear and quadratic equations. Prerequisite: 1½ years algebra and one year geometry in high school, or equivalent. Three units; fall, spring

8. Trigonometry. Trigonometric functions, solutions of triangles, logarithms, graphs, functions of two angles, multiple-angle formulas and other identities. Prerequisite: Two years of algebra and one year of geometry in high school, or Math. 5, or Math. 7. Three units; fall, spring

12. Number Systems. A study of elementary yet basic ideas of sets and logic. A study of the structure of the whole number, rational number, and real number systems. Other topics include numeration systems, elementary number theory, solution of equations, and coordinates. Prerequisite: one year of high school algebra and one year of high school geometry. Three units; fall, spring

29. Introduction to College Mathematics. Logic, sets, axiomatic foundations of algebra and trigonometry, the function concept, binomial theorem, determinants, induction, complex numbers, inequalities, theory of equations, combinations and permutations. Prerequisite: Trigonometry, one year geometry, two years algebra. Four units; fall, spring

30. Analytic Geometry and Introduction to Calculus. A unified course covering plane analytic geometry and the basic properties of the derivative. Introduction to integration. Prerequisite: Math. 29, or qualification by examination on the subject matter of Math. 29. Four units; fall, spring

31. Calculus I. Differentiation and integration of transcendental functions and applications of the derivative, differential, and integral. Prerequisite: Math. 30. Four units; fall, spring

32. Calculus II. Topics from solid analytic geometry; partial differentiation, multiple integrals, infinite series and vector calculus. Prerequisite: Math. 31. Four units; fall, spring

70. Finite Mathematics I. Introduction to logic, set theory, and probability theory with selected applications to the biological and social sciences. Prerequisite: Two years high school mathematics. Three units; fall

71. Finite Mathematics II. A continuation of Math. 70 including linear programming, game theory and applications of finite mathematics to behavioral science problems. Prerequisite: Math. 70 or consent of the instructor. Three units; spring

Upper Division Courses

104. History of Mathematics. Historical survey of mathematical development from earliest times to the 19th century. Prerequisite: Either Math. 128 and an upper division geometry course, or permission of the instructor. Two units; fall, spring

106. Concepts of Elementary Mathematics. Basic ideas of algebra including inequalities, modular systems, functions, and solution of quadratics with real and complex roots. Intuitive concepts of non-metric geometry, measurement and similarity. An introduction to mathematics as a deductive science. Prerequisite: Math. 12 or equivalent. (Credit not applicable to mathematics major or minor) Three units; fall, spring

108. Problem Solving in Mathematics. A study of general ideas useful in solving mathematical problems: generalization, specialization, analogy, induction, recursion, and others. Practice in applying these ideas to a variety of non-routine problems. Prerequisite: at least one mathematics course numbered above 110. Two units; fall, spring

113. Differential Geometry. Properties of curves and surfaces, Frenet-Serret formulas and the fundamental forms. The study of curves and surfaces in the small by means of differential calculus. Prerequisite: Math. 142. Three units; fall (1966)

115. Projective Geometry. An introductory course including primitive forms, ideal elements, incidence, duality, special figures, harmonic properties, perspectivity and projectivity, related forms, conics, cones, and reguli, specialization to metric geometry. Prerequisite: Math. 31. Three units; fall, spring

116. College Geometry. A course in synthetic geometry built directly on a first course in plane Euclidean geometry: loci, similarity, harmonic arrays, systems of circles, inversion, constructions, and foundations. Prerequisite: Math. 31 and plane geometry. Three units; fall, spring

118. Non-Euclidean Geometry. Hyperbolic and elliptic plane geometry and trigonometry, with emphasis on historical and logical development. Prerequisite: Math. 31. Two units; fall, spring

121. Mathematics of Finance. Simple interest, discount, partial payment, compound interest, annuities, amortization, depreciation. Brief algebra review included in course. (Credit not applicable to mathematics major.) Three units; fall, spring

128. Algebraic Structures. Groups, rings, integral domains, fields, polynomials over a field. Prerequisite: Math. 31. Three units; fall, spring

129. Linear Algebra. Matrices, systems of linear equations, vector spaces, vector geometry, linear transformations. Prerequisite: Math. 31. Three units; fall, spring

133. Differential Equations. A course in ordinary differential equations; numerical solutions; introduction to Fourier series. Prerequisite: Math. 32. Three units; fall, spring

134. Advanced Calculus I. The real number system, with emphasis on the Completeness Axiom and its consequences; proofs of theorems on limits and continuity; sequences; the Bolzano-Weierstrass and Heine-Borel Theorems; additional topics selected from: differentiation and integration of functions of one and of more than one variable; improper integrals; infinite series; line and surface integrals. Prerequisite: Math. 32. Three units; fall, spring

135. Advanced Calculus II. Continuation of Math. 134. Prerequisite: Math 134. Three units; fall, spring

141. Boundary Value Problems. Partial differential equations of physics and engineering, Legendre polynomials, Bessel functions, orthogonal functions. The Sturm-Liouville equation. Prerequisite: Math. 133. Three units; fall, spring

142. Vector Analysis. The fundamentals of vector algebra, vector differentiation and integration; gradient, divergence, curl; curvilinear coordinates. Prerequisite: Math. 133. Three units; fall, spring

1964-1965

143. Numerical Analysis. Differences; interpolation formulas; numerical differentiation and integration; Milne and Runge-Kutta methods for ordinary differential equations; partial differential equations; integral equations. Prerequisite: Math. 133. Three units; fall spring

144. Programming. A consideration of current practices in preparing problems for solution on electronic computers. Prerequisite: Math. 133. Three units; fall, spring

148. Complex Variable. Conformal mapping, study of analytic functions, complex integration, residues, and power series. Prerequisite: Math. 134. Three units; fall, spring

151. Theory of Numbers I. Euclid's algorithm, study of prime numbers, congruences of first and higher degrees, theorems of Fermat, Euler, and Wilson, quadratic residues. Prerequisite: Math. 31 and junior standing. Three units; fall

163. Introduction to Mathematical Statistics I. Random variables, frequency and probability functions, transformation of variables, sampling distributions, point and interval estimates, and limit theorems. Prerequisite: Math. 32. Three units; fall, spring

164. Introduction to Mathematical Statistics II. Power functions, regression, analysis of variance, elements of design of experiments, likelihood ratio principle, order statistics, and nonparametric tests. Prerequisite: Math. 163. Three units; spring

165. Introduction to Probability. Fundamentals and axioms, combinatorial probability, conditional probability and independence, generating functions, binomial, Poisson, and normal distributions, law of large numbers and central limit theorem. Prerequisite: Math. 32. Three units; spring

171. Foundations of Mathematics. Fundamental and unifying principles of logic, number, algebra and geometry with emphasis on the nature of proof and the axiomatic approach. Prerequisite: One semester each of upper division algebra and geometry. Three units; fall, spring

180. Special Problems. Individual study in a specific field. Registration to be approved by department head. One to four units; on demand

Professional Courses

Ed. 393. Elementary School Mathematics. Development and Meanings of numbers. Topics of arithmetic from the point of view of meanings, uses, and history. Organization and methods of teaching basic skills and facts. Prerequisite: Math. 106. (May be taken in combination with Math. 106 where so indicated in the schedule of classes.) Two units; fall, spring, summer

Ed. 394. Secondary School Mathematics. Basic course in teaching of secondary mathematics. The place and function of mathematics in secondary education, the improvement and evaluation of instruction, and the teaching of the subject matter of secondary mathematics. Two units; fall, spring, summer

Ed. 395. Curriculum and Instruction in Elementary School Mathematics. A study of problems in teaching mathematics, including courses of study, methods and content for instruction, evaluation of learning, construction of units, and use of visual aids. Prerequisite: Educ. 393. Two units; spring

Graduate Courses

(See Graduate Division Bulletin for description of courses)

201A, B. Mathematics for Secondary Teachers. Three units; A fall, B spring

211A, B. Higher Geometry. Three units; A fall, B spring

213. Advanced Differential Geometry. Three units; on demand

221A, B. Higher Algebra. Three units; A fall, B spring

231. Real Variable I. Three units; fall

232. Real Variable II. Three units; spring

235A, B. Tensor Analysis. Three units; A fall, B spring

1964-1965

243. Advanced Numerical Analysis. Three units; spring
246. Applied Mathematics I. Three units; fall
247. Applied Mathematics II. Three units; spring
248. Advanced Complex Variable. Three units; on demand
251. Theory of Numbers II. Three units; on demand
265. Theory and Application of Probability. Three units; fall
271. Mathematical Symbolic Logic. Three units; on demand
275. Point-Set Topology. Three units; on demand
285. Advanced Mathematics. Three units; on demand
295. Graduate Seminar. One to four units; on demand
298. Special Study. One to four units; fall, spring
299. Thesis. One to four units; fall, spring