MATHEMATICS AND STATISTICS

College of Natural Sciences and Mathematics

Program Description
In today's highly technological society, the study of Mathematics takes on an increasingly important role. The Sacramento State Mathematics Department designs its courses with the goal of providing students with the mathematical concepts appropriate to the student's field.

The program consists of sequences of courses that lead to a Bachelor of Arts with a major in Mathematics, with emphasis in Pure Mathematics, Applied Mathematics, Statistics, or a Teacher Preparation Program. A minor in Mathematics or Statistics and a Master of Arts in Mathematics is also offered.

Special Features
• The study of mathematics at Sacramento State has several strong advantages. The flexibility of the major gives students enough freedom to mold their degree along their particular interest.
• An excellent computer facility gives mathematics students easy access to the campus computer resources.
• Currently there is a demand for majors in mathematics with training in applied mathematics and statistics. Program graduates have had success in finding employment in public and private sectors.
• Since there is presently a need for high school mathematics teachers, some majors pursue a secondary teaching career. Graduate students in mathematics are finding opportunities for public and private employment in jobs requiring more advanced training in mathematics and statistics. Sacramento State Master’s Degree graduates now teach at community colleges throughout the state. Upper division majors may check with the mathematics administrative support coordinator on the possibility of applying for paid positions as student assistants.
• Student assistants work from 10-20 hours per week in math-related duties on campus.

Note: Students interested in a major or minor in mathematics should contact the Department secretary for an advising appointment with a mathematics advisor.

Career Possibilities
Mathematics Teacher · Mathematician · Encryption Analyst · Quantitative Analyst · Engineering Analyst · Systems Analyst · Operations Analyst · Actuary · Risk Analyst · Image Scientist · Technical Writer · Statisticians involved in: Surveying/Polling, Biology/Agriculture, Business/Economics, Physical Sciences/Engineering

Contact Information
David Zeigler, Department Chair
Dawn Giovannoni, Administrative Support Coordinator
Brighton Hall 141
(916) 278-6534
www.csus.edu/math (http://www.csus.edu/math)

Faculty
CETIN, COSKUN
CUMMINGS, JAY
DIAZ-ESCAMILLA, RAFAEL E.
DOMOKOS, ANDRAS
ELCE, KIMBERLY
HAMILTON, TRACY
INGRAM, JOHN
KASIMATIS, ELAINE A.
KRAUEL, MATTHEW
LU, BIN
MORRIS, BARBARA
NORRIS, ANN MICHELLE
PIGNO, VINCENT
PRAJS, JANUSZ
SCHULTE, THOMAS R.
SHANBROM, COREY
SHEA, EDWARD
TAYLOR, LISA
TIMMONS, CRAIG
VANVALKENBURGH, MICHAEL
WISCONS, JOSHUA
ZEIGLER, DAVID
ZHONG, JIANYUAN KATHY
ZHOU, KECHENG

Undergraduate Programs
Prerequisites must be completed with grade "C-" or better. Grade "C-" or better required in all courses applied to Mathematics major or to the Mathematics or Statistics minors. PHYS 11A and PHYS 11C is recommended for all Mathematics majors.

Placement - Mathematics Courses
Students who have not completed four years of high school mathematics consisting of
• Beginning Algebra (one year)
• Geometry (one year)
• Intermediate Algebra-Trigonometry (one year)
• Analytic Geometry-Mathematical Analysis (one year)
may need to complete part of this preparation at the University. The
following diagram, which is based upon course prerequisites and major
objectives, may be of assistance in selecting the necessary coursework.

Satisfactory completion of the Entry Level Mathematics (ELM)
requirement is a prerequisite to enroll ment in any mathematics or
statistics course in Area B-4 (Quantitative Reasoning) of General
Education. The mathematics and statistics courses listed in Area B-4 are:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1</td>
<td>Mathematical Reasoning</td>
<td>3</td>
</tr>
<tr>
<td>MATH 17</td>
<td>An Introduction to Exploration, Conjecture, and Proof in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 24</td>
<td>Modern Business Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26A</td>
<td>Calculus I for the Social and Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26B</td>
<td>Calculus II for the Social and Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 29</td>
<td>Pre-Calculus Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 30</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 31</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 35</td>
<td>Introduction to Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 37</td>
<td>An Introduction to Exploration, Conjecture, and Proof in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 1</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 50</td>
<td>Introduction to Probability and Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Students Planning to take any of the following courses must pass a
diagnostic test.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 9</td>
<td>Essentials of Algebra and Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 11</td>
<td>Algebra for College Students</td>
<td>4</td>
</tr>
<tr>
<td>MATH 17</td>
<td>An Introduction to Exploration, Conjecture, and Proof in Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 24</td>
<td>Modern Business Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26A</td>
<td>Calculus I for the Social and Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 26B</td>
<td>Calculus II for the Social and Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MATH 29</td>
<td>Pre-Calculus Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 30</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 31</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 35</td>
<td>Introduction to Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 1</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 50</td>
<td>Introduction to Probability and Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

A brochure describing the diagnostic tests and containing sample
questions is available in the campus bookstore. The following table gives
the course and appropriate diagnostic tests.

Those students who want to prepare for the ELM may purchase the Entry
Level Mathematics workbook at the Hornet Bookstore (see Placement Tests section of this catalog).

All students planning to take MATH 30, Calculus I, must take the Calculus
Readiness test prior to the semester of enrollment in MATH 30.

**BA Degree in Mathematics**

Units required for Major: 48-54
Minimum total units required for the BA: 120

**Lower Division Core Courses (21 Units)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 30</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 31</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 32</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 35</td>
<td>Introduction to Linear Algebra 3</td>
<td></td>
</tr>
<tr>
<td>MATH 45</td>
<td>Differential Equations for Science and Engineering 3</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 10</td>
<td>Introduction to Programming Logic</td>
<td>3</td>
</tr>
<tr>
<td>CSC 15</td>
<td>Programming Concepts and Methodology I</td>
<td>3</td>
</tr>
<tr>
<td>CSC 22</td>
<td>Visual Programming in BASIC</td>
<td>3</td>
</tr>
<tr>
<td>CSC 25</td>
<td>Introduction to C Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

**Upper Division Core Courses (15 Units)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 108</td>
<td>Introduction to Formal Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110A</td>
<td>Modern Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110B</td>
<td>Modern Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 130A</td>
<td>Functions of a Real Variable</td>
<td>3</td>
</tr>
<tr>
<td>MATH 130B</td>
<td>Functions of a Real Variable</td>
<td>3</td>
</tr>
</tbody>
</table>

**Additional Requirements for Specialized Study (12-18 Units)**

Select an emphasis from the following four options:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasis in Pure Mathematics</td>
<td></td>
<td>12-18</td>
</tr>
<tr>
<td>Emphasis in Applied Mathematics</td>
<td></td>
<td>12-18</td>
</tr>
<tr>
<td>Emphasis in Statistics</td>
<td></td>
<td>12-18</td>
</tr>
<tr>
<td>Teacher Preparation Program</td>
<td></td>
<td>12-18</td>
</tr>
</tbody>
</table>

**Total Units** 48-54

**Emphasis in Pure Mathematics**

Required units: 12-17

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 117</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 134</td>
<td>Functions of a Complex Variable and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

Select two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 101</td>
<td>Combinatorics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 102</td>
<td>Number Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 104</td>
<td>Vector Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 105A</td>
<td>Advanced Mathematics for Science and Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 105B</td>
<td>Advanced Mathematics for Science and Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 121</td>
<td>College Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Introduction to Numerical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 161</td>
<td>Mathematical Logic</td>
<td>3</td>
</tr>
<tr>
<td>MATH 162</td>
<td>Set Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 170</td>
<td>Linear Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 190</td>
<td>History Of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 115A</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 115B</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 155</td>
<td>Introduction to Techniques of Operations Research</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Units** 12-17

1 Has an extra prerequisite that is not in the lower or upper division core.
Emphasis in Applied Mathematics
Required units: 14

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 105A</td>
<td>Advanced Mathematics for Science and Engineering I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 105B</td>
<td>Advanced Mathematics for Science and Engineering II</td>
<td>4</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>MATH 101</td>
<td>Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 102</td>
<td>Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 104</td>
<td>Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 117</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 134</td>
<td>Functions of a Complex Variable and Applications</td>
<td></td>
</tr>
<tr>
<td>MATH 150</td>
<td>Introduction to Numerical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 170</td>
<td>Linear Programming</td>
<td></td>
</tr>
<tr>
<td>STAT 115A</td>
<td>Introduction to Probability Theory</td>
<td>1</td>
</tr>
<tr>
<td>STAT 115B</td>
<td>Introduction to Mathematical Statistics</td>
<td>1</td>
</tr>
<tr>
<td>STAT 155</td>
<td>Introduction to Techniques of Operations Research</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Units: 14

1 Has an extra prerequisite that is not in the lower or upper division core.

Emphasis in Statistics
Required units: 15-16

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 1</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 50</td>
<td>Introduction to Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 115A</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 115B</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>MATH 101</td>
<td>Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH 117</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 134</td>
<td>Functions of a Complex Variable and Applications</td>
<td></td>
</tr>
<tr>
<td>MATH 150</td>
<td>Introduction to Numerical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 170</td>
<td>Linear Programming</td>
<td></td>
</tr>
<tr>
<td>STAT 155</td>
<td>Introduction to Techniques of Operations Research</td>
<td></td>
</tr>
</tbody>
</table>

Total Units: 15-16

Emphasis in Teacher Preparation Program
Required units: 15

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 1</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 102</td>
<td>Number Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 121</td>
<td>College Geometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 190</td>
<td>History Of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 193</td>
<td>Capstone Course for the Teaching Credential Candidate</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Units: 15

Notes:
- Prerequisites must be completed with grade "C-" or better.
- Grade "C-" or better required in all courses applied to a Mathematics major, or the Mathematics or Statistics minors.
- PHYS 11A and PHYS 11C recommended for all Mathematics majors.

Subject Matter Program (Pre-Credential Preparation)

Students interested in a Secondary Teaching Credential should select Teacher Preparation Program in Section C in the BA requirements outlined above.

Teaching credential candidates must also complete the Professional Education Program in addition to other requirements for a teaching credential. Consult the Department credential advisor for details. You may also obtain information about the Professional Education Program from the Teacher Preparation and Credentials Office, Eureka Hall 216, (916) 278-6403.

Note: Due to continuing policy changes, it is important to consult a credential advisor for current details.

Bachelor of Arts Degree Requirements - Integrated Mathematics Major/Single Subject Credential Program

Students in the Integrated Mathematics Major/Single Subject Credential Program (also called the Blended Program in Mathematics) begin their pedagogical studies while they are completing the mathematics courses required for the Bachelor's degree in Mathematics. The mathematics requirements include all of the courses required for the subject matter program in mathematics (see above), and MATH 198. Students who are interested in being admitted to the Blended Program in Mathematics must plan ahead, and must see their advisor as soon as possible.

Admission requirements for the Blended Program include junior class standing with a minimum overall GPA of 2.67, a grade of "C-" or better in MATH 108, passing the Writing Placement for Juniors Exam (WPJ), spending and documenting at least 45 hours observing classes, tutoring, or teaching in a variety of settings in grades 7-12, taking all three sections of the California Basic Education Skills Test (CBEST), and submitting an application packet to the Department of Mathematics and Statistics. A completed application packet includes:

- an application form;
- an essay outlining reasons for entering a career in teaching;
- two letters of recommendation;
- two sets of transcripts from each college or university attended, other than Sacramento State; and
- one complete Sacramento State transcript.

The application packet may be submitted during the semester in which the requirements for admission are being completed, so the application may be submitted during the semester in which enrollment in MATH 108 occurs.

There are three courses which are prerequisites or corequisites to the Blended Program and students are encouraged to take these courses prior to formal admission:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 170</td>
<td>Bilingual Education: Introduction to Educating English Learners</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 100A</td>
<td>Educating Students with Disabilities in Inclusive Settings</td>
<td>2</td>
</tr>
</tbody>
</table>
Mathematics or Statistics. A minimum of 6 upper division units is required. At least 6 upper division units must be taken at Sacramento State.

Prerequisites must be completed with grade "C-" or better.

Specific requirements are:

- MATH 30 Calculus I 4
- MATH 31 Calculus II 4
- MATH 32 Calculus III 4
- or STAT 50 Introduction to Probability and Statistics 4
- STAT 103 Intermediate Statistics 3
- STAT 115A Introduction to Probability Theory 3
- STAT 115B Introduction to Mathematical Statistics 3
- Total Units 21

Graduate Program

The Department of Mathematics and Statistics offers a Master of Arts degree in Mathematics. The MA program is designed to provide qualified students with an opportunity to increase the breadth and depth of their mathematical knowledge and understanding. Beyond assuring that successful candidates are proficient in the basic areas of mathematics, the program is sufficiently flexible to permit graduates to pursue individual professional and mathematical interests ranging from teaching at the secondary or community college level to a career in the private sector, to preparation for graduate study beyond the master's degree. Graduate courses are usually offered in the late afternoon to accommodate students who work full-time.

Admission Requirements

Admission as a classified graduate student in Mathematics requires:

- an undergraduate major in Mathematics which includes one year each of Modern Algebra and Advanced Calculus or an undergraduate major in a related field together with one year each of Modern Algebra and Advanced Calculus;
- a minimum 2.5 GPA; and
- a minimum 2.5 GPA in the last 60 units attempted and a 3.0 GPA in Mathematics coursework.

Students who have deficiencies in admission requirements that can be removed by specified additional preparation may be admitted with conditionally classified graduate status. Any such deficiencies will be noted on a written response to the admission application. No credit will be given towards the MA for the following:

- MATH 105A Modern Algebra 3
- MATH 105B Modern Algebra 3
- MATH 130A Functions of a Real Variable 3
- MATH 130B Functions of a Real Variable 3

Admission Procedures

Applications are accepted as long as room for new students exists. However, students are strongly urged to apply by the posted university application deadline for the fall or spring terms, in order to allow time for admission before registration. All prospective graduate students, including Sacramento State graduates, must file the following with the Office of Graduate Studies, River Front Center 215, (916) 278-6470:

- an online application for admission; and

Minor - Mathematics

Units required for the Minor: 20-21, all of which must be taken in Mathematics or Statistics. A minimum of 8 upper division units is required. At least 6 upper division units must be taken at Sacramento State.

Prerequisites must be completed with grade "C-" or better.

Select one of the two following options.

Option 1 (20-21 Units)

- MATH 30 Calculus I 4
- MATH 31 Calculus II 4
- Select one of the following: 3 -
  - MATH 32 Calculus III 4
  - MATH 35 Introduction to Linear Algebra 4
  - STAT 50 Introduction to Probability and Statistics 4
- Select 9 units of upper division Mathematics and/or Statistics courses selected with approval of a Mathematics advisor 9
- Total Units 20-21

Option 2 (23 Units)

- MATH 30 Calculus I 4
- MATH 31 Calculus II 4
- MATH 32 Calculus III 4
- MATH 45 Differential Equations for Science and Engineering 3
- MATH 105A Advanced Mathematics for Science and Engineering I 4
- MATH 105B Advanced Mathematics for Science and Engineering II 4
- Total Units 23

Minor - Statistics

Units required for the Minor: 21, all of which must be taken in Mathematics or Statistics. A minimum of 6 upper division units is
• two sets of official transcripts from all colleges and universities attended, other than Sacramento State.

For more admissions information and application deadlines please visit http://www.csus.edu/gradstudies/.

Admission decisions are made approximately six to eight weeks after the application deadline date. Applicants will be notified of an admission decision via e-mail.

**Advancement to Candidacy**

Each student must file an application for Advancement to Candidacy, indicating a proposed program of graduate study. This procedure should begin as soon as the classified graduate student has:

• removed any deficiencies in admission requirements;
• completed at least 18 units in the graduate program with a minimum 3.0 GPA, including at least 12 units at the 200 level; and
• taken the Writing Placement for Graduate Students (WPG) or taken a Graduate Writing Intensive (GWI) course in their discipline within the first two semesters of coursework at California State University, Sacramento or secured approval for a WPG waiver.

Advancement to Candidacy forms are available in the Office of Graduate Studies. The student fills out the form after planning a degree program in consultation with a Mathematics advisor. The completed form is then returned to the Office of Graduate Studies for approval.

**MA Degree in Mathematics**

Units required for the MA: 30, including at least 24 units of approved 200-level courses

Minimum required GPA: 3.0.

**Required Courses (27 Units)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 210A</td>
<td>Algebraic Structures</td>
<td>3</td>
</tr>
<tr>
<td>MATH 210B</td>
<td>Algebraic Structures</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230A</td>
<td>Real Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 230B</td>
<td>Real Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Select four from the following: 12

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>MATH 220A</td>
<td>Topology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220B</td>
<td>Topics In Topology</td>
<td></td>
</tr>
<tr>
<td>MATH 234A</td>
<td>Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 234B</td>
<td>Topics in Complex Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 241A</td>
<td>Methods of Applied Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 241B</td>
<td>Topics in Applied Mathematics</td>
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<tr>
<td>STAT 215A</td>
<td>Introduction to Mathematical Statistics</td>
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<tr>
<td>STAT 215B</td>
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Select one of the following with advisor approval: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 299</td>
<td>Special Problems</td>
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Electives in mathematics and related disciplines

**Culminating Requirement (3 Units)**

<table>
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<tr>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>Written Comprehensive Examination</td>
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Total Units 30

Note: A foreign language is not required for the MA degree. However, students who plan further graduate study are encouraged to take coursework in French, German, or Russian since proficiency in two of these languages is usually required in doctoral programs.

**MATH 1. Mathematical Reasoning.** 3 Units

Prerequisite(s): MATH 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; and completion of ELM requirement.

General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)

Recommended for students whose majors do not include a specific mathematics requirement. Objectives are to show some of the essence and quality of mathematics, and to enhance precision in the evaluation and expression of ideas, thereby developing a student’s quantitative reasoning skills. Designed to give students an understanding of some of the vocabulary, methods, and reasoning of mathematics with a focus on ideas.

**MATH 9. Essentials of Algebra and Trigonometry.** 3 Units

Prerequisite(s): One year each of high school algebra and geometry; and a passing score on the Elementary Algebra Diagnostic Test. Prepares students, especially in bioscience, economics and social science, for courses requiring basic algebra and trigonometry. Topics: measurement and scientific notation; review of basic algebra; factoring; laws of exponents; linear and quadratic equations; Cartesian coordinates and graphing; the trigonometric functions and their basic identities; solutions of right triangles; the laws of sines, cosines and tangents; solutions of general triangles; logarithms.

Note: Applicable to workload credit for establishing full-time enrollment status, but not applicable to the baccalaureate degree.

**MATH 11. Algebra for College Students.** 4 Units

Prerequisite(s): A passing score on the Intermediate Algebra Diagnostic Test. Prepares students for Precalculus and other courses requiring algebra. Linear equations and inequalities, absolute value equations and inequalities, systems of linear equations, quadratic equations, polynomial expressions and equations, rational expressions and equations, roots and radicals, and exponential and logarithmic equations.

Note: Applicable to workload credit for establishing full-time enrollment status, but not applicable to the baccalaureate degree.

**MATH 15H. Honors Mathematical Reasoning.** 3 Units

Prerequisite(s): Open only to Honors students.

General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)

Introduction to the composition and interpretation of mathematical ideas and to the mathematical reasoning necessary to derive results in a variety of mathematical topics. Emphasis on developing concepts and analyzing results.

**MATH 17. An Introduction to Exploration, Conjecture, and Proof in Mathematics.** 3 Units

Prerequisite(s): MATH 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test.

General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)

 Prepares students for MATH 107A and MATH 107B. Students will explore mathematical patterns and relations, formulate conjectures, and prove their conjectures. Topics from number theory, probability and statistics, and geometry.
MATH 24. Modern Business Mathematics. 3 Units
Prerequisite(s): MATH 9 or three years of high school math that includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Mathematics for business world, including functions, math of finance, linear programming and rates of change. Applications to economics and business will be emphasized throughout.

MATH 26A. Calculus I for the Social and Life Sciences. 3 Units
Prerequisite(s): MATH 11 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Limits, differentiation with applications, integration and applications in the Social Sciences and Life Sciences.

MATH 26B. Calculus II for the Social and Life Sciences. 3 Units
Prerequisite(s): MATH 26A or appropriate high school based AP credit.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Continuation of MATH 26A, integration and applications to the Social Sciences and Life Sciences. Multi-variate analysis including partial differentiation and maximization subject to constraints; elementary differential equations; sequences and series. Calculus of the trigonometric functions as time allows.
Note: Not open to students already having credit for MATH 31 or equivalent.

MATH 29. Pre-Calculus Mathematics. 4 Units
Prerequisite(s): MATH 11 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and Intermediate Algebra Diagnostic Test.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Designed to prepare students for calculus. Topics: trigonometry, points and lines in the Cartesian plane; lines and planes in space; transformation of coordinates; the conics; graphs of algebraic relations; the elementary transcendental functions.

MATH 29A. Pre-Calculus Mathematics A. 2 Units
Prerequisite(s): MATH 11 or three years of high school mathematics that includes two years of algebra and one year of geometry; completion of the Intermediate Algebra Diagnostic Test.
Corequisite(s): MATH 29L.
First semester of a two semester course that is designed to prepare students for calculus. Topics: functions and graphs, polynomial functions, rational functions and applications. Lecture two hours.

MATH 29B. Pre-Calculus Mathematics B. 2 Units
Prerequisite(s): MATH 29A.
Corequisite(s): MATH 29M.
Second semester of a two semester course that is designed to prepare students for calculus. Topics: exponential and logarithmic functions, trigonometric functions, analytic geometry, and applications. Lecture two hours.

MATH 29L. Lab for Pre-Calculus Math A. 1 Unit
Corequisite(s): MATH 29B.
Workshop designed to deepen the understanding of pre-calculus developed in MATH 29A.
Note: May be taken for workload credit toward establishing full-time enrollment status, but is not applicable to the baccalaureate degree. Laboratory

MATH 29M. Lab for Pre-Calculus Math B. 1 Unit
Corequisite(s): MATH 29B.
Workshop designed to deepen the understanding of pre-calculus developed in MATH 29B.
Note: May be taken for workload credit toward establishing full-time enrollment status, but is not applicable to the baccalaureate degree. Laboratory

MATH 30. Calculus I. 4 Units
Prerequisite(s): MATH 29 or four years of high school mathematics which includes two years of algebra, one year of geometry, and one year of mathematical analysis; completion of ELM requirement and Pre-Calculus Diagnostic Test.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Functions and their graphs; limits; the derivative and some of its applications; trigonometric and hyperbolic functions and their inverses; the integral; the fundamental theorem; some applications of the integral.

MATH 30L. Laboratory for First Semester Calculus. 1 Unit
Corequisite(s): Enrollment in a designated section of MATH 30.
Workshop designed to deepen the understanding of calculus developed in MATH 30.
Note: May be taken for workload credit toward establishing full-time enrollment status, but is not applicable to the baccalaureate degree. Laboratory

MATH 31. Calculus II. 4 Units
Prerequisite(s): MATH 30 or appropriate high school based AP credit.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
MATH 30 continuation. Methods of integration; improper integrals; analytic geometry; infinite sequences and series.

MATH 31L. Laboratory for Second Semester Calculus. 1 Unit
Corequisite(s): Enrollment in a designated section of MATH 31.
Workshop designed to deepen the understanding of calculus developed in MATH 31.
Note: May be taken for workload credit toward establishing full-time enrollment status, but is not applicable to the baccalaureate degree. Laboratory

Credit/No Credit

MATH 32. Calculus III. 4 Units
Prerequisite(s): MATH 31.
Continuation of Calculus II. Algebra and calculus of vectors; functions of several variables; partial differentiation; multiple integration; vector analysis.
MATH 35. Introduction to Linear Algebra. 3 Units
Prerequisite(s): MATH 30 or appropriate high school based AP credit.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Careful development of matrices, systems of equations, determinants, vector spaces, linear transformations, orthogonality, real and complex eigenvalues; R3 viewed as a vector space with generalization to Rn.

MATH 45. Differential Equations for Science and Engineering. 3 Units
Prerequisite(s): MATH 31.
First order differential equations, second order differential equations with constant coefficients. Laplace transforms, small systems of linear differential equations, numerical methods, introduction to second order differential equations with variable coefficients.

MATH 99. Special Problems. 1 - 6 Units
Individual projects or directed reading.
Note: Open only to students who appear competent to carry on individual work; admission requires the approval of the faculty member under whom individual work is to be conducted, and approval of the advisor and the Department Chair.
Credit/No Credit

MATH 100. Applied Linear Algebra. 3 Units
Prerequisite(s): MATH 26B or MATH 31.
Linear algebra and its elementary applications. Topics: Matrix algebra; simultaneous linear equations; linear dependence and vector spaces; rank and inverses; determinants; numerical solution of simultaneous linear equations; linear transformations; eigenvalues and eigenvectors; unitary and similarity transformations; quadratic forms.
Note: May not be taken for credit toward a mathematics major.

MATH 101. Combinatorics. 3 Units
Prerequisite(s): MATH 31.
Introduction to the art of counting. The focus will be on actually listing the objects being counted in small cases and using the knowledge gained in working with small cases to build toward general principles. Sum and product principles, models of counting, permutations and combinations, equivalence relations and partitions, inclusion-exclusion principle, recurrence relations, and generating functions.

MATH 102. Number Theory. 3 Units
Prerequisite(s): MATH 31.
Theory of divisibility; some number theoretical functions; congruencies (linear and quadratic); some Diophantine equations. Simple continued fractions.

MATH 104. Vector Analysis. 3 Units
Prerequisite(s): MATH 32.
Vector and scalar fields, integral theorems, orthogonal curvilinear coordinates, vector spaces and linear transformations, applications to physical fields and operators.

MATH 105A. Advanced Mathematics for Science and Engineering I. 4 Units
Prerequisite(s): MATH 32, MATH 45.

MATH 105B. Advanced Mathematics for Science and Engineering II. 4 Units
Prerequisite(s): MATH 105A.
Partial differential equations continued, complex function theory and its applications.

MATH 107A. Fundamental Mathematical Concepts. 3 Units
Prerequisite(s): MATH 17 and passing score on the Intermediate Algebra Diagnostic Test.
First half of a one-year course in the structure of the real number system and its sub-systems and in the basic properties and concepts of geometry. Topics will include: definitions and properties of set theory and their use in the development of the natural and whole number systems, definitions and properties of the arithmetic relations and operations for the natural numbers, whole numbers, integers.
Note: May not be taken for credit toward a mathematics major or minor.

MATH 107B. Fundamental Mathematical Concepts. 3 Units
Prerequisite(s): MATH 107A.
Continuation of MATH 107A. Topics will include: rational numbers, real numbers, measurement, Euclidean Geometry.
Note: May not be taken for credit toward a mathematics major or minor.

MATH 108. Introduction to Formal Mathematics. 3 Units
Prerequisite(s): MATH 31, MATH 35.
Logic of mathematical proof, set theory, relations, functions. Examples and applications from set cardinality, algebra, and analysis.

MATH 110A. Modern Algebra. 3 Units
Prerequisite(s): MATH 108.
First half of a one-year introductory course in algebraic concepts. Topics include: groups, subgroups, properties of groups, permutation groups, factor groups, homomorphism theorems.

MATH 110B. Modern Algebra. 3 Units
Prerequisite(s): MATH 110A.
Continuation of MATH 110A.
Note: Topics include

MATH 117. Linear Algebra. 3 Units
Prerequisite(s): MATH 110A.
Abstract linear spaces and linear transformations; invariant subspaces; canonical forms.

MATH 121. College Geometry. 3 Units
Prerequisite(s): MATH 31; MATH 32 or MATH 35.
Study of the axioms and theorems of Euclidean geometry. A comparison of several geometry axiom systems and their theorems, including those of some non-Euclidean and finite geometries.

MATH 130A. Functions of a Real Variable. 3 Units
Prerequisite(s): MATH 32 and MATH 108.
First half of a one-year upper division course in functions of a real variable. The first semester will consist of a rigorous development of the theory of real-valued sequences and continuity and differentiation for functions of one real variable.
MATH 130B. Functions of a Real Variable. 3 Units
Prerequisite(s): MATH 130A.
Continuation of MATH 130A. This semester will be devoted to a rigorous
development of the theory of Riemann integration, infinite series, and
sequences and series of functions.

MATH 134. Functions of a Complex Variable and Applications. 3 Units
Prerequisite(s): MATH 32.
Complex plane; analytic functions; integration and Cauchy’s Theorem;
sequences and series; residue calculus; applications to potential theory;
Fourier and Laplace transforms.

MATH 150. Introduction to Numerical Analysis. 3 Units
Prerequisite(s): MATH 31
Numerical solutions of algebraic and transcendental equations;
interpolation, inverse interpolation, finite differences, cubic splines, and
applications; numerical differentiation and integration; direct and iterative
numerical solutions of linear systems; discrete and continuous least
squares approximation.

MATH 161. Mathematical Logic. 3 Units
Prerequisite(s): MATH 108.
Advanced study of logic with special application to mathematics.

MATH 162. Set Theory. 3 Units
Prerequisite(s): MATH 108.
Axiomatic study of set theory. Topics usually considered include:
relations and functions; set theoretical equivalence; finite and infinite
sets; cardinal arithmetic; ordinal numbers and transfinite induction;
variants of the Axiom of Choice.

MATH 170. Linear Programming. 3 Units
Prerequisite(s): MATH 31; MATH 35 or MATH 100.
Theory of linear programming, duality, simplex method, integer
programming, applications.

MATH 190. History Of Mathematics. 3 Units
Prerequisite(s): MATH 31 and upper division status in mathematics.
Study of the development of mathematical ideas and techniques and
their impact on the general course of the history of western civilization.

MATH 193. Capstone Course for the Teaching Credential Candidate. 3 Units
Prerequisite(s): Successful completion of at least five of the following:
MATH 102, MATH 110A, MATH 110B, MATH 121, MATH 130A,
MATH 130B or MATH 190; MATH 110A or MATH 130A may be taken
concurrently. Reviews the major themes presented in the upper division program in
Mathematics, and relates the themes to junior high school and high
school curriculum. Required for all subject matter students.
Note: Not accepted for credit for non-Teaching Credential students.

MATH 198. Seminar for Mathematics Tutors. 2 Units
Prerequisite(s): Students must be working as tutors in a campus-based
program.
Supports Sacramento State students who are working in tutorial and
related roles in mathematics programs on campus. Focus on questioning
as a fundamental strategy for teaching mathematics, on classroom
observation, and on communication among mathematics instructors in
support of effective teaching and learning.
Note: May be repeated up to two times for credit.

Credit/No Credit

MATH 199. Special Problems. 1 - 6 Units
Individual projects or directed reading. Open only to those students who
appear competent to carry on individual work. Admission to this course
requires the approval of the faculty member under whom the individual
work is to be conducted, in addition to the approval of the advisor and the
Department Chair.

Credit/No Credit

MATH 210A. Algebraic Structures. 3 Units
Prerequisite(s): MATH 110B.
General algebraic systems and concepts; groups.

MATH 210B. Algebraic Structures. 3 Units
Prerequisite(s): MATH 210A.
Fields; vector spaces; Galois theory.

MATH 220A. Topology. 3 Units
Prerequisite(s): MATH 130B.
Point set topology, continuity, compactness, connectedness.

MATH 220B. Topics In Topology. 3 Units
Prerequisite(s): MATH 220A.
Continuation of MATH 220A with topics selected from: General topology/
Foundations, Geometric Topology, Continuum Theory, Homology Theory,
Homotopy Theory, Topological Dynamics.
Note: May be taken twice with approval of the graduate coordinator.

MATH 230A. Real Analysis. 3 Units
Prerequisite(s): MATH 130B.
Metric topology; the theory of the derivative; measure theory.

MATH 230B. Real Analysis. 3 Units
Prerequisite(s): MATH 230A.
Continuation of MATH 230A, with topics selected from: Theory of the
integral, including Riemann, Riemann Stieltjes, and Lebesgue integrals.
Note: May be taken twice with approval of the graduate coordinator.

MATH 234A. Complex Analysis. 3 Units
Prerequisite(s): MATH 130B; MATH 105B or MATH 134 is recommended.
Complex numbers, complex functions, analytic functions, complex
integration, harmonic functions.

MATH 234B. Topics in Complex Analysis. 3 Units
Prerequisite(s): MATH 234A.
Continuation of MATH 234A with topics selected from: Partial Fractions
and Infinite Products, Entire Functions, Riemann Zeta Function, Normal
Families, Riemann Mapping Theorem, Conformal Mapping of Polygons,
Dirichlet Problem, Analytic Continuation.
Note: May be taken twice with approval of the graduate coordinator.

MATH 241A. Methods of Applied Mathematics. 3 Units
Prerequisite(s): MATH 134 recommended.
Topics from: Hilbert Space Theory, Operators on Hilbert Space,
Generalized Functions with Applications to Sturm-Liouville Theory and
Partial Differential Equations.
Note: May be repeated for credit provided topic is not repeated.

MATH 241B. Topics in Applied Mathematics. 3 Units
Prerequisite(s): MATH 241A.
Continuation of MATH 241A with topics: Calculus of Variations,
Functional Analysis, Dynamical Systems, Integral Equations, Sobolev
Spaces, Fourier Analysis, Potential Theory, and Optimal Control Theory.
Note: May be taken twice with approval of the graduate coordinator.
MATH 299. Special Problems. 1 - 6 Units
Any properly qualified student who wishes to pursue a problem may do so if the proposed subject is acceptable to the supervising instructor and to the student’s advisor.
Credit/No Credit

MATH 316. The Psychology of Mathematics Instruction. 2 Units
Prerequisite(s): Admission to the Mathematics Blended Program.
A survey course for students in the Blended Program in Mathematics that relates broad areas of educational psychology and theories of learning to instruction in the secondary mathematics classroom. The focus is on practical applications of theories through the design of lesson and unit plans. Students will design learning activities for diverse classes of learners, including English Language Learners, and build and refine assessment plans that include formative assessments. Lecture two hours.
Credit/No Credit

MATH 371A. Schools and Community A. 2 Units
Corequisite(s): Enrollment in EDTE 470A.
The first of a two-part sequence supporting student teachers in the Mathematics Blended Program. Focus is on strategies for secondary mathematics instruction, the process of reflection on teaching, communication among mathematics teachers in support of effective teaching and learning, strategies for engagement, questioning, creating a safe classroom environment, classroom management, assessment, and familiarity with school and community resources. Emphasis on issues related to English Language Learners, special needs students, and intervention strategies. Seminar two hours.
Credit/No Credit

MATH 371B. Schools and Community B. 2 Units
Corequisite(s): Enrollment in EDTE 470B.
The second of a two-part sequence supporting student teachers in the Mathematics Blended Program. Focus is on strategies for secondary mathematics instruction, the process of reflection on teaching, communication among mathematics teachers in support of effective teaching and learning, strategies for engagement, questioning, creating a safe classroom environment, classroom management, assessment, and familiarity with school and community resources. Emphasis on issues related to English Language Learners, special needs students, and intervention strategies. Seminar two hours.
Credit/No Credit

MATH 500. Culminating Experience. 1 - 3 Units
Prerequisite(s): Advanced to candidacy and permission of the graduate coordinator.
Directed reading programs for master’s candidates preparing for written comprehensive examinations.

STAT 1. Introduction to Statistics. 3 Units
Prerequisite(s): MATH 9 or three years of high school mathematics which includes two years of algebra and one year of geometry; completion of ELM requirement and the Intermediate Algebra Diagnostic Test.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Descriptive statistics, basic concepts of probability and sampling with the aim of introducing fundamental notions and techniques of statistical inference.

STAT 10A. Introductory Statistics with Developmental Mathematics. 3 Units
Prerequisite(s): A minimum ELM score of 44, and being placed in Learning Skills Program for one semester of developmental mathematics. Data analysis process and the concept of randomness. Descriptive statistics: Summarizing the data distribution graphically and numerically. Reasoning about bivariate numerical data; linear correlation and regression. Linear, quadratic and exponential functions as a way of modeling a correspondence between two variables. Reasoning about bivariate categorical data. Basic concepts of probability. Discrete and random variables. Binomial distribution. Introduction to normal distribution. Lecture three hours.

STAT 10B. Introductory Statistics with Developmental Mathematics. 3 Units
Prerequisite(s): Successful completion of STAT 10A with a minimum "C-" grade or better.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Continuation of STAT 10A. Continuous random variables. The normal distribution. Sampling distributions and the central limit theorem. Confidence intervals and tests of hypotheses for means, proportions, difference in means and difference in proportions. Chi-squared tests. Lecture three hours.

STAT 50. Introduction to Probability and Statistics. 4 Units
Prerequisite(s): MATH 26A, MATH 30, or appropriate high school based AP credit.
General Education Area/Graduation Requirement: Math Concepts & Quantitative Reasoning (B4)
Sample spaces, combinatorics, and random variables. Density and distribution functions. Expectation, variance, and covariance. The binomial, uniform, poisson, negative binomial, hypergeometric, exponential, gamma, beta, and normal distributions. Sampling distributions, estimation, and hypothesis tests. Students are given periodic writing assignments which encourage them to think through concepts of the course.

STAT 96. Experimental Offerings in Statistics. 1 - 6 Units
When there is a demand from a sufficient number of qualified students, one of the staff will conduct a seminar on some topic in statistics.

STAT 103. Intermediate Statistics. 3 Units
Prerequisite(s): STAT 50 or instructor consent

STAT 115A. Introduction to Probability Theory. 3 Units
Prerequisite(s): MATH 31 and either STAT 1 or STAT 50
Probability axioms, discrete and continuous random variables, functions of random variables, joint densities, expectation, moment generating functions. Chebyshev’s inequality, transformations, weak law of large numbers, central limit theorem.

STAT 115B. Introduction to Mathematical Statistics. 3 Units
Prerequisite(s): STAT 115A
Point Estimation, interval estimation, hypothesis testing, the multivariate normal distribution, non-parametric tests.
STAT 128. Statistical Computing. 3 Units
Prerequisite(s): (STAT 1 or STAT 50) and (MATH 26A or MATH 30) or consent of the instructor.
Computer methods for accessing, transforming, summarizing, graphing and making statistical inferences from data; focus is on command-line statistical software, but menu-driven software may be introduced; application of computer methods to solve problems selected from the areas of modeling, simulation, inference and statistical learning.

STAT 155. Introduction to Techniques of Operations Research. 3 Units
Prerequisite(s): MATH 31; STAT 50, STAT 103, or STAT 115A; MATH 31 may be taken concurrently.
Formulation and analysis of mathematical models with emphasis on real systems applications. Introduction to Queueing theory and Markov Processes for application.

STAT 196J. Statistical Computing. 3 Units
Prerequisite(s): STAT 1 or STAT 50, and MATH 26A or MATH 30
Computer methods for accessing, transforming, summarizing, graphing, and making statistical inferences from data. Both a command-line statistical software package such as R and menu-driven package such as SAS will be used. Students will learn to apply computer methods to solve problems selected from the areas of modeling, simulation, inference and statistical learning. The intent of this course is to provide students with the software skills needed for statistical work in industry or academia.

STAT 199. Special Problems. 1 - 6 Units
Individual projects or directed reading. Open only to students who appear competent to carry on individual work. Admission to this course requires approval of the instructor in addition to the approval of the advisor and the Department Chair.
Credit/No Credit

STAT 215A. Introduction to Mathematical Statistics. 3 Units
Prerequisite(s): STAT 115A, STAT 115B; MATH 134 is recommended.
Probability measure, conditional probability and independence, random variables, characteristic and moment-generating functions, modes of convergence.

STAT 215B. Topics in Introduction to Mathematical Statistics. 3 Units
Prerequisite(s): STAT 215A.
Note: May be taken twice with approval of Graduate Coordinator.

STAT 299. Special Problems. 1 - 6 Units
Any properly qualified student who wishes to pursue a problem may do so if the proposed subject is acceptable to the department committee, the supervising instructor and the student’s advisor.