MATHMATICS (MATH)

See Course Description Symbols and Terms (https://catalog.csuchico.edu/academic-standards-policies/course-description-symbols-terms/) for an explanation of course description terminology and symbols, the course numbering system, and course credit units.

- In certain courses, at the discretion of the instructor, you may be required to buy a computer program and/or graphing calculator.
- Completion of the Entry-Level Mathematics (ELM) requirement is a prerequisite for registration in all MATH courses.
- Enrollment in any mathematics course requires a grade of C- or higher in all prerequisite courses or their transfer equivalents.

MATH 5L  Foundational Mathematics B  1 Unit
Prerequisite: Credit in Math 031 or GE Math Ready with Support.
Corequisites: MATH 105.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics in support of general education mathematics. This course is a supplemental requirement for Math Ready with Support students required to enroll in designated general education courses. 3 hours laboratory. (005498)
Grade Basis: ABC/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 7L  Foundational Mathematics B  1 Unit
Prerequisite: Credit in Math 031 or GE Math Ready with Support.
Corequisites: MATH 107.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics in support of general education mathematics. This course is a supplemental requirement for Math Ready with Support students required to enroll in designated general education courses. 3 hours laboratory. (022081)
Grade Basis: ABC/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 10L  Foundational Mathematics B  1 Unit
Prerequisite: Credit in Math 031 or GE Math Ready with Support.
Corequisites: MATH 110.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics in support of general education mathematics. This course is a supplemental requirement for Math Ready with Support students required to enroll in designated general education courses. 3 hours laboratory. (022082)
Grade Basis: ABC/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 16L  Foundational Mathematics B  1 Unit
Prerequisite: Credit in Math 031 or GE Math Ready with Support.
Corequisites: MATH 116.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics in support of general education mathematics. This course is a supplemental requirement for Math Ready with Support students required to enroll in designated general education courses. 3 hours laboratory. (022083)
Grade Basis: ABC/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 31B  Foundational Mathematics A  1 Unit
Prerequisite: GE Math Ready with Support and Early Start Program.
Corequisites: BIOL 102.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics. Satisfactory completion of this course fulfills the prerequisite for enrollment in Math 005L, MATH 007L, MATH 010L, and MATH 016L. This course is a supplemental requirement for Math Ready with Support, Early Start Program Required students required to enroll in designated general education courses. 3 hours laboratory. (022087)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 31G  Foundational Mathematics A  1 Unit
Prerequisite: GE Math Ready with Support and Early Start Program.
Corequisites: ERTH 101.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics. Satisfactory completion of this course fulfills the prerequisite for enrollment in Math 005L, MATH 007L, MATH 010L, and MATH 016L. This course is a supplemental requirement for Math Ready with Support, Early Start Program Required students required to enroll in designated general education courses. 3 hours laboratory. (022086)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 31N  Foundational Mathematics A  1 Unit
Prerequisite: GE Math Ready with Support and Early Start Program.
Corequisites: SCED 101.
Typically Offered: Fall and spring
Foundational level California Common Core State Standards mathematics topics. Satisfactory completion of this course fulfills the prerequisite for enrollment in Math 005L, MATH 007L, MATH 010L, and MATH 016L. This course is a supplemental requirement for Math Ready with Support, Early Start Program Required students required to enroll in designated general education courses. 3 hours laboratory. (005493)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate
MATH 31P  Foundational Mathematics A  1 Unit
Prerequisite: GE Math Readiness with Support and Early Start Program.
Corequisites: PSSC 101.
Typically Offered: Fall and spring
Foundation level California Common Core State Standards
mathematics topics. Satisfactory completion of this course fulfills the
prerequisite for enrollment in Math 005L, MATH 007L, MATH 010L, and
MATH 016L. This course is a supplemental requirement for Math Ready
with Support, Early Start Program. Required students required to enroll in
designated general education courses. 3 hours laboratory. (022085)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Pre-Collegiate

MATH 101 Patterns of Mathematical Thought  3 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
An informal approach to mathematics designed to bring an appreciation
and workable knowledge of the subject to non-majors. Not acceptable
for a mathematics major or minor. 1 hour discussion, 2 hours
lecture. (00514)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 105 Introduction to Statistics  3 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
Summary of numerical data, distributions, linear regression, and
introduction to statistical inference. Statistical software is used. 1.5
hours discussion, 1.5 hours lecture. (005501)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 107 Finite Mathematics for Business  3 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
Solutions to systems of linear equations, matrices, linear programming,
combinatorics, probability, binomial and normal distributions. 1.5 hours
discussion, 1.5 hours lecture. (005521)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 108 Statistics of Business and Economics  3 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
Descriptive statistics, sampling theory, statistical inference and tests of
hypotheses, analysis of variance, chi-square tests, simple regression and
correlation, and multiple regression and correlation. 1.5 hours discussion,
1.5 hours lecture. (001042)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 109 Survey of Calculus  4 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready. MATH 118
and MATH 119 (or equivalent) with a C- or higher, or a qualifying score on
the department administered calculus readiness assessment in addition
to high school trigonometry and precalculus with a C- or higher.
Typically Offered: Fall and spring
This course covers the fundamental concepts and techniques of
differential and integral calculus with an introduction to differential
equations. Emphasis on applications from the Life Sciences. This
course is not intended for majors in mathematics, physics, chemistry,
or engineering. No credit for students with credit in MATH 120. A score
that meets department guidelines on a department administered calculus
readiness exam must be achieved by those who claim high school
 equivalence. 4 hours discussion. (005512)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division

MATH 109X Survey of Calculus Problem Solving Session  1 Unit
Corequisites: MATH 109.
Typically Offered: Fall and spring
This is a 1-unit supplement to Survey of Calculus, MATH 109. This is
structured as a workshop designed to complement MATH 109 students
with broader and deeper applications of calculus, providing students
with opportunities for additional problem-solving and skill-building in
a student-centered collaborative environment. 3 hours independent
study. (021280)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 2 units
Course Attributes: Lower Division

MATH 110 Concepts and Structures of Mathematics  3 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
Structure of the real number system, operations on real numbers, number
theory. Not acceptable for a mathematics major or minor. 3 hours
discussion. (005522)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 116 College Algebra  4 Units GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
This course covers advanced algebra concepts beyond the scope of
Intermediate Algebra. The topics include algebraic simplifying, conics,
time and solution of equations and inequalities, systems of equations,
linear functions, exponential and logarithmic functions, polynomial and
rational functions, binomial expansion, and partial fractions. 4 hours
lecture. (021954)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division
MATH 117  Hands-On Lab, Mathematics  2 Units
Prerequisite: MATH 110.
Corequisites: MATH 210 or faculty permission.
Typically Offered: Fall and spring
The Hands-On Lab for Mathematics provides a rich, sustained, and guided teaching experience for undergraduate students preparing to be elementary or middle school teachers. By developing, refining, and repeatedly teaching a lesson aligned to California mathematics standards, prospective teachers gain insights into the complexities of teaching mathematics content. In addition, prospective teachers engage in Lesson Study with the teachers for these children, thus acquiring experience in a collegial relationship with practicing professionals. 2 hours seminar. (020430)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division

MATH 118  Trigonometry  3 Units  GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready, and either 1/2 year of high school trigonometry or MATH 118 (may be taken concurrently).
Typically Offered: Fall and spring
Trigonometric functions, graphs, identities and conditional equations, logarithms, solutions of triangles, and complex numbers. 3 hours discussion. (005500)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 119  Precalculus Mathematics  4 Units  GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready, and either 1/2 year of high school trigonometry or MATH 118 (may be taken concurrently).
Typically Offered: Fall and spring
Functions and graphs, including polynomial, rational, exponential, logarithmic, and trigonometric functions. Systems of equations and inequalities, polar and parametric equations, complex numbers, and analytic trigonometry. 4 hours discussion. (005504)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division

MATH 119X  Precalculus Problem Session  1 Unit
Prerequisite: Faculty permission.
Corequisites: MATH 119.
Typically Offered: Fall and spring
Designed to supplement MATH 119 with additional applications. Provides the student with the opportunity for additional assistance in developing problem-solving abilities. 3 hours independent study. (005505)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 120  Analytic Geometry and Calculus  4 Units  GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready, MATH 118 and MATH 119 (or equivalent) with a C- or higher, or a qualifying score on the department administered calculus readiness assessment in addition to high school trigonometry and precalculus with a C- or higher.
Typically Offered: Fall and spring
Limits and continuity. The derivative and applications to related rates, maxima and minima, and curve sketching. Transcendental functions. An introduction to the definite integral and area. 4 hours discussion. (005506)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division

MATH 120X  Calculus Problem Session  1 Unit
Prerequisite: Faculty permission.
Corequisites: MATH 120.
Typically Offered: Fall and spring
Designed to supplement MATH 120 with additional applications of introductory calculus. Provides the student with the opportunity for additional assistance in developing problem-solving abilities. 3 hours independent study. (005510)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 121  Analytic Geometry and Calculus  4 Units  GE
Prerequisite: MATH 120.
Typically Offered: Fall and spring
The definite integral and applications to area, volume, work, differential equations, etc. Sequences and series, vectors and analytic geometry in 2 and 3-space, polar coordinates, and parametric equations. 4 hours discussion. (005507)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 121X  Calculus Problem Session  1 Unit
Prerequisite: Concurrent enrollment in MATH 121, faculty permission.
Typically Offered: Fall and spring
Designed to supplement MATH 121 with additional applications and expanded explanations of concepts encountered in second-semester calculus. Provides the student with the opportunity for additional assistance in coming to an understanding of the concepts of calculus. 3 hours independent study. (005511)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 125  Advanced Number and Operation  3 Units
Prerequisite: Successful completion of high school precalculus, concurrent enrollment in MATH 118 or 119, or faculty permission.
Typically Offered: Fall only
Investigate number and operation through calculation and abstraction, find patterns and relationships through computation, develop and test mathematical conjectures, and develop an appreciation of proof and an ability to make mathematical arguments. Basic concepts from Number Theory are explored, culminating in proof of the Fundamental Theorem of Arithmetic and related theorems in other number sets. 3 hours discussion. (021846)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division
MATH 130  Introduction to R  1 Unit
Typically Offered: Fall and spring
This accelerated short-course is designed as a primer to get the complete
novice up and running with the basic knowledge of how to use the
statistical programming language R. Target audience is anyone who
wants to become the boss of their own data and conduct their own
analysis. We cover how to get data into R, how to manipulate it into
analyzable format, and how to create informative plots. Emphasis
is placed on reproducibility and literate programming. The course
culminates with a data exploration project. This course requires the use
of a laptop computer and appropriate software. Typically offered as 3
hour seminar. (021774)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 2 units
Course Attributes: Lower Division; Laptop required

MATH 185  Data Analytics for Social Good  3 Units  GE
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
This course introduces students how to start harnessing the power
of data to intelligently cope with the requirements of citizenship,
employment, and family to be prepared for a healthy, happy and
productive life. Students practice collecting and wrangling data into a
usable form, visualizing large data sets to discover patterns, representing
data in a meaningful way, exploring varying interpretations of the data
and results, and discussing potentials for misuse and abuse. This course
promotes critical reflection on the ethical, social, cultural, and political
dimensions of data as well as providing direct hands on experience with
both spreadsheets, and the programming language R. Students from all
majors are welcome, no prior programming experience is expected. 1
hour activity, 2 hours lecture.  (022285)
General Education: Quantitative Reasoning (B4)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division; Laptop required

MATH 195  Project MATH Seminar Year 1  1 Unit
Typically Offered: Fall and spring
The Project M.A.T.H. Seminar - Year 1 is a biweekly seminar for students
in their first year of Project M.A.T.H., an innovative program for students
interested in becoming secondary mathematics teachers. Students work
with mentor teachers, prepare and present lessons, and participate in
a structured early field experience. Completion of the seminar series
satisfies the Credential Program's Early Field Experience requirement. 1
hour seminar.  (020431)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 2 units
Course Attributes: Lower Division

MATH 198  Special Topics  1-3 Units
Prerequisite: GE Mathematics/Quantitative Reasoning Ready.
Typically Offered: Fall and spring
This course is for special topics offered for 1.0-3.0 units. Typically the
topic is offered on a one-time-only basis and may vary from term to term
and be different for different sections. See The Class Schedule for the
specific topic being offered. 3 hours discussion.  (005528)
Grade Basis: Graded
Repeatability: You may take this course more than once
Course Attributes: Lower Division

MATH 199  Special Problems  1-3 Units
Typically Offered: Fall and spring
This course is an independent study of special problems offered for
1.0-3.0 units. 9 hours supervision.  (020782)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Lower Division

MATH 210  Concepts and Structures of Mathematics  3 Units
Prerequisite: MATH 110.
Typically Offered: Fall and spring
Problem-solving, probability and statistics, measurement and the metric
system, geometry. Not acceptable for a mathematics major or minor. 3
hours discussion.  (005523)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 217  Discrete Mathematics  3 Units
Prerequisite: GE Mathematics/Quantitative Reasoning Ready, CSCI 111
with a grade of C or higher (may be taken concurrently), MATH 119 (or
equivalent).
Typically Offered: Fall and spring
Offers an intensive introduction to discrete mathematics as used in
computer science. Topics include sets, relations, propositional and
predicate logic, basic proof methods including mathematical induction,
digital logic circuits, complexity of algorithms, elementary combinatorics,
and solving linear recurrence relations. 3 hours discussion.  (005550)
Cross listing(s): CSCI 217
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

MATH 220  Analytic Geometry and Calculus  4 Units
Prerequisite: MATH 121.
Typically Offered: Fall and spring
Vector functions and space curves. Functions of several variables, partial
derivatives, and multiple integrals. Vector calculus line integrals, surface
integrals, divergence/curl, Green’s Theorem, Divergence Theorem, and
Stokes’ Theorem. 4 hours discussion.  (005508)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division

MATH 220X  Calculus Problem Session  1 Unit
Corequisites: MATH 220.
Typically Offered: Fall and spring
Designed to supplement MATH 220 with broader and deeper applications
of calculus, providing students with opportunities for additional problem-
solving skill building. Twenty hours activity minimum for credit, but 40
hours are available to students. 3 hours independent study.  (020358)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Prerequisite</th>
<th>Typically Offered</th>
<th>Grade Basis</th>
<th>Repeatability</th>
<th>Course Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 225</td>
<td>Algebra Functions, Real and Complex Number Systems</td>
<td>3</td>
<td>MATH 125</td>
<td>Spring only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 230</td>
<td>An Introduction to Computational Mathematics</td>
<td>3</td>
<td>MATH 121, no previous computer experience required</td>
<td>Fall only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 9 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 235</td>
<td>Elementary Linear Algebra</td>
<td>3</td>
<td>MATH 121</td>
<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 241</td>
<td>Secondary Math Early Field Experience</td>
<td>1</td>
<td></td>
<td>Fall and spring</td>
<td>Credit/No Credit</td>
<td>You may take this course for a maximum of 4 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 260</td>
<td>Elementary Differential Equations</td>
<td>4</td>
<td>MATH 121</td>
<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course for a maximum of 4 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 260X</td>
<td>Elementary Differential Equations Problem Session</td>
<td>1</td>
<td>MATH 260</td>
<td>Fall and spring</td>
<td>Credit/No Credit</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 290</td>
<td>Mathematics and Statistics Tutoring</td>
<td>1</td>
<td>Concurrent enrollment in a course offered through the Dept of Mathematics Statistics at CSU, Chico.</td>
<td>Fall and spring</td>
<td>Credit/No Credit</td>
<td>You may take this course for a maximum of 8 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 295</td>
<td>Project MATH Seminar Year 2</td>
<td>1</td>
<td>MATH 195</td>
<td>Fall and spring</td>
<td>Credit/No Credit</td>
<td>You may take this course for a maximum of 2 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>MATH 298</td>
<td>Special Topics</td>
<td>1-3</td>
<td></td>
<td>Inquiry at department</td>
<td>Graded</td>
<td>You may take this course more than once</td>
<td>Lower Division</td>
</tr>
</tbody>
</table>
MATH 299  Special Problems  1-3 Units  
**Prerequisite:** Faculty permission.  
**Typically Offered:** Inquire at department  
This course is an independent study of special problems offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 0 hours supervision.  (021629)  
**Grade Basis:** Credit/No Credit  
**Repeatability:** You may take this course for a maximum of 6 units  
**Course Attributes:** Lower Division  

MATH 300  Undergraduate Mathematics Seminar  2 Units  
**Prerequisite:** GE Mathematics/Quantitative Reasoning Ready.  
**Typically Offered:** Fall and spring  
This course is designed to expose you to mathematics not normally covered in your regular curriculum. Guest speakers are drawn from the ranks of our faculty, including other disciplines, our students, and industry. Talks are interactive, participatory, and fun. There is no prerequisite, except an interest in interesting mathematics. Topics typically include selections from number theory, math education, statistics, problem solving, undergraduate research, calculus, differential equations, spatial and planar geometry, probability, computer applications, mathematical operations, modeling, topology, trigonometry, metric measurements, elliptical curves, and bubbles, among others. This exposure broadens your horizons and expands your curiosity in hopes that you will explore mathematics beyond your required courses. 2 hours lecture.  (021647)  
**Grade Basis:** Credit/No Credit  
**Repeatability:** You may take this course for a maximum of 8 units  
**Course Attributes:** Upper Division  

MATH 305  Conceptual and Practical Statistics  3 Units  
**Prerequisite:** MATH 120 or MATH 109 (may be taken concurrently).  
**Typically Offered:** Spring only  
Design of statistical experiments, graphing, sampling techniques, probability, and common probability distributions will be discussed, with an emphasis on practical applications. Uses and misuses of statistics, misrepresentation of data, and proper and improper statistical analyses will be discussed. 3 hours discussion.  (005532)  
**Grade Basis:** Graded  
**Repeatability:** You may take this course for a maximum of 3 units  
**Course Attributes:** Upper Division  

MATH 310  Patterns and Structures in Mathematics  3 Units  
**Prerequisite:** MATH 110; MATH 210 or MATH 225.  
**Typically Offered:** Fall and spring  
Builds upon student’s understanding of numbers and operations to develop their algebraic and proportional reasoning. Probability viewed as an application of proportional reasoning. Foundational statistics is also covered. Overall focus on developing a deep understanding of mathematics that is relevant to the teaching of Kindergarten-8th grade. Not acceptable for a mathematics major or minor except the Foundational Math Education option and Math Education minor. 3 hours discussion.  (005542)  
**Grade Basis:** Graded  
**Repeatability:** You may take this course for a maximum of 3 units  
**Course Attributes:** Upper Division  

MATH 311  Intuitive Foundations of Geometry  3 Units  
**Prerequisite:** MATH 110, MATH 210; or MATH 225.  
**Typically Offered:** Spring only odd years  
An intuitive approach to problem-solving in Euclidean, coordinate, motion, and space geometry. Concrete models are used for analyzing abstract ideas. Not acceptable for a mathematics major or minor other than the Math Education minor. 3 hours discussion.  (005543)  
**Grade Basis:** Graded  
**Repeatability:** You may take this course for a maximum of 3 units  
**Course Attributes:** Upper Division  

MATH 314  Probability and Statistics for Science and Technology  4 Units  
**Prerequisite:** MATH 121; and one of the following: CSCI 111, MATH 130 (may be taken concurrently), MATH 230 or MECH 208.  
**Typically Offered:** Fall and spring  
Basic concepts of probability and statistics with emphasis on models used in science and technology. Probability models for statistical estimation and hypothesis testing. Confidence limits. One- and two-sample inference, simple regression, one- and two-way analysis of variance. Credit cannot be received for both MATH 314 and MATH 315. 4 hours discussion.  (005533)  
**Grade Basis:** Graded  
**Repeatability:** You may take this course for a maximum of 4 units  
**Course Attributes:** Upper Division; Laptop required  

MATH 315  Applied Statistical Methods I  3 Units  
**Prerequisite:** MATH 105, MATH 109, or MATH 120, or faculty permission.  
**Typically Offered:** Fall and spring  
Single and two sample inference, analysis of variance, multiple regression, analysis of co-variance, experimental design, repeated measures, nonparametric procedures, and categorical data analysis. Examples are drawn from biology and related disciplines. The statistical programming language R is used. Appropriate for biology, agriculture, nutrition, psychology, social science and other majors. 3 hours discussion.  (005568)  
**Grade Basis:** Graded  
**Repeatability:** You may take this course for a maximum of 3 units  
**Course Attributes:** Upper Division  

MATH 317  Cryptography  4 Units  
**Prerequisite:** CSCI 111; MATH 217 or MATH 330W.  
**Typically Offered:** Spring only  
This is the first course in cryptography with an emphasis on public key cryptosystems, digital signature schemes, and the underlying mathematical principles on which they are based. Students implement algorithms and solve problems in programming-based assignments. Some time is devoted to getting familiar with the Python programming language and the SageMath Software system. 4 hours discussion.  (022044)  
**Grade Basis:** Graded  
**Repeatability:** You may take this course for a maximum of 4 units  
**Course Attributes:** Upper Division
### Mathematics (MATH)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
<th>Prerequisite</th>
<th>Typically Offered</th>
<th>Grade Basis</th>
<th>Repeatability</th>
<th>Course Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 330W</td>
<td>Methods of Proof (W)</td>
<td>3</td>
<td>GE Written Communication (A2) requirement and MATH 121.</td>
<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division; Writing Course</td>
</tr>
<tr>
<td>MATH 331</td>
<td>History of Mathematics</td>
<td>3</td>
<td>MATH 121; MATH 220 or MATH 225; and at least one upper division mathematics course. Recommended: MATH 330W.</td>
<td>Spring only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 337</td>
<td>Introduction to the Theory of Numbers</td>
<td>3</td>
<td>MATH 121, MATH 330W.</td>
<td>Fall only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 341</td>
<td>Mathematical Topics for the Credential</td>
<td>3</td>
<td>MATH 121 or MATH 225.</td>
<td>Fall only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 342</td>
<td>Math Topics for the Credential</td>
<td>3</td>
<td>MATH 341.</td>
<td>Spring only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 344</td>
<td>Graph Theory</td>
<td>3</td>
<td>MATH 121; CSCI 217, MATH 217, or MATH 330W.</td>
<td>Spring only odd years</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 346</td>
<td>College Geometry</td>
<td>3</td>
<td>MATH 220 or MATH 225, MATH 330W.</td>
<td>Spring only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 350</td>
<td>Introduction to Probability and Statistics</td>
<td>3</td>
<td>MATH 121.</td>
<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 351</td>
<td>Introduction to Probability and Statistics</td>
<td>3</td>
<td>MATH 350.</td>
<td>Spring only</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
</tbody>
</table>
MATH 360 Ordinary Differential Equations 3 Units
Prerequisite: MATH 260.
Typically Offered: Spring only
Systems of first order linear equations, existence and uniqueness theorems, stability, Sturm separation theorems, power series methods. 3 hours discussion. (005538)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 361 Boundary Value Problems and Partial Differential Equations 3 Units
Prerequisite: MATH 260.
Typically Offered: Fall only
Partial differential equations, separation of variables, orthogonal sets of functions, Sturm-Liouville problems, Fourier series, boundary value problems for the wave equation, heat equation, and Laplace equation; Bessel functions, Legendre polynomials. 3 hours discussion. (005540)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 365 Introduction to Data Science 3 Units
Prerequisite: CSCI 111, MATH 130, or MATH 230; MATH 109 or MATH 120.
Typically Offered: Fall only
Data Science is the science of learning from data in order to gain useful predictions and insights. The course provides an overview of the wide area of data science, with a particular focus on the tools required to store, clean, manipulate, visualize, model, and ultimately extract information from various sources of data. Topics include the analytics life cycle, data integration and modeling in R/Python, relational databases and SQL, text processing and sentiment analysis, and data visualization. Emphasis is placed on reproducible research, code sharing, version control, and communicating results to a non-technical audience. 3 hours discussion. (021756)
Cross listing(s): CSCI 385
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 398 Special Topics in Math 1-3 Units
Prerequisite: At least one 100- or 200-level mathematics course appropriate to the subject, faculty permission.
Typically Offered: Fall and spring
This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 9 hours supervision. (005559)
Grade Basis: Graded
Repeatability: You may take this course more than once
Course Attributes: Upper Division

MATH 399 Special Problems 1-3 Units
Typically Offered: Fall and spring
This course is an independent study of special problems offered for 1.0-3.0 units. You must register directly with a supervising faculty member. MATH 399 cannot be used to fulfill major requirements without prior approval of the advisor and department chair. 0 hours supervision. (005560)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

MATH 401 CMP Institute - Summer 1 2 Units
Typically Offered: Summer session only
CMP Institute - Summer 1 2 hours discussion. (005578)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

MATH 405 Cmp Institute-Sp 1 Unit
Typically Offered: Spring only
1 hour lecture. (005552)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

MATH 407 CMP Institute - Summer 2 1 Unit
Typically Offered: Summer session only
1 hour discussion. (005579)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 2 units
Course Attributes: Upper Division

MATH 420W Advanced Calculus (W) 3 Units, W, GW
Prerequisite: GE Written Communication (A2) requirement, MATH 220, MATH 330W, upper-division standing.
Typically Offered: Fall and spring
Limits, continuity, uniform continuity, the definite integral, series, convergence, uniform convergence, and metric spaces. Differentiation and integration of functions of several variables. Transformation of multiple integrals. 3 hours discussion. (005575)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division; Writing Course; Graduation Writing Assessment

MATH 421 Advanced Calculus 3 Units
Prerequisite: MATH 420W.
Typically Offered: Spring only
Continuation of MATH 420W. 3 hours discussion. (005576)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 425W Computational and Communication in Mathematical Modeling (W) 3 Units, W, GW
Prerequisite: GE Written Communication (A2) requirement, completion of computer literacy requirement, MATH 225, MATH 235, MATH 330W, and upper division standing.
Typically Offered: Fall only
In this course, intended for pre-service teachers, student experience mathematical modeling with content common in the secondary setting (algebra through calculus) as well as from their undergraduate coursework and develop and produce formal modeling reports. Students use technology to aid in exploring real-world circumstances, make sense of and analyze existing models, and develop their own mathematical models. 3 hours discussion. (021977)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division; Writing Course; Graduation Writing Assessment
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
<th>Prerequisite(s)</th>
<th>Typically Offered</th>
<th>Corequisites</th>
<th>Grade Basis</th>
<th>Repeatability</th>
<th>Course Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 428</td>
<td>Differential Geometry</td>
<td>3</td>
<td>MATH 220, MATH 330W.</td>
<td>Fall only odd years</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 435</td>
<td>Linear Algebra</td>
<td>3</td>
<td>MATH 220, MATH 235, MATH 330W.</td>
<td>Spring only even years</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 437</td>
<td>Topology</td>
<td>3</td>
<td>MATH 220, MATH 330W.</td>
<td>Fall only even years</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 441</td>
<td>Math Topics for the Credential</td>
<td>4</td>
<td>MATH 342.</td>
<td></td>
<td></td>
<td>Credit/No Credit</td>
<td>You may take this course for a maximum of 8 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 442</td>
<td>Mathematics and the Teaching of Mathematics</td>
<td>3</td>
<td>MATH 342.</td>
<td>Fall only</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 449</td>
<td>Modern Algebra</td>
<td>3</td>
<td>MATH 220, MATH 235, MATH 330W.</td>
<td>Fall only</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 450</td>
<td>Mathematical Statistics</td>
<td>3</td>
<td></td>
<td>Fall only</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 451</td>
<td>Modern Algebra II</td>
<td>3</td>
<td>MATH 449.</td>
<td>Spring only odd years</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 455</td>
<td>Applied Statistical Methods II</td>
<td>3</td>
<td>MATH 314 or MATH 315.</td>
<td>Spring only even years</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>MATH 458</td>
<td>Sampling Methods</td>
<td>3</td>
<td>MATH 314, MATH 315, or MATH 351 (may be taken concurrently).</td>
<td>Spring only odd years</td>
<td></td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division</td>
</tr>
</tbody>
</table>
MATH 461 Numerical Analysis 3 Units
Prerequisite: MATH 220 or MATH 260; completion of computer literacy requirement.
Typically Offered: Spring only
Approximation; numerical integration; numerical solution of ordinary and partial differential equations; interpolation and extrapolation. 3 hours discussion. (005584)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 465 Introduction to Complex Variables 3 Units
Prerequisite: MATH 220.
Typically Offered: Fall only
Algebra of Complex Numbers, Cauchy-Riemann Equations, the exponential, trigonometric, and logarithmic functions, complex integration and Cauchy integral formula, Taylor and Laurent series, the residue theorem, conformal mapping, and applications. 3 hours discussion. (005577)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 472 Introduction to Chaotic Dynamical Systems 3 Units
Prerequisite: MATH 260. Recommended: MATH 235, MATH 360.
Typically Offered: Fall only odd years
An introduction to the study of non-linear dynamical systems. Both discrete and continuous systems will be studied using classical analysis combined with geometric techniques and computer simulation. Areas of application include fractal geometry, coding theory, fluid turbulence, population fluctuation, and chaotic vibrations of structures and circuits. 3 hours discussion. (005588)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 475 Calculus of Variations 3 Units
Prerequisite: MATH 260, MATH 361 is recommended.
Typically Offered: Fall only even years
Classical problems in the calculus of variations. Euler-Lagrange equations. Isoperimetric problems, Fermat’s principle. Lagrangian and Hamiltonian mechanics of particles. Two independent variables. Applications to physics and engineering. 3 hours discussion. (005590)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 480 Mathematical Modeling 3 Units
Prerequisite: MATH 235, MATH 260.
Typically Offered: Spring only
The translation of real world phenomena into mathematical language. Possible applications include population and competing species models, mathematical theories of war, traffic flow, river pollution, water waves and tidal dynamics, probabilistic and simulation models. 3 hours discussion. (005592)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 485 Advanced Topics in Data Science 3 Units
Prerequisite: CSCI 385 or MATH 385; MATH 456 (may be taken concurrently).
Typically Offered: Spring only
Getting connected to current events in Data Science and building an online presence. Ethics of predictive analytics and privacy and open data. Reporting and dissemination of research using interactive dashboards and web-publishing. Introduction to current scalable technologies to handle Big Data. Introduction to advanced statistical analysis and machine learning techniques for Data Science. 3 hours lecture. (021890)
Cross listing(s): CSCI 485
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

MATH 490 Data Science Capstone 1-3 Units
Prerequisite: MATH 485, senior standing, approved project, enrollment in the Data Science Certificate Program.
Typically Offered: Fall and spring
Students work independently to provide a service in the form of a data product to a local business, researcher, or community member. Students provide status reports at weekly meetings and present their finished project to a group of peers at the end of the semester in an appropriate venue such as at an undergraduate seminar series or poster symposium. 0 hours supervision. (021898)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

MATH 495H Honors Reading Course 3 Units
Prerequisite: Admission to the Department Honors Program, completion of MATH 420W with a grade of B or higher.
Typically Offered: Fall and spring
Directed reading in an advanced topic under the guidance of an Honors thesis supervisor. The course exceeds the usual level of difficulty associated with undergraduate work. It provides the background necessary to write an Honors thesis. 9 hours supervision. (005595)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

MATH 498 Advanced Topics in Mathematics 1-3 Units
Prerequisite: At least one 300- or 400-level mathematics course appropriate to the subject, faculty permission.
Typically Offered: Fall and spring
This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 3 hours supervision. (005593)
Grade Basis: Graded
Repeatability: You may take this course more than once
Course Attributes: Upper Division

MATH 499 Special Problems 1-3 Units
Prerequisite: Faculty permission.
Typically Offered: Fall and spring
This course is an independent study of special problems offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 3 hours supervision. (005594)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division
MATH 499H Honors Thesis 3 Units
Prerequisite: Completion of MATH 495H with a grade of B or higher, and
approval by the department Honors advisor and thesis supervisor of the
proposed thesis topic.
Typically Offered: Fall and spring
Preparation of written thesis in mathematics under supervision of Honors
thesis advisor. The thesis, based on studies begun in MATH 495H, will
require original work beyond that normally required in undergraduate
work. Completed written thesis must be approved by the thesis
supervisor and Honors advisor. A summary of the thesis will be presented
by the student in public lecture. Successful completion of MATH 495H
and MATH 499H is one of the requirements for being designated as an
Honors graduate in mathematics. 9 hours supervision. (005596)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

MATH 610 Topics in Mathematics for Secondary Teachers: Analysis 3 Units
Prerequisite: Admission to the master's program in mathematics
education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics
teachers explore analysis topics appropriate for the secondary
school curriculum. These topics and strategies provide a basis for
reflective analysis and deepening knowledge of analysis. 3 hours
discussion. (005597)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 615 Statistical Methods for Graduate Research 3 Units
Prerequisite: MATH 105, MATH 305, MATH 315, or MATH 350 (only one is
required).
Typically Offered: Fall only
Introduction to common procedures used to analyze data. Single and
two-sample inference, analysis of variance, multiple regression, analysis
of co-variance, experimental design, repeated measures, nonparametric
procedures, and categorical data analysis. Examples will be drawn from
Biology and related disciplines. Statistical computer packages will be
introduced. Appropriate for biology, agriculture, nutrition, psychology,
social science, and other majors. 3 hours discussion. (005598)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Graduate Division

MATH 620 Topics in Mathematics for Secondary Teachers: Geometry 3 Units
Prerequisite: Admission to the master's program in mathematics
education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics
teachers explore geometry appropriate for the secondary school
curriculum. These topics and strategies provide a basis for
reflective analysis and deepening knowledge of geometry. 3 hours
seminar. (005601)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 630 Topics in Mathematics for Secondary Teachers: Foundations of Mathematics 3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics
teachers explore the foundations of mathematics topics appropriate for
the secondary school curriculum. These topics and strategies provide a
basis for reflective analysis and deepening knowledge of the foundations
of mathematics. 3 hours seminar. (005602)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 633 Topics in Mathematics for Secondary Teachers: Number Theory 3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics
teachers explore number theory appropriate for the secondary
school curriculum. These topics and strategies provide a basis for
reflective analysis and deepening knowledge of number theory. 3 hours
seminar. (005603)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 635 Topics in Mathematics for Secondary Teachers: Discrete Mathematics 3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics
teachers explore discrete mathematics topics appropriate for the
secondary school curriculum. These topics and strategies provide a basis for
reflective analysis and deepening knowledge of discrete mathematics. 3 hours
seminar. (005604)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 637 Topics in Mathematics for Secondary Teachers: History of Mathematics 3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics
teachers explore the history of mathematics appropriate for the
secondary school curriculum. These topics and strategies provide a
basis for reflective analysis and deepening knowledge of the history of
mathematics. 3 hours seminar. (005605)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division
MATH 640  Topics in Mathematics for Secondary Teachers: Modern Algebra  3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics teachers explore modern algebra topics appropriate for the secondary school curriculum. These topics and strategies provide a basis for reflective analysis and deepening knowledge of modern algebra. 3 hours seminar. (005598)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 650  Topics in Mathematics for Secondary Teachers: Probability and Statistics  3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics teachers explore probability and statistics appropriate for the secondary school curriculum. These topics and strategies provide a basis for reflective analysis and deepening knowledge of probability and statistics. 3 hours seminar. (005606)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 660  Topics in Mathematics for Secondary Teachers: Mathematical Modeling  3 Units
Prerequisite: Admission to the master's program in mathematics education or instructor permission.
Typically Offered: Inquire at department
Through an array of pedagogical strategies, secondary mathematics teachers explore mathematical modeling appropriate for the secondary school curriculum. These topics and strategies provide a basis for the reflective analysis and deepening knowledge of mathematical modeling. 3 hours seminar. (005604)
Grade Basis: Report in Progress: ABC/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 697  Independent Study  1-3 Units
Typically Offered: Fall and spring
This course is a graduate-level independent study offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 3 hours supervision. (005616)
Grade Basis: Report in Progress: Graded
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 698  Grad Advanced Topics in Math  1-3 Units
Typically Offered: Fall and spring
This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 9 hours supervision. (005615)
Grade Basis: Graduate Graded
Repeatability: You may take this course more than once
Course Attributes: Graduate Division

MATH 699P  Master's Project  1-3 Units
Typically Offered: Fall and spring
This course is offered for 1.0-6.0 units. You must register directly with a supervising faculty member. 9 hours supervision. (005622)
Grade Basis: Report in Progress: CR/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

MATH 699T  Master's Study  1-3 Units
Typically Offered: Fall and spring
This course is offered for 1.0-6.0 units. You must register directly with a supervising faculty member. 9 hours supervision. (005620)
Grade Basis: Report in Progress: CR/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division