



The Department of

MATHEMATICS AND

COMPUTER SCIENCE

"Inspired by Dr. Bresee's prophetic vision and a glorious Centennial Celebration of God's Grace, I believe the future of Point Loma Nazarene University is as bright as the promises of God."

~ Kimber Moulton, Class of 1949, Former Member of the Board of Trustees

OBJECTIVES

1. To provide preparation for:
 - careers that use mathematics, computer science and management information systems in business, industry or government.
 - graduate study in mathematics, computer science and management information systems.
 - teaching mathematics and computer science at the secondary level.
2. To train students in the appropriate use of technology.
3. To provide understanding of, and appreciation for, the historical development, contemporary progress, and societal role of mathematics and computer science.
4. To prepare students to make sound value judgments from a Christian perspective by integrating training in mathematics and computer science with the Christian liberal arts.

TRADITION OF EXCELLENCE...

The Department of Mathematics and Computer Science features a highly skilled team of professors who share their wealth of knowledge with students both in and out of the classroom. The personal attention of the faculty and innovative learning environment help students to comprehend concepts in mathematics and computer science. The accomplished faculty also conducts research with current students. Recently, topics have included random number generation, music and graph theory, stereo vision using genetic algorithms and artificial intelligence. These types of research opportunities provide experience with modern technology and current real-world applications.

STEP INTO YOUR FUTURE...

Students who graduate with a degree from the Department of Mathematics and Computer Sciences are prepared to succeed. Students have chosen careers in actuarial science, industrial engineering, information science, applied mathematics, statistics, espionage, teaching, software engineering, project management, and systems analysis.

FACULTY

Lorinda Carter, Ph.D.

University of California, San Diego

Gregory Crow, Ph.D.

University of Notre Dame

Donald S. Evans, B.S.

Stanford University

Jesús Jiménez, Ph.D.

University of Utah

Dean A. Marsh, D.A.

University of Northern Colorado

Jeffrey L. McKinstry, Ph.D.

University of California, San Diego

Sheldon O. Sickler, Ph.D.

University of California, Los Angeles

David L. Strawn, Ph.D.

University of Minnesota

Bradley S. Whitaker, M.A.

Teachers College, Columbia University

Maria R. Zack, Ph.D.

University of California, San Diego

Computer Science MAJOR

In addition to the departmental objectives, the goal of the major in Computer Science is for students to understand the field of computing both as an academic discipline and as a profession.

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
CSC 134	Introduction to Computer Science	.4
CSC 154	Fundamentals of Computer Science	.4
CSC 254	Data Structures and Algorithms	.4
MTH 164	Calculus I*	.4
MTH 174	Calculus II*	.4
TOTAL		17-20

*Mathematics 145, Calculus with Applications (5 units) may be substituted for this sequence.

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
CSC 314	Operating Systems	.4
CSC 324	Software Engineering	.4
CSC 394	Programming Languages	.4
CSC 454	Computer Architecture and Assembly Language	.4
CSC 494	Senior Software Project	.4
MTH 322	Discrete Mathematics	.2
<i>14 additional units chosen from:</i>		
CSC 334	Artificial Intelligence	.4
CSC 354	Algorithm Analysis and Theory of Computation	.4
CSC 374	Computer Networks and Parallel Processing	.4
CSC 414	Topics in Computer Science	.4
MIS 412	Database Management Systems	.2
MIS 470	Internship in MIS	.2
MTH 372	Numerical and Symbolic Computation	.2
TOTAL		36

Mathematics MAJOR

In addition to the departmental objectives, the goal of the major in Mathematics is for students to understand mathematics as an academic discipline and to master the skills used in mathematical professions.

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
MTH 164	Calculus I	.4
MTH 174	Calculus II	.4
MTH 232	Linear Algebra	.2
MTH 242	Number Theory with Proofs	.2
MTH 274	Calculus III	.4
CSC 134	Introduction to Computer Science	.4
CSC 154	Fundamentals of Computer Science	.4
PHY 241	University Physics I	.4
TOTAL		28

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
MTH 334	Applied Mathematics	<i>OR</i>
MTH 364	Mathematical Statistics	.4
MTH 424	Real Analysis I	.4
MTH 444	Abstract Algebra I	.4
MTH 432	Real Analysis II	<i>OR</i>
MTH 452	Abstract Algebra II	.2
MTH 492	Special Topics in Mathematics	.2
<i>Six additional elective units from:</i>		
MTH 312	Advanced Linear Algebra	.2
MTH 322	Discrete Mathematics	.2
MTH 334	Applied Mathematics	.4
MTH 352	History of Mathematics	.2
MTH 364	Mathematical Statistics	.4
MTH 372	Numerical and Symbolic Computation	.2
MTH 402	Topics in Geometry	.2
MTH 412	Complex Analysis	.2
MTH 432	Real Analysis II	.2
MTH 452	Abstract Algebra II	.2
MTH 491	Independent Studies in Mathematics	1-3
MTH 492	Special Topics in Mathematics	.2
TOTAL		22

RECOMMENDED ELECTIVES FOR DEPARTMENT TRACKS

Graduate School in Pure Mathematics: Abstract Algebra II and Real Analysis II, Advanced Linear Algebra, Complex Analysis.

Graduate School in Applied Mathematics: Mathematical Statistics, Applied Mathematics, Numerical and Symbolic Computation, Advanced Linear Algebra.

Teaching: Topics in Geometry, History of Mathematics, Mathematical Statistics, Discrete Mathematics and Secondary School Methods (Mathematics 463) (These classes are required by the State of California for a secondary credential.)

Industry: Mathematical Statistics and Applied Mathematics, Complex Analysis, Numerical and Symbolic Computation.

Actuary: Mathematical Statistics, Numerical and Symbolic Computation, Advanced Linear Algebra, Discrete Mathematics.

Management Information Systems

INTERDEPARTMENTAL MAJOR

In addition to the departmental objectives, the goal of the major in Management Information Systems is to prepare students for management positions in business information systems.

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
CSC 134	Introduction to Computer Science	.4
CSC 154	Fundamentals of Computer Science	.4
CSC 254	Data Structures and Algorithms	.4
ACC 201	Principles of Accounting I	.4
MTH 203	Introduction to Statistics <i>OR</i>	
MTH 364	Mathematical Statistics	.3-4
TOTAL		.19-20

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
MIS 304	Business Application Software	.4
MIS 314	Operating Systems	.4
MIS 324	Software Engineering	.4
MIS 412	Data Base Management Systems	.2
MIS 470	Internship in MIS	.2
MIS 484	Operations Management	.4
CSC 374	Computer Networks and Parallel Processing	.4
BUS 301	Legal Environment of Business	.4
<i>Eight units from:</i>		
BUS 312	Principles of Management	.4
BUS 313	Administrative Communication	.4
BUS 374	Industrial Organizational Psychology/Human Resources	.4
BUS 410	Business Finance	.4
TOTAL		.36

Computer Science MINOR

A minor in Computer Science is offered to those who wish to complement study in another discipline. This minor is not available to students who earn a major in Management Information Systems. The requirements are:

LOWER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
CSC 134	Intro to Computer Science	.4
CSC 154	Fundamentals of Computer Science	.4
CSC 254	Data Structures and Algorithms	.4
TOTAL		.12

UPPER-DIVISION REQUIREMENTS

COURSE #	TITLE	UNITS
<i>Choose 10 units from:</i>		
CSC 314	Operating Systems	.4
CSC 324	Software Engineering	.4
CSC 334	Artificial Intelligence	.4

CSC 354	Algorithm Analysis and Theory of Computation	.4
CSC 374	Computer Networks and Parallel Processing	.4
CSC 394	Programming Languages	.4
CSC 414	Topics in Computer Science	.4
CSC 454	Computer Architecture and Assembly Language	.4
MIS 412	Data Base Management Systems	.2
TOTAL		.10

Management Information Systems MINOR

A minor in Management Information Systems is offered to those who wish to complement study in another discipline. This minor is not available to students who earn a major in Computer Science.

REQUIRED COURSES

COURSE #	TITLE	UNITS
CSC 134	Introduction to Computer Science	.4
CSC 154	Fundamentals of Computer Science	.4
CSC 254	Data Structures and Algorithms	.4
ACC 201	Principles of Accounting I	.4
BUS 312	Principles of Management	.4
<i>Choose six additional units from:</i>		
MIS 304	Business Application Software	.4
MIS 314	Operating Systems	.4
MIS 324	Software Engineering	.4
MIS 412	Data Base Management Systems	.2
MIS 484	Operations Management	.4
TOTAL		.26

Mathematics MINOR

REQUIRED COURSES

COURSE #	TITLE	UNITS
MTH 164	Calculus I	.4
MTH 174	Calculus II	.4
MTH 232	Linear Algebra	.2
<i>Choose 12 additional units from:</i>		
MTH 242	Number Theory with Proofs	.2
MTH 274	Calculus III	.4
MTH 312	Advanced Linear Algebra	.2
MTH 322	Discrete Mathematics	.2
MTH 334	Applied Mathematics	.4
MTH 364	Mathematical Statistics	.4
MTH 372	Numerical and Symbolic Computation	.2
MTH 402	Topics in Geometry	.2
MTH 412	Complex Analysis	.2
MTH 424	Real Analysis I	.4
MTH 432	Real Analysis II	.2
MTH 444	Abstract Algebra I	.4
MTH 452	Abstract Algebra II	.2
MTH 492	Special Topics in Mathematics	.2
TOTAL		.22

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Mathematics and Computer Science

Computer Science COURSES

CSC 122 (2) INTRODUCTION TO COMPUTERS

An introduction to the tools used for computing, including operating system commands, word-processing, spreadsheets, network communication, graphical presentation tools, and database application programs. In addition an introduction to personal computer hardware, its characteristics and the ethical considerations of computing are considered.

Prerequisite: Mathematics 099

CSC 134 (4) INTRODUCTION TO COMPUTER SCIENCE

An overview of the field of computer science, including computer architecture, operating systems and networks, algorithms, programming languages, software engineering, artificial intelligence and the theory of computation. Introduces the syntax of a high level programming language (C++) with emphasis on the programming environment and the use of the constructs of the language to write simple application programs. Lecture two hours and laboratory four hours each week.

CSC 154 (4) FUNDAMENTALS OF COMPUTER SCIENCE

In the context of a modern programming language, such topics as problem solving strategies, basic data structures, and data and procedural abstraction are discussed. Programming problems involve game playing and the use of a graphical user interface. Lecture two hours and laboratory four hours each week.

Prerequisite: Computer Science 134.

CSC 254 (4) DATA STRUCTURES AND ALGORITHMS

Standard data structures, including queues, stacks, trees, and graphs, as objects are defined and illustrated with associated dynamic storage management mechanisms; computational complexity is explored through the design and analysis of searching, sorting, and graph algorithms. Lecture three hours and laboratory two hours each week.

Prerequisite: Computer Science 154.

CSC 314 (4) OPERATING SYSTEMS

A course in systems software that is largely concerned with operating systems. Such topics as process management, device management, and memory management are discussed, as are relevant issues associated with security and protection. Computer hardware concepts related to operating systems are also covered. A significant component of the course covers graphical user interface, application programmer interface (API) provided by modern operating systems such as Windows NT and Unix.

Prerequisite: Computer Science 254.

CSC 324 (4) SOFTWARE ENGINEERING

This course offers an in-depth treatment of the software development process. Software analysis and design study emphasizes an object-oriented approach that is introduced and contrasted with traditional design methodologies. CASE tools are used during the design process. Lecture three hours and laboratory two hours each week. Alt.+
Corequisite: Computer Science 254.

CSC 334 (4) ARTIFICIAL INTELLIGENCE

An introduction to theoretical issues and computational techniques arising from a comparison of human and machine intelligences. Knowledge representation languages; problem-solving heuristics; machine learning; artificial neural networks; genetic algorithms and application areas including vision, robotics, and natural language understanding will be reviewed. Alt.*

Prerequisite: Computer Science 254.

CSC 354 (4) ALGORITHM ANALYSIS AND THEORY OF COMPUTATION

A review of graph theory and basic graph algorithms. Computational complexity beyond order N^2 , including the ideas of tractable, intractable, and unsolvable problems. Complexity classes P, NP and NC are characterized along with the notion of Turing machine and Turing computability. Lecture three hours and laboratory two hours each week. Alt.*

Prerequisites: Computer Science 254 and Mathematics 322.

CSC 374 (4) COMPUTER NETWORKS AND PARALLEL PROCESSING

Current methods and practices in the use of computer networks are covered. The physical and architectural elements and information layers of a communication network are explained. Further discussion will include: the diagnostic, design, operational, and performance measurement tools used to implement, operate, and tune such a network. Different network architectures are contrasted and compared with traditional mainframe and time-shared computer models. Alt.*
Corequisite: Computer Science 254.

CSC 394 (4) PROGRAMMING LANGUAGES

This course in programming languages covers language design issues and language translators. Laboratories will give students a practical understanding of programming language concepts as well as give experience in programming several programming languages. Lecture three hours and laboratory two hours each week. Alt.*

Prerequisite: Computer Science 154.

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Mathematics and Computer Science

CSC 414 (4) TOPICS IN COMPUTER SCIENCE

Study of an area of computer science not otherwise included in the curriculum. Topics are determined by the needs and interest of the students and faculty involved. Alt.+

Prerequisites: Computer Science 254, Mathematics 145 or Mathematics 164.

CSC 454 (4) COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE

An in-depth treatment of computer architecture, including digital logic, digital systems, memory system organization, interfacing and communications, and alternative architectures. Students gain experience writing assembly language programs. Lecture three hours and laboratory two hours each week. Alt.+

Prerequisite: Computer Science 154.

CSC 491 (1-4) INDEPENDENT STUDIES IN COMPUTER SCIENCE

Study of a selected problem or topic under the direction of an instructor. Instructor and student will propose the course of study. Approval by department chair is required. May be repeated for up to a maximum four units credit.

CSC 494 (4) SENIOR SOFTWARE PROJECT

This course presents the student with a strong experience in software engineering. Students, working in teams, investigate, design, implement and present to their classmates a significant software project. The project should solve a significant, complex and generalizable problem, dealing with constraints and trade-offs in the solution. The course includes study of project management concerns such as planning, scheduling, and assessing progress.

Prerequisites: Computer Science 324 and senior standing.

Management Information Systems

COURSES

MIS 304 (4) BUSINESS APPLICATION SOFTWARE

Business applications with in-depth programming of spreadsheets and databases plus an intensive look at microcomputer-based business management software.

Prerequisite: Computer Science 154.

MIS 314 (4) OPERATING SYSTEMS

A course in systems software that is largely concerned with operating systems. Such topics as process management, device management, and memory management are discussed, as are relevant issues associated with security and protection. Computer hardware concepts related to operating systems are also covered. A significant component of the course covers graphical user interface application programmer interface (API) provided by modern operating systems such as Windows NT and Unix.

Corequisite: Computer Science 254.

MIS 324 (4) SOFTWARE ENGINEERING

This course offers an in-depth treatment of the software development process. Software analysis and design study emphasizes an object-oriented approach that is introduced and contrasted with traditional design methodologies. CASE tools are used during the design process. Lecture three hours and laboratory two hours each week. Alt.+

Corequisite: Computer Science 254.

MIS 412 (2) DATABASE MANAGEMENT SYSTEMS

Physical data organization, data models (including relational, network, and hierarchical), the CODASYL approach, query optimization, integrity, and security of databases. An examination of currently available models that can be used to evaluate the trade-offs in systems and database developments. Alt.*

Corequisite: Computer Science 154.

MIS 470 (2) INTERNSHIP IN MIS

A supervised experience in which the student works with industry professionals to gain experience with managing information systems. May be repeated to a total of four units.

Prerequisite: Consent of instructor.

MIS 484 (4) OPERATIONS MANAGEMENT

An analysis of the information support systems which aid the manager in the decision-making process. Topics include mathematical and computer models for production and operations management, allocation of resources, planning, and financial analysis.

Prerequisite: Mathematics 203 or 364.

Mathematics COURSES

MTH 099 (3) ELEMENTARY ALGEBRA

An introduction to algebra, including a study of the real number system, solutions of linear and quadratic equations, polynomials, factoring, systems of equations, graphing, inequalities, and radicals.

NOTE: This course does not count toward the 128 units required for graduation.

MTH 113 (3) INTERMEDIATE ALGEBRA

A review and extension of elementary algebra, solutions of linear and quadratic equations, radicals, inequalities, linear and quadratic functions, polynomial functions, exponential and logarithmic functions, and graphing.

Prerequisite: Mathematics 099 (or equivalent).

MTH 123 (3) ELEMENTARY FUNCTIONS

A basic introduction to functions designed to meet the prerequisite skills necessary for the study of calculus. A study of polynomial, rational, exponential, logarithmic, and trigonometric functions, coordinate geometry, and graphing.

Prerequisite: Mathematics 113 (or equivalent).

MTH 131 (1) COMPUTER AIDED CALCULUS

Introduction to the use of a computer algebra system to complement the knowledge of Calculus.

Prerequisite: AP Calculus or a calculus course taken at another college or university.

MTH 145 (5) CALCULUS WITH APPLICATIONS - GE

Differential and integral calculus of elementary functions of one variable, supported by use of computer graphics and a symbolic computer system. Limits, continuity, derivatives, integrals, and applications. Lecture four hours and computer laboratory two hours each week.

Prerequisite: Mathematics 123 (or equivalent).

MTH 164 (4) CALCULUS I - GE

Calculus of the elementary functions of one variable, supported by the use of computer graphics and a symbolic computer algebra system. Limits, continuity, derivatives, integration and applications.

Prerequisite: Mathematics 123 (or placement test).

MTH 174 (4) CALCULUS II

A continuation of Calculus I. Methods of integration, sequences, series, elementary differential equations, polar coordinates and parametric equations.

Prerequisites: Mathematics 131, 145 or 164.

MTH 203 (3) INTRODUCTION TO STATISTICS

A first course in statistics for the general student. Description of sample data, probability theory, theoretical frequency distributions, sampling, estimation, and hypothesis testing. Not applicable toward a major in mathematics.

Prerequisite: Mathematics 099 (or equivalent).

MTH 232 (2) LINEAR ALGEBRA

A computational introduction to linear algebra with applications. A study of linear equations, matrix algebra, Euclidean spaces and subspaces supported by the use of a symbolic computer algebra system.

Prerequisite: Mathematics 145 or 174.

MTH 242 (2) NUMBER THEORY WITH PROOFS

An introduction to proofs using the study of natural numbers, integers, prime factorization, divisibility, congruences, multiplicative functions, continued fractions, quadratic residues. Methods used include investigation, conjecture, inductive and deductive proofs.

Prerequisite: Mathematics 145 or 164.

MTH 274 (4) CALCULUS III

Conceptual development of the calculus of functions of more than one variable supported by the use of a symbolic computer algebra system. Limits and continuity, partial derivatives, chain rule, extreme values, Taylor's theorem, multiple integrals, line and surface integrals, Green's Theorem and Stokes' Theorem.

Prerequisite: Mathematics 174.

MTH 303 (3) PROBLEM SOLVING - GE

A General Education course whose major goal is to develop the ability to solve non-routine problems through dynamic processes of inquiry and exploration, logical reasoning, making and testing conjectures and investigating implications of conclusions. A study of major concepts, methods, and applications of quantitative reasoning with emphases on active problem solving and developing connections with other disciplines. Not applicable toward a major in mathematics.

Prerequisites: Mathematics 099 (or equivalent) and junior or senior standing.

MTH 312 (2) ADVANCED LINEAR ALGEBRA

A continuation of MTH 232 with emphasis on the theory of vector spaces, linear transformations, eigenvalues, eigenvectors and inner products. Alt.+

Prerequisite: Mathematics 232.

MTH 314 (4) MATHEMATICS FOR ELEMENTARY TEACHERS I

An integrated approach to the concepts and methods of elementary school mathematics. Problem solving, sets and numbers, numeration systems, number systems. Number theory, fractions and decimals, probability, statistics, geometry (including the Van Hiele levels), and measurement (including SI metrics). Use of calculators and computers, manipulative materials and activities, small group cooperative learning, constructivist learning theory, and recommendations of professional organizations. Lecture three hours and laboratory two hours each week. Passing a mathematics proficiency test is a requirement for the completion of this course; it is strongly recommended though not required, that the student take this proficiency test before entering the class. Not applicable toward a major in mathematics.

Prerequisite: Mathematics 099 (or equivalent).

Recommended: Education 408.

**MTH 321 (1) LABORATORY IN MATHEMATICS FOR
ELEMENTARY TEACHERS I**

This course consists of a two-hour weekly laboratory integrating mathematical concepts and methods in a hands-on environment. May be taken only by students who have credit from another institution in one or more courses covering mathematical concepts for elementary teachers. Not applicable toward a major in mathematics.

Prerequisite: Mathematics 314.

MTH 322 (2) DISCRETE MATHEMATICS

Sets, functions, propositional logic and switching theory, graphs including trees, matrices, induction and proof by contradiction, combinatorics, and probability. Selected applications from computer science included. Alt.*

Prerequisites: Mathematics 145 or 164.

MTH 324 (4) MATHEMATICS FOR ELEMENTARY TEACHERS II

Continuation of Mathematics 314. Passing a mathematics proficiency test is a requirement for the completion of this course; it is strongly recommended though not required, that the student take this proficiency test before entering the class. Not applicable toward a major in mathematics.

Prerequisite: Mathematics 314.

**MTH 331 (1) LABORATORY IN MATHEMATICS FOR
ELEMENTARY TEACHERS II**

This course consists of a two-hour weekly laboratory integrating mathematical concepts and methods in a hands-on environment. May be taken only by students who have credit from another institution in one or more courses covering mathematical concepts for elementary teachers. Not applicable toward a major in mathematics.

Prerequisite: Mathematics 324.

MTH 334 (4) APPLIED MATHEMATICS

Ordinary differential equations, Laplace transformation, Fourier analysis, partial differential equations, optimization, and mathematical modeling. Alt.+

Prerequisite: Mathematics 274.

MTH 352 (2) HISTORY OF MATHEMATICS

Development of mathematics from pre-Greek to recent times. Perspectives and contributions of persons from diverse cultural, ethnic, and gender groups. Impact of culture on mathematical progress. Alt.+

Prerequisite: Mathematics 145 or 164.

MTH 364 (4) MATHEMATICAL STATISTICS

A study of statistics including random variables, probability, density functions, limit theorems and the estimation of parameters. Alt.*

Prerequisite: Mathematics 274.

MTH 372 (2) NUMERICAL AND SYMBOLIC COMPUTATION

A study of computer-based methods for solving numeric problems. Includes error analysis, zeros of functions, interpolation, approximation and numeric integration. Alt.*

Prerequisite: Mathematics 274.

MTH 402 (2) TOPICS IN GEOMETRY

A study of the foundations of geometry, Affine, non-Euclidean and projective geometries. A synthetic development of advanced Euclidean geometry including geometric transformations, convexity, and constructions. Alt.+

Prerequisite: Mathematics 145 or 164.

MTH 412 (2) COMPLEX ANALYSIS

Complex numbers, analytic functions, integration, series, contour integration and residues. Alt.*

Corequisite: Mathematics 274.

MTH 424 (4) REAL ANALYSIS I

Real numbers, topology of Euclidean n-space, continuity, differentiation and integration theory. Alt.*

Corequisites: Mathematics 232 and 242.

MTH 432 (2) REAL ANALYSIS II

Continuation of Mathematics 424. Differentiation and integration in Euclidean n-space, uniform convergence. Alt.*

Prerequisite: Mathematics 424.

MTH 444 (4) ABSTRACT ALGEBRA I

A study of groups, rings, fields and related structures with selected applications. Alt.+

Corequisites: Mathematics 232 and 242.

MTH 452 (2) ABSTRACT ALGEBRA II

Continuation of Mathematics 444. Polynomial rings, finite fields and extension fields. Alt.+

Prerequisite: Mathematics 444.

MTH 463 (3) SECONDARY SCHOOL MATHEMATICS

An analysis of the secondary school mathematics curriculum from the perspective of collegiate mathematics. Strategies and models for developing mathematical concepts and skills with understanding and for communicating mathematical ideas effectively. Emphasis on critical thinking, problem solving, mathematical connections, use of technology, assessment issues and field experiences. Not applicable toward a major in mathematics.

Prerequisites: Mathematics 274 and completion of 10 units of upper-division mathematics. Corequisite: Education 412.

MTH 491 (1-3) INDEPENDENT STUDIES IN MATHEMATICS

Study of a selected problem or topic under the direction of an instructor. Instructor and student will propose the course of study. Approval by the department chair is required. May be repeated once.

MTH 492 (2) SPECIAL TOPICS IN MATHEMATICS

Study of an area of mathematics not otherwise included in the curriculum. The needs and interests of students and faculty involved determine the topics. May be repeated for a total of six units.

Prerequisite: Consent of instructor.