

MATHEMATICS AND COMPUTER SCIENCE

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Mission Statement

The Mathematics and Computer Science Department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Objectives

1. To prepare students for:
 - careers that use mathematics, computer science and management information systems in business, industry or government.
 - graduate study in fields related to mathematics, computer science, and management information systems.
 - teaching mathematics and computer science at the secondary level.
2. To prepare students to apply their knowledge and utilize appropriate technology to solve problems.
3. To educate students to speak and write about their work with precision, clarity, and organization.
4. To help students gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of mathematics and computer science.
5. To integrate the study of 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, artificial intelligence, and computer architecture. 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.

Majors & Minors

Majors

Computer Science
Management Information Systems
Mathematics

Minors

Computer Science
Management Information Systems
Mathematics

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 132	Intro to Computer Science	.2
CSC 142	Intro to Computer Programming	.2
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 481	Senior Seminar in Comp. Science	.1
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
HON 498	Honors Project I	.2
HON 499	Honors Project II	.1
TOTAL		.37

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 132	Intro to Computer Science	.2
CSC 142	Intro to Computer Programming	.2
CSC 154	Fundamentals of Computer Science	.4
PHY 241	University Physics I	.4
TOTAL		.28

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

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 481	Senior Seminar in Mathematics	.1
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 471	History of Mathematics Study Tour	.1
MTH 491	Independent Studies in Mathematics	.1-3
MTH 492	Special Topics in Mathematics	.2
HON 498	Honors Project I	.2
HON 499	Honors Project II	.1
TOTAL		.23

RECOMMENDED ELECTIVES FOR DEPARTMENT TRACKS

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

Graduate School in Applied Mathematics: Mathematical Statistics, Applied Mathematics, Numerical and Symbolic Computation, and 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, Applied Mathematics, Complex Analysis, and Numerical and Symbolic Computation.

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

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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 132	Intro to Computer Science	.2
CSC 142	Intro to Computer Programming	.2
CSC 154	Fundamentals of Computer Science	.4
CSC 254	Data Structures and Algorithms	.4
ACC 201	Principles of Financial Accounting	.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 212	Principles of Management	.4
BUS 213	Administrative Communication	.4
BUS 374	Industrial Organizational Psychology/Human Resources	.4
BUS 410	Business Finance	.4
HON 498	Honors Project I	.2
HON 499	Honors Project II	.1
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 132	Intro to Computer Science	.2
CSC 142	Intro to Computer Programming	.2
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 132	Intro to Computer Science	.2
CSC 142	Intro to Computer Programming	.2
CSC 154	Fundamentals of Computer Science	.4
CSC 254	Data Structures and Algorithms	.4
ACC 201	Principles of Financial Accounting	.4
BUS 212	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 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 424	Real Analysis I	4
MTH 432	Real Analysis II	2
MTH 444	Abstract Algebra I	4
MTH 452	Abstract Algebra II	2
MTH 471	History of Mathematics Study Tour	1
MTH 492	Special Topics in Mathematics	2
	TOTAL	22

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

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.

Prerequisite: Mathematics 099.

CSC 132 (2) INTRODUCTION TO COMPUTER SCIENCE

An overview of the field of computer science, including computer architecture, operating systems and networks, algorithms, programming languages, software engineering, and the theory of computation. Lecture two hours and laboratory four hours each week.

Prerequisite: Mathematics 113 (or equivalent).

CSC 142 (2) INTRODUCTION TO COMPUTER PROGRAMMING

Introduces the syntax of a high level programming language 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.

Prerequisite: CSC 132 or consent of instructor.

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 132 and 142 or consent of instructor.

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. Offered 2004-05.

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. Offered 2003-04.

Prerequisite: Computer Science 254.

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