



Mathematics and Computer Science

FACULTY

Chairperson: Associate Professor Richard Quindley

Graduate Program

Coordinators: Professor Glenn Pavlicek (Computer Science), Professor Philip Scalisi (Mathematics)

Professors: Hang-Ling Chang, Zon-I Chang, Paul Fairbanks, Walter Gleason, Thomas Moore, Uma Shama

Associate Professors: Mahmoud El-Hashash, Ward Heilman, Torben Lorenzen, Michael Makokian, John Nee

Assistant Professors: Heidi Burgiel, Shannon Lockard, Lee Mondschein, John Santore, Abdul Sattar

Instructor: Rebecca Metcalf

Department Telephone Number: 508.531.1342

Location: Hart Hall, Room 215

Web site: www.bridgew.edu/depts/mathcs/

DEGREE PROGRAMS

- BS in Mathematics
- BS in Computer Science
- MAT - Mathematics
- MS in Computer Science

UNDERGRADUATE MINORS

- Actuarial Science*
- Computer Science
- Mathematics

* Interdisciplinary Minor

UNDERGRADUATE PROGRAMS

BACHELOR OF SCIENCE IN MATHEMATICS

Since mathematics is both a cultural and a technical field of study, the curriculum is planned with the following objective:

1. to introduce students to mathematics as an important area of human thought;
2. to prepare students for careers in industry;
3. to give preparation to students for graduate study in mathematics and related fields;
4. to prepare students planning to teach mathematics on the

- secondary level;
5. to serve the needs of students in fields which rely on mathematics, e.g., experimental sciences, social sciences, and elementary education.

Note: The Bachelor of Arts in Mathematics is inactive.

DOUBLE MAJOR WITH ELEMENTARY EDUCATION OR EARLY CHILDHOOD EDUCATION

Students may choose a double major in mathematics and elementary education, early childhood education or special education for licensure purposes. Appropriate advising materials with suggested course sequences are available.

MINOR IN SECONDARY EDUCATION (HIGH SCHOOL, MIDDLE SCHOOL, OR PREK-12 SPECIALIST)

Students may minor in secondary education (high school, middle school or PreK-12 specialist). Successful completion of this minor will lead to Massachusetts Initial Teacher Licensure. Please refer to the "Department of Secondary Education and Professional Programs" for specific teacher licensure and program requirements.

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

This program provides a broad background in computer science and will serve as preparation for employment in computer applications or for graduate studies in the field.

The department participates in a number of multidisciplinary programs for students preparing for careers in medicine, dentistry or oceanography. Additional information on these programs may be found in the section "Interdisciplinary and Preprofessional Programs."

Note: The Bachelor of Arts in Computer Science is inactive.

MATHEMATICS MAJOR

All majors are required to take:

	CREDITS
MATH 151-152 Calculus I-II	6
MATH 202 Linear Algebra.....	4
MATH 251-252 Calculus III-IV	6
MATH 301 Abstract Algebra I	3
MATH 401 Introduction to Analysis I.....	3
COMP 101 Computer Science I.....	3
PHYS 243-244 General Physics I-II.....	8

Five electives from any 300 or 400 level courses except

MATH 318, PHYS 403 Mathematical Physics may be taken as one of these five electives. Majors preparing for secondary school teaching careers must take MATH 403 Probability Theory, MATH 408 History of Mathematics, and MATH 354 Introduction to Modern Geometry or



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MATH 325 Foundations of Geometry as three of the five electives 15

Note: Not more than one grade in the D range (D+, D, D-) among the five courses MATH 151, MATH 152, MATH 202, MATH 251, and MATH 252 shall be accepted in partial fulfillment of the requirements for the major in mathematics. A student receiving a second grade in the D range in one of the above courses must repeat the course with the higher number and receive a C- or better before being allowed to enroll in other mathematics courses.

Note: Students who are contemplating majoring in mathematics or computer science should be aware of the sequential nature of the course offerings. In order for students to plan their programs so that degree requirements may be completed within a four-year period, students should consult with the chairperson of the department or their adviser as soon as possible.

Total minimum credits: 48

Core Curriculum Requirements

A minimum of 120 earned hours is required for graduation. These earned hours include Core Curriculum Requirements as specified in the "Undergraduate Academic Programs" section of this catalog. For additional graduation requirements, see the "Undergraduate Academic Policies" section of this catalog.

MATHEMATICS MINOR

A minimum of 18 hours is required. Students must satisfy the following three requirements:

	CREDITS
1. MATH 151-152 Calculus I-II	6
or	
MATH 141-142 Elements of Calculus I-II	
2. One course from among the following:	3
MATH 120 Introduction to Linear Algebra	
MATH 202 Linear Algebra	
MATH 214 Introduction to Modern Algebra	
3. Three <i>additional</i> courses from among the following:.....	9
MATH 110 Elementary Statistics I	
MATH 120 Introduction to Linear Algebra	
MATH 130 Discrete Mathematics I	
MATH 200 Probability and Statistics	
MATH 202 Linear Algebra	
MATH 214 Introduction to Modern Algebra	
MATH 216 Analytic Geometry	
MATH 251 Calculus III	
MATH 252 Calculus IV	
any 300 or 400 level MATH courses (including	
MATH 318)	

Students who take one course from any of the following pairs

of courses may not take the other course of that pair for credit towards the minor:

- MATH 110 and MATH 200
- MATH 120 and MATH 202
- MATH 214 and MATH 301

Students may elect to take MATH 220 Introduction to Calculus to satisfy #1. Students who do so must take four courses to satisfy #3 although they may use up to two courses from among MATH 105 Selected Topics in Mathematics, MATH 107 Principles of Mathematics I, and MATH 108 Principles of Mathematics II to satisfy that requirement.

Total minimum credits: 18

ACTUARIAL SCIENCE MINOR

This interdisciplinary minor, drawing from both high-level mathematics courses and finance courses is, ideally suited for mathematics majors or accounting and finance majors who are interested in preparing for the actuarial science exam and in pursuing a career as an actuarial or in a related area.

	CREDITS
ACFI 240 Principles of Accounting I	3
ACFI 241 Principles of Accounting II	3
ACFI 385 Managerial Finance.....	3
MATH 151 Calculus I.....	3
MATH 152 Calculus II.....	3
MATH 251 Calculus III.....	3

Choose one course from the following:..... 3

- ACFI 476 Insurance and Risk Management
- ACFI 490 Investments
- MATH 403 Probability Theory

Note: Accounting and finance majors may *not* choose ACFI 476 or ACFI 490 to satisfy the minor requirements. Mathematics major may *not* choose MATH 403 to satisfy the minor requirements.

Total minimum credits: 21

COMPUTER SCIENCE MAJOR

All majors are required to take the following courses:	CREDITS
COMP 101 Computer Science I	3
COMP 102 Computer Science II	3
COMP 206 Introduction to Computer Organization.....	3
COMP 330 Data Structures and Algorithms.....	3
COMP 340 Organization of Programming Languages.....	3
COMP 350 Operating Systems	3
COMP 430 Computer Networks.....	3
COMP 435 Analysis of Algorithms	3
COMP 442 Object-Oriented Software Engineering.....	3
COMP 470 Introduction to Artificial Intelligence	3
MATH 120 Introduction to Linear Algebra.....	3
MATH 130 Discrete Mathematics I	3

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MATH 151-152 Calculus I - II.....	6
MATH 200 Probability and Statistics.....	3

At least four elective courses (12 credit hours) must be selected from: 12

- Any COMP courses at the 300-400 level (except COMP 410 Database Applications and those required above)
- MATH 415 Numerical Analysis
- PHYS 442 Digital Electronics I

12 credit hours in the natural sciences including one of the following sequences: 12

- BIOL 121-122 General Biology I-II
- CHEM 131-132 Survey of Chemistry I-II
- CHEM 141-142 Chemical Principles I-II
- PHYS 181-182 Elements of Physics I-II
- PHYS 243-244 General Physics I-II

Not more than one grade in the D range (D+, D, D-) among the four courses COMP 101, COMP 102, COMP 206 and COMP 330 shall be accepted in partial fulfillment of the requirements for the major in computer science. A student receiving a second D in one of the above must repeat the course with the higher number and receive a C- or better before being allowed to enroll in other computer science courses.

Any computer science major who has successfully completed COMP 102 will not be allowed to take COMP 100 or COMP 105 for academic credit.

Total minimum credits: 69

Core Curriculum Requirements

A minimum of 120 earned hours is required for graduation. These earned hours include Core Curriculum Requirements as specified in the "Undergraduate Academic Programs" section of this catalog. For additional graduation requirements, see the "Undergraduate Academic Policies" section of this catalog.

COMPUTER SCIENCE MINOR	CREDITS
COMP 101 Computer Science I.....	3
COMP 102 Computer Science II.....	3
COMP 201 Assembly Language Programming.....	3
and three additional courses to be selected from:.....	9
PHYS 442 Digital Electronics I	
or any course counting toward the computer science major	

Total minimum credits: 18

HONORS PROGRAM

The honors program in mathematics and computer science provides highly motivated mathematics and computer science majors with opportunities to enhance their academic program through intensive scholarly study and research designed to be of assistance in post-graduate employment or in the pursuit of an

advanced degree in mathematics or computer science. Contact the Department of Mathematics and Computer Science for further information concerning eligibility and application.

GRADUATE PROGRAMS

MASTER OF SCIENCE IN COMPUTER SCIENCE

The Master of Science in Computer Science is intended to meet the growing need for high-level computer professionals by:

- strengthening the preparation of individuals currently working in computer-related fields;
- training professionals in other areas who wish to apply computer science to their respective fields or who desire to retrain for entry in a computer science career;
- providing the necessary general and theoretical background for those individuals who wish to continue graduate study in computer science beyond the master's degree.

The program consists of 30 credits and may be completed entirely on a part-time basis (courses are offered in the late afternoon or evening).

Admission Requirements

- 1.) A minimum undergraduate GPA of 2.75 based upon four years of work or a 3.0 undergraduate GPA based upon work completed during the junior and senior years
- 2.) A composite score of 900 on the quantitative and verbal parts of the GRE General Test
- 3.) Three appropriate letters of recommendation
- 4.) Official transcripts of all undergraduate and graduate course work

The Master of Science in Computer Science program seeks to attract individuals from various backgrounds who are highly motivated and prepared to meet the challenges of a rigorous advanced degree curriculum. In addition to a bachelor's degree, applicants should be familiar with the organization of computers and have competencies in:

- a high-level programming language such as C, C++, or Java;
- discrete and continuous mathematics;
- data structures and algorithms.

Demonstrated competencies within these areas can be achieved through professional experience, undergraduate study, or transitional graduate coursework. Students who do



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not already have a computer science degree should contact the program coordinator to determine their level of preparedness.

Program Requirements

Candidates must successfully complete each of the following courses:

	CREDITS
COMP 520 Operating Systems Principles.....	3
COMP 540 Automata, Computability, and Formal Languages.....	3
COMP 545 Analysis of Algorithms.....	3
COMP 560 Artificial Intelligence	3
COMP 590 Computer Architecture.....	3

Candidates must successfully complete five courses from among the following:..... 15

- COMP 510 Topics in Programming Languages
- COMP 525 Design and Construction of Compilers
- COMP 530 Software Engineering
- COMP 536 Graphics
- COMP 550 Topics in Discrete Mathematics
- COMP 562 Expert Systems
- COMP 565 Logic Programming
- COMP 570 Robotics
- COMP 575 Natural Language Processing
- COMP 580 Database Systems
- COMP 582 Distributed Database Systems
- COMP 594 Computer Networks
- COMP 596 Topics in Computer Science*
- COMP 599 Computer Science Seminar

*Topics in Computer Science (COMP 596) has recently addressed issues such as human-computer interaction, bioinformatics, computer security, computer vision and computer learning systems.

At the conclusion of the program, candidates will have the option of sitting for a comprehensive written exam which incorporates subject matter from the five required courses or completing a capstone project that allows candidates to pursue an area of interest in depth.

Total minimum credits: 30

MASTER OF ARTS IN TEACHING MATHEMATICS

The Master of Arts in Teaching degree was developed for high school and middle school subject area teachers who have an initial license and are seeking a professional license in the Commonwealth of Massachusetts. The MAT program is designed to meet the "appropriate master's degree" requirement, which is part of the criteria for professional stage licensure, as set forth in the most recent DOE licensure regulations. This degree program will also appeal to secondary school teachers who already hold a standard level or professional license and want to acquire additional knowledge and a master's degree in the discipline.

Students should consult the "School of Graduate Studies" section of the catalog for information regarding graduate program policies and procedures.

Admission Requirements

- 1.) A minimum undergraduate GPA of 2.75 based upon four years of work or a 3.0 undergraduate GPA based upon work completed during the junior and senior years
- 2.) A composite score of 900 on the quantitative and verbal parts of the GRE General Test
- 3.) An initial teaching license
- 4.) Three appropriate letters of recommendation
- 5.) Official transcripts of all undergraduate and graduate course work

All accepted students must enroll under the direction of their adviser in GRPP 501 Graduate Program Planning, which is described under "Graduate Advisers and Graduate Program Planning" in the "School of Graduate Studies" section of this catalog.

Program Requirements

	CREDITS
GRPP 501 Graduate Program Planning.....	1

Education Core Courses

EDMC 530 The Teacher as Researcher	3
EDMC 531 The Standards-Based Classroom: Curriculum.....	3
EDMC 532 The Teacher as Leader: From Issues to Advocacy.....	3
EDMC 533 The Standards-Based Classroom: Instruction and Assessment for Diverse Learners	3
EDMC 538 The Professional Teacher (final program course).....	3

Concentration Electives 18

MAT students are expected to have, or acquire in addition to degree requirements, an appropriate background of college level courses, to be determined by the department.

A minimum of 18 approved graduate credits in the academic area of concentration, which meet the academic and professional objectives of the student, is required.

Successful completion of a comprehensive examination in the six required courses or a capstone project approved by the department is also required.

Total minimum credits: 34

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