

FACULTY

Chairperson: Associate Professor Martina Arndt

Graduate Program

Coordinator: Professor Jeffrey Williams

Associate

Professors: Edward Deveney, Thomas Kling

Department Telephone Number: 508.531.1386

Location: Conant Science Building, Room 115A

Web site: www.bridgew.edu/physics

DEGREE PROGRAMS

- BA in Physics
Concentration: General Physics
- BS in Physics
Concentration: Professional Physics
- MAT - Physical Science
- MAT - Physics

UNDERGRADUATE MINORS

- Physics
- Geophysics*

*Interdisciplinary Minor

The Department of Physics strives to provide students with the necessary skills and knowledge to pursue successful careers in research, teaching, or further study in graduate programs. Programs in physics culminating in the degrees of Bachelor of Arts, Bachelor of Science and Master of Arts in Teaching are offered.

UNDERGRADUATE PROGRAMS

BACHELOR OF ARTS/BACHELOR OF SCIENCE

The Department of Physics offers programs leading to the bachelor's degree in physics. A major in physics provides students with the necessary skills and knowledge to pursue successful careers in research, teaching, graduate and professional programs, industry, engineering and many other fields. Each student can plan a physics program with the help of a faculty adviser to meet specific future needs. The department also offers students opportunities in on-campus research and internships.

Students who are contemplating majoring in this department should be aware of the sequential nature of the course offerings. It is of prime importance that students consult with the chairperson of the department as soon as possible so that they can complete degree requirements in four years.

PHYSICS MAJOR

The physics department offers two physics concentrations: a **professional physics concentration** and a **general physics concentration**. Both concentrations have a core set of seven physics courses along with cognate courses in mathematics and chemistry.

PHYSICS CORE

All physics majors take the physics core.

	CREDITS
PHYS 243-244 General Physics I-II	8
PHYS 401 Modern Physics	4
PHYS 402 Quantum Mechanics.....	3
PHYS 414 Experimental Physics	3
PHYS 438 Electricity and Magnetism.....	3
PHYS 439 Mechanics.....	3
<i>Core Cognates:</i>	
CHEM 141-142 Chemical Principles I-II.....	8
MATH 151-152 Calculus I-II	6
Total minimum credits: 38	

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.

PROFESSIONAL PHYSICS CONCENTRATION

The physics major with a professional physics concentration is designed to meet the needs of students going to graduate school in physics or a related field, or jobs in science or engineering.

Requirements

	CREDITS
Physics core courses	24
Physics core cognates.....	14

Electives: 12 credit hours of physics electives above the 100 level from the list below:..... 12

- PHYS 403 Mathematical Physics
- PHYS 405 Nuclear Physics
- PHYS 409 General Relativity and Cosmology
- PHYS 422 Computer Simulation in Physical Science
- PHYS 433 Thermal Physics
- PHYS 435 Optics
- PHYS 442 Digital Electronics I
- PHYS 458 Advanced Electricity and Magnetism
- PHYS 459 Advanced Mechanics
- PHYS 460 Advanced Quantum Mechanics
- PHYS 498 Internship in Physics
- PHYS 499 Directed Study in Physics

Cognates:

MATH 251 Calculus III.....	3
MATH 316 Differential Equations.....	3
Total minimum credits: 56	

GENERAL PHYSICS CONCENTRATION

The physics major with a general physics concentration is designed to meet the needs of students seeking jobs in teaching, engineering, industry, computers, finance, biology, medicine, law and many other fields. It also would be an effective major to combine with many of the minors offered at the college. Along with the physics core and physics core cognate courses, the student must take six hours of physics electives from the list below.

Cognates: CREDITS

Physics core courses:	24
Physics core cognates.....	14

Physics Electives.....6

- PHYS 107 Exploring the Universe
- PHYS 180 Energy and its Social Uses
- PHYS 403 Mathematical Physics
- PHYS 405 Nuclear Physics
- PHYS 409 General Relativity and Cosmology
- PHYS 422 Computer Simulation in Physical Science
- PHYS 433 Thermal Physics
- PHYS 435 Optics
- PHYS 442 Digital Electronics I
- PHYS 458 Advanced Electricity and Magnetism
- PHYS 459 Advanced Mechanics
- PHYS 460 Advanced Quantum Mechanics
- PHYS 498 Internship in Physics
- PHYS 499 Directed Study in Physics

Total minimum credits: 44

PHYSICS MINOR

18 credits in physics acceptable for the physics major.
Total minimum credits: 18

GEOPHYSICS MINOR

A minor is jointly offered with the Department of Earth Sciences and Geography. For further information contact the department chairpersons.

DOUBLE MAJOR WITH ELEMENTARY EDUCATION, EARLY CHILDHOOD EDUCATION OR SPECIAL EDUCATION

Students may choose a double major in physics and elementary education, early childhood education or special education for licensure purposes. Please contact the Department of Physics and the appropriate education department for further information.

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, the program requirements of either a BA or BS in Physics and PHYS 107 Exploring the Universe will lead to Massachusetts Initial Teacher Licensure. Please refer to the "Department of Secondary Education and Professional Programs" for specific teacher licensure requirements.

HONORS PROGRAM

The honors program in physics provides highly motivated physics 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 physics. Contact the Department of Physics for further information concerning eligibility and application.

GRADUATE PROGRAMS

MASTER OF ARTS IN TEACHING PHYSICS

The Master of Arts in Teaching Physics 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. This 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.

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 3

EDMC 538 The Professional Teacher

(final program course) 3

Concentration Electives

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. 18

Successful completion of a comprehensive examination is also required.

Total minimum credits: 34

MASTER OF ARTS IN TEACHING GENERAL SCIENCE

This program is inactive.

MASTER OF ARTS IN TEACHING PHYSICAL SCIENCE

The MAT Physical Science degree was developed for high school and middle school subject area teachers who have an initial license in chemistry, earth science or physics and are seeking a professional license in the Commonwealth of Massachusetts. This MAT program is defined 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 Massachusetts Department of Education licensure regulations.

Students should consult the “School of Graduate Studies” section of this catalog for information regarding program policy and procedures.

Admission requirements:

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- 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

Program requirements:

Education Core Courses CREDITS

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

Introductory course

PHSC 501 Problem Solving in Physical Science..... 3

Concentration Electives

Twelve (12) credits in electives at least 3 credits from each area:..... 12

Chemistry

CHEM 512 Microcomputers as Laboratory Instruments

CHEM 550 Chemistry and the Environment

CHEM 560 Special Topics in Chemistry

Earth Science

EASC 501 Observational Astronomy

EASC 504 Observational Meteorology

EASC 550 Modern Developments in Earth Science

EASC 560 Special Topics in Earth Science

Physics

PHYS 550 Physics for Teachers-A Modern Review

PHYS 560 Special Topics in Physics Teaching

PHYS 581 The Physics of the Environment

PHYS 593 Special Topics in Secondary School Science

or

PHYS 594 Special Topics in Junior High Science I

Capstone course

PHSC 590 Integrated Physical Science 3

Total minimum credits: 33