
PHYSICS

FACULTY

Chairperson: Associate Professor Jeffrey Williams

Associate Professor: Edward Deveney

Assistant Professor: Martina Arndt

Department Telephone Number: (508) 531-1386

Web site: www.bridgew.edu/depts/physics/index.htm

DEGREE PROGRAMS

- BA in Physics
- BS in Physics
 - Concentrations: General Physics, Professional Physics
- MAT - Physics
- MAT - Physical Sciences

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 a program 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.

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

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

- PH 243-244 General Physics I-II
- PH 401 Modern Physics
- PH 402 Quantum Mechanics
- PH 414 Experimental Physics
- PH 438 Electricity and Magnetism
- PH 439 Mechanics

Core Cognates:

- CH 141-142 Chemical Principles I-II
- MA 151-152 Calculus I-II

General Education Requirements (GER)

A minimum of 120 earned hours is required for graduation. These earned hours include General Education 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. Along with the physics core and physics core cognate courses, the students must take 12 credit hours of physics electives above the 100 level from the list below. The students also are required to take two additional cognate courses: MA 251 Calculus III and MA 316 Differential Equations.

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.

Physics Electives

- PH 107 Exploring the Universe
- PH 180 Energy and its Social Uses
- PH 403 Mathematical Physics
- PH 405 Nuclear Physics
- PH 409 Theory of Relativity
- PH 422 Computer Simulation in Physical Science
- PH 432 Electronic Circuits
- PH 433 Thermal Physics
- PH 435 Optics
- PH 442 Digital Electronics I
- PH 458 Advanced Electricity and Magnetism
- PH 459 Advanced Mechanics
- PH 460 Advanced Quantum Mechanics
- PH 498 Internship in Physics
- PH 499 Directed Study in Physics

PHYSICS MINOR

18 credits in physics acceptable for the physics major

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 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.

GRADUATE PROGRAMS

MASTER OF ARTS IN TEACHING

PHYSICS

PHYSICAL SCIENCES

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 M.A.T. 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. The M.A.T. Physical Sciences program will 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 area.

Students should consult the Graduate and Continuing Education section of the catalog for information regarding graduate program procedures and admission standards.

All accepted students must enroll under the direction of their adviser in GP 501 Graduate Program Planning, which is described under “Graduate Advisors and Program Planning” in the Graduate and Continuing Education section of this catalog.

Program Requirements

Education Core Courses	15 credits
ED 530 The Teacher as Researcher	
ED 531 The Standards-Based Classroom: Curriculum	
ED 532 The Teacher as Leader: From Issues to Advocacy	
ED 533 The Standards-Based Classroom: Instruction and Assessment	
ED 538 The Professional Teacher (final program course)	

Information about ED 530-538 is provided in the Course Descriptions section of this catalog under the heading of “School of Education and Allied Studies (SEAS) Master’s Courses (ED)”.

Concentration Electives

M.A.T. 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 is also required.