

# PHYSICS

Chair: Tsanangurayi Tongesayi, Department of Chemistry and Physics

Physics faculty members offer a curriculum leading to a minor in physics, which may be combined with any major. The minor in physics can be combined with a major in chemistry and education to prepare for the Teacher of Physical Science Certification. A minor in physics also complements the interests of students majoring in mathematics, software engineering, and a variety of other fields. The physics faculty support various undergraduate programs by offering specific courses required in other majors and courses designed to meet the general education natural sciences requirements. They also provide research opportunities for interested students.

## Programs

### Minor

- Physics (<http://catalog.monmouth.edu/undergraduate-catalog/science/physics/physics-minor/>)

## Courses

### PH-101 Physics in Our Lives

**Credits: 3**

Term Offered: All Terms

Course Type(s): NS

Presents major concepts and methodologies in physics and their importance in today's society. Introduction to principles of physics and their applications to today's technology using lectures and demonstration.

### PH-103 The Physics of Sound and Music

**Credits: 3**

Term Offered: All Terms

Course Type(s): NS

Presents the topics of sound and music from a physics point of view. Covered topics are harmonic motion, waves (both traveling and standing), the human voice and ear, the production of music and musical scales and the physics of several representative instruments.

### PH-105 Physics for the Life Sciences I

**Credits: 3**

Prerequisite(s): MA-101 or MA-109 or MA-115 or higher Math courses passed with grade of C- or higher.

Co-requisite(s): PH-105L

Term Offered: All Terms

Course Type(s): NS

An introduction to classical physics intended primarily for students majoring in the life sciences. Topics include: mechanics, dynamics, heat, electricity, magnetism, and optics.

### PH-105L Physics for the Life Sciences I Laboratory

**Credits: 1**

Co-requisite(s): PH-105

Term Offered: All Terms

Course Type(s): None

Laboratory work to complement PH-105. Experiments in the fields of statics, dynamics, energy, momentum, heat, sound, electricity, magnetism, optics, and spectroscopy. Three hours per week.

### PH-106 Physics for the Life Sciences II

**Credits: 3**

Prerequisite(s): PH-105 and PH-105L both passed with a grade of C- or higher

Co-requisite(s): PH-106L

Course Type(s): NS

An introduction to classical physics intended primarily for students majoring in the life sciences. Topics include, mechanics, dynamics, heat, electricity, magnetism, and optics.

### PH-106L Physics for the Life Sciences II Laboratory

**Credits: 1**

Co-requisite(s): PH-106

Course Type(s): None

Laboratory work to complement PH-106. Experiments in the fields of sound, electricity, magnetism, optics, and spectroscopy. Three hours per week.

### PH-150 Principles of Astronomy

**Credits: 3**

Term Offered: All Terms

Course Type(s): NS

The historical development of astronomy and the modern concepts of the universe, including demonstrations and viewing sessions with optical telescopes.

### PH-199 Independent Study in Physics

**Credits: 1**

Term Offered: All Terms

Course Type(s): None

Guided study of a selected topic in physics not substantially treated in a regular course, under the direction of a member of the Physics faculty. Prior permission of the directing professor and department chair is required to take this course.

### PH-211 General Physics with Calculus I

**Credits: 3**

Prerequisite(s): MA-116 or MA-125

Co-requisite(s): PH-211L

Term Offered: Fall Term

Course Type(s): NS

The first of a two-semester sequence of courses that, taken together, provide a thorough introduction to classical physics using calculus. Topics covered include: one- and two-dimensional motion, Newton's laws and their applications, energy, momentum and impulse, rotational mechanics, and thermodynamics.

### PH-211L General Physics with Calculus I Laboratory

**Credits: 1**

Co-requisite(s): PH-211

Term Offered: Fall Term

Course Type(s): None

Laboratory experiments to complement the topics covered in PH-211. Includes experiments in statics, dynamics, and thermodynamics.

### PH-212 General Physics with Calculus II

**Credits: 3**

Prerequisite(s): PH-211 and PH-211L passed with a grade of C- or higher.

Co-requisite(s): PH-212L

Term Offered: Spring Term

Course Type(s): NS

The second of a two-semester sequence of courses that, taken together, provide a thorough introduction to classical physics using calculus. Topics covered include: sound and wave mechanics, electrostatics, circuits, magnetic forces and fields, Faraday's Law, reflection and refraction, and optics.

**PH-212L General Physics with Calculus II Laboratory****Credits: 1**

Co-requisite(s): PH-212

Term Offered: Spring Term

Course Type(s): None

Laboratory experiments to complement the topics covered in PH-212. Includes experiments in sound, electricity, magnetism, circuits, and optics.

**PH-270 Physical Oceanography****Credits: 3**

Prerequisite(s): BY-109, CE-111, CE-111L, CE-112, and CE-112L

Term Offered: Fall Term

Course Type(s): MEBP

Physical Oceanography provides a survey of physical, chemical and geological processes that define and affect the coastal ocean including ocean basins, beach formation and dynamic ocean processes (currents, waves, wind, weather). Environmental considerations include the role of the ocean in the association with global climate change issues, problems associated with coastal development, exploitation of marine resources, and ocean and coastal pollution.

**PH-298 Special Topics in Physics (200 Level)****Credits: 1-3**

Term Offered: Spring Term

Course Type(s): None

An intensive study of a particular subject or problem in physics to be announced prior to registration. May be conducted on either a lecture-discussion or a seminar basis. If a prerequisite is required it will be announced in the course schedule.

**PH-299 Independent Study in Physics****Credits: 1-3**

Term Offered: All Terms

Course Type(s): None

Guided study of a selected topic in physics not substantially treated in a regular course, under the direction of a member of the Physics faculty. Prior permission of the directing professor and department chair is required to take this course.

**PH-311 Theoretical Physics****Credits: 3**

Prerequisite(s): PH-212 passed with a grade of C- or higher

Term Offered: All Terms

Course Type(s): None

Presents physics topics aimed at the advanced undergraduate level.

The subjects range over classical mechanics, electromagnetism, and statistical mechanics, with explicit links made to topics from PH-301. The course is calculus-based, and seeks to round out the physics education of physics minors.

**PH-312 Modern Physics****Credits: 3**

Prerequisite(s): PH-311 passed with a grade of C- or higher

Term Offered: Spring Term

Course Type(s): None

Topics from physics of the twentieth century, including special relativity, the origins of quantum theory, quantum mechanics, atomic structure, nuclear physics, and elementary particles.

**PH-350 Research in Physics****Credits: 1-3**

Term Offered: All Terms

Course Type(s): EX5

Original research work, carried out under the mentorship of a faculty research advisor. Research conducted by the students may be submitted for presentation, publication, or review, as appropriate. The number of course credits will be determined by arrangement with the advisor. Three hours/week per credit, 1-3 credits.

**PH-399 Independent Study in Physics****Credits: 1-3**

Term Offered: Spring Term

Course Type(s): None

Reading and research on a selected topic under the direction of a Physics faculty member. Prior permission of the directing professor and department chair is required to take this course.

**PH-499 Independent Study in Physics (400 Level)****Credits: 1-3**

Course Type(s): None

Reading and research on a selected topic under the direction of a Physics faculty member. Three hours per week per credit. Prior permission of the directing professor and department chair is required to take this course.