PHYSICS (PHY)

PHY 101. Elements of Physics.

3 Credits.

Students study the basic principles of physics and some important applications. Kinematics, Newton's laws of motion, circular motion, torque, fluid dynamics, electrostatics, circuits, waves, sound and light are studied. This course is suitable for both science and non-science majors. Students who have credit for PHY 110 or PHY 121 may not register for PHY 101.

Prerequisites: Take MA 107 minimum grade C- or Math placement score of 3.

Corequisites: Take PHY 101L. **Offered:** Every year, Fall and Spring **UC:** Natural Sciences

PHY 101L. Elements of Physics Lab.

Lab must be taken with PHY 101. (2 lab hrs.) Corequisites: Take PHY 101. Offered: Every year, Fall and Spring UC: Natural Sciences

PHY 105. Physics of Music.

3 Credits.

3 Credits.

1 Credit.

1 Credit.

1 Credit.

Students study the principles of wave mechanics and emphasize applications associated with sound, music and instruments. Topics cover the anatomy of waves and sound, the structure and physics of instruments (guitar, trumpet, drums, piano, etc), human voice, singing and speech, musical harmony and scales, architecture acoustics and electronic communication and sound digitization. This course is designed for nonscience majors with no previous coursework in physics or any background in music. This course will use mathematics and algebra but not be the focus of the course. Any math background acceptable. No prerequisites. **Corequisites:** Take PHY 105L;

Offered: Every year, Fall **UC:** Natural Sciences

PHY 105H. Physics of Music.

Students study the principles of wave mechanics and emphasize applications associated with sound, music and instruments. Topics cover the anatomy of waves and sound, the structure and physics of instruments (guitar, trumpet, drums, piano, etc), human voice, singing and speech, musical harmony and scales, architecture acoustics and electronic communication and sound digitization. This course is designed for nonscience majors with no previous coursework in physics or any background in music. This course will use mathematics and algebra but not be the focus of the course. Any math background acceptable. No prerequisites. **Corequisites:** Take PHY 105HL **Offered:** Every year, Fall **UC:** Natural Sciences

PHY 105HL. Physics of Music Lab.
Corequisites: Take PHY 105H
Offered: Every year, Fall
UC: Natural Sciences

PHY 105L. Physics of Music Lab. Corequisites: Take PHY 105; Offered: Every year, Fall UC: Natural Sciences

PHY 107. Introduction to Astronomy.

3 Credits.

3 Credits.

1 Credit.

3 Credits.

This course provides students with an overview of the principles and techniques used for observing the night sky, components of the Solar System, Milky Way galaxy and the universe. Students assemble the required tools to examine recent and historic data that is used to build models of the ever-evolving universe. Using hands-on activities, students apply concepts and techniques related to the structure of our solar system, reading and plotting celestial coordinates, gravitation, features and operation of telescopes, methods of determining astronomical distance, stellar and cosmic evolution, and general relativity. Required nighttime telescope observation sessions reinforce lecture concepts. This course is intended for non-science majors and will use basic geometry and algebra for modeling.

Corequisites: Math Placement level of 2 or higher.

Offered: Every year, Spring

UC: Natural Sciences

PHY 110. General Physics I.

Students apply algebra and trigonometry to examine the fundamentals of Newtonian mechanics. Topics include vectors, translational and rotational equilibrium, dynamics, kinematics, momentum, and energy. Designed primarily for science majors, this course must be taken in conjunction with PHY 110L.

Prerequisites: Take MA 107; minimum grade C-; or Math placement score of 3.

Corequisites: Take PHY 110L. **Offered:** Every year, Fall and Summer **UC:** Natural Sciences

PHY 110L. General Physics I Lab.

Lab must be taken with PHY 110. (2 lab hrs.) Corequisites: Take PHY 110. Offered: Every year, Fall and Summer UC: Natural Sciences

PHY 111. General Physics II.

Students apply algebra and trigonometry to examine the fundamentals of classical electromagnetic theory. Topics include electrostatics, magnetostatics, dc circuits, electromagnetic waves, geometric optics, and interference. Designed primarily for science majors, this course must be taken in conjunction with PHY 111L. **Prerequisites:** Take PHY 110, PHY 110L; Minimum grade C-.

Corequisites: Take PHY 111L.

Offered: Every year, Spring and Summer **UC:** Natural Sciences

PHY 111L. General Physics II Lab.	1 Credit.	
Lab must be taken with PHY 111. (2 lab hrs.)		
Corequisites: Take PHY 111.		
Offered: Every year, Spring and Summer		
UC: Natural Sciences		
PHY 121. University Physics.	4 Credits.	
Students use calculus to examine classical Newtonian mechanics in an		
integrated lecture and laboratory classroom. Through exper	imentation,	
computer modeling and group problem-solving, students ap	ply physics	
principles to predict the outcome of reality-based and open-	ended	
problema Tanica include kinematica Newton's laws, concer	nuction of	

problems. Topics include kinematics, Newton's laws, conservation of energy and momentum, torque, and equilibrium of static bodies and fluids. (6 studio-lab hrs.) **Prerequisites:** Take MA 141 or MA 151; Minimum grade C-. **Offered:** Every year, Fall and Spring **UC:** Natural Sciences

PHY 122. University Physics II.

4 Credits.

Students use calculus to examine classical electromagnetism in an integrated lecture and laboratory classroom. Through experimentation, computer modeling, and group problem-solving, students apply physics principles to predict the outcome of reality-based and open-ended problems. Topics include electrostatics, magnetostatics, dc circuits, Maxwell's equations, electromagnetic waves, and interference. (6 studio-lab hrs.)

Prerequisites: Take PHY 121; Minimum grade C-. Offered: Every year, Fall and Spring UC: Natural Sciences

PHY 200. Special Topics in Physics I.

3 Credits.

This course explores special topics in physics or astronomy. Prerequisites: None Offered: As needed

PHY 202. Physics of Life and Technology.

4 Credits.

Students study the basic principles of physics including everyday applications and their use in applied technology. Topics include Newton's Laws of Motion and Gravity, torque, sound, light and optics, electricity and magnetism. These principles are examined through the study of roller coasters, space travel, musical instruments, the mechanics of muscle movements, sports and sport technology, the circuitry of the human brain, medical imaging using light and sound, optics of the human eye, lasers and elementary circuits. Enrollment in this course is restricted to students in the Online Bachelor of Science in Health Science Studies degree completion program. Students may not receive credit for PHY 202 if they already have credit for PHY 101 or PHY 110.

Prerequisites: Basic algebraic skills; MA 107 or MA 110 or higher; or a Math placement score of 3 or higher. **Offered:** As needed

PHY 300. Special Topics in Physics II.

3 Credits.

This course explores advanced special topics in physics or astronomy. **Prerequisites:** Take PHY 111 or PHY 122 and Take MA 141 or MA 151. Minimum grade C-. **Offered:** As needed

PHY 301. Modern Physics.

3 Credits.

Students explore the five shortcomings of classical physics: the luminiferous aether problem, the ultraviolet catastrophe, the photoelectric effect, the electron-orbit problem, and the atomic spectra problem. Through these topics, students uncover how both Einstein's theory of relativity and quantum theory resolve these issues, leading to a paradigm shift that marks the birth of modern physics. The course begins with an introduction to Einstein's special theory of relativity, followed by a study of the foundations of quantum mechanics and its application in modern technologies and scientific instruments.

Prerequisites: Take PHY 111 or PHY 122; Minimum grade C-. And take MA 141 or MA 151, Minimum grade C-.

Offered: Every year, Fall

PHY 399. Independent Study.

1-6 Credits.

This individual study in a specialized area of experimental or theoretical physics or astronomy is open to students by special arrangement with the department chairperson. This is a structured program of reading, problem solving, and/or experiments established through conferences with a member of the physics faculty. **Prerequisites:** None

Offered: As needed