

PHY 341*	Analytical Mechanics	4
PHY 361	Electricity, Magnetism, and Waves I	.3
PHY 401	Thermodynamics	.3
PHY 431	Quantum Mechanics	.3
PHY 495	Seminar in Physics	.1
MTH 164	Calculus I	.4
MTH 174	Calculus II	.4
MTH 274	Calculus III	.4
MTH 334	Applied Mathematics	.4
CHE 152	General Chemistry I	.4
	TOTAL	.48

* *Engineering Physics majors may substitute Engineering 215 for Physics 341.*

RECOMMENDATION

COURSE #	TITLE	UNITS
CSC 142	Intro to Computer Science	.2
CSC 154	Fundamentals of Computer Science	.4

Engineering Physics (B.S.) Major

The courses listed below are required in addition to the core curriculum to obtain a B.S. degree in Engineering Physics.

COURSE #	TITLE	UNITS
EGR 130	Engineering Drawing I	.1
EGR 140	Engineering Drawing II	.1
EGR 215	Engineering Mechanics	.3
EGR 352	Analog Electronics	.2
EGR 422	Digital Electronics	.2
EGR 432	Computer Interfacing	.2
EGR 442	Mobile Robotics	.2
PHY 311	Nuclear Physics	.3
PHY 362	Electricity, Magnetism, and Waves II	.3
PHY 443	Solid State Physics	.3
	TOTAL	.22

Physics (B.A.) Major

The following courses are required in addition to the core curriculum to obtain a B.A. in Physics:

COURSE #	TITLE	UNITS
CHE 153	General Chemistry II	.4
<i>One of the following courses:</i>		
PHY 311	Nuclear Physics	.3
PHY 362	Electricity, Magnetism, and Waves II	.3
PHY 443	Solid State Physics	.3
	TOTAL	.7

Physics (B.S.) Major

The courses listed below are required in addition to the core curriculum to obtain a B.S. degree in Physics.

COURSE #	TITLE	UNITS
CHE 153	General Chemistry II	.4
PHY 311	Nuclear Physics	.3
PHY 362	Electricity, Magnetism, and Waves II	.3
PHY 443	Solid State Physics	.3
<i>At least four units from the following courses:</i>		
CHE 295	Organic Chemistry I	.5
EGR 422	Digital Electronics	.2
EGR 432	Computer Interfacing	.2
	TOTAL	.17-18

Physics Minor

COURSE #	TITLE	UNITS
PHY 241	University Physics I	.4
PHY 242	University Physics II	.4
PHY 304	Modern Physics	.4
• Eight (8) more hours of physics or engineering courses at level 300 or above.		
	TOTAL	.20

Engineering Courses

EGR 110 (1) COMPUTATIONAL METHODS FOR ENGINEERS AND SCIENTISTS I

An introduction to techniques used in scientific analysis, including graphing of data, curve fitting, numerical methods of problem solution, error analysis, and the use of computers for solving problems in physics and engineering. Three hours laboratory each week. Offered on a Quad basis.

EGR 120 (1) COMPUTATIONAL METHODS FOR ENGINEERS & SCIENTISTS II

Engineering and scientific computing utilizing MatLab software. Examples and applications taken From Engineering, Physics, chemistry, and biology. Three hours laboratory each week. Offered on a Quad basis.

Corequisite: Engineering 110.

EGR 130 (1) ENGINEERING DRAWING I

An introduction to orthographic projection and isometric pictorials. Visualization of 3-dimensional objects. Concepts are introduced using sketching followed by extensive use of computer-aided design (CAD). Applications relevant to the student's major. One two-hour lab each week.

EGR 140 (1) ENGINEERING DRAWING II

A continuation of the concepts introduced in Engineering 130, using more advanced drawing concepts and CAD commands. One two-hour lab each week.

Corequisite: Engineering 130.

EGR 215 (3) ENGINEERING MECHANICS

Statics of particles and rigid bodies as applied to engineering design. Topics include vector algebra, forces, moments and couples, conditions of equilibrium, friction, and virtual work. Offered 2007-08.

Prerequisite: Physics 241.

EGR 352 (2) ANALOG ELECTRONICS

AC/DC circuit analysis, transients, characteristics of equivalent circuits for diodes, transistors, power supplies, transistor/operational amplifiers, and feedback applications. Two lectures and one laboratory each week. Offered 2006-07.

Prerequisite: Physics 142 or 242.

EGR 422 (2) DIGITAL ELECTRONICS

Boolean algebra, logic gates, combinational logic circuits, state minimization, flip/flops, sequential circuits, asynchronous and synchronous counters. Course emphasizes design aspects using electronic design software. Two lectures and one laboratory each week. Offered 2006-07.

Prerequisite: Physics 142 or 242.

EGR 432 (2) COMPUTER INTERFACING

Design, analysis, and implementation of digital controls systems using microcomputers and microcontrollers. Special attention given to the interfacing of hardware and digital devices to processors and controllers. Two lectures and one laboratory each week. Offered 2006-07.

Prerequisite: Engineering 422.

EGR 442 (2) MOBILE ROBOTICS

The objective of this course is to use a hands-on approach to introduce the basic concepts in robotics, focusing on mobile robots and the importance of sensors and the integration of those sensors. Also to be discussed are navigation mechanisms and the various robot learning and control paradigms. Two lectures and one laboratory each week. Offered 2007-08.

Prerequisite: Engineering 432.

EGR 489 (1-4) INTERNSHIP IN ENGINEERING

Designed to provide engineering experience in applied settings. An academic plan must be developed in consultation between the supervising faculty member, student and work supervisor. Students must complete 45 hours of supervised work for each unit of credit received. Students may repeat this course for up to four units.

EGR 490 (1-4) SPECIAL TOPICS IN ENGINEERING

The topics chosen in engineering depend on regular or visiting faculty expertise as well as student demand. May be repeated as topics vary for as many as six units.

Physics Courses

PHY 103 (4) EARTH SCIENCE-GE

An introductory survey of the disciplines of geology, oceanography, meteorology, and astronomy, with a discussion of philosophical and societal issues.

Prerequisite: Mathematics 099 or equivalent.

PHY 141, 142 (4,4) GENERAL PHYSICS I, II-GE

A general introduction to physics including mechanics, thermodynamics, waves and sound, electricity and magnetism, optics, and modern physics. The course is taught primarily at the algebra/trigonometry level but does require limited use of calculus. Meets the professional requirements of life and medical science majors. Four lectures and one laboratory each week.

Corequisite: Mathematics 145 or 164 or consent of instructor.

PHY 241, 242 (4,4) UNIVERSITY PHYSICS I, II-GE

An analytic, calculus-based study of classical physics appropriate for science and engineering majors. Includes mechanics, thermodynamics, electromagnetism, and optics. Four lectures and one laboratory each week. Offered spring-fall.

Corequisite: Mathematics 145 or 164 or consent of instructor.

PHY 304 (4) MODERN PHYSICS

An introduction to concepts of modern physics including relativity, quantum theory, atomic physics, and high energy physics. Four lectures and one laboratory each week.

Prerequisite: Physics 142 or 242.

PHY 311 (3) NUCLEAR PHYSICS

A survey of nuclear physics including nuclear models, laws of radioactive decay, radiation detection, and applications of nuclear science in engineering and medicine. Three lectures and one laboratory each week. Offered 2006-07.

Prerequisite: Physics 142.

PHY 341 (4) ANALYTICAL MECHANICS

Newtonian mechanics, dynamics of particles and rigid bodies, oscillatory motion, central forces, inertial tensors, Lagrangian and Hamiltonian formulations. Offered 2007-08.

Prerequisites: Physics 242 and Mathematics 274.

Recommended: Mathematics 334.

PHY 361, 362 (3,3) ELECTRICITY, MAGNETISM, AND WAVES I, II

Classical electromagnetism including electric and magnetic fields, the electromagnetic properties of matter, Maxwell's equations, and a study of electromagnetic radiation including interference, diffraction, and interaction with material bodies. Offered 2007-08.

Prerequisites: Physics 242 and Mathematics 274.

Recommended: Mathematics 334.

PHY 401 (3) THERMODYNAMICS

Fundamental concepts of thermodynamics and statistical mechanics; applications to both classical and quantum systems. Offered 2007-08.

Prerequisite: Physics 242.

Recommended: Mathematics 334.

PHY 431 (3) QUANTUM MECHANICS

A rigorous introduction to quantum physics including Schrodinger's equation, matrix mechanics, perturbation theory, and applications in atomic and molecular physics. Offered 2006-07.

Prerequisites: Physics 304 and Mathematics 274.

Recommended: Mathematics 334.

PHY 443 (3) SOLID STATE PHYSICS

An introduction to the study of solids, including crystal structure, reciprocal lattices, crystal binding, phonons, and electron band theory. Offered 2006-07.

Prerequisite: Physics 431.

PHY 489 (1-4) INTERNSHIP IN PHYSICS

Designed to provide experience in applied settings for students majoring in physics. An academic plan must be developed in consultation between the supervising faculty member, student and work supervisor. Students must complete 45 hours of supervised work for each unit of credit received. Students may repeat this course for up to four units.

PHY 490 (1-3) SPECIAL TOPICS IN PHYSICS

The topics in physics chosen depend on regular or visiting faculty expertise as well as student demand. May be repeated as topics vary up to a total of six units.

Prerequisite: Consent of instructor.

PHY 495 (1) SEMINAR IN PHYSICS

Presentation of papers by students, faculty, and visiting scholars, as well as attendance at seminars at other institutions. May be repeated up to a maximum of four units. Graded Credit/No Credit.

PHY 499 (1-4) RESEARCH IN PHYSICS

Independent investigation, under the supervision of a faculty member, of a specific problem in physics or engineering.

Prerequisite: Consent of instructor and Senior standing.

Physical Science Course**PSC 110 (4) PHYSICAL SCIENCE – GE**

An introductory survey of selected principles in physics and chemistry with a discussion of related societal and environmental issues. This course meets a General Education requirement in The Natural World, but it does not count toward the Chemistry or Physics major. One three-hour laboratory each week.

Corequisite: Mathematics 099 or equivalent.