ECU COURSE CATALOG

PHYSICS COURSES

PHYS-1114 General Physics I 4 Credits
BEGINNING COURSE IN MECHANICS AND THERMODYNAMICS. 3 HOURS LECTURE, 2 HOURS LAB. (NOTE: DEGREE CREDIT NOT ALLOWED IN BOTH PHYS 1114 AND PHYS 2115.) Required Previous: Must remediate science deficiency by completing PHSCI-0123 or passing placement test.

PHYS-1114L General Physics I Lab 0 Credits
LAB COURSE FOR PHYS 1114. Required Previous: MATH-1513 or departmental approval

PHYS-1214 General Physics II 4 Credits
BEGINNING COURSE IN ELECTRICITY, MAGNETISM, WAVES AND SOUND, AND OPTICS. 3 HOURS LECTURE, 2 HOURS LAB. (NOTE: DEGREE CREDIT NOT ALLOWED IN BOTH PHYS 1214 AND PHYS 2225.) Required Previous: PHYS-1114

PHYS-1214L General Physics II Lab 0 Credits
LAB COURSE FOR PHYS 1214. Required Previous: PHYS-1114

PHYS-1314 Astronomy 4 Credits
A NON-MATHEMATICAL TREATMENT OF INTRODUCTORY ASTRONOMY. TOPICS OF INTEREST INCLUDE A STUDY OF THE CONSTELLATIONS, THEORIES OF PLANETARY MOTION, THEORIES OF EVOLUTION OF THE UNIVERSE, AND SUCH EXTRAGALACTIC OBJECTS AS NEBULAE, STAR CLUSTERS, VARIABLE STARS, BINARY STARS AND QUASISTELLAROBJECTS. LABORATORY WORK INCLUDED. Required Previous: Must remediate science deficiency by completing PHSCI-0123 or passing placement test.

PHYS-2115 Engineering Physics I 5 Credits
VECTORS, KINEMATICS AND DYNAMICS OF PARTICLES, WORK AND ENERGY SYSTEMS OF PARTICLES, ROTATIONAL KINEMATICS AND DYNAMICS, GRAVITATION, FLUID MECHANICS AND HEAT. 4 HOURS LECTURE, 2 HOURS LABORATORY. (NOTE: DEGREE CREDIT NOT ALLOWED IN BOTH PHYS 1114 AND PHYS 2115) Required Previous: MATH-2825

PHYS-2115L Engineering Physics I Lab 0 Credits
LAB COURSE FOR PHYS 2115. Required Previous: MATH-2825

PHYS-2225 Engineering Physics II 5 Credits
THERMODYNAMICS, VIBRATIONS, WAVES AND SOUND, ELECTRICITY, MAGNETISM, OPTICS, AND RADIOACTIVITY. 4 HOURS LECTURE, 2 HOURS LAB. (NOTE: DEGREE CREDIT NOT ALLOWED IN BOTH PHYS 1214 AND PHYS 2225.) Required Previous: MATH-3025

PHYS-2225L Engineering Physics II Lab 0 Credits
LAB COURSE FOR PHYS 2225.

PHYS-2812 Calculus Applications in Physics 2 Credits
APPLICATIONS OF DIFFERENTIAL AND INTEGRAL CALCULUS TO SELECTED TOPICS IN MECHANICS, THERMODYNAMICS, WAVES, ELECTRICITY, AND MAGNETISM. Required Previous: PHYS-1114

PHYS-2881 Special Studies in Physics- 1 Credit
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-2882 Special Studies in Physics- 2 Credits
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-2883 Special Studies in Physics- 3 Credits
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-2884 Special Studies in Physics- 4 Credits
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-3013 Modern Physics 3 Credits
THE QUANTUM THEORY, BORH'S THEORY OF THE HYDROGEN ATOM, EINSTEIN'S THEORY OF RELATIVITY. Required Previous: PHYS-2225

PHYS-3113 Mechanics I 3 Credits
LINEAR MOTION, MOMENTUM, POTENTIAL THEORY, CONSERVATIVE FORCES. Required Previous: PHYS-2115

PHYS-3123 Mechanics II 3 Credits
LANGRANGIAN AND HAMILTONIAN MECHANICS. Required Previous: PHYS-3113

PHYS-3213 Basic Electronics 3 Credits
AN INTRODUCTORY COURSE IN ELECTRONICS WHICH COVERS SUCH TOPICS AS DIGITAL ELECTRONICS, CIRCUIT THEORY, SOLID STATE THEORY, COMMONLY USED INTEGRATED CIRCUITS, ANALOG TO DIGITAL CONVERSION, MICROPROCESSOR BASICS, AND POWER SUPPLIES. Required Previous: PHYS-1214 or PHYS-2225

PHYS-3221 Basic Electronics Laboratory 1 Credit
BASIC EXPERIMENTS IN ANALOG AND DIGITAL ELECTRONICS TO ACCOMPANY PHYS 3213 BASIC ELECTRONICS. Required Previous or Concurrent: Take PHYS-3213

PHYS-3222 Medical Physics 2 Credits
INTENDED FOR THOSE INTERESTED IN MEDICAL PHYSICS, RADIOLOGY, PRE-MEDICINE, AND BIOLOGY. INTRODUCTION TO X-RAYS, MAGNETIC RESONANCE IMAGING, COMPUTED TOMOGRAPHY, ULTRASOUND, NUCLEAR MEDICINE, GAMMA KNIFE, RADIATION THERAPY, RADIOISOTOPES, AND BRACHYTHERAPY. VARIOUS CAREERS IN MEDICAL PHYSICS AND MEDICINE WILL ALSO BE EXAMINED AS WELL AS THE PREPARATION REQUIRED IN THESE FIELDS. Required Previous: PHYS-1214 or PHYS-2225

PHYS-3412 Junior Physics Laboratory 2 Credits
ADVANCED EXPERIMENTS IN CLASSICAL AND MODERN PHYSICS. Required Previous: PHYS-1214 or PHYS-2225

PHYS-3511 Junior Physics Laboratory 1 Credit
PRINCIPALLY ELECTRICITY AND LIGHT, VARIED AS NECESSARY. OPEN TO UNDERGRADUATES ONLY. Required Previous: PHYS-1214 or PHYS-2225

PHYS-3611 Ultrasound Physics Laboratory 1 Credit
LABORATORY COURSE IN ULTRASOUND PHYSICS WHICH COVERS GENERAL DESIGN AND FUNCTION OF TRANSDUCERS, ECHO SIGNAL DESCRIPTION, MEASURING DEPTH IN TIME, DEPTH, BUILD, AND MOTION MODES, FOURIER TRANSFORM CALCULATIONS OF FREQUENCY, EFFECTS OF SOUND IN VARIOUS MEDIA, CALCULATION OF VARIOUS PROPERTIES OF MATTER USING SOUNDWAVES, USE OF PHANTOMS IN IMAGING, PROPAGATION OF SOUND IN MATTER, USE OF CONTINUOUS AND PULSED WAVE TRANSDUCERS, AND DELIVERY OF ENERGY VIA SOUND WAVES. Required Previous: PHYS-1214 or PHYS-2225

PHYS-3713 Thermodynamics 3 Credits
PROPERTIES OF SUBSTANCES AND PRINCIPLES GOVERNING CHANGES IN FORM OF ENERGY. FIRST AND SECOND LAWS. Required Previous: PHYS-2225

PHYS-3813 Optics 3 Credits
GEOMETRICAL AND PHYSICAL OPTICS. Required Previous: PHYS-1214 or PHYS-2225

PHYS-4113 Electricity & Magnetism-Field Theory 3 Credits
ELECTRIC AND MAGNETIC FIELDS. GAUSS'S THEOREM, POTENTIAL THEORY, MAXWELL'S EQUATIONS. Required Previous: PHYS-2225

PHYS-4222 X-Ray and Nuclear Physics Laboratory 2 Credits
COURSE INVOLVES LABORATORY EXPERIENCE IN THE STUDY OF GAMMA SPECTROSCOPY USING A NAI DETECTOR, X-RAY DIFFRACTION STUDIES, AND OTHER NUCLEAR PHYSICS TOPICS. Required Previous: PHYS-3013

PHYS-4313 Introduction to Nuclear Physics 3 Credits
NUCLEAR DISINTEGRATIONS, NUCLEAR STRUCTURE, NEUTRON PHYSICS. Required Previous: PHYS-3013

PHYS-4413 Advanced Electronics 3 Credits
A CONTINUATION OF THE TOPICS INTRODUCED IN PHYS 3213 BASIC ELECTRONICS. Required Previous: PHYS-4113

PHYS-4513 Quantum Mechanics 3 Credits
THE SCHRODINGER EQUATION, ITS STATISTICAL INTERPRETATION, PHYSICAL MEANING OF QUANTUM MECHANICS. Required Previous: PHYS-3013

PHYS-4713 Mathematical Physics 3 Credits
FUNCTIONS OF A REAL VARIABLE, ELLIPTIC FUNCTIONS, BESSEL FUNCTIONS, THEORY OF INTEGRATION, FOURIER SERIES AND THE LAPLACE TRANSFORM. Required Previous: PHYS-3113

PHYS-4981 Seminar- 1 Credit
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4982 Seminar- 2 Credits
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4983 Seminar- 3 Credits
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4984 Seminar- 4 Credits
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4991 Individual Studies- 1 Credit
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4992 Individual Studies- 2 Credits
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4993 Individual Studies- 3 Credits
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-4994 Individual Studies- 4 Credits
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-5214 Theoretical Mechanics 4 Credits
THE HAMILTONIAN EQUATIONS, LAGRANGE'S FORMULATION, CANONICAL TRANSFORMATIONS AND RELATIVITY MECHANICS. Required Previous: PHYS-3123

PHYS-5981 Seminar- 1 Credit
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-5982 Seminar- 2 Credits
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-5983 Seminar- 3 Credits
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-5984 Seminar- 4 Credits
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-5991 Individual Studies- 1 Credit
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: Twelve (12) hours of Physics

PHYS-5992 Individual Studies- 2 Credits
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: Twelve (12) hours of Physics

PHYS-5993 Individual Studies- 3 Credits
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: Twelve (12) hours of Physics

PHYS-5994 Individual Studies- 4 Credits
DIRECTED INTENSIVE STUDY ON DEFINITE PROBLEM OR SPECIAL SUBJECT, BASED ON APPROVED OUTLINE OR PLAN, CONFERENCES, ORAL AND WRITTEN REPORTS. Required Previous: Twelve (12) hours of Physics

PHYS-H1314 Honors-Astronomy 4 Credits
A NON-MATHEMATICAL TREATMENT OF INTRODUCTORY ASTRONOMY. TOPICS OF INTEREST INCLUDE A STUDY OF THE CONSTELLATIONS, THEORIES OF PLANETARY MOTION, THEORIES OF EVOLUTION OF THE UNIVERSE, AND SUCH EXTRAGALACTIC OBJECTS AS NEBULAE, STAR CLUSTERS, VARIABLE STARS, BINARY STARS AND QUASISTELLAR OBJECTS. LABORATORY WORK INCLUDED.

PHYS-H2225 Honors-Engineering Physics II 5 Credits
THERMODYNAMICS, VIBRATIONS, WAVES AND SOUND, ELECTRICITY, MAGNETISM, OPTICS, AND RADIOACTIVITY. 4 HOURS LECTURE, 2 HOURS LAB. (NOTE: DEGREE CREDIT NOT ALLOWED IN BOTH PHYS 1214 AND PHYS 2225.) Required Previous: MATH-3025

PHYS-H3013 Honors-Modern Physics 3 Credits
THE QUANTUM THEORY, BORH'S THEORY OF THE HYDROGEN ATOM, EINSTEIN'S THEORY OF RELATIVITY. Required Previous: PHYS-2225

PHYS-H3123 Honors-Mechanics II 3 Credits
LANGRANGIAN AND HAMILTONIAN MECHANICS Required Previous: PHYS-3113

PHYS-H3213 Honors-Basic Electronics 3 Credits
AN INTRODUCTORY COURSE IN ELECTRONICS WHICH COVERS SUCH TOPICS AS DIGITAL ELECTRONICS, CIRCUIT THEORY, SOLID STATE THEORY, COMMONLY USED INTEGRATED CIRCUITS, ANALOG TO DIGITAL CONVERSION, MICROPROCESSOR BASICS, AND POWER SUPPLIES. Required Previous: PHYS-1214 or PHYS-2225

PHYS-H3813 Honors- Optics 3 Credits
GEOMETRICAL AND PHYSICAL OPTICS. Required Previous: PHYS-1214 or PHYS-2225

PHYS-H4113 Honors-Electricity & Magnetism-Fld Theory 3 Credits
ELECTRIC AND MAGNETIC FIELDS. GAUSS'S THEOREM, POTENTIAL THEORY, MAXWELL'S EQUATIONS. Required Previous: PHYS-2225

PHYS-H4313 Honors-Introduction to Nuclear Physics 3 Credits
NUCLEAR DISINTEGRATIONS, NUCLEAR STRUCTURE, NEUTRON PHYSICS. Required Previous: PHYS-3013

PHYS-H4991 Honors-Individual Studies- 1 Credit
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-H4993 Honors-Individual Studies- 3 Credits
DIRECTED INDIVIDUAL STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-S4981 Seminar- 1 Credit
DIRECTED GROUP STUDY ON SPECIAL SUBJECT OR PROBLEM.

PHYS-S5981 Seminar- 1 Credit
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-S5982 Seminar- 2 Credits
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-S5983 Seminar- 3 Credits
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.

PHYS-S5984 Seminar- 4 Credits
DIRECTED INTENSIVE STUDY ON SELECTED PROBLEM OR SPECIAL TOPIC.