



UNIVERSITY OF THE PACIFIC

Engineering Physics

The Bachelor of Science degree in Engineering Physics (EPHYS) is offered through the cooperation of University of the Pacific's School of Engineering and Computer Science and the Department of Physics in the College of the Pacific. Engineering physics is a field that provides broad training in physics, mathematics, and engineering design. The practitioner of engineering physics is often involved in the development of new devices and products using sophisticated physical concepts.

The engineering physics curriculum educates students to work in areas where technology is changing rapidly and where the boundaries of several traditional engineering disciplines overlap, such as sensors, robotics, materials, energy, and semiconductor materials, particularly in nano-scale electronic devices. The curriculum develops sufficient depth in both engineering and science to produce graduates who are able to relate basic knowledge to practical problems in engineering. The physics engineer is a person with the training of an applied physicist and can function as either an electrical engineer or mechanical engineer with a deeper understanding of physics applied to the two engineering disciplines.

COOPERATIVE EDUCATION PROGRAM (CO-OP)

CO-OP coordinators work with students to arrange 7 month full-time, paid jobs with engineering employers. (CO-OP is optional for non-U.S. citizens)

ENGINEERING PHYSICS PROGRAM OBJECTIVES

Through their careers in engineering or related profession, Pacific graduates are expected to demonstrate the following within a few years of earning their bachelor's degree in Engineering Physics:

- + Competency in an engineering or science profession via promotion to positions of increasing responsibility, publications, and/or conference presentations.
- + Adaptability to new developments in science and technology by successfully completing or pursuing graduate education in engineering or related fields, participating in professional development and/or industrial training courses, or pursuing professional licensure.

For more information, contact:

Dr. Jeffrey Shafer, Associate Professor and Chair
jshafer@pacific.edu | 209-946-2302 | Anderson 230

UNIVERSITY OF THE
PACIFIC

School of Engineering
and Computer Science

BACHELOR OF SCIENCE IN ENGINEERING PHYSICS - PROGRAM CURRICULUM

MATHEMATICS & SCIENCE CORE

MATH 051 [4] CALCULUS I
MATH 053 [4] CALCULUS II
MATH 055 [4] CALCULUS III
MATH 057 [4] APPLIED DIFFERENTIAL EQUATIONS I
ECPE 127 [4] RANDOM SIGNALS
PHYS 053 [5] PHYSICS I
PHYS 055 [5] PHYSICS II
CHEM 024 [4], 025 [5], OR 027 [5] GENERAL CHEM.
ADVANCED MATH ELECTIVE [3 - 4] (SEE LIST BELOW)

ENGINEERING PHYSICS CORE:

COMP 051 [4] INTRO TO COMPUTER SCIENCE
↳ OR ENGR 019 [3] COMPUTER APPLICATIONS IN ENGINEERING
IDEA 010 - INTERDISCIPLINARY DESIGN & SUCCESS
IDEA 020 - INTERDISCIPLINARY DESIGN & INNOVATION
ECPE 041 [3] CIRCUITS
ECPE 041L [1] CIRCUITS LAB
ECPE 071 [3] DIGITAL DESIGN
ECPE 071L [1] DIGITAL DESIGN LAB
ECPE 121 [4] DIGITAL SIGNAL PROCESSING
ECPE 131 [4] ELECTRONICS
EPHY 195 [2] SENIOR PROJECT I
EPHY 196 [2] SENIOR PROJECT II
ENGR 020 [3] ENGINEERING MECHANICS I (STATICS)

GENERAL EDUCATION

CORE 001 [4] CORE SEMINAR 1
CORE 002 [4] CORE SEMINAR 2
GEN. ED. [3-4] ARTISTIC PROCESS & CREATION*
GEN. ED. [3-4] CIVIC & GLOBAL RESPONSIBILITY*
GEN. ED. [3-4] LANGUAGE & NARRATIVES*
GEN. ED. [3-4] SOCIAL INQUIRY*
ENGR 030 [3] ENGINEERING AND COMPUTING ETHICS IN SOCIETY
*NO MORE THAN ONE COURSE IN EACH AREA CAN BE TAKEN TO SATISFY THE GEN. ED. REQUIREMENTS

PROFESSIONAL PRACTICE (CO-OP)

ENGR 181 [16]
ENGR 182 [16]
32 UNITS OF CO-OP ARE REQUIRED TO GRADUATE,
CO-OP IS OPTIONAL FOR NON - U.S. CITIZENS.

ENGINEERING PHYSICS CORE (CONT.):

ENGR 025 [1] PROFESSIONAL PRACTICE SEMINAR
ENGR 045 [4] MATERIALS ENGINEERING
ENGR 120 [3] ENGINEERING MECHANICS II (DYNAMICS)
PHYS 057 [4] MODERN PHYSICS
EPHY 144 [4] APPLIED ELECTROMAGNETICS
↳ OR PHYS 101 [4] ELECTRICITY AND MAGNETISM
PHYS 161 [4] THERMAL PHYSICS
↳ OR ENGR 122 [3] THERMO DYNAMICS

FOUR TECHNICAL ELECTIVES MUST BE CHOSEN FROM THE LIST BELOW WHICH INCLUDE SUGGESTED COURSES. STUDENTS MAY TAKE OTHER COURSES NOT INCLUDED IN THE LIST BELOW.

ENGINEERING PHYSICS ELECTIVES:

PHYSICS ELECTIVES (SELECT ONE)

PHYS 102 [4] ELECTRODYNAMICS
PHYS 105 [4] OPTICS
PHYS 127 [4] COMPUTATIONAL PHYSICS
PHYS 137 [4] MATHEMATICAL PHYSICS
PHYS 141 [4] COSMOLOGY
PHYS 151 [4] ADVANCED PHYSICS LAB
PHYS 170 [4] SOLID STATE DEVICES
PHYS 181 [4] CLASSICAL MECHANICS
PHYS 183 [4] QUANTUM MECHANICS
PHYS 191 [3-4]* INDEPENDENT STUDY
PHYS 193 [3-4]* SPECIAL TOPICS
PHYS 197 [3-4]* UNDERGRADUATE RESEARCH

ENGINEERING ELECTIVES (SELECT TWO)

ANY TWO 100-LEVEL OR ABOVE COURSES IN ANY ENGINEERING OR COMPUTER SCIENCE MAJOR EXCEPT ENGR 181/182/183 OR COMP 187.
CIVL 130 [3] FLUID MECHANICS 1
ECPE 133/EPHY 133 [4] SOLID STATE DEVICES
ECPE 135 [4] POWER ELECTRONICS
ECPE 141 [4] ADVANCED CIRCUITS
ECPE 155 [4] AUTONOMOUS ROBOTICS
ECPE 161 [4] AUTOMATIC CONTROL SYSTEMS
ECPE 162 [4] COMMUNICATION SYSTEMS
ECPE 163 [4] ENERGY CONVERSION
ECPE 165 [3] POWER SYSTEM ANALYSIS
ECPE 170 [4] COMPUTER SYSTEMS & NETWORKS
ECPE 172 [4] MICROCONTROLLERS
ECPE 173 [3] COMPUTER ORGANIZATION AND ARCH
ECPE 174 [2] ADVANCED DIGITAL DESIGN
ECPE 177 [4] COMPUTER NETWORKING
ECPE 178 [3] COMPUTER NETWORK SECURITY
ECPE 191 [3-4]* INDEPENDENT STUDY

ECPE 193 [3-4]* SPECIAL TOPICS
ECPE 197 [3-4]* UNDERGRADUATE RESEARCH
EMGT 170 [4] PROJECT DECISION MAKING
EMGT 172 [3] ENGINEERING ECONOMY
EMGT 174 [3] ENGINEERING PROJECT MANAGEMENT
ENGR 110 [3] INSTRUMENTATION AND EXPERIMENTAL METHODS
ENGR 121 [4] MECHANICS OF MATERIALS
MECH 100 [3] MANUFACTURING PROCESSES
MECH 100L [1] MANUFACTURING PROCESSES LAB
MECH 104 [3] INTRODUCTION TO MECHATRONICS
MECH 150 [3] HEAT TRANSFER
MECH 151 [3] APPLIED HEAT TRANSFER
MECH 155 [3] SOLAR ENERGY ENGINEERING
MECH 157 [3] THERMODYNAMICS II
MECH 158 [3] AIR CONDITIONING
MECH 160 [3] FLUID DYNAMICS
MECH 175 [4] SYSTEMS ANALYSIS AND CONTROL
MECH 178 [3] FINITE ELEMENT METHODS

ADVANCED MATH ELECTIVES (SELECT ONE)

MATH 110 [4] NUMERICAL ANALYSIS
MATH 145 [4] APPLIED LINEAR ALGEBRA
MATH 148 [3] CRYPTOGRAPHY
MATH 152 [4] VECTOR ANALYSIS
MATH 157 [4] APPLIED DIFF. EQNS. II
MATH 174 [4] GRAPH THEORY