



**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 program is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Engineering Physics Programs.

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:

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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