

# UNIVERSITY OF THE PACIFIC

## ELECTRICAL ENGINEERING

The Bachelor of Science degree in Electrical Engineering is offered by University of the Pacific through the Department of Electrical and Computer Engineering (ECPE). Electrical engineering encompasses a wide range of topics, including communication systems, automatic control systems, digital and embedded systems, electronics, energy conversion, digital signal processing, and integrated circuits. All electrical engineering students complete a team-oriented, multidisciplinary senior design project, which provides an opportunity to apply engineering fundamentals and design methods to solve a real-world problem. Graduates of this program have the essential knowledge to continue their education through graduate studies, or enter the workforce directly after graduation.

The electrical engineering laboratories at Pacific provide hands-on experience with circuits, test equipment, microcontrollers, robots, control systems, energy conversion, power electronics, and the latest software. Students have easy access to all computer and laboratory equipment, and can conduct approved independent research.

### COOPERATIVE EDUCATION PROGRAM

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)

### ELECTRICAL ENGINEERING PROGRAM OBJECTIVES

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

- + Competency in the electrical engineering 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, or participating in professional development and/or industrial training courses



# EE

For more information, contact:

Dr. Ken Hughes

Associate Professor and Chair

khughes@pacific.edu | (209) 946-3073

Offices are located in Anderson Hall

[pacific.edu/engineering](http://pacific.edu/engineering)

# BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - PROGRAM CURRICULUM

## MATHEMATICS & BASIC SCIENCE

MATH 051 [4] CALCULUS I  
MATH 053 [4] CALCULUS II  
MATH 055 [4] CALCULUS III  
MATH 057 [4] DIFFERENTIAL EQUATIONS  
PHYS 053 [5] PHYSICS I  
PHYS 055 [5] PHYSICS II  
SCIENCE ELECTIVE [3-5] (SEE LIST BELOW)  
ADVANCED MATH ELEC. [4] (SEE LIST BELOW)

## ELECTRICAL ENGINEERING CORE:

ECPE 005 [1] INTRO TO ELECTRICAL & COMPUTER ENGR.  
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 127 [3] RANDOM SIGNALS  
ECPE 131 [3] ELECTRONICS  
ECPE 131L [1] ELECTRONICS LAB  
ECPE 141 [4] ADVANCED CIRCUITS  
ECPE 172 [4] MICROCONTROLLERS  
ECPE 194 [0] CORE ASSESSMENT EXAM  
ECPE 195 [2] SENIOR PROJECT 1  
ECPE 196 [2] SENIOR PROJECT 2

**MINIMUM TOTALS: 120 ACADEMIC UNITS: 32 CO-OP UNITS**

## ELECTRICAL ENGINEERING ELECTIVES (SELECT FOUR) AT LEAST ONE COURSE

ECPE 135 [4] POWER ELECTRONICS  
ECPE 163 [4] ENERGY CONVERSION  
ECPE 165 [3] POWER SYSTEMS

### AT LEAST ONE COURSE

ECPE 124 [4] DIGITAL IMAGE PROCESSING  
ECPE 135 [4] POWER ELECTRONICS  
ECPE 136 [4] VLSI DESIGN  
ECPE 155 [4] AUTONOMOUS ROBOTICS  
ECPE 161 [4] CONTROL SYSTEMS  
ECPE 162 [4] COMMUNICATION SYSTEMS

### TWO ADDITIONAL ELECTIVES

ANY OF THE ABOVE ECPE COURSES  
ECPE 133 [4] SOLID STATE DEVICES  
ECPE 170 [4] COMPUTER SYSTEMS AND NETWORKS  
ECPE 173 [3] COMPUTER ORGANIZATION & ARCHITECTURE  
ECPE 174 [4] ADVANCED DIGITAL DESIGN  
ECPE 177 [4] COMPUTER NETWORKING  
ECPE 178 [3] COMPUTER NETWORK SECURITY  
ECPE 191 [3-4]\* INDEPENDENT STUDY  
ECPE 197 [3-4]\* UNDERGRADUATE RESEARCH  
MECH 155 [3] SOLAR ENERGY ENGINEERING  
MECH 175 [3] SYSTEMS ANALYSIS AND CONTROL  
BENG 171 [4] BIOELECTRICITY  
ECPE 2XX [3-4] ANY GRADUATE ECPE COURSE

## GENERAL EDUCATION

PACS 001 [4] PACIFIC SEMINAR 1  
PACS 002 [4] PACIFIC SEMINAR 2  
PACS 003 [3] PACIFIC SEMINAR 3  
GEN. ED. [3-4] (I-A, I-B, OR I-C)\*  
GEN. ED. [3-4] (I-A, I-B, OR I-C)\*  
GEN. ED. [3-4] (II-A OR II-C)  
ENGR 030 [3] ENGR., ETHICS & SOCIETY (II-B)  
\*CATEGORY I GEN. EDS MUST BE FROM DIFFERENT AREAS.

ENGR 010 [1] DEAN'S SEMINAR  
ENGR 025 [1] PROFESSIONAL PRACTICE SEMINAR  
COMP 051 [4] INTRO TO COMPUTER SCIENCE  
COMP 053 [4] DATA STRUCTURES  
PHYS 101 [4] ELECTRICITY AND MAGNETISM  
OR ECPE 144 [4] APPLIED ELECTROMAGNETISM

## PROFESSIONAL PRACTICE (CO-OP)

ENGR 181 [16]  
ENGR 182 [16]

## ELECTIVES (6 ELECTIVES FROM LISTS BELOW)

- FOUR EE ELECTIVES [3-4]  
- ONE ENGINEERING SCIENCE ELECTIVE [3-4]  
- ONE UPPER DIVISION SOECS ELECTIVE [3-4]

## ENGINEERING SCIENCE ELECTIVES (SELECT ONE)

CIVL 015 [3] CIVL ENGINEERING GRAPHICS  
MECH 015 [3] MECH ENGINEERING GRAPHICS  
ENGR 020 [3] ENGINEERING MECHANICS  
ENGR 045 [4] MATERIALS SCIENCE  
ENGR 122 [4] THERMODYNAMICS

## SCIENCE ELECTIVES (SELECT ONE)

BENG 053 [4] BIO WITH APPS FOR ENGRS I  
BENG 063 [4] BIO WITH APPS FOR ENGRS II  
BIOL 051 [4] PRINCIPLES OF BIOLOGY  
BIOL 061 [4] PRINCIPLES OF BIOLOGY  
CHEM 024 [4] FUNDAMENTALS OF CHEMISTRY  
CHEM 025 [5] GENERAL CHEMISTRY  
CHEM 027 [5] GENERAL CHEMISTRY

## ADVANCED MATH ELECTIVES (SELECT ONE)

MATH 075 [4] INTRO TO LINEAR ALGEBRA  
MATH 110 [4] NUMERICAL ANALYSIS  
MATH 145 [4] APPLIED LINEAR ALGEBRA  
MATH 148 [3] CRYPTOGRAPHY  
MATH 152 [4] VECTOR ANALYSIS  
MATH 155 [4] REAL ANALYSIS  
MATH 157 [4] APPLIED DIFF. EQUATIONS II  
MATH 174 [4] GRAPH THEORY

## UPPER DIVISION SOECS ELECTIVE (SELECT ONE)

ANY 100 OR 200 BENG, CIVL, COMP, ECPE,  
ENGR, EMGT OR MECH COURSE.  
EXCLUDES ENGR 150, 181, 182, 183

**32 UNITS OF CO-OP ARE REQUIRED TO GRADUATE. CO-OP IS OPTIONAL FOR NON - U.S. CITIZENS.**

\*ECPE 191: INDEPENDENT STUDY, AND ECPE 197: UNDERGRADUATE RESEARCH CAN BE TAKEN FOR 1-4 UNITS; A MINIMUM OF 3 OR MAXIMUM OF 4 UNITS CAN COUNT AS AN EE ELECTIVE. ECPE 193: SPECIAL TOPICS MAY QUALIFY AS AN ECPE ELECTIVE. GRADUATE (200 LEVEL) COURSES MAY ALSO COUNT AS ECPE ELECTIVES. A 3.0 GPA IS REQUIRED TO TAKE A 200 LEVEL COURSE AS AN ELECTIVE.