



UNIVERSITY OF THE PACIFIC

Mechanical Engineering

Our Mechanical Engineering Program is accredited by the Engineering Accreditation Commission of ABET under the General Criteria and the Program Criteria for Mechanical and Similarly Named Engineering Programs. The first two years of the program concentrate primarily on math, science, general education, and general engineering. During the remaining years, students concentrate more on mechanical engineering topics. Several courses include a laboratory component. A variety of equipment is available such as vibration and noise instruments, robots and mechatronic systems, a wind tunnel, solar collectors, a complete machine shop with CNC equipment, data acquisition systems, computer aided design software, materials testing machines and analytical devices including optical and electron microscopes.

Mechanical engineering is a very broad discipline. Consequently, mechanical engineers are typically found engaged in a diverse range of activities including machine design and analysis, product development, plant design, basic and applied research, environmental control, manufacturing, robotics and technical sales. Mechanical engineers are employed by virtually every industry that uses engineers, such as public utilities, aerospace, consumer products, computers, bioengineering, food processing, automotive and materials. Some people earn a mechanical engineering degree and then use their broad technical background to pursue graduate studies and careers in other fields such as business, law or medicine.

The student majoring in mechanical engineering receives basic preparation in these areas, yet it is possible through several electives to emphasize in Energy Systems or Mechanical Systems. Elective courses in the program are fulfilled by engineering electives chosen by the student, and in their senior year, the student performs a project in the Senior Design courses. A number of mechanical engineering courses are available as engineering electives and certain courses in other engineering departments may also be taken as an engineering elective. Students with an interest in multidisciplinary areas such as mechatronics, bioengineering, materials, or manufacturing can take electives or additional courses to develop their abilities in these areas.

MECHANICAL ENGINEERING CONCENTRATIONS

Although many specialties exist within mechanical engineering, two major focus areas are often described:

- + Energy Systems or Thermal Sciences – energy conversion and alternative energy, power devices, combustion, engineering design and analysis involving the transfer of heat and the flow of gases and liquids, and manufacturing of energy systems

- + Mechanical Systems or Applied Mechanics – machine design, structures, systems, and devices where considerations of motion, wear, fatigue, vibration, material selection, manufacturing, strength and safety are important

For more information, contact:
Dr. Kyle Watson, Associate Professor and Chair
kwatson@pacific.edu | 209.946.3081 | Khoury 110 119

UNIVERSITY OF THE
PACIFIC

School of Engineering
and Computer Science

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - PROGRAM CURRICULUM

REQUIREMENTS: MIN. 120 UNITS WITH 32 UNITS CO-OP.

MATHEMATICS & BASIC SCIENCE (MIN. 30 UNITS)

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
 CHEM 024 [4] FUNDAMENTALS OF CHEMISTRY

GENERAL EDUCATION

CORE 001 [3] **PROBLEM SOLVING & ORAL COMMUNICATION**
 CORE 002 [4] **WRITING & CRITICAL THINKING**
 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 ETHICS AND SOCIETY | DIVERSITY & INCLUSION REQUIREMENT**

ENGINEERING SCIENCE

ENGR 010 [1] DEAN'S SEMINAR
 ENGR 019 [3] COMPUTER APPLICATIONS IN ENGINEERING ENGR
 020 [3] ENGINEERING MECHANICS I (STATICS)
 ENGR 025 [1] PROFESSIONAL PRACTICE SEMINAR
 ENGR 045 [3/1] MATERIALS ENGINEERING AND LAB
 ENGR 120 [3] ENGINEERING MECHANICS II (DYNAMICS)
ENG 121 [3] MECHANICS OF MATERIALS
 ENGR 122 [4] THERMODYNAMICS I
 CIVL 130/L [3/1] FLUID MECHANICS I AND LAB
 ECPE 041/L [3/1] CIRCUITS AND LAB

MECHANICAL ENGINEERING CORE

MECH 015 [3] MECHANICAL ENGINEERING GRAPHICS
 MECH 100/L [3/1] MANUFACTURING PROCESSES AND LAB MECH
 120 [4] MACHINE DESIGN AND ANALYSIS I
 MECH 129 [4] VIBRATIONS
 MECH 140 [4] ENGINEERING DESIGN/SENIOR PROJECT I MECH
 141 [4] ENGINEERING DESIGN/SENIOR PROJECT II

MECHANICAL ENGINEERING ELECTIVE (MIN. 12 UNITS)

MECH 104 [3] INTRODUCTION TO MECHATRONICS
 MECH 123 [3] KINEMATICS AND DYNAMICS OF MACHINERY MECH
 125 [3] MACHINE DESIGN AND ANALYSIS II
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 [3] SYSTEMS ANALYSIS AND CONTROL
 MECH 178 [3] FINITE ELEMENT METHODS
 MECH 200* [3] COMPUTER AIDED MANUFACTURING
MECH 202* [3] POLYMERS AND COMPOSITE MATERIALS MECH
 MECH 204* [3] ADVANCED MECHATRONICS
 MECH 262* [3] COMBUSTION

FOR ALL SUBDICIPLINE

MECH 191 [1-4] INDEPENDENT STUDY
 MECH 193 [3] SPECIAL TOPICS
 MECH 197 [1-4] UNDERGRADUATE RESEARCH
 * GRADUATE LEVEL COURSES REQUIRE INSTRUCTOR PERMISSION

ENGINEERING ELECTIVE (MIN. 3 UNITS CAN BE CHOSEN)

BENG/COMP/CIVL/EMGT 100 LEVEL COURSES
 ECPE 071/L AND 100 LEVEL COURSES

COOPERATIVE EDUCATION PROGRAM (CO-OP)

ENGR 181 [16]
 ENGR 182 [16]

ONE POSSIBLE CURRICULUM PLAN FOR 7 TERMS WITH CO-OP

STUDENTS WORK WITH THEIR FACULTY ADVISORS TO DEVELOP CURRICULUM PLANS IN ACCORDANCE WITH PREREQUISITE REQUIREMENTS AND COURSE SCHEDULES.

	FALL	SPRING
1ST YEAR	<ul style="list-style-type: none"> CORE 001 ENGR 010 MATH 051 CHEM 024 MECH 015 	<ul style="list-style-type: none"> CORE 002 MATH 053 PHYS 053 GE 1
2ND YEAR	TERM 3 <ul style="list-style-type: none"> MATH 055 PHYS 055 ENGR 019 ENGR 020 GE 2 	TERM 4 <ul style="list-style-type: none"> MATH 057 ENGR 045/L ENGR 120 ENGR 122 ENGR 121
3RD YEAR	<ul style="list-style-type: none"> ENGR 025 ECPE 041/L MECH 100/L MECH 129 GE 3 	SPRING/SUMMER <p>CO-OP PROGRAM</p> <ul style="list-style-type: none"> ENGR 181 16 UNITS ENGR 182 16 UNITS
4TH YEAR	<ul style="list-style-type: none"> MECH 120 MECH 140 MECH ELECTIVE MECH ELECTIVE CIVL 130/L 	<ul style="list-style-type: none"> MECH 141 MECH ELECTIVE MECH/ENGR ELECTIVE ENG 030 GE 4