

FRESNO STATE

Mechanical Engineering



For additional information, contact:

Dr. The Nguyen, Associate Professor and Department
Chair

2320 E San Ramon Avenue, M/S EE94

Fresno, CA 93740

(559) 278-1675

Email: then@mail.fresnostate.edu



THE MECHANICAL ENGINEERING CAREER

Mechanical engineering is a broad technical field encompassing many areas:

Aerospace
Automobile
Biomedical
Energy
Environment
Manufacturing
Power Generation
Product Design
Transportation

Well-known multi-national companies, as well as local firms, employ our graduates. Some of our graduates pursue management degrees upon receiving BSME degrees to prepare them for management careers.

Accreditation

The BSME program at California State University, Fresno (CSUF) is accredited by the Engineering Commission of ABET, <http://www.abet.org>

STUDENT ORGANIZATIONS:

American Institute of Aeronautics and Astronautics (AIAA)

American Society of Mechanical Engineers (ASME)

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

Human Powered Vehicle Challenge (HPVC) Project

Pi Tau Sigma (IITΣ)

Society of Automotive Engineers (SAE)

Formula SAE

Baja SAE

Engineers Without Borders (EWB)

Mechatronics Union

National Society of Black Engineers

Society of Hispanic Professional Engineers (SHPE)

MECHANICAL ENGINEERING PROGRAM

The Mechanical Engineering program at CSUF is a broad-based, hands-on curriculum. The undergraduate program currently requires 123 units (8 semesters) for graduation. The program's key elements include:

- Courses in machine design, energy, and materials
- Hands-on experience via laboratories, classes, and clubs
- Industry sponsored senior class projects
- Paid internships with leading companies (VIP program)
- Participation in professional society activities (ASME, SAE)
- Preparation towards the Professional Engineers license
- Preparation for graduate studies

MECHANICAL ENGINEERING

Recommended Program Sequence

Bachelor of Science Degree

(66 Units in Engineering, 123 Total Units)

Student: _____	ID# _____	Adviser: _____	
Telephone: _____	Catalog Year: _____	Graduation Date: _____	
Email: _____			

ADVISING SHEET

MAJOR CODE: 054402

2023-2024

1st (Fall) SEMESTER				2nd (Spring) SEMESTER			
Units	Grade	Sem	Trnsfr	Units	Grade	Sem	Trnsfr
ENGR 1	Intro to ME	1	_____	ME 2	Cmpt App in ME	1	_____
ME 26	Engr Graphics	3	_____	CHEM 1A	Gen Chemistry	3	_____
ECE71/CSCI40	(Intro Prog)	3/4	_____	CHEM 1AL	Gen Chemistry Lab	2	_____
GE Area A2	ENGL 10	3	_____	Math 76	Math Analysis II	4	_____
MATH 75*	Math Analysis 1	4	_____	PHYS 4A	Mech+Wave Motion	3	_____
GE Area B2 ²	Life Sciences	3	_____	PHYS 4AL	Mech+Wave Lab	1	_____
		17/18		GE Area D1	HIST 11 or 12	3	_____
						17	
3rd (Fall) SEMESTER				4th (Spring) SEMESTER			
ME 31	Engr Materials	3	_____	ME 95	Manuf Processes	2	_____
ME 32	Engr Materials Lab	1	_____	CE 20	Engr Mech: Statics	3	_____
MATH 77	Math Analysis III	4	_____	ECE 90	Prin Elec Cir	3	_____
PHYS 4B	Elec+Mag+Heat	3	_____	ECE 90L	Prin Elec Cir Lab	1	_____
GE Area A1	Oral Communication	3	_____	Math 81 ⁴	Applied Analysis	3	_____
GE Area C2	PHIL 20	3	_____	PHYS 4C	Light+Mod Phys	3	_____
		17		PLSI 2	Amer Govt	3	_____
						18	
5th (Fall) SEMESTER				6th (Spring) SEMESTER			
ME 112	Engr Mech: Dyn	3	_____	ME 116	Fluid Mechanics	3	_____
ME 115	Instru & Meas Lab	1	_____	ME 118**	Fluid Mech Lab	1	_____
ME 136	Thermodynamics	3	_____	ME 156	Adv Thermo	3	_____
ME 125	Engr Stat & Expt	3	_____	ME 134 ¹	Kinematics of Mach	3	_____
CE 121	Mech of Mtls	3	_____	ME 140	Adv Engr Analysis	3	_____
		13				13	
7th (Fall) SEMESTER				8th (Spring) SEMESTER			
Technical Area Course ³		3	_____	Technical Area Course ³		3	_____
ME 135**	Intro Design-Sr Cap I	3	_____	ME 155	Sr Cap Design II	3	_____
ME 145	Heat+Mass Trans	3	_____	ME 166	Energy Sys Design	3	_____
ME 154	Dsgn of Mach Elem	3	_____	ME 159	Mech Sys Dsgn Lab	1	_____
GE Area D2 ²	Social Sciences	3	_____	GE Area F	Ethnic Studies	3	_____
		15				15	

¹Also counts as major GPA

²See Catalog for GE Courses

³Take a minimum of 6 units in Group A (ME 122, 137, 142, 144, 146, 162 or 164 (to be offered in alternate years)). A maximum of 3 units from Group B (ME 180, 190, 191T) may be substituted for a course in Group A with faculty advisor's approval.

⁴ENGR 101 may be taken as an alternative for Math 81 with faculty advisor's approval

*Math 75 is a pre/co-requisite for all engineering courses except ME 1.

**NOTE: Department approved writing course or equivalent must be taken in the junior year, prior to taking ME118 and ME135, if the student fails the writing exam requirement.

Must have a minimum grade of "C" or better on all math, science, and engineering courses.

MECHANICAL ENGINEERING COURSES

ENGR 1: Introduction to Engineering (1)

An active learning orientation to the various disciplines of the engineering and construction management professions, the design process, functioning effectively on a team, ethical responsibilities of engineers and construction managers, and best practices for success in a degree program within the LCOE.

ME 2: Computer Applications in Mechanical Engineering Laboratory (1)

Prerequisites: MATH 75 (or concurrently). Students develop fundamental skills in basic analytical and design tools used in mechanical engineering. Topics covered include spreadsheet applications, graphing data, technical communication, programming concepts, and computer-aided design (CAD).

ME 26: Engineering Graphics (3)

Prerequisites: MATH 75 (or concurrently). Basic computer literacy required. Principles of orthographic projection, dimensioning, and descriptive geometry. Applications to the solution of engineering problems including the use of interactive computer graphics.

ME 29: Engineering Mechanics (3)

Prerequisites: MATH 77 (or concurrently); PHYS 4A. Not open to mechanical or civil engineering majors. Study of fundamental principles of statics and dynamics by scalar and vector methods.

ME 31: Engineering Materials (3)

Prerequisites: CHEM 1A and MATH 75 (or concurrently). Fundamental nature and properties of engineering materials; structure of matter and its effect on mechanical, electrical, magnetic, and thermal properties.

ME 32: Engineering Materials Laboratory (1)

Prerequisite: ME 31 or concurrently. Application of experimental methods to engineering materials. Study of stress and strain in metals; fatigue; hardness; toughness.

ME 95: Product Development (2)

Prerequisites: ME 2 (or concurrently), ME 26, ME 31, and ME 32 (or concurrently) and MATH 75 (or concurrently). Examines the overall process of product development including preliminary design, drafting, material selection, fabrication, inspection, assembly, and testing. Laboratory component introduces basic machining and fabrication skills.

ME 112: Engineering Mechanics / Dynamics

Prerequisites: CE 20; MATH 81 or ENGR 101. Development of principles of kinematics and kinetics in engineering.

ME 115: Instrumentation and Measurement Laboratory (1)

Prerequisites: ECE 71 or CSCI 40, ECE 91, ECE 91L. Application of different measuring devices and techniques used in engineering systems. Calibration and response characteristics of instruments will be examined. Use of data acquisition system in the recording and analyzing of experimental data. Technical reports are required.

ME 116: Fluid Mechanics (3)

(ME 116 same as ENGR 116). Prerequisites: CE 20, MATH 81 or ENGR 101, and ME 112 (or concurrently). Fundamentals of fluid mechanics as applied to engineering problems.

ME 118: Fluid Mechanics Laboratory (1)

Prerequisites: ENGR 105W or successful completion of university writing exam, ME 115 (or concurrently); ME 116 (or concurrently). Applications of experimental methods used in engineering practice to fluid systems.

ME 122: Dynamic Systems and Controls (3)

Prerequisites: ME 112 and ME 115. Modeling of mechanical systems; mechanical feedback systems; time domain analysis; stability, frequency response, and root locus plots; performance criteria, and system compensations; applications of different measuring devices and techniques used in engineering systems.

⁴Lecture/lab.

MECHANICAL ENGINEERING COURSES

ME 125: Engineering Statistics and Experimentation (3)

Prerequisites: MATH 77 completed or concurrent. Provides fundamentals of statistical and uncertainty analysis applied to engineering measurements, experimental methods, product design, and manufacturing processes. Includes probability distributions, data sampling, confidence intervals, quality control, reliability, life testing, and analysis of uncertainty in experimental measurements.

ME 134: Kinematics of Machinery (3)

Prerequisites: ME 26, ME 112, CE 121; MATH 81 or ENGR 101. Analytical, graphical, and computer solutions applied to design problems in machinery, mechanisms. Cam design, different types of followers, cam manufacturing considerations. Gear design, different types of gears, gear trains. Students will be assigned class projects related to the topics covered in class. (2 lecture, 3 lab hours)

ME 135: Introduction to Design—Senior Capstone Design I (3)

Prerequisites: ME 95 and 134. Introduction to product engineering with consideration given to economic, safety, quality, aesthetic, environmental, liability, and patent law issues. Open-ended design project is required.

ME 136: Thermodynamics (3)

Prerequisites: CHEM 1A, PHYS 4A, MATH 77, and upper-division standing. Fundamentals of thermodynamics and heat transfer as applied to engineering problems.

ME 137: Turbomachinery (3)

Prerequisites: ME 116 and 136. Applications of fluid mechanics and thermodynamics and rotor-fluid energy interchange. Steady flow problems of pumps, compressors, and turbines with incompressible and compressible fluids. Both closed- and open-ended homework problems.

ME 140: Advanced Engineering Analysis (3)

Prerequisites: CE 121; ECE 71 or CSCI 40; ME 112 (or concurrently), ME 116 (or concurrently). Development of finite element method of engineering analysis; applications to heat flow, fluid flow, vibrations, and stresses in mechanical design using appropriate numerical techniques and closed-form solutions of partial differential equations.

ME 142: Mechanical Vibration (3)

Prerequisites: ME 112. Mathematical and physical basis of vibration theory with applications to engineering analysis and design. Includes transient and steady state phenomena, distributed and lumped parameter systems, coupled systems, and computer solutions.

ME 144: Advanced Mechanics of Materials (3)

Prerequisites: CE 121, ME 125, MATH 81. Advanced topics in mechanics of materials. Statistical considerations in design, stress and strain theories; contact stresses, strain energy, Castigliano's theorem; failures resulting from static and dynamic loading; static and fatigue theories of failure; stress concentrations.

ME 145: Heat and Mass Transfer (3)

Prerequisites: ME 116, ME 136, ME 140 or concurrently. Analytical, numerical, and electrical analogy methods are used to solve a variety of heat transfer and mass transfer problems. Advanced topics in radiation, boundary layer flow, and heat exchanger design.

ME 146: Air Conditioning (3)

Prerequisites: ME 116, 136. Theory and practice in air conditioning including psychrometrics, load estimating, heating and cooling systems, fluid design and controls.

ME 154: Design of Machine Elements (3)

Prerequisites: ME 31, CE 121. Design of machine elements and components using theory learned in prerequisite courses. Both individual and team-type open-ended design projects are required. Use of computers for design is required. (2 lecture, 3 lab hours)

MECHANICAL ENGINEERING COURSES

ME 155: Senior Capstone Design II (3)

Prerequisites: ME 135 and completion of Upper Division Writing Requirement, Engineering design process with consideration given to economic, safety, quality, aesthetics, environmental, liability, and patent law issues. Meeting client-based specifications; optimizing designs, working in a team environment, and developing project management skills form the basis for the course. second semester of a two-semester capstone design experience

ME 156: Advanced Thermodynamics—Fluid Mechanics (3)

Prerequisites: ME 136. Advanced topics in thermodynamics including analysis of conventional and alternative energy conversion processes.

ME 159: Mechanical Engineering Laboratory (1)

Prerequisites: ME 118, ME 125, ME 145, ME 156 (or concurrently), and senior standing. Analysis of mechanical engineering and measurement systems. Students conduct experiments dealing with advanced thermal and mechanical systems. Using knowledge and experience gained from experimentation, students design and conduct their own group experiments. Both written and oral technical reports are required.

ME 162: Computer-Aided Design (3)

Prerequisites: ME 2, ME 26, ME 140, ME 145 (or concurrently). Survey of computer applications for design, analysis of mechanical systems, and manufacturing of mechanical components. Typical programming language software packages used in industry (CAD/CAM and FEA) will be introduced.

ME 164: Mechanical Systems of Engineer Design I (3)

Prerequisites: ME 135 and successful completion of university writing requirement. Open ended design problems of complete machine systems. Integration of prerequisite course material into final design project. Team project report/presentation required.

ME 166: Energy Systems Design (3)

Prerequisites: ME 135 and successful completion of university writing requirement. Design of conventional and alternative energy conversion systems i.e. solar; selection and integration of components of the system; use of codes and standards. Group project report required. Satisfies the senior major requirement for B.S. in Mechanical Engineering.

ME 180: Special Projects (1-3; max total 3)

Prerequisites: senior standing in mechanical engineering, approved subject, department approved writing course or successful completion of writing exam. Study of a problem under supervision of a faculty member; final typewritten report required. Individual project except by special permission.

ME 190: Independent Study (1-3; max total 6)

See Academic Placement -- Independent Study. Approved for **RP** grading.

ME 191T: Topics in Mechanical Engineering (1-3; max total 6)

Prerequisite: permission of instructor. Investigation of selected mechanical engineering subjects not in current courses.

ME 193: Mechanical Engineering Cooperative Internship (1-6; max total 12)

Prerequisite: permission of adviser. Engineering practice in an industrial or government installation. Each cooperative internship period usually spans a summer-fall or spring-summer interval. This course cannot be used to meet graduation requirements. **CR/NC** grading only.

MECHANICAL ENGINEERING FACULTY

Full-time Faculty

Sankha Banerjee, PhD (Associate Professor and Graduate Coordinator)
Design, Materials, and Numerical Methods

Alaeddin Bani Milhim, PhD (Assistant Professor)
Mechatronics, Robots, Autonomous Vehicles/Systems, Nanomanipulation

Mazen Eldeeb, PhD (Associate Professor)
Thermodynamics, Heat Transfer and Combustion

Gemunu Happawana, PhD (Professor)
Applied Mechanics, Vibrations, Dynamics and Control

Aaron Hoskins, PhD (Assistant Professor)
Aerospace Engineering and Numerical Methods

Michael Jenkins, PhD, PE (Professor)
Mechanics, Materials, Test Methods, Brittle Materials and Reliability

Deify Law, PhD (Associate Professor)
Computational Fluid Dynamics (CFD), Experimental Fluid Mechanics, Aerodynamics, HVAC, Two-Phase Flow and Heat Transfer

Ho-Lung Li, PhD (Lecturer)
Machine Design, Robust Control, Circuit Design, 3D Multi-material Printing Machine

The Nguyen, PhD (Associate Professor and Department Chair)
Controls, Mechatronics, Advanced Materials and Design

Ajith Weerasinghe, PhD (Associate Professor)
Energy Systems, Solar Cells and Life Cycle Analysis

Yuanyuan Xie, PhD (Associate Professor)
Design/Numerical Methods and Battery Technologies

Part-time Faculty

Troy Watson, MSME

Jiixin Zhao, PhD (Lecturer)
Machine Design, Fluid Mechanics, and Tribology