

MECHANICAL ENGINEERING TECHNICAL ELECTIVES

(This is a general TE list- refer to the mae.ucsd.edu website for the specific list of TEs for a specialization)

- Mech. Eng. majors following the Fall 2019 catalog must complete **five** TEs.
- Mech. Eng. majors following the Fall 2017 catalog must complete **three** TEs.
- Mech. Eng. majors following a pre-Fall 2017 catalog must complete **four** TEs.

At least one of your electives must be an MAE course.

- Not all courses are offered each year/quarter.
- All prerequisites are enforced.

FLUIDS AND THERMAL ENGINEERING (Area of Study)

MAE-101D	Intermediate Heat Transfer
MAE-104	Aerodynamics
MAE-110	Thermodynamic Systems (<i>formerly 110B</i>)
MAE-113	Fundamentals of Propulsion
MAE-118	Intro to Energy Systems
MAE-119	Intro to Renewable Energy: Solar & Wind
MAE-120	Intro to Nuclear Energy
MAE-180	Orbital Mechanics
MAE-181	Space Mission Analysis and Design
MAE-185	Computational Fluid Mechanics
MAE-201	Mechanics of Fluids
MAE-202	Thermal Processes
MAE-210A	Fluid Mechanics I
MAE-211	Intro to Combustion
MAE-212	Introductory Compressible Flow
MAE-220A	Physics of Gases

ENVIRONMENTAL ENGINEERING (Area of Study)

MAE-118	Intro to Energy Systems
MAE-119	Intro to Renewable Energy: Solar & Wind
MAE-120	Intro to Nuclear Energy
MAE-122	Flow and Transport in the Environment
MAE-123	Intro to Transport in Porous Media
MAE-124	Environmental Challenges, Science and Solutions
MAE-125	Building Energy Efficiently
CENG-100	Material and Energy Balances
CHEM-171	Environmental Chemistry I
CHEM-172	Environmental Chemistry II
CHEM-173	Atmospheric Chemistry
ECE-121A	Power Systems Analysis and Fundamentals
ECE-121B	Energy Conversion
ECE-125A	Introduction to Power Electronics I
ECE-125B	Introduction to Power Electronics II
ESYS-101	Environmental Biology
ESYS-103	Environmental Challenges: Science and Solutions
SIO-111	Introduction to Ocean Waves
SIO-117	The Physical Basis of Global Warming
SIO-141	Chemical Principles of Marine System/CHEM 174
SIO-143	Ocean Acidification

SIO-171/CHEM-174	Introduction to Physical Oceanography
SIO-172	Physics of the Atmosphere
SIO-173	Dynamics of the Atmosphere and Climate
SIO-174	Chemistry of the Atmosphere and Oceans
SIO-175	Analysis of Oceanic and Atmospheric Data
SIO-176	Observational Physical Oceanography
SIO-178	Geophysical Fluid Dynamics
SIO-179	Ocean Instruments and Sensors
MAE-206	Energy Systems

DESIGN (Area of Study)

MAE-131B	Solid Mechanics II <i>(only counts for TE if MAE-160 was taken)</i>
MAE-133	Finite Element Methods in Mechanical and Aerospace Engineering
MAE-144	Embedded Control & Robotics (formerly 143C)
MAE-153	Design of Machine Components
MAE-154	Product Design and Entrepreneurship
MAE-232A/B	Finite Element Methods in Solid Mechanics I & II
MAE-291	Design and Mechanics Problems in Computer Technology
MAE-292	Computer Aided Analysis and Design

DYNAMIC SYSTEMS AND CONTROL (Area of Study)

MAE-108	Prob & Statistical Methods for Engineering <i>(only if following FA19 academic plan (Credit not offered for MAE-108 if ECE-109, ECON-120A, MATH-180A, MATH-183, MATH-186, or SE-125 were taken)</i>
MAE-142	Dynamics and Control of Aerospace Vehicles
MAE-144	Embedded Control & Robotics (formerly 143C)
MAE-145	Robotic Planning & Estimation
MAE-146	Introduction to ML Algorithms
MAE-148	Intro to Autonomous Vehicles
MAE-180	Orbital Mechanics
MAE-181	Space Mission Analysis and Design
MAE-190	Topics: Marine Robotics <i>(Note: Must be this specific course topic)</i>
BENG-103B	Bioengineering Mass Transfer
CENG-101C	Mass Transfer
ECE-172A	Robotics and Machine Intelligence
SIO-111	Introduction to Ocean Waves
SIO-172	Physics of the Atmosphere
SIO-173	Dynamics of the Atmosphere and Climate
SIO-178	Geophysical Fluid Dynamics
MAE-200	Controls
MAE-204	Robotics
MAE-280A	Linear Systems Theory
MAE-281A	Nonlinear Systems
MAE-283A	Parametric Identification: Theory and Methods

MECHANICS AND MATERIALS ENGINEERING (Area of Study)

MAE-130	Advanced Vibrations <i>(only if following FA19 academic plan)</i>
MAE-131B	Solid Mechanics II <i>(only counts for TE if MAE-160 was taken)</i>
MAE-133	Finite Element Methods in Mechanical and Aerospace Engineering
MAE-160	Mechanical Behavior of Materials <i>(only counts for TE if MAE-131B was taken)</i>

MAE-165	Fatigue and Failure Analysis of Engineering Components
MAE-166	Modern Concepts in Nanotechnology
MAE-190	Topics: Biomaterials & Medical Devices (<i>Note: Must be this specific course topic</i>)
SE-131A	Finite Element Analysis
SE-131B	Finite Element Analysis: Beam and Shell Models
SE-163	Nondestructive Evaluation
NANO-134	Polymeric Materials
NANO-148	Thermodynamics of Materials
NANO-158	Phase Transformations and Kinetics
NANO-158L	Material Processing Laboratory
NANO-161	Material Selection Engineering
NANO-174L	Mechanical Behavior Laboratory
MAE-231A	Foundations of Solid Mechanics

STRUCTURAL ENGINEERING (Area of Study)

SE-103	Conceptual Structural Design
SE-120	Engineering Graphics and Computer Aided Structural Design
SE-130A/B	Structural Analysis
SE-142	Design of Composite Structures
SE-143A	Aerospace Structural Design I
SE-143B	Aerospace Structural Design II

Note: SE-143A/B are the SE senior design capstone courses so students will be expected to complete both A&B in consecutive quarters (credit will be given for 2 TEs)

SE-181	Geotechnical Engineering
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OTHER

COGS-152	Cognitive Foundations of Mathematics
ECE-120	Solar System Physics
MAE-190	Topics: Radiation and Light Sources (<i>Note: Must be this specific course topic</i>)
PSYC-161	Engineering Psychology
MATH-102	Applied Linear Algebra
MATH-109	Mathematical Reasoning
MATH-120A	Elements of Complex Analysis
MATH-175	Numerical Partial Differential Equations
MATH-187A	Introduction to Cryptography
MGT-164	Business and Org Leadership (<i>Only one MGT course can be used for TE credit</i>)
MGT-172	Business Project Management (<i>Only one MGT course can be used for TE credit</i>)
MAE-198/199	Independent Study. Two quarters of MAE-198/199 can be used for one TE under certain circumstances. See our website, mae.ucsd.edu , for details.

Global TIES: One quarter of ENG-100D and two consecutive quarters of ENG-100L can be used for one TE.

* Enrollment in graduate courses requires approval by the instructor and course dept via an EASy request.

All TEs must be taken for a letter grade. No P/NP grades allowed except in MAE-199.

For information about receiving TE credit for courses not on this list, please contact a MAE undergraduate advisor through the VAC.