Department of Mechanical and Aerospace Engineering
Updated: February 2025

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 *(formerly 110B)*
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 *(only counts for TE if MAE 160 was taken)*
MAE 131C	Solid Mechanics III
MAE 133	Finite Element Methods in Mechanical and Aerospace Engineering
MAE 144	Embedded Control & Robotics (formerly 143C)
MAE 154	Product Design and Entrepreneurship
MAE 190	Topics: Design of Machine Elements *(Note: Must be this specific course topic)*
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 & Stat/Method/ME (*only if following FA19 academic plan*)
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 149	Sensor Networks
MAE 180	Orbital Mechanics
MAE 181	Space Mission Analysis and Design
MAE 190	Topics: Marine Robotics *(Note: Must be this specific course topic)*
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 (*only if following FA19 academic plan*)
MAE 131B	Solid Mechanics II *(only counts for TE if MAE 160 was taken)*
MAE 131C	Solid Mechanics III
MAE 133	Finite Element Methods in Mechanical and Aerospace Engineering

MAE 160	Mechanical Behavior of Materials *(only counts for TE if MAE 131B was taken)*
MAE 165	Fatigue and Failure Analysis of Engineering Components
MAE 166	Modern Concepts in Nanotechnology
MAE 167	Wave Dynamics in Materials
MAE 190	Topics: Biomaterials & Medical Devices *(Note: Must be this specific course topic)*
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

OTHER

COGS 152	Cognitive Foundations of Mathematics
ECE 120	Solar System Physics
MAE 190	Topics: Radiation and Light Sources *(Note: Must be this specific course topic)*
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 *(Only one MGT course can be used for TE credit)*
MGT 172	Business Project Management *(Only one MGT course can be used for TE credit)*
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.