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 180A Spacecraft Guidance I
- 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 125 Building Energy Efficiently
- CENG 100 Material and Energy Balances
- CHEM 171/172 Environmental Chemistry
- 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 117 The Physical Basis of Global Warming
- SIO 141 Chemical Principles of Marine System/CHEM 174
- SIO 143 Ocean Acidification
- SIO 171 Introduction to Physical Oceanography
- SIO 174 Chemistry of the Atmosphere and Oceans
- SIO 175 Analysis of Oceanic and Atmospheric Data
SIO 176  Observational Physical Oceanography
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 180A  Spacecraft Guidance
- MAE 181  Space Mission Analysis and Design
- 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 131  Finite Element Analysis
- 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  
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.  

-Only students with an overall GPA of 3.5 and an A- or better in all prerequisite courses are encouraged to take graduate-level classes to fulfill their TE requirement. Students must obtain consent from both the instructor and the MAE Student Affairs Office to take graduate level courses.  

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

*If you enroll in a course on this list and it is not shown on your degree audit, please notify an MAE undergraduate advisor.*  

For information about receiving TE credit for courses not on this list, please contact a MAE undergraduate advisor:  
mae-ugradadm@eng.ucsd.edu