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

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 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

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
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
DESIGN

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 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

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

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  Nanomaterials
MAE 167  Wave Dynamics in Materials
MAE 190  Biomaterials and Medical Devices (*Note: Must be this specific course topic*)
SE 131  Finite Element Analysis
SE 163  Nondestructive Evaluation
NANO 134  Polymeric Materials
Department of Mechanical and Aerospace Engineering  
Updated: May 2021

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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>SE 103</td>
<td>Conceptual Structural Design</td>
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<tr>
<td>SE 120</td>
<td>Engineering Graphics and Computer Aided Structural Design</td>
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<tr>
<td>SE 130A/B</td>
<td>Structural Analysis</td>
</tr>
<tr>
<td>SE 142</td>
<td>Design of Composite Structures</td>
</tr>
<tr>
<td>SE 143A</td>
<td>Aerospace Structural Design I</td>
</tr>
<tr>
<td>SE 143B</td>
<td>Aerospace Structural Design II</td>
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<tr>
<td>SE 181</td>
<td>Geotechnical Engineering</td>
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</tbody>
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**OTHER**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>COGS 152</td>
<td>Cognitive Foundations of Mathematics</td>
</tr>
<tr>
<td>ECE 120</td>
<td>Solar System Physics</td>
</tr>
<tr>
<td>PSYC 161</td>
<td>Engineering Psychology</td>
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<tr>
<td>MATH 102</td>
<td>Applied Linear Algebra</td>
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<td>MATH 109</td>
<td>Mathematical Reasoning</td>
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<tr>
<td>MATH 120A</td>
<td>Elements of Complex Analysis</td>
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<tr>
<td>MATH 175</td>
<td>Numerical Partial Differential Equations</td>
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<tr>
<td>MATH 187</td>
<td>Introduction to Cryptography</td>
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<tr>
<td>MGT 164</td>
<td>Business and Org Leadership (Only one MGT course can be used for TE credit)</td>
</tr>
<tr>
<td>MGT 172</td>
<td>Business Project Management (Only one MGT course can be used for TE credit)</td>
</tr>
<tr>
<td>MAE 198/199</td>
<td>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.</td>
</tr>
</tbody>
</table>

**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