

**ENGINEERING SCIENCE  
TECHNICAL ELECTIVES**

**Undergraduate MAE COURSES:**

MAE 104	Aerodynamics
MAE110B	Thermodynamic Systems
MAE 113	Fundamentals of Propulsion
MAE 118A	Introduction to Energy Systems
MAE 118B	21 <sup>st</sup> Century Energy Technologies I
MAE 118C	21 <sup>st</sup> Century Energy Technologies II
MAE 124	Introduction to Environmental Engineering
MAE 125A	Flow and Transport in the Environment
MAE 125B	Fluid-Solid Interactions in Environment Engineering
MAE 125C	Case Studies in Environmental Engineering
MAE 127	Statistical Methods for Environmental Sciences and Engineering
MAE 131B	Fundamentals of Solid Mechanics II
MAE 131C	Solid Mechanics III
MAE 133	Finite Element Methods in Mechanical and Aerospace Engineering
MAE 142	Dynamics and Control of Aerospace Vehicles (prerequisites MAE 104, 143B)
MAE 143A	Signals and Systems
MAE 143B	Linear Control
MAE 143C	Digital Control Systems
MAE 149	Sensor Networks
MAE 152	Computer Graphics for Engineers and Scientists
MAE 166	Nanomaterials
MAE 180A	Spacecraft Guidance
MAE 181	Space Mission Analysis and Design (formerly MAE 180B)
MAE 191	Topics in Engineering Science

**GRADUATE COURSES: *Must have departmental approval***

MAE 207	Topics in Engineering Science
MAE 210A-C	Fluid Mechanics
MAE 220A	Physics of Gases
MAE 220B	Physics of Gas dynamics
MAE 220C	Non-equilibrium gas dynamics
MAE 223	Computational Fluid Mechanics
MAE 231A	Foundation of Solid Mechanics (prerequisite MAE 131B)
MAE 231B	Elasticity (prerequisite MAE 231A)
MAE 231C	Anaelasticity (prerequisite MAE 231B)
MAE 232A	Finite Element Methods in Solid Mechanics I
MAE 233A	Fracture Mechanics (prerequisites MAE 231A-B)
MAE 233B	Micromechanics (prerequisites MAE 231A-C)
MAE 251	Thermodynamics
MAE 280A	Linear Systems Theory (prerequisite MAE 141A)
MAE 280B	Linear Control Design
MAE 281A	Nonlinear Systems (prerequisite MAE 280A)
MAE 281B	Nonlinear Control (prerequisite MAE 281A)
MAE 283A	Parametric Identification: Theory and Methods
MAE 283B	Approximate Identification and Control (prerequisite MAE 283A)
MAE 284	Robust and Multi-Variable Control (prerequisites MAE 141B or MAE 280A)

MAE 285A-B	Optimal Control and Estimation (prerequisite MAE 280A)
MAE 290A	Numerical Methods in Science and Engineering
MAE 290B	Numerical Methods for Differential Equations

**OTHER COURSES:**

CHEM 140A-B	Organic Chemistry
CHEM 149A-B	Environmental Chemistry
COGS 152	Cognitive Foundations of Mathematics
ECE 103	Fundamentals of Devices and Materials (prerequisite: PHYS 2D)
ECE 120	Solar System Physics
ECE 135A	Semiconductor Physics (prerequisite ECE 103)
ECE 135B	Electronic Devices (prerequisite ECE 135A)
ECE 173	Theory and Applications of Neural Networks and Fuzzy Logic
ESYS 101	Environmental Biology (prerequisite BILD 1, 2)
ESYS 150	Environmental Perils
MATH 102	Applied Linear Algebra
MATH 109	Mathematical Reasoning
MATH 110	Introduction to Partial Differential Equations
MATH 120A	Elements of Complex Analysis
MATH 120B	Applied Complex Analysis
MATH 130A-B	Ordinary Differential Equations
MATH 131	Variational Methods in Optimization
MATH 132A-B	Elements of Partial Differential Equations and Integral Equations
MATH 150A	Differential Geometry
MATH 150B	Calculus on Manifolds
MATH 172	Numerical Partial Differential Equations
MATH 183	Statistical Methods
MATH 187	Introduction to Cryptography
MATH 193A	Actuarial Mathematics
MATH 194	The Mathematics of Finance
PHYS 100A-C	Electromagnetism
PHYS 130A-C	Quantum Physics
PHYS 140A-B	Statistical and Thermal Physics
PHYS 152A	Introduction to Condensed Matter Physics (prerequisites PHYS 130A, 140A)
PHYS 152B	Electronic Materials (prerequisite PHYS 152A)
PHYS 162	Galaxies and Cosmology (prerequisites: PHYS 2D)
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 181	Geotechnical Engineering

Any questions, please contact an MAE Undergraduate Advisor, Gerri Johnson, at [gljohnson@ucsd.edu](mailto:gljohnson@ucsd.edu) or Christina Sandoval, at [cgsandoval@ucsd.edu](mailto:cgsandoval@ucsd.edu).