

Prospective students whose B.S. major is not Aerospace Engineering or a closely related field such as Mechanical or Civil Engineering must show that they have the necessary background in Aerospace Engineering in order to meet the prerequisite requirements for the graduate level courses.

Students considering applying to the AE graduate program should have taken the following courses or their equivalent in order to be considered for admission.

[MATH 285](#) – Intro to Differential Equations

Techniques and applications of ordinary differential equations, including Fourier series and boundary value problems, and an introduction to partial differential equations. Intended for engineering majors and others who require a working knowledge of differential equations. Credit is not given for both [MATH 285](#) and any of [MATH 284](#), [MATH 286](#), [MATH 441](#). Prerequisite: [MATH 241](#).

This course satisfies the General Education Criteria for:
Quantitative Reasoning II

[AE 311](#) – Incompressible Flow⁴

Equations of motion for incompressible flow, both inviscid and viscous; potential flow theory, inviscid airfoil theory: two- and three-dimensional, Navier-Stokes equations, laminar boundary layer and transition to turbulence. Prerequisite: Credit or concurrent registration in [AE 202](#) and [MATH 241](#).

[AE 321](#) – Mechs of Aerospace Structures⁴

Fundamental concepts in the linear theory of elasticity, including stress, strain, equilibrium, compatibility, material constitution and properties. Failure mechanisms and criteria. Application to plane stress-strain problems, beams in extension and bending, and shafts in torsion. Prerequisite: [MATH 285](#) and [TAM 210](#).

[AE 352](#) – Aerospace Dynamical Systems⁴

Particle kinematics and dynamics; Lagrange's equations; vibration of multiple degree-of-freedom systems; rotational kinematics and dynamics of rigid bodies. Credit is not given for both [AE 352](#) and [TAM 412](#). Prerequisite: [MATH 225](#), [MATH 285](#), and [TAM 212](#).

[AE 312](#) – Compressible Flow⁴

Dynamics of compressible fluid; conservation of mass, momentum, and energy; one-dimensional and quasi-one-dimensional flow; oblique shock waves & Prandtl-Meyer expansion fans; unsteady wave motion; linearized theory. Application to nozzles, diffusers, airfoils, shock tubes and other geometries. Prerequisite: [AE 202](#) and [MATH 285](#). Credit or concurrent registration in [ME 300](#).

[AE 323](#) – Applied Aerospace Structures4

Fundamental concepts of stress, strain, equilibrium, compatibility, material constitution and properties. Analysis of beams and shafts of monocoque and semi-monocoque construction. Energy methods. Prerequisite: [AE 321](#), [MATH 241](#), [MATH 285](#), and [TAM 210](#).

[AE 353](#) – Aerospace Control Systems4

Modeling of linear dynamic systems; Laplace transform techniques; linear feedback control systems; stability criteria; design techniques. Credit is not given for both [AE 353](#) and either GE 320 or [ME 340](#). Prerequisite: [MATH 225](#), [MATH 285](#), and [TAM 212](#).

AE 370 – Aerospace Numerical Methods

Numerical methods used in aerospace engineering. Numerical integration, curve fitting, root finding, numerical solution of ODE, solution of linear systems of equations. Finite difference. Rayleigh-Ritz, and Finite element methods. Applications to simple structural mechanics and aerodynamics problems encountered in aerospace engineering. Prerequisite: Credit or concurrent registration in [AE 311](#) or [AE 312](#); credit or concurrent registration in [AE 321](#) or [AE 323](#).

[AE 433](#) – Aerospace Propulsion

Fundamentals of rocket and airbreathing jet propulsion devices electric propulsion; prediction of thrust, combustion reactions, specific fuel consumption, and operating performance; ramjets; turbojets; turbofans; turboprops; aerothermodynamics of inlets, combustors, and nozzles; compressors, turbines; component matching, fundamentals of electrothermal, electromagnetic elastostatic thrusters, and solar sails. 3 undergraduate hours. 4 graduate hours. Prerequisite: [AE 312](#) and [PHYS 212](#).