

AEROSPACE ENGINEERING (AESP)

AESP 101 - Introduction into Aerospace Engineering (3 Credits)

Historical overview of air and space flight. Principles of flight and characterization of the atmosphere and space. Vehicle concepts, and an introduction to aerodynamics, materials, structures, propulsion, flight mechanics, control, aircraft systems, and design.

AESP 265 - Aerodynamics I Incompressible Flow (3 Credits)

Fundamentals of inviscid, incompressible flow. Derivation of basic equations for lift, drag and aerodynamic moments through dimensional analysis. Two dimensional flow over airfoils. Airfoil characteristics. Thin airfoil theory, finite wing theory. Wing and body interactions. Aerodynamic drag characteristics. Boundary layers.

Prerequisites: D or better in MATH 242; D or better in EMCH 201 or ENCP 201.

AESP 314 - Energy Power and Propulsion (3 Credits)

Introduction to aircraft and rocket engines with emphasis on the performance and characteristics of various types of propulsion systems, including turbojet, turbofan, turboprop, ramjet, scramjet and liquid & solid propellant rockets.

Prerequisites: D or better in EMCH 290 or ENCP 290.

AESP 350 - Aerospace Systems (3 Credits)

Fundamentals of flight control systems, engine control systems, fuel systems, hydraulic systems, landing gears, electrical systems, environmental control systems, emergency systems, avionics and rotary wing systems. Aerospace systems design and development methodology.

Prerequisites: D or better in AESP 101, ENCP 101.

AESP 361 - Aerospace Laboratory I (3 Credits)

Aerospace component experiments: drag polar and C_m -alpha curve for an airfoil; fuselage and landing gear drag; compliance matrix of an isotropic and a laminated composite; mechanical and thermal properties of various aerospace materials; reporting.

Prerequisites: D or better in STAT 509 and AESP 265.

Prerequisite or Corequisite: D or better in EMCH 371; D or better in EMCH 310 or ENCP 210.

AESP 362 - Aerospace Laboratory II (3 Credits)

Introduction to experimental determination of structures, propulsion and systems aspects of aerospace engineering. Oral and written presentations and reports.

Prerequisites: AESP 361.

AESP 365 - Aerodynamics II: Compressible Flow (3 Credits)

Thermodynamics of compressible flow. One dimensional steady flow; isentropic flow, normal shock waves oblique and curved shocks. Nozzle and diffuser design. Raleigh and Fanno flows and their application in propulsion devices.

Prerequisites: D or better in EMCH 290 or ENCP 290 and AESP 265.

AESP 415 - Aircraft Design Part I Basics (3 Credits)

Aircraft mission analysis; Conceptual aircraft design; Weight estimation; Wing design; Payload compartment design; Stabilizer and control surface design; engine selection; aircraft systems design; performance analysis; trade studies; design verification; design documentation and presentation.

Prerequisites: AESP 265.

Prerequisite or Corequisite: AESP 350 and AESP 314.

Graduation with Leadership Distinction: GLD: Research

AESP 420 - Flight and Orbital Mechanics (3 Credits)

Derivation of the general equations of motion (EoM) for aircraft and space flight. Solution of Aircraft EoM for cruise flight and flight maneuvers including coordinated turns, takeoff and landing. Solution of EoM for orbital mechanics problems including transfer trajectories. Calculation of required specific impulses. Design of interplanetary trajectories.

Prerequisites: D or better in EMCH 310 or ENCP 210.

AESP 428 - Design I (3 Credits)

Techniques for managing, planning and executing engineering projects. Computer based analysis and synthesis techniques. Manufacturing and assembly techniques. Statistical methods to support manufacturing, safety and reliability based design. Engineering Ethics. Social impact of engineering decisions and projects. Effective written and oral communication.

Prerequisites: D or better in AESP 350 and EMCH 577.

Prerequisite or Corequisite: D or better in AESP 314.

Graduation with Leadership Distinction: GLD: Research

AESP 460 - Special Problems: Aerospace Engineering (1-3 Credits)

Special Problems (1-3) Individual investigation or studies of special topics related with aerospace engineering.

Graduation with Leadership Distinction: GLD: Research

AESP 466 - Flight Dynamics and Control (3 Credits)

Flight Dynamics and Control is a three-credit course that covers the dynamics of aircraft motion, methods of analysis and design for stability and control, longitudinal motions, lateral-directional motions, and coupled longitudinal and lateral-directional motions.

Prerequisites: EMCH 330 or ENCP 330, AESP 420.

AESP 543 - Aerospace Propulsion (3 Credits)

Propulsion system performance and cycle analysis. Momentum theorem, thrust and propulsive efficiency. Thermodynamics of compressible flow with heat and work addition. Combustion Processes. Components and principles of turbojet, turbofan, ramjet and SCRAM jet engines. Combustors and afterburners. Introduction to rocket engines.

Prerequisites: D or better in AESP 365.