AET - AERONAUTICAL ENG TECH (AET)

AET 2103 Fundamentals of Flight (2-2-3)
Covers the basic aspects of atmospheric flight, the aerodynamic characteristics of airplanes and the engine performance, as well as how the geometric shape of the airplane influences these properties. Focuses on the analysis of steady and accelerated flights.
Prerequisites: PHY 1103, MTH 1203

AET 2403 Applied Thermofluids (2-2-3)
Presents the properties a pure substance, first and second laws of thermodynamics, analysis applied to different systems and control volumes, thermodynamics applications. Covers fluids and their properties, conservation equations and their applications.
Prerequisites: PHY 1103, MTH 1203

AET 2902 Sophomore Design Project (1-2-2)
Sophomore project requires the formation of a team to propose a plan, design and prototype an open-ended basic aeronautical engineering relevant project. The student team is totally responsible for the completion of the project milestones and course objectives while working under the mentorship of a faculty or industry engineer. The team is evaluated on its ability to coordinate efforts to propose the project design criteria, components, resources, implementation and prototyping schedule, and estimated cost.
Corequisites: AET 2103

AET 3303 Aircraft Structures (2-2-3)
Covers the principles of stressed skin structures, aircraft structural materials and components, airworthiness and airframe loads. Presents topics including bending, shear and torsion analyses of open and closed thin-walled beams, structural idealisation, and stress analysis of aircraft components.
Prerequisites: MCE 2213, MCE 2303

AET 3413 Applied Aerodynamics I (2-2-3)
Introduces the basics of aerodynamics, the concept of lift and drag. Aerodynamic characteristics of airfoils: airfoil geometry parameters, vortex panel method, Kutta condition, thin-airfoil theory, high-lift airfoil section, Wings of finite span: lifting-line theory, trailing vortices and downwash, vortex-induced drag, vortex-lattice method, Effects of boundary layer interaction.
Prerequisites: PHY 1103
Corequisites: MTH 2503

AET 3423 Applied Aerodynamics II (2-2-3)
Covers the principles of compressible flow, one-dimensional gas dynamics, normal and oblique shock waves. Prandtl-Meyer flow, Mach lines and characteristics. Includes analysis of two-dimensional, supersonic flows over wings and airplane configuration.
Prerequisites: AET 3413

AET 3503 Fixed And Rotary Wing Assemblies (2-2-3)
Presents a general view of the various fixed and rotary wing aircraft components, control systems, landing gear, fuel systems, wheels, brakes, and rotor systems.
Prerequisites: AET 2103

AET 3513 Aircraft Design (2-2-3)
Conceptual design of an airplane based on a set of requirements. Size and weight estimation. Design analysis based on the performance parameters. Sizing of cockpit, passengers' cabin, cargo compartment. Weapon carriage considerations, Conic shape lofting of fuselage and wings for design layout, engine selection and integration.
Prerequisites: AET 2103, AET 3303

AET 3603 Flight Vehicle Dynamics and Stability (2-2-3)
Focuses on topics that include static stability and control, airplane equations of motion, analysis of aerodynamic forces and moments, analysis of longitudinal and lateral dynamic stability.
Prerequisites: MTH 2503, MCE 2223, AET 2103

AET 4123 Aircraft Reliability and Maintenance Engineering (3-1-3)
Presents an introduction to reliability theory, life testing, maintained systems, integrated logistic support (ILS), aircraft handling, repair station requirements, quality systems, inventory control, structural repair, engine maintenance and overhaul, maintenance of aircraft systems and instruments.
Prerequisites: AET 3303, EGN 2806

AET 4143 Human Factors in Aviation (3-1-3)
Develops understanding of the human behaviour and performance when applied to aviation operations. Optimises the fit between people and the aeronautical systems in which they work to improve safety and performance. Introduces a comprehensive overview of the effect and management of human factors in aviation.
Prerequisites: EGN 2806

AET 4203 Mechanics of Composite Structures and Materials (2-2-3)
Introduces fiber reinforced composites and their properties. Examines the stress, strain, and strength of composite laminate. Presents topics such as failure analysis of composites, environmental effect on laminates, and design of composite structure.
Prerequisites: MCE 2213

AET 4213 Rotary Wing Aircraft (3-1-3)
Presents the aerodynamics of flight for rotary wing aircrafts. Two-dimensional aerodynamic characteristics of airfoils and their application in helicopter design. Aerodynamics of finite rotary wings. Theory of helicopter hovering and vertical flight including autorotation. Aerodynamic behaviour of the rotor and the helicopter in forward flight.
Prerequisites: AET 2103, AET 3423, AET 3603

AET 4313 Manufacturing Processes (3-1-3)
Introduces common manufacturing processes such as rolling, drawing, machining, and joining (welding, soldering, adhesive bonding, and mechanical fastening), sheet-metal forming processes, and fabrication of composite materials. Introduction to heat treatment and plasma coating.
Prerequisites: AET 3513

AET 4323 Non Destructive Testing (2-2-3)
Develops understanding of the various Non Destructive Evaluation and Testing methods, theory and their industrial applications. Demonstrates the difference between non-destructive testing and mechanical testing methods, testing techniques for surface, liquid dye penetration method, thermography, eddy current testing, ultrasonic testing, acoustic emission and radiography testing methodologies.
Prerequisites: MCE 2213

AET 4333 Introduction to Aero Elasticity (3-1-3)
Studies the interaction of aerodynamics and structural motion and covers the essential knowledge of structural vibrations and aero-elastic static and dynamic critical flight conditions such as divergence, flutter and aileron reversal. Presents topics including structural vibrations and divergence, flutter and energy methods emphasising indeterminate structures.
Prerequisites: AET 3303, AET 3413

AET 4433 Aircraft Propulsion (2-2-3)
Develops understanding and enhances capabilities to perform analysis on different aircraft propulsion systems. Topics include: turboprops, turbojets, turbofans, turbo shaft, ramjets, scramjets and rocket engines, beside intakes, compressors, fans, turbines and propelling nozzles.
Prerequisites: AET 2403, AET 3423

AET 4443 Computational Fluid Dynamics (2-2-3)
Introduces the fundamental concepts, techniques, methods, and algorithms used in Computational Fluid Dynamics (CFD). Focuses on developing and implementing numerical methods and related algorithms for numerical solution of flow and transport partial differential equations (PDE) models. The practical utility of the course will be demonstrated by the application of the theory to understand and perform flow simulations using a commercial CFD software.
Prerequisites: AET 2403, EGN 2712

AET 4453 Space Propulsion (3-1-3)
Presents an introduction to rocket propulsion systems, solid, liquid-bipropellant, and hybrid rocket engines. Fundamentals of orbital, and interplanetary flight. Cover topics that include structural constraints, propellant feed systems, turbo pumps, and combustion processes.
Prerequisites: AET 2103, AET 4433

AET 4503 Finite Element Analysis (3-1-3)
Addresses the practice and use of FEA in industry. Introduces finite element mathematical modeling of engineering problems. Presents the application of CAD software using FEM to a range of engineering problems.
Prerequisites: MCE 2311, AET 3303

AET 4613 Avionics Systems (2-2-3)
Introduces knowledge of aircraft instruments, aircraft communication systems, aircraft navigation systems, flight control and flight management system.
Prerequisites: MTE 3603

AET 4623 Automatic Control of Flight Vehicles (3-1-3)
Focuses on introduction and analysis of automatic control systems for both atmospheric and space aerospace vehicles. Covers basic control theory and design concepts and relevant flight dynamics principles for designing flight control system. With extensive use of MATLAB and Simulink, the student has hands on experience in practical aspects of automatic control application of aerospace vehicles. Covers single-variable control and also linear optimal control, nonlinear orbit plane control, two-point boundary value problem solution for de-orbiting spacecraft.
Prerequisites: AET 3603, MCE 4603

AET 4863 Special Topics in Aeronautical Engineering (3-1-3)
Presents a theoretical or practical topic proposed by the faculty beyond what is offered in existing courses. Can be repeated for credit.

AET 4902 Capstone Design Project I (1-3-2)
Combines the knowledge, skills and competencies acquired in aeronautical engineering courses into design activity. Requires the formation of a team to propose, plan and design an engineering project relevant to aeronautical engineering. Ensures team responsibility for the completion of the project milestones and course objectives while working under the mentorship of a faculty or industry engineer. Includes evaluation of the team on it's ability to coordinate efforts to propose the project design criteria, components, resources, implementation schedule, and estimated cost.
Prerequisites: AET 3603, AET 3513, (EGN 3806 or EGN 3812)

AET 4912 Capstone Design Project II (1-3-2)
Consists of implementation, evaluation, and analysis of an aeronautical engineering design project carried forward from the previous semester. Though guided by faculty, the student team is primarily responsible for the completion of the project milestones and course objectives. Requires the integration and application of technological, organizational, communication, and interpersonal skills by the student team. Includes accurate analysis, implementation, documentation, and presentation skills for assessments.
Prerequisites: AET 4902