

**SCHOOL OF ENGINEERING, DESIGN AND AUTOMATION // PH.D. IN
AEROSPACE ENGINEERING**



SYLLABUS FOR PHD ENTRANCE TEST IN AEROSPACE ENGINEERING

Section 1: Aerodynamics	1
Section 2: Aerospace Propulsion	1
Section 3: Flight Mechanics & Aircraft Performance	1
Section 4: Aerospace Structures & Materials	1
Section 5: Aircraft Design & Aerospace Systems	1
Section 6: Avionics, Guidance & Navigation System	1
Section 7: Unmanned Aerial Vehicles & Systems	1
Section 8: Thermodynamics, Heat Transfer & CFD	1

Section 1: Aerodynamics

Fundamentals of Fluid Mechanics, Incompressible Flow, Boundary Layer Theory, Airfoils and Wings, Compressible Flow, Hypersonic Aerodynamics, Computational and Experimental Aerodynamics.

Section 2: Aerospace Propulsion

Fundamentals of Propulsion, Gas Turbine Engines, Compressors and Turbines, Combustion, Ramjets, Scramjets and Advanced Propulsion, Rocket Propulsion, Advanced Aerospace Propulsion Techniques.

Section 3: Flight Mechanics & Aircraft Performance

Equations of Aircraft Motion, Aircraft Performance, Aircraft Stability, Aircraft Dynamics, Flight Control.

Section 4: Aerospace Structures & Materials

Engineering Mechanics, Strength of Materials, Aircraft Structural Analysis, Aerospace Materials, Composite Materials, Structural Failure and Life, Advanced Manufacturing.

Section 5: Aircraft Design & Aerospace Systems

Aircraft Conceptual Design, Aerodynamic Design, Aircraft Propulsion Integration, Stability and Control Design, Aircraft Systems, Aircraft Design Optimization, Aerospace Systems Engineering.

Section 6: Avionics, Guidance & Navigation Systems

Fundamentals of Avionics, Sensors and Instrumentation, Navigation Systems, Guidance Systems, Flight Control Systems, Communication and Data Systems, Navigation and Sensor Fusion.

Section 7: Unmanned Aerial Vehicles & Systems

UAV Fundamentals, Aerodynamics and Performance, Propulsion, Guidance, Navigation and Control, Communication and Data Systems, Autonomous UAV Systems, UAV Applications and Regulations.

Section 8: Thermodynamics, Heat Transfer & CFD

Fundamentals of Engineering Thermodynamics, Zeroth Law, 1st Law and 2nd Law of Thermodynamics and its applications, Vapour Power Cycles and Gas Power Cycles, Fundamentals of Heat Transfer, Conduction, Convection, Radiation, Heat Exchangers, Computational Fluid Dynamics Fundamentals and Governing Equations, CFD Modelling and Validation Fundamentals.