



Department of Aeronautical Engineering

M. Tech. Aerospace Engineering (1st Semester)

Course Name: **MAE21101: Aerodynamics**

| MAE21101 | Course Outcomes |
|----------|--|
| CO1 | Apply the knowledge of inviscid, incompressible fluid flow for solving real time fluid flow problems. |
| CO2 | Apply the knowledge of incompressible fluid flow to solve complex engineering problems on finite wings. |
| CO3 | Evaluate the importance of viscous fluid flows and arrive at the solution of related problems. |
| CO4 | Analyze the application of numerical methods in aerodynamics and use panel methods to generate solutions. |
| CO5 | Understand the basics of experimental aerodynamics and apply the knowledge for project work. |

Course Name: **MAE21102: Aircraft Propulsion**

| MAE21102 | Course Outcomes |
|----------|---|
| CO1 | Apply the knowledge of aircraft propulsion methods and solve problems on basics of propulsion. |
| CO2 | Utilize the knowledge of turbine based engine for solving problems on aircraft propulsion. |
| CO3 | Implement the understanding of thermodynamic analysis of jet engines for solving the complex problems. |
| CO | Analyze the operating principle of ramjet and scramjet engines and solve related problems. |
| CO5 | Solve the basic problems on rocket and electric propulsion. |



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Course Name: **MAE21103: Aircraft Structure & Materials**

| MAE21103 | Course Outcomes |
|----------|---|
| CO1 | Understand the properties of materials used in aeronautical applications |
| CO2 | Utilize the knowledge of material types and manufacturing process involved in aircraft for solving related problems. |
| CO3 | Implement the understanding of aircraft structure and solve complex problems. |
| CO4 | Analyze the loads applied on aircraft and evaluate its effect on the structure. |
| CO5 | Understand the basic certification requirements for aircraft structures. |

Course Name: **MAE21104: Aeronautical Engineering Lab-1**

| MAE21104 | Course Outcomes |
|----------|---|
| CO1 | Perform various type flow visualization and evaluate aerodynamic properties of the structures. |
| CO2 | Evaluate the aerodynamic forces and aerodynamic properties and show the pressure distribution over different aerodynamic bodies. |
| CO3 | Estimate Performance Test on Single Cylinder, two stroke Petrol engine at different loads |
| CO4 | Apply the unsymmetrical bending and deflection test on different cross-sections and loading conditions of beams. |
| CO5 | Evaluate location of shear center for open and closed sections. |
| CO6 | Estimate the constant strength and flexibility matrix of the beam. |



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Course Name: **Program Elective-I (MAE21105 Boundary Layer theory)**

| MAE21105 | Course Outcomes |
|----------|--|
| CO1 | Apply the concept of viscous flow to solve problems on boundary layer. |
| CO2 | Solve the problems on thermal boundary layer using Reynolds analogy and Colburn analogy |
| CO3 | Analyze flow transition from laminar to turbulent using Summerfield equation |
| CO4 | Estimate turbulent boundary layer characteristics by various methods |
| CO5 | Investigate the causes of boundary layer separation and control strategies |

Course Name: **Program Elective-I (MAE21106 Theory of Fuel and Combustion)**

| MAE21106 | Course Outcomes |
|----------|---|
| CO1 | Calculate adiabatic flame temperature and estimate equilibrium products of combustion. |
| CO2 | Solve chemical kinetics and species conservation equations |
| CO3 | Acquire knowledge in different flame structures and stability characteristics |
| CO4 | Compare the performance of different combustors and design of flame holders. |
| CO5 | Analyze the combustion mechanisms of different propellants. |



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Course Name: **Program Elective-I (MAE21107 Aircraft Materials & NDT)**

| MAE21107 | Course Outcomes |
|----------|--|
| CO1 | Describe the fundamental concepts of composite materials. |
| CO2 | Analyze the composite materials by micro and macro mechanics analysis. |
| CO3 | Understand the Micro-Mechanical Behavior of a Lamina of composites. |
| CO4 | Examine the failure of composite by different methods and applications of compositematerials. |
| CO5 | Analyze the nondestructive testing of an aircraft structure components and its utilization. |

Course Name: **Program Elective-I (MAE21108 Finite Element Methods)**

| MAE21108 | Course Outcomes |
|----------|---|
| CO1 | Understand the plane stress & plane strain differential equation of equilibrium & compatibility equation, with boundary conditions |
| CO2 | Analyze the Concept of discretization of body into elements and basic types of 2-D & 3-D elements, displacement models, |
| CO3 | Analyze the various types of 2D elements applied to plane stress, plane strain and axis symmetric problems. |
| CO4 | Solve complicated 2D & 3D Isoperimetric structural problems for stress analysis. |
| CO5 | Determine formulation of mass matrix for one-dimensional bar element, free vibration analysis using one dimensional bar element. |



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Course Name: **Program Elective-II (MAE21109 Experimental Aerodynamics)**

| MAE21109 | Course Outcomes |
|-----------------|--|
| CO1 | Classify the wind tunnel and boundary corrections and image processing. |
| CO2 | Study the shock waves in supersonic flow. |
| CO3 | Portray flow measurement technique using advance visualization methods |
| CO4 | Conduct quantitative analysis of forces on aircraft. |
| CO5 | Understand the various types measurement technique in wind tunnel |

Course Name: **Program Elective-II (MAE21110 Air Transportation)**

| MAE21110 | Course Outcomes |
|-----------------|---|
| CO1 | Understand the history of air transportation and roles of IATA and concerned authorities |
| CO2 | Study weather forecasting method for safe flight |
| CO3 | Study cost estimation and management in air transportation |
| CO4 | Understand flight scheduling methods and related practices |
| CO5 | Study reliability centered maintenance practices and related procedures |



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Course Name: **Program Elective-II (MAE21111 Unmanned Aerial Vehicle Systems)**

| MAE21111 | Course Outcomes |
|-----------------|--|
| CO1 | Demonstrate various types of unmanned aerial vehicles |
| CO2 | Design the Unmanned aerial vehicle and know the regulations |
| CO3 | Demonstrate various types of sensors in UAV systems |
| CO4 | Apply the concepts controlling of unmanned aerial vehicle |
| CO5 | Develop the Unmanned aerial vehicle and test it practically |

Course Name: **Program Elective-II (MAE21112 Computational Fluid Dynamics)**

| MAE21112 | Course Outcomes |
|-----------------|---|
| CO1 | Familiarize with different governing equations and boundary conditions. |
| CO2 | Understand the partial differential equations and their physical behaviors in fluid flow problems. |
| CO3 | Discrete governing equations using Finite difference methods and carry out numerical error analyses. |
| CO4 | Follow the basic procedures to generate grid for fluid flow. |
| CO5 | Apply the difference formulations to fluid flow problems. |