

**SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY**  
**AERONAUTICAL ENGINEERING DEPARTMENT**

**MID SEMESTER-1 EXAMINATION SYLLABUS**

**NAME OF SUBJECT:** AIRCRAFT STRUCTURES I

**SUBJECT CODE:** 2140101

**SEMESTER:** IV

**PERCENTAGE OF MID SEM EXAM SYLLABUS:** 35 %

CH. NO.	TOPIC
1	<p><b>Introduction of structure and structural analysis</b></p> <p>Types of Structure, basic concept of determinate and indeterminate structure, static and kinematic indeterminacy of structure, Introduction to stability of structure, Elastic theorems (Principal of superposition, Maxwell's Reciprocal Theorem), Principal of Virtual work.</p>
2	<p><b>Slope and deflection of determinate beams</b></p> <p>Differential equation of the elastic curve, relation between moment-slope and deflection, Double Integration Method, Macaulay's method, Conjugate Beam Method, Moment area Method.</p>

Prof. Nikhil Borse

**Subject Coordinators**

Dr. Pina Bhatt  
Prof. Mit K. Shah  
**Head, Mech. Engg. Dept.**

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**MID SEMESTER-1 EXAMINATION SYLLABUS**

**NAME OF SUBJECT:** AIRCRAFT SYSTEMS, INSTRUMENTS AND MAINTENANCE

**SUBJECT CODE:** 2140103

**SEMESTER:** IV

**PERCENTAGE OF MID SEM EXAM SYLLABUS:** 35 %

CH. NO.	TOPIC
1	<p><b>Pitot Static System and flight Instruments</b></p> <p>Air Speed Indicator, Vertical Speed Indicator, Altimeter</p> <p><b>Gyro Instruments-</b> Attitude Indicator, Directional Gyro Indicator, Turn Coordinator, Turn and Slip Indicator.</p> <p><b>Engine Instruments-</b> Tachometer, Engine Pressure Ratio Indicator, Cylinder head Temperature gauge, Manifold Pressure gauge, Exhaust Temperature Gauge, Fuel Flow Indicator.</p> <p><b>Control Indicators :</b> Flap Position Indicator, Trim position Indicator</p>

Prof. Nimesh Patel

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**MID SEMESTER-1 EXAMINATION SYLLABUS**

**NAME OF SUBJECT:** COMPUTATIONAL FLUID DYNAMICS

**SUBJECT CODE:** 2140107

**SEMESTER:** IV

**PERCENTAGE OF MID SEM EXAM SYLLABUS:** 35 %

CH. NO.	TOPIC
1	<b>Introduction:</b> Introduction to Computational Fluid Dynamics, Need for problem solving with CFD, Applications of CFD, Models of fluid flow, concept of substantial derivative, Governing equations of fluid flow: Continuity, Momentum & Energy equation, Conservation and Non-conservation forms of governing equation, Navier-Stokes's model and Euler's model
2	<b>Mathematical behavior of Partial Differential equations:</b> Classification methods for simple PDEs: Cramer's rule & Eigen value method, Role of characteristic lines in hyperbolic equations
3	<b>Basic discretization techniques:</b> Discretization, Need to discretize the domain, Classification: FDM, FVM, FEM

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**MID SEMESTER-1 EXAMINATION SYLLABUS**

**NAME OF SUBJECT:** BASIC ENGINEERING THERMODYNAMICS

**SUBJECT CODE:** 2140106

**SEMESTER:** IV

**PERCENTAGE OF MID SEM EXAM SYLLABUS:** 30 %

CH. NO.	TOPIC
1	<p><b>Basic Concept of Thermodynamics</b></p> <p>Thermodynamic system &amp; classification , Properties of substance( like pressure, temperature, volume, heat, work, energy ), Various forms of energy (like static energy, kinetic energy, potential energy, internal energy, enthalpy etc..), Concept of enthalpy and entropy , Thermodynamic equilibrium, concept of process and cycles , Quasi-static process, Zeroth Law of Thermodynamics.</p>
2	<p><b>First law of thermodynamics</b></p> <p>Joule's experiment-set up &amp; Significance , Law of conservation of energy, , PMM1, First Law of Thermodynamics, its limitations &amp; Application , Energy equation &amp; its application to:</p> <ul style="list-style-type: none"><li>i. Non flow process.</li><li>ii. Open system.</li><li>iii. Steady flow (Steady flow energy equation –SFEE) Numerical based on SFEE.</li></ul>

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**MID SEM EXAM-1 SYLLABUS**

**Subject: Numerical Methods (2140105)**

1. Solution of Non-linear equations by NMs
  - a. bisection
  - b. false position
  - c. secant
  - d. Newton Raphson
2. NMs for Integration
  - a. Trapezoidal Rule
  - b. Simpson's  $1/3$  &  $3/8$  rule
3. NMs for Interpolation
  - a. Newton's Forward & Backward method
  - b. Gauss Forward & Backward, Stirling, Bessel's method, Laplace-Everett
  - c. Newton's Divided Difference & Lagrange method
4. NMs to solve system of linear equations
  - a. Gauss Elimination & Jordan
  - b. Gauss Seidel & Jacobi