



R. K. Institute of Engineering and Technology  
Approved by AICTE, New Delhi and Affiliated to SCTE&VT, Odisha

## MECHANICAL ENGINEERING

**SEMESTER : 3<sup>rd</sup> (SEC-A)**

**FROM :01/07/2026 TO :05/11/2026**

**NAME OF THE FACULTY : Er. JIBANJYOTI PRADHAN**

**SUBJECT : Strength of Materials**

**TOTAL CLASS AVAILABLE IN SEMESTER: 45 nos**

**NO. OF PERIODS : 03/ WEEK**

| Class No. | Unit | Topic / Sub-topic                                       | Teaching Method     | Learning Outcome              |
|-----------|------|---------------------------------------------------------|---------------------|-------------------------------|
| 1         | I    | Introduction to Strength of Materials & Types of Forces | Lecture             | Understand scope of SOM       |
| 2         | I    | Stress and Types of Stress                              | Lecture + Examples  | Define stress                 |
| 3         | I    | Strain and Types of Strain                              | Lecture             | Explain strain                |
| 4         | I    | Stress-Strain Diagram for Mild Steel                    | PPT + Discussion    | Interpret stress-strain curve |
| 5         | I    | Elastic Constants (E, G, K, $\mu$ )                     | Lecture + Numerical | Calculate elastic constants   |
| 6         | I    | Significance of Stress-Strain Diagram                   | Discussion          | Analyze material behavior     |
| 7         | I    | Factor of Safety & Working Stress                       | Lecture + Numerical | Solve design problems         |
| 8         | I    | Thermal Stress                                          | Lecture + Numerical | Calculate thermal stresses    |
| 9         | I    | Strain Energy & Resilience                              | Lecture             | Explain strain energy         |
| 10        | I    | Numerical Problems & Unit Test                          | Practice            | Apply concepts                |
| 11        | II   | Types of Beams & Supports                               | Lecture             | Identify beams                |
| 12        | II   | Types of Loads                                          | Lecture             | Classify loads                |
| 13        | II   | Shear Force (SF)                                        | Lecture             | Define SF                     |
| 14        | II   | Bending Moment (BM)                                     | Lecture             | Define BM                     |
| 15        | II   | SFD & BMD for Cantilever (Point Load)                   | Numerical           | Draw diagrams                 |
| 16        | II   | Cantilever with UDL                                     | Numerical           | Draw SFD & BMD                |
| 17        | II   | Simply Supported Beam (Point Load)                      | Numerical           | Solve beam problems           |
| 18        | II   | Simply Supported Beam (UDL)                             | Numerical           | Draw diagrams                 |



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|-----------|------|--------------------------------------|----------------------|-------------------------------|
| 19        | II   | Overhanging Beam & Combination Loads | Numerical            | Analyze beams                 |
| 20        | II   | Revision, Numerical Practice & Test  | Practice             | Reinforce concepts            |
| 21        | III  | Simple Bending Theory & Assumptions  | Lecture              | Explain bending theory        |
| 22        | III  | Neutral Axis & Neutral Layer         | Lecture              | Define basic terms            |
| 23        | III  | Bending Equation Derivation          | Lecture              | Understand derivation         |
| 24        | III  | Bending Stress Problems              | Numerical            | Solve bending stress          |
| 25        | III  | Section Modulus                      | Lecture + Numerical  | Calculate section modulus     |
| 26        | III  | Safe Load & Safe Span                | Numerical            | Design simple beams           |
| 27        | III  | Deflection of Beams                  | Lecture              | Explain deflection            |
| 28        | III  | Standard Deflection Formulae         | Numerical            | Apply formulae                |
| 29        | III  | Numerical Problems                   | Practice             | Solve beam problems           |
| 30        | III  | Revision & Unit Test                 | Test                 | Assess learning               |
| 31        | IV   | Introduction to Torsion              | Lecture              | Explain torsion               |
| 32        | IV   | Torsion Equation                     | Lecture + Derivation | Understand equation           |
| 33        | IV   | Solid Shaft Problems                 | Numerical            | Solve shaft problems          |
| 34        | IV   | Hollow Shaft Problems                | Numerical            | Compare shafts                |
| 35        | IV   | Shaft Design                         | Numerical            | Design shafts                 |
| 36        | IV   | Helical Springs                      | Lecture              | Explain spring terminology    |
| 37        | IV   | Deflection & Stiffness of Springs    | Numerical            | Calculate spring parameters   |
| 38        | IV   | Spring Design Problems               | Practice             | Solve numerical problems      |
| 39        | IV   | Revision & Test                      | Practice/Test        | Assess learning               |
| 40        | V    | Thin Cylindrical Shells Introduction | Lecture              | Explain shell concepts        |
| 41        | V    | Hoop Stress                          | Lecture + Numerical  | Calculate hoop stress         |
| 42        | V    | Longitudinal Stress                  | Lecture + Numerical  | Calculate longitudinal stress |
| 43        | V    | Safe Thickness & Working Pressure    | Numerical            | Solve design problems         |



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|-----------|------|------------------------------------------------------|-----------------|----------------------|
| 44        | V    | Comprehensive Numerical Practice                     | Practice        | Apply shell formulas |
| 45        | V    | Final Revision, Doubt Clearing & Internal Assessment | Discussion/Test | Course revision      |

J S Pradhan

Sign of Faculty

H. Jena

Sign of HOD

Deepa

Sign of Principal

Principal  
R.K. INSTITUTE OF ENGINEERING & TECHNOLOGY  
KANTAPADA, NIALI, CUTTACK