R. K. Institute of Engineering and Technology

Approved by AICTE, New Delhi and Affiliated to SCTE&VT,Odisha

CIVIL ENGINEERING

SEMESTER : 3rd

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

NAME OF THE FACULTY : Er. RADHASHYAM JENA

SUBJECT : MECHANICS OF MATERIAL

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 Centre of Gravity (CG), Definition & Applications	Lecture	Understand concept of CG
2	I	CG of Symmetrical Sections (Rectangle, Square, Circle, Hollow Sections)	Lecture + Numerical	Calculate CG of simple sections
3	I	CG of I-Section and Composite Sections	Numerical Practice	Determine centroid of built-up sections
4	I	Moment of Inertia (MI), Radius of Gyration & Section Modulus	Lecture	Explain MI and related terms
5	I	Parallel & Perpendicular Axis Theorems	Lecture + Numerical	Apply MI theorems
6	I	MI of Rectangle, Circle, Triangle, Semicircle & Quarter Circle	Numerical	Solve MI problems
7	I	MI of I, T, Channel, Angle, Hollow & Built-up Sections, Polar MI	Numerical	Calculate MI of composite sections
8	I	Revision & Unit Test	Practice/Test	Assess Unit-I
9	II	Elastic, Plastic & Rigid Bodies, Stress, Strain & Hooke's Law	Lecture	Explain basic material behavior
10	II	Types of Stress & Strain	Lecture	Identify different stresses and strains
11	II	Stress-Strain Curve for Tor Steel	Lecture + Graph	Interpret stress-strain curve
12	II	Yield Stress, Proof Stress, Ultimate Stress & Factor of Safety	Lecture	Explain strength parameters
13	II	Deformation Due to Axial Load	Lecture + Numerical	Calculate deformation
14	II	Axial Loading with Intermediate Loads & Composite Sections	Numerical	Solve axial loading problems

Class No.	Unit	Topic / Sub-topic	Teaching Method	Learning Outcome
15	II	Temperature Stress & Strain	Lecture + Numerical	Calculate thermal stresses
16	II	Longitudinal & Lateral Strain, Poisson's Ratio	Lecture	Explain elastic constants
17	II	Modulus of Rigidity, Bulk Modulus & Relationships	Lecture + Numerical	Apply modulus relations
18	II	Complex Stress System – Principal Stress & Principal Planes	Lecture	Understand complex stresses
19	II	Mohr's Circle – Construction & Applications	Lecture + Numerical	Draw and interpret Mohr's circle
20	II	Numerical Practice & Unit Test	Practice/Test	Assess Unit-II
21	III	Types of Supports, Beams & Loads	Lecture	Identify beam types
22	III	Shear Force & Bending Moment – Concepts	Lecture	Explain SF and BM
23	III	Relationship among Load, SF & BM	Lecture	Understand load-SF-BM relationship
24	III	SFD & BMD for Cantilever with Point Load & UDL	Numerical	Draw SFD and BMD
25	III	SFD & BMD for Simply Supported Beam with Point Load	Numerical	Solve beam problems
26	III	SFD & BMD for UDL, Couple & Combined Loading	Numerical	Analyze beam loading
27	III	Point of Contraflexure, Revision & Unit Test	Practice/Test	Assess Unit-III
28	IV	Theory of Simple Bending & Assumptions	Lecture	Explain bending theory
29	IV	Flexural Equation & Bending Stress Distribution	Lecture + Numerical	Apply flexural equation
30	IV	Moment of Resistance & Numerical Problems	Numerical	Solve bending problems
31	IV	Shear Stress Equation & Average/Maximum Shear Stress	Lecture	Explain shear stress
32	IV	Shear Stress Distribution in Rectangular & Circular Sections	Lecture + Sketches	Interpret stress distribution
33	IV	Shear Stress Distribution in I, T, Channel, Angle & Hollow Sections	Lecture + Numerical	Analyze complex sections
34	IV	Numerical Practice & Unit Test	Practice/Test	Assess Unit-IV

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Class No.	Unit	Topic / Sub-topic	Teaching Method	Learning Outcome
35	V	Compression Members, Short & Long Columns	Lecture	Differentiate column types
36	V	Effective Length, Radius of Gyration & Slenderness Ratio	Lecture + Numerical	Calculate column parameters
37	V	End Conditions & Buckling of Columns	Lecture	Explain column behavior
38	V	Euler's Theory – Assumptions & Limitations	Lecture	Understand Euler theory
39	V	Euler's Buckling Load – Numerical Problems	Numerical	Calculate critical load
40	V	Rankine's Formula – Theory	Lecture	Explain Rankine formula
41	V	Rankine's Formula – Numerical Problems	Numerical	Solve crippling load problems
42	V	Working Load, Safe Load, Design Load & Factor of Safety	Lecture + Numerical	Apply design concepts
43	V	Comprehensive Numerical Practice	Practice	Strengthen problem-solving skills
44	V	Complete Revision & Model Test	Revision/Test	Reinforce all units
45	V	Final Doubt Clearing & Internal Assessment	Discussion/Test	Complete course assessment

17.10.26
Sign of Faculty

HOD Civil Engg.
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Sign of HOD

Principal
R.K INSTITUTE OF ENGG & TECH.
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