

INSTITUTE OF ENGINEERING & TECHNOLOGY
DR. RAMMANOHAR LOHIA AVADH UNIVERSITY AYODHYA



EVALUATION SCHEME & SYLLABUS

for

B.TECH. First YEAR
(Common to All)

MECHANICAL ENGINEERING DEPARTMENT

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AICTE MODEL CURRICULUM

[Effective from the Session: 2026-27]

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DIRECTOR
Institute of Engineering & Technology
Dr. R.M.L. Avadh University
Ayodhya, U.P. - 224001

Name of Subject: Basic Mechanical Engineering

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Course Objectives: To introduce fundamental concepts of mechanical engineering and its role in the overall field of engineering.

UNIT 1:

Engineering Materials : Classification of engineering material, Composition of Cast iron and Carbon steels, Alloy steels their applications. Mechanical properties like strength, hardness, toughness , ductility, brittleness , malleability of materials , Tensile test- Stress-strain diagram of ductile and brittle materials , Hooks law and modulus of elasticity [7]

UNIT 2:

Production Engineering: Elementary theoretical aspects of production processes like casting, carpentry, gas and arc welding processes, basics of powder metallurgy process and its applications. [8]

UNIT 3:

Thermodynamics: Thermodynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy. [7]

UNIT 4:

Heat Machines: Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines. [8]

Text Books:

- 1- Basic Mechanical Engineering" by Praveen Kumar, Pearson Education India
- 2- Basic Mechanical Engineering" by R. K. Rajput, Laxmi Publications India

Reference Books:

- 1- Kothandaraman & Rudramoorthy, Fluid Mechanics & Machinery, New Age .
- 2- Nag P.K, Engineering Thermodynamics , TMH .
- 3- Ganesan , Internal Combustion Engines, TMH .
- 4- Agrawal C M, Basic Mechanical Engineering ,Wiley Publication.
- 5- Achuthan M , , Engineering Thermodynamics ,PHI.

Course Outcomes

After completing this course, the students should be able to understand the various effects of force and motion on the engineering design structures and the students are expected to be able to demonstrate following knowledge, skills and attitudes:

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1. **Define** the basic parameters related to knowledge of materials for engineering and **draw** corresponding applications. L1
2. **Describe** and **explain** general governing equations for various types of elements related to basic physical shape and geometry. L2
3. **Calculate** and **analyze** parameters by the help of conditions of equilibrium for fluids and its basic properties. L3
4. **Design** and **compare the** engineering machines for the basic applications. L5
5. **Evaluate** values and properties of the thermo-mechanical system. L3

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COURSE OUTCOMES

	Course Outcome (CO)
CO 1	Study and practice on machine tools and their operations
CO 2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
CO 3	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
CO 4	Welding and soldering operations

LIST OF EXPERIMENTS**Machine shop:**

- Study of machine tools in particular Lathe machine
- Demonstration of different operations on Lathe machine
- Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting.
- Study of Quick return mechanism of Shaper.

Fitting shop:

- Preparation of T-Shape Work piece as per the given specifications.
- Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
- Practice marking operations.

Carpentry:

- Study of Carpentry Tools, Equipment and different joints.
- Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

Welding:

- Instruction of BI standards and reading of welding drawings.
- Butt Joint
- Lap Joint
- TIG Welding
- MIG Welding

Casting:

- Introduction to casting processes

Smithy

- Sharpening any arc and edge.

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- Preparing smaller can dedge,
- Repair of agricultural implements and power plough, use of power hammer etc.

Text Books:

1. Raghuwanshi B.S. , Workshop Technology Vol.I &II, Dhanpath Rai& Sons.
2. Kannaiah P. and Narayana K.L., Workshop Manual,2nd Edn,Scitech publishers.
3. John K.C., Mechanical Workshop Practice. 2nd Edn.PHI2010.
4. Jeyapoovan T. and Pranitha S., Engineering Practices Lab Manual,3rd Edn. Vikas Pub.2008.

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Engineering Graphics

Course Objectives:

1. The course is aimed at developing Basic Graphic skills.
2. Develop Skills In Preparation Of Basic Drawings.
3. Skills in Reading and Interpretation of Engineering Drawings.

Module 1: Introduction to Engineering Drawing

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Scales – Plain and Diagonal Scales

Module 2: Orthographic Projections

Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both planes; Projections of planes inclined Planes – Auxiliary Planes.

Module 3: Projections and Sections of Regular Solids

Geometrical Constructions – Simple Constructions, Sections in lined to both the Planes – Auxiliary Views; Simple annotation, dimensioning and scale.

Module 4: Isometric Projections

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes Simple and compound Solids.

Course Outcomes:

After learning the course the students should be able to

1. To know and understand the conventions and the method of engineering drawing.
2. Interpret engineering drawings using fundamental technical mathematics.
3. Construct basic and intermediate geometry.
4. To improve their visualization skills so that they can apply these skill in developing new products.
5. To improve their technical communication skill in the form of communicative drawings.
6. Comprehend the theory of projection.

Suggested Text/ Reference Books:

- (i) Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
- (ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- (iii) Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, TMH Publication
- (iv) Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House
- (v) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.

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