

ME151 R - ENGINEERING GRAPHICS

Teaching Scheme: 03L +00T, Total: 03

Credit : 03

Evaluation Scheme: 30 MSE+10 ISA+ 60 ESE

Total marks : 100

Duration of ESE: 04 Hrs.

COURSE DESCRIPTION:

Engineering Graphics is a basic course for all undergraduate Engineering program. This course provides the elementary level knowledge of technical Geometry that is engineering drawing. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. Course includes in briefs that introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection, line planes, solids and Development of solids

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Geometry, mechanics

COURSE OUTCOMES:

Students will be able to -

1. Understand the concept of Projection of lines , Planes and able to draw basic views of projection of lines and Planes.
2. Understand the concept of conversion of Pictorial view into orthographic view and able to draw orthographic view.
3. Understand the concept of conversion of Orthographic view into Isometric view/Pictorial View and able to draw isometric view.
4. Understand the concept of calculating external surface area of given object and able to draw the external surface .

RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	-	-	2	-	-	-	-	3	-	2	3	2	1
2	1	-	1	2	2	-	-	-	1	3	-	1	3	1	1
3	1	2	1	1	2	-	-	-	-	3	-	-	3	1	1
4	1	-	3	-	2	-	-	-	-	3	-	2	3	1	1

1-Weakly correlated

2 – Moderately correlated

3 – Strongly correlated

COURSE CONTENT

Projections of Lines:

Projections of Straight Lines: Introduction and concept projection of line, line position & its exercises on following cases as: - line parallel to both the reference planes, line parallel to one reference plane and perpendicular to the other, line inclined to one reference plane and parallel to the other, line inclined to both the reference planes. Applications based exercise on line inclined to both reference planes based on HP & VP only. (Note: - *Exercises on Traces of line are excluded*).

Projections of Planes:

Projections of planes: Introduction and concept of shapes or forms of various types Plane, Position of plane with respective reference plane cases concepts and exercises based on following cases as: plane surface parallel to one reference plane and perpendicular to other reference plane, plane surface inclined to one reference plane and perpendicular to other reference plane, planes inclined to both reference planes (Oblique planes). (Exercises shall be based and exercised on all above cases as well as suspended planes & Composite planes applications).

Note: - *all exercises will be solving by any **one** of method chose among of two kinds which are as either by 'change of position method' or 'Auxiliary Plane method'.*

Orthographic Projections:

Principle of orthographic projections Methods (First and third angle orthographic projection methods) Exercises shall be consist of orthographic projection methods of different machine / mechanical components; problem shall be based on first and third angle Orthographic. Projection Methods only, Concept of sectional orthographic projections method (First and third angle orthographic projection methods). Types of Sectional view; Sectional orthographic projections (view) problem shall be exercised only on object sectioned (cut) only by single cutting plane.

Note: - following part are excluded from TH –ESE and ICA. *Following Prerequisite part of ME151R & ME153R EG LAB is necessitate to obeying Standards of drawing as: - Lettering -single stroke and double stroke gothic lettering, Types of lines, Dimensioning: methods of dimensioning and types of dimensioning, scaling. All these topics of standards shall be cover in practical session of ME153R EGD lab.*

Isometric view:

Isometric Views: Introduction to pictorial views, isometric scale, isometric projections and its classification, exercises consist of problems on simple and complex mechanical objects shall be solve on Isometric view and isometric projection methods.

Projection of Development of Lateral surfaces:

Introduction, Concept and significance of Development of surfaces and lateral surfaces, Development of lateral surfaces of all types of regular solids such as prisms, pyramids, cones and cylinders Cases shall be exercised as: - solid surface/s are cut by following means such as single cutting plane line (C-P line), two parallel C-P lines, Two Non-parallel C-P lines, Two Intersecting CP lines and Underneath cuts of any shape on surfaces of solids (parallel and radial method only).

Introduction to CAD tool:

Introduction to 2D CAD software, Advantages of CAD packages, applications of CAD, essential configuration, basic operation of drafting packages, Understand Basic Use of Various menus commands in CAD tool.

(Note: - ***The CAD based questions shall be excluded from theory - MSE & ESE.** The teaching part of same shall be conduct concurrently in the laboratory practical hours with practice of different exercises.*)

Text Books:

- 1) Engineering Drawing, Bhatt N. D., Panchal V. M., 2008 onwards Charotar Publication, Anand, India.
- 2) Engineering Drawing and Graphics, K. Venugopal, 3rd edition, New Age International, 1998.
- 3) Publishers, New Delhi, 2007.
- 4) A Text book of Engineering Drawing, P.J. Shah, S. Chand & company Ltd., New Delhi. 2009.
- 5) A First Course in Engineering Drawing, Rathnam, K., (2018), Springer Nature Singapore Pte. Ltd., Singapore.

Reference Books:

- 1) Engineering Drawing and design, Madsen, D. P. and Madsen, (2016), D. A Delmar Publishers Inc., USA.
- 2) A Textbook of Engineering Drawing, Dhawan, R. K., (2000), S. Chand, New Delhi.
- 3) Fundamentals of Engineering Drawing, W J Luzadder and J M Duff, Fundamentals of Engineering Drawing, 11th edition, Prentice-Hall of India, 1995Giesecke, F. E., Mitchell, A., Spencer, H. C., Hill, I. L., Loving, R. O., Dygon, J. T., (1990), “Principles of engineering graphics, McMillan Publishing, USA
- 4) Engineering Drawing and Design”, Jensen, C., Helsel, J. D., Short, D. R., (2008), McGraw-Hill International, Singapore.
- 5) Graphic Science and Design, T. E. French, C. J. Vierck and R J Foster, 4th edition, McGraw Hill, 1984.
- 6) Engineering Graphics, Vol.-I and Vol.-II, Dhabhade M. L., Vision Publications 2003 onwards
- 7) Engineering drawing – P.S Gill, S. K. Kataria publication.2012 onwards.
- 8) Engineering Graphics with AutoCAD, Kulkarni, D. M., Rastogi, A. P. and Sarkar, A. K PHI, India, 2009.

ME153-R- ENGINEERING GRAPHICS LAB

Teaching Scheme: 01PR, Total: 01
Evaluation Scheme: 50 ICA

Credit: 02
Total Marks: 50

COURSE DESCRIPTION:

Engineering Graphics Lab is a basic course for all undergraduate Engineering program. This course provides the elementary level knowledge of technical Geometry that is engineering drawing. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. Course includes in briefs that introduction to Engineering Drawing, Orthographic Projection, Isometric view and Isometric Projection, line planes, solids and Development of solids by plotting on sheets manually and computerized.

DESIRABLE AWARENESS/SKILLS:

Fundamental knowledge of Geometry, elements of Mechanical, Civil and Electrical Engineering.

COURSE OUTCOMES:

Students will be able to –

1. Understand the concept of Projection of lines , Planes and able to draw basic views of projection of lines and Planes.
2. Understand the concept of conversion of Pictorial view into orthographic view and able to draw orthographic view.
3. Understand the concept of conversion of Orthographic view into Isometric view/Pictorial View and able to draw isometric view.
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RELEVANCE OF COURSE OUTCOMES (COs) WITH POs AND PSOs (WITH STRENGTH OF CO-RELATION)

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3	1	2	1	1	2	-	-	-	-	3	-	-	3	1	1
4	1	-	3	-	2	-	-	-	-	3	-	2	3	1	1

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CONTENT:

Internal continuous assessment (ICA) shall be on performances of sheets drawn and based on syllabus of course ME 151R EG.

All **five** sheets are mandatory. Each sheet shall be based and drawn as per below;

*Plot the following sheets on full trimmed sheet (hand sketched sheets),
Sheets shall be based on –*

1. The orthographic projections and sectional view – problems shall be exercised in the sheet on five mechanical objects.
2. The Isometric View and isometric projections - – problems shall be exercised in the sheet on four 2d drawings.
3. The projections of lines – problems shall be exercised in the sheet on two on simple cases and rest four on line inclined to both reference planes.
4. The projections of plane – problems shall be exercised in the sheet on plane inclined to both reference planes.
5. Development of surfaces – four problems shall be exercised on the lateral Development of surfaces of different regular solid (out of four two shall be on parallel line method and rest two shall be based on radial line method only).

Note:-

- Standard sizes of trimmed and untrimmed sheet shall be as per BIS standards SP: 46 (2003).

Guide lines for ICA:

Internal Continuous Assessment should support for regular performance of practical/sheets and its regular assessment with proper understanding principles of practical/ sheets completed.

Text books:

1. A text book of Engineering Graphics with an Introduction to Computer Aided Drafting (Vol. I) by Phakatkar. H. G, 7th edition, Nirali Prakashan, Pune 1997.
2. A text book of Machine Drawing and Computer Graphics by Farazdak Haideri, Nirali Prakashan, Pune, 1998.

Reference Books:

1. Engineering Drawing, N. D. Bhatt and V.M. Panchal, Charoter Publications.
2. Fundamental of Engineering Drawing and computer Graphics, Haravinder Singh, 3rd edition, Dhanpat Rai Publication Co, New Delhi, India.
3. Engineering Graphics with AutoCAD, Kulkarni, D. M., Rastogi, A. P. and Sarkar, A. K PHI, India, 2009.