

Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

COURSE DESCRIPTION FORM

Course Title	Engineering Drawing						
Course Code	AME001						
Course Structure	Lectures	Tutorials	Practicals	Credits			
	2	1	3	4			
Course Coordinator	Prof. BVSN Rao	Prof. BVSN Rao					
Team of Instructors	Prof. U.S P. Rao, Mr. G. Sarat Raju Associa Mr. B.DY Sunil Assistant	Prof. U.S P. Rao, Mr. G. Sarat Raju Associate Professor, Mr. B.DY Sunil Assistant Professor .					

I. COURSE OVERVIEW

One of the best ways to communicate one's ideas is through some form of picture or drawing. This is especially true for the engineer. An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. Students study use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with focus on interpretation, importance and accurate reflection of dimensions in an engineering drawing. Other areas of study in this course may include projected views, pictorial projections and development of surfaces. This course also gives basic concepts for studying machine drawing, building drawing, circuit drawings etc.

II. PREREQUISITE(S)

Level	Credits	Periods	Prerequisite
UG	4	9	Mathematics, Physics

III. MARKS DISTRIBUTION

Subject	SEE Examination	CIA Examination	Total Marks
Engineering Drawing	70 Marks	30 Marks	100 Marks

Semester End Examination	70 Marks	5 questions to be answered. Each question
70 Marks	(3 Hours)	carries 14 Marks
All the Units $(1, 2, 3, 4 \text{ and } 5)$		

	Continuous Internal Assessment - 1				
Average of	30 Marks (2 Hours)	Units I, II and III (half)	Continuous internal examination (CIE) (2 hours)	3 questions to be answered out of 5 questions, each question carries 6 marks. 2 Marks for neatness.	
			Quiz-I/Alternate assessment tool (AAT- I)	10 marks for day to day drawing practice	
two CIA	Continuous Internal Assessment - 2				
Examinations	30 Marks (2 Hours)	Units III (half) IV and V	Continuous internal examination (CIE) (2 hours)	3 questions to be answered out of 5 questions, each question carries 6 marks. 2 Marks for neatness.	
		Quiz-II / Alternate assessment tool (AAT- II)	10 marks for day to day drawing practice		

IV. EVALUATION SCHEME

S. No	Component Duration		Marks		
1	CIE - I Examination	2 hour	20		
2	Drawing charts	-	10		
TOTAL			30		
3	CIE - II Examination	2 hour	20		
4	Drawing charts -		10		
	TOTAL	30			
	CIA Examination marks to be considered as average of above two CIA's				
5	5 EXTERNAL Examination 3 hours		70		
	GRAND TOTAL		100		

V. COURSE OBJECTIVES

The goal of this course is to create awareness and acquire comprehensive knowledge in algebra and differential equations.

The course should enable the students to

- I. Understand the basic principles of engineering drawing and construction of curves used in engineering field.
- II. Apply the knowledge of interpretation of projection in different quadrants.
- III. Understand the projections of solids, when it is inclined to both planes simultaneously.
- IV. Convert the pictorial views into orthographic view and vice versa.
- V. Create intricate details of components and develop its surfaces.

VI. COURSE OUTCOMES

By the end of the module students should be able to

- 1. Identifying the basic concepts of Engineering Drawing.
- 2. Constructing various conic sections, cycloids and scales.
- 3. Understanding principles of orthographic projections.
- 4. Applying the principles of orthographic projections to projections of points and lines.
- 5. Recognizing different methods for projection of planes and solids.
- 6. Sketching different sections and sectional views of solids.
- 7. Developing the surfaces of various types of solids.
- 8. Creating intersection of simple solids.
- 9. Interpreting the principles of isometric projections.
- 10. Organizing orthographic projections into isometric projections.
- 11. Showing the orthographic projection of the isometric views.
- 12. Designing the perspective projections of various points, lines, plane figures and simple solids.

VII. HOW PROGRAM OUTCOMES ARE ASSESSED

	Program outcomes	Level	Proficiency
			assessed by
PO.1	Capability to apply the knowledge of mathematics, science and engineering in the field of mechanical engineering.	Н	Assignments, Practicals, Midterm and University examinations
PO.2	An ability to analyze complex engineering problems to arrive at relevant conclusion using knowledge of mathematics, science and engineering.	Н	Assignments, Practicals, Midterm and University examinations
PO.3	Competence to design a system, component or process to meet societal needs within realistic constraints.	Η	Assignments, Practicals, Midterm and University examinations
PO.4	To design and conduct research oriented experiments as well as to analyze and implement data using research methodologies.	Н	Assignments, Practicals, Midterm and University examinations
PO.5	An ability to formulate solve complex engineering problem using modern engineering and information Technology tools.	Н	Assignments, Practicals, Midterm and University examinations
PO.6	To utilize the engineering practices, techniques, skills to meet needs of the health, safety, legal, cultural and societal issues.	S	Practicals, Projects
PO.7	To understand impact of engineering solutions in the societal context and demonstrate the knowledge for sustainable development.	S	Practicals, Projects
PO.8	An understanding and implementation of professional and ethical responsibilities.	S	Practicals, Projects

PO.9	To function as an effective individual and as a member or leader in multi disciplinary environment and adopt in diverse teams.	S	Practicals, Midterm and University examinations, Projects, Technical activites.
PO.10	An ability to assimilate, comprehend, communicate, give & receive instructions to present effectively with engineering community and society.	S	Practicals, Midterm and University examinations, Projects, Technical activites.
PO.11	An ability to provide leadership in managing complex engineering projects at multidisciplinary environment and to become a Technocrat.	Н	Practicals, Midterm and University examinations, Projects, Technical activites.
PO.12	Recognition of the need and an ability to engage in lifelong learning to keep abreast with technological changes.	Н	Practicals, Midterm and University examinations, Projects, Technical activites.

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED

	Program Specific Outcomes	Level	Proficiency
			Assessed by
PSO.1	To produce engineering professional capable of synthesizing	Н	Practicals,
	and analyzing mechanical systems including allied engineering		Midterm and
	streams.		University
			examinations,
			Projects,
			Technical
			activites.
PSO.2	An ability to adopt and integrate current technologies in the	Н	Practicals,
	design and manufacturing domain to enhance the employability.		Midterm and
			University
			examinations,
			Projects,
			Technical
			activites.
PSO.3	To build the nation, by imparting technological inputs and	Н	Practicals,
	managerial skills to become technocrats.		Midterm and
			University
			examinations,
			Projects,
			Technical
			activites.
	N - None S - Supportive	H –	Highly Related

IX. SYLLABUS

UNIT-I

Introduction to engineering drawing: Drawing instruments and accessories, types of line, lettering practice, and rules of dimensioning, geometrical constructions, basic geometrical shapes; Scales: Types of scales, units of length and their conversion, construction of scales, plain scale, diagonal scale, vernier scale; Curves used in engineering practice and their constructions; Conic sections, construction of ellipse parabola and hyperbola, special curves, construction of cycloid, epicycloid, hypocycloid and involutes.

UNIT – II

Orthographic projection: Principles of orthographic projections, conventions, first and third angle projections, projection of points, projection of lines, lines inclined to single plane, lines inclined to both the planes, true lengths and traces; Projection of planes: Projection of regular planes, planes inclined to one plane, planes inclined to both planes, projection of planes by auxiliary plane projection method.

UNIT – III

Projection of solids: Projections of regular solid, prisms, cylinders, pyramids, cones. Solids inclined to one plane, solids inclined to both planes, projection of solid by auxiliary plane projection method.

$\mathbf{UNIT} - \mathbf{IV}$

Development of surfaces: Development of lateral surface of right regular solids, prisms, cylinders, pyramids and cones. Isometric projections: Principle of isometric projection, isometric scale, isometric projections and isometric views, isometric projections of planes, prisms, cylinders, pyramids, and cones.

$\mathbf{UNIT} - \mathbf{V}$

Transformation of projections: Conversion of isometric views to orthographic views and conversion of orthographic views to isometric views.

Textbooks:

- 1. N.D.Bhatt, "Engineering Drawing", Charotar Publications, 49th Edition, 2012.
- 2. C. M.Agrawal, Basant Agrawal, "Engineering Drawing", Tata McGraw Hill, 2ndEdition, 2013.

Reference Books:

- 1. K. Venugopal, "Engineering Drawing and Graphics", New Age Publications, 2ndEdition, 2010.
- 2. Dhananjay. A. Johle, "Engineering Drawing", Tata McGraw Hill, 1st Edition, 2008.
- 3. K. C. John, "Engineering Drawing", PHI Learning Private Limited", 2nd Edition, 2009.

X. COURSE PLAN:

The course plan is meant as a guideline. There may probably be changes.

Unit	Lecture Number	Topic Planned to be covered	Learning Objective	References
T	1-3	Introduction To Engineering Drawing:	Principles of Engineering Drawing – Various Drawing instruments and their use (general exercises)	T1,R1
	4-6	Drawing Instruments And Accessories, Types Of Line, Lettering Practice and Rules Of Dimensioning,	Conventions in Drawing – Lettering – BIS	T-1, R-1

	7-9	Geometrical Constructions, Basic Geometrical Shapes	Geometrical Constructions	T1,R1
	10-15	Scales: Types Of Scales, Units Of Length And Their Conversion, plain scale,	Construction of various scales for engineering use	T2, T1
	16-21	Construction Of Scales, Plain Scale, Diagonal Scale, Vernier Scale	Construction of various scales for engineering use	T1,T2
	22-24	Curves Used In Engineering Practice And Their Constructions	Construction of various curves	T1,T2,R1
	25-30	Conic Sections, Construction Of Ellipse Parabola And Hyperbola	Construction of various curves, ellipse, parabola, hyperbola	T-1, R-1
	31-39	Special Curves, Construction Of Cycloid, Epicycloids, Hypocycloid And Involutes.	Construction of various curves Cycloid, Epicycloids, Hypocycloid And Involutes.	T1,T2,R1
	40-45	Orthographic Projection: Principles Of Orthographic Projections, Conventions, First And Third Angle Projections, Projection Of Points	Points projection methods	T1,T2,R1
п	46-54	Projection of lines, lines inclined to single plane, lines inclined to both the planes, true lengths and traces.	Draw lines projection methods	T2,R1
	55-57	Projection Of Planes: Projection Of Regular Planes, Planes Inclined To One Plane,	Draw planes projection methods	T1,T2,R1
	58-60	Projection Of Planes: Projection Of Regular Planes, Planes Inclined To Both Planes,	Draw planes projection methods	T1,T2,R1
	61-63	Projection Of Planes By Auxiliary Plane Projection Method	Draw planes projection methods	T2,R1
ш	64-72	Projection Of Solids: Projections Of Regular Solid, Prisms, Cylinders, Pyramids, Cones.Solids Inclined To One Plane	Draw solids projection methods	T1,T2,R1

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ш	73-81	Projection Of Solids: Projections Of Regular Solid, Prisms, Cylinders, Pyramids, Cones. Projection Of Solid By Auxiliary Plane Projection Method.	Draw solids projection methods	T1,T2,R1
	82-102	Development Of Surfaces:Development Of Lateral Surface Of Right Regular Solids, Prisms, Cylinders, Pyramids And Cones	Draw surfaces for solids	T2,R1
IV	103-120	Isometric Projections: Principle Of Isometric Projection, Isometric Scale, Isometric Projections And Isometric Views, Isometric Projections Of Planes, Prisms, Cylinders,	Draw isometric projections	T1,T2,R1

		Pyramids, And Cones.		
v	121-129	Transformation Of Projections: Conversion Of Isometric Views To Orthographic Views And Conversion Of Orthographic Views To Isometric Views	Draw transformation of projections	T2,R1

XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF THE PROGRAM OUTCOMES

Course Objectives	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Ι	Н	S	S	S	S	S	Ν	Ν	N	Н	Ν	S	S	S	S
Π	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S
Ш	Н	S	S	S	S	S	Ν	Ν	N	Н	Ν	S	S	S	S
IV	Н	S	S	S	S	S	Ν	Ν	N	Н	Ν	S	S	S	S
V	Н	S	S	S	S	S	Ν	Ν	N	Н	Ν	S	S	S	S
N = None				S =	Supp	ortive		H = Highly related							

XII. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF THE PROGRAM OUTCOMES

Course Outcomes	Program Outcomes												Program Specific Outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3		
1	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
2	Н	S	S	S	S	S	N	N	N	Н	N	S	S	S	S		
3	Н	S	S	S	S	S	Ν	N	Ν	Н	Ν	S	S	S	S		
4	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
5	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
6	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
7	Η	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
8	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
9	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
10	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
11	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
12	Н	S	S	S	S	S	Ν	Ν	Ν	Н	Ν	S	S	S	S		
N = None	e				S = Supportive H = high									ıly related			

Prepared by: USP Rao, Professor. BDY Sunil, Assistant Professor.

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