Program : **Diploma in Mechanical Engineering / Manufacturing Technology**	
Course Code : **3025**	Course Title: **Machine Drawing**
Semester : **3 / 3**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per Semester: **45**

Course Objectives:

- To acquire knowledge about fastening arrangements such as welding, riveting etc.
- To develop the skill to prepare the assembly of various machine or engine components and miscellaneous machine components
- To familiarize with the surface finish representation and geometric tolerances.
- To impart the skill for development of production drawings.

Course Pre-requisites:

Topic	Course code	Course Name	Semester
Basic knowledge about all aspects of drawing, Orthographic projection		Engineering Graphics	1

Course Outcomes

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	To outline the use and development of fastening devices and its assembly	7	Applying
CO2	Illustrate tolerances and level of surface finish of machine elements	6	Understanding
CO3	Develop drawings of various machine elements, components and part details.	19	Applying
CO4	Outline and apply the concept and method of developing production drawings.	13	Applying

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						2
CO4	3						2

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**To outline the use and development of fastening devices and its assembly.**		
M1.01	Illustrate knowledge of threaded fasteners (Nomenclature, Types and Forms), assembly and foundation bolts	1	Understanding
M1.02	Outline basic knowledge of rivet heads and joints	2	Understanding
M1.03	Extend knowledge of weld joints and symbols	1	Understanding
M1.04	Develop bolt joints, rivet head and joints, foundation bolts, weld symbols in drawing sheet.	3	Applying
Contents: Exercises in drawing sheet 1) Drawing assembly of a bolt, nut and a plain washer (Hexagonal and Square headed), Drawing different types of locking arrangements of nuts (Nut with a locking nut, Castle nut with a split pin and Nut with a spring washer), Weld symbols (specified types of locking arrangements) 2) Drawing rivet heads (general purpose) and riveted joints using standard proportions. Single riveted and double riveted lap joint (Chain and zigzag), single riveted single strap butt joint and single riveted double strap butt joint. (2 Sheets).			
CO2	**Illustrate tolerances and level of surface finish of machine elements**		
M2.01	Illustrate the concept of Limits, Fits and Tolerances- BIS table usage	2	Understanding

M2.02	Basic idea about demonstration of representing surface roughness, values, grades and symbols	2	Understanding
M2.03	Explain the need of preparing a production drawing - Components of production drawing.	2	Understanding

Contents:

Need of preparing production drawing - Components of a production drawing.

Concept of Limits, Fits and Tolerances. Geometrical tolerance – Dimensional tolerance – Systems of fits. Select dimensions from B. I. S. Tables to obtain clearance, transition and interference fit for a given set of mating parts. Selection of fits and tolerances form B. I. S. tables.

Surface Roughness: Surface roughness terminology- surface roughness values, Grades and symbols. Symbols indicating surface texture – Relation between surface finish and manufacturing processes. Symbols representing direction of lay.

Familiarization of industrial drawings.

Note: This area can be covered by class discussion/ group discussion and through assignment.

CO3	**Develop drawings of various machine elements, components and part details.**		
M3.01	Illustrate various machine elements, construction details of components and bill of materials required	3	Understanding
M3.02	Construct views of various machine elements / components and to prepare bill of materials in A2 size drawing sheet.	16	Applying

Contents

Isometric / Detailed drawings of following items are to be given to students, draw the sectional or plain elevations, plans and side views of assembled object with dimension and bill of materials in drawing sheet.

1) Socket & Spigot Joint
2) Knuckle Joint
3) Stuffing Box
4) Plummer Block
5) Flanged Coupling Unprotected type
6) Machine Vice

Note: Students need to prepare different views with dimensioning and bill of materials of each machine component in A2 size drawing sheet.

CO4	**Outline and apply the concept and method of developing production drawings.**		
M4.01	Outline and need of production drawings	2	Understanding

M4.02	Construction of production drawing of simple machine elements	11	Applying

Contents:

Exercise in preparation of production drawing of following machine components.

1) Slip bush
2) Stepped shaft
3) Slotted nut
4) Sleeve

Note: Students need to prepare production drawing of machine component in A2 size drawing sheet.

Note: - Use of appropriate BIS tables showing-Tolerance zones and limits , Commonly used fits are permitted for end semester examination
(Tables specified)
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Text / Reference:

T/R	Book Title/Author
T1	P I Varghese, K C John., Machine Drawing, VIP Publishers
R2	Sidheswar, N., Kannaiah, P. and Sastry, V.V.S., Machine Drawing, Tata McGraw Hill Book Company, New Delhi 2000
R3	Bhatt, N.D., Machine Drawing, Charotar Publishing House, 2003.
R4	PS Gill, Machine Drawing, Katson Publishing.
R5	V Lakshmi Narayan, A text book of Machine Drawing
R6	M B Shah and BC Rana, Engineering Drawing, Pearson Education India.

Online resources

Sl.No	Website Link
1	https://ndl.iitkgp.ac.in/
2	https://nptel.ac.in/