GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name : Engineering

Level : Diploma

Branch : Fabrication Technology

Course / Subject Code: DI02C55021(Only for C to D Students)

Course / Subject Name : Fabrication Drafting

w.e.f. Academic Year:	2024-25
Semester:	2nd
Category of the Course:	PCC

Prerequisite:	Engineering Graphics
Rationale:	This course provides the knowledge and practice regarding drafting/drawing of different types of fabrication products, process piping, structural products and mechanical assemblies, etc. This course aims at development of fundamental understanding and application of fabrication drafting/drawing, so as to develop the ability to prepare, read and interpret drawings correctly and make aware of drafting practices, symbols, codes, norms and standards generally used in fabrication industries. It covers knowledge, application of drawing instruments and familiarizes the learner about codified symbols and principles of technical drawing as per BIS (Bureau of Indian Standards). The course also intended to develop the sense of drawing sequence and imagination in the students.

Course Outcomes:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Draw general format of fabrication drawing.
02	Draw orthographic sectional missing views and isometric projections.
03	Develop lateral surfaces of solid components having different geometrical shapes.
04	Prepare Interpenetration drawing of solids.
05	Prepare typical fabrication drawing showing different elements of process equipment, piping system and structural fabrication.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	PR	C	ESE (E)	PA/ CA (M)	PA/CA (I)	ESE (V)	
2	0	4	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction to Fabrication Drafting** 1.1 General format of fabrication drawing. Information provided on fabrication drawing (Weld joint, detail design data, nozzle schedule, BOM, Title Block, Special note, General Notes etc.) 1.2 Lines, Lettering and Dimensioning methods as per BIS 1.3 Limits, fits and tolerances as per BIS 1.4 Surface roughness representation as per BIS	03	10.00
2.	**Orthographic and Isometric Projection** 2.1 Orthographic Projection 2.1.1 Projection methods 2.1.2 Orthographic projection 2.1.3 Sectional views 2.1.4 Orthographic Reading 2.1.5 Detail and assembly drawing for any one of cotter joint, knuckle joint, etc. 2.2 Isometric Projection / Views / Drawing 2.2.1 Isometric lines, axes, planes 2.2.2 Isometric scale 2.2.3 Isometric views or drawing 2.2.4 Isometric projection	12	40.00
3.	**Development of Lateral Surfaces** 3.1 Development of Prisms 3.2 Development of Cylinder 3.3 Development of Pyramids 3.4 Development of Cone	05	16.67
4.	**Interpenetration of Solids** 4.1 Cylinder to Cylinder interpenetration 4.2 Cylinder to Cone interpenetration	04	13.33
5.	**Process Equipment, Process Piping and Structural Drafting** 5.1 Process Equipment Drafting 5.1.1 Drafting of Pressure Vessel (P/V), Heat Exchanger (H/E), Agitators, Filters, Distillation Columns etc. 5.1.2 Different types of process equipment set-up & fit-up 5.2 Process Piping Drafting 5.2.1 Piping Symbols 5.2.2 Piping line diagram 5.2.3 Piping flanges	06	20.00

	5.3 Structural Drafting 5.3.1 Commercial forms of metal as per BIS (angle, flat, plate, channel, strip, I-section, pipe, etc.) 5.3.2 Welding symbols 5.3.3 Riveted joint drafting		
	Total	**30**	**100.00**

Suggested Specification Table with Marks (Theory) :

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20%	41%	39%	-	-	-

Where R:Remember;U:Understanding; A:Application, N:Analyze and E:Evaluate; C:Create (as per Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

References/Suggested Learning Resources:

(a) Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Elementary Engineering Drawing	N. D. Bhatt	Charotar Publishing house Pvt. Ltd., Anand, Gujarat, 2019. ISBN : 9789380358963
2	Machine Drawing	N. D. Bhatt	Charotar Publishing house Pvt. Ltd., Anand, Gujarat, latest edition ISBN:9789385039232
3	A Textbook of Engineering Drawing	P. J. Shah	S. Chand, New Delhi. 2013 ISBN : 9788121941822
4	Engineering Drawing Practices for School and Colleges SP 46:2003	Bureau of Indian Standards	Bureau of Indian Standards, Government of India, Third Reprint, October 1998; ISBN:. 81-7061-091-2
5	Joshi's Process Equipment Design	V. V. Mahajani S. B. Umarji	MACMILLAN Publishers India Ltd., New Delhi 110002 ISBN 10 : 0230-63810-4

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
			ISBN 13 : 978-0230-63810-5
6	Textbook of Machine Design	R. S. Khurmi J. K. Gupta	S. Chand & Company Pvt. Ltd. Ahmedabad, Gujarat 380014; 6th edition, ISBN-10 : 8121900883 ISBN-13 : 978-8121900881
7	The 'Piping Guide'	David R. Sherwood Dennis J. Whistance	Published by Syentek Books Company Inc. PO Box 26588, Sanfrancisco, CA 94126 ISBN 0 914082-04-3

(b) Open-source software and website:

1. https://nptel.ac.in/courses/112/105/112105294/
2. https://nptel.ac.in/courses/112/104/112104172/
3. https://nptel.ac.in/courses/112/102/112102304/
4. https://nptel.ac.in/courses/112/103/112103019/
5. https://www.youtube.com/results?search_query=engineering+drawing
6. https://www.youtube.com/c/MechanicalEnggSubjectsGTU/playlists
7. https://www.youtube.com/watch?v=55mR97uzjys&list=PL5Rqb_WO7qVxzROfyk2EusQDokGkLXVax
8. https://www.youtube.com/watch?v=WWH8NeW_95A
9. https://www.youtube.com/watch?v=WXDbu7vm4_4
10. https://workforce.libretexts.org/Bookshelves/Manufacturing/Interpretation_of_Metal_Fab_Drawings_(Moran)/01%3A_Chapters/00%3A_Front_Matter/03%3A_Table_of_Contents
11. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
12. https://www.scribd.com/search?content_type=tops&page=1&query=engineering%20drawing&content_types=tops,books,audiobooks,summaries,articles,documents,sheet_music,podcasts
13. http://www.technologystudent.com/designpro/drawdex.htm

Suggested Course Practical List:

Sr. No.	List of Practical	No. of Hours
1	Draw general format of fabrication drawing.	04
2	Draw sectional orthographic projections for given object.	08
3	Draw missing views in a given drawing.	06
4	Prepare detailed drawing for given mechanical assembly and vice-versa.	04
5	Draw isometric projections or views from given orthographic views.	08
6	Prepare development of lateral surfaces for given object.	10
7	Draw interpenetration of solids for given object.	08
8	Prepare a drawing of process equipment.	04
9	Draw process piping line diagram with symbols.	04
10	Draw different elements of structural fabrication drawing.	04
	Total	**60**

Note : More practical exercises can be designed, offered, and changed by the respective course teacher to develop the industry-relevant skills/outcomes to match the COs. The above table is only a suggestive list.

List of Laboratory / Learning Resources Required:

No.	Equipment Name with Broad Specifications
1	Drawing instruments for class room teaching (Large Size).
2	Models of various objects.
3	Drawing Board (B2) & Mini Drafter.
4	Other Instruments: T-Square, Set square (45˚ and 30˚-60˚), Roller Scale, Protector, Drawing Compass, Dividers, Drawing Pencils (Clutch Pencil with H & 2H Lead), Lead Box (H & 2H – 0.5 or 0.7 mm) Circle Master and other templates, French Curves, Stencils (8-6-4 mm, All in One), Eraser, Drawing sheets, Drawing Pins/Clips, Sheet Container and Drawing instrument box etc.
5	LCD projector

Suggested Project List:

1. **Creating Digital Portfolio**: Students should observe and collect photographs and images of industrial/domestic components/items which contain shapes/features like cylinder, prism, pyramid, cone etc. and make a report of these activity.
2. **Chart making:** Prepare chart / drawing of various process equipment, piping system, structural fabrication etc.
3. **Model Making:** Students should build 3D model of various object as per shape and dimension from thermocol, hardboard scrap, wooden scrap, plastic or metal scrap or drawing sheet etc.
    - Prepare a model of cross-sectional orthographic projection.
    - Prepare model of development of lateral surfaces.
    - Prepare a model of interpenetration of solids.
4. **World of work connect:** Students should collect various fabrication drawings like steel structural drawing, piping drawing, process equipment drawing from industry and try to
    - redraw types of lines used
    - redraw lettering styles used
    - list BIS code referred
    - list the symbols/annotations/dimensioning used

Suggested Activities for Students:

1. Prepare solutions of different assignments given by subject faculty.
2. Prepare chart showing dimensioning methods.
3. Prepare chart for limits, fits and tolerances as per BIS.
4. Prepare chart for surface roughness representation as per BIS.
5. Prepare chart showing difference between first angle and third angle.
6. Take any object from your surroundings and prepare the orthographic projections (with appropriate dimension) and isometric views vice versa.
7. Prepare chart of different types of process equipment set-up & fit-up.
8. Prepare chart of welding symbols.

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