

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**  
**Course Curriculum**

**FABRICATION DRAFTING**  
**(Code: 3335501)**

<b>Diploma Programme in which this course is offered</b>	<b>Semester in which offered</b>
Fabrication Technology	3 <sup>rd</sup> Semester

**1. RATIONALE**

This course provides the knowledge and practice regarding drafting/Drawing of different types of fabricated items, process piping, structural items and mechanical assemblies. The course develops interpretation ability of industrial blue prints. This makes student conversant with related standards and codes related with fabrication technology. The student will be in a position to refer and use data books. Thus it is a key course for would be fabrication engineers.

**2. COMPETENCY (Programme Outcome according to NBA Terminology):**

The course content should be taught and with the aim to develop different types of skills so that students are able to acquire following competency:

- **Prepare fabrication production drawings of different products and, calculate MTO and BOM**

**3. TEACHING AND EXAMINATION SCHEME**

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
2	-	4	6	70	30	40	60	

**Legends:** L-Lecture; T – Tutorial/Teacher Guided Student Activity; P - Practical; C – Credit; ESE - End Semester Examination; PA - Progressive Assessment.

#### 4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Course Outcomes as per NBA terminology)	Topics and Sub-topics
<b>Unit – I</b>  <b>Introduction to Fabrication Drafting</b>	1a. Describe basic concepts of Fabrication drawing. 1b. Describe Limits, fits and tolerances as per BIS. 1c. Explain Surface roughness representation as per BIS.	1.1 Types of drawing used in Fabrication Industries (Production Drawing, Assembly Drawing, Installation Drawing, sketching etc.) 1.2 General format of fabrication drawing. Information provided on fabrication drawing (Weld joint, detail design data, nozzle schedule, BOM, Title Block, Special note, General Notes, Hold etc.) 1.3 Lines, Lettering and Dimensioning methods as per BIS 1.4 Limits, fits and tolerances as per BIS Surface roughness representation as per BIS
<b>Unit– II</b>  <b>Orthographic Drawing</b>	2a. Describe different projection method 2b. Draw different views of given object. 2c. Draw detail drawing from given assembly drawing and vice versa	2.1 Projection methods 2.2 Orthographic projection. 2.3 Sectional views. 2.4 Orthographic Reading 2.5 Detail and assembly drawing.
<b>Unit– III</b>  <b>Isometric Projection / Views / Drawing</b>	3a. Draw isometric projection by using isometric scale from given orthographic views	3.1 Isometric views 3.2 Isometric scale 3.3 Isometric projection
<b>Unit– IV</b>  <b>Interpenetration of Solids</b>	4a. Draw interpenetration views of cylinder to cylinder 4b. Draw interpenetration views of cylinder to cone	4.1. Cylinder to Cylinder. 4.2. Cylinder to Cone.
<b>Unit– V</b>  <b>Development of Lateral Surfaces</b>	5a. Draw development of lateral surfaces of object containing cylinder, cone, prism and pyramid	5.1 Development of Cylinder. 5.2 Development of Cone. 5.3 Development of Prisms. 5.4 Development of Pyramids.
<b>Unit– VI</b>  <b>Process Equipment Drafting</b>	6a. Draw various Process Equipment Drawings 6b. Draw different set-up & fit-up used in process equipment 6c. Use different welding symbols in fabrication drawing	6.1 Drafting of Pressure Vessel(P/V), Heat Exchanger (H/E), Agitators, Condensers, Dryers, Filters, Crystallizers, Reaction Vessels, Distillation Columns etc. 6.2 Different types of process equipment set-up & fit-up 6.3 Welding symbols

Unit	Major Learning Outcomes (Course Outcomes as per NBA terminology)	Topics and Sub-topics
		6.4 Interpretation of process equipment Drawing
<b>Unit– VII</b> <b>Structural Drafting</b>	7a. Interpret structural drawing 7b. Calculate BOM from structural drawing 7c. Draw structural set-up and joints	7.1 Commercial forms of metal (angle, flat, plate, channel, strip, " I " Sec., pipe, etc..) 7.2 Study of structural drawing. 7.3 Calculation of Bill of material (BOM) from given blue print. 7.4 Draw structural set-up and fit-up. 7.5 Riveted and welded joint drafting
<b>Unit– VIII</b> <b>Process Piping Drafting</b>	8a. Interpret different types of process piping drawing 8b. Calculate material take- off from process piping drawing	8.1 Piping Symbols 8.2 Study P & I diagram, GA diagram, nozzle orientation drawing & special support drawing. 8.3 Calculation of MTO from given blue prints 8.4 Prepare material take-off (MTO) report from given piping drawing

### 5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1	Introduction to Fabrication Drafting	4	7	0	0	7
2	Orthographic Drawing	8	0	0	14	14
3	Isometric Projection / Views / Drawing	4	0	0	14	14
4	Interpenetration of Solids	2	0	0	7	7
5	Development of Lateral Surfaces	4	0	0	7	7
6	Process Equipment Drafting	2	0	0	7	7
7	Structural Drafting	2	0	7	0	7
8	Process Piping Drafting	2	0	0	7	7
	Total	<b>28</b>	<b>07</b>	<b>07</b>	<b>56</b>	<b>70</b>

**Legends:** R = Remember; U = Understand; A = Apply and above levels (Bloom's revised 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.

## 6. SUGGESTED LIST OF PRACTICAL/EXERCISES

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (**Course Outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

**Note:** Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

S. No.	Unit No.	Practical/Exercise (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx Hours Required.
1	I.	Read fabrication drawing and prepare a report on information available in it.	04
2	II.	Draw Sectional Orthographic Projections	08
3	III.	Draw Missing views in a given drawing	04
4	IV.	Draw Assembly Drawing with details	06
5	V.	Draw Isometric Projections	08
6	VI.	Draw Interpenetration of Solids	06
7	VII.	Develop Lateral Surfaces	08
8	VIII.	Draw Process Piping	04
9	VI,VII,VIII	Sketch piping symbols, welding symbols, structural setup / fit-up, Commercial form of metals, process equipment etc in a sketch book	04
10	VI,VII,VIII	Calculate MOC from given process equipment drawing, structural drawing and piping drawing	04
Total			56

## 7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities:

7.1 Read fabrication drawing and prepare a report on information available in it.

7.2 Prepare sketch book of piping symbols, welding symbols, structural setup / fit-up, Commercial form of metals, process equipment etc

7.3 Calculate MOC from given process equipment drawing, structural drawing and piping

Drawing.

7.4. Visit any fabrication unit/industry; observe fabrication process for any fabrication Structure, prepare drawing, and MTO/BOM.

## 8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any):

Models of different shape of solids should be used for explaining drawing of different views and different type of drawings such as orthographic or isometric. Card board models may be used for explaining development of lateral surfaces for different shapes of solids.

## 9. SUGGESTED LEARNING RESOURCES

### A. List of Books

S.No.	Title of Books	Author	Publication
1	Elementary Engineering Drawing	N.D.Bhatt	Charotar Publishing house Pvt. Ltd., Anand, Gujarat, latest edition
2	Machine Drawing	N.D.Bhatt	Charotar Publishing house Pvt. Ltd., Anand, Gujarat, latest edition
3	Engineering Drawing	P.J.Shah	S. Chand, New Delhi, Latest edition
4	BIS 696 : 1972		
5	Piping Guide		
6	Structural Work for Students	L.V.Leach	Latest edition

### B. List of Major Equipment/ Instrument

1. Drawing board and drawing instruments

### C. List of Software/Learning Website-

- [http://en.wikipedia.org/wiki/Engineering\\_drawing](http://en.wikipedia.org/wiki/Engineering_drawing)
- <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
- <http://www.youtube.com/channel/HCZWOfCRODR8k>
- <http://edpstuff.blogspot.in/2010/07/basics-of-engineering-drawing.html>
- <http://www.gobookee.net/engineering-drawing-basics/>

## 10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

### Faculty Members from Polytechnics

- Prof. P.B.PATHAK, I/C HOD, Dept of Fabrication Technology, Sir B.P.I., Bhavnagar
- Prof. B.K.GANDHI, Sr. Lecturer, Dept of Fabrication Technology, Sir B.P.I., Bhavnagar
- Prof. S.Y.MERCHANT, Sr. Lecturer, Dept of Fabrication Technology, Sir B.P.I., Bhavnagar

### Co-coordinator and Faculty Members from NITTTR Bhopal

- Dr. A.K. SARATHE, Associate Professor, Department of Mechanical Engineering.
- Dr. C.K.CHUGH, Prof. Department of Mechanical Engineering.