

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FABRICATION TECHNOLOGY

### SEMESTER: V

Subject Name: **Fabrication Design**

Sr. No.	Course Content
1	<b>Basic Consideration In Process Equipment Design:</b> <ul style="list-style-type: none"> <li>1.1 Introduction</li> <li>1.2 General design procedure</li> <li>1.3 Equipment classification</li> <li>1.4 Fabrication techniques</li> <li>1.5 Material of construction (ASME Sec-II) <ul style="list-style-type: none"> <li>1.5.1 Mechanical properties</li> <li>1.5.2 Materials</li> <li>1.5.3 Corrosion &amp; corrosion prevention</li> <li>1.5.4 Selection of material</li> <li>1.5.5 Protective coatings</li> <li>1.5.6 Lining</li> </ul> </li> </ul>
2	<b>Design Considerations:</b> <ul style="list-style-type: none"> <li>2.1 Introduction</li> <li>2.2 Load, stress &amp; strain</li> <li>2.3 Different stress like Tensile, Compressive, Shear, Bearing, Thermal, Impact, Line an &amp; Lateral stresses, Tensional &amp; Bending.</li> <li>2.4 Young's moduls or modulus of elasticity</li> <li>2.5 Shear modulus or modulus of rigidity</li> <li>2.6 Stress Strain diagram</li> <li>2.7 Working stress or design stress</li> <li>2.8 Factor of safety</li> <li>2.9 Selection of factor of safety</li> <li>2.10 Poission's ratio</li> <li>2.11 Volumetric strain</li> <li>2.12 Bulk modulus</li> <li>2.13 Resilience</li> <li>2.14 Application of principle stresses in design</li> <li>2.15 Cyclic stresses</li> <li>2.16 Fatigue &amp; Endurance limit</li> <li>2.17 Stress concentration</li> <li>2.18 Method of reducing stress concentration</li> <li>2.19 Center of gravity</li> <li>2.20 Moment of inertia</li> </ul>
3	<b>Design Of Welded Joint And Riveted Joint:</b> <ul style="list-style-type: none"> <li>3.1 Types, classification</li> <li>3.2 Differences</li> <li>3.3 Design consideration</li> </ul>

	3.4 Design calculation <ul style="list-style-type: none"> <li>• Butt welded</li> <li>• Lap welded</li> </ul>
4	<b>Design Of Pressure Vessel ( Asme Sec-Viii ):</b> 4.1 Design preliminaries as per ASME sec-VIII 4.2 Design of cylindrical and spherical vessel under Internal pressure 4.3 Design of Head and closers 4.4 local stress in process equipment due to discontinuity 4.5 Design of supports for vessels 4.6 Codes and standards for process equipment design
5	<b>Design of Structure ( As Per Bis-800 ):</b> 5.1 Factors affecting structural design 5.2 Steps in structural design 5.3 load analysis in structure 5.4 basic design consideration in structural design 5.5 method of design like simple design, seminigid design, fully rigid design 5.6 Slenderness ratio 5.7 Corrosion protection 5.8 types of structure 5.9 Design consideration of industrial shade & Transmissions tower 5.10 Bending moment and shear force diagram Simple design of beam, column and strut

### Laboratory Experiences:

Sr. No.	Course Content
1.	<b>Demonstration &amp; Study (Report/Observation Writing)</b>  <b>Industrial drawing reading and practices:</b> <ol style="list-style-type: none"> <li>1. Detail study of industrial drawings such as pressure vessels, industrial shade, Transmission tower riveted and welded joints etc.</li> <li>2. Reproduction of given industrial drawing with help of AutoCAD.</li> <li>3. Solid modeling of simple objects using AutoCAD</li> <li>4. Preparation of sketch book for riveted joints, welded joints, structural joints Etc.</li> </ol>
2.	<b>Job Preparation ( Write Sequence and Parameters of Operation)</b>
3.	<b>Seminar &amp; Presentation &amp; Group Discussion:</b> <ol style="list-style-type: none"> <li>1. Prepare a Seminar Using Power Point Presentation/Transparencies on The Topic Covered in Syllabus/Beyond The Syllabus</li> <li>2. Give 10 minutes Presentation</li> <li>3. Group Discussion</li> </ol>

4.	<b>Preparation Of Models, Charts, Quiz Competition &amp; Slogans(Group/Individual)</b>
5.	<b>Industrial Visit:</b>  Term Work content of Industrial Visit Report Should Also Include Following <ol style="list-style-type: none"> <li>Brief Detail of Industry Visited</li> <li>Type, location, product, rough lay-out, Human resource etc. of industry</li> <li>Details, Description, Broad Specification of machinery/Process Observed</li> <li>Safety Norms and Precautions observed</li> <li>Student on Observation on Industrial Environment, Culture and Attitude</li> <li>Any Other Detail/Observation asked by accompanying faculty.</li> </ol> 1. Industrial visit of Structural Fabrication Industry
6.	<b>Sheet &amp; Sketch Work</b>
7.	<b>Report Writtings:</b>  <ol style="list-style-type: none"> <li>Report on Materials of construction as per ASME Sec.-II and selection of Materials.</li> <li>Report on design stresses and strains.</li> <li>Report on corrosion and corrosion prevention.</li> <li>Report on riveted and welded joints.</li> <li>Report on pressure vessel design.</li> <li>Report on design of transmission tower and industrial shade.</li> <li>Report on design codes and standards.</li> <li>Role and responsibilities of design engineer.</li> <li>Examples and calculation related to designs of various parts/equipments</li> <li>Report on latest development in Design of various parts/equipments.</li> </ol>
8.	<b>Beyond Syllabus Activities (Develop Creative &amp; Innovative Ideas Among Students):</b>  Display article, information, sketch, under knowledge zone(K-Zone), inspiration zone(I- Zone) & Creative zone(C-zone)
9.	<b>Literature Survey:</b>  <ol style="list-style-type: none"> <li>Library assignment</li> <li>Internet surfing</li> <li>Refer product pamphlets</li> <li>Technical magazines</li> </ol>
10.	<b>Shop Talk:</b>  Ten minutes presentation on shop floor/Laboratory during the presentation of job/laboratory experience by the students
11.	<b>Audio Visual Aids:</b>  <ol style="list-style-type: none"> <li>Prepare audio cassette</li> <li>Photograph lab manual</li> <li>Technical video download</li> </ol>

12.	<b>Paper Solutions:</b> <ol style="list-style-type: none"> <li>1 Write a paper solution of last five examination papers</li> </ol>
13.	<b>School Within School:</b> <ol style="list-style-type: none"> <li>1. Guiding / Sharing / Mentoring the know-how by meritorious students to lower performing students</li> </ol>
14.	<b>Self Learning:</b> <ol style="list-style-type: none"> <li>1. Contact with field expert, seniors, alumni and get further know-how individually or in a group.</li> <li>2. Read related book / magazine / article / literature and share the content</li> </ol>

### **Note:**

1. Term work report content of each experience should also include following.
  - a) Experience description/ data and objective.
  - b) A skill which is/are expected to be developed in student after competition of experience.
  - c) Drawing of experience / set up with labels / nomenclature to carry out the experience.
  - d) The specification of machine / equipment / devices / tools / instruments/items / elements which is / are used to carry out and to check experience.
  - e) Process parameters / set up settings values applied to carry out experience
  - f) Steps / process description to execute the experience.
  - g) Observation
  - h) Information on resent machine / equipment / devices / tools/ instrument/ item available. In market to carry out the experience.
  - i) Special / additional notes or remarks.
2. Term work report of student of regular more should exclude distance learning manual, photocopy, printed content, etc. focus should be on developing the term work as original efforts of student.
3. Term work content of industrial visit report should also include following
  - a) brief detail of industry visited
  - b) Type, location, product, rough layout, human resource, etc of industry.
  - c) Details, description and broads specification of machinery / process observed.
  - d) Safety norms and precautions observed
  - e) Student on observation on industrial environment, culture and attitude
  - f) Any other detail /observation asked by accompanying faculty.
4. Term work also include experience logbook duly certified by subject teacher.

<b>Sr. No.</b>	<b>Book names</b>	<b>Author name</b>
1	Machine design	R.S. Khurmi
2	Strength of material	R.S. Khurmi
3	Machine design	Agrawal & Shah
4	Design analysis of steel structure	Vazirani
5	Process equipment design	M.V. Joshi
6	Chemical equipment design	B.C. Bhattacharya
7	Introduction to process engineering and design	S.B. Thakor and B.I. Bhatt
8	Engineering Thermo dynamics	R.S. Khurmi
9	Text book of mechanical engineering	R.S. Khurmi
10	TEMA Code	
11	Process design of equipment	Shrikant D. Dawande