

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Diploma in Fabrication Technology

### Semester : 4

**Subject Name:** Sheet Metal Fabrication

| Sr.<br>No. | Course Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| 1.         | <b>SHEET METAL WORKING</b><br>1.1 Need, Scope and Importance of sheet metal fabrication<br>1.2 Major sheet metal industries in Gujarat<br>1.3 Profile of sheet metal fabrication supervisor<br>1.4 Sheet metal use in sheet metal work<br>1.5 Sheet metal hand tool<br>1.6 Sheet metal joint<br>1.7 Sheet metal allowance<br>1.8 Sheet metal machine equipment and instrument<br>1.9 Lay outing pattern<br>1.10 Sheet metal pattern calculation<br>1.11 Stiffening and stiffeners |
| 2.         | <b>SHEET METAL OPERATION</b><br>2.1 Press tool operation<br>2.2 Shearing action<br>2.3 Shearing operation<br>2.4 Drawing operation<br>2.5 Spring operation<br>2.6 Banding operation<br>2.7 Sheet forming<br>2.8 Embossing<br>2.9 Types of dies<br>2.10 Press tool assembly                                                                                                                                                                                                        |
| 3.         | <b>SOLDERING AND BRAZING</b><br>3.1 Definition ,concept & classification<br>3.2 Soldering and brazing mechanism<br>3.3 Fluxes & filler metal<br>3.4 Principal, procedure, joint design & processes<br>3.5 Selection of process<br>3.6 Post cleaning and inspection<br>3.7 Advantages, limitation and application                                                                                                                                                                  |
| 4.         | <b>GAS WELDING</b><br>4.1 Definition<br>4.2 Oxy-acetylene welding process parameters<br>4.3 Principle of operation<br>4.4 Types of welding flames<br>4.5 Chemistry of oxy-acetylene flame<br>4.6 Flame ignition and flame adjustment<br>4.7 Gas welding equipment<br>4.8 Gas welding torch                                                                                                                                                                                        |

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|    | 4.9 Base metal penetration<br>4.10 Gas welding filler metal and fluxes<br>4.11 Application<br>4.12 Gas welding quality control<br>4.13 Gas welding safety                                                                                                                                                                                                                                                                                                          |
| 5. | <b>RESISTANCE WELDING</b><br>5.1 Definition<br>5.2 Resistance welding joint and practices<br>5.3 Variable in resistance welding<br>5.4 Definition, sketch, techniques, procedure, equipment, advantages, limitation and application of : <ul style="list-style-type: none"> <li>• Spot welding</li> <li>• Seam welding</li> <li>• Upset butt welding</li> <li>• Percussion welding</li> <li>• Projection welding</li> </ul> 5.5 Resistance welding quality control |
| 6. | <b>MECHANICAL FASTENING OF SHEET METAL</b><br>6.1 Riveted joints<br>6.2 Screwed joints<br>6.3 Bolted joints<br>6.4 Types of fasteners ( Riveted, Screwed, Bolted )                                                                                                                                                                                                                                                                                                 |
| 7. | <b>SHEET METAL WORK APPLICATION</b><br>7.1 Vehicle body building<br>7.2 Refrigeration and air-condition<br>7.3 Furniture fabrication<br>7.4 Refrigeration and air –condition<br>7.5 Domestic appliances<br>7.6 Coolers, chillers, visi-coolers/ducts<br>7.7 Air craft industries<br>7.8 Food processing                                                                                                                                                            |

## Laboratory Experience

| Experience No. | Description of Laboratory Experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| 1.             | <b>DEMONSTRATION &amp; STUDY (REPORT / OBSERVATION WRITING)</b> <ol style="list-style-type: none"> <li>1. Sheet metal working</li> <li>2. Press Tool Assembly</li> <li>3. Soldering processes</li> <li>4. Brazing Processes</li> <li>5. Gas Welding</li> <li>6. Resistance Welding</li> <li>7. Mechanical Fastening of Sheet Metal</li> </ol>                                                                                                                                                                                                                                                                                              |
| 2.             | <b>JOB PREPARATION (WRITE SEQUENCE AND PARAMETERS OF OPERATION)</b> <ol style="list-style-type: none"> <li>1. Job-1 Sheet Metal Working Job</li> <li>2. Job-2 Soldering of Sheet Metal</li> <li>3. Job-3 Brazing of M.S. Strip</li> <li>4. Job-4 Gas Welding of M.S. Strip</li> <li>5. Job-5 Spot welding of Sheet Metal</li> <li>6. Job-6 Upset butt welding</li> </ol>                                                                                                                                                                                                                                                                   |
| 3.             | <b>SEMINAR &amp; PRESENTATION</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><br>Term work content of industrial visit report should also include following <ol style="list-style-type: none"> <li>a) Brief detail of industry visited</li> <li>b) Type, location, product, rough layout, human resource, etc of industry.</li> <li>c) Details, description and broads specification of machinery / process observed.</li> <li>d) Safety norms and precautions observed</li> <li>e) Student on observation on industrial environment, culture and attitude</li> <li>f) Any other detail / observation asked by accompanying faculty.</li> </ol> Industrial visit of Sheet Metal Working industry |
| 6.             | <b>SHEET &amp; SKETCH WORK</b> <ol style="list-style-type: none"> <li>1. Development of Funnel</li> <li>2. Development of Liter Cane</li> <li>3. Development of A.C. Duct</li> <li>4. Drawing of Fasteners as per BIS</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                           |

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| 7.  | <b>REPORT WRITING</b> <ol style="list-style-type: none"> <li>1. Different types of Sheet Metal Joints</li> <li>2. Sheet Metal Pattern Calculations</li> <li>3. Sheet Metal Operations</li> <li>4. Soldering and Brazing process</li> <li>5. gas welding process</li> <li>6. Different Resistance welding processes</li> <li>7. Sheet Metal Work Application</li> </ol> |
| 8.  | <b>BEYOND SYLLEBUS ACTIVITIES ( DEVELOP CREATIVE &amp; INNOVATIVE IDEAS AMONG STUDENTS )</b><br>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>1. Library Assignment</li> <li>2. Internet Surfing</li> <li>3. Refer Product Pamphlets</li> <li>4. Technical Magazines</li> </ol>                                                                                                                                                                      |
| 10. | <b>SHOP TALK</b><br>10 minutes presentation on shop floor / laboratory during the preparation of job / laboratory experience by the students                                                                                                                                                                                                                           |
| 11. | <b>AUDIO VISUAL AIDS</b> <ol style="list-style-type: none"> <li>1. Prepare Audio Cassette</li> <li>2. Photograph Lab Manual</li> <li>3. Technical Video Download</li> </ol>                                                                                                                                                                                            |
| 12. | <b>PAPER SOLUTION</b> <ol style="list-style-type: none"> <li>1. Write 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>                                                                                                             |
| 15. | <b>LIVE LEARNING</b> <ol style="list-style-type: none"> <li>1. Prepare student for live learning.</li> <li>2. Study activities through powerful observation.</li> <li>3. Make them aware and to form a habit to Learn at any place, any time &amp; from any person.</li> </ol>                                                                                         |

## NOTES:

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 resented 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 also include experience logbook duly certified by subject teacher

## **F - 402 SHEET METAL FAB.**

| Sr.No. | BOOK NAME                               | AUTHOR                                  |
|--------|-----------------------------------------|-----------------------------------------|
| 1.     | Machine Design                          | R.S.Khurmi                              |
| 2.     | Work Shop Technology<br>VOL I & VOL II  | M.Lal & O.P.khanna                      |
| 3.     | Production Technology<br>VOL I & VOL II | P.N.Rao                                 |
| 4.     | Sheet Metal Practice                    | Audels                                  |
| 5.     | Welding Technology                      | O.P.Khanna                              |
| 6.     | Resistance Welding                      | G.D.A                                   |
| 7.     | Welding Technology ITB Manual           | Dr. R.S.Parmar                          |
| 8.     | Body Repair Techniques                  | Smt.Sumitra handa<br>Prof. Satyaprakash |
| 9.     | Vehicle Body Repair                     | F.John                                  |
| 10.    | Workshop Practice                       | Bawa                                    |

