## B. Tech. in Automobile Engineering

**Year 2nd** **Sem 3rd**

| SUBJECT CODE | Category | SUBJECT NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM UNIVERSITY EXAM | TWO TERM EXAM | TEACHER ASSESSTMENT* | END SEM UNIVERSITY EXAM | TEACHER ASSESSTMENT* | | | | |
| BTAU305 | DCS | Machine Drawing | 60 | 20 | 20 | 30 | 20 | 2 | 0 | 4 | 4 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 20 marks.

### Course Educational Objectives (CEOs):

This course provides comprehensive knowledge of (A) production drawing, (B) assembly drawings and (C) orthographic Sectional views and use of (D) computer applications in production drawing.

### Course Outcomes (COs):

1. Students will be able to understand all drawing conventions, symbols and concepts of machine drawing Creation.
2. Student would be able to convert functional specification of mechanical engineering parts and assembly requirements into manufacturing drawing in a manner consistent with standards.
3. Students will be able to interpret manufacturing and assembly drawings and acquire skill in preparing production drawings pertaining to various designs.
4. On completion of this course the students will be able to acquire knowledge of the applications of computers in design, parts creation, assembling and production drawing creation, mechanism and manufacturing activity.

## Syllabus

### Unit – 1

**Introduction of Machine Drawing and Drawing Conventions:** Introduction, classification of machine drawings, principles of drawing, elements of drawing, types of machine drawing, Drawing standards, Drawing Instruments, sheet layout and title block, Application of types of lines, lettering and numbering, Sketching, Dimensioning, screw threads, screw fastening bolt, nut, washer, screw, locking arrangements of nuts, foundation bolts, keys, cotter-joints and pin joint, pipe joint and valves, Riveted joints and welded joints, shaft bearings, brackets and hangers, shaft coupling, clutches and brakes.

**Drawing Conventions and Symbols:** Conventional materials**,** Conventional breaks, Convention of rivets and bolts, welding conventions, Convention of roughness of surface, Convention of



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machine operation and parts, Convention of gear and gear transmission, convention of springs, Symbolic Representation of fasteners, Holes and bolts, profile section, pipe fittings and valve symbols, Electric symbols.

**Unit – II**

**Production Drawing Elements and Assembly Drawings:** Introduction, geometric tolerance types and representation, dimensional tolerance types and representation, Limits and fits, hole basis and shaft basis system of fits, surface roughness, indication of surface roughness, roughness value and grade symbol, Assembly concepts, introduction, types, sequence of preparing the assembly drawing, sectional views, convention in sectioning, bill of materials, plotting techniques.

**Assembly drawing**

**Shaft joints:** knuckle joint, cotter joints and types etc.

**Keys & Shaft coupling:** Muff, Flanged, Flexible, Universal and Oldham's coupling etc.

**Pipe joint:** Flanged joint, Socket and Spigot joint, Hydraulic joint, Union joint, Gland & Stuffing Box etc.

**Bearing:** Plummer block, Pedestal bearing etc.

**Engine Parts:** Steam engine, Piston, connecting rod, Stuffing box, cross head, crank shaft etc.

**Unit - III**

**Orthographic Conversion, Sectional and Interpretation of Views:** Principle and method of projection, orthographic projection, first angle, third angle, isometric, oblique and perspective projection, conversion of pictorial views into orthographic views illustrative problems,

**Sectional views and Interpretation:** Types of sectional views, full section, half section, partial section, removed section, revolved section, offset section, sectioning conventions. Reading of orthographic views, blue print reading, missing lines and views, identification of planes, illustrative problems.

**Unit – IV**

**Production and Assembly Drawing Creation through CAD:** Introduction to CAD, Why CAD Software, Scope, objective, benefit and limitations, CAD Interface, Coordinate system, Create Objects and Modify Object. Layers & Blocks, Text, Table & Dimensions, Introducing Printing, Plotting, and Layouts.

**Drawing practice sheet:** Indicate the surface roughness symbols, welding symbols, tolerances, all production drawing symbols and conventions in drawing practice sheets of AutoCAD Mechanical.

**Parts Assembly, Visualization & Graphics standards:** Assembly Creation methods, Parts Modeling & Representation, Assembly Constraints, Mechanism & Mechanism Analysis, Mass Properties

Data exchange standards – IGES – STEP – CALS – DXF – STL.

**References**

1. *Machine drawing- N.D. Bhatt. & V.M. Panchal, published by Charotar Publishing house.*



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2. *Machine Drawing & Design, Dr. K.K. Dwivedi & Dr. M. Pandey, Dhanpat Rai Publications.*
3. *Machine drawing – P.S. Gill S.K. Kataria & Sons Delhi.*
4. *Fundamentals of Machine Drawing by Sadhu Singh & Shah, PHI*
5. *Machine drawing – T. Jones.*
6. *Machine Design by-J.E. Shigly-McGraw Hill Publications.*
7. *Design of Machine Elements from V.B. Bhandari, TMH Publications.*
8. *Introduction to Engineering Design, McGraw Hill.*
9. *Mastering CAD George Omura with Brian Benton Autodesk.*
10. *Machine Design – P.C. Sharma & D.K. Agrawal-Kataria & Sons Publications.*
11. *Principles of Mechanical Design - R. Phelan – McGraw Hill Pub.*
12. *Machine Design - An Integrated Approach Robert-L-Norton Published by Addison Wesley Longman*
13. *(Singapore) Machine Design – M. F. Spott – PHI*
14. *Machine Design, Theory & Practice – J. Michels Walter, E. Wilson Charles – Add MacMilan Publishers, New York.*

**List of Experiments**

Assembly Drawing and design problem as per given syllabus.



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