| | |
|---|---|
| Course Title: **Computer Aided Assembly Drawing** | Course Code: **15AT43P** |
| Credits (L:T:P) :**0:2:4** **Credit-3** | Core/ Elective: **Core** |
| Type of course: **Tutorial/Practical** | Total Contact Hours: **78** |
| CIE- 25 Marks | SEE- 50 marks |

**Prerequisites:**

**Basic knowledge of Engineering Graphics I&II studied in the previous semesters.**

**Course Objectives:**
To know the concepts of Automobiles components assembly, machine drawing.

*On successful completion of the course, the students will be able to attain CO:*

| **Course Outcome** | | **CL** | Experiments linked | **Linked POs** | **Teaching Hours** |
|---|---|---|---|---|---|
| **CO1** | Interpret the machine drawings. | ***U/A*** | ***Contents of UNIT1 and UNIT5*** | 1,2,3,4,8,9 | **10** |
| **CO2** | Understand the role of Computers in Machine Drawing | ***U/A*** | ***Contents of UNIT2*** | 1,2 | **03** |
| **CO3** | Demonstrate CAD commands. | ***U*** | ***Contents of UNIT3 and 4*** | 1,2 | **12** |
| **CO4** | Draw different auto/machine component drawings. | ***U/A*** | ***Contents of UNIT5 and 6*** | 1,2,3,4,8,9,10 | **53** |
| | | | | **Total sessions** | **78** |

**COURSE PO ATTAINMENT MATRIX:**

| **Course** | **Programme Outcomes** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **Computer aided assembly drawing** | **3** | **3** | **3** | **3** | **-** | **-** | **-** | **3** | **3** | **3** |

**Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.**

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

**Course Delivery:**

The course will be delivered through Tutorials, demonstration.

**Course Content:**

**Unit I: Introduction to Machine Drawing**

Requirements of machine drawing, drawing views – front – top - side, section plane, sectional views – full – half – local - partial – revolved – removed – offset, conventions of section lines, conventional representation of machine parts, production drawing – tolerance – hole basis system – shaft basis system, limits – upper – lower, fits – clearance fit – interference fit - transition fit, surface roughness – representation of surface roughness on drawings, assembly drawing – types – sequence of preparing assembly drawing.

**Unit II: Computer Aided Drafting**

Information about CAD – comparison between manual drawing & CAD – advantages of using CAD –areas of applications, System requirements for CAD. Setting drawing area - coordinates – units - limits – grid – snap – Osnap – Ortho mode.

**Unit III: Drawing Entities**

Draw/sketch tools- point – line – construction line – circle – arc – polygon – poly line – hatch – text – ellipse – rectangle – spline – donut – modifying/changing entities properties.

**Unit IV: Modifying Entities**

Modify / Edit tools – erase – copy – array – move – mirror – offset – rotate – scale – stretch – trim – extend – break – explode – join – chamfer – fillet.

**Unit V:Assembly Drawing**

Drawing detailed parts drawings – assembling the parts – drawing sectional front view –drawing top/side view.

**Unit VI: Dimensioning and Printout**

Dimension the assembly in different views– setting the drawing for printing – printout.

**Course Assessment and Evaluation Scheme:**

| Method | What | | To whom | When/Where (Frequency in the course) | Max Marks | Evidence collected | Course outcomes |
|---|---|---|---|---|---|---|---|
| Direct Assessment | CIE(Continuous Internal Evaluation) | IA | Students | Manual assignments ( Average to be computed) | 10 | Drawing/ Sketch book | 1,2,3,4 |
| | | | | Assembly drawing & print outs (Average to be computed) | 15 | Print outs | 1,2,3,4 |
| | SEE ( Semester End Examination) | End Exam | | End of the course | 50 | Answer scripts at BTE | 1,2,3,4 |
| Indirect Assessment | Student Feedback on course | | Students | Middle of the course | | Feedback forms | 1&,2 Delivery of course |
| | End of Course Survey | | | End of the course | | Questionnaires | 1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods |

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

**Note:**

1. Average of manual assignments and assembly drawings/printouts shall be separately rounded off to the next higher digit..

## MODEL OF RUBRICS FOR ASSESSING STUDENT ACTIVITY/ASSIGNEMENT

**Note: Dimensions in the below table are only representatives and lecturer has to design/decide suitable dimensions based on the activity given.**

| Dimension | Scale | | | | | Students Score | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Unsatisfactory 1marks | Developing 2marks | Satisfactory 3marks | Good 4marks | Exemplary 5marks | 1 | 2 | 3 | 4 | 5 |
| 1. Research and gather information | Does not collect information relate to topic | Collects very limited information ,some relate to topic | Collects basic information, most refer to the topic | Collects more information, most refer to the topic | Collects a great deals of information, all refer to the topic | 1 | | | | |
| 2.Full fills teams roles and duties | Does not perform any duties assigned to the team role | Performs very little duties | Performs nearly all duties | Performs almost all duties | Performs all duties of assigned team roles | 2 | | | | |
| 3.Shares work equally | Always relies on others to do the work | Rarely does the assigned work, often needs reminding | Usually does the assigned work, rarely needs reminding | Always does the assigned work, rarely needs reminding. | Always does the assigned work, without needing reminding | 3 | | | | |
| 4. listen to other team mates | Is always talking, never allows anyone to else to speak | Usually does most of the talking, rarely allows others to speak | Listens, but sometimes talk too much, | Listens and talks a little more than needed. | Listens and talks a fare amount | 4 | | | | |
| **Grand Average/Total=1+2+3+4/4=10/4=2.5=3** | | | | | | 3 | | | | |

**Resources**

**Reference books:**

| Sl no | Title of book | author | publisher |
|---|---|---|---|
| 1 | Automobile Engineering Drawing | R B Gupta | Satya prakashan |
| 2 | Machine Drawing | N D Bhatt and V M Panchal | Charotar Publishing |
| 3 | Machine Drawing | K R Gopalakrishna | Subhas Stores |

2. **Software**: Any Genuine CAD software or free and open source CAD software.

**LAB EXERCISES**

**Assembly drawings of following automotive components:**

***Note: 1. each drawing should be drawn with proper border, title block and bill of materials.***
***2. Detailed drawing sheets should be provided to students, students have to draw detailed drawings first then assembly drawing has to be drawn.***

1. Piston with piston pin
2. Connecting rod assembly.
3. Single plate clutch
4. Synchromesh unit
5. Master cylinder
6. Wheel cylinder
7. Diesel Injector
8. SU carburetor
9. Balanced crank shaft
10. Universal coupling

## SCHEME OF EVALUATION

### a. Internal evaluation

- All the exercises are ***compulsory.***
- Students should draw the detailed parts drawings of each exercise manually at home in drawing sketch/record book as ***assignment*** before attending the class to practice on that exercise in CAD software.
- Each ***in-time completed*** assignment carries 1 mark. (1X10 Exercise).
- Each ***completed*** assembly drawing carries 1 mark & print out carries 0.5 marks. (1.5X10).
- Printouts of assembly drawing are to be kept along with respective manual drawing in lab record.

### b. Semester End examination

| Serial no | Description | Marks |
|---|---|---|
| 1 | Drawing of detailed parts | 20 |
| 2 | Sectional front view | 15 |
| 3 | Top/side view | 10 |
| 4 | Dimensioning & Print out | 05 |
| | **Total** | **50** |

### LAB FACILITIES REQUIRED:

1. Personnel computer with 17" color LED monitor, Intel core i5 fifth gen processor, 4 GB ram, Graphics card with 2 GB RAM -20 numbers.
2. Laser jet Printer-02.
3. UPS 5KV.
4. Genuine CAD software / Free and open source CAD software.
5. LCD Projector.