

Program : <b>Diploma in Automobile Engineering</b>	
Course Code : <b>6058</b>	Course Title: <b>Advanced CAD Lab</b>
Semester : <b>6</b>	Credits: <b>1.5</b>
Course Category: <b>Program Core</b>	
Periods per week: <b>3 (L:0, T:0, P:3)</b>	Periods per semester: <b>45</b>

### Course Objectives:

- To familiarize with solid primitives and Boolean operations
- To make aware of use of layers and their options
- To identify and apply polylines and solid modelling options
- To apply layers and their applications, block creation and insertion. Dimensioning
- To identify UCS, VIEWPOINT, VIEWPORT, and Multiview of a solid object.
- To appreciate Engineering components in conceptual level and three dimensional level.

### Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge of basic science		Engineering graphics	1
Knowledge of program core course		Basic Automobile Engineering	2
Knowledge of program core course		Automobile Engineering Drawing	3

### Course Outcomes:

On completion of the course, the student will be able to:

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive level
CO1	Develop 3D modelling. Solid primitives and Boolean operations	9	Applying
CO2	Make use of Polyline options to prepare models of Automobile components.	9	Applying
CO3	Build automobile models using Layers , Blocks and Dimensioning tool.	12	Applying

CO4	Make use of viewing options to prepare 3D models of Automobile components.	12	Applying
	Lab Exam	3	

### CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2					
CO2	3	2					
CO3	3	2					
CO4	3	2				2	2

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

### Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	<b>Develop 3D modelling. Solid primitives and Boolean operations</b>		
M1.01	Identify the benefits of 3D modelling.	2	Applying
M1.02	Identify the solid primitives	2	Applying
M1.03	Choose methods Boolean operations	2	Applying
M1.04	Organize exercises related to applications of 3D primitives and Boolean operations	3	Applying
<b>Contents:</b> Benefits of 3D modelling. Solid primitives such as box, sphere, cone, pyramid, torus etc. Boolean operations - union, intersection, subtract			
CO2	<b>Make use of Polyline options to prepare models of Automobile components.</b>		
M2.01	Apply basic uses of polylines	2	Applying
M2.02	Make use of the options of p edit command	2	Applying
M2.03	Interpret the options in solid modeling.	2	Applying
M2.04	Outline method of creating solid models with extrude, revolve, sweep, loft, press pull	2	Applying

M2.05	Make use of polylines, pedit and 3D modeling methods	1	Applying
	Series Test – I	1.5	
<b>Contents:</b> Polylines, Closed Polylines, Pedit Commands, Editing Commands, Extrusion And Its Variants. Sweep Command, Revolve, Loft, Press Pull			
<b>CO3</b>	<b>Build automobile models using Layers, Blocks and Dimensioning tool.</b>		
M3.01	Identify layers and their applications	2	Applying
M3.02	Apply block creation method	2	Applying
M3.03	Choose the operation of inserting block in a drawing	3	Applying
M3.04	Identify the features of dimensioning	2	Applying
M3.05	Solve problems on Layers, block creation/insertion, and dimensioning	3	Applying
<b>Contents:</b> Layers and its applications. Block creation and its insertion. Dimensioning.			
<b>CO4</b>	<b>Make use of viewing options to prepare 3D models of Automobile components.</b>		
M4.01	Identify types of positioning UCS	3	Applying
M4.02	Summarize the features of view point and v ports	3	Applying
M4.03	Plan multi view of a solid object	3	Applying
M4.04	Identify the methods of preparing of 3D drawing of automobile engine components such as poppet valve, piston, crankshaft with dimensions and gear wheel/plummerblock	3	Applying
	Open Ended projects**		Applying
	Series Test – II	1.5	
<b>Contents:</b> UCS, Viewpoint, VIEWPORT, Creating multi-view of a SOLID OBJECT. Sketches based on 3D Poppet valve, piston, crankshaft, gearwheel, flywheel, and plumberblock.			

**Text / Reference:**

<b>T/R</b>	<b>Book Title/Author</b>
T1	AUTOCAD by S.VISHAL, Dhanpat Rai Publishing Company(P) Ltd.
R1	AutoCAD by VISHNU PRIYA SINGH, Computer Publishing Limited
R2	MACHINE DRAWING by P.I.VARGHEESE

**Online Resources:**

<b>Sl.No</b>	<b>Website Link</b>
1	<a href="http://grabcad.com/tutorials/basic-tutorial-for-autocad">grabcad.com/tutorials/basic-tutorial-for-autocad</a>
2	<a href="https://www.educba.com/category/design/design-tutorials/autocad-tutorial">https://www.educba.com/category/design/design-tutorials/autocad-tutorial</a>
3	<a href="https://www.autodesk.in/campaigns/autocad-tutorials">https://www.autodesk.in/campaigns/autocad-tutorials</a>

**\*\*Suggested Open Ended Projects**

(Not for End Semester Examination but compulsory to be included in Continuous Internal Evaluation. Students can do open ended experiments as a group of 2-3. There is no duplication in experiments between groups.

1. Build Automobile components using CAD tools
2. Model the hydraulic brake circuit employing CAD design centre.
3. Develop the sketch of electrical systems using symbols.