



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Diploma Engineering**

**Level: Diploma**

**Branch: Automobile Engineering**

**Subject Code : DI04002071**

**Subject Name : Automobile Drafting**

<b>w. e. f. Academic Year:</b>	2025-26
<b>Semester:</b>	4 <sup>th</sup>
<b>Category of the Course:</b>	Professional Elective - II

<b>Prerequisite:</b>	-
<b>Rationale:</b>	The automobile sector plays a key role in global development, with design engineering at its core. This course focuses on the fundamentals of automobile drafting, including engineering drawing standards, tolerances, part and assembly drawings, and AutoCAD drafting. Learners will develop the ability to interpret and prepare technical drawings of automotive components such as pistons, connecting rods, clutches, and gearboxes. It provides a strong foundation for advanced automobile design and modelling.

### Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Interpret common and geometrical drawing symbols used in automotive drawings.	R & U
02	Explain the need and concept of dimensional and geometrical tolerances.	U & A
03	Develop detailed part drawing of an automotive component with all subcomponents.	U & A
04	Prepare assembly drawing of piston and connecting rod and different types of Gearboxes assembly with correct fit and alignment.	U & A
05	Understand the basics of 2D automobile drafting using AutoCAD.	R & U & A

*\*Revised Bloom's Taxonomy (RBT)*

### Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
			ESE(E)		PA(M)	PA(I)	ESE(V)	
3	0	2	4	70	30	20	30	150



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## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<b>Introduction to Automobile Drafting</b> 1.1 Introduction to drafting, types of drafting Importance. <ul style="list-style-type: none"><li>• Differences of detail drawing and assembly drawing.</li><li>• Difference between workshop and manufacturing drawings</li></ul> 1.2 Common drawing symbols and its conventional representation 1.3 Geometrical symbols and its interpretation 1.4 General welding symbols: <ul style="list-style-type: none"><li>• Length and size of weld,</li><li>• Surface contour and finish of weld, all round and site weld,</li><li>• Symbolic representation in Engineering practices and its interpretation.</li></ul> 1.5 Machining symbol and surface texture: <ul style="list-style-type: none"><li>• Indication of machining symbol showing direction of lay, sampling length.</li><li>• Roughness grades, machining allowances, manufacturing methods.</li><li>• Representation of surface roughness on drawing.</li></ul> 1.6 Other drafting symbols like threading, dowels, pins, ribs, Bearings. 1.7 Importance of development of surfaces. Drawing of development of surfaces of simple shapes like cylinder, cone, pyramid, prism 1.8 Various types of automotive component drawing used at Manufacturing units, workshop manuals and car catalogs.	10	22
2.	<b>Dimensional and Geometrical Tolerances in Engineering Design</b> 2.1 Definitions, introductions to ISO system of Tolerance. 2.2 Dimensional tolerances:-Terminology. <ul style="list-style-type: none"><li>• Selection and representation of dimensional tolerance- number and grade method.</li><li>• Definitions concerning Tolerance and Limits system, unilateral and bilateral tolerance</li><li>• Hole and shaft base systems</li><li>• Types of fits-Clearance, transition and Interference</li><li>• Selection of fit for engineering applications.</li></ul>	08	18



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	<ul style="list-style-type: none"> <li>• Calculation of limit sizes and identification of type of fit from the given sizes like 050 H7/s6, 030 H7/d9 etc.</li> </ul> <p>2.3 Geometrical Tolerances: Types of geometrical tolerances</p> <ul style="list-style-type: none"> <li>• Terminology for deviation, Tolerances of form and position and its geometric representation.</li> <li>• Tolerance frame, datum feature, magnitude of tolerance and symbol,</li> <li>• Representation and interpretation of geometrical tolerance on drawing.</li> </ul>		
3.	<p><b>Part Drawings of Engine Components</b></p> <p>3.1 Part drawing of Piston (with rings, skirt, pin)</p> <p>3.2 Part drawing of connecting rod.</p> <p>3.3 Part drawing of Single plate clutch assembly</p> <p>3.4 Part drawing of Flywheel</p>	09	20
4.	<p><b>Assembly Drawings, Exploded Views, and Bill of Materials of Automobile Components</b></p> <p>4.1 Assembly, Types of assembly.</p> <p>4.2 Assembly of Piston &amp; Connecting Rod</p> <p>4.3 Simple exploded views</p> <p>4.4 Sectional views, BOM (Bill of Materials).</p> <p>4.5 Assembly drawing of different types of Gearboxes</p>	09	20
5.	<p><b>Automobile Drafting Using AutoCAD</b></p> <p>5.1 Introduction to Automobile Drafting (2D) with AutoCAD.</p> <p>5.2 AutoCAD Environment &amp; Interface:</p> <ul style="list-style-type: none"> <li>• The ribbon, command line, status bar, and model/paper space.</li> <li>• Basic file management: saving, opening, and templates (.dwg).</li> </ul> <p>5.3 Basic Drawing Commands:</p> <ul style="list-style-type: none"> <li>• LINE, CIRCLE, ARC, RECTANGLE, ELLIPSE, etc.</li> <li>• PLINE (polyline) for complex shapes, etc.</li> </ul> <p>5.4 Editing &amp; Modifying Objects:</p> <ul style="list-style-type: none"> <li>• TRIM, EXTEND, OFFSET, FILLET, CHAMFER, etc.</li> <li>• MIRROR, ROTATE, SCALE, MOVE, COPY, etc.</li> <li>• Creating and using ARRAY (rectangular and polar).</li> </ul>	09	20



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5.5 Drawing Organization & Layers: <ul style="list-style-type: none"><li>● Creating, naming, and managing layers for different components (e.g., lines, dimensions, text).</li><li>● Controlling layer visibility and properties (color, line type).</li></ul> 5.6 Project: Draft a 2D engineering drawing of a simple automotive component (e.g. 1) Fly wheel 2) Spur gear 3) Screw Jack 4) Universal Joint 5) Machine Vice 6) Connecting Rod 7) piston) with a title block and dimensions.		
<b>Total</b>	<b>45</b>	<b>100</b>

## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
30	35	35	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

## References/Suggested Learning Resources:

### (a) Books:

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	Automobile Engineering Drawing	R.B.Gupta	Satya prakashan ISBN-13 8176841474-978 :
2	Machine Drawing	N.D. Bhatt , V.M. Panchal	Charotar Publishing House Pvt. Ltd. ISBN-13 : 978-9380358697
3	Engineering graphics for degree	K. C. JOHN	PHI Learning; ISBN-13 : 978-8120337886
4	Engineering Drawing	Kannaiah P, K L Narayana	Scitech Publications ISBN-13: 978-8195330584
5	Engineering Drawing And Graphics Using Autocad	T. Jeyapoovan	S Chand Publication ISBN-13 : 978-8125940005
6	Machine Drawing	P.S. Gill	S K Kataria and Sons Publishers ISBN-13: 978-8185749792



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7	Automobile Mechanics	William Crouse	Tata Mc-Graw Hill Publication ISBN-13:978-0-07-063435-0
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**(b) Open source software and website:**

1. <https://nptel.ac.in>
2. <https://swayam.gov.in>
3. <https://vlab.co.in>

**Suggested Course Practical List:**

Sr. No	Practical Outcomes (PrOs)		Unit No.	Approx. Hrs. required
1	Draw and explain various Geometrical symbols in sketchbook.	Any one	I	02
2	Draw and explain various machining symbols and drafting symbols like threading, dowels, pins, ribs, bearings, etc. in sketchbook.		I	02
3	Draw development of surface of cylinder and cube.	Any one	I	02
4	Draw development of surface of prism and pyramid.		I	02
5	Illustration of unilateral and bilateral tolerances on component sketch.	Any Two	II	04
6	Study of ISO system of limits, fits, and tolerances.		II	04
7	Selection of suitable fits for different engineering applications.		II	04
8	Draw detail drawing of piston from given data.	Any two	III	04
9	Draw detail drawing of Connecting rod from given data.		III	04
10	Draw detail drawing of Flywheel from given data.		III	04
11	Draw detail drawing of Single plate clutch from given data.	Any one	III	04
12	Draw assembly drawing of piston & connecting rod from given data.		IV	04
13	Draw assembly drawing of different types of Gearboxes.		IV	04
14	Draw basic 2D shapes using commands such as LINE, CIRCLE, ARC, RECTANGLE, and ELLIPSE and modify drawings using commands like TRIM, EXTEND, OFFSET, FILLET, CHAMFER, and STRETCH.	Any one	V	06
15	To prepare a complete 2D engineering drawing (e.g., Flywheel, Spur Gear, Connecting Rod, Piston, or Screw Jack) with a title block and dimensions.		V	06
<b>Total Hrs.</b>				<b>30</b>



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## List of Laboratory/Learning Resources Required:

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1	Large size drawing equipment and instruments for classroom teaching and laboratory work. <ul style="list-style-type: none"><li>● Half imperial size drawing board.</li><li>● T-square or drafter (Drafting Machine).</li><li>● Set squares (450 , 300 and 600) Protector.</li><li>● Drawing instrument box (containing compasses and divider and circle master).</li></ul>	1 to 13
2	Detachable assembly of piston, connecting rod, clutch, Flywheel, crankshaft, propeller shaft and axle.	8 to 15
3	Set of various industrial updated drawings being used by industries.	1 to 15
4	AutoCAD Software	14,15

## Suggested Project List:

Industrial drawings of small components should be given for making their (students) own remarks/ interpretation.
Prepare chart representing geometrical, machining and other drafting symbols.
Prepare a list where surface development is useful with explanation.
Demonstrate Part/Assembly drawing including dimensioning, geometric tolerance, surface finish, threads, welds, bearing, etc.
Perform case study of design and drafting of any automobile component.

## Suggested Activities for Students: If any

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of each activity. They should also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Charts can be prepared.
- Small report on any topic given by concern faculty.
- Small groups of students can be formed for assigned work. Assigned work should be such that it covers market survey, team work, presentation, time management, quality development.

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