GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Vocation (B.Voc)
Semester: III
Branch: Production Technology
Subject Name: Designer Mechanical
Subject Code: 21130307

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Identifying customer's requirements, creating a design brief, planning design activities, creating and evaluating design options, creating detailed design and models using 2D and 3D software's for design.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
0	0	15	15	0	0	100	100	200

Sr. No.	Topic	No. of Hours	Weightage %
01	**Identify Customer's Requirement and Develop Plan for EngineeringDesign Process.** Various procedures used in the design process, Identify factors that should be taken into account for information dissemination, Examine problems that might occur during the design process, Develop contingency plans and explain its importance, Plan and schedule design activities, List resources required for the design activity, List detailed specifications to be incorporated in the design, Develop a schedule for the design process, Establish version control for the document	20	10
02	**Make or Modify 2D Mechanical Engineering Drawings using CAD**. Analyse various types of projections Explain various symbols used in drawing, Distinguish between component/layout and assembly drawing, Select appropriate projection for the drawing as per the standards, Standards and conventions used in engineering drawings Basic principles of engineering manufacturing operations – casting, forging, machining, joining process, assembly and installation methods and kinematic principles, Identify Input and output devices of a system, Identify design features, as appropriate to the drawing being produced-function, material, clearances, operational environment, quality, aesthetics, interferences, tolerances etc., Select appropriate drawing tool(software), Create a drawing template to the required standards, which includes all necessary detail using various drawing tools – layer, scale, paper size, colour setup, line types, dimension system, title, drawing number, date , text ,style etc.	30	15

03	**Make or Modify 3D Mechanical Engineering Models using CAD.** Applications of different 3D Modelling programs such as Surface modelling, solid modelling and wire frame modelling, Setup the equipment for 3D modelling, Choose the right application for 3D modelling, Set the drawing datum at a convenient point to create a modeling template with title, file number, material, date etc. Establish coordinate system, view and orientation Identify and use key features of solid modeling software package to produce models extrude, extrude, cut, solid-model, revolve, wire frame, radius/chamfer, hide, rectangular pattern, fillet, cut/remove, circular pattern, shell, development view, motion analysis, animation, defining material properties, exploded view etc. Create 3-D views on the screen by manipulating drawing planes and inserting 3-D geometric shapes, Create swept, extruded and revolved solids in 3-D space. Extract mass and area properties from solid model, Extract physical properties as per job requirement, including volume, mass and centre of gravity, Use PAN, isometric and Zoom CAD operations to highlight design areas in the modelling environment Modify parts in the assembly environment using the listed features – constrained parts and assemblies, straight lines, insertion of standard components, hidden details, dimensions, symbols and abbreviations, hatching and shading, angular surfaces, parts lists, texts, circles or ellipses, material colour, surface texts etc. Produce 3 –D drawings incorporating section views with all necessary annotations Produce a model for export to the manufacturing systems – DNC and CNC machines, 3D printer and other specific systems	100	50
04	**Make or Modify Assembly of Mechanical Engineering Models using CAD.** Assembly Modelling, Creating Bottom-Up Assemblies, Placing Components in the Assembly Document, Assembling Components, Creating Top-down Assemblies, Moving Individual Components Using the Move Component Tool, Rotating Individual Components, Moving and Rotating Individual Components Using the Triad, Assembly Visualization and various assembly mates.	50	25

Distribution of marks weightage for cognitive level:

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**15**	**40**	**10**	**5**	**5**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

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Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO 1	Identify Customer's Requirement and Develop Plan for Engineering Design Process.	10
CO 2	Make or Modify 2D Mechanical Engineering Drawings using CAD.	25
CO 3	Make or Modify 3D Mechanical Engineering Models using CAD.	35
CO 4	Make or Modify Assembly of Mechanical Engineering Models using CAD.	30

Reference Books:

1. Ibrahim Zied, CAD / CAM: Theory and Practice, McGraw-Hill
2. Hearn E J and Baker M P, Computer Graphics, Pearson.
3. Farazdak Haideri, Cad/Cam and Automation.

List of Open Source Software/learning website:
https://nptel.ac.in