SARVAJANIK UNIVERSITY

Sarvajanik College of Engineering and Technology

Bachelor of Technology

Mechanical Engineering

B. Tech. Semester IV

Course Name: Industrial Drafting **Course Code: BTME19452**

Type of course: **Minors – Computer Aided Modeling and Simulation**
Prerequisite: Engineering Graphics & Design
Rationale of course: This course is designed to introduce the student to the concepts, practices, standards, and drafting techniques needed for engineering design. In this course, students will become familiar with the fundamentals of industrial drafting and the significance it has in our present way of life.

Teaching and Examination Scheme:

Teaching scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	200
2	2	4	6	60	25	15	60	40	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction to drafting and drawing:** History of drafting, the basic elements and method of drafting, traditional method and use of instruments, advanced drafting methods, types of drawings, lettering and lines, geometric construction, freehand sketching, orthographic and isometric projection, sectioning, dimensioning, paper folding techniques, drawing symbols , industry standard for drawing	**6**	**20 %**
2	**Engineering measurement:** Limits, tolerances and fits, indicating geometrical tolerances on the drawing, tolerance of form and position - grades of tolerance, surface roughness, roughness and machining symbols and it's indication on drawing	**6**	**20 %**
3	**Fundamentals of components design:**	**6**	**20 %**

Sr. No.	Topics	Teaching Hrs.	Module Weightage
	Design principle, load and its types, factor of safety, types of stresses, stress concentration, principle stress determination, eccentric loading, bearing pressure, design stress factors affecting its selection		
4	**Drawing of industrial engineering components:** Overview of engineering drawing in various engineering fields, exploded pictorial drawing, layout of the building, mechanical joint, PCB circuit diagram , electrical schematic drawings, loop diagrams, control panel layout drawings, distillation column diagram	**8**	**26 %**
5	**Drafting for manufacturing:** Introduction to systematic design approach, conceptual design, phases of a design process at conceptual design stage, problem identification in a design and drawing approach, indian standards designation of different engineering materials, selection of materials , properties of materials	**4**	**14 %**

Percentage Distribution of Marks as per Bloom's Taxonomy (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	**25**	**20**	**--**	**--**	**45**

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

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.

Reference Books:

Sr. No.	Title of book /article	Author(s)	Publisher	Publication Year	Publication Edition
1	Manual of Engineering Drawing	Colin H Simmons	Elsevier Newnes	2004	2nd
2	Production Drawing	K.L. Narayana	New Age International Pvt Ltd	2014	3rd
3	Engineering metrology and measurements	N.V. Raghavendra	Oxford University Press	2013	1st
4	Strength of Materials	R.K. Kaushik	Dreamtech Press	2019	1st

Sr. No.	Title of book /article	Author(s)	Publisher	Publication Year	Publication Edition
5	Technical Drawing 101 with AutoCAD 2017	Douglas Smith	SDC Publications	2016	1st

Course Outcome (CO's):

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Describe principles of industrial drafting and drawing	20 %
CO-2	Determine geometrical data used in measurement for engineering design	20 %
CO-3	Solve problems related stress and load situation on a components	20 %
CO-4	Construct detail industrial drawing of a components	26 %
CO-5	Interpret the knowledge of industrial drafting for manufacturing	14 %

Mapping of CO's with Program Outcomes (PO's)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO-1	3	1	2	1	2	2	1	0	1	1	0	1
CO-2	2	2	1	2	1	1	1	0	2	2	1	1
CO-3	2	2	3	2	3	1	1	1	1	1	0	2
CO-4	2	2	3	2	3	1	1	1	2	2	2	2
CO-5	3	2	2	2	1	1	3	1	1	1	2	1
Rationale*	**12**	**9**	**11**	**9**	**10**	**6**	**7**	**3**	**7**	**7**	**5**	**7**

***Rationale of CO-PO Mapping:** This course highly maps with PO 1, 3 & 5. It states that the course will develop engineering knowledge, design / development of solutions, modern tool usage. This course also focuses on drawing of engineering systems with the aid of current computing software.

List of Practical's:

1) Prepare drawing symbols used in various engineering fields on the drawing sheet
   (a) Symbolic representation of electrical and electronic elements
   (b) Symbolic representation of weld, brazed and soldered joints
   (c) Symbolic representation of bars and profile sections
   (d) Symbolic representation of piping joints and fittings
2) Demonstration of computer aided drafting tools
3) Prepare drawing of component on the drawing sheet
4) Practice drawing of component using CAD software tools

5) Construct detail industrial drawing using CAD software tools
6) Prepare design of joints using CAD software tools
7) Generate assembly and production drawings using CAD software tools
8) Create exploded pictorial drawing of model and prepare its bills of material using CAD software tools

List of Tutorials:

1) Problems related to limits, fits and tolerances
2) Examples based on simple load and fatigue load
3) Examples based on bending and torsional shear stress
4) Problems for design of joints
5) Case study based problems related to design of engineering components

Major Equipment:

1. Drawing tables
2. Computational facility

List of Open Source/learning website:

1. https://nptel.ac.in/courses/112105294
2. https://nptel.ac.in/courses/112104172
3. https://nptel.ac.in/courses/112103019
4. https://academy.autodesk.com/curriculum/introduction-cad-and-cae