INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

1. **Name of the Academic Unit: Department of Mechanical Engineering**

2. **Subject Name: Engineering and Machine Drawing L-T-P: 1-0-3 Credits: 3**

3. **Pre-requisites: None**

4. **Syllabus and reference books:**

Syllabus:

Manual Drawing (Drawing boards required)

Dimensioning: Placing of dimensions, Functional and Non-functional dimensions, Dimensioning common features like: Circular Arcs, Diameters, Holes, Angles, Chamfers, Tapers, Undercut, Repetitive features, Countersunk, Square, Sphere, Across flat, Threads.

Engineering curves: (1) Ellipse, (2) parabola, (3) hyperbola, (4) cycloid, (5) trochoid, (6) involute, (7) evolute, and (8) spirals.

Orthographic Projection: (a) Points, (b) Lines, (c) Traces of lines.

Projections of Planes: (a) projections on perpendicular planes, (b) projections on auxiliary planes, (c) traces of planes.

Projections of regular solids: cubes, prisms, cylinders, cones, pyramids, and tetrahedron.

Isometric Projections & views of solids.

Sections of solids having regular geometric shapes: cubes, prisms, cylinders, cones, pyramids, tetrahedron, spheres.

SolidWorks (Need CIC facility)

I S Conventions : Need and Types, I S conventions of Threads, Nuts, Bolts, Gears, Bearings, Springs, Washers, Knurling, array of holes, Ratchet & Pawl

Limits, Fits & Dimensional Tolerances: Terminology, Necessity of Limit system, Unilateral and Bilateral Tolerances, Relation between Tolerances and Manufacturing Processes, Methods of indicating tolerances on drawings, IT grades, Systems of fits, Types fits, Selection of fits, Selection of tolerances based on fits.

Geometrical Tolerances: Need of Geometrical Tolerances, Terminology, Tolerances for Single Features such as Straightness, Flatness, Circularity, Cylindricity. Tolerances for

Related Features such as Parallelism, Perpendicularity, Angularity, Concentricity, Tolerance Symbol and Value, Indicating Geometrical Tolerances on drawings. Surface Finish: Surface Texture, Surface Roughness Number, Roughness Symbols, Range of Roughness obtainable with different manufacturing processes. Assembly and Part Drawings of simple assemblies and subassemblies of machine parts viz., couplings, clutches, bearings, gear assemblies, I.C. Engine components, valves, machine tools, etc.
Reference Books: 1) Engineering Drawing, N. D. Bhatt, Charotar 2) Machine Drawing, N. D. Bhatt, Charotar 3) Machine Drawing, A. Singh, Tata McGraw-Hill 4) Machine Drawing, Narayana, Kannaiah and Reddy, New Age 5) Machine Drawing, A. M. Bisen, New Age

5. Lecture-wise break-up:

Sl. No.	Topic	No. of lectures
1.	**Manual Drawing**	**6**
2.	**SolidWorks**	**6**
	Total number of hours	**12**