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Computer Aided Machine Drawing Practice — Complete Syllabus

BTEUP Diploma in Mechanical Engineering • 3rd Semester • Session 2026–27
Subject 3.6 (Practicum) • Total 100 Marks • 4 Credits • L 1 – P 6

About this subject: a practicum — one lecture and six practical periods a week. You learn sectional views and GD&T, draw machine components by hand, then rebuild the same assemblies in CAD (2D drafting and solid modelling). Assessment: 60 marks internal, 40 marks external (3 hours). All exercise drawing sheets must be submitted for the model and end-semester examination as a record of work done.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
3.6	Computer Aided Machine Drawing Practice	Practicum	1 – 6	4	60	40 (3 hrs)	100
Machine Drawing Practice Total				**4**	**60**	**40**	**100**

What This Subject Aims To Do

To teach the language of machine drawing — how a real machine component is shown on paper so that it can be made in a workshop. You learn to read and draw sectional views, to specify sizes and tolerances the way industry does (GD&T), to draw assembled views of machine components by hand with dimensions and a bill of materials, and then to do the same work on a computer: 2D drafting and solid modelling with CAD software, finishing with a printout of the assembled model.

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Syllabus Contents — 98 Periods

Section	Periods
Sectional Views	24
Geometric Dimensioning and Tolerances (GD&T)	—†
Manual Drawing Practice	24
Computer Aided Drafting (CAD) Practices — Part A: 2D Drafting	24
Computer Aided Drafting (CAD) Practices — Part B: Solid Modelling	26
Total	**98**

†The GD&T section carries no separate period figure in the official syllabus; the printed section figures add to the stated total of 98 periods. Reproduced as printed.

Sectional Views

Sectioning; sectional views; representation of the sectional plane; hatching — inclination, spacing, hatching large areas, hatching adjacent parts; full section / half section — types of half sections; conventional representation of materials in section.

In simple words: how to “cut” a part on paper so its hidden inside can be seen and dimensioned — the section lines, the hatching patterns, and the difference between a full and a half section.

Geometric Dimensioning and Tolerances (GD&T)

Importance of GD&T; tolerance specification and interpretation; tolerance symbols; features; datum plane and axis; shaft basis and hole basis system; material condition modifiers; Maximum Material Condition (MMC); Least Material Condition (LMC); feature control frames.

In simple words: the standard symbols that tell a machinist exactly how much variation is allowed on every size and shape — without them, two workshops would make two different parts from the same drawing.

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Manual Drawing Practice

Detailed drawings of machine components are given to students, who draw the assembled views: only the assembled front view (without section / full section / half section) and the top view or side view (without section / full section / half section), with dimensions and a bill of materials on the drawing sheet.

Note: all the exercise drawing sheets should be submitted for the model and end-semester examination as a record of work done.

Computer Aided Drafting (CAD) Practices

Part A — Drafting Practices (2D)

2D drafting practice: draw the front view of the assembled drawing of the components, with dimensions.

Part B — Solid Modelling Practices

Detailed drawings of the machine components are given to students, who create the solid modelling and assemble them using any CAD software on the computer and take the printout.

Note: the syllabus prescribes no single CAD software — "any CAD software" is the official wording. Use whichever CAD package your polytechnic teaches.

Machine Components for the Practical Exercises

- Sleeve and Cotter Joint
- Plummer Block
- Flange Coupling
- Bushed Bearing

Detailed drawings of these four components are given for both the manual drawing practice and the CAD practices.

How to Prepare

Drawing is a hand skill — it improves only by drawing. Practise sectional views until hatching and section selection feel automatic, learn the GD&T symbols and the shaft/hole basis systems well enough to read them on any drawing, and complete every exercise sheet on time: the sheets themselves are your record of work for the model and end-semester examination. In the CAD lab, build each of the four components as a solid model and

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assemble it — the printout is part of the work, not an afterthought. Keep the 60 internal marks in mind: they reward steady practical work through the semester, not a last-week rush.

Note: the official syllabus gives no marks-distribution table for the sections of this subject, so no section-wise marks split is shown here.

Text and Reference Books (as listed in the syllabus)

- A Beginner’s Guide to 3D Modeling — Cameron Coward.
- SolidWorks 2022 Step by Step Guide — Amit Bhatt and Mark Wiley.
- Web-based / online resources listed in the syllabus: AutoCAD tutorials (autodesk.in), mycadsite.com tutorials, NPTEL lectures.

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Source: BTEUP IRDT Kanpur NEP-2020 curriculum for Diploma in Mechanical Engineering (Automobile), effective session 2025-26 (urise.up.gov.in). Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text. Please confirm with your own polytechnic for any local changes.

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