

<b>Course objectives:</b> <ul style="list-style-type: none"> <li>To acquire the knowledge of limits, tolerance and fits and indicate them on machine drawings.</li> <li>To make drawings using orthographic projections and sectional views</li> <li>To impart knowledge of thread forms, fasteners, keys, joints, couplings and clutches.</li> <li>To understand and interpret drawings of machine components leading to preparation of assembly drawings manually and using CAD packages.</li> </ul>	
<b>Module 1 (only for CIE)</b>	<b>01 Sessions</b>
Review of basic concepts of Engineering Visualization <b>Geometrical Dimensioning and Tolerances (GD&amp;T):</b> Introduction, Fundamental tolerances, Deviations, Methods of placing limit dimensions, machining symbols, types of fits with symbols and applications, geometrical tolerances on drawings. Standards followed in industry.	
<b>Module 2 (only for CIE)</b>	<b>02 Sessions</b>
<b>Sections of Simple and hollow solids:</b> True shape of sections.	
<b>Module 3 (only for CIE)</b>	<b>03 Sessions</b>
<b>Thread Forms:</b> Thread terminology, sectional views of threads. ISO Metric (Internal & External), BSW (Internal & External) square and Acme. Sellers thread, American Standard thread, Helicoil thread inserts <b>Fasteners:</b> Hexagonal headed bolt and nut with washer (assembly), square headed bolt and nut with washer (assembly), simple assembly using stud bolts with nut and lock nut. Flanged nut, slotted nut, taper and split pin for locking, countersunk head screw, grub screw, Allen screw <b>Rivets</b> <b>Keys:</b> Parallel key, Taper key, Feather key, Gib-head key and Woodruff key.	
<b>Module 4</b>	<b>03 Sessions</b>
<b>Assembly of Joints, couplings and clutches (with GD&amp;T) using 2D environment</b> <b>Joints:</b> Like Cotter joint (socket and spigot), knuckle joint (pin joint). <b>Couplings:</b> Like flanged coupling, universal coupling <b>Clutches:</b> Like Single Plate clutch, cone clutch	
<b>Module 5</b>	<b>05 Sessions</b>
<b>Assembly of Machine Components (with GD&amp;T) using 3D environment</b> <i>(Part drawings shall be given)</i> <ol style="list-style-type: none"> <li>Bearings</li> <li>Valves</li> <li>Safety Valves</li> <li>I.C. Engine components</li> <li>Lifting devices</li> <li>Machine tool components</li> <li>Pumps</li> </ol>	
<b>Course outcomes (Course Skill Set):</b>  At the end of the course the student will be able to: CO1: Interpret the Machining and surface finish symbols on the component drawings. CO2: Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies. CO3: Illustrate various machine components through drawings CO4: Create assembly drawings as per the conventions.	

### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks) and that for SEE minimum passing mark is 35% of the maximum marks (18 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% ( 18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

### Continuous Internal Evaluation (CIE):

CIE marks for the practical course is 50 Marks.

- CIE shall be evaluated for max marks 100. Marks obtained shall be accounted for CIE final marks, reducing it by 50%.
- CIE component should comprise of
  - Continuous evaluation of Drawing work of students as and when the Modules are covered.
  - At least one closed book Test covering all the modules on the basis of below detailed weightage.
  - *Weightage for Test and Continuous evaluation shall be suitably decided by respective course coordinators.*

Module	Max. Marks weightage	Evaluation Weightage in marks	
		Computer display & printout	Preparatory sketching
Module 1	10	05	05
Module 2	15	10	05
Module 3	25	20	05
Module 4	25	20	05
Module 5	25	25	00
<b>Total</b>	<b>100</b>	<b>80</b>	<b>20</b>

### Semester End Evaluation (SEE):

SEE marks for the practical course is 50 Marks.

- The duration of SEE is 03 hours. **Questions shall be set worth of 3 hours**
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the University.
- SEE shall be conducted and evaluated for maximum marks 100. Marks obtained shall be accounted for SEE final marks, reducing it to 50 marks.
- Question paper shall be set jointly by both examiners and made available for each batch as per schedule. **Questions are to be set preferably from Text Books.**
- Evaluation shall be carried jointly by both the examiners.
- Scheme of Evaluation: *To be defined by the examiners jointly and the same shall be submitted to the university along with question paper.*
- One full question shall be set from Modules 3 and 4 as per the below table weightage details. **However, the student may be awarded full marks, if he/she completes solution on computer display without sketch.**

Module	Max. Marks Weightage	Evaluation Weightage in marks	
		Computer display & printout	Preparatory sketching
Module 4	40	30	10
Module 5	60	50	10
<b>Total</b>	<b>100</b>	<b>80</b>	<b>20</b>

**Suggested Learning Resources:**

**Books:**

- K L Narayana, P Kannalah, K Venkata Reddy, "Machine Drawing", New Age International, 3rd Edition. ISBN-13: 978-81-224-2518-5, 2006
- N D Bhatt , "Machine Drawing", Charotar Publishing House Pvt. Ltd., 50th Edition, ISBN-13: 978-9385039232, 2014

**Reference Books:**

- Sadhu Singh, P. L. Sah, "Fundamentals of Machine Drawing", PHI Learning Pvt. Ltd, 2nd Edition, ISBN: 9788120346796, 2012
- Ajeet Singh, "MACHINE DRAWING", Tata McGraw-Hill Education, , ISBN: 9781259084607, 2012