Engineering Graphics with AutoCAD

Overview

By

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Team of Authors

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What is Engineering Graphics

Engineering Graphics is the language of Engineers. Like any other language, one should be able to READ | WRITE | SPEAK. The knowledge of Engineering Graphics is useful to both scientist as well as Engineers.
Engineers use graphics to communicate technical information without ambiguity to executives, fabricators, customers, and each other.

Engineering graphics has a well-defined set of standards by which technical drawings are produced.

This course teaches the language of engineering graphics from basic sketching through 3-D solid modeling using computer aided design (CAD) software AutoCAD.

The course also gives the opportunity to apply this new knowledge to creative engineering design projects.
Applications of Computer Aided Drafting

**Mechanical**: Design of machine elements, CNC machine tools, Robotics.

**Automotive**: Kinematics, Hydraulics, Steering.

**Electrical**: Circuit layout, Panel design, control system.

**Electronics**: Schematic diagrams of PCs, Ics, etc.

**Communication**: Communication network, satellite transmitting pictures, T.V Telecasting

**Civil**: Mapping, contour plotting, building drawing, structural design.

**Architectural**: Town planning, interior decorations, multi storied complex.

**Aerospace**: Design of spacecraft, flight simulator, lofting
Why with AutoCAD?

- Current industrial practice (traditional drafting is obsolete).
- Helps students to explore other solid modelling softwares in their own disciplines.
- Helps Mechanical students to generate 2-D Machine drawings as well as 3-D models using Pro-Engineers.

Helps Institute in many ways:

- Online Assignments, online Exams and online evaluation solves n number of problems.
- Storing the digital drawings (if required).
What about the hand-skills of students?

Students are asked to practice on the printed (ortho/iso) grid papers in tutorial section.

Also, students are asked to draw free-hand sketches on paper.
Course Objectives

1. To learn the AutoCAD tool
2. To learn the theory of projections
3. To learn the descriptive geometry
4. To learn a 3-D imaginative skill
5. To learn a hand-sketch skills for 2-D drawing and 3-D modelling
Course Coverage

**Engineering Graphics**

- AutoCAD
- Theory of Projections
- Descriptive Geometry
- Freehand Sketching
Proficiencies

Institutional proficiencies assigned to this course
Successful completion of this course will enhance the student's ability to:
- Interpret and synthesize information and ideas
- Analyze and evaluate
- Use computer technologies for communication

Department-specific proficiencies assigned to this course
By completing this course, students will understand:
- Visualization as it pertains to engineering design
- Engineering drawing techniques
- Orthographic and pictorial projections
- Auxiliary and section views
- Basic dimensioning
- 2-D CAD drawing techniques
- 3-D CAD modeling techniques
Course Conduct

- 30 Lectures (50 Mins each)
- 15 Tutorials (50 Mins each)
- 25 Practical (2 Hrs each)
## Course Handout

<table>
<thead>
<tr>
<th>Lect. No.</th>
<th>Learning Objectives</th>
<th>Topics to be covered</th>
<th>Pract. Classes</th>
<th>Chap./Sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 4</td>
<td>Intro. To AutoCAD</td>
<td>Basic commands</td>
<td>4</td>
<td>Ch.1, Ch.2&amp;Ch 4</td>
</tr>
<tr>
<td>5 to 9</td>
<td>Orthographic projections</td>
<td>Theory, techniques, first and third angle projections, Multi view drawing from pictorial views.</td>
<td>3</td>
<td>3 &amp; Ch. 5</td>
</tr>
<tr>
<td>10 to 12</td>
<td>Pictorial drawings</td>
<td>Theory of isometric and oblique drawing, construction of isometric and oblique from orthographic.</td>
<td>3</td>
<td>Ch. 6</td>
</tr>
<tr>
<td>13 to 14</td>
<td>Missing line(s) &amp; view</td>
<td>Identification and drawing of missing line(s) and view in orthographic projections</td>
<td>2</td>
<td>Ch. 7</td>
</tr>
</tbody>
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<tr>
<td>15 to 16</td>
<td>Auxiliary projections</td>
<td>Need, primary and secondary auxiliary views, true shapes.</td>
<td>1</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>16 to 20</td>
<td>Spatial geometry</td>
<td>Projection of points; lines, true lengths, inclinations, shortest distance; planes</td>
<td>3</td>
<td>Ch. 9, Ch.10&amp; Ch11</td>
</tr>
<tr>
<td>21 to 24</td>
<td>Geometrical solids and sections</td>
<td>Construction of right, regular, oblique solids; section planes and sectional view.</td>
<td>4</td>
<td>12 &amp; Ch. 13</td>
</tr>
<tr>
<td>25 to 26</td>
<td>Development of surfaces</td>
<td>Radial line, parallel line; reverse development</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>27 to 30</td>
<td>Intersection of surfaces</td>
<td>Intersections between: line-plane, plane-plane, line-solid, solid-solid</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>
Online Teaching through AutoCAD

2 Lectures per Week
Tutorial Class Conduct on Grid Sheet

1 Tutorial Hour per Week (Hand skills)
Online Assignment

2 Practicals, each of 2 hours (4 Hours per Week)
Online Examination & Evaluation
Evaluation Components & Evaluation

1) Assignments  120 Marks
2) Mid-Test     60 Marks
3) Compre. Exam. 120 Marks

Total  300 Marks
Assignments Evaluation

Total 25 Assignments

First 5 Assignments on AutoCAD Commands

Total 20 Assignments on course

20 Assignments X 20 Marks Each = 400 Marks

400 Marks X 0.3 = 120 Marks
Mid-Test (60 M)
Model Q & A Sheet
Thanks