DRAWING FOR GEOMATICS

ENGE 151

Lecture : 2 **Year : I**
Tutorial : 0 **Part : II**
Practical : 4

Course Objectives:
To make familiar with the conventional practices of orthographic and sectional views and introduce how to draw Isolines including contour. After completing this course, students will be able to comprehend standard symbols of different engineering fields and to develop basic concept of CAD technology for preparation of drawings and map related to engineering design and construction.

1 Conventional Practices for Orthographic and Sectional Views (6 hours)

1.1 Conventional practices in orthographic views: Half views and partial views, treatment of unimportant intersections, aligned views, treatment for radially arranged features, representation of fillets and rounds
1.2 Conventional practices in sectional views: Conventions for ribs, webs and spokes in sectional view, broken section, removed section, revolved section, offset section, phantom section and auxiliary sectional views
1.3 Simplified representations of standard machine elements

2 Familiarization with Graphical Symbols (4 hours)

2.1 Standard symbols for civil, cultural, tourist, forestry, and agricultural components
2.2 Topographical symbols
2.3 Symbols for geology and mining

3 Drawing of Isolines (4 hours)

3.1 Concept of Isobar, Isobath, Isohyet and Isotherm
3.2 Detail drawing of Isobar, Isobath, Isohyet and Isotherm
3.3 Contours
  3.3.1 Alignment of road, canal, transmission lines, etc.
  3.3.2 Cross section and longitudinal profile
  3.3.3 Earthwork volume

4 Construction Drawing (6 hours)

4.1 Drawing templates and layout of building
4.2 Detailed construction drawing of building, road, canal bridge and related infrastructure projects

4.3 Fixing horizontal and vertical curves
4.4 Preparation as-built drawing and use for payments, repair and maintenance, etc.

5 Introduction to CAD (6 hours)

5.1 Introduction to basic CAD commands
5.2 Building blocks in CAD
5.3 Types of line in CAD
5.4 Dimensioning in CAD
5.5 Hatching and rendering
5.6 CAD to GIS integration
5.7 Georeferencing and digitization
5.8 3D CAD

6 Map Design and Layout (4 hours)

6.1 Map templates and map book
6.2 Symbols for general use
6.3 Scale and orientation
6.4 Symbolization and legend generation
6.5 Layout design
6.6 Map publication

Practical (60 hours)

1. Conventional practices for orthographic and sectional views (Full and half section)
2. Conventional practices for orthographic and sectional views (Other type sections)
3. Familiarization with graphical symbols (Limit, fit, tolerances and surface roughness symbols)
4. Familiarization with graphical symbols (Symbols for different fields such as geology, forestry, agricultural, etc.)
5. Familiarization with CAD: Drawing lines, polylines, polygons, circles, parabola, eclipses, etc., dimensioning, labeling and annotation; Introduction to 3D CAD
6. Preparation of floor plans of a two-story building with elevations and sectional views in CAD
7. More practice on CAD: Dimensioning, labeling, annotation, symbolization including site plan and location plan
8. Collection of data and drawing Isolines, generate longitudinal profile and cross-sections (Paper based or CAD)
9. Fixing road or canal alignment, generating plan, longitudinal profiles and cross-sections in CAD
10. Preparation of map templates based on common engineering practice, split up large maps into tiles and preparation of map book

11. Construction drawings – Layout drawings and as built drawings in CAD
12. Publication of map in hardcopy or softcopy with proper pen assignments

References

1. Luzadder, W.J. (1992). Fundamentals of engineering drawing (Latest Edition). Prentice Hall.
2. French, T.E., Vierck, C.J., Foster, R.J. (1993). Engineering drawing and graphic technology (Latest Edition). McGraw Hill.
3. Giesecke, F.E., Spencer, H., Hill, I.L., Dygdon, J., Novak, J., Lockhart, S., Mitchell, A., Goodman, M. (2014). Technical drawing with engineering graphics. Pearson Education.
4. Kulkarni, D.M., Rastogi, A.P., Sarkar, A.K. (2010). Engineering graphics with AutoCAD. Prentice Hall India.
5. Philips, K. (2015). Beginner's guide to 2D and 3D drawings: A complete illustrative teaching approach. Kendrol CAD Training.
6. Graham, R., Holland, L. (2012). Mastering AutoCAD Civil 3D: Autodesk official training guide. Wiley Publishing.
7. Luintel, M.C. (2020). Engineering Drawing I & Engineering Drawing II. Heritage Publishers & Distributors.