



DEPARTMENT OF CIVIL ENGINEERING  
C.V.RAMAN COLLEGE OF ENGINEERING



**Training Modules (Session-2012-16)**

Semester	Hours	Compulsory Courses-I &II
3 <sup>rd</sup>	45	Auto CAD-I
4 <sup>th</sup>	40	Auto CAD-II with projects
5 <sup>th</sup>	48	GIS & RS-I
7 <sup>th</sup>	24	GIS & RS-I

**AUTOCAD -I**

**PARTICIPANT PROFILE:**

Engineering students of degree level. /Product designer, tool designer, planning personal, drafter, Etc...

**COURSE OBJECTIVE:**

- Making participants familiar with CAD so that they can plan & create products like house, bridge, dam etc... by using AutoCAD as AutoCAD is a widely used software commonly found in most of the industry.
- The trainee's concept on 2D & 3D design will be cleared as design is called as the language of an engineer so a good engineer must be a good designer.
- To convert the trainee into a good designer.
- To provide the trainee with live project works to improve their confidence level to work in an industry.

**TEACHING & LEARNING MEDIA:**

- Multimedia presentation
- Pc animation
- AutoCAD software
- 2D & 3D exercises.
- White board, marker, etc...



# TRAINING MODULES

## **Module-(I) INTRODUCTION**

CAD Requirements in Engineering, Introduction of Auto CAD, Acquaintance with Auto cad graphic environment, knowing all about visible Tool bars on screen. System (hardware) Requirements, Functions of Mouse button, key board Hot keys/ functional Keys, What is scratch window and How to set it? How to set limits/working area? An Over view of standard paper size? How to call tool bar?

## **Module-(II) DRAW**

**Lines**, Construction lines. Co-ordinate system, Use of status bar, **Rectangle**-Zooming & planning, Co-ordinate system using Auto cad, Drawing using co-ordinate system, Polygon, Donut, Multiline, Poly line, Revision Cloud, Ellipse, **Arc**-Types of arc, **Circle**-Types of circle

## **Module-(III) MODIFY**

Erase, Copy, Move, Scale, Stretch, Rotate, Extend, Break a point, Break, Join, Trim, Region Explode, Off-set, Mirror, Fillet, Chamfer, and lengthen (percent, total)

## **Module-(IV) PROPERTIES**

Line type & their uses in Eng. Drawing, Use of Property Toolbar, Scale used in Eng. Drawing Projection views, **Array** - Rectangular, polar, Block/ W-block, Overview of Sectioning & types Hatching/Gradient, Layer setting/ Design center, Creating bill of material, Annotation, Match Properties

## **Module-(V) 3D/ MODELING**

Introduction to 3D, Knowledge about UCS / WCS, Tool bars used in 3D, Concept of isometric views, Working in 3 Dimensions, Extrude, Press pull, Revolve, Sweep, Loft, Poly solid, Add Material (Tool Palettes)

## **Module-(VI) 3D OPERATION**

Boolean operation-Union, Subtraction, Intersection, 3D move, 3D rotate, Align, 3D align, 3D array, Slice, 3D mirror, Thicken, Convert to solid, Convert to surface

## **Module-(VII) SOLID EDITING**

Extrude face, Offset face, Delete face, Shell, Imprint edges, Separate, Taper face, color edges, Copy edges, rotate faces, Color faces, copy faces

## **Module-(VIII) DRAFTING/ DIMENSIONING**

Types of Dimensioning in Eng. Drawing and their Rules, Command for dimension modification & their uses. **Text** -Dynamic text, Multi text, Auto CAD Extension files, **Short cut command** - Calculator, design center, Tool palettes and text symbols,

## **AUTO CAD-II with Projects**

### TRAINING MODULES

#### **PROJECT WORK/ ADVANCE OPTION**

**Project-01:** Draw plan, four side elevation and sectional elevation of the building with dimension.

#### **Options:**



Block/ W-Block

Q-Leader, Leader setting manager, Setting Reminding message, Data Extraction Process

**Project-02:** Draw ground floor and first floor plan, four side elevation and sectional elevation of the building with dimension.

**Options:**

Meshes, Plot Manager, Render, Motion Path Animation, Draw Order

**Project-03:** Draw plan, plan with water- supply, sanitary connections, furniture details, four side elevation and sectional elevation of the building with dimension.

**Options:**

Attribute Definition, Purge, Walk & Fly, Raster Image

**Project-04:**

- Prepare fully dimensional & Furnished plan of your own residence and
- Draw typical sectional elevation and front elevation

## **REMOTE SENSING AND GIS**

**Objective/ rational:**

The advent of Remote Sensing images either from satellites or from aerial based platforms in digital mode has provided challenging opportunities for earth scientists, physical planners, civil engineers etc. to survey, map and monitor natural resources of the surface of the earth and utilize this in optimization of the developmental planning process related to these resources. The GIS has emerged as a powerful tool for analyzing maps in digital environment towards decision making. The GPS has revolutionized the surveying and mapping activities by way of providing accurate locations. Under this background, the Civil Engineering Department of C.V. Raman College of Engineering has realized the significance of these developments and plans to introduce a course on Remote Sensing and GIS.

**Training/Learning outcome:** The course is designed to introduce basic concepts of Remote Sensing, GIS and GPS. Also practical exercises have been incorporated tailored towards hands on experience in digital image processing of satellite images as well as using GIS facilities in map analysis. At the end of the course the students should have the capability to understand the utility of these technologies in natural resources management and will have acquired basic operational knowledge on digital image processing and GIS.

**Target group and duration of the programme:**

It will be imparted to B.Tech civil Engineering students of CV Raman College of Engineering. The duration of the proposed course will be of two semesters (5<sup>th</sup> and 6<sup>th</sup> semester). There will be 2 hours theory and 2 hours practical per week in 5<sup>th</sup> semester and 2 hours practical per week in 6<sup>th</sup> semester. The 3<sup>rd</sup> year students of B.Tech Civil will be allowed to take this course concurrently as an option. This course will have no bearing on their ongoing B.Tech Civil programme but will be adding to their skill. A certificate will be provided to each participant after successful completion of this course by the CVRCE and SSEPL.



## TRAINING MODULES

### Semester V:

**Theory:** a) Principles and practices of GIS and GPS technology (12 hours)

b) Principles of Remote Sensing and Digital Image Processing (12 hours)

**Practical:** a) GIS (24 hours)

### Semester VI:

**Practical:** Digital Image Processing (24 hours)

### Geographic Information System (GIS) and GPS (12 hrs)

#### **MODULE I: Basic concepts (8 hrs)**

**GIS introduced:** An overview of the development of the GIS field, spatial and non-spatial data, GIS defined, Components and functions, Data sources, GIS applications.

**Basic Cartographic Concepts:** Cartography, map and its characteristics, types of maps, use of maps, Reference systems (spheroid and geoid), Earth based coordinate systems, Map projection, Grid coordinate system, Map design: cartographic generalization, symbolization, Marginal and border information, typography: principles of lettering, geographic names, map production

**Spatial data Modelling (Computer Representation of cartographic features):** Spatial feature types – points, lines, areas and networks and surfaces, Spatial data models (vector and raster models), spatial data structure (vector and raster)

**Data Capture Methods:** Map digitization: manual digitization, semi-automatic and automatic digitization, Scanning and geo-referencing, automatic vectorization, Conversion from other digital sources, Attribute data input and management, metadata.

**GIS data analysis/processing:** Measurements in GIS, Queries, Buffering, Integration, digital terrain modeling, data visualization.

#### **MODULE II Global Positioning System (GPS) (4 hrs)**

**Satellite positioning:** GPS and GLONASS - History and Developments, System Components, Signal Structure

**GPS positioning:** Positioning concept (resection from space), Point positioning, Relative positioning, Static positioning, Kinematic positioning, Limitations

### REMOTE SENSING: (12 hours)

#### **MODULE I: Basics of Remote Sensing (8 hrs)**



**Physics of Remote Sensing:** Definition and Stages, Electromagnetic radiation, Electromagnetic Spectrum, Radiation Laws, Interaction Mechanism with Atmosphere and Earth Features, Atmospheric Windows and bands, Spectral Reflectance Curve

**Platform and Sensors:** Ground, air and space borne platforms, Sensors: Imaging and non-imaging sensors, Active and Passive Sensors, Push broom Scanners, Characteristics of some Remote Sensing Satellites: LANDSAT, SPOT, IRS, IKONOS, QUICKBIRD etc.

**Image interpretation:** Spectral, Spatial, Radiometric and Temporal Resolution, False Colour Composites, Elements of image interpretation, Visual and digital interpretation techniques, their advantages and limitations, Ground truth Collection.

**Applications:** Topographic surveying, Landuse/Land cover mapping

## **Module II: Digital Image processing (4 hrs)**

**Image Pre-processing:** Image statistics, Radiometric Corrections, Geometric Corrections, Geo-referencing.

**Image Enhancement:** Contrast enhancement, Band combinations, Ratioing, Spatial filtering, Edge enhancement, Special transformations, Image fusion.

**Information extraction:** Supervised and Un-supervised Classification Techniques for land use / land cover mapping.

## **PRACTICALS (48 hrs)**

### **Module I (Semester V): GIS (24 hours)**

Exercises:

- 1) Map reading
- 2) Geo-referencing a scanned map
- 3) Map digitization and composition
- 4) GIS analysis (measurement, overlay and buffering).

### **Module II (Semester VI): Digital Image Processing (24 hours)**

Exercises:

- 1) Image display and interpretation
- 2) Image enhancement (contrast, FCC etc)
- 3) Image geo-referencing
- 4) Mapping using high resolution satellite images in Arcview GIS environment
- 5) Supervised classification for land use/land cover mapping using moderate resolution images in Rolta Geomatica image processing environment.

**For feedback and suggestion please write to [trainingfeedback@cvrgi.edu.in](mailto:trainingfeedback@cvrgi.edu.in)**

