

Course Title: Geographical Information System

Course no: CSC-459

Credit hours: 3

Full Marks: 60+20+20

Pass Marks: 24+8+8

Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

Course Synopsis: Basic concepts of Geographical Information System

Goal: The course covers about spatial data modelling and database design, capturing the real world, spatial analysis and visualization, overview of open GIS

Course Contents:

Unit 1: Introduction

6hrs.

- 1.1 Overview, History and concepts of GIS
- 1.2 Scope and application areas of GIS
- 1.3 Purpose and benefits of GIS
- 1.4 Functional components of GIS
- 1.5 Importance of GPS and remote sensing data in GIS

Unit2: Digital mapping concept

3 hrs.

- 2.1 Map concept: map elements, map layers, map scales and representation
- 2.2 Map projection: coordinate system and projection system

Unit 3: spatial data modeling and database design

9 hrs.

- 3.1 introduction to geographic phenomena and data modeling
- 3.2 spatial relationships and topology
- 3.3 scale and resolution
- 3.4 vector, raster and digital terrain model
- 3.5 Spatial database design with the concepts of geodatabase.

Unit 4: capturing the real world

8hrs.

- 4.1 different methods of data capture
- 4.2 map projection and spatial reference
- 4.3 data preparation, conversion and integration
- 4.4 quality aspects of spatial data
- 4.5 GPS
- 4.6 Remote Sensing

Unit 5: spatial analysis and visualization

7hrs.

- 5.1 spatial analysis
 - i. overlay
 - ii. buffering

5.2 map outputs and its basic elements

Unit 6: introduction to spatial data infrastructure

8hrs.

- 6.1 SDI concepts and its current trend
- 6.2 The concept of metadata and clearing house
- 6.3 Critical factors around SDIs

Unit 7: Open GIS

4hrs.

- 7.1 Introduction of open concept in GIS
- 7.2 Open source software for spatial data analysis
- 7.3 Web Based GIS system
- 7.4 System Analysis and Design with GIS

Laboratory work: The lab should cover at least the concepts given the chapters

Reference books:

- 1- Principles of geographic information systems: An introductory textbook, international institute for Geo-information science and Earth observation, the Netherlands- By rolf De By, Richard A. knippers, yuxian sun
- 2- ESRI guide to GIS analysis Andy Mitchell, ESRI press, Red lands
- 3- GIS Cook BOOK