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

Unit 2: 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