COURSE CODE: **GIE-103**

COURSE NAME: **INTRODUCTION TO GIS**

CREDIT HOURS:

Theory	= 02
Practical	= 01
Total	= 03

CONTACT HOURS:

Theory	= 32
Practical	= 48
Total	= 80

PREREQUISITE: Nil **(It is a Pre-requisite course for GIE-342 GIS Applications and GIE-414 Land Use Planning)**

MODE OF TEACHING:

Instruction:	Two hours of lecture per week	67%
Practical:	Three hours of Lab work per week	33%

COURSE DESCRIPTION:

This course is designed to familiarize the students of Geoinformatics Engineering to understand the spatial data models and design concepts of GIS, data acquisition, sources of data, querying data and visualizing data. Students would also be able to understand and use map projections and coordinate systems during map making process.

COURSE OBJECTIVES:

The course aims at providing an understanding of GIS, its evolution, applications, spatial data models and data structures, design aspects of GIS; spatial data acquisition, sources, and standards; spatial data manipulation, spatial analysis and visualization of data. This course also covers the understanding of GIS software environment.

This course provides basic training in understanding GIS data capture, storage, retrieval, analysis, and display. It also helps to learn functionality of GIS software and to gain basic skills.

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

1	Engineering Knowledge:	☑	7	Ethics:	☐
2	Problem Analysis:	☐	8	Individual and Collaborative Team Work:	☐
3	Design/Development of Solutions:	☐	9	Communication:	☐
4	Investigation:	☐	10	Project Management:	☐
5	Tool Usage:	☑	11	Lifelong Learning:	☐
6	The Engineer and Society:	☐			

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, students will be able to:

No.	CLO	Domain	Taxonomy Level	PLO
1	Describe basic concepts of GIS, use of map projections and coordinate systems for geospatial mapping	Cognitive	2	1
2	Describe spatial data models and data acquisition, sources of data and visualizing data	Cognitive	2	1
3	Apply the theoretical knowledge to practice different spatial data models in GIS environment.	Cognitive	3	5

TOPICS COVERED:

Theory:

Week	Topic
1	Introduction to GIS, elements, and components
2	Vector Data Models, Geo relational vector data model.
3	Object based vector data model
4	Raster Data Model, Types of raster data model
5-6	Raster data structure, compression, and conversion
7	Data Acquisition, Existing GIS data, Meta data
8	Creating new data and its conversion
9	Coordinates and Map projections
10	Georeferencing
11	Spatial Data Editing
12-13	Attribute data input and management
14	Geocoding
15	Visualization of geospatial data
16	Data Exploration, Overview of GIS Application
17-18	**ESE**

PRACTICAL APPLICATION

Practical's of this course enable the students to sharpen their skills in visualizing managing and exploring different spatial data models in commercial and open-source GIS software. Learn to manage and generate new spatial and non-spatial data.

Practicals:

Labs	Topic
1	Introduction to GIS Softwares.
2	Data File Structure of Coverage and Shapefile, Regions and Routs, TIN.
3	Raster data structures
4	Creating new Geodatabase, Feature dataset and Feature Class
5-6	On-Screen Digitizing
7	Rasterization/Vectorization
8	Projection and Reprojection
9	Georeferencing
10-11	Spatial data editing
12-13	Enter Attribute data of a Geodatabase Feature Class, Join and Relate Tables
14	Geocoding
15-16	Data exploration by vector and raster data model queries
17-18	**ESE**

TEXT AND MATERIAL:

Textbook (s):

a. Introduction to Geographical Information Systems (8th edition) by Kang-Tsung Chang, 2012

References Material:

a. Getting to Know ArcGIS Desktop by Tim Ormsby, Eileen J. Napoleon, Robert Burke and Carolyn Groessl, 2010 ISBN: 1589482603
b. Geographic Information Systems: A Management Perspective, (5th Edition) by Aronoff, S., 2004, WDL Publications, Ottawa, ISBN : 0912804008.
c. Getting started with Geographic Information System, (2nd Edition) by Clarke, K., 2004, Prentice Hall, New York, ISBN – 1879102897.
d. An introduction to Geographic Information System, (2nd Edition) by Heywood, I., Cornelius, S. and Carver, S., 2003, Addison Wesley Longman, New York, ISBN : 0130611980.
e. Principles of Geographic Information Systems for Land Resources Management (2nd Edition)by Burrough, P. 2002, Oxford University Press, Oxford, ISBN : 0198233655.
f. Principles of Geographic Information Systems by McDonald, R. and Burrough, P., 2001, Oxford University Press, Oxford, ISBN : 0198233855.
g. The history of Geographic Information SystembyForesman, T., 1997,Prentice Hall, New York. ISBN : 0138621454.

ASSESMENT SYSTEM:

1. **CLOs Assessment**

Cognitive	**Psychomotor**	**Affective**
Spreadsheet	-	-

2. **Relative Grading**

Theoretical/Instruction			67%
	Assignments10%		
	Quizzes10%		
	Mid Semester Exam30%		
	End Semester Exam50%		
Practical Work			33%
Laboratory Work		*70%*	
	Laboratory Attendance20%		
	Laboratory Report20%		
	Laboratory Quiz30%		
Viva/Quiz		*30%*	
Total			**100%**