

COURSE CODE: GIE-471
COURSE NAME: GIS PROGRAMMING
CREDIT HOURS: Theory = 02
 Practical = 01
 Total = 03
CONTACT HOURS: Theory = 32
 Practical = 48
 Total = 80
PREREQUISITE: Nil

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 mainly designed to provide introduction to GIS programming.

COURSE OBJECTIVES:

To provide a foundation for customized geospatial applications using programming platforms such as Python and JAVA.

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

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

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|---|----------------------------------|-------------------------------------|----|-----------------------------------------|--------------------------|
| 1 | Engineering Knowledge: | <input checked="" type="checkbox"/> | 7 | Ethics: | <input type="checkbox"/> |
| 2 | Problem Analysis: | <input type="checkbox"/> | 8 | Individual and Collaborative Team Work: | <input type="checkbox"/> |
| 3 | Design/Development of Solutions: | <input checked="" type="checkbox"/> | 9 | Communication: | <input type="checkbox"/> |
| 4 | Investigation: | <input type="checkbox"/> | 10 | Project Management: | <input type="checkbox"/> |
| 5 | Tool Usage: | <input checked="" type="checkbox"/> | 11 | Lifelong Learning: | <input type="checkbox"/> |
| 6 | The Engineer and Society: | <input type="checkbox"/> | | | |

COURSE LEARNING OUTCOMES:

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

No.	CLO	Domain	Taxonomy Level	PLO
1	Demonstrate theoretical background and advanced level concept of GIS programming	Cognitive	2	1
2	Design a structured and well documented GIS programs	Cognitive	5	3
3	Develop a complete application using GIS programming	Cognitive	5	5

TOPICS COVERED:

Theory:

Week	Topics
1	Fundamentals of geo-processing, Fundamentals of Python
2	Usage of variables and special datatypes, Naming conventions and reserved words
3	testing and printing variable values, Looping and control structures
4	Debugging, optional and required parameters
5-6	Objects, properties and methods, the OO paradigm
7-8	Object Model Diagrams, The geo-processor object introduction
9	Functions and parameters, passing and returning values, Multiple inputs and complex parameter passing
10-11	Selections and sets, SQL basics, Writing results to disk, various formats, and switches
12-13	Advanced topics and further directions
14	Num.py for numerical modeling
15	Java Topology Suite
16	Architecture of ArcObjects
17	Main ArcObjects classes, classes, and interfaces (Feature Layer, Feature Class, Feature, Feature Cursor, etc.) other useful modules
18	ESE

Practical:

No.	Topics
1	Looping statements
2	Getting and setting object parameters
3	Creating features and feature classes
4	Editing layer's display properties
5	Changing/editing and summarizing attribute data
6	Exploring the geo-processor object,
7	Java Topology Suite
8	Looping statements
9	Getting and setting object parameters
10	Projects

Books:

Text

- Eric Pimpler (2013), "Programming ArcGIS 10.1 with Python Cookbook".

Reference Books

- Bugg, K.E. (2003), "GIS Programming: Prepare for the Gathering Storm", GEO World.
- Kropla, B. (2005), "Beginning MapServer: Open Source GIS Development", 1st Edition, Apress, Co. ISBN: 1590594908
- Ralston, B. A. (2001), "Developing GIS Solutions with Map Objects and Visual Basic", Onword Press, New York. ISBN: 0766854388
- Rigaux, P., Scholl, M. and Voisard, A. (2001), "Spatial Databases: With Application to GIS" 1st Edition, Morgan Kaufmann. ISBN: 1558605886.

ASSESSMENT SYSTEM:

1. CLOs Assessment

Cognitive	Psychomotor	Affective
Spreadsheet	Rubrics	Rubrics

2. Relative Grading

Theoretical / Instruction			67%
	<i>Assignments 10%</i>		
	<i>Quizzes 10%</i>		
	<i>Mid Semester Exam 30%</i>		
	<i>End Semester Exam 50%</i>		
Practical Work			33%
<i>Laboratory Work</i>		70%	
	<i>Laboratory Assignment 70%</i>		
	<i>Semester Project 30%</i>		
<i>Viva/Quiz</i>		30%	
Total			100%