

Academic Course Description

<p style="margin: 0;">BHARATH UNIVERSITY</p> <p style="margin: 0;">Faculty of Engineering and Technology</p> <p style="margin: 0;">Department of Civil Engineering</p> <p style="margin: 0;">BCE095 Geographic Information System</p> <p style="margin: 0;">Eighth Semester, 2016 -17 (Even Semester)</p>

Course (catalog) description

The purpose of this course is to introduce the students the basic concepts and principles of various components of remote sensing and also provide an exposure to GIS and its practical applications in civil engineering.

Compulsory/Elective course : Compulsory for Civil students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Dr.S. Buvaneshwari, Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Dr.S. Buvaneshwari	Fourth year Civil	Civil Block			9.00 - 9.50 AM
A.Ambica	Fourth year Civil	Civil Block		ambicacivil@bharathuniv.ac.in	

Relationship to other courses:

Pre –requisites : Remote Sensing and GIS
 Assumed knowledge : Basic knowledge in Maths and Physics

Following courses : Hydrology, Ground water Engineering, Coastal Engineering

Syllabus Contents

UNIT I INTRODUCTION 9

Definition – Map and amp analysis – Automated cartography, History and development of GIS. Hardware requirement -system concepts Coordinate systems - Standard GIS packages.

UNIT II DATA ENTRY, STORAGE & MAINTENANCE 9

Type of data. Spatial and non-spatial data – Data structure – points – Lines – polygon - Vector and raster Files and data formats-Data compression.

UNIT III DATA ANALYSIS OF MODELING 9

Spatial analysis - Data retrieval- Query Simple analysis- Record overlay- vector data analysis-raster data analysis - Modeling in GIS-Digital elevation model- DTM cost and path analysis -Artificial intelligenceExpert system.

UNIT IV DATA OUTPUT & ERROR ANALYSIS 9

Types of output data – Display on screen – Printer – Plotter – Other output devices – Sources of errors – Types of error – Elimination. Accuracies.

UNIT V APPLICATION**9**

GIS Application: Application areas – Resources management – Agriculture Soil – Water Resources management – Cadestral records and US – Integrated remote sensing application with GLS – Knowledge based techniques

TEXT BOOKS:

1. Anji Reddy, "Remote Sensing and Geographical Information Systems", BS Publications 2001

REFERENCE:

1. Chester (England), Geo informational System, Application of GIS and Related Spatial Information
2. Burrough .P.A, "Principles of GIS for Land Resources Assessment", Oxford Publication,2000.
3. Jeffrey Star and Join Estes, "Geographical Information System An Introduction" – Prentice Hall,1990.

Computer usage: Image Analysis using GIS software

Professional component

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

Broad area: Environmental Applications

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 1 st week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2 nd week	Session 15 to 28	2 Periods
3	Model Test	April 1 st week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To introduce the students to the basic concepts and principles of various components of remote sensing. To provide an exposure to GIS and its practical applications in civil engineering	Correlates to program outcome		
	H	M	L
1. To procure knowledge about History and development of GIS.	d,e,i	a	
2. Apply the concept of Data Entry, Storage & Maintenance	d,e,i	a	
3. Apply the concepts of DBMS in GIS.	d,e,i	a	
4. Analyze raster and vector data and modeling in GIS.	d,e,i	a	
5. Apply GIS in land use, disaster management, ITS and resource information system.	d,e,i	a	

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I INTRODUCTION			
1.	Definition	No	[T1, R1&R2]
2.	Map and its analysis	No	
3.	Automated cartography	No	
4.	History and development of GIS	No	
5.	Hardware requirement	No	
6.	system concepts	No	
7.	Coordinate systems	No	
8.	Projections	No	
9.	Standard GIS packages.	No	
UNIT II DATA ENTRY, STORAGE & MAINTENANCE			
10.	Type of data-Spatial and non-spatial data	No	[T1, R1&R2]
11.	Data structure- points – Lines – polygon	No	
12.	Data structure-Raster	No	
13.	Data structure-Vector	No	
14.	Raster File Formats	No	
15.	Vector File Formats	No	
16.	Comparison of Raster and Vector data structure	No	
17.	Data compression Techniques	No	
18.	Data compression Techniques	No	
UNIT III DATA ANALYSIS AND MODELING			
19.	Spatial analysis	No	[T1, R2& R3]
20.	Data retrieval	No	
21.	Query Simple analysis	No	
22.	Record overlay	No	
23.	Vector data analysis	No	
24.	Raster data analysis	No	
25.	Modeling in GIS- Digital elevation model	No	
26.	DIM cost and path analysis	No	
27.	Artificial intelligence & Expert system.	No	

UNIT IV	DATA OUTPUT & ERROR ANALYSIS		
28.	Types of output data	No	[T1, R2&R3]
29.	Display on screen – Printer – Plotter	No	
30.	Other output devices	No	
31.	Other output devices	No	
32.	Sources of Errors	No	
33.	Other output devices	No	
34.	Other output devices	No	
35.	Elimination Accuracies	No	
36.	Elimination Accuracies	No	
UNIT V	APPLICATION		
37.	GIS Application	No	[T1, R1 & R2]
38.	Resources management	No	
39.	Agriculture Soil	Yes	
40.	Water Resources management	Yes	
41.	Cadastral records and US	No	
42.	Integrated remote sensing application with GIS	No	
43.	Application of Remote Sensing and GIS Flood Management	No	
44.	Application of Remote Sensing and GIS -Urban Studies	No	
45.	Knowledge based techniques	No	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by: Dr.S. Buvaneshwari, Professor , Department of Civil

Dated :

Addendum**ABET Outcomes expected of graduates of B.Tech / Civil / program by the time that they graduate:**

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives**PEO1: PREPARATION**

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

PEO2: CORE COMPETENCE

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

PEO3: PROFESSIONALISM

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

PEO4: SKILL

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

Course Teacher	Signature
Dr.S. Buvaneshwari	
Ms.A.Ambica	

Course Coordinator

HOD/CIVIL