Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2022-23

Course Information

Programme	B.Tech. (Information Technology)
Class, Semester	Final Year, B. Tech. , Sem-VIII
Course Code	
Course Name	Professional Elective -5: Geographical Information System
Desired Requisites:	-

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
	-	**Credits: 3**			

Course Objectives

1	To make students able to describe, GIS.
2	To introduce GIS data structures, data capture, storage, analysis and the use.
3	To impart typical uses of GIS in business, government, and resource management

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Distinguish spatial and non-spatial characteristics of GIS data	II	Understanding
CO2	Examine the data quality issues and performance for GIS data	III	Applying
CO3	Design a GIS application for real time system	VI	Creating

Module	**Module Contents**	**Hours**
I	**Module 1: Introduction to GIS** Introduction to GIS, components of GIS, Real World to Digital World through GIS, GIS data and structures, representing the Real World.	7
II	**Module 2: Georeferencing and Map Projections** Georeferencing, Relative and Discrete Referencing, levation models, Coordinate Systems, Maps and Numbering, Map Projections.	6
III	**Module 3: Data Quality and Measures** Positional Accuracy and Source of Errors, Classification Accuracy and Pixel Errors, Spatial Data Editing and Transformations, data model and comparisons.	6
IV	**Module 4: Remote Sensing and GPS and Database systems:** Introduction to Remote Sensing, RS-working, satellites, and GPS, GPS: Working and Signals , GPS errors Introduction to database, Database Management System - Introduction, DBMS models, Normalization forms, Creating and Maintaining a database, Spatial Database systems.	7
V	**Module 5: Spatial Query and analysis** Spatial Query - Introduction, Spatial analysis, Raster and vector data analysis, Overlay operations, Basic spatial analysis, advanced spatial analysis.	6
VI	**Module 6: GIS Data Standard and Infrastructure** Open Source GIS Softwares- Introduction, PROS & CONS of open source, GIS Data Standards, Open Geospatial Consortium (OGC), National Spatial Data Infrastructure (NSDI), Introduction to Web GIS and Geoserver.	7

Text Books

1	Ian HeyWood, Sarah Cornelius and Steve Carver, "*An Introduction to Geographical Information Systems",* Pearson Education, 2nd Edition, 2006
2	Kang-tsung Chang , "*Introduction to Geographic Information Systems*", Tata McGrawHill, 4th Edition, 2007
References	
1	Peter A. Burrough, Rachael A. McDonnell and Christopher D. Lloyd "*Principles of Geographical Information System*", Oxford University Press, 2016
2	Keith C. Clarke, Bradley O. Parks, and Michael P. Crane, "*Geographical Information Systems and Environmental Modeling*", Prentice-Hall India, 2001
3	Michael N. Demers , "*Fundamentals of Geographic Information Systems*", 4th Edition, Wiley Publication 2008,
4	Chor Pang Lo , "*Concepts and Techniques of Geographic Information Systems*", Pearson Prentice Hall, 2007
Useful Links	
1	https://nptel.ac.in/courses/107/105/107105088/
2	https://nptel.ac.in/courses/105/107/105107206/
3	https://nptel.ac.in/courses/105/107/105107155/
4	

CO-PO Mapping															
	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3							1					2		
CO2		1													
CO3	2		2											1	
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.															

Assessment
The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3. ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO. ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)