| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| ITC8043 | Geographical Information Systems | 4 | - | - | 4 | - | - | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | MSE | | ESE | | | |
| | | 10 | 30 | | 100 (60%Weightage) | | | |

| Pre-requisite Course Codes | | |
|---|---|---|
| After successful completion of the course, student will be able to: | | |
| Course Outcomes | CO1 | Apply the knowledge of science for real world applications in GIS. |
| | CO2 | Design and conduct experiments as well as analyze, interpret the geospatial data using GIS tools |
| | CO3 | Function with multidisciplinary Teams. |
| | CO4 | Use the techniques, skills and modern engineering tools necessary for engineering practice. |
| | CO5 | Adapt to Open source standards |

| Module No. | Unit No. | Details of Topic | Refer. | Hrs. |
|---|---|---|---|---|
| 1.0 | | **Fundamentals of GIS** | 1,2 | 06 |
| | 1.1 | Introduction, Definition of GIS, Evolution of GIS ,components of GIS, | | |
| | 1.2 | Geospatial Data, Geographic Coordinate System, Map Projections, Commonly Used Map Projections, UTM grid system, Map Scale | | |
| | 1.3 | Cartographic Symbolization, Types of Maps, Typography, Map Design ,Map Production | | |
| 2.0 | | **Data Management, Models and Quality Issues** | 1,2 | 06 |
| | 2.1 | Vector Model : Topology, Non topological Vector models, Attribute Data in GIS, Attribute Data Entry, Vector Data<br>Query, Manipulation of Fields and Attribute Data | | |
| | 2.2 | Raster Data Model : Elements of Raster Data Model, Types of Raster Data, Raster Data Structure, Raster Data Query, Data Compression, Data Conversion, Integration of Raster and Vector data | | |

| | | | | |
|---|---|---|---|---|
| | 2.3 | Data input and editing, Data quality Issues: Accuracy, Consistency, Precision and Resolution, Completeness ;sources of error in GIS | | |
| **3.0** | | **GIS Data Exploration Analysis and Visualization** | 2,4 | 2+2+4+ |
| | 3.1 | Data exploration: Descriptive statistics, Graphs, Dynamic Graphics | | |
| | 3.2 | Vector Data Analysis: Buffering, Overlay, Distance Measurement, Pattern Analysis, Map Manipulation | | |
| | 3.3 | Raster Data Analysis :Local Operations ,Neighborhood Operations, Zonal Operations, Data Extraction, Data Generalization, Comparison of Vector and Raster Based Data | | |
| | 3.4 | Spatial Interpolation: Elements of Spatial Interpolation, Global methods, Local Methods, Kriging, Comparison of | | |
| **4.0** | | **Terrain mapping, Geo coding and Segmentation** | 3,4 | 04 |
| | 4.1 | Terrain Mapping and Analysis: Data for Terrain Mapping and Analysis: DIM, TIN, Terrain Mapping, Slope and Geo coding and Dynamic | | |
| | 4.2 | Geo coding, Applications of Geo coding, Dynamic Segmentation, Applications of Dynamic Segmentation. | | |
| **5.0** | | **Remote Sensing Fundamentals** | 2,3 | 12 |
| | 5.1 | Remote Sensing :Basic Principles, Electromagnetic Remote Sensing, Energy Sources, Energy Interactions with Surface Materials, , Energy Interactions with Earth's Atmosphere, Spectral Reflectance Curves | | |
| | 5.2 | Microwave Remote Sensing, The Radar Principle, Factors Affecting Microwave Measurements, Radar Wavebands, SLAR Systems, SAR, Interpreting SAR Images, Geometrical Characteristics, Remote Sensing, Platform and Sensors, Satellite System Parameters, Sensor Parameters, Imaging Sensor Systems, Earth Resources Satellites, Meteorological Satellites. Data | | |
| | 5.3 | Visual Image Interpretation :Information Extraction By human and Computer, Remote sensing Data Products, | | |
| **6.0** | | **Project Management** | 4,7 | 04 |
| | 6.1 | Planning of Project , Implementation of Project, Management of Project, Case study | | |

| | | | | |
|---|---|---|---|---|
| **7.0** | | **Modern trends and Applications of GIS** | 6,7 | 04 |
| | 7.1 | Multimedia GIS, Internet GIS, Mobile GIS**,** Applications of GIS in Urban and municipal area | | |

**References**


1. Kang-tsung Chang," *Introduction to Geographical Information Systems*", Third Edition, 2003,Tata McGraw Hill.
2. M. Anji Reddi, "*Remote Sensing and Geographical Information Systems*", Second Edition, 2001, B. S. Publications.
3. Basudeb Bhatta ,"*Remote Sensing and GIS*", 2nd edition, Oxford University Press.
4. Ian Heywood, Sarah Cornelius & etal , *"An Introduction to Geographical Information Systems*", 2nd Edition, Pearson Education.
5. A.M. Chandra and S.K. Ghosh, "*Remote Sensing and Geographical Information Systems*", Narosa Publishing House Pvt ltd.
6. Peter A Burroughand Mc Donell , "*Principles of Geographical Information Systems*", Oxford UniversityPress,1998.
7. M. N. DeMers," *Fundamentals of GeographicInformationSystems",*3rdedition, Wiley.
8. George BKorte, " *The GIS Book*", On word press, Thomson Learning, 5thEdition, 2003
9. Tor Bernhardsen,"*Geographic Information Systems–An Introduction*", 3rd edition, Wiley Publications
10. Grigore Burdea, Philippe Coiffet, "*Virtual Reality Technology*", Wiley.
11. Steven Harrington, *"Computer Graphics*", McGraw Hill.
12. Rogers, "*Procedural Elements of Computer Graphics*", Tata McGraw Hill.
13. Vince, "*Virtual Reality Systems*", Pearson Education.
14. F.S. Hill , Stephen M. Kelley , "*Computer Graphics using Open GL*" Prentice Hall