

GIS 453: ADVANCED GIS		
Unit 1	GIS Data and Analysis: Spatial Analysis:-Classification, Overlay analysis , Proximity Analysis, Polygon Neighborhoods, Data analyzing operations in GIS, Buffering and neighboring functions, integrated data, raster and vector overlay method, problems of vector and raster overlay, spatial interpolation GIS for surface analysis and network analysis.	06 hrs
Unit 2	Introduction to modeling in ArcGIS Concepts of 3D models: Suitable Site selection – Simple overlay analysis, multi-criteria analysis, View shed analysis, Flood analysis, Sun shadow volume analysis, Using Model Builder. Grid based spatial analysis – local, focal, zonal, and global function (Neighborhood analysis).	06 hrs
Unit 3	Topology and network analysis: Topology – Types of Errors, Editing and Error Rectification, Types of Topology, Modeling topological Relationships, Network connectivity rules, Finding Shortest Route, Creating Geometric network, creating and building a network dataset. Applications of network analysis. Geovisualization; GIS classification methods, Image Classification.	06 hrs
Unit 4	Spatial Statistical Modeling: Identification of Central feature, directional distribution, mean center, median center, linear directional mean, standard distance, hot-spot analysis, correlation, raster calculator and Boolean operation. Geostatistics - Pattern Analysis, Measures of Arrangements & dispersion, Spatial Auto Correlation, Kriging.	06 hrs
Unit 5	Decision Support Systems (DSS): Concepts of decision making, systems and modeling, Need for DSS. Concepts of multicriteria decision making.	06 hrs
Unit 6	Web GIS: Definition, concept and history of Web GIS, components of web and internet GIS, advantages and limitations of web GIS. Web mapping: Static and interactive web mapping, open GIS web map server. Geographic Markup Language - principles and characteristics, commercial web mapping programs. Functions of Web GIS: Display of general information for the public, display of planning information, interactive display of spatial information, sharing and distribution of spatial data as well as management of spatial data. Open Source GIS and its components.	06 hrs
Unit 7	Open source GIS platforms, software, Libraries - GRASS GIS, Cloud GIS, QGIS, Application of Open source GIS, Arc GIS.	06 hrs
Unit 8	Applications of GIS in various fields of Geoinformatics.	06 hrs

References

1. Bonham – Carter G.F. (1994). Geographic Information System for Geoscientists, Pergamon Press, Tarrytown, New York.
2. Burough, P.A. and Rachael A. McDonnell (1998). Principles of Geographic Information System, Oxford University Press (Indian Print).
3. Demers, Michael (1999). Fundamental of Geographic Information System, John Wiley, (Indian Print).
4. Fraser Taylor, P.A. (1991). Geographic Information System – The Microcomputer and Modern Cartography, Pergamon Press.
5. Heywood, Cernelin and Carven (1998). An Introduction to Geographic Information System by, Prentice Hall.
6. Keaies, J.S. (1973). Cartographic design and Production London, Longman group.
7. Les Worell, (1990). Geographic Information System, Development and Applications, Belbaven Press.
8. Longley, P. A., Maguire, D. J., Goodchild, M. F and Rhind, D. W. (2001). GIS Principles Techniques, Applications and Managements, Longman Scientific and Technical (very Expensive Book).
9. Maguire, D. J. Goodchild, M. F., and Rhind, D. W. (1991). GIS- Principles and Application, Longman Scientific and Technical.

