Unit 8	**Digital Image Classification:** Classification scheme; Supervised classification, Training sites selection and statistical information extraction; Discriminant functions; Maximum Likelihood classifier, Euclidian distance, Mahalanobis distance; Unsupervised classification, classification accuracy assessment, Error Matrix.	06 hrs

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1. Bracewell, R.O. (1978). The Fourier transform and its application 2nd edition Mc Grew-Hill NY
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3. Fu, K.S. (1974). Syntactic Method in pattern recognition. Academic.
4. Drury, S. A. (1987). Image Interpretation in Geology, Allan & Unwin - Publ. Ltd, 23-67.
5. Kenneth R, Castle man, (1979). Digital Image Processing, Prentice Hall, 24-98.
6. Lillies and T.M. & Kiefer R.W. (1994). Remote Sensing and Image Interpretation, John Wiley & Sons, New York, 56-78.
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GIS 453: ADVANCED GIS

Skills, employability and entrepreneurship: This is the most important course for students to study advanced with the help of advanced software and computer programs. There is a good scope of this course for students who can work as geoinformatician, GIS engineer in government organizations like ISRO, IIRS, KSRSAC, INCOIS etc., and in private institutions such as disaster management organizations and MNCs. Students can also open their own start-up companies.

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 overly 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

BIBLIOGRAPHY

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).
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