

MGS 505: GIS AND GPS

Skills, employability and entrepreneurship: These are advanced as well applied subjects in terms of not only studying the entire earth science, but also all aspects of spatio-temporal data of any discipline. With the help of computers, and allied systems with advanced software's and programs, huge data collected over time can be analyzed find out the complex trends in the future. Data There is good scope of this subject in terms of almost absolute employability in different organizations related to human resource development as well as private firms and MNCs. Students can start their entrepreneurship.

Geographical Information System

Unit 1	Introduction: Data and information: Types of data - spatial and time variant. Geographical Information System (GIS): Introduction, fundamentals and functions of GIS. Components of GIS. Generation of database, Database Management System (DBMS) , DBMS Architecture and Model. Map Concept: Map features, scale, resolution and accuracy. Map Projection: Earth's size and shape in time and space. Spherical coordinates, Properties of map projections, Types of basic projections classification - Cylindrical, Conical and Azimuthal projections. UTM Coordinates.	8 hrs
Unit 2	Spatial Data Models:Raster and Vector models. Advantages and Disadvantages of Raster and Vector Models. Digitization, editing, topology creation and structuring of map data. Data quality and errors: Importance of Errors, Accuracy and Precision, Types of Errors, Sources of Inaccuracy and Imprecision, Problems of Propagation and Cascading, False precision and false accuracy, and dangers of undocumented data.	8 hrs
Unit 3	Spatial Analysis:Introduction, significance of spatial Analysis, spatial analysis tools in GIS. Vector Based - Various types of overlay analysis operations: Topological overlays, Polygon-in-polygon overlay, line-in-polygon overlay, Point-in-polygon overlay, Logical operations (Boolean operations), Conditional operations, Buffer analysis, Steps for performing Geographic analysis. Raster Based - Introduction, Advantages and disadvantages of raster analysis, Grid operations used in map algebra, important raster analysis operations, Grid based spatial analysis. Digital Elevation and Terrain Models (DEM and DTM): Generation and structure of DEM/DTM and their applications. Geospatial Triangulated Irregular Network (TIN) model. Introduction to network analysis and its Applications.	16 hrs
Unit 4	Global Positioning System (GPS): GPS system segments, GPS satellites and receivers. GPS-Error sources, Measurements, Accuracy and estimates of user position and time. Applicationand limitations of GPS.	8 hrs

	Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum.	
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List of References:

- 1) Remote Sensing and Image Interpretation – T. M. Lillesand and R. W. Kiefer – John Wiley and Sons.
- 2) Remote Sensing and Photogrammetry, vol. 1 and vol. 2 – M. L. Jhanwar and T. S. Chouhan – VignanPrakasan, Jaipur
- 3) Applied Remote Sensing and Photo Interpretation – T. S. Chouhan and K. N. Joshi – VignanPrakasan, Jaipur
- 4) Remote Sensing in Geology – P. S. Siegal and A. R. Gillespie – John Wiley
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- 6) Remote Sensing – Sabins, John Wiley and Sons
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- 8) Geographical Information System: A Guide to Technology – John C. Antenucci – Van Norstrand Reinhold Publications
- 9) Principles of Geographical Information System for Land Resource Assessment – P. A. Burrough – Oxford University Press
- 10) Computers: Concepts and Uses – Mary Summer - Prentice Hall
- 11) The Hardware Bible – Winn L. Roseh – BPB Publications, New Delhi.
- 12) Computer Fundamentals - P K Sinha BPB
- 13) Introduction to computers - N Subramanian TMH
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- 19) Computers today - Suresh K BasandraGalgotia
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- 21) Outline of theory and problems of data processing - Martin M Schaum's
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- 24) Photogeology and Image Interpretation – Shiv N. Pandey – Wiley Eastern, New Delhi
- 25) Fundamentals of Photogeology, Geomorphology – Verstappen – TTC Holland.
- 26) Elements of GPS: Nand Kishore Agrawal.
- 27) Geographic Information Analysis: Darid O, Sur - John Willey.
- 28) A Primer of GIS: Fundamental Geographic and Cartographic concept: Francis Harvey - Rawath Publisher.
- 29) Geoinformatics: G. Randy Keller and Chaithanya Bara - CUP
- 30) Remote Sensing in Geomorphology: Patrick Simon-Oxford Book Company.
- 31) Remote Sensing Techniques for Regional Development: Banarjee R. K- Concept Publishers.
- 32) Principles of Map Design: Tyner Judith A. - The Guil Ford Press.
- 33) Spatial Statistics and Spatio-Temporal Data: Covariance Functions and Directional Properties :Sheman Michael - John Velly and sons .
- 34) Remote Sensing in Geomorphology: S.M. Ramaswamy- New India.