| Course Type | Course Code | Name of the Course | L | T | P | Credits |
|---|---|---|---|---|---|---|
| DE1 | NMND502 | Geospatial Technologies for Natural Resources | 3 | 0 | 0 | 3 |

**Objective:** The course is aimed at developing skills of engineering and geoscience students in the area of Geodetic, Aerial and Remote Sensing tools and techniques including their applications in mapping, monitoring, and management of natural resources.

**Learning outcomes:** Students will learn the principles of Geographic Information Systems (GIS), Apply basic graphic and data visualization concepts such as color theory, symbolization, and use of white space, give examples of interdisciplinary applications of Geospatial Information Science and Technology, apply GIS analysis to address geospatial problems and/or research questions.

| Unit No. | Topics to be covered | Contact Hours | Learning Outcomes |
|---|---|---|---|
| I | **Advances in Geospatial Technologies**: Geodetic, Aerial and Remote Sensing | 6 | Students will have knowledge on Remote Sensing and Geographic Information System for Natural Resources Management |
| II | **Geospatial Data Acquisition, Processing and Representation**: Computer Aided Tool & Techniques for Preparation of Maps Plans, Contours, Sections, Estimation of Earthworks | 6 | Students will understand the Recent Trends in Natural Resources Inventory, Mapping and Monitoring |
| III | **Geo-Referencing and Digitization** | 4 | Students will be able to understand the concepts of conversion of map transformation models and digitization. |
| IV | **Mapping and Monitoring of natural resources**: Application of GPS & GNSS in digital mapping of mining leases and forest land | 5 | Students will be able to understand the Integration of Geospatial Analysis Techniques for Natural Resources Management |
| V | **GIS & Remote Sensing:** Application of GIS and Remote Sensing for identification, evaluation, monitoring and management of natural resources | 5 | Students will be able to understand the Land Evaluation for Sustainable Land Use Management, and Capability Assessment, Mapping of Soil Resources |
| VI | **Remote Sensing Applications** for mapping of land surface subsidence, Assessment of surface deformation & change detection, Vegetation characterization, Retrieval of soil moisture, Groundwater depletion, Detection and characterization of coal fire, Land use/Land Cover changes etc. | 10 | Students will be able to understand the Spatial & Temporal Variations in Cropped Area in the Thar Desert, Landslide Hazards Zonation & its Management using Remote Sensing and GIS |
| VI | **Management of Natural Resources**: Geoscience, Hydrology, Land, and Vegetation Ecology. | 6 | Students will be able to analyse the Site Suitability Modeling for Future Urban Development using MCDM- Analytic Hierarchy Process, Multi-Temporal Satellite Data for Wastelands Monitoring, Land Degradation Mapping Using Geospatial Technologies. |
| | **Total:** | 42 | |

**Text Book**

1. Rencz, Andrew B. (Editor-in-Chief) (2004), "Remote Sensing for Natural Resource Management and Environmental Modeling", Manual of Remote Sensing, Vol. 4. John Wiley.

**References:**

1. Mahesh Gaur, C.B. Pandey and R.K. Goyal "Remote Sensing for Natural Resource Management & Monitoring"
2. Lecture Notes by Faculty.