GIP 455: GEOMORPHOLOGY AND GEOSTATISTICS (Lab S)

Skills, employability and entrepreneurship: Studying these courses will help to students learn to analyze and create thematic maps about landforms, geomorphological maps. The SPSS software is helpful to create and model for geospatial databases. Students learning these courses develop skills which are useful to work in geomorphological and environmental research laboratories of both private and government sectors.

Geomorphology	
1.	Morphometry of drainage basins. Analysis of drainage patterns and orientation structure.
2.	Preparation of DEM from topographical maps, ASTER and SRTM data.
3.	Preparation of Aspect, Shaded relief, and Slope maps from DEM.
4.	Interpretation of longitudinal and cross-valley profiles.
5.	Generation of geomorphologic maps showing fluvial, coastal/marine, denudational, volcanic and glacial land forms.
6.	Exercises related to measurements of runoff dynamics and sediment dynamics.
Geostatistics	
1.	Quartiles, Deciles and Percentages
2.	Measures of Dispersion
3.	Skewness and Kurtosis
4.	Students T test
5.	Regression and Multiple linear regression
6.	**SPSS**: Introduction to SPSS. Use of SPSS in creating a database. Applications of SPSS in Correlation Co-efficient. Use of SPSS in Linear Regression. Modeling and Prediction. Application of SPSS in GIS data modeling.

GIP 456: GIS AND DBMS (Lab S):

Skills, employability and entrepreneurship: This course is provides students with knowledge about creating number of basic and thematic maps. There is a good scope of this course where students can work as geoinformaticians and as well as data operators in disaster management sectors, government institutions, various organizations, research institutes and MNCs. Students can also open their own start-up company.

GIS	
1.	Geo-referencing – image rectification based on co-ordinate system. Onscreen digitization
2.	GIS and Remote Sensing data integration: Integration of vector and raster data (linking of spatial and non-spatial data)
3.	Extraction of Thematic maps: preparation of thematic layers-on screen from toposheets, images - Road, Settlement, Drainage, LU/LC etc.

4.	Map composition and presentation of results. Overlay and proximity analysis-clip, erase, intersect, union, buffer.
5.	Edge matching/spatial adjustment. Calculation of slope in degrees and percentages. Calculation of area, perimeter and distance using Arc GIS.
6.	Creation of 3D maps: TIN, Hill shade, Slope, and Aspect with Arc GIS.
DBMS	
1.	Outlines of DBMS and Applications of DBMS in Geoinformatics.
2.	Introduction to SQL and its application in GIS.SQL Queries (Alter, Insert, Update, Delete).
3.	Designing database: Creation of tables, inserting values in to the tables, updating the existing Value, modifying the structure of the database, Use of Drop and delete commands. Use of Numeric, Aggregate, Date, Conversion and character functions.
4.	C programming: Applications of C program in Geoinformatics.

GIE 457: GEOINFORMATICS (Open Elective)

Skills, employability and entrepreneurship: This course is open to other disciplines such as chemistry, physics, life sciences, statistics and computer sciences. Currently, remote sensing and GIS technology are being used in various disciplines. However, students can perform better in their career if they know some knowledge about this subject for interdisciplinary science. Students have employability opportunities in many branches of science in various government organizations and MNCs.

Unit 1	**Definition:** of data and information, historical evolution and need for information, Basic Concepts of Spatial Data and aspatial data, spatial information. Sources of spatial data-survey data, air photos, satellite imagesand field data.	6 hrs
Unit 2	**Scope and Importance:** of Geoinformatics; Basic concepts of Remote Sensing; aerial photography and satellite remote sensing. Indian Space Program and Indian Remote Sensing Satellites.	6 hrs
Unit 3	**Principles of Thermal and Microwave Remote Sensing:** Introduction, Black body Radiation, Temperature Radiations from the earth's surface and Applications of thermal remote sensing. Basic concepts of micro wave remote sensing, Real Aperture Radars and Synthetic Aperture Radars, Microwave sensors. Applications of Microwave Remote Sensing. Visual and digital image analysis techniques.	6 hrs
Unit 4	**Map Concept**: Map features, scale, resolution, accuracy, projection and data base extent. Map Projection and parameters: Geographical co-ordinate system, spheroid and spheres. Types of projection and parameters. Indian geodetic system and Everest spheroid, world geodeticsystem-084(WGS-084).	6 hrs
Unit 5	**Geographic Information System**: Definition, components, packages, capabilities and purpose of GIS. Spatial and non-spatial databases. Data Models: Vector and Raster models. Application and limitations of GIS.	6 hrs