5. Murthy, K. S. 1988. *National Environmental Policy Act (NEPA) Process*. CRC Press, Boca Raton USA, 1-18.
6. Ortolano, L. 1993. *Control on Project Proponents and EIA Effectiveness*. *The Environmental Professional*, Vol. 15:350-363.
7. Thornbury,W. D., 2004, *Principles of Geomorphology*, CBS Publ., 5-570.
8. Wathern, P. 1988. *EIA: Theory & Practice.* Unwin Hyman, London, 1-17.
9. Wood, C. 1995. *EIA: A Comparative Review*. Longman. 87-255.

GIP 455: GEOMORPHOLOGY AND GEOSTATISTICS (Lab S)	
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):	
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)		
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 images and 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
Unit 6	**Fundamentals of GPS:** Introduction, space segments, user segments and control segments, observation principle and signal structure, accuracy of GPS measurements, point positioning and relative positioning, methods of surveying with GPS, Static and Kinematic positioning, navigation with GPS, differential GPS, navigational receivers.	6 hrs
Unit 7	**Geoinformatics and other Information Sciences**: Geoinformatics – Spatial and Non-spatial data Management. Spatial information Technology.	6 hrs
Unit 8	**Applications of Geoinformatics**: Geoinformatics technologies. Applications in Natural Resource Management, Agriculture, Solid Waste Management, Natural Disaster Management, Coastal Zone Management.	6 hrs