

Post graduate Department of Environment Science and Management,

Sree Sankara College, Kalady

Add on Course on

INTRODUCTION TO REMOTE SENSING, GNSS AND GIS

Programme code: SSCADP22

Unit	Course Description	Hours
1	Geodetical aspects, mapping concepts and surveying	5
1.1	Earth System – Geodesy: Datum/Spheroids and coordinate systems, map projection - different projections and their characteristics	
1.2	Features on the earth’s surface: their basic properties – discrete vs continuous and geometries of representation	
1.3	Cartography: Maps – their characteristics and elements, types - Basic surveying principles and techniques: EDMs and GNSSs; GNSSs – segments, various constellations, errors, differential correction and precise positioning Map reading and interpretation Global, national and state mapping agencies and their authorized reference maps – general & thematic	
2	Remote sensing: Introduction	5
2.1	Remote sensing system – components and principles – platforms, sensors, medium, target, interactions and their characteristics including various resolutions, concept of DN value, radiance, reflectance, emission	
2.2	Electromagnetic spectrum - energy interaction with atmosphere and earth surface, atmospheric windows, spectral properties of various objects on the earth’s surface and the concept of spectral signature, active and passive remote sensing	
2.3	Space borne earth observation: various orbits and their characteristics, operations, image acquisition and various data products Indian remote sensing programme & Other satellites and sensors like Landsat, SPOT, etc.	
3	Digital Image Processing	5
3.1	Various image formats, loading and visualization – panchromatic and multispectral colour visualization – TCC and FCCs	
3.2	Image restoration – geometric, radiometric – atmospheric errors and their correction	
3.3	Image interpretation – visual and digital; visual interpretation elements and key Digital image classification – unsupervised and supervised; accuracy assessment	
4	Geographical Information System (GIS): Basics	5
4.1	Concepts, components and organisation of GIS Representing & modelling spatial features and processes - vector and raster structures, relationship between features – topology; raster data compressions and storage formats	

4.2	Non-spatial/attribute Database Management Systems (DBMS), significance of DBMS, principles, data types, models – RDBMS, data storage, query and retrieval	
4.3	Basic GIS functions: data inputting methods & various data sources, data management, data manipulation and geographic analysis and output presentation	
5	Global Navigational Satellite Systems: Basics	
5.1	Basic concepts of Global Navigational Satellite Systems (GNSSs): History and timeline, overview. Components of GNSSs (Space Segment, Control Segment, User Segment),GPS working principle, -	5
5.2	GPS (Global positioning System), - GLONASS, Galileo , BeiDou, NavIC, GPS signals (L1 and L2 Frequencies)/ Course-Acquisition (C/A) code Precision (P) code,	
6	Geographic analysis and modelling	
6.1	Exploration, query, vector spatial analysis & reprocessing – extraction, proximity, overlay	5
6.2	Raster based spatial modeling and analysis – density, distance, map algebra – arithmetic & weighted overlay: multi-criteria decision making	
6.3	Surface modeling and analysis: DEM creation – input sources, interpolation; slope, aspect, volume, profile, hillshade, viewshed, visibility, contouring	

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