

**SHORT-TERM COURSE IN GEOINFORMATION SCIENCE AND TECHNOLOGY****DR. R. SATHEESH CENTRE FOR REMOTE SENSING & GIS***(Supported under NNRMS-SC-T Programme of Govt. of India led by ISRO, Dept. of Space)**School of Environmental Sciences, Mahatma Gandhi University, Kottayam, Kerala***MODULE I: GEODESY AND COMPUTER FUNDAMENTALS**

<b>1</b>	<b>Mapping concepts</b>	Introduction and basic concepts of maps (types, characteristics, elements, map projections)
		Geodesy
		Coordinate systems - positions & datum, Spheroids
		Toposheets
<b>2</b>	<b>Fundamentals of Computer Science</b>	History and evolution of computer
		Hardware and software; overview
		Introduction to computer generation and networking

**MODULE II: GEOGRAPHICAL INFORMATION SYSTEM**

<b>3</b>	<b>Introduction to Geoinformatics</b>	Fundamental concepts, principles, components & functions
		Different types of GIS
		Application in various areas with cases studies
		Geographic phenomena - spatial and non-spatial data concepts (DBMS, RDBMS)
		Geographic data structures, compression/storage techniques & formats
		Various methods & processing steps Data inputting, topology creation, editing, attribute coding Projections & datum transformations
<b>4</b>	<b>Geospatial analysis</b>	Introductory concepts & overview
		Analysis - basic tools, steps & types
		Explorative analysis - measure, identify, find etc...
		Attribute & spatial query
		Vector analysis (extraction, proximity, overlay)
		Raster based analysis (3D analysis, IDW, Kriging etc.)
<b>5</b>	<b>Advanced GIS analysis &amp; Modelling</b>	Surface modelling & analysis
		Geostatistical analysis
		Network modelling & analysis
<b>6</b>	<b>Web/Mobile GIS</b>	Basic concepts & principles
		Working methods, configurations etc.
		Open source initiatives - tools, platforms: UMN Mapserver, Geoserver
		Web Geoservices: WMS, WFS

**MODULE III: REMOTE SENSING AND DIGITAL IMAGE PROCESSING**

<b>7</b>	<b>Remote Sensing</b>	Basic principles of RS
		Remote sensing system & its components, type of remote sensing
		EMR spectrum, Interactions with atmosphere,
		Resolutions, Spectral signature
<b>8</b>	<b>Earth observation</b>	Sensors & Platforms

		Major EO data portals
<b>9</b>	<b>Digital image processing &amp; analysis</b>	Image formats & data structures
		Image preprocessing (Radiometric & Geometric corrections)
		Image enhancements techniques ( radiometric, spatial & spectral)
		Visual interpretation ( interpretation elements & keys)
		Image classification- Supervised/ Unsupervised
		Image fusion- PAN Sharpening
		Accuracy assessment
<b>MODULE IV: GLOBAL NAVIGATIONAL SATELLITE SYSTEMS AND ADVANCED DIGITAL SURVEY</b>		
<b>10</b>	<b>Global Navigational Satellite Systems (GNSSs)</b>	History of GNSS
		Basic principles & components, Applications in various fields
		Different type of receivers, processing methods, errors & accuracy
		GPS signal characteristics, Data formats (broadcast, precise ephemeris)
		Various GNSSs in the world
<b>11</b>	<b>Advanced Geosurveying techniques</b>	Demonstrations of surveying instruments (Unmanned Aerial Vehicle (UAV)
		Total Station
		Differential Global Positioning Systems
		Compass, Omnisight, Omnislope, Distometer
<b>MODULE V: INTRODUCTIONS TO COMPUTER AIDED DESIGN</b>		
<b>12</b>	<b>Introduction to Autocad</b>	Overview of AutoCAD & drafting principles
		The interface of AutoCAD
		Drafting fundamentals: Line, circle, arc, ellipse, erase, oops
<b>13</b>	<b>Coordinate Systems &amp; Editing Fundamentals</b>	Introduction to different coordinate systems
		Perspectives, Drafting settings, Object snap, Dynamic inputs
		Limits and units
		Editing fundamentals
<b>14</b>	<b>Navigation , Selection &amp; Editing Techniques</b>	Navigation techniques
		Selection techniques
		Editing techniques
		Editing with grips
<b>15</b>	<b>Autocad data conversion</b>	Spatial data creation and conversions( to google earth, gdb)
<b>MODULE VI: PROJECT WORK</b>		
<b>16</b>	<b>Project/ Thesis work</b>	Group Project - Thesis submission, Viva voce