DEPARTMENT OF REMOTE SENSING

Ph. D. Entrance Exam Syllabus

Part-I

Fundamentals (Compulsory)

Satellite Images, Aerial Photographs & Their Interpretation, Mapping Terrain Elements, Digital Terrain Model, Components of GIS, Spatial Data Models–Raster & Vector, Topological & Non-Topological Vector Data, Map Scale, RDBMS, Global Positioning System- Segments, Signals, Geoids/Datum/Ellipsoid, Coordinate Systems, Digital Image Processing-Filtering, Band Ratio, Types of Vegetation Indices, Principal Component Analysis, Supervised & Unsupervised Classification Techniques, Object Oriented Classification, Hyper Spectral Image Analysis, Electromagnetic Radiation (EMR), Atmospheric Windows, Interaction of EMR Earth's Surface, Spectral, Spatial, Temporal & Radiometric Resolutions, Earth Resource Satellites, Concept of Thermal & Microwave Remote Sensing, Trend Surface Analysis, Regression Models, Thiessen Polygons, Interpolation, Multiple-Criteria Decision Making in Spatial Data Analysis, Basic Principles of AHP, Basic Concept of C-Language.

Part –II

Application Fields

EARTH SYSTEM SCIENCE

Lithosphere, Biosphere, Hydrosphere & Atmosphere, Igneous, Sedimentary & Metamorphic Rocks, Mineral Deposits & Their Types, Folds, Faults, Joints And Lineaments, Geomorphic Landforms, Application of Satellite Images, Drainage Patterns & their Significance, Mineral Resources, Surface Mining & Land Degradation, Fundamental Concept of Disaster Management, Geological Hazards (Remote Sensing Perspective): Landslide, Earthquake, Glacial Hazards, Hydro-Meteorological Hazards: Flash Floods, River Floods, Cyclones, Drought.

WATER RESOURCES

Hydrologic Cycle, Hydrological Parameters, Types of Aquifers, Classification of Streams & Rivers, Remote Sensing Application in Surface & Sub Surface Water Resources Evaluation, Concept of Hydrogeomorphological Mapping, Ground Water Contamination, Water Quality Monitoring through Remote Sensing, Watershed Development & Prioritization Modeling, Morphometric Parameters & Analysis, Site Selection for River Valley Projects, Surface Water Harvesting Structures, Runoff Modeling, Flood Management, Drought Management, Reservoir Sedimentation, Snowmelt Runoff Modeling, Glacier Mass Balance, Glacier Retreat & Climate Changes.

NATURAL RESOURCE MANAGEMENT

Resources Classification Systems, Crop Yield & Acreage Estimation, Disease & Stress Detection, Soil Salinity, Waterlogging & Soil Degradation, Land Capability, Land Use / Land Cover Classification, Forest Classification, Forest Density & Type, Fire Damage Assessment, Habitat Assessment, Carbon Sequestration, Primary Productivity, Sustainable Development, Ecological & Biological Aspects of Environment, Landscape Ecology, Green House Effect & Global Warming, Solid Waste Management, Environmental Impact Assessment (EIA), Non Conventional Energy Resources, Land Degradation, Desertification Assessment & Monitoring.

PLANNING AND MANAGEMENT

Urban Landuse Classification, Utility Mapping, Urban Change Detection & Urban Sprawl, Site Selection for Different Purposes, Criteria Evaluation & Land Suitability Analysis for Urban Development, Urban Information System, Regional Planning, Settlement Types & Patterns, Urban Land Use, Transportation Network, Utility-Facility Mapping, Urban Sprawl Studies, Site Selection for Urban Development, Landuse Pattern & Traffic System, Rural Network, Road Inventory on Hierarchy-Accessibility Classification, Concept of Networks & Network Models, Network Analysis, Concepts of LIS, Human Settlement Planning, Decision Support System for Urban And Regional Management.