P.G. Diploma in Remote Sensing and GIS
Distribution of Courses and Credits in Various Semesters

Semester –I

Course Code	Title	Credits
PGDRS-01	Principles of Remote Sensing	5
PGDRS-02	Fundamentals of GIS	5
PGDRS-03	Remote Sensing I (Practical)	5
PGDRS-04	GIS Analysis I (Practical)	5
	Total	**20**

Semester –II

Course Code	Title	Credits
PGDRS-01	Advances in Remote Sensing and GIS	4
PGDRS-02	Digital Image Processing	4
PGDRS-03	Remote Sensing and GIS Applications	4
PGDRS-04	Remote Sensing II (Practical) I GIS Analysis II (Practical) II	4
PGDRS-06	Project/Dissertation*	4
	Total	**20**
	Grand Total of Credits	**40**

PGDRS-01 Principles of Remote Sensing

Block-01 Basics of RS

Unit 01- Definition and Scope of Remote Sensing, Electromagnetic Radiation as Remote Sensing Medium Remote Sensing Regions and Bands;

Unit 02- Stages of Remote Sensing Interactions with atmosphere and matter

Unit 03- General Characteristics of Remote Sensing Platforms;

Unit 04- General Characteristics of Remote Sensing Sensors

Block-02 Data Characteristics of RS

Unit 01- Spectral Characteristics of Common Natural Objects; Soil, Water, Vegetation Spectral Signatures and spectral response Patterns.

Unit 02- Atmospheric Effects on Remote Sensing Data; Atmospheric Windows;

Unit 03- Resolutions of Remote Sensing Data; characteristics of Raw Remote Sensing Data, products IRS Land sat , Spot, Iknods

Block-03 Aerial Photos

Unit 01- Types and specification of Aerial photographs;

Unit 02- Scale, Resolution; Geometric properties of Single Aerial Vertical Aerial Photo;

Unit 03- Stereoscopy; Stereoscopic Parallax; Relief Displacement

Block-04 Remote Sensing Data Interpretation:

Unit 01- Nature of Qualitative Information and Sequence in Interpretation;

Unit 02- Elements of Image Interpretation;

Unit 03- Elements of Image Patterns–Landforms, Drainage, Erosion Details

Block-01 Basics of GIS

Unit 01- Definitions of GIS and Related Terms; Development of GIS;

Unit 02- Components of GIS; Geographical Data Characteristics and GIS;

Unit 03- Coordinate Systems, Datums and Projections in GIS.

Block-02 Data Structures and Data Base Design

Unit 01- Digital representation of Geographic Data; Raster and Vector models for Geographic Data Representation and Conversion;

Unit 02- Digitization—Methods and Errors; Topology Building;

Unit 03- GIS Data Standards—Concepts and Components

Unit 04- Data and Information Sources for GIS; GIS Data Base Management Modelling;

Unit 05- Spatial Data Quality and Error Analysis; GIS Customization.

Block-03 Application Methodologies

Unit 01- Spatial Analysis through GIS; DEM/DTM and Derivatives;

Unit 02- Remote Sensing Data and GIS Integration;

Unit 03- GIS Project Design and Planning Methodologies;

Unit 04- GIS Information Products.

PGDRS-03 Remote Sensing Practical -I

Block-01 Interpretation of Aerial Photographs

Unit 01- Stereo test, Orientation of stereopair under mirror stereoscope.

Unit 02- Use of auxiliary information   in object Identification, interpretation of
stereopair   for physical and cultural features .

Unit 03- Preparation of land use/land cover classification system based on aerial
photographs .

Unit 04- Delineation interpretation and mapping of general land use.

Block-02 Interpretation of Satellite Imageries

Unit 01- Referencing and layout of satellite imageries.
Unit 02- Identification of objects/beaters on multi-band imagers and FCC.
Unit 03- Interpretation of physical and cultural featers from IRS imagery.
Unit 04- Delineation interpretation and mapping of land uses/land cover using
FCCS.

PGDRS-04 GIS PRACTICAL

Geographical Information System (GIS) & GPS Practical-I

Block-1 Introduction to Computers & GIS

Unit-1: Introduction to computers, Basics of operating system: DOS and Windows;

Unit-2: Hardware and software requirements of GIS;

Unit-3: Introduction to GIS Software,

Block-2 Data Base Creation

Unit-1: Spatial data input and Geo-referencing;

Unit-2: Spatial data base creation; Creation of non-spatial data base;

Unit-3: Linking of Spatial data with non-spatial data sets.

Block-3 Spatial Analysis

Unit-1: Thematic mapping and Over lay;

Unit-2: 3D modeling: DEM, Slope and Aspect,

Unit-3: Buffer , proximity analysis;

Unit-4: Output and report generation;

Block-3 Global Positioning System

Unit-1: Demonstration on GPS; Selection of datum, units and scale;

Unit-2: GPS measurement: Collection of GCPs; Mobile mapping;

Unit-3: Transfer of GPS data in to GIS platform.

SECOND SEMESTER

PGDRS-05 Advances in Remote Sensing and GIS

Block-01 Thermal and Microwave Remote Sensing

Unit-1: Thermal Spectrum application of funnel image   Factors affecting Thermal Image

Unit-2: Thermal Data Interpretation—Qualitative and Quantitative;

Unit-3: Principles of Microwave Remote Sensing; Characteristics of Microwave Remote Sensing Data

Block-02 Recent Advances in Remote Sensing

Unit-1: Hyper spectral Remote Sensing;

Unit-2: LIDAR; Image Fusions; Object oriented classification;

Unit-3: Digital Photogrammetric and Information Extraction Techniques

Block-03 Spatial Analysis and Modeling

Unit-1: Network Analysis and Shortest Route Characteristics;
Unit-2: Spatial Decision Support System;
Unit-3: Multi-criteria Decision Analysis;
Unit-4: Spatial Data Infrastructures (NSDIs)

Block-04 Recent Advances in GIS

Unit-1: 3D Virtual GIS; Internet and WEB GIS;
Unit-2: GPS in GIS Applications;
Unit-3: Mobile Computing;
Unit-4: Interoperability and Open GIS;
Unit-5: Internet GIS;

PGDRS-06 Digital Image Processing

Block-01 Pre-processing Operations

Unit-1: Digital Image, Digital Data Format, LUT;

Unit-2: Image Restoration; Noise Reduction; Radiometric Correction of Data;
Geometric Correction of Data;

Unit-3: Linear and Non-linear Transformations for Geometric Corrections;
Histogram .

Block-02 Image Enhancements

Unit-1: Radiometric Enhancement;

Unit-2: Spatial Enhancements; Contrast stretching—Linear and Non-linear
Methods;

Unit-3: Multi-band Enhancement Techniques—Band Ratios, Vegetation Indices,
PCA,

Unit-4: Spatial Filtering; Resolution Merge Techniques or Image Fusion

Block-03 Thematic Information Extraction Procedures

Unit-1: Multi-spectral Patterns; Spectral Discrimination and Signature Bank;

Unit-2: Parametric and Non-parametric Classifiers;

Unit-3: Supervised and Unsupervised Classification Methods;

Unit-4: Multi-date Data Analysis and Change Detection Processes,

Unit-5: Accuracy Assessment

PGDRS-07 Remote Sensing and GIS Applications
Block-01 Remote Sensing Applications

Unit-1: Natural Resource Mapping;

Unit-2: Environmental Mapping and Monitoring;

Unit-3: Geomorphic/Geological Mapping— logy Litho and Structure;

Unit-4: Mineral Resource Identification and Assessment;

Unit-5: Land Use Mapping; Evaluation of Surface Water Resources; Ground Water Exploration;

Unit-6: Flood Zones; Soils and Soil Salinity Mapping;

Unit-7: Crop Types and Crop Yield Estimations.

Block-02 GIS Applications

Unit-1: Rural and Urban Land Use; Rural and Urban Change; Rural and Urban Information System;

Unit-2: GIS in Planning; Forest Fire Mapping;

Unit-3: GIS in Health Services and Disease Mapping; Solid Waste Management;

Unit-4: Wild Life Habitat Suitability Studies;

Unit-5: Shortest Path Characteristics; Spatial Decision Support System.

PGDRS - 08 Remote Sensing and GIS practical-II

Block-01 Remote Sensing

Unit-1: Data Import; Geometric Corrections and Geo-referencing of Data;
Unit-2: Enhancements; Subsetting; Vegetation Indices; Use of Filters and PCA;
Unit-3: Supervised and Unsupervised Classifications; Map Composition;
Unit-4: DEM/DTM creation and 3D Visualization and Virtual Image

Block-02 GIS Practical

Unit-1: Coverage's in ArcInfo; Editing of Coverage's;

Unit-2: Source Data Registration; Spatial Modeling and Analysis;

Unit-3: Query building; Network Analysis; TIN/DEM models and derivatives;

Unit-4: 3D Virtual GIS;

Unit-5: GPS Survey and Plotting

PGDRS-09

Project Work/Dissertation*

To be finalized and assigned at the end of First Semester; laboratory and/or field work based; to be done in the department/elsewhere; to be submitted 35 to 45 days after the last theory/practical examination whichever is later but definitely 15 days before the reopening of the university after summer vacation.

*Specialization in:
        (i) GIS data organization and analysis
        (ii) GIS Web Services
        (iii) Natural Resource & Environment Mapping and Monitoring
        (iv) Spatial Decision Support System
        (v) Digital Image Analysis and Accuracy Assessment
        (vi) Automated Information Extraction Methods
       (vii) Rural and Urban Land Use Planning