Course Code: GIM-701
Introduction to Geo-Informatics, Space Science and Principles of Remote Sensing

4 Credits (4-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Note:
1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I

Unit-II

Unit-III

Unit-IV

**Image Interpretation:** Generation of B/W, True colour and False Colour Composites (FCC), scales of the data products, annotation of satellite data products. Introduction to image Interpretation, Basic principles of Image Interpretation, Decoding of Different Imageries, Elements of Image Interpretation, Techniques of image Interpretation, Visual verses digital Interpretation, Interpretation Keys. Factors affecting image interpretation; Use of image interpretation keys; Basics of Artificial intelligence; Effects of weather on images i) Clouds, ii) Surface winds, iii) Penetration of smoke plumes etc. Remote Sensing Data Products and their procurement.

**Ground Investigation in support of Remote Sensing:** Uses of ground data, Ground truth instruments and spectral signature, interpretation and calibration of GTR observations, test sites, accuracy assessment.

**Reference Books**


6. Floyd M. Henderson; Principles & Applications of Imaging Radar, John Wiley & Sons, N.Y.


Course Code: GIM-702
Fundamentals of Geographic Information System

5 Credits (5-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Note:
1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit – I
Basic Concepts of spatial information, Philosophy, History and definition of GIS, interdisciplinary relations, applications areas. Spatial Concepts: introduction to space, Spatial awareness, Euclidean space, Set based geometry of space, Topology of space, Network spaces, Metric spaces, Spatial elements - point, line, area, surface and network- spatial patterns, spatial data relationships, topological relationships and geometrical relationships, proximal, directional relationships Fundamentals of Data Storage, Information Organization and Data Structure Basic File Structures, Spatial and Non-spatial Databases, Advantages of Database.

Types of Databases, Hierarchical systems, Network systems, Relational systems, Data Models- Entity Relationship model, Relational Model, Data Structures; Raster Structures, Vector Structures, GIS Data Requirement, sources and collection, Methods of data capture-scanning, digitization, associated errors in data capture, Conversion from Other Digital Sources, Attribute data input and management, Edge matching, Creating digital data, generating data from existing data, Metadata standards and formats, different kinds of geospatial data, Detecting and Evaluating Errors, Data Quality Measurement and Assessment, Digital output options. Data retrieval and Data compression.

Unit-II
Vector & Raster data query, Geographic visualization; Local operations, Zonal operations, Distance measure operations, Spatial auto correlations, 2D, 2.5D, 3D, DEM, STM, SEM generation, Spatial Modeling, Combining data; Terrain mapping, Finding and quantifying relationships; Techniques of interpolation, Vector data base, Topological Relationships; Creation of Topology.

Basic Spatial Analysis, Integration and Modelling: Logic operations, general arithmetic operations, general statistical operations, geometric operations, query and report generation from attribute data, geometric data search and retrieval, complex operations of attribute data, classification, reclassification, integrated geometry and attributes, overlay, buffer zones, raster data overlay, integrated data analysis. Distant Measurement. Advanced Analysis and Modelling: Spatial reference systems, trend surface analysis, Network and Raster connectivity operations, Spatial interpolation and proximity operations, fuzzy analysis, GIS analytic models, Digital Terrain models
Unit-III

Spatial data editing: Importance of Error, types of error, sources of error, Locational errors editing, Digitizing errors and editing, Topological errors and editing, Errors resulting due to natural variation from original measurements. Errors arising through processing, errors arising from overlay and boundary intersections. Errors resulting from rasterizing a vector map. Errors associated with overlaying two or more polygon networks. Nature of boundaries. Statistical nature of boundaries. Combining attributes from overlaid maps. Accuracy, Precision and data quality, Data Processing: Updation, corrections, modifications, scale changes, Coordinate thinning, geometric transformations and map projection transformations, conflation sliver removal, edge matching, interactive graphic editing, rubber sheeting.

Unit-IV

Spatial Data Classification methods: Multivariate analysis, Allocating individuals to existing classes, Expert systems for GIS. Data Quality and Standards: Definition of data quality, components of geographic data quality – lineage, positional accuracy, attributes accuracy, temporal accuracy, logical consistency and completeness; assessment of data quality. Accuracy, precision, error and uncertainty. Sources and types of errors, error propagation and error management; Geographic data standards components and types of GIS standards, international GIS standards, interoperability of GIS, quality control.

Reference Books


Course Code: GIM-703
Cartography and Surveying
4 Credits (4-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Note:
1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I
History of Cartography, Basic Concept of cartography, Categories of maps, Interpretation of Topographic maps, Cartographic databases, Data measurement, Cartographic design issues, Colour and pattern, Cartographic visualization, Cartography today, Models for digital cartographic information - Map digitizing, Cartographic design - Color theory and models - Color and pattern creation and specification - color and pattern - Typography and lettering the map - Selection and generalisation principles – Symbolisation-Map compilation, Methods of map composing - Demography and statistical mapping. Dot, isopleth and choropleth mapping, Map characteristics, cartographic materials, Base maps and thematic maps, Map legend symbols &; border information Design and layout of maps, Cartographic problems of mapping the earth with horizontal and vertical controls.

Unit-II
Earth-Map relations- Concept of Map Projections, need and utility of map projections, Grouping of map projections: conical, cylindrical, Zenithal Projections Types: Mercator, Transverse Mercator, Polyconic, Lambert, Orthomorphic, UTM Projections and their comparison and their properties - Scale - Reference and coordinate system - Transformation - Basic transformation - Affined transformation, Choosing a Map Projection, Map Projection transformation, Analysis and visualization of distortion, Visualization of geospatial data: Design aspects, Multiscale and geometric aspects of scale, Dissemination of (visualized) geospatial data, Data products, users and uses of products, various issues in map visualization, Cartography as graphic means of Communication. Theory of Visual perception-Visual variables. Graphic elements- Clarity and legibility contrast,

Unit-III

Unit-IV

**Reference books**

13. R. Singh & Kanujia. Map work and practical geography, Central Book Depot, Allahabad

**Course Code: GIM-704**

**Introduction to Earth systems**

4 Credits (4-0-0)

Maximum Marks: 100
Note: 1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I

Unit-II

Unit-III

Unit-IV
Soil & Regolith: Soil forming processes, soil forming factors, Soil profile, Soil components, Pedogenic regimes. Classification of soils up to order level.

List of Text Books
1. Structural Geology by Billings, M. 1984
2. Earth History & Plate Tectonics by Carl K. Seyfert, Leslie A. Sirkin
4. General Climatology by H.J. Critchfield
5. Physical Geology by Arthur Holmes
6. Physical Geography by Stahler

Course Code: GIM-705*

0 Credits (3-0-0)
Maximum Marks: 100
Note: 1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.


**Unit-I**


**Unit-II**

Exploratory Data Analysis, Co-varience, Correlation Analysis, Karl Pearson's Coefficient of Correlation, Statistical inference, Significance of tests, Hypothesis testing (t and F test), Simple Regression Analysis. Linear and nonlinear regression, Introduction to linear programming, problem solving using graphical methods.

Probability theory: Trial, events, mutually exclusive events, Theorem of total probability, Additions and multiplication laws, Basic problems on these laws. Random variable and probability: Concept of random variables and probability distribution, Discrete and continuous random variable, Sample space and events.

**Unit-III**

Introduction to Visual Basic and programming

**References Books**
1. Statistics by S.P. Gupta
2. Statistical theory and methods by Sanchetic and Kapoor

Course Code: GIM-706: LAB-I
Remote Sensing, Cartography and Surveying

3 Credits (3-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Remote Sensing

Study of Ground Truth Radiometers (GTR), study of reflectance of selected objects using GTR, plotting diurnal variations in reflectance, Study of satellite imagery, border information and marking reference system; Familiarizing various satellite image formats Study of infrared radiometer. Use of spectro-radiometer – production and analysis of spectral reflectance curves; Use and analysis of Densitometric data for a given image; Familiarizing Digital Satellite Images-Spectral Reflectance values, Resolution, Study Identification of features of a given area in panchromatic, multi spectral, hyper spectral images, Study of satellite imagery in different bands and visual interpretation; Study of thermal image interpretation of various features and drawing of isotherms; Study of Radar (microwave), Thermal imagery and interpretation of features; Interpretation of cultural details from IRS and SPOT imagery; Preparation of Map using satellite image FCC.

Cartography

Study of different types of maps and scales, Map series, numbering methods, scales of the map series (Old & New), Latitudinal and Longitudinal extents of International maps and topographical maps, Interpretation of topographical maps, Representation of relief features by contours, Profile drawing – Simple, superimposed and composites, Study of Weather maps. Scales: Methods of Representation, Conversions, Map projections: Zenithal, Conical, Cylindrical, Conventional Map Projections, Preparation of base maps visually and digitally using satellite Images and Topo-sheets Reading and Understanding of Cadastral Maps of India. Integration of Cadastral Maps with Satellite images, Reading and understanding of Forest Stock Maps, Reading and understanding of town planning/urban planning maps. Preparation of Base Maps using topographical maps and GPS readings. Preparing infrastructure, Transport network maps, tourist maps, natural resources maps, planning maps. Bar graphs – simple, compound, wind roses, Line graphs – simple and polygraph, Dot method, Choropleth Technique, Isopleth technique, Proportional circles, Sector Diagrams

Course Code: GIM-707: LAB-II
Geographic Information System

3 Credits (3-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Understanding available GIS softwares: ARC/VIEW, ARC/GIS, MAP-INFO, ILWIS, GEO MEDIA, IGIS, Understanding Types of geodatabases, Understand the raster and vector data models, Convert data to raster format and build raster databases, Understanding Geodatabase Validation rules, Understanding Geodatabase Subtypes and domains, Georeferencing scanned map, Managing Projection & Datums, Digitization - Point, Line, Polygon and Surface Data, Building topology - measuring distance and area, Editing using geodatabase topology points, lines and polygons Removal of errors – Overshoot & Undershoot, Snapping, Data Collection and Integration, Non-spatial data attachment working with tables, Dissolving and Merging, Clipping, Intersection and Union, Creation of different spatial layers, Symbolizing layers Overlaying with satellite images and Google Earth, Join\Relate layers with External Database, Converting XY Data to GIS format, Creating geodatabase schemas, Digital database creation Loading data into a geodatabase, Adding attribute data - querying on attribute data, On screen digitization - Data Conversion - Vector to Raster, Raster to Vector, Generation of DEM from contours, spot heights, Vector Analysis - Buffering, Overlay and Network analysis, Raster Analysis - Measurement - Arithmetic overlaying, Logical overlaying, Data Output: Bar charts, Map compilation, Customization and scripting, Designing Cartographic Output Familiarity with DBase Commands including record updating and processing. Theme representation by usage of graphics command resources data maintenance, Theme filling and retrieval and usage. Grid Analysis: working with Grid Arithmetic Operators Selection Operations: TEST, SELECT, CON. Grouping Operations: RECLASS, REGIONGROUP Topographic Operations: SLOPE, ASPECT. Optimal Path Operations: COSTDISTANCE, COSTPATH,
Collection of Meteorological data and analysis, Preparation graphs, diagrams, Change detection.

Identification and Delineation of following earth system features using Satellite Data Products of different spatial and temporal resolutions.


Soil and Water Testing: Understanding working, mechanism and utility of Soil and Water testing laboratory equipments and instruments, Understanding purpose and utility of different Soil and Water Quality testing parameters.
Course Code: GIM-709
Principals of Photogrammetry

4 Credits (4-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Note:
1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I
Fundamentals of Photogrammetry Overview and History of Aerial and Satellite Photogrammetry, Anatomy of Eyes and Stereo Vision, Types of photographs; Vertical photographs, Oblique Photographs, Principal point; Scale – overlaps – stereoscopy – concepts. 3D visualization in digital environment, anaglyph, polarization.

Unit-II

Unit-III

Unit-IV

REFERENCES:


Digital Image Processing

4 Credits (4-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Note: 1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I
Basic concepts of Analog and Digital Photographic Image, Digital image Data formats Advantages and Disadvantages of Analog and Digital Images, Image formats and its characteristics, Visual vs. Digital image processing methods, Image data storage and retrieval, Computer Hardware for digital image processing Introduction to spatial data sources, Digital data acquisition Characteristics of spatial Image data, Basic Statistics used in DIP- Initial Statistics Extraction – Univariate and Multivariate, Statistics, Histogram – Contrast modification of Image data, Histogram Equalization, Histogram matching, Density slicing, Quantitative analysis Types of image displays and FCC, System design considerations, Sources of image degradation – Pre-processing of satellite image, Radiometric and Geometric correction technique, Interpolation methods – linear and non-linear transformation for geometric corrections, Look-up Tables (LUT) and Image display, Image Reduction & Magnification,

Unit-II

Unit-III

Unit-IV

Reference Books


Course Code: GIM-711
Information, Communication, GPS Technologies and Applications
Unit I

Fundamentals of Computers

Unit II


Unit III

Elements of Satellite Communication: Satellite-description of different ccommunication ubsystems, communication bands, Bandwidth allocation. Imaging Technologies for Web Publishing: Image file formats, creating low bandwidth graphics, using color, browser-safe colors, imaging transparency, creating graphical navigation tools, scanning techniques, creating small animations, image mapping, using scalable vector graphics (SVG), and graphical layout and alignment. Fundamentals of creating dynamic, interactive web pages: An introduction to Active Server Pages (ASP) technology, ASP syntax, and introduction to VBScript, the request, response, server, application and session objects, working component, and connecting databases to ASP pages.

Unit IV

Reference Books
1. Introduction to Information technology by V. Rajaraman, PHI
2. Introduction to Computers by Peter Norton.
4. The HTML 4.0 Source book- Ian Graham, John Wiley
5. The XML Specification Guide- Ian Graham and Liam Quin, John Wiley
6. The XHTML 1.0 Web Development Sourcebook- John Wiley and Sons.
9. ESRI Press
11. Sathish Gopi , GPS and Surveying using GPS9

Course code- GIM-712
An Introduction to Geo-Informatics Applications in Natural Resources Management

4Credits (4-0-0)
Note: 1. Nine (9) questions will be set in all.
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I

Unit-II
Applications in Disaster Management: Mapping and modeling landslide, floods, cyclones forest fire and droughts. Applications in Urban Planning: Mapping of urban sprawl, urban land use, transportation network, infrastructure mapping, and urban sprawl. Applications in Geology and Geo-technical Engineering: Geological mapping, slope stability, drainage/ transport/ communication network analysis and alignment.

Unit-III

Unit-IV

Reference Books
Management, Springer-Verlag, Berlin, Germany.


Course Code: GIM-713
Advances in Remote Sensing and GIS

4 Credits (4-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Unit-I


Unit-II


Unit-III

Introduction to Web GIS, Web Mapping Basics, Web Page Basics, Geospatial Web Services, Geospatial Mashups, Web mapping – static and interactive web mapping, collaborative web mapping. adding and rendering map layers to a Web GIS. Symbolizing layers, classifying continuous variables for choropleth mapping. Building and enabling map services on the GIS server, querying the finished map, zooming in, panning, etc Web Map Servers- WMS-, interoperable systems and non-interoperable systems- Web Feature Servers- Metadata standard, XML, Geographic Markup Language.

Unit-IV


References
1. Floyd M. Henderson; Principles & Applications of Imaging Radar, John Wiley & Sons, N.Y.


7. Ron Lake, David S. Burggraf, Milan Trninic, Laurie Rae, 2004, Geography mark-up language (GML) John Wiley & Sons Ltd.
Course Code: GIM-715 -Lab- V
Computer Programming Languages and softwares

0 Credits (3-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70

Working with Micro Soft Access, programming in c language and Oracle Data Base software.

Course Code: GIM-716 -Lab- VI

3 Credits (3-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70

Photogrammetry and Global Positioning System

Testing stereo vision, Use of Lens stereoscope and Mirror stereoscope, Marginal Information of aerial photograph, Determination of vertical exaggeration, Orientation of stereo model and marking principle point, fiducial axes and flight line. Use of Parallax Bar for height calculation from aerial photographs and Stereo satellite images, Calculation of scale of the aerial photographs and Stereo satellite images, Computing photo scale using known objects. Computing photo scale using a map of known scale. Computing photo scale using focal length and altitude. Preparation of photo / imagery line index, Preparation of grid; plotting of control points, Preparation of mosaics, stereo plotting instruments, Use of planimeter, Dot/square Grid for area calculation Digital photogrammetry – digital image matching and collection of mass points, Construction digital terrain models using stereo photographs and satellite stereo images.

GPS: Surveying with GPS, Software and hardware needs of GPS, Collecting ground control points, Lines, Polygons, Editing points, lines and polygons, Geo referencing using GPS, Exporting to GIS Environ. Field Survey and GPS GIS Integration,
Course Code: GIM-717
Soft Skills, Geoinformatics Project Planning and Management and Research Methodology

0 Credits (3-0-0)
Maximum Marks: 100
Internal Marks: 30
External Marks: 70
Time: 3 Hours

Unit-I
Communication: Importance of verbal & Non verbal communication, Personal appearance, Posture, Gestures Facial expressions, Eye contact, Space distancing, Goal setting: Immediate, short term, long term, Smart goals and strategies to achieve goals, Time management: Types of time, Identifying time wasters, Time management skills. Leadership and team management: Qualities of a good leader, Leadership styles, Decision making, Problem solving, Negotiation skills, Group discussions: Purpose (Intellectual ability, creativity, approach to a problem, solving, tolerance, qualities of a leader), Group behavior, Analyzing performance, Job interviews: Identifying job openings, Preparing resumes & CV, Covering letter, Interview-Types of questions.

Unit-II

Unit-III
Geoinformatics Project Planning and Management.
Definition of plan, project, program and scheme. Functions of planning and management. Components of Geoinformatics project, Geoinformatics project types. GIS Project Planning-Project phases and Project life cycle, project stakeholders, system development lifecycle, Software development models, Project initiation, systems planning and methodology, systems analysis and user requirements studies, GIS software evaluation and selection, Hardware considerations and acquisition, Geographic database design – conceptual, logical, and physical data modeling, planning and database issues - screening of project ideas, selection of project based on techno-economic feasibility analysis, project formulation, product and project design, Project proposals, project report preparation. Project Costs-Elements of cost, costing techniques, resources planning, cost components of a geo-informatics project- men, Hardware and software costs, cost of Remote Sensed Data/Imageries, Maintenance cost, organizational cost, service charges, outsourcing cost, pricing the product / service. Cost budgeting. Project Appraisal-Project appraisal Methods -Discounting and non discounting techniques, Benefit Cost Ratio, Break Even Point Analysis, Cost and Return simulation, return on investment. Project Time, Quality and Cost Management-Project scheduling- network analysis, PERT and CPM techniques, Gant chart, time and cost crashing. Project cost and time control, feed

Unit-IV


REFERENCE BOOKS:

1. Effective Technical Communications’ by Rizvi M. Ashraf, McGraw–Hill Publication
2. Developing Communication Skills’ by Mohan Krishna & Meera Banerji, Macmillan
3. Creative English for Communication’ by N.Krishnaswami & T.Sriraman, Macmillan
5. Research Methodology . Methods & Techniques : Kothari, C.R.
11. Project Management PERT / CPM & Precedence Diagramming Moder, Philip, Galgotia
12. UNIDO Guide to Project Appraisal
Course Code: GIM-718  
Geo-Informatics in Geo-Resources  

3 Credits (3-0-0)  
Maximum Marks: 100  
Internal Marks: 30  
External Marks: 70  
Time: 3 Hours

Note:  
1. Nine (9) questions will be set in all.  
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section. Each question will be of 14 marks.

Unit-I

Remote Sensing in Land use and Land cover- an over view, spectral characteristics of different land use and land cover categories, Remote Sensing in Human settlement and urban planning – An Overview. Principles of urban area development planning and Urban land use, Data requirement for regional planning and Urban/Sub-urban, Large scale mapping for cadastral database in urban areas, Settlement patterns – Image characterization and recognition, Slum, squatter settlement - detection, interpretation, delineation and analysis,

Urban land use classification, Urban land use mapping and analysis, Residential land use, Commercial land use and Industrial land use, Urban land conservation using remote sensing, Transportation/ road network analysis through RS and GIS, Site selection and suitability analysis for urban development, Urban Sprawl and change detection studies, Highway, canal, sewage alignment, Land use change detection, Utility mapping.

Unit-II

Remote Sensing in geology – an overview, Basic concept of geomorphology, earth, surface process and resultant landforms, Spectral characteristics of rocks and minerals Drainage patterns – types and its significance in geologic interpretation, Interpretation of drainage patterns through satellite images, Interpretation of fluvial, glacial and coastal of eolian and volcanic landforms. Morphometric analysis, Interpretation of landforms related to igneous, sedimentary and metamorphic rocks, Geomorphological mapping and terrain evaluation.

Unit-III

Lithological interpretation of Igneous rocks, Sedimentary rocks, Metamorphic rocks, Structure – Definition, types and structural mapping , Interpretation of folds, faults, unconformities and lineaments, Studying physiography and landforms relation to water resources, ground water targeting sites. Hydro-geomorphological mapping


Unit-IV
Geo-Stationary and OceanSat satellites its use in Oceanographic studies, Sea Surface Temperature (SST), Assessment of aquatic resources, mapping and monitoring of oil spills, turbulent zones, pollution at coastal zones, coastal landforms, monitoring of coastal landforms, tides and impact on coasts, assessment of vessel movements and on time information generation. Monitoring the fresh, polluted water and cold water coming up to the surface close to the coast, Ocean Color, Assessment of vulnerable costal zones, Cyclones and early warning system methods and models.

**BOOKS RECOMMENDED:**

- Hand book of Applied Hydrology by Ven Te Chow
- Groundwater by H.M. Raghunath
- Water Resources Engineering by R.K. Linsely & J.B. Franzini
- Vasilis D. Valavanis Geographic Information Systems in Oceanography and Fisheries, Taylor & Francis, 11 New Fetter Lane, London. EC4P 4EE.
Prentice Hall
Sabbins, F.F., 1985: Remote sensing Principles and interpretation, W.H. Freeman and company

Course Code: GIM-719  
Geo-Informatics in Bio-Resources

3 Credits (3-0-0)  
Maximum Marks: 100  
Internal Marks: 30  
External Marks: 70  
Time: 3 Hours

Note:  
1. Nine (9) questions will be set in all.  
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section.

Unit-I


Unit-II

Introduction and distribution of forests, Forest types of India, Introduction and concept of forestry, Role of Geoinformatics in forestry, Interaction of EMR with vegetation and spectral characteristics of vegetation, Temporal characteristics of Vegetation, Vegetation indices, Forest cover mapping through RS and GIS, Forest types and forest density mapping, Remote Sensing application in forest cover change detection, Remote Sensing application in mapping of stressed vegetation, Study of association between geomorphology, physiography, rocks and forest types using RS and GIS.

Unit-III

Role of Microwave Remote Sensing in forest studies, Biomass estimation by non destructive method, Growing stock estimation using RS and GIS, Remote Sensing application in formulation of forest working plan, Bio diversity studies using RS and GIS, Wildlife habitat analysis using RS and GIS, Biological invasion and monitoring of invasive species through RS and GIS, Forest Management Information System (FMIS) using Geoinformatics techniques.
Unit-IV


List of Reference Books
Course Code: GIM-720  
Geo-Informatics in Disaster Management

3 Credits (3-0-0)  
Maximum Marks: 100  
Internal Marks: 30  
External Marks: 70  
Time: 3 Hours

Note:  
1. Nine (9) questions will be set in all.  
2. Question no. 1 will be objective type covering the entire syllabus & Compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will required to attempt five in total, Question no. 1 and four by selecting one from each section.

Unit-I

Geo-Informatics in Disaster Management: Tectonic disasters: Introduction and understanding structure of the earth and plate-tectonic theory: Meaning and types of Tectonic disasters, Geoinformatics for early warning system, Earthquake- post disaster damage estimates-selection of variables-space-time analysis, Geoinformatics for minimizing human/ biotic and abiotic loss/damages, Geoinformatics for post disaster relief plans and communication, Landslides – Location and Demarcation of vulnerable zones and spots using satellite data and communication techniques to the administration.

Unit-II

Cyclones and Flooding: Cyclone: Parameters related to cyclone, Assessment of effects on land and sea, GIS for early warning system and Damage assessment. Flooding: topography, Land use and flooding -space-time integration -GIS based parameters and layers, Flood prone area analysis and management, Risk assessment, Surface water and ground water pollution, and disasters

Unit-III

Disasters due to Weather and Climate - Drought and Desertification: Drought-Types of droughts, Factors influencing droughts, Variable identification – Calculation of heat, water balance and evapotranspiration, Land use /ground water level changes, Delimiting drought prone areas and communication for relief measures, Desertification- processes of desertification, over utilization of water and land resources layer creation, GIS based management strategies.

Unit-IV

Disaster Management Handbook-Indian Railways publications.
Kamal Taori, IAS., Disaster Management through Panchayati Raj, Concept Publishing Company, New Delhi.
National Disaster Management Publications, Ministry of Home Affairs, Govt. of India, New Delhi.
Randolph Kent, Disaster Preparedness, University of Wisconsin Disaster Management Center.
David G. Kibble, Safety and Disaster Management in Schools and colleges: A Training Manual.
D. Fulton Publishers, 1998 Original from the University of Virginia.
Dave, Gupta, Parmar, Kant, Harsh K. Gupta, Disaster Management, Indian National Science Academy, Bangalore.