

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech in GEO-INFORMATICS AND SURVEYING TECHNOLOGY

Effective from Academic Year 2017- 18 admitted batch
COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Remote Sensing	25	75	4	0	0	4
PC-2	Geographical Information System	25	75	4	0	0	4
PC-3	Elements of Photogrammetry	25	75	4	0	0	4
PE-1	Digital Image Processing-I Object Oriented Programming Statistical Methods	25	75	3	0	0	3
PE-2	Advanced Surveying and Cartography Environmental Impact Assessment Database Management Systems	25	75	3	0	0	3
OE-1	*Open Elective – I	25	75	3	0	0	3
Laboratory I	RS and GIS	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		275	525	21	0	6	25

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Global Positioning System	25	75	4	0	0	4
PC-5	Advanced GIS	25	75	4	0	0	4
PC-6	Digital Photogrammetry	25	75	4	0	0	4
PE-3	Digital Image Processing – II Soft Computing Techniques Internet GIS	25	75	3	0	0	3
PE4	Geospatial Techniques for Rural Development Geospatial Techniques for Disaster Management Geospatial Techniques for Water and Environmental Engg	25	75	3	0	0	3
OE-2	*Open Elective – II	25	75	3	0	0	3
Laboratory II	DIP and GPS	25	75	0	0	3	2
Seminar II	Seminar-II	100	0	0	0	3	2
Total		275	525	21	0	6	25

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	200	100	0	3	22	14

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	100	100	0	0	24	24

*Open Elective subjects must be chosen from the list of open electives offered by **OTHER** departments.

For Project review I, please refer 7.10 in R17 Academic Regulations.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

GLOBAL POSITIONING SYSTEM (PC - IV)

Course Objective: To understand the Principles of geodesy with reference to GPS, processing of GPS data to help for satellite survey.

Course Outcome: at the end of the course the student able to learn to identify GPS components and their functions, Select GPS survey method, Interpret the navigational message and signals received by the GPS, Identify error sources in GPS observations, apply the corrections for accurate positioning and to Map the geospatial features.

UNIT- I:

Basics : Definition - Fundamental goals of Geodesy - Definitions - basic concepts - Historical perspective - development applications in Satellite Geodesy - Geoid and Ellipsoid satellite orbital motion - Keplerian motion - Kepler's Law - Perturbing forces - Geodetic satellite

UNIT- II:

Different Techniques : Determination of direction by photography - SECOR - Electronic observation techniques - Doppler effect - Positioning concept - Development of TRANSIT satellites.

UNIT- III:

Satellite System: GPS - Different segments - space control and user segments - satellite configuration - GPS signal structure - Orbit determination and Orbit representation Anti Spoofing and Selective Availability - Task of control segment - GPS receivers - main receiver components - Example of GPS receivers.

UNIT- IV:

GPS Data Processing : GPS observables - code and carrier phase observation - linear combination and derived observables - concept of parameter estimation - data processing - software modules - solutions of cycle slips ambiguities RINEX format. Concepts of rapid static methods with GPS semi kinematic and pure kinematic methods - basic constellation of satellite geometry & accuracy measures.

UNIT- V:

Applications of Satellite Geodesy: Geodetic control surveys, Cadastral surveying, Photogrammetry & Remote Sensing, Engineering applications, and Monitoring - GIS. GLONASS , GALILEO, COMPASS and IRNSS satellite configuration comparison - Satellite Laser Ranging & Applications - Concepts of satellite altimetry.

TEXTBOOKS:

1. Satellite Geodesy by Gunter Seeber, Copy Right 2003 By Walter De Gruyter 1993, ISBN: 3-11-017549-5.
2. Global Positioning System – Theory and Practice – Hofmann W. B, Lichtenegger. H, Collins. J – Springer Verlag Wein, New York.-2008
3. "GPS Satellite Surveying", Alfred Leick 3rd Edition, John Wiley and Sons 2004.

REFERENCES:

1. Global Navigation Satellite Systems by G. S. Rao 2010 Tata McGraw Hill Education Pvt. Ltd.
2. "GPS Theory, Algorithms and Applications .Guocheng Xu," Springer-Verlag, 2003.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

ADVANCED GIS (PC- V)

Course Objective: to understand the spatial analysis and modeling using/with GIS

Course Outcome: At the end of the course the student will able to learn spatial analysis using GIS, surface mapping, spatial arrangement of data of different types and modeling of the given system in a space frame.

UNIT - I:

Elementary Spatial Analysis – Introduction to GIS Spatial Analysis, A Simple Analysis Framework, How the GIS Finds Objects, Why We Need to Find and Locate Objects, Defining Objects Based on Their Attributes, Defining Point Objects Based on Their Attributes, Defining Line Objects Based On Their Attributes, Defining Area Objects Based on Their Attributes, Higher Level Point Objects, Higher Level Line Objects, Higher Level Area Objects,

UNIT - II:

Measurement – Measuring Length of Linear Objects, Measuring Polygons, Calculating Polygon Lengths, Calculating Perimeter, Calculating Area of Polygonal Features, Measuring Shape, Measuring Sinuosity, Measuring Polygon Shape, Measuring Distance, Functional Distance, Classification – Neighborhood Functions, Roving windows, Polygonal neighborhoods, Terrain reclassification, Buffers,

Unit - III:

Statistical Surfaces – Surface **Mapping**, Sampling the Statistical Surface, The Digital Elevation Model (DEM), Raster Surface, Interpolation, Linear Interpolation, Methods of Nonlinear Interpolation, Uses of Interpolation, Problems in Interpolation, Slicing the Statistical Surface, Cut and Fill Discrete Surfaces, Dot Distribution Maps, Choropleth Maps.

Unit - IV:

Spatial Arrangement – Point Patterns – Quadrat Analysis, Nearest Neighbor Analysis, Thiessen Polygons, Area patterns, Linear Patterns – Line Densities, Nearest Neighbors and Line Intercepts, Directionality of Linear and Areal Objects, Connectivity of Linear Objects, Gravity Model, Routing and Allocation.

Unit - V

Overlay and Cartographic modeling – Cartographic Overlay, Point-in-Polygon and Line-in-Polygon, Polygon Overlay, Automating Point-in-Polygon and Line-in-Polygon in Raster, Automating Polygon Overlay in Raster, Automating Vector Overlay, Types of Overlay, CAD-Type Overlay, Topological Vector Overlay, Topological Vector Point-in-polygon and Line-in-polygon Overlay, Vector Polygon overlay. Types of Cartographic Models, Inductive and Deductive Modeling, Model Flowcharting, Working through the model, Conflict Resolution, Examples Cartographic Models, Model Implementation.

TEXT BOOKS:

1. Fundamental of GIS by MICHAEL N DEMERS – MN DEMERS, Published by John Wiley & Sons Inc
2. Introduction to GIS by Kang-tsung Chang-, published by Mc Graw Hill Education

REFERENCES:

1. Geographic Information System- An Introductory – Jeffrey Star and John Estes
2. Basic Readings in Geographic Information System – Marble, D.F and Calkins, H.W – Spad Systems Ltd
3. Anji Reddy, M., (2001) Remote Sensing and Geographical Information Systems, 2nd edition, BS Publications, Hyderabad
4. George Joseph,(2005) Fundamentals of Remote sensing 2nd edition , University press, Pvt, Ltd, Hyderabad
5. Principles of GIS by P.A. Burrough, Rachael Mc Donnell
6. Principles of Geographical Information Systems for Land Resources Assessment by P.A. Burrough

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

DIGITAL PHOTOGRAMMETRY (PC- VI)

Course Objective: To understand the digital photogrammetric work stations, measurement of digital data, its refinement, orientation and compilation

Course Outcome: at the end of the course the student will able to calculate the parameters for performing relative and absolute orientation on overlapping photographs, Differentiate the analytical and digital photogrammetry in analyzing the terrain, Prepare DTM and orthophotos

UNIT – I

Introduction & Digital Photogrammetric Work Stations

Definition of Digital Photogrammetry & Its Development, Comparison between Three Phases of Photogrammetry (Analogue, Analytical and Digital) Advantages of Digital Photogrammetry, Hardware & Software Components of DPWS, Various Inputs for Digital Photogrammetry: Control Point selection, Scanned Photo, Digital Photographs, Remote Sensing Imagery
Photogrammetric Scanners: Principle of Image Scanning, Configuration of Scanners, Method of Scanning, File Format and Size.

UNIT – II

Image Measurements & Their Refinement

Introduction to Coordinate Systems And Image Measurements, Simple Scales for Photographic measurements, Measuring Photo Coordinates with Simple Scales, Trilaterative method of Photo Coordinate Measurement, Measurement of Photo Coordinates with Tablet Digitizers, Mono Comparator measurement of Photo Coordinates.

Refinement of Measured Image Coordinates: Distortions of Photographic Films and Paper, Shrinkage Correction, Lens Distortions Corrections, Atmospheric Refraction Correction, Earth Curvature Correction, Reduction of Coordinates to an Origin at the Principal Point.

UNIT – III

Orientation Procedures in Digital Photogrammetry

Inner orientation (IO), Mathematical transformations, Epipolar geometry, Exterior Orientation (EO), Auto Tie Point Generation, Digital Image Matching Process: Area Based, Feature and Relation Based, Co linearity Condition

Space Resection Method, Space Intersection, Aerial Triangulation and Bundle Block Adjustment, Use Of GPS And IMU in Digital Photogrammetry

UNIT – IV

3D Visualization & Stereo-Compilation

Principle and Method of 3d Visualization: Anaglyph Polarized and Hybrid Techniques, Feature Extraction, Feature Coding, Data Model and Feature Class.

Definition DEM, DTM, DSM, Various Inputs to DEM/DTM, DTM Specification And Accuracy, Application of DTM, Various Interpolation Techniques: Grid, TIN, Break Lines, Mass Points, Digital Orthophoto Generation (Pre-processing, Main processing, Post processing) and its uses.

UNIT – V

Air Borne Laser Terrain Mapping (LIDAR)

Introduction to Laser Ranging, Principle of LiDAR, System Components, Range Measurements, LiDAR Error Sources, Accuracy, Applications & Advantages of ALTM.

TEXT BOOKS:

1. Elements of Photogrammetry with application in GIS (3rd edition)- Paul R. Wolf & bon A. Dewitt, McGraw Hill
2. Digital Photogrammetry by Karl Krauss
3. Introduction to Modern Photogrammetry (Paperback)by Edward M. Mikhail, James S. Bethel

REFERENCES:

1. Manual of Photogrammetry – American society of Photogrammetry & R.S by Albert.D
2. Modern Photogrammetry – Deward M. Midhail.
3. Photogrammetry Vol-I by – Drauss J, Springer- Verlag publication.
4. Digital Photogrammetry by –Michel Kasser & Yves. Egels.
5. Geographic information systems an introduction by Bernhardsen, 3rd edition.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

DIGITAL IMAGE PROCESSING - II (PE - III)

Course Objective: to understand the advance image enhancement, analysis and management techniques

Course Outcome: At the end of the course the student will able to classify the processed remote sensing data, apply the advanced processing methods for deriving the useful information and Classify, and analyze Hyper spectral data

UNIT- I:

Image Resolution: Correction and calibrations- Noise Reduction – Global, Local and Periodic, radiometric calibrations, Sensor Calibrations, Atmospheric Correction, Topographic Correction.

UNIT- II:

Advance Enhancement: Advanced Enhancement Techniques. PCA, Tasseled Cap Transformation, MNF Transformation, Independent Component Analysis. Color Transformation – RGB to IHS, Natural Color Transformation. Data Fusion Techniques: IHS, Multiplicative, Brovey and Wavelet Based Transformation.

UNIT- III:

Image Compression Techniques: Data compression: Methods- lossless & Lossy –Techniques- DFT, wavelet, JPEG, Cosine transformations.

UNIT- IV:

Classifications: Parametric & Non Parametric- Training sets Statistics, Minimum distance to mean, Maximum Likelihood, ANN, Weight Vector, Support Vector Machine, Decision Tree Approach, Concepts of hierarchical decision tree for Multi Temporal data, GLCM & Texture based classifiers. Sub pixel classifiers: Fuzzy Classification, K Mean, ISO Data, Fuzzy K Means, Fuzzy ML Classifiers, Expert and Artificial Intelligence Based Systems, Mathematical Morphology.

UNIT- V:

Hyper Spectral Image & Change Detection Analysis: Data Visualization, Dimensional Reduction, Feature Extraction – Characteristic, Pixel Purity Index, Hyper Spectral Mapping Methods: - SAM, Spectral Feature Filtering, Spectral Unmixing. Change Detection: Nature of Change Detection, Introduction to Change Detection algorithms. Post Classification- Comparison, Ratioing, Vegetative Indices, Change Vector Analysis.

TEXT BOOKS:

1. John R. Jenson, "Introductory Digital Image Processing", Prentice Hall Series, 1996.
2. John A. Richards, Springer-Verlag, "Remote Sensing Digital Image Analysis" 1999.

REFERENCES:

1. Rafael C. Gonzalez, "Digital Image Processing (2nd Edition)", Prentice Hall, 2002.
2. Remote sensing models and methods for Image processing – Schowengerdt 2nd edition
3. Anil K. Jain "Fundamentals of Digital Image Processing" Prentice Hall Publications, USA.
4. David L. Verbyla "Satellite Remote sensing of Natural Resource Management", Lewis publishers, Florida
5. Image Analysis, Classification and change Detection in Remote Sensing – Mortan J. Century, Taylor and Francis, 2007.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

SOFT COMPUTING TECHNIQUES (PE- III)

Course Objective: to understand the soft computing techniques application to Geo informatics

Course Outcome: at the end of semester the student will able to learn identify the ANN, fuzzy and neuro fuzzy algorithms which were suitable for geo informatics application.

UNIT - I

Information and uncertainty, Chance versus ambiguity, Classical sets and fuzzy sets, Logic and reasoning,

UNIT – II

Fuzzy set operations and fuzzy relations, Membership Functions, Fuzzy Systems

UNIT - III

Decision Making with Fuzzy Information. Fuzzy Classification and Pattern Recognition

UNIT – IV

Artificial Neural Networks (ANN), Biological Neuron, perceptron, Artificial neuron, neural processing , and Types of ANN.

UNIT - V

Learning algorithms, Neuro-Fuzzy Systems, Applications in Remote Sensing.

TEXT BOOKS:

1. Haykin (2008), *“Neural Networks: A Comprehensive Foundation”*, Prentice Hall India, New Delhi
2. Rajasekaran S., and Vijayalakshmi Pai G.A. (2003), *Nueral Networks, Fuzzy Logic and Genetic Algorithms – Synthesis and Applications*, Prentice-Hall India, New Delhi

REFERENCE:

1. Jang, J.R., Sun Chuen-tsai, and Mizutani Eiji, (2009), *“Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence”*, PHI Learning

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

INTERNET GIS (PE- III)

Course Objective: To understand/application of the GIS environment in the internet frame.

Course Outcome: At the end of semester the student will able to develop models in GIS using Open source and Web GIS, Analyze GIS data and solve problems

UNIT - I

Introduction to Distributed Internet GIS:

Introduction, Distributed GIS – Basic components, Applications. Networking: Network environment protocols, (TCP/IP, LAN, WAN, Data exchange b/w 2 terminals).

UNIT - II

Client/Server Computing:

Client, server, glue, client-server system partition, 2-tier, 3-tier & n-tier architectures, advantages & disadvantages of client-server architecture.

UNIT - III

Distributed Component Framework:

Introduction to Microsoft .NET framework: arrays, operators, flow control statements, functions and properties, collection and generics. Getting started with ASP.NET, Error handling, debugging and tracking ASP.NET.

DCOM and .NET, DCOM Architecture and Interface, Advantages & disadvantages of DCOM, CORBA, CORBA Architecture and Interface, advantages & disadvantages CORBA.

UNIT - IV

Web Services in GIS Domain:

ADO.NET programming objects and architecture, connected model (command objects), disconnected model (data sets).

Interoperability in GIS, OGC and its specifications, OGC specifications for GIS web services (WMS, WFS, WCS, WPS, SLD etc) Google Earth, KML Virtual Earth & Bhuvan.

UNIT - V

Web Mapping: Static map publishing, clickable maps, architecture of static web publishing, web mapping architecture

Client - HTML viewer, HTTP server with CGI, Map server & other server, side applications, Web-Mapping options & objects, Web mapping applications.

TEXT BOOK:

1. **Internet GIS** – “Distributed Geographic Information Services for Internet and Wireless Networks” – by Zhong-ren peng and Ming- Hsiang Tsou

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GEOSPATIAL TECHNIQUES FOR RURAL DEVELOPMENT (PE- IV)

Course Objective: to understand the application of Remote sensing and GIS for Rural Development

Course Outcome: at the end of the course the student will able to learn to Evaluate the contribution of sectors, policies and services for rural development, Analyze geographical and socio-economic features of rural areas, plan and design the rural infrastructure, apply the geospatial concepts for rural governance

UNIT - I:

Concepts of Rural Area and Rural Development; Causes of Rural Backwardness, Need for Rural Development, Levels of Living of Rural People Poverty indicators.

UNIT - II:

Organizational Aspects of Agriculture, Alternative Occupations in Rural Areas, Assessment of Rural Energy Supply and Demand, Planning for Rural Development, Definition and Characteristics of Village Communities – Concept and Importance of Rural Industrialization.

UNIT - III:

Engineering aspects of rural infrastructure development - Education - Housing – Health - Drinking Water Supply Road Network, PURA model, Study of poverty alleviation programmes implementation.

UNIT - IV:

Governance of Rural Information and Communication Technology: Opportunities and Challenges; GIS and Governance in Development in India: Trends and Strategy for Implementation; ICT Infrastructure for Rural Development: Issues and Priority for Application.

UNIT - V:

Geospatial techniques for mapping of rural resources. Spatial technologies in rural planning management administration and development.

TEXT BOOKS:

1. Jain S.C. Indigenous Resources for Rural Development, Concept Publishers, 2005.
2. Technologies for Rural Development; [http://en.wikibooks.org/wiki/Technologies for Rural Development](http://en.wikibooks.org/wiki/Technologies_for_Rural_Development), 2010.
3. Harekrishna Misra (ed.), Governance of Rural Information and Communication Technologies, Opportunities and Challenges, Academic Foundation, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

GEOSPATIAL TECHNIQUES FOR DISASTER MANAGEMENT (PE - IV)

Course Objective: To understand the application of Remote sensing and GIS for natural disasters

Course Outcome: at the end of the course the student will be able to learn to evaluate the spatial data for disaster and risk management, assess and monitor the natural disasters. Develop methods for early warning systems, and Prepare the long term disaster management plans in geospatial environment.

UNIT - I

Geologic Hazards:

Earthquake, landslide: Meaning and types of disasters – earthquakes and Tsunamis – volcanoes – landslides – selection of variables – creation of GIS layers – space-time analysis – commissions and boards-case studies.

UNIT - II: Floods and Cyclones:

cyclone related parameters and effects on land and sea – Life cycle, Classification, movement & Cyclone intensity, Flooding: topography, land use and flooding – space-time integration – GIS based parameters and layers – flood prone area analysis and management – risk assessment – commissions and boards, Soil erosion – coral / mangrove depletion – forest fire-mining – overlay analysis – GIS modeling – case studies.

UNIT - III

Drought and Desertification:

Types of droughts – factors influencing droughts – variable identification – vegetation index – land use /ground water level changes – delimiting drought prone areas – processes of desertification – over utilization of water and land resources layer creation – GIS based management strategies – case studies.

UNIT - IV

Anthropogenic Disasters & Marine Disasters:

Atmospheric Disasters: Ozone layer depletion – green house / global warming – acid rain – snow melt – sea level rise – related problems layer creation – coastal erosion and deposition – parameters/factors identification – over lays – analysis / management strategies – commissions and boards -case studies.

UNIT – V

Ecology related Disasters & Decision support system:

Ecological degradation – nuclear disaster and biodiversity loss – parameters (mapping of forest types, protected areas and natural forests) – habitat loss – conserving bio-diversity (species and subspecies).

TEXT BOOKS:

1. Babar, Md.: Environmental Changes and Natural Disasters, New India Publishing Agency, 2007
2. D.B.N. Murthy – Disaster Management – Deep and Deep Publication, 2008
3. GIS and Emergency Management in Indian Ocean Earthquake/ Tsunami Disaster, An ESRI® White Paper, 2006

4. Orhan, R. Backhaus, P. Boccardo, S. Zlatanova (eds.), Geoinformation for Disaster and Risk Management Examples and Best Practices, Joint Board of Geospatial Information Societies and United Nations Office for Outer Space Affairs, Denmark, 2010.

REFERENCES:

1. Korte, G. B., (2001) the GIS book: 5th edition, Onward Press, Australia. Barett, E.C. and Anton Micallef (Editors),[1991]. Remote Sensing for Hazard Monitoring and Disaster Assessment, Taylor and Francis, London.
2. Anji Reddy, M., (2001) Remote Sensing and Geographical Information Systems., 2nd edition, BS Publications, Hyderabad.
3. Demers, Michael N., (2000) Fundamentals of Geographic Information Systems, John Willey and sons. Inc. New York.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

GEOSPATIAL TECHNIQUES FOR WATER AND ENVIRONMENTAL ENGINEERING (PE - IV)

Course Objective: To understand the application of Remote sensing and GIS for water and environment management

Course Outcome: at the end of the course the student will able to learn to use the geospatial tools in water resources and environmental models, Estimate and analyze, Apply the geospatial methods for planning and design of water resources systems, Identify the geospatial tools for understanding the environmental systems the spatio-temporal quantification of water resources

UNIT - I

Surface-Water Hydrologic Data, Spatial techniques for Surface-Water Hydrology Modeling, Surface-Water Hydrology Models, ArcSWAT model and its applications; Groundwater Data, Ground water Models and spatial techniques for Groundwater Modelling and Visualization, The ArcHydro Data Model.

UNIT - II

Geospatial techniques for planning and design of Water-Supply and Irrigation Systems, Spatial Database Development for Wastewater and Storm water Systems, GIS-Based Wastewater Collection System Design and Management Applications, GIS-Based Decision-Support Systems for Wastewater and Storm water Systems.

UNIT - III

Geospatial technologies for Water Resources Monitoring and Forecasting; Spatial Decision-Support Systems in River Basin Management; Spatial systems for floodplain mapping and management.

UNIT - IV

Spatial techniques for Water Quality Monitoring and Modeling, GIS for Water-Quality Database Development, GIS for Water-Quality Management Decision Support

UNIT - V

taxonomy of Environmental Models in the Spatial Sciences. Geographic Data for Environmental Modeling and Assessment. Applications of Remote Sensing and Geographic Information Systems in Wildlife Mapping and Modeling. Land Use Planning and Environmental Impact Assessment Using Geographic Information Systems.

TEXT BOOKS:

1. Lynn E. Johnson, Geographic Information Systems in Water Resources Engineering, CRC Press, 2008.
2. Allan Brimicombe, GIS, Environmental Modeling and Engineering, Second Edition, CRC Press, 2009.

REFERENCES:

1. Andrew Skidmore (Editor, Environmental Modelling with GIS and Remote Sensing, CRC Press), 2002.
2. Praveen Kumar, Mike Folk, Momcilo Markus and Jay C. Alameda, Hydroinformatics: Data Integrative Approaches in Computation, Analysis, and Modeling, CRC Press, 2005.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (GIST)

DIP AND GPS

Course Objective: to understand the digital data preparation and its analysis using Digital image processing software

Course Outcome: at the end of the course the student will able to learn to analyze temporal, spectral and spatial differences of satellite data using image processing software, Perform image pre-processing and post-processing techniques on a given satellite data, classify given satellite data for thematic mapping process, Collect and analyze GPS data and Map geospatial features using GPS data.

List of Experiments:

1. Loading, Creating Image and Display Manipulation
2. Image Enhancement – Linear and Nonlinear
3. Geometric Correction and Mosaicing
4. Band Ratioing
5. NDVI Images
6. Spectral Enhancement
7. Generation of Training Sets
8. Supervised Classification and Accuracy Assessment
9. Unsupervised Classification
10. Change Detection
11. Programs for Image Analysis
12. Study of GPS and various parts and its working
13. Surveying with GPS-Static and Kinematic

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