



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
Kakinada-533003, Andhra Pradesh, India

M.Tech in Remote Sensing

Vision

To be a catalyst through state-of-art technology in Remote Sensing and Geographical Information System for the development and utilization of resources across the wide spectrum of its applications.

Mission

- To Incorporate the effective and efficient use of Remote Sensing & GIS Applications and related technology, by using a variety of training methods and materials.
- To provide proactive support and assistance for the students to emerge as an efficient player in the industry.
- To support the growth of the GIS industry by offering a wide range of technical services in Remote Sensing & GIS applications
- To extend faculty development and support industrial attachment; and continuously research on emerging knowledge and technology.

PROGRAM EDUCATIONAL OBJECTIVES

- PE01 Apply principles of Remote sensing and GIS to collect, map and retrieve spatial information.
- PE02 Plan, assess and evaluate natural and manmade systems using geospatial models and methods
- PE03 Use geospatial tools and techniques for hazard mitigation and resource planning
- PE04 Pursue research and develop capabilities to handle multi-disciplinary field projects
- PE05 Work in teams and demonstrate leadership skills with professional ethics.

PROGRAM OUTCOMES: At the end of the program the student will be able to:

- P01** Engage in critical thinking and pursue research/ investigations and development to solve practical problems.
- P02** Communicate effectively on complex engineering activities with the engineering community and with society at large, write and present substantial technical reports.
- P03** Demonstrate higher level of professional skills to tackle multidisciplinary and complex problems related to "Remote Sensing and GIS".
- P04** Apply principles of Remote sensing and GIS to collect, map and retrieve spatial information
- P05** Plan, assess and evaluate natural and manmade systems using geospatial models and methods
- P06** Develop geospatial models and tools to address the social and engineering problems



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COURSE OUTCOMES

Course Code	REMOTE SENSING
M3301	

After completion of course, students would be able to:

- C01 Analyze the energy interactions in the atmosphere and earth surface features
- C02 Identify the earth surface features from satellite images
- C03 Select the type of remote sensing technique / data for required purpose
- C04 Acquire knowledge about concepts of remote sensing, sensors and their characteristics
- C05 Acquire knowledge in basic concepts of photogrammetry and mapping method

Course Code	GEOGRAPHICAL INFORMATION SYSTEM
M3302	

After completion of course, students would be able to:

- C01 Analyze the basic components of GIS
- C02 Classify the maps, coordinate systems and projections
- C03 Process spatial and attribute data and prepare thematic maps
- C04 Perform Spatial Querying & Analysis
- C05 Conceptualization of GIS project

Course Code	PHOTOGRAMMETRY (Elective-I)
M3303	

After completion of course, students would be able to:

- C01 Classify the photogrammetry methods and their applications
- C02 Determine the scale, ground coordinates and the aerial extent of aerial photographs
- C03 Demonstrate interior and exterior orientation on two overlapping aerial photographs
- C04 Measure parallax and compute elevations from parallax measurements
- C05 Prepare mosaics, orthophotos and photomaps for mapping in a range of applications

Course Code	EARTH SYSTEMS (Elective-I)
M3304	

After completion of course, students would be able to:

- C01 Understand mapping lithological and structural features
- C02 Understand mapping concepts involved in Fluvial structures
- C03 Understand thematic concepts of Glacial/Aeolian landforms
- C04 Analyse the structure and behaviour of Atmosphere
- C05 Get exposed to various earth sciences applications

Course Code	WATER RESOURCES MANAGEMENT (Elective-I)
M3305	

After completion of course, students would be able to:

- C01 Explain Hydrological cycle and its different parameters
- C02 Analyze the Rainfall-runoff relationship with flood forecasting
- C03 Describe various terms related to "Groundwater"
- C04 Explain the rainwater harvesting techniques and water models
- C05 Describe important characteristics of "Watershed".



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Course Code	OBJECT ORIENTED PROGRAMMING (Elective-II)
M3306	

After completion of course, students would be able to:

- C01 Understand the basics of any Object-Oriented Language
- C02 Write small programs with basic controls and objects
- C03 Write some complicated programs using Packages and Interfaces
- C04 Program Multi-threaded programs with exceptions
- C05 Design GUIs using AWT packages of Java

Course Code	PRINCIPLES OF GEODATABASE (Elective-II)
M3307	

After completion of course, students would be able to:

- C01 Understand the components of DBMS and file management methods
- C02 Apply the concepts of SQL and its use to manage the databases
- C03 Understand the data models and data structures used for spatial data
- C04 Perform Geospatial Topology analysis
- C05 Design a geodatabase for various Remote Sensing & GIS applications

Course Code	GEO-STATISTICAL METHODS (Elective-II)
M3308	

After completion of course, students would be able to:

- C01 Study basics of statistical methods
- C02 Understand concept of probability distribution, correlation methods
- C03 Conduct hypothesis testing
- C04 Study GIS data with complex geospatial methods
- C05 Solve the geospatial problems using R

Course Code	REMOTE SENSING LABORATORY
M3309	

After completion of course, students would be able to:

- C01 Analyze temporal, spectral and spatial differences of satellite data using image processing software
- C02 Perform image pre-processing and post-processing techniques on a given satellite data
- C03 Classify given satellite data for thematic mapping process
- C04 Identify various geographical features on Toposheets & Satellite Images
- C05 Understand various elements of Visual Interpretations and their identities.

Course Code	GEOGRAPHICAL INFORMATION SYSTEMS LABORATORY
M3310	

COURSE OUTCOMES

After completion of course, students would be able to:

- C01 Delineate various geographical features using ArcGIS & QGIS softwares
- C02 Understand the various Projection Systems & Coordinate Systems
- C03 Generate 3D outputs and profiles
- C04 Differentiate various Analysis – 3D, Buffer, Network, Spatial etc...
- C05 Understand all the overlay analysis techniques



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Course Code	RS & GIS APPLICATIONS IN EARTH SCIENCES
N3301	

After completion of course, students would be able to:

- C01 Visualize landforms, and locate / identify geographic and geologic features.
- C02 Explain the various components of Forests using various Remote Sensing Data
- C03 Explain the Soil and Agriculture relationship using RS & GIS
- C04 Understand the importance of Watershed and its application in the real world
- C05 Integrate between RS, GIS & Disasters and provide steps for mitigations

Course Code	SATELLITE IMAGE PROCESSING
N3302	

After completion of course, students would be able to:

- C01 Process the remotely sensed data with satellite image processing techniques
- C02 Statistically evaluate the image variables
- C03 Classify the processed remote sensing data
- C04 Evaluate the accuracy of the image classification
- C05 Apply the advanced image processing methods for deriving the useful information

Course Code	GLOBAL NAVIGATIONAL SATELLITE SYSTEM (Elective-III)
N3303	

After completion of course, students would be able to:

- C01 Identify GNSS components and their functions
- C02 Interpret the navigational message and signals received by the GNSS
- C03 Identify error sources in GNSS observations, and apply the corrections for accurate positioning
- C04 Select GNSS survey method
- C05 Map the geospatial features

Course Code	GEOSPATIAL DATA PROCESSING AND MODELING (Elective-III)
N3304	

After completion of course, students would be able to:

- C01 Conduct advanced spatial analyses using GIS tools
- C02 Study GIS data with complex geospatial models
- C03 Solve the geospatial problems using programming tools
- C04 Develop models in GIS using appropriate GIS software
- C05 Analyse GIS data and generate applications

Course Code	CLIMATE SYSTEMS (Elective-III)
N3305	

After completion of course, students would be able to:

- C01 Understand and explain the differences between weather and climate, local to global climatic variations.
- C02 Quantify relationship between ecosystem, rainfall, and temperature, etc.,
- C03 identify/map different types of surface waterbodies, glaciers, and drought impact from satellite imageries.
- C04 Describe global policies and EIA methods, and link them with local, regional and national developmental initiatives and generate report.
- C05 Map/model the impact of global warming on these systems using RS & GIS.



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Course Code	ADVANCED REMOTE SENSING (Elective-IV)
N3306	

After completion of course, students would be able to:

- C01 Understand the principles of thermal and microwave remote sensing
- C02 Relate backscattering signals from different surfaces to physical processes, and understand active and passive microwave systems.
- C03 Make use of thermal and hyperspectral data for real world applications (analyzing Urban Heat Island problem, estimation of surface composition, forest species identification etc.).
- C04 Classify and analyze Hyperspectral data
- C05 Identify the working mechanism and applications of UAV systems

Course Code	WEB & MOBILE GIS (Elective-IV)
N3307	

After completion of course, students would be able to:

- C01 Publish geospatial data in web environment
- C02 Analyse the geospatial layers in web environment
- C03 Establish Server-Client configuration for GIS environment
- C04 Develop applications in web and mobile platforms
- C05 Prepare and publish geospatial data in mobile applications

Course Code	GEO-SPATIAL APPLICATIONS FOR COASTAL ZONE MANAGEMENT (Elective-IV)
N3308	

After completion of course, students would be able to:

- C01 Manage the demands of the coastal zone as the interface between land and sea
- C02 Explain the Coastal Ecosystem and the role of RS & GIS to study
- C03 Understand the coastal disasters and their mitigations
- C04 Understand the Anthropogenic Disasters effecting the coasts
- C05 Explain various CZM techniques to solve various Coastal problems

Course Code	SATELLITE IMAGE PROCESSING LABORATORY
N3309	

After completion of course, students would be able to:

- C01 Analyze temporal, spectral and spatial differences of satellite data using image processing software
- C02 Perform image pre-processing and post-processing techniques on a given satellite data
- C03 Classify given satellite data for thematic mapping process

Course Code	GEOSPATIAL SIMULATIONS LABORATORY
N3310	

After completion of course, students would be able to:

- C01 Differentiate between various Interpolation methods
- C02 Delineate watersheds based on DEM and SWAT models
- C03 Build models using Model Builder in ArcGIS & QGIS
- C04 Perform various analysis on Hydrology using Hydrological models
- C05 Program on R software and Python scripting



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Course Code	SOFT COMPUTING TECHNIQUES
P3302	

After completion of course, students would be able to:

- C01 Differentiate between various Interpolation methods
- C02 Delineate watersheds based on DEM and SWAT models
- C03 Build models using Model Builder in ArcGIS & QGIS
- C04 Perform various analysis on Hydrology using Hydrological models
- C05 Program on R software and Python scripting

Course Code	ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT USING RS & GIS
P3303	

After completion of course, students would be able to:

- C01 Understand the concepts of Environmental Impact Assessment
- C02 Understand the principles involved in EIA management
- C03 Get exposed to various methods of risk assessment and management

Course Code	URBAN & REGIONAL PLANNING USING GEOSPATIAL TECHNOLOGIES
P3304	

After completion of course, students would be able to:

- C01 Gain knowledge of urban and regional planning concepts, the use of geomatics technology in
- C02 planning and management in urban areas and regions.
- C03 Familiarize with case studies, inputs from Remote Sensing and GIS.

Course Code	FUNDAMENTALS OF REMOTE SENSING & GIS
POE71	

After completion of course, students would be able to:

- C01 Be familiar with ground, air and satellite based sensor platforms.
- C02 interpret the aerial photographs and satellite imageries
- C03 create and input spatial data for GIS
- C04 apply RS and GIS concepts for application
- C05 Program on R software and Python scripting

Course Code	APPLICATION OF REMOTE SENSING IN ENVIRONMENTAL MANAGEMENT
POE60	

After completion of course, students would be able to:

- C01 Acquire knowledge of various components of environment and assessment of their quality.
- C02 Gain exposure to current and future satellite missions used for environmental assessment and modelling.

Course Code	INTERNET OF THINGS
POE35C	

After completion of course, students would be able to:

- C01 understand the application areas of IOT.
- C02 realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
- C03 understand building blocks of Internet of Things and characteristics.