MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)

Kokapet (Village), Gandipet (Mandal), Hyderabad-500 075

B.Tech. Minor in REMOTE SENSING AND GIS
(MR 25 Regulation)

(Applicable for the students admitted from AY 2025-26)

COURSE STRUCTURE & SYLLABUS

Semester	Course Code	Course	L	T	P	C
IV Semester	M154AE	Concepts of Remote Sensing and GIS	3	0	0	3
IV Semester	M15404	GIS Laboratory	0	0	2	1
V Semester	M155AE	Geospatial Analysis and Research	3	0	0	3
VI Semester	M156AF	Database Concepts and Web GIS	3	0	0	3
VI Semester	M15605	Remote Sensing Laboratory	0	0	2	1
VII Semester	M157AQ	Drone Survey and Mapping	3	0	0	3
VII Semester	M15705	Project/ Experiential Learning	0	0	8	4
		Total	12	0	12	18

L-Lecture, T-Tutorial, P-Practical, C-Credits

L	T	P	C
3	0	0	3

B.Tech. Minor in REMOTE SENSING AND GIS

IV Semester Syllabus

M154AE: CONCEPTS OF REMOTE SENSING AND GIS

Course Objectives:

1. To introduce the fundamental concepts, principles, electromagnetic radiation characteristics, and energy interactions involved in Remote Sensing and its relevance to Civil Engineering.
2. To familiarise students with satellite systems, sensor characteristics, image resolutions, and visual interpretation techniques used in Remote Sensing.
3. To explain the principles, types, and applications of aerial photographs, stereoscopy, scale, mosaics, ground control, and parallax measurements in photogrammetry.
4. To introduce the components, categories, operations, data representation methods, and database creation techniques in GIS.
5. To explain raster, vector, and attribute data models, geospatial data analysis, and the integration of Remote Sensing, GIS, and GPS for spatial decision-making.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Explain the principles of Remote Sensing
2. Differentiate types of sensors and satellites
3. Describe the principles of photogrammetry
4. Demonstrate the concepts and fundamentals of geographic information system
5. Apply the knowledge of RS and GIS in data analysis

Unit –I: INTRODUCTION OF REMOTE SENSING:

History, Development, Definition, Concept & Principles, Electromagnetic Radiation (EMR) and Its Characteristics, Wavelength Regions and their Significance, Interaction of EMR with Atmosphere and Earth's Surface: Absorption, Reflectance and Scattering, Atmospheric Windows, Spectral Response and Spectral Signature. Learning outcomes: At the end of the unit, the student will be able to 1. explain the importance of Remote Sensing in Civil Engineering 2. discuss the elements in Remote Sensing 3. describe the concepts of energy interactions with various features

Unit –II: SATELLITES & SENSORS:

Spectral, Spatial, Temporal and Radiometric resolutions, Satellite and sensor characteristics of LANDSAT series, SPOT, IRS, High Resolution Satellite Systems. Visual interpretation keys - converging evidence. Learning outcomes: At the end of the unit, the student will be able to 1. explain the various sensors in a satellite system 2. discuss the sensor characteristics 3. explain the factors that influence image interpretation

Unit –III: PHOTOGRAMMETRY:

Introduction – principle and types of aerial photographs, Stereoscopy, Scale of a vertical aerial photograph, map

Vs aerial photographs, mosaic, ground control, parallax measurements for height. At the end of the unit, the student will be able to 1. explain the concepts of Photogrammetry 2. discuss the principles in Aerial Photo data capture 3. describe the overall process in photogrammetry

Unit –IV: GEOGRAPHICAL INFROMATION SYSTEM:

Introduction, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS. Types of data representation- Data collection data input and output. Manual digitizing and scanning. GIS data file management; Layer based GIS, Feature based GIS mapping. At the end of the unit, the student will be able to 1. explain the components and workflow of GIS 2. explain the methods to create GIS database 3. discuss the importance of data accuracy

Unit – V: GEOSPATIAL DATA AND ANALYSIS:

Data storage – raster, vector and attribute data storage, Overview of the data manipulation and analysis. Integration of RS, GIS & GPS, Raster and Vector data Analysis, Integrated analysis of the spatial and attribute data. Learning outcomes: At the end of the unit, the student will be able to 1. discuss the methods to store data in GIS 2. explain the GIS data models 3. explain the methods to integrate GIS, GPS and RS

TEXT BOOKS:

1. Lillesand and Kiefer, “Remote Sensing and Image Interpretation”, 5th Edition, published by John Wiley and Sons, 2008.
2. M.Anji Reddy, “Remote Sensing and Geographical Information systems”, 3rd Edition, B.S.Publications, 2006.
3. A.M. Chandra, S.K. Ghosh, “Remote Sensing and Geographical Information System”, Narosa Publishing house, 1st Edition, 2007.
4. Basudeb Bhatta, “Remote Sensing and GIS” Oxford University Press.

REFERENCE BOOKS & WEBLINKS:

1. Micheal N Demers, “Fundamental of GIS”, 3rd Edition, John Wiley & Sons, 2008.
2. C.P.Lo Albert, K.W. Yonng, “Concepts & Techniques of GIS”, 2 nd Edition, Prentice Hall (India) Publications, 2008.
3. David P Paine, “Aerial Photography and Image Interpretation”, 2nd Edition, published by Wiley, Higher Education, 2006.
4. Kang – Tsung chang, “Introduction to GIS”, 4th Edition, TMH Publications & Co., 2007.
5. Ian Heywood, Sarah Cornelius, Steve Carver, “An Introduction to Geographical Information Systems”, 1st Edition, Pearson Education Asia, 2000.
6. Bernhardsen, “Geographic Information Systems- An Introduction”, 3rd Edition, Published by John Wiley Sons, 2006.
7. LRA Narayana, “Basics of Remote Sensing and its applications”, Universities press, 1st Edition, 2001 8
8. Peter A Burrough and Rachael A, MC Donnell, “Principles of Geographical Information Systems”, 1st Edition, Oxford Publishers, 1998.

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0	0	2	1

B.Tech. Minor in REMOTE SENSING AND GIS

IV Semester Syllabus

M15404: GIS LABORATORY

Course Objectives:

1. To familiarise students with the QGIS software interface, spatial data loading, symbology, map layout preparation, digitisation, at g\]'jntribute management and map export procedures.
2. To train students in core GIS operations such as attribute queries, CRS transformation, georeferencing, buffering, overlay analysis, spatial joins and topology validation.
3. To develop practical skills in thematic mapping, raster analysis, terrain derivative generation and preparation of GIS-based outputs for planning, infrastructure and environmental applications.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Create, edit, manage and visualise vector and raster geospatial datasets using QGIS tools.
2. Perform GIS operations such as attribute query, digitisation, reprojection, georeferencing, buffering, overlay, spatial join and topology validation.
3. Prepare thematic maps, choropleth maps, raster derivatives and print-ready GIS outputs for civil engineering and regional planning applications

List of Experiments:

1. Software Interface and Data Loading Launch QGIS; add vector (shapefiles: roads, boundaries) and raster layers. Explore toolbars, zoom/pan; save project. Output: Layer-stacked map view.

2. Symbology and Map Layout Symbolize layers (graduated colors for population); add legend, scale bar, north arrow in Print Layout. Export PDF. Focus: Visual hierarchy.

3. Attribute Queries and Selection Query roads by length/type (Select by Expression: "length" > 5000 AND "type" = 'paved'). Export selection; compute statistics. Output: Filtered layer.

4. Digitization of Features Trace points (wells), lines (rivers), polygons (parcels) over imagery. Snap/edit vertices; add attributes. Output: New editable shapefile.

5. Map Projections and Reprojection Check CRS (e.g., WGS84 to UTM 43N); reproject layers. Overlay for alignment check. Output: Consistent projection map.

6. Georeferencing Scanned Maps Place 10+ GCPs on scanned toposheet; apply polynomial warp (RMSE

7. Buffering and Proximity Analysis Buffer schools (500m); union with zones. Calculate overlap areas. Output: Accessibility heatmap.

8. Overlay Operations Intersect land use with flood zones; dissolve boundaries. Output: Risk polygons with area stats.

9. Spatial Joins and Table Management Join census CSV to boundaries; calculate per-capita fields. Output: Enriched attribute table/map.

10. Choropleth and Thematic Mapping Normalize data (density choropleth); classify 5 breaks. Output: Print-ready population density map.

11. Raster Analysis Basics Convert vectors to raster; resample elevation DEM. Output: Slope/aspect derivatives.

12. Basic Topology and Validation

Note: Any 10 experiments may be conducted.

TEXT BOOKS:

1. Longley, P. A., Goodchild, M. F., Maguire, D. J. and Rhind, D. W., **Geographic Information Science and Systems**, 4th Edition, Wiley. This is a comprehensive reference for GIS concepts, systems and practical problem-solving.
2. Burrough, P. A., McDonnell, R. A. and Lloyd, C. D., **Principles of Geographical Information Systems**, Oxford University Press. Suitable for theory and practice of GIS, including spatial data handling and analysis.
3. Bolstad, P. and Manson, S., **GIS Fundamentals: A First Text on Geographic Information Systems**, 7th Edition. Useful for data models, projections, editing, mapping, raster/vector analysis and GIS applications.

REFERENCE BOOKS

1. Chang, K. T., **Introduction to Geographic Information Systems**, 9th Edition, McGraw Hill. Useful for undergraduate GIS laboratory courses because it balances GIS concepts with hands-on applications.
2. Heywood, I., Cornelius, S. and Carver, S., **An Introduction to Geographical Information Systems**, 4th Edition, Pearson. A clear introductory GIS text with practical applications and multidisciplinary case studies.

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3	0	0	3

B.Tech. Minor in REMOTE SENSING AND GIS

V Semester Syllabus

M155AE: GEOSPATIAL ANALYSIS AND RESEARCH

Course Objectives:

1. To introduce the concepts of spatial and non-spatial data, database management systems, geodatabase models, and geospatial data standards for effective geospatial data management.
2. To familiarise students with raster data structures, raster data models, image processing techniques, data compression methods, surface analysis, and image classification approaches.
3. To explain vector data representation, vector data models, topology, geoprocessing tools, neighbourhood analysis, and network analysis for spatial problem-solving.
4. To develop an understanding of DEM/DTM generation, surface representation, terrain analysis, and their applications in geospatial modelling.
5. To expose students to geospatial research problems, national and international projects, geospatial data requirements, and major data sources for regional and local-level research.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Explain the concepts of Geospatial database
2. Explain data analysis tools using Raster data
3. Explain data analysis tools using Vector data
4. Demonstrate the uses of 3D GIS
5. Describe the importance of geo spatial data in research

Unit –I: GEO SPATIAL DATABASE

Spatial and Non-Spatial data, Data Base Management Systems (DBMS), Components of DBMS, Functions of DBMS, Data abstraction models, Geodatabase model, Geospatial data standards Learning outcomes: At the end of the unit, the student will be able to 1. discuss the database concepts 2. explain the spatial and non-spatial data 3. discuss types of analysis

Unit –II: RASTER ANALYSIS

Raster Data & its Representation, Raster data models, Image processing -Preprocessing, post processing, Data Compression-block code, chain code, run length code, quadtree, MrSID, Surface analysis, Supervised and Un-Supervised classification. Learning outcomes: At the end of the unit, the student will be able to 1. explain the raster data structure 2. discuss about the data compression techniques 3. explain image classification

Unit –III: VECTOR ANALYSIS:

Vector data representation, Vector data models, Topology, Geo Processing-Buffer, Intersect, Clip, Union,

Dissolve, Neibourhood analysis, Network Analysis. Learning outcomes: At the end of the unit, the student will be able to 1. explain the vector data structure 2. discuss the concept of topology 3. discuss the Geo processing tools

Unit –IV: MODELING AND ANALYSIS

DEM Generation Surface Representation & Analysis-GRID, TIN, Terrain Analysis-Slope, Aspect, Hill shade, Relief, Applications of DEM/DTM. Learning outcomes: At the end of the unit, the student will be able to 1. explain the 3D GIS 2. differentiate between TIN and GRID 3. demonstrate applications using DEM/DTM

Unit – V: GEO SPATIAL RESEARCH AND DATA SOURCES

Geo-spatial Research Problems. National and International Projects: Past and Recent, Different types of Geo-spatial data requirement, USGS Global Visualization Viewer (GloVis), NASA Earth Observation (NEO), USGS Earth Explorer, ESA's Sentinel data, NOAA, IPMUS Terra, LANCE, VITO Vision, Bhuvan, MOSDAC, India-WRIS, Identification of problems at regional and Local level. Learning outcomes: At the end of the unit, the student will be able to 1. identify the research areas in Geo Spatial Technology 2. identify the data sources for research 3. discuss past and present research

TEXT BOOKS:

1. Lillesand and Kiefer, "Remote Sensing and Image Interpretation", 5th Edition, published byJohn Wiley and Sons, 2008.
2. M.Anji Reddy, "Remote Sensing and Geographical Information systems", 3rd Edition, B.S.Publications, 2006.
3. A.M. Chandra, S.K. Ghosh, "Remote Sensing and Geographical Information System", Narosa Publishing house, 1st Edition, 2007.
4. Basudeb Bhatta, "Remote Sensing and GIS" Oxford University Press

REFERENCE BOOKS:

1. Micheal N Demers, "Fundamental of GIS", 3rd Edition, John Wiley & Sons, 2008.
2. C.P.Lo Albert, K.W. Yonng, "Concepts & Techniques of GIS", 2 nd Edition, Prentice Hall (India) Publications, 2008.
3. David P Paine, "Aerial Photography and Image Interpretation", 2nd Edition, published by Wiley, Higher Education, 2006.
4. Kang – Tsung chang, "Introduction to GIS", 4th Edition, TMH Publications & Co., 2007.
5. Ian Heywood, Sarah Cornelius, Steve Carver, "An Introduction to Geographical Information Systems", 1st Edition, Pearson Education Asia, 2000.
6. Bernhardsen, "Geographic Information Systems- An Introduction", 3rd Edition, Published by John Wiley Sons, 2006.
7. LRA Narayana, "Basics of Remote Sensing and its applications", Universities press, 1st Edition, 2001
8. Peter A Burrough and Rachael A, MC Donnell, "Principles of Geographical Information Systems", 1st Edition, Oxford Publishers, 1998.

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B.Tech. Minor in REMOTE SENSING AND GIS

VI Semester Syllabus

M156AF: DATABASE CONCEPTS AND WEB GIS

Course Objectives:

1. To introduce spatial and non-spatial data, DBMS concepts, components, functions, data abstraction models, geodatabase models, and geospatial data standards.
2. To familiarise students with GIS data file management, database models, and different approaches for storing GIS data.
3. To explain the concept, history, components, users, stakeholders, advantages, and limitations of Web GIS and Distributed GIS.
4. To introduce the fundamentals of HTML, CSS, forms, tables, and static and interactive web mapping techniques.
5. To expose students to open-source and proprietary web mapping platforms, vector data formats, GeoServer, NSDI, Census GIS, BHUVAN, and crowdsourcing applications.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Explain the concepts of Geo Spatial database
2. Explain about database models
3. Discuss the components of Web GIS
4. Discuss the basics of web development
5. Describe the importance open source Web GIS

Unit –I: GEO SPATIAL DATABASE:

Spatial and Non-Spatial data, Data Base Management Systems (DBMS), Components of DBMS, Functions of DBMS, Data abstraction models, Geodatabase model, Geospatial data standards Learning outcomes: At the end of the unit, the student will be able to 1. discuss the database concepts 2. explain the components of DBMS 3. Discuss the Geospatial data standards

Unit –II: DATABASE MODELS

GIS data file management - Ordered sequential and indexed files, Database models - Hierarchical model, Network systems, Relational database models, Storage of GIS data- hybrid data model, integrated data model, Object based data models, entity relationship attribute model. Learning outcomes: At the end of the unit, the student will be able to 1. discuss the GIS data file management 2. explain the database models 3. explain storage of GIS data

Unit –III: WEB GIS INTRODUCTION:

Definition, concept of Web GIS, History of Web GIS, components of web GIS, internet, web GIS v/s Internet GIS, Distributed GIS, users and stake holders of web GIS, advantages and limitations of web GIS. Learning

outcomes: At the end of the unit, the student will be able to 1. explain the concepts of Web GIS 2. discuss the advantages and limitations of Web GIS P 0 C 3 3. explain the history of Web GIS

Unit –IV: BASICS OF WEB DEVELOPMENT:

HTML- The structure of an HTML document, Basic HTML Tags, HTML Tables, HTML Forms, Basics of CSS, Web mapping: static and interactive web mapping. Learning outcomes: At the end of the unit, the student will be able to 1. explain HTML forms 2. discuss basics of CSS 3. discuss the methods of web mapping

Unit – V: OPEN SOURCE AND PROPRIETARY WEB APPLICATIONS:

Open source and proprietary web-based scripting and mapping environments, KML, GeoJSON, and other formats for drawing vector data in the browser, GeoServer, NSDI, Census GIS, BHUVAN, Crowd Sourcing. Learning outcomes: At the end of the unit, the student will be able to 1. discuss the open source web platforms 2. explain different formats for vector in web 3. Discuss GeoServer, BHUVAN

TEXT BOOKS:

1. M.Anji Reddy, “Remote Sensing and Geographical Information systems”, 3rd Edition, B.S.Publications, 2006.
2. Kraak, M. and Brown, A. Web Cartography: Development and Prospects, Taylor and Francis,London, 2001.
3. Tereshenkov, A., Web GIS Application in Local Government, VDM Verlag, 2009.

REFERENCE BOOKS:

1. Micheal N Demers, “Fundamental of GIS”, 3rd Edition, John Wiley & Sons, 2008.
2. C.P.Lo Albert, K.W. Yonng, “Concepts & Techniques of GIS”, 2nd Edition, Prentice Hall(India) Publications, 2008.
3. Peter A Burrough and Rachael A, MC Donnell, “Principles of Geographical InformationSystems”, 1st Edition, Oxford Publishers, 1998.
4. Pinde Fu and Jiulin Sun, Web GIS: Principles and Applications, ESRI Press, 2011
5. Maximiliano Firtman., jQuery Mobile: Up and Running, O'Reilly, 2012

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B.Tech. Minor in REMOTE SENSING AND GIS

VI Semester Syllabus

M15605: REMOTE SENSING LABORATORY

Course Objectives:

1. To familiarise students with satellite image handling, band composites, image enhancement, geometric/radiometric correction, subsetting and layer stacking using ENVI/QGIS.
2. To train students in raster-based remote sensing analysis such as vegetation indices, image classification, change detection, filtering, PCA and accuracy assessment.
3. To develop practical skills in preparing classified maps, thematic outputs, statistical reports and interpretation of remotely sensed data for civil/environmental applications.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Display, enhance, subset, stack and correct satellite images using standard digital image processing techniques.
2. Generate remote sensing outputs such as RGB composites, NDVI/NDWI maps, classified land use/land cover maps, change detection maps and PCA images.
3. Evaluate and interpret classification results using accuracy assessment, error matrix, RMSE, kappa coefficient and statistical outputs for practical geospatial applications.

List of Experiments

1. Image Display and Band Composites Open Landsat/Sentinel bands in ENVI/QGIS. Create RGB (true: 4-3-2; false: 5-4-3). Output: Composite images with profiles.

2. Grayscale and Pseudo-Color Enhancement Stretch single bands (linear/histogram equalize); apply pseudo-color ramps. Output: Enhanced grayscale views.

3. Geometric Correction (Orthorectification) Select GCPs (20+); warp subscene (cubic convolution). Output: RMSE report; basemap overlay.

4. Radiometric Correction Correct haze (dark object subtraction); normalize multi-date images. Output: Histogram-matched pairs.

5. Image Subsetting and Layer Stacking Subset ROI (Hyderabad); stack bands into multi-band file. Output: Cropped, stacked imagery.

6. Vegetation Indices (NDVI, NDWI) Raster calc: (NIR-Red)/(NIR+Red). Threshold classify. Output: Binary vegetation map.

7. Unsupervised Classification (K-Means) Cluster 5-10 classes on stacked image. Output: Land cover map; statistics table.

8. Supervised Classification (Maximum Likelihood) Train 5 classes (signatures); classify/validate. Output: Classified raster with confusion matrix.

9. Change Detection (Post-Classification) Compare two dates (2024-2025); matrix of from-to changes. Output: Change map (urban growth).

10. Edge Detection and Filtering Apply directional filters (Sobel); focal statistics (mean/median). Output: Enhanced edges/textures.

11. Accuracy Assessment Generate 50 random points; error matrix from ground truth. Output: Kappa coefficient report.

12. Principal Component Analysis (PCA) Transform bands to PCs; select PC1-3 for composite. Output: Noise-reduced PCA image; eigenvalue table.

Note: Any 10 experiments may be conducted.

TEXT BOOKS:

1. Campbell, J. B., Wynne, R. H. and Thomas, V. A., **Introduction to Remote Sensing**, 6th Edition, Guilford Press.
2. Richards, J. A. and Jia, X., **Remote Sensing Digital Image Analysis: An Introduction**, Springer.
3. Schowengerdt, R. A., **Remote Sensing: Models and Methods for Image Processing**, 3rd Edition, Academic Press/Elsevier.

REFERENCE BOOKS:

1. Mather, P. M. and Koch, M., **Computer Processing of Remotely-Sensed Images**, 5th Edition, Wiley-Blackwell.
2. Sabins, F. F. and Ellis, J. M., **Remote Sensing: Principles, Interpretation, and Applications**, 4th Edition, Waveland Press.

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3	0	0	3

B.Tech. Minor in REMOTE SENSING AND GIS

VII Semester Syllabus

M157AQ: DRONE SURVEY AND MAPPING

Course Objectives:

1. To introduce the fundamentals, components, history, payload, battery life, DGCA regulations, licensing requirements, and pre- and post-flight planning procedures for drone-based data collection.
2. To familiarise students with drone hardware selection, surveying accuracy, error control techniques, GCP requirements, job planning, and autonomous, manual, and hybrid flight profiles.
3. To explain aerial triangulation, post-processing software workflows, terrain data extraction, contouring, DEM, DSM, cut-fill analysis, volumetric measurement, and orthophoto generation.
4. To develop an understanding of drone-based mapping and modelling concepts, including RTK, PPK, GCPs, and data processing software platforms.
5. To expose students to the applications of drones in surveying, mapping, construction, irrigation, agriculture, engineering land survey, and transportation sectors.

Course Outcomes:

After the completion of the course, the student will be able to:

1. Explain the fundamentals of Drone surveying
2. Describe the Methods of Surveying with Drone
3. Explain the concepts of Image processing and Photogrammetry
4. Explain Modeling with Drones
5. Discuss about Drone applications

Unit –I INTRODUCTION ON DRONES:

Introduction to Drones, History of Drone/UAS/UAVs, payload, battery life, Specs for good results, Regulations of DGCA and Drone license, Pre and Post Flight planning- Flight execution and photography, data collection Learning outcomes: At the end of the unit, the student will be able to 1. explain the components in Drone 2. discuss about flying regulations 3. explain the flight plan

Unit –II SURVEYING WITH DRONE:

Consideration for hardware selections, comparison on surveying drone and its accuracy, Techniques of controlling errors, Consideration of GCP in vertical and horizontal accuracies, Planning and estimation of drone surveying jobs, Autonomous flight vs. manual and hybrid flight profiles Learning outcomes: At the end of the unit, the student will be able to 1. explain drone hardware 2. describe about drone applications and accuracy 3.

explain the planning process in Drone Surveying

Unit –III IMAGE PROCESSING AND PHOTOGRAMMETRY:

Aerial Triangulation, post processing softwares, Analyzing Data, Contouring, DEM, DSM, Cut, Fill, and Volumetric Measurement Calculation and orthophoto generation. Learning outcomes: At the end of the unit, the student will be able to 1. discuss the software workflow 2. explain the terrain data extraction 3. describe the process of orthophoto generation

Unit –IV MAPPING AND MODELING:

Introduction to mapping and modeling concepts, Understanding RTK, PPK and GCP's, Overview of popular data processing software platforms and functions. Learning outcomes: At the end of the unit, the student will be able to 1. explain the concepts of mapping 2. describe the concepts of RTK and GCP 3. explain drone data processing

Unit – V APPLICATIONS:

Application of drone for Surveying & Mapping-Construction, Irrigation and Agricultural, Engineering Land Survey and Transportation. Learning outcomes: At the end of the unit, the student will be able to 1. discuss the applications of drones in construction 2. explain the role of drones in irrigation and agriculture 3. explain drone role in land survey

TEXT BOOKS:

1. Lillesand and Kiefer, "Remote Sensing and Image Interpretation", 5th Edition, published byJohn Wiley and Sons, 2008..
2. One Nation Under Drones: Legality, Morality, and Utility of Unmanned Combat Systems byJohn E. Jackson.
3. A.M. Chandra, S.K. Ghosh, "Remote Sensing and Geographical Information System", NarosaPublishing house, 1st Edition, 2007

REFERENCE BOOKS:

1. David P Paine, "Aerial Photography and Image Interpretation", 2nd Edition, published byWiley, Higher Education, 2006.
2. Drones and Support for the Use of Force by James Igoe Walsh.

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B.Tech. Minor in REMOTE SENSING AND GIS

VII Semester Syllabus

M15705: PROJECT/ EXPERIENTIAL LEARNING

Course Objective:

To enable students to apply the concepts of Remote Sensing, GIS, GPS, Web GIS, geospatial databases, raster/vector analysis, DEM/DTM, and drone-based mapping to identify, analyse and solve real-world civil engineering and environmental problems through project-based experiential learning.

Course Outcome:

After the completion of the Project, the student will be able to:

Develop a complete geospatial project by acquiring relevant spatial and non-spatial data, processing satellite/drone/GIS datasets, performing spatial analysis, preparing thematic maps, interpreting results, and presenting decision-support outputs for civil engineering, infrastructure, environmental or regional planning applications.

Projects will be offered in the major thrust areas of Remote Sensing & GIS.