## Semester-III

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Grand Total Marks and Credits 2400 96

ID: Inter Disciplinary Paper
** Elective Paper (Discipline Centric)
UNIT-I
2. Urban Settlements - Processes, Patterns & Levels of Urbanization.

UNIT-II
4. Urbanization in Developed and Developing Countries.
5. Third World Urbanization, Impact of Colonialism.
6. Comparative Study of Urbanization in NW Europe, South Asia and East Africa.

UNIT-III
7. City size Structure Relation Rank Size Rule and Primate City pattern
8. Urban land use and land values, Concept of Smart City
9. Models of Urban Morphology (Concentric Zone, Sector, Multiple Nuclei Models and alternatives given by Berry, Robson, Taffe)

UNIT-IV
10. Central Place Theory of Christaller and Losch
11. Suburbanization and growth of City Fringe, Urban Sprawl
12. Urban Environment – Housing, Slums, pollution
13. Master plans for urban development

REFERENCES:
10. Singh K. and Steinberg F. (Eds) - Urban India in Crises, New Age Interims, New Delhi, 1998.
UNIT-I

2. Approaches to the Study of Agriculture in Geography.
3. Origin and Development of Agriculture in different parts of the world.

UNIT-II

4. Factors influencing Agriculture.
6. Concept of land capability and carrying capacity.

UNIT-III

7. Agricultural Regionalization:
   i. Concept of Agricultural region.
   ii. Agricultural regions in India and World.
8. Quantitative methods in Agricultural Regionalization.

UNIT-IV

10. Models in Agricultural Geography:
    i. Von Thunen’s Agricultural Model.
    ii. Olaf Jonasson’s Agricultural Model.
11. Problems and prospectus of Indian Agriculture (general treatment) Precision Farming its relevance in India context.

REFERENCES:

THEORY PAPER-III (GG303T)

PHOTOGRAMMETRY (4 Credits)

UNIT-I
1. History of Photogrammetry
2. Electro-magnetic spectrum with application in Aerial photography.
3. Classification of Aerial Photographs.

UNIT-II
4. Geometric aspects of Aerial photos, Scale, Focal length, Angle of coverage.
5. Stereoscopic vision-Depth perception.
6. Ortho-photo, Mosaics

UNIT-III
7. Principles and Techniques of Photo-Interpretation
8. Flight Planning/Acquisition of Aerial Photograph.
9. Type of cameras, Stereo- Plotting, Radial line Triangulation.

UNIT-IV
10. Application of Aerial photographs—Urban Studies, land uses, land cover mapping – Mapping from Aerial photos
12. Difference between Aerial photograph and Map.

REFERENCES:

Elective (Discipline Centric)

THEORY PAPER-IV (GG304T)  
NATURAL RESOURCE MANAGEMENT  (4 Credits)

UNIT-I

1. Concept, models and approaches to natural resource management.
2. Utilisation, Conservation and Management of Resources.

UNIT-I

4. Resource Appraisal: Ground, remote sensing and G.I.S.

UNIT-I

5. Sustainable Resource Development: Concept, method and dimensions, creating sustainable systems.
6. Integrated Resource Development: Ecological, economic and social aspects; problems of river basin development.

UNIT-I

8. Utilization, management problems and policies of natural resources in India.

REFERENCES:

Elective (Discipline Centric)

THEORY PAPER-IV (GG304T)
POLITICAL GEOGRAPHY (4 Credits)

UNIT-I
2. Approaches in the study of political Geography.
3. Relevance of Political Geography with other Disciplines.

UNIT-II
4. Nation and State – Concept and evolution – Locational- Morphological and Demographic Components- Land locked, littoral and Island states.
5. Frontiers and Boundaries – Evolution and classification – core areas and capitals, Centre-
6. Periphery relations.

UNIT-III
   International Relations –Multi National Organizations: Political, Economic and Cultural Blocks.
8. Geography of Federalism – Colonialism.
9. Concept of Buffer State.

UNIT-IV
10. Electoral studies in Political Geography.

REFERENCES:
8. R. Ddikshit - Political Geography.
PRACTICAL PAPER-I (GG351P)

TECHNIQUES OF AGRICULTURAL AND URBAN ANALYSIS

(2 Credits)

1. Determination of crop combination regions.
2. Crop concentration (Location Quotient Method).
3. Agricultural efficiency and Productivity.
4. Determination of cropping intensity.
5. Determination of crop diversification.
8. Functional Classification of Settlements (Nelson’s Method)
10. Centro Graphic Analysis – Mean Center and Median Center.

REFERENCES:

PHOTOGRAMMETRY

1. Introduction to aerial photograph and definitions
2. Setting of Aerial Photographs – Transfer of principal point and drawing of flight line.
3. Types of Air Photos – Vertical & Oblique.
4. Calculation of Photo Scales, Calculation of number of Photographs and Strips
5. Mapping of Physical and Cultural details.

VISUAL IMAGE ANALYSIS:

6. Satellite Imageries of various scales/Bands
8. Identification of ground truth locations on Satellite Imagery.
9. Identification of Land Cover Changes – with the help of multi-date imagery.

DIGITAL IMAGE ANALYSIS.

10. Introduction to Digital Image Processing.
13. Unsupervised Classification and Supervised Classification.

REFERENCES:

PRACTICAL PAPER-III (GG353P)
GEOINFORMATICS

(2 Credits)

1. Introduction to Geoinformatics.
2. GIS Models and Structures.
3. Editing and Topology creation.
4. Spatial data Analysis.
7. Land evaluation and Land use planning.
8. Urban area Analysis.
9. Open GIS and Virtual GIS.

WEB TECHNOLOGY

SIMPLE PROGRAMS USING

1. HTML, JAVA Script, VB Script
2. HTML EDITORS
3. XML
4. GML
5. ASP
6. MAP SERVER
7. Map display, Pan, Zoom using client server.

REFERENCES:

1. P.A.Burrough, principles of geographical information systems for land resources assessment.
2. Godchild, geographical information systems – principles, vol.1
3. Graeme F.Bossham caster, Geographical information system for Geoscientists.
7. N.k.Agawal, essentials of GPS.
8. GIS India.
9. GIS @ Development.
11. Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Networks, authored by Dr.
INTER DISCIPLINARY PAPER (ID)

Geography Department, O.U. offering Inter-disciplinary Course Under CBCS

SEMESTER – III

ID PAPER: ENVIRONMENTAL STUDIES (GG354)

(2 Credits)

UNIT -I

1. Environmental Geography – Content Scope and Relationship with other disciplines

2. Concept of ecosystem – abiotic and biotic components


UNIT -II


5. Global concerns: Climate change – Global warming and its implications and ozone layer depletion.

6. Concept of sustainable development – temporal and spatial dimensions

REFERENCES:

3. Savindhra Singh, Environmental Geography, PPB, 2000
5. Gadgil, M & Guha, R., This Fissured Land, An Ecological History of India, OUP, 1995
11. Down to Earth-Science and Environment fortnightly.
UNIT-I
2. Hardware and software used in GIS, GIS capabilities.

UNIT-II
4. Methods and Elements of Data Input, Verification, Storage and Output.
5. Data Quality (Factors affecting data quality), Errors in G.I.S. and Editing – sources of errors, Errors resulting from natural variation, processing.

UNIT-III
7. Spatial Data Analysis – joins, overlays, buffers, Boolean operation.
8. Concept of DTM, DSM, DEM and TIN: Types of Data Products.
9. Digital Elevation model – Data sources and sampling methods for DEM; Structures of DEM-Line, TIN and Grid; Uses of DEM; Products derived from DEM.

UNIT-IV
10. Global Positioning System – Concept, Methods (DGPS), Segments, Data Errors and Rectification, Advantages, Disadvantages.
11. Approaches to GIS and its Future.

REFERENCES:
UNIT-I
1. Regional Concept, types, construction, culture and consciousness.
2. Theory of Space and Spatial Development.
3. Growth pole, Core-Periphery, Basic needs Strategy.

UNIT-II
4. Socio-economic and demographic basis of Regional Development.
5. Resources, Industrialization, Urbanization, and Regional Development.
6. Political economy of Regional Development colonial and post-independence development in India.

UNIT-III
7. Nationality identities and national articulations, and globalization.
8. State articulation of Regional question and civil societal response to regional identity-India and International scenario

UNIT-IV
11. Multi-level/ Micro-level Regional Planning; Regional Justice.

REFERENCES:
Elective (Discipline Centric)

THEORY PAPER-III (GG403T)
RURAL DEVELOPMENT AND PLANNING (4 Credits)

UNIT-I
2. History of Rural Development in India.
3. Theories of Development – Structural, Functional and Spatial Theories of Development.

UNIT-II
5. Rural Development and its Relation with Other Subjects.

UNIT-III

UNIT-IV
12. Participation and role of Panchayats, Rural women and Child Development, role of voluntary organizations and public participation.

REFERENCES:
5. V. Nath – Rural development and Planning in India, Concept publication, New Delhi, 2010.

**Elective (Discipline Centric)**

**THEORY PAPER-III (GG403T)**

**GEOGRAPHY OF CLIMATE CHANGE**
**SPECIAL REFERENCE TO INDIA**  (4 Credits)

**UNIT-I**
1. Emerging global pattern
2. Causes/factors of climatic change in the past
3. Natural and man-made factors
4. Evidences and indicators of climate change

**UNIT-II**
5. Causes of global warming – role of anthropogenic factors
6. Consequences of global warming – effect on biotic communities
7. Impact on agro-climatic zones in India

**UNIT-III**
8. Droughts in India– identifying drought-prone areas
9. Factors responsible and consequences of droughts
10. Flood-prone regions of India – impact on people and economy
11. Measures to combat droughts and floods – food security

**UNIT-IV**
12. Initiatives at global level
13. Role of global players – IPCC, UNFCCC – Kyoto Protocol, Paris Agreement
14. Carbon credits – definition, carbon markets, Clean Development Mechanism
15. Carbon footprint – methods of calculating and reduction

**REFERENCES:**

2. Khan, MZA et al. (2011), Global Climate Change: Causes and Consequences, Rawat publication, Jaipur
3. Lomborg B. (2010), Smart Solutions to Climate Change, Rawat Publication,
Elective (Discipline Centric)
THEORY PAPER-IV (GG404T)
PRINCIPLES OF GPS (4 Credits)

UNIT-I
1. Definition, Concept, History and Utilities of GPS, Various GPS products and peripherals- Recent trends.
2. Basic GPS components:
   b. Control Segment: Ground Stations.
3. GPS Systems.
   a. Wide Area Augmentation System (WAAS)
   b. Augmented GPS (AGPS)
   c. Space Based Augmentation System (SBAS)
   d. Ground Based Augmentation System (GBAS)
   e. Differential GPS (DGPS)

UNIT-II
5. False Signals:
   a. False Signals (spoofing)
   b. Navigation Message Authentication (NMA)
   c. Public spreading Code Authentication
   d. Certificates of Authorization
   e. Signal Interference or Jamming
   f. Cryptographic Concepts
6. Working principles of GPS: Simple navigation –satellite ranging; calculating the distance to the satellites – error sources; differentially corrected position – reference, receiver – the rover receiver.

UNIT-III
7. International GPS Systems: GALILEO, GPS, NAVSTAR, GAGAN, COMPASS, GLONASS, GNSS, NAVIC.
9. Surveying with GPS: GPS measuring Techniques- Static Surveys, Kinematic Surveys, RTK.
UNIT-IV
10. GPS Applications in Different Fields:
11. Integration of GPS and GIS- Role of GPS and GIS in Remote Sensing.

REFERENCES:
1. ESRI Arc Pad Manual.
2. Introduction to GPS (Global Positioning System) by Leica.

Elective (Discipline Centric)
THEORY PAPER-IV (GG404T)
PRINCIPLES OF CARTOGRAPHY (4 Credits)

UNIT-I
3. Types of Maps: Classed by Scale, Classed by Functions, Classed by Subject Matter.

UNIT-II
4. Map Scale, Projections and Co-Ordinate Systems:
   a) Types of Scales
      i. Statement.
      ii. R.F.
      iii. Graphic Scales.
      iv. Scale Transformation.
   b) Map projection: Definition, Types of Projection.
   c) Co-ordinate Systems: Concept, Definition and Types.

UNIT-III
8. Symbolization: Types of Symbols (Qualitative and Quantitative), Measurement Levels, Feature Dimensions – Shape, Size, Colour and Patterns. Selection and Simplification of Symbols.

UNIT-IV
10. Types of Graphs: Line Graph, Bar Graph, Combined Line and Bar, Compound Bar Graph, Polygraph, Band Graph, Chimagraph, Hythergraph, Ergograph.

REFERENCES:

PRACTICAL PAPER-I (GG405P)

GPS SURVEY (4 Credits)

1. Introduction to GPS and initial setting
2. Field procedures of GPS
3. GPS surveying
4. Transfer of data in software
5. Creating codes and attribute table for GPS receiver
6. Point Data collection using GPS with different datum
7. Line data collection using GPS and measurements
8. GPS data collection for area calculation
9. GPS Data collection in DGPS mode.
10. Post processing of the GPS data
11. GPS and GIS integrations output preparation

References:
# PROJECT (Dissertation and Viva Voce) (GG 456P)

(Credits 4)

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DEPARTMENT OF GEOGRAPHY, OSMANIA UNIVERSITY
### M.Sc. GEOINFORMATICS - Syllabus (2016-17 & onwards) as per CBCS
#### Scheme of Instruction and Examination

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*ID: Inter Disciplinary Paper*

** Elective Paper (Discipline Centric)
M.Sc. GEO INFORMATICS

SEMESTER III

THEORY PAPER-I (GI-301T)

URBAN AND REGIONAL PLANNING

(4 Credits)

UNIT-I
2. Concepts- Urban, Urbanism, Urbanization, Regional Concept and Types.

UNIT-II

UNIT-III
8. Regional/Rural Development practices- India and China.
9. Regional/Multilevel Planning.

UNIT-IV
10. Application of GIS, GPS and RS in Urban and Regional Planning.

REFERENCES:
UNIT-I

1. Natural Resources: Concept, Meaning, Scope and Classification; Biotic- Abiotic, Renewable, Non Renewable Resources.
2. Natural Resources Evaluation and GIS: Objectives and Need for evaluation.

UNIT-II

4. Water Resources: Types, Sources, Consumption Pattern, Need for conservation, Sustainable Water Management

UNIT-III

5. Forest Resources: Types, Functions of Forests, Deforestation & Consequences and Conservation strategies

UNIT-IV

7. Capacity Building, an approach to People Centered Development
8. Approaches to Land Information Management & Problem solving at National & International level.

REFERENCES:

UNIT-I
12. Definition, Concept, History and Utilities of GPS, Various GPS products and peripherals- Recent trends.
13. Basic GPS components:
   e. Control Segment: Ground Stations.
14. GPS Systems.
   f. Wide Area Augmentation System (WAAS)
   g. Augmented GPS (AGPS)
   h. Space Based Augmentation System (SBAS)
   i. Ground Based Augmentation System (GBAS)
   j. Differential GPS (DGPS)

UNIT-II
16. False Signals:
   g. False Signals (spooing)
   h. Navigation Message Authentication (NMA)
   i. Public spreading Code Authentication
   j. Certificates of Authorization
   k. Signal Interference or Jamming
   l. Cryptographic Concepts
17. Working principles of GPS: Simple navigation –satellite ranging; calculating the distance to the satellites – error sources; differentially corrected position – reference, receiver – the rover receiver.

UNIT-III
18. International GPS Systems: GALILEO, GPS, NAVSTAR, GAGAN, COMPASS, GLONASS, GNSS, NAVIC.
20. Surveying with GPS: GPS measuring Techniques- Static Surveys, Kinematic Surveys, RTK.

UNIT-IV
21. GPS Applications in Different Fields:
22. Integration of GPS and GIS- Role of GPS and GIS in Remote Sensing.

REFERENCES:
8. Introduction to GPS (Global Positioning System) by Leica.

Websites:

1. www.gpsworld.com
2. www.gpsociety.org
UNIT-I

UNIT-II

UNIT-III

UNIT-IV

REFERENCES:
1. Introduction to Interactive Programming on the Internet - By Craig D. Knukeles. Published by John Wiley & sons Inc.
2. Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Networks, authored by Dr. Zhong-Ren Peng and Dr. Ming-Hsiang Tsou
Elective ( Discipline Centric)  
**THEORY PAPER-IV (GI-304T)**  
**GEODATABASE FOR GIS**  
(4 Credits)  

**UNIT-I**  
1. Introduction to DBMS – Brief history  
3. GIS data model: Conceptualizing the real world in GIS.  

**UNIT-II**  
4. Relational Database Management Systems: Concepts – Constrains  
5. Relational Database Design – Relational Models Extended with ADT.  

**UNIT-III**  
7. Representation of Spatial Objects: Geographic space modeling  
8. Representation Modes – Representing the Geometry of a Collection of objects – Spatial data formats and Exchange formats – Object Oriented GIS  

**UNIT-IV**  
10. Emerging Trends: Data Mining: concepts – application of data mining  
11. Data Warehousing: Characteristics of Data Warehouse – applications  
12. Intelligence Decision making: Artificial Intelligence, Decision support system, Expert system – design – applications.  

**References:**  
PRACTICAL PAPER-I (GI-351P)
CARTOGRAPHIC APPLICATIONS
(Terrain, Agricultural and Urban) (2 Credits)

Terrain
1. General maps and Specific maps
2. Mapping techniques for Thematic Analysis
3. Relief Analysis-Profiles
   i. Slope.
   ii. Hypsometry.
   iii. Altimetry and Relative Relief.
4. Drainage Analysis.
   i. Identification of Basins (Delimitation)
   ii. Stream Orders & Numbers
5. DEM Representation.

Agricultural
1. Determination of crop combination regions.
2. Crop concentration (Location Quotient Method).
3. Agricultural efficiency.
4. Determination of cropping intensity.
5. Determination of crop diversification.

Urban
4. Centro Graphic Analysis – Mean Center and Median Center.

REFERENCES:
PRACTICAL PAPER-II (GI-352P)
G.I.S & MAP CUSTOMIZATION AND WEB TECHNOLOGY

(2 Credits)

Arc Objects and Map Objects

1. Drawing Layers on maps and attaching data to layers.
2. Adding vector data, adding shape file, Arc/Info coverage, CAD, Adding Raster Data.
3. Applying Co-ordinates and Geometry (COGO).
4. Rendering and selecting features on the maps & retrieving information.
5. Matching addresses & locating places.
6. Deploying applications.
7. Creating ActiveX DLLs and added to the ArcGIS applications.
8. Introduction to ArcGIS Engine
9. Using the Map Control, TOC Control, Toolbar control.

Web Technology

12. Simple Programs Using
13. HTML,
14. HTML EDITORS
15. XML
16. GML
17. ASP
18. MAP SERVER

References:

3. ESRI Technical Publication and ESRI Online Help Resource.
PRACTICAL PAPER-III (GI-353P)
GPS SURVEY (2 Credits)

12. Introduction to GPS and initial setting
13. Field procedures of GPS
14. GPS surveying
15. Transfer of data in software
16. Creating codes and attribute table for GPS receiver
17. Point Data collection using GPS with different datum
18. Line data collection using GPS and measurements
19. GPS data collection for area calculation
20. GPS Data collection in DGPS mode.
21. Post processing of the GPS data
22. GPS and GIS integrations output preparation

References:
UNIT – I


2. GIS data structures and Models


UNIT – II


5. Concepts of GPS – Types of GPS - Integration with GIS

6. GIS & GPS Applications.

REFERENCES:

M.Sc. GEOINFORMATICS

SEMESTER- IV

THEORY PAPER –I (GI-401T)
DIGITAL IMAGE PROCESSING (4 Credits)

UNIT-I
1. Introduction to Digital Image Processing
2. Data acquisition methods
   a) Toposheets (b) Aerial Photographs (c) Satellite imagery
3. Hardware, Software and Processing principles of Digital Image Processing

UNIT-II
4. Preprocessing Techniques:
   a) Geometric Correction      b) Radiometric Correction.
   c) Atmospheric correction    d) Noise Removal.
5. Image Enhancement:
   a) Contrast Enhancement      b) Density Slicing.
   c) Contrast Manipulation     d) Pixel Intensity Transformation.
   e) Histogram Equalization and Matching
   f) Edge Sharpening.

UNIT-III
6. Supervised classification
   a) Ground Truth               b) Training Sites
   c) Evaluation of Classification d) Output Stage
7. Unsupervised Classification:- Spatial Filtering
8. FCC and TCC image preparation.

UNIT-IV
9. Field data Collection
10. Equipment used in Field data collection
    a) GPS          b) Radiometer
11. Post classification:- Map Output.

REFERENCES:
THEORY PAPER-II (GI-402T)

DISASTER MANAGEMENT STUDIES

(4 Credits)

UNIT-I

1. Definition and Concept of Hazards and Disasters.
3. Classification of Hazards and Disasters:
   ii. Human Induced: Droughts, Floods, Desertification, Epidemics and Biological Disasters.

UNIT-II

4. Impact of Human Induced Disasters on Environment: - Global Warming, Ozone Depletion, Green House Effect, Climate Change, Threat to the Biodiversity.
5. Impacts and Mitigation Measures in the context of Air, Water, Soil, Noise and Thermal Pollution both in Urban and Rural Areas.
6. Case Studies:

UNIT-III

7. Risk Assessment: Preparedness and Management for various Natural Hazards.
9. Various National and Global Authorities, Agencies, Institutes and Organizations engaged in Disaster Management Practices:

UNIT-IV

10. Disaster Management Policies in India, National Disaster Management Authority (NDMA).
11. Application of RS and GIS for Disaster Management
12. Role of ISRO in Disaster Management, Disaster Prediction, Disaster Management Support System (DMS), Indian Forest Fire Response and Assessment System (INFFRAS), Digital Disaster Warning System (DDWS), National Database for Emergency Management (NDEM).

REFERENCES:

Elective (Discipline Centric)
THEORY PAPER-III (GI-403T)
INFORMATION SYSTEMS AND MANAGEMENT (4 Credits)

UNIT-I

1. Information Technology Meaning, Scope & Developments in I.T.

UNIT-II

4. Managerial Overview of Hardware, Software, People, Data & Institutional Linkage.
6. Data Management: Data vs Information vs Knowledge, Knowledge Management and Efficiency to Utilize the Data for Decision Making.

UNIT-III

7. Internet & Information Management: Internet, Intranet & Extranet.

UNIT-IV


REFERENCES:

1. Introduction to Information Technology – Alexis Leond Mathews Leen.
Elective (Discipline Centric)

THEORY PAPER-III (GI 403T)
URBAN GIS - STUDY OF HYDERABAD AND HMDA (4 Credits)

UNIT-I
1. Basic Concepts: Urban - scope and content of urban GIS
2. Evolution of Hyderabad from Historical city to global city, Demography
3. Strategies of sustainable development, Primacy of Hyderabad

UNIT-II
4. Hyderabad Urban Structure: Land use dynamics
5. Infrastructure – utility mapping – process and change analysis – 2D and 3D

UNIT-III
electoral application
8. Solid waste management – water supply and sanitation – recreation site identification – property
tax – tax assessment
9. Network analysis – optimum route/ shortest route –traffic and parking studies – accident analysis
– vehicle tracking - case studies.

UNIT-IV
10. Urban Modelling: Urban Growth Modelling
(LBS)
12. 3D city modelling and applications.

References:
   PLC, London.
   Analysis. Taylor and Francis, London.
   City/County Management association(ICMA).ESRI Press, Redlands, California
   Private Limited.
   University Press.
   Approach, Rawat Publication, Jaipur
Elective (Discipline Centric)

THEORY PAPER-IV (GI-404T)
RS & GIS APPLICATIONS FOR AGRICULTURE AND RURAL DEVELOPMENT

UNIT-I

2. Theories of development: Structure Functional and Spatial theories of development.
3. Significance of Agricultural Growth and Development, Types of Agriculture.

UNIT-II

4. Rural Socio – Economic structure, social stratification population Characteristics, Marketing and transportation, Problems.
5. Agricultural Developments: Land holdings, Irrigation and land Use, Land reforms – Green revolution and Socio-Economic changes.
6. Socio-Economic Information System, RS and GIS for Socio-Economic Information Analysis.

UNIT-III


UNIT-IV

12. Geoinformatics for Precision Farming: Importance and relevance to Indian Agriculture.

References:

Elective (Discipline Centric)

THEORY PAPER-IV (GI-404T)
GEOINFORMATICS IN UTILITY MANAGEMENT
(4 Credits)

UNIT - I
1. Utilities, Description of all essential services and utilities,
2. Database development and Data Acquisition
3. Acquiring and integrating geospatial data, Spatial Data Bases

UNIT - II
4. Spatial Data Manipulation and Analysis
5. Geospatial system analysis and design
6. Geospatial technology project, management, Query Processor and Visualization

UNIT - II
7. Applications and Problem solving with GIS: Electricity, Gas, Transport
8. Water supply, Sewerage System, Solid waste disposal
9. Telecommunication, Public health and safety, Crime analysis, E-governance

UNIT - II
10. Modelling in utility applications, Infrastructure aims and objectives,
11. Environmental law and regulations governing infrastructure utilities, Modern infrastructure tools
12. Case study

REFERENCES:
5. Network Analysis in Geography. St Martin's Press Haggett P, Chorley R J

PRACTICAL PAPER-I (GI-451P)
**IMAGE ANALYSIS**

1. Elements of image characteristics and interpretation of image
2. Comparison between aerial photographs and satellite imageries
3. Visual Interpretation of Satellite Imagery-Mapping Land use/Land Cover in Urban areas
4. Image Rectification-Geometric and Radiometric correction.
5. Image Enhancement- Contrast and Band Rationing.
6. Digital Image Classification-Supervised and Unsupervised
7. Introduction to Digital Photogrammetry
8. Accuracy estimation.
10. Identification of Land Use/Land Cover changes with Multi Date Imagery

**Reference:**

### PROJECT (Dissertation and Viva Voce)

No. of Credits: 4

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<th>S.No.</th>
<th>Topics to be covered</th>
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<td>1</td>
<td>Problem identification and literature review</td>
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<td>Data acquisition / collection</td>
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<td>Results and interpretation</td>
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