DEPARTMENT OF GEOGRAPHY, OSMANIA UNIVERSITY

M.Sc. GEOGRAPHY - Syllabus as per CBCS

Scheme of Instruction and Examination

S.No.	Subject Code	Paper	C O U R S E	(40) Marks IAE	(10) Marks Attendance	(50) Marks Theory	Total Marks (100)	CREDITS
			SEMESTER-I					
1.	**GG101T**	**I**	Geomorphology	40	10	50	100	4
2.	**GG102T**	**II**	Social and Population Geography	40	10	50	100	4
3.	**GG103T**	**III**	Geographical Thought	40	10	50	100	4
4.	**GG104T**	**IV**	Regional Geography of India with Special ref. to Telangana State	40	10	50	100	4
5.	**GG151P**	**I**	Basic Techniques of Mapping & Map Interpretation				25	1
6.	**GG152P**	**II**	Statistical Techniques & Research Methods				25	1
7.	**GG153P**	**III**	Introduction to G.I.S.				25	1
8.	**GG154P**	**IV**	Terrain and Soil Analysis				25	1
	Total						**500**	**20**
			SEMESTER-II					
1.	**GG201T**	**I**	Climatology & Oceanography	40	10	50	100	
2.	**GG202T**	**II**	Economic Geography	40	10	50	100	
3.	**GG203T**	**III**	Environmental Studies	40	10	50	100	
4.	**GG204T**	**IV**	Principles of Remote Sensing	40	10	50	100	
5.	**GG251P**	**I**	GIS Applications				25	1
6.	**GG252P**	**II**	Instrumental and Field Survey				25	1
7.	**GG253P**	**III**	Map Projections				25	1
8.	**GG254P**	**IV**	Image Analysis				25	1
	Total						**500**	**20**

M.SC. GEOGRAPHY
I-SEMESTER
THEORY PAPER-I (GG101T)
GEOMORPHOLOGY (4 Credits)

Unit-I

1. Definition and Scope of Geomorphology, Fundamental Concepts in Geomorphology, Geological Time Scale.
2. Interior of the Earth – Chemical composition, layering system of the earth, Evidences from the theories of the origin of earth. Rocks – Classification of Rocks, Igneous, Sedimentary and Metamorphic Rocks
3. Earthquakes and Volcanos – Causes of Earthquakes, Classification and world distribution of Earthquakes, Concept and causes of Vulcanicity, types of Volcanoes, world distribution of Volcanos, Landforms formed by Volcanos.

Unit-II

4. Isostasy – Concept and Theories of Airy and Pratt.
5. Earth Movements – Types; Folds and Faults, Mountain building.
6. Continental Drift – Wegener's Theory and Plate Tectonics.

Unit-III

7. Denudation, Weathering, Erosion, Mass wasting.
8. Erosional and Depositional Landforms by: -
    a) Rivers.
    b) Glaciers.
    c) Wind.
    d) Underground Water.
    e) Waves and Currents.

Unit-IV

9. Concept of Cycle of Erosion.
10. Davis and Penck's Cycles of Erosion.
11. Concept of Rejuvenation and Evidences.

REFERENCE BOOKS:

1. W. D. Thornbury – Principles of Geomorphology, Wiley Eastern Ltd., New Delhi, 1993.
2. P. G. Worcester – A text book of Geomorphology, East - West Press Pvt. Ltd., New Delhi, 1961.
3. A. K. Lobeck - Geomorphology, Mc Graw Hill Book Co. Ltd., New York, 1969.
4. Hamblin W. K. and Christiansen E. H. – Earth Dynamic Systems (10th Edition), John Willey and Sons, 2013
5. Alan Strahler with Zeeya Merali – Visualizing Physical Geography (8th Edition), Willey Visualizing, 2007.
6. Butser, K. W. – Geomorphology from the Earth, Longmans, London 1963, Harper & Row Publishers, New York, 1976.

7. Robert E. Gabler, James F. Peterson, L. Michael Trapasso, Dorothy Sack – Physical Geography 9th Edtn, Brooks/Cole, Cengage Learning 2009.
8. Richard John Hugget – Fundamentals of Geomorphology (2nd Edition), Routledge Taylor and Francies Group, London and New York, 2007.
9. C. A. M. King – Perspective on Landform Evolution (Benchmark series in Geology) – Dowden, Hutchinson & Ross Inch. Pennsylvania, U.S.A., 1976.
10. K. Siddartha – Earth Dynamic Surface, Transworld Media & Communications Publication, Patna, 1994.
11. Savindra Singh – Geomorphology/Physical Geography, Prayag Pustak Bhawan, New Delhi. 2005.

THEORY PAPER-II (GG102T)
SOCIAL AND POPULATION GEOGRAPHY (4 Credits)

UNIT-I

1. Nature and scope of social Geography
2. Elements of social processes – Race, Tribe, Dialect, Language, Caste and Religion.
3. Concept of social wellbeing, Human development Index.

UNIT-II

4. Concept of culture – areas and cultural regions
5. Factors for cultural region formation
6. Major cultural Realms of the world

UNIT-III

7. Factors determining the distribution of world population pattern.
8. Patterns of Fertility and Mortality, sex ratio and age pyramid
9. Growth trends and density of population – Optimum Population

UNIT-IV

10. Theory of Demographic transition - Malthusian theory on population growth.
11. Population and resources – Implication for development
12. Patterns and Processes of Migration., International Migrations (Past & Present)

REFERENCES:

1. Zimmerman, RW – World resources and industries, Marper Brother, New York.
2. Clark, J.L.-Population Geography, Pergamon Press, Oxford, 1972.
3. Garnier J.B.- Geography of Population, Longman, Harlow, 1966
4. UNESCO – Determinates and consequences of World & Population Trends.
5. R. B. Mandal, Joseph Uyanga and H. Prashad – Introductory Methods in Population Analysis, Concept Publication Co. New Delhi, 2007.
6. Arun Kumar Sharma – Population and Society: Present Scenario and Future Prospect, Concept Publication Co., New Delhi, 2012.

THEORY PAPER-III (GG103T)
GEOGRAPHICAL THOUGHT (4 Credits)

UNIT - I

1. Geographical Thought in Classical and Medieval Period – Greeks and Roman Contributions, Arab Contributions.
2. Contemporary Times – Immanuel Kant, Alexander von Humboldt, Carl Ritter, Friedrich Ratzel, Vidal de la Blasche, Halford J. Mackinder and Patrick Geddes.
3. Development of Concepts in Geography – Environmental Determinism, Possiblism and Human Ecology.

UNIT - II

4. Geography as Study of Distribution and Areal Differentiation.
5. Dualisms and Dichotomies in Geography.
6. Behavioral approach in geography.

UNIT - III

7. Quantitative Revolution in Geography.
8. Relevance of Models in Geography.
9. Systems approach in geography.

UNIT - IV

10. Marxism in geography.
11. Postmodernism and Social Justice.
12. Welfare Geography.

REFERENCES:

1. Kimble, G. H. T. - Geography in the middle Ages, University Press, London, 1952.
2. Holt Jenson – Geography: Its History and Concepts, Longman, 1980.
3. Griffith Taylor - Geography in Twentieth Century, Philosophical Library, New York 1960.
4. Dickinson R. E. – The Makers of Modern Geography, Routledge and Kegan Paul, London, 1969.
5. James P. E. – All Possible World, The Odyssey press, New York, 1972.
6. Lalita Rana – Geographical Thought: Classical to Contemporary, Concept Science, 2014.
7. Harvey D. – Explanation in Geography, Edward Arnold, London, 1969.
8. Broek J. E. E. M. – Geography: Its Scope and Spirit, Charles E. Nerrill, Columbus, Ohio, 1965.
9. Hartshorne R. - Perspective on the Nature of Geography Annals, Association of American Geographers, Washington D. C., 1959.
10. Abler, Adams and Gould - Spatial Organization, Engewood, Cliff, New Jersey, 1971.
11. Gregory D. – Ideology, Science and Human Geography, St. Martin's Press New York, 1978.
12. Johnston R. J. – Geography and Geographers, Arnold Heinamann, London, 1983.
13. Chorley R. J. – Directions in Geography, Pergomen, London, 1969.
14. Woolridge S. & East W.G.: The Spirit and Purpose of Geography, Hutchinson, London, 1966.
15. Minshull R. – The Changing Nature of Geography, Hutchinson, London, 1970.
16. David Harvey - Justice Nature and Geography of Differences, Blackwell, 2000.
17. David Harvey - The Condition of Postmodernity, Oxford, 1989.
18. E. W. Soja - Postmodern Geographies, Verso, 1989.
19. M. E. Harvey - Themes in Geographic thought 2002.
20. David Harvey - Social Justice and the City, JHUP, 1973
21. R. D. Dikshit - Geographical Thought: A Contextual History of Ideas, PHIL.
22. M. Husain - Evolution of Geographical Thought, rp, 2002.

THEORY PAPER-IV (GG104T)
REGIONAL GEOGRAPHY OF INDIA
WITH SPL. REFERENCE TO TELANGANA STATE

UNIT-I **(4 Credits)**

1. Regional Studies- Significance, Nature Scope and Content of regional Geography.
2. Physical Aspects- Physiography, Drainage, Climate, Soils and Vegetation.
3. Natural Regions of India and Sub-Regions, Drought prone and Flood prone regions.

UNIT-II

4. Resource base – Distribution - Utilization and Conservation of Land, Water, Forest, Mineral and Energy resources.
5. Human Aspects – Population – Growth, Density, Distribution, problems and policies; Ethnographic diversities, Caste, Tribe and Religion.
6. Rural and Urban settlements – Pattern of Urbanisation – Concept of Smart Cities.

UNIT-III

7. Agriculture – Land Use and Cropping Pattern - Major Crops: Rice, Wheat, Tea, Coffee, Cotton and Sugar cane. Green Revolution- Agricultural regions of India.
8. Industry – Industrial regions – Study of Iron and Steel and Cotton Textile, Sugar Industry
9. Transport – Roads, Railways, Ports and Information and Communication; India's International Trade.

UNIT-IV

10. Regional planning and development – Five year plans.
11. Regional Disparities and impact of globalization.
12. Regional consciousness and National integration.

REFERENCES:

1. Spate O. H. K - India and Pakistan, 1974, Methuen & Co., London, 1967.
2. R. L. Singh (ed), India – A Regional Geography, National Geographical Society of India, Varanasi, 1971.
3. C. D. Deshpandey - Regional Geography of India.
4. R. C. Tiwari - Geography of India (3rd Edition), Prayag Pustak Bhawan, 2006.
5. Gazetteer of India vols. 1 to 3, Ministry of Information & Broadcasting, Govt. of India, New Delhi, 1965.
6. Kullar D. R. – India: A Comprehensive Geography, 2014.
7. C. B. Memoria - Economic and Commercial Geography of India.
8. Govt. of A.P. Planning Department, 'Perspective Plans for Telangana, coastal Andhra and Rayalaseema.
9. Planning Atlas of Andhra Pradesh, Dept. of Geography, O. U.
10. Venkat Ram Reddy and Kosal Ram, Multilevel Planning of A.P., Published by CESS.
11. V. Vidyanath, Resource Inventory of A.P.
12. Data News features, Changing Horizons of A. P.
13. Data News Features, A. P at 50 a data based analysis.

14. Simhadri S. & P. L. Vishweshwar Rao, Telangana: Dimensions of Under development, Center for Telangana Studies, 1997.
15. Fifty years of Andhra Pradesh: 1956-2006, Centre for Documentation, Research and Communication, 2008.

PRACTICAL PAPER-I (GG151P)

Basic Techniques of Mapping & Map Interpretation

(1 Credit)

1. Map Scales – Types and Conversion.
2. Symbiology – Qualitative and Quantitative
3. Elements of Map Design, Point, Line, Area.
4. Techniques of Mapping – Choropleth, Flow Diagram, Interpolation Techniques, Isopleth Mapping, Triangular Graphs.
5. Interpretation of Indian Topographical Maps and Weather Maps.

REFERENCES: -

1. Monkhouse F. J., 1967 – Maps and Diagrams, Methuen and Co., London.
2. Robinson A. H. –1982 Elements of Cartography, John Willey and Sons, New York.
3. Sing R.L. – Elements of Practical Geography, Kalyani Publishers, New Delhi, 1994.
4. Lewis, Peter – Maps and Statistics, Methuen and Co., Ltd., London, 1977.
5. Dickinson, G.C. – Maps and Air Photos, Edward Arnold Ltd., London, 1969.
6. Cuff, D.J. and Mattson, M.J. – Thematic Maps: Their Design and Production, Methuen, New York 1982.
7. Mishra R. P. and Ramesh A – Fundamentals of Cartography, Concept Publishing Company, New Delhi, 1989.
8. Judith A. Tyner – Principles of Map Design, The Gulford Press, New York, London, 2010.

PRACTICAL PAPER-II (GG152P)

STATISTICAL TECHNIQUES AND RESEARCH METHODS

(1 Credit)

1. Descriptive Statistics – Scope and Applications
2. Sources and Methods of collection of Data – Sampling Techniques, Field Survey Techniques
3. Measures of Central Tendency – Merits & Demerits, Mean, Median, Mode
4. Measures of Dispersion: Standard Deviation, Coefficient of Variation, Skewness, (Karl Pearson's and Bowley's) Kurtosis.
5. Correlation – Karl Pearson's Correlation coefficient and Spearman's Rank Correlation, Regression Analysis.
6. Statistical Applications - Analysis of Variance, Chi-square tests, Time series Analysis
7. Scientific Methods and Research - Hypothesis Development, Basis for Hypothesis, Hypothesis Formation, Hypothesis test.
8. Research Process - Preparation of Research Design, Collection of Data, Determining Sample Design, Data Processing and data Analysis.

REFERENCES:

1. R. P. Mishra - Research Methodology,
2. Harikesh N. Mishra and Vijai P. Singh - Research Methodology in Geography,
3. Kothari C. R. - Research Methodology: Methods and Techniques,
4. Cole J. P. & King CAM – Quantitative methods in Geography, John Wiley & Sons, New York, 1968.
5. Gregory S. – Statistical methods and the Geographer, Longmans, London, 1963.
6. Jones P. A. – Field work in Geography, Longman, London, 1968.
7. Johnson R. J. – Multivariate statistical analysis in Geography, Longman, London, 1978.
8. King L. J. –Statistical Analysis in Geography, Prentice Hall, Englewood Cliffs, N. J.
9. Tomislav Hengl – A practical Guide to Geostatistical Mapping, University of Amsterdam, 2009.

PRACTICAL PAPER-III (GG153P)

INTRODUCTION TO GIS (1 Credit)

1. Computer components – Input, Output and storage devices.
2. Computer Software Operating Systems – DOS and Windows Commands.
3. System Software, Application Software.
4. Directory, File structures and Databases.
5. Working with Documents and worksheets.
6. Introduction to G.I.S.
7. Sources and Components of Information Systems.
8. Computer fundamentals of G.I.S.
9. Creation of Map coverage – Scanning, Digitization, Editing.

REFERENCES: -

1. Taylor D. R. F - GIS: The Micro Computer and Modern Cartography, Pergamon Press, Oxford.
2. C. P. Lo and Yeung A. W. - Concepts and Techniques of Geographical Information Systems, Prentice Hall of India Pvt. Ltd., 2002.
3. I. Heywood, Cornelius S., Carrer S. - An Introduction to Geographical Information Systems, Pearson Education Pvt. Ltd., 2002.
4. Kang-Stung-Chang, Introduction to Geographical Information Systems, Tata McGraw Hill Publishing Co., 2002.

PRACTICAL PAPER-IV (GG154P)

TERRAIN AND SOIL ANALYSIS (1 Credit)

1. Methods of Representation of relief – Profiles.
2. Basic Geological cross sections – Analysis.
3. Methods of Express on of Slope and Slope Analysis.
4. Altimetric Frequency Analysis.
5. Hypsometric Analysis.
6. Clinometric Analysis.
7. Relative Relief Analysis
8. Drainage Analysis (Numerical & Linear Characters).
9. Grain size analysis.
10. PH Determination.
11. Conductivity of Soils.
12. Permeability of Soil.
13. Soil strength.
14. Porosity of Soils.
15. Instrumentation & Soil testing.

REFERENCES:

1. Singh R. L. and Singh R. B. P. - Elements of Practical Geography, Kalyani Publishers, New Delhi, 1923.
2. Mishra R. P. and Ramesh - Fundamentals of Cartography, Concept, New Delhi, 2002.
3. Bunting B. T. - The Geography of Soils, Hwtchinson, London 1967.
4. Dee Stella - Geography of Soils.
5. Jenny H. - Factors of Soil Formation, McGraw Hill, New York, 1941.
6. Govinda Rajan - Soils of India.

M.Sc. Geography
II-Semester

THEORY PAPER-I (GG201T)
CLIMATOLOGY AND OCEANOGRAPHY (4 Credits)

UNIT-I

1. Atmosphere – Structure, Chemical composition of the atmosphere, Elements of Weather and Climate.
2. Insolation and Temperature Distribution – Factors affecting the distribution of Insolation, Heat Budget of the Earth and the Atmosphere, Vertical distribution of Temperature – Inversion of Temperature and its Significance, Horizontal distribution of Temperature.
3. Atmospheric Pressure and Winds – Horizontal distribution of Air Pressure and Pressure belts, Pressure Gradient and Air circulation, Cariolis force, Ferrel's Law; Planetary Winds – Global Pattern of Planetary Winds; Monsoon Winds: Meaning and Distribution, Origin of Indian Monsoon; Local Winds, Jet Streams – Types and Significance of Jet Streams.
4. Humidity and Moisture in the atmosphere - Forms of condensation, Rainfall types and distribution. Classification of Clouds, Other forms of Precipitation.

UNIT-II

5. Air masses and Fronts: Air Masses - Characteristics, Source Region, Classification; Fronts and Frontogenesis, Conditions for Frontogenesis, Classification of Fronts.
6. Cyclones and Anticyclones:
    i. Temperate Cyclones: Origin, Stages of Life Cycle and weather conditions associated with it.
    ii. Tropical Cyclones: General Characteristics, Types, Origin, Distribution and Weather conditions associated with it.
    iii. Thunder Storms: General Characteristics, Structure and Conditions for Thunder Storm development.
    iv. Anticyclones: General Characteristics, Weather conditions associated with it.
7. Classification of climates – Koppen's Classification, Thornthwaite's scheme of climatic classification – 1931 and 1948.

UNIT-III

8. Relief of Ocean Basins – Hypsometry, The Continental Shelf, The Continental Slope, The Deep Sea Plains, Submarine Canyons – Characteristics, Origin and Distribution. Bottom Relief of Atlantic, Pacific and Indian Ocean.
9. Temperature and Density of Ocean Waters – Horizontal and Vertical Temperature Distribution, Density of Oceans.
10. Salinity and Ocean Deposits – Composition of Sea Water, Controlling factors, Distribution (Horizontal and Vertical) and Significance of Salinity; Ocean Deposits and Marine resources - Sources, Types and Distribution.

UNIT-IV

11. Distribution of Ocean Currents and Oceanic Circulation – Origin, Effects and Factors modifying Ocean Currents, Oceanic Circulation: Currents of Atlantic, Pacific and Indian Oceans.

12. Ocean Tides – Origin, Types and Theories on the origin of tides, Tidal Bores, and Tidal Currents.
13. Coral Reefs, Atoll and Marine Oceanic Resources – Origin, Types of Coral Reefs, Importance of Marine Resources.

REFERENCES:

1. G. T. Threwartha – Introduction to Climatology, Mc. Graw Hill Book Co. Inc., New York, 1981.
2. H. J .Critchfield - General Climatology, Prentice Hall of India Ltd., New Delhi, 2002.
3. Barry & Chroley – Atmosphere, Weather and Climate, Methuen & Co. Ltd., London, 1995.
4. Miller A.et al and Merrill – Elements of Meteorology, Columbus, 1983.
5. Savindra Singh – Climatology/Physical Geography, Prayag Pustak Bhawan, New Delhi. 2005.
6. Alan Strahler – Visualizing Physical Geography, Willey Visualization, New York and London, 2007.
7. C. Donald Ahrens – Essentials of Meteorology: An Invitation to the Atmosphere (5^{th} Edition), Thomson Learning Inc. Canada, 2008.
8. John Marshall and R. Alan Plumb – Atmosphere, Oceans and Climate Dynamics, Cambridge, Massachusetts, Elsevier Academic Press, 2008.
9. V. P. Subramanyam – Applied Indian Climatology.
10. C.A.M.King – Oceanography for Geographers, Edward Arnold publishers Ltd.
11. Kshudiram Saha – The Earth's Atmosphere: Its Physics and Dyanamics, Springer Verlang Berlin Heidelberg, 2008.
12. Siddarth K. – Oceans, Transworld Media & Communication Publication, Patna.

THEORY PAPER-II (GG202T)
ECONOMIC GEOGRAPHY (4 Credits)

UNIT-I

1. Scope and Contents and Importance of Economic Geography.
2. Classification of Economic activities: Primary, Secondary, Tertiary and Quaternary.
3. Concept of Resources: Classification and Types of Resources.

UNIT-II

4. Types and Distribution of Agriculture, Forest, Minerals and Energy Resources.
5. Resource Utilization and its Impacts (Positive and Negative).
6. Conservation and Management of Resources.

UNIT-III

7. Factors Influencing Industrial Location.
8. Industrial Location Theories: Alfred Weber's and August Losch's approaches.
9. Von Thunen's Agricultural Model.

UNIT-IV

10. Transport : Principles of Transportation , Transportation and Economic development
11. Taffe's Model on Transportation development
12. Economic Regionalization and Role of Geographer in Economic Planning.

REFERENCES:

1. Norman Pounds – Success in Economic Geography, John Murray Pub Ltd, London 1981.
2. Jones C. F. and Darkenwald C. G. – Economic Geography, Surjeet Pub, 1982.
3. Alexander Gibson: Economic Geography, Prentice Hall International, New Delhi, 1979.
4. Hodder B. W. and Regerlee – Economic Geography, Methuen Co. Ltd., 1977.
5. Von Roben and Bengtson – Fundamentals of Economic Geography, Prentice Hall, New Delhi, 1971.
6. Thatcher W. D. – Economic Geography, Longmans Business Education Series, Landmans, London, New York, 1984.
7. Williams T. R. – Economic Geography, Longmans Business Education Series, New York, 1984.

THEORY PAPER-III (GG203T)

ENVIRONMENTAL STUDIES (4 Credits)

UNIT-I

1. Context, scope, related sciences, and environmental components
2. Ecosystem, types – biomes and food chain.
3. Biomes-Terrestrial and Aquatic biomes and food chain.

UNIT-II

4. Environmental degradation and pollution- soil, water, air, and noise.
5. Global warming and climate change – impact and remedial measures
6. Ozone layer depletion – causes and consequences.

UNIT-III

7. Environmental – Economic development debate
8. Environmental movements in India – Chipko, Silent valley, Tehri Dam and Narmada Bachao Andolan – Role of NGOs.
9. Environmental planning and legislation in India.

UNIT-IV

10. Concept of sustainable growth and development.
11. Biodiversity – Hotspots of biodiversity and threats – its conservation.
12. Natural Disaster Management – NDMA – Role of GIS and Remote Sensing.

REFERENCES: -

1. David Harvey - Justice, Nature, and Geography of Differences, Blackwell, 2000.
2. John Bellomy Foster - The Vulnerable Planet, Monthly Review Press, 1994.
3. Savindra Singh - Environmental Geography, PPB, 2000.
4. David Pepper - Eco-socialism: From Deep Ecology to Social Justice, Routledge, 1993.
5. Gadgil M. & R. Guha - This Fissured Land: An Ecological History of India, OUP, 1995.
6. Guha R. - The Unquiet Woods, OUP. 2000.
7. John McCormick - The Global Environmental Movement, JWS, 1995.
8. Reiner Grundmann - Marxism and Ecology, Clarendon Press, Oxford, 1991.
9. Desai V. & Potter R. B. (ed) - The Companion to Development Studies, 2002.
10. The Hindu - Survey of the Environment 2002.
11. Down to Earth-Science and Environment (Fortnightly Journal).
12. Bill McGuire, Ian Manson and Christopher Kilburn – Natural Hazards and Environmental Change, Oxford University Press Inc. New York, 2002.
13. John C. Pine – Natural Hazards Analysis: Reducing the Impact of Disasters, CRC Press, Taylor and Francis Group, London, New York. 2008.

THEORY PAPER-IV (GG204T)

PRINCIPLES OF REMOTE SENSING (4 Credits)

UNIT-I

1. Introduction to Remote Sensing: Concept, Definition, History and Scope.
2. Energy flow from source to the sensor: Electromagnetic Energy, Radiant Flux
3. Energy Interaction with the Atmosphere and Object.

UNIT-II

4. Spectral Reflectance Curve: Spectral Signatures.
5. Scanning:
    a) Multi-spectral:
        i. Across Track scanning
        ii. Along Track scanning.
    b) Thermal
6. Microwave Remote Sensing.

UNIT-III

7. Types of Sensors, Their Characteristics and Purpose: Spatial, Spectral, Radiometric, and Temporal.
8. Types of Satellites, Orbit and orbital, Swath and IFOV, Their Characteristics and Purpose: IRS, LANDSAT, SPOT, ADEOS, Quick Bird, Resource Sat, Ocean Sat
9. Electro Magnetic Spectrum, Atmospheric Window.

UNIT-IV

10. Application of Remote Sensing to land-use/land-cover mapping.
11. Interpretative aspects of Satellite Imagery – Visual and Digital.
12. Ground Truth Concept.

REFERENCES:

1. Nejel Veziroglu – Remote Sensing: Energy related studies – Hemisphere Publishing Corporation, Washington, 1975.
2. Paul Curren – Principles of Remote Sensing, English Language Book Society, London, 1988.
3. Rovert, G. Reeves (ed) – Manual of Remote Sensing: Vol. I & II. American Society of Photogrammetry, New York, 1978.
4. James B. Campbell and Randolph H. Wynne – Introduction to Remote Sensing (5^{th} Edition), The Guilford Press, New York and London, 2011.
5. W. G. Rees – Physical Principles of Remote Sensing (2^{nd} Edition), Cambridge University Press, 2001.
6. R.C. Olsen – Remote Sensing from Air and Space, SPIE Press, USA, 2007.
7. P. S. Ray, R. S. Dwivedi and D. Vijayan – Remote Sensing Applications, NRSC, Hyderabad, 2010.
8. Qihao Weng – Remote Sensing and GIS Integration: Theories, Methods and Applications, McGraw Hill, 2010.

PRACTICAL PAPER-I (GG251P)
GIS APPLICATIONS (1 Credit)

1. Spatial and Non-spatial Data Management.
2. Creation of Thematic Maps – Choropleth & Dot Maps, Charts.
3. Map Layouts, Designing and Output Generation.
4. GIS Single layer operations - Clip, Split, Dissolve, Map Join, Buffering.
5. Overlay Functions in G.I.S. – Union, Intersect, Identity.
6. Set Theoretical Concepts – Venn Diagrams and Boolean Concept.
7. Simple and Complex Querying using GIS Data.
8. Network Analysis.
9. Digital Elevation Model.

REFERENCES:

1. Taylor D. R. F - GIS: The Micro Computer and Modern Cartography, Pergamon Press, Oxford.
2. Lo C. P. and Yeung A. W. - Concepts and Techniques of Geographical Information Systems, Prentice Hall of India Pvt. Ltd., 2002.
3. Ian Heywood, Cornelius S. and Carrer S. - An Introduction to Geographical Information Systems, Pearson Education Pvt. Ltd., 2002.
4. Kang-Stung-Chang - Introduction to Geographical Information Systems, Tata McGraw Hill Publishing Co., 2002.

PRACTICAL PAPER-II (GG252P)

INSTRUMENTAL AND FIELD SURVEY (1 Credit)

1. Importance of field instrument survey- scope and purpose, principles and application of selected survey instruments.
2. Chain survey: use of tapes-open traverse, triangulation survey.
3. Plane table surveying.
4. Prismatic compass, Open and Closed Traverse.

REFERENCES:

1. Clendinning J. - Principles of Surveying (2^{nd} edition), 1960.
2. Hotine Major - The Re-Triangulation of Great Britain Empire Survey Review, 1935.
3. Mishra R. P. and Ramesh A. - Fundamentals of Cartography Revised Edition, Concept Publication, New Delhi, 2002.
4. Monk house – Maps and Diagrams, Methurn, 1971.
5. Negi, Balbir Singh - Practical Geography (Third Revised Ed), Kedar Nasth and Ram Nath, Meerut & Delhi, 1994-95.
6. Sandover J. A. - Plane Table Surveying, Arnold, 1961.
7. Singh & Karanjta – Map Work and Practical Geography Central Book Depot, Allahabad, 1972.
8. Singh R. L. and Dutt P. K. - Elements of Practical Geography, Students Friends, Allahabad, 1968.
9. Agarwal A. K. - Fundamentals of Global Positioning System.
10. Huffmann Wellerhofb - GPS Theory and Practice, H. Lichtenegger & J. Collins, Springer Wien, New York, 1977.
11. Leick A. - GPS Satellite Surveying (2nd edn), Weily, New York, 1995.
12. Ferguson M. - GPS Land Navigation, Glanford Publishing, Boise, Idaho, 1997.

PRACTICAL PAPER-III (GG253P)

MAP PROJECTIONS (1 Credit)

1. Types of Map Projections – Uses and Choice of Projections
2. Construction of Simple Conical (one and two standard parallels)
3. Bonne's and Polyconic projections
4. Simple Cylindrical (Equal Area and Equidistant),
5. Zenithal Equal Area, Gnomonic and Stereographic
6. Mercator's (Universal Transverse Mercator – UTM Projection).

REFERENCES: -

1. Monkhouse F. J., 1967 – Maps and Diagrams, Methuen and Co., London.
2. Robinson A. H. –1982 Elements of Cartography, John Willey and Sons, New York.
3. Sing R.L. – Elements of Practical Geography, Kalyani Publishers, New Delhi, 1994.
4. Lewis, Peter – Maps and Statistics, Methuen and Co., Ltd., London, 1977.
5. Dickinson, G.C. – Maps and Air Photos, Edward Arnold Ltd., London, 1969.
6. Cuff, D.J. and Mattson, M.J. – Thematic Maps: Their Design and Production, Methuen, New York 1982.
7. Mishra R. P. and Ramesh A – Fundamentals of Cartography, Concept Publishing Company, New Delhi, 1989.
8. Judith A. Tyner – Principles of Map Design, The Gulford Press, New York, London, 2010.

PRACTICAL PAPER-IV (GG254P)

IMAGE ANALYSIS (1 Credit)

VISUAL IMAGE ANALYSIS:

1. Satellite Imageries of various scales/Bands
2. Mapping from Satellite Imagery – Land forms, Water resources, Forest, Agricultural and other Land use.
3. Identification of ground truth locations on Satellite Imagery.
4. Identification of Land Cover Changes – with the help of multi-date imagery.

DIGITAL IMAGE ANALYSIS.

5. Introduction to Digital Image Processing.
6. Image Rectification: Geometric and Radiometric Correction.
7. Image Enhancement: Contrast and Band Rationing.
8. Unsupervised Classification and Supervised Classification.

REFERENCES:

1. Mejal Veziroglu – Remote Sensing: Energy Related Studies, Hemisphere Publishing Corporation, Washington, 1975.
2. Curran Paul J. - Principles of Remote Sensing, Longman Publications.
3. Thomas M. Lillesand and Ralf W. Kiefer - Remote Sensing & Image Interpretation, John Wiley & Sons.
4. Green W. B. - Digital Image Processing, Von Nas-Ir & Rein Told Co.
5. Castleman J. M. - Digital Image Processing, Englewood Cliff.
6. Paul M. Mather and Magaly Koch – Computer Processing of Remotely Sensed Images: An Introduction (4th Edition), John Willey & Sons Ltd. 2011.
7. Jian Guo Liu and Philipa J. Mason – Essential Image Processing and GIS for Remote Sensing, Willey-Blackwell, John Willey & Sons Ltd., 2009.
8. C. H. Chen (Edt). – Image Processing for Remote Sensing, CRC Press, Taylor & Francis Group, 2008.

DEPARTMENT OF GEOGRAPHY, OSMANIA UNIVERSITY

M.Sc. GEOINFORMATICS - Syllabus as per CBCS

Scheme of Instruction and Examination

S.No.	Subject Code	*C O U R S E*	**(40) Marks IAE**	**(10) Marks Attendance**	**(50) Marks Theory**	**Total Marks (100)**	**CREDITS**
		SEMESTER-I					
1.	GI-101T	Introduction to Geoinformatics	40	10	50	100	4
2.	GI-102T	Physical & Socio – Economic Environment	40	10	50	100	4
3.	GI-103T	Principles of Remote Sensing	40	10	50	100	4
4.	GI-104T	Principles of Cartography	40	10	50	100	4
5.	GI-151P	Cartographic Techniques				25	1
6.	GI-152P	Spatial Statistics				25	1
7.	GI-153P	Introduction to GIS				25	1
8.	GI-154P	Field Survey				25	1
	Total					**500**	**20**
		SEMESTER-II					
1.	GI-201T	Advanced G.I.S.	40	10	50	100	4
2.	GI-202T	Environmental Studies	40	10	50	100	4
3.	GI-203T	Photogrammetry	40	10	50	100	4
4.	GI-204T	Programming Languages	40	10	50	100	4
5.	GI-251P	Computer Programming Lab &Visual Computing				25	1
6.	GI-252P	G.I.S. Applications				25	1
7.	GI-253P	Map Interpretation & Terrain Analysis				25	1
8.	GI-254P	Aerial Photo Interpretation				25	1
	Total					**500**	**20**

M.Sc. GEOINFORMATICS
SEMESTER-I

THEORY PAPER-I (GI-101T)
INTRODUCTION TO GEOINFORMATICS **(4 Credits)**

UNIT-I

1. Scope and Importance of Geo-informatics, Basic Concepts about Spatial Information.
2. Philosophy and Definition of GIS.
3. Geo-informatics and other Information Sciences, Approaches to the study of G.I.S.: G.I.S. as a Special field of Academic study, G.I.S. as a Branch of Information Technology.

UNIT-II

4. Role of RS and GIS in Geo-Informatics.
5. Geo-informatics – Spatial and Non-Spatial data Management.
   a) Fundamentals of Data Storage, Information Organization and Data Structure, Basic File Structures;
   b) Tabular Databases – Advantages of Databases, Types of Databases – Hierarchical Systems, Relational Systems and Object – Oriented Database System (OODS).
   c) Data Models – Entity Relationship Model, Relational Model, Data Structure; Raster Data Structures, Vector Data Structures.
   d) GIS Data Requirement, Sources and Collection, Methods of Data Capture – Scanning,
6. Digitization and Associated Errors, Conversion from other Digital Sources, Attribute Data Input and Management, Edge Matching, Creating Digital Data – Remote Sensing, Generating Data from Existing Data; Metadata, Different Kinds of Geospatial Data, Detecting and Evaluating Errors, Data Quality Measurement and Assessment, Digital Output Options.

UNIT-III

7. Components of GIS: Hardware, Software and Liveware.
8. Maps and G.I.S.
   a) Vector and Raster Data Query.
   b) Topological Relationships, Creation of Topology and Error Correction.
   c) Accuracy and Precision - The Importance of Error, Accuracy and Precision, Types of Error, Sources of Error and Data Quality.
9. Geographic Visualization.

UNIT-IV

10. Spatial Information Technology;
    a) Image Storage Formats, Data Retrieval, Data Compression, NSDI, GSDI.
    b) GIS as DSS.
    c) Human Resources and Education.
    d) Interactive Data Exploration.
11. G.I.S. as a Spatial Data Institution and its Social Implications.
12. Information and Communication Technologies; Internet, Web Technology and Geo-informatics – MIS, DBMS.

REFERENCES:

1. Kang-Tsung Chang 2002, 'Introduction to Geographic Information Systems' Tata McGraw Hill, New Delhi.
2. C. P. Lo and Albert K. W. Yeung 2005 "Concepts and Techniques of Geographic Information Systems" Prentice Hall of India, New Delhi.
3. Burrough Peter A. and Rachael McDonnell -Principles of Geographical Information Systems, Oxford University Press, New York, 1998.
4. Maguire David J., Goodchild Michael F., P. A. Longley and Rhind David W. - Geographical Information Systems: Principles, Techniques, Management and Applications, Longman Group, U. K, 1991.
5. Goodchild M. F. and Karen K. Kemp – Developing a Curriculum in GIS: The NCGIA Core Curriculum Project, University of California, Santa, Barbara 1990.
6. Ian Heywood, Sarah Cornelius and Steve Carver – An Introduction to GIS, Longman, New York, 2000.
7. Mishra H. C. – A Handbook on GIS, GIS India, Hyderabad, 2000.
8. Smith T.R. and Piquet D. - GIS London Press, London, 1985.
9. Taylor DRF – GIS: The Micro Computer and Modern Cartography, Pergamon Press, Oxford, 1991.
10. C. P. Lo, Yeung and Albert K. W. - Concepts & Techniques of Geographical Information Systems, Prentice Hall of India, New Delhi, 2003.
11. Quihao Weng – Remote Sensing and GIS Integration: Theories, Methods and Applications, McGraw Hill, 2010.
12. Gottfried Konecny – Geoinformation: Remote Sensing, Photogrammetry and Geographic Information System, Taylor and Francis, Newyork and London, 2003.
13. Sahab Fazal – GIS Basics, New Age International Publisher, 2008.
14. Rolf A.de By (Ed) – Principles of Geographic Information System: An Introductory Text Book, ITC Educational Textbook Series, Netherland, 2001.

THEORY PAPER-II (GI-102T)
PHYSICAL & SOCIO-ECONOMIC ENVIRONMENT **(4 Credits)**

UNIT-I

1. Interior of the Earth, Pangea, Slow and Sudden Movement of Earth.
2. Processes of Landforms: Faulting, Folding, Earthquakes and Volcanoes.
3. Erosional & Depositional Features of Rivers, Glaciers, Wind and Underground Water.

UNIT-II

4. Structure and Composition of the Atmosphere.
5. Factors effecting Insolation –Heat Budget.
6. Ocean: Ocean Relief, Temperature, Salinity & Oceanic Circulations.

UNIT-III

7. Population: Factors influencing, Distribution and Characteristics of World Population.
8. Population Theories, Growth Trends.
9. Population Density, Optimum Population.

UNIT-IV

10. Types of Economies: Primary, Secondary, Tertiary and Quaternary.
11. Factors for Location of Agriculture, Factor for Location of Industry.
12. Locational Theories: Von Thunen Theory, Johnson Theory, Weber's Theory.

REFERENCES:

1. William David Thornbury -Principles of Geomorphology, Wiley Eastern Ltd, New Delhi 1993.
2. Phillip G. Worcester 'A Text Book of Geomorphology', East-West Press Pvt. Ltd., New Delhi 1961.
3. Alan Strahler with Zeeya Merali – Visualizing Physical Geography (8th Edition), Willey Visualizing, 2007.
4. John Innes Clarke: 'Population Geography', Pergamon Press, Oxford 1965.
5. Garnier J. B.: 'Geography of Population, St. Martin's Press, New York, 1966.
6. Majid Husain: 'Agricultural Geography', Rawat Publication, New Delhi 2007.
7. R. Knoweles and J. Wareing: 'Economic and Social Geography Made Simple', Rupa & Co., New Delhi 2005.
8. Hamblin W. K. and Christiansen E. H. – Earth Dynamic Systems (10th Edition), John Willey and Sons, 2013.
9. Robert W. Christopherson – Geosystems: An Introduction to Physical Geography, Pearson Prentice Hall, New Jersey, 2005.
10. Michael Craghan – Physical Geography: A Self Teaching Guide, John Willey & Sons Inc., 2003.
11. Peter Smithson, Ken Addison and Ken Atkinson – Fundamentals of Physical Environment, Taylor and Francis, New York and London, 2008.
12. Robert E. Gabler, James F. Peterson, L. Michael Trapasso, Dorothy Sack – Physical Geography 9th Edtn, Brooks/Cole, Cengage Learning 2009.
13. Richard John Hugget – Fundamentals of Geomorphology (2nd Edition), Routledge Taylor and Francies Group, London and New York, 2007.
14. R. B. Mandal, Joseph Uyanga and H. Prashad – Introductory Methods in Population Analysis, Concept Publication Co. New Delhi, 2007.

15. Arun Kumar Sharma – Population and Society: Present Scenario and Future Prospect, Concept Publication Co., New Delhi, 2012.

THEORY PAPER-III (GI-103T)
PRINCIPLES OF REMOTE SENSING **(4 Credits)**

UNIT-I

1. Introduction to Remote Sensing: Definition, Concept and Types of Remote Sensing.
    i) Passive Remote Sensing.
    ii) Active Remote Sensing.
2. History of Remote Sensing :-
    a) The Early Age (1839 – 1907).
    b) The Middle Age (1908 – 1948).
    c) The Modern Age (1949 onwards).
3. Energy flow From Source to Sensors :-
    a) Electro Magnetic Energy: Definition and Concept.
    b) Characteristics of Electro Magnetic Radiation and its interaction with the Atmosphere.
    c) Electromagnetic Spectrum.

UNIT-II

4. Remote Sensing Platforms, Atmospheric Window.
5. Spectral Reflectance Curve :-
    a) Spectral Signatures.
6. Scanning System :-
    a) Multispectral.
        i) Across Track Scanning.
        ii) Along Track Scanning.
    b) Thermal Imaging.

UNIT-III

7. Sensors Resolution: - Spatial, Spectral, Radiometric and Temporal Resolution.
8. Types of Errors and Rectifications.
9. Geometry of Remote Sensing :-
    a) Orbit of Satellites:-
        i) Geosynchronous.
        ii) Geostationary.
        iii) Sun Synchronous.
    b) Swath, Nadir and IFOV.

UNIT-IV

10. Characteristics of IRS, LANDSAT, IKONOS, SPOT.
11. Ground Truth.
    a) Definition.
    b) Parameters of Ground Truth.
12. Types of Imageries:
    a) Aerial Photography.
    b) Satellite Imagery.
    c) RADAR Imagery
    d) LiDAR and UAV.

REFERENCES:

1. Nejel Veziroglu - Remote Sensing: Energy, Related Studies, Hemisphere Publishing Corporation, Washington, 1975.
2. Paul J. Curran - Principles of Remote Sensing, English Language Book Society, London, 1988.
3. Robert G. R. - Manual of Remote Sensing vol. I & II, American Society of Photogrammetry, New York, 1975 & 1978.
4. Phillip H. Swain & Shirley M. Davis - Remote Sensing: The Quantitative approach, McGraw Hill International Book Co., 1978.
5. Thomas M. Lillesand & Ralph W. Kiefer - Remote Sensing & Image Interpretation, John Wiley & Sons, New York 1987.
6. Deekshatalu B.L. & Rajan Y. S. - Remote Sensing, Indian Academy of Sciences, 1984.
7. Basudeb Bhatta - Remote Sensing and GIS, Oxford University Press, 2008.
8. James B. Campbell and Randolph H. Wynne – Introduction to Remote Sensing (5^{th} Edition), The Guilford Press, New York and London, 2011.
9. W. G. Rees – Principles of Remote Sensing (2^{nd} Edition), Cambridge University Press, 2001.
10. R. C. Olsen – Remote Sensing from Air and Space, SPIE Press, USA, 2006.
11. Thomas M. Lillesand and Ralf W. Kiefer – Remote Sensing and Image Interpretation (4^{th} Edition) John Willey & Sons Inc.
12. P. S. Ray, R. S. Dwivedi and D. Vijayan – Remote Sensing Applications, NRSC, Hyderabad, 2010.

THEORY PAPER-IV (GI-104T)

PRINCIPLES OF CARTOGRAPHY **(4 Credits)**

UNIT- I

1. History of cartography:
    a) Sequence of development.
    b) Impact of changing ideas.
    c) Concept of Representation.
    d) Concept of Distribution.
    e) Impact of Changing Technology.
2. Nature and Scope of Cartography:-
    a) Scope of Cartography.
    b) Needs for Maps: - Basic Characteristics of Maps.
    c) Cartographer as a Consultant.
3. Types of Maps: - Classed by Scale, Functions & Subject matter.

UNIT-II

4. Map Scale, Projections and Co-ordinate Systems: -
    a) Types of Scales: Statement, R. F., Graphic Scales.
    b) Transforming the map scale.
    c) Map Projections: - Definition, Types of Projections: - Based on Property, Surface, Aspect and Source of Light.
    d) Coordinate Systems: - Rectangular, Geodetic & Cartesian.
5. Cartographic Design & Methods: -
    a) Map Designing: Design Principles, Controls on Map Design and Elements of Map design.
6. Design Planning: - Choropleth, Isopleth, Dot and Choro-Chromatic methods.

UNIT-III

7. Generalization: - Elements of Generalization, Controls of Generalization, Manipulations.
8. Symbolization: Types of symbols: - Qualitative and Quantitative, Point, Line and Area. Measurement Levels, Feature Dimensions, Shape, Size, Colour and Patterns. Selection and Simplification of Symbols.
9. Colours and Patterns in Cartography: -
    a) Nature of Colour: - Colour Troll Chart, Dimensions of Colour, Vision, Functions of Colours and Patterns.
    b) Selection of Colours for Mapping.

UNIT-IV

10. Types of Graphs: - Line Graph, Bar Graph, Combine Line and Compound Bar Graph, Polygraph, Band Graph, Climo-Graph, Hyther Graph, Ergo Graph.
11. Types of Diagrams: Star Diagram, Wheel Diagram, Wind Rose, Age and Sex Pyramid, Flow Maps, Cartograms and Histograms, Importance of using Graphs and Diagrams in Cartography.
12. Digital cartography: -
    a) Types of Data: Spatial, Non-Spatial (Attribute) and DBMS.
    b) Organization, Comprehension, Manipulation, Analysis and Display of Digital Data.
    c) Automation and Map Reproduction.

REFERENCES:

1. Robinson A. H. et al - Elements of Cartography, John Wiley & Sons. New York, 1978.
2. Monkhouse F. J. & Wilkinson - Maps & Diagrams, Methuen & Co. London, 1967.
3. Raisz and Erwin - Principles of Cartography, MCGraw Hill, New York, 1962.
4. Campbell John - Introductory Cartography, Prentice Hall, Inc. Englewood Cliff, New.
5. Lawrence G. R. P. - Cartographic Methods, Methuen, London, 1974.
6. Menno- Jan Keraak and Ferjan Ormeling – Cartography: Visualization of Spatial Data (3rd Edition), Prentice Hall, 2010.
7. Gretchen N. Peterson – GIS Cartography: Aguide to Effective Map Design, CRC Press, Taylor and Francis Group, 2009.
8. John Krygier and Denis Wood – Making Maps: A Visual Guide to Map Design for GIS, The Guilford Press, New York and London, 2005.
9. Judith A. Tyner – Principles of Map Designing, The Guilford Press, New York and London, 2010.

PRACTICAL PAPER-I (GI-151P)

CARTOGRAPHIC TECHNIQUES **(1 Credit)**

1. Map Scale – Types of Scales, Scale Conversion.
2. Map Projections: Cylindrical, Conical & Zenithal projection, UTM Projection
3. Techniques of Mapping – Choropleth, Flow Diagram, Interpolation Techniques, Isopleth Mapping, Triangular Graphs.
4. Symbolization - Preparation of Thematic Maps using - Point, Line, Area Symbols.

REFERENCES:

1. Monkhouse , F.J.1967 – Maps and Diagrams , Methuen and Co., London.
2. Robinson , A.H. –1982 Elements of Cartography, John Willey and Sons , New York .
3. Sing R.L. – Elements of Practical Geography, Kalyani Publishers , New Delhi , 1994.
4. Lewis , Peter – Maps and Statistics , Methuen and Co., Ltd., London , 1977.
5. Dickinson , G.C. – Maps and Air Photos , Edward Arnold Ltd., London , 1969.
6. Cuff , D.J. and Mattson , M.J. – Thematic Maps : Their Design and Production , Methuen , New York 1982.
7. Mishra R. P. and Ramesh A – Fundamentals of Cartography, Concept Publishing Company, New Delhi, 1989.
8. Judith A. Tyner – Principles of Map Design, The Gulford Press, New York, London, 2010.
9. Getchen N. Peterson – GIS Cartography: A Guide to Effective Map Design, CRC Press, Taylor and Francis, New York and London, 2009.
10. John Krygier and Denis Wood – Making Maps: A Visual Guide to Map Design for GIS, The Guilford Press, New York and London, 2005.

PRACTICAL PAPER-II (GI-152P)

SPATIAL STATISTICS **(1 Credit)**

1. Introduction to Spatial Statistics.
2. Measurement Scales: Nominal, Ordinal, Interval, Ratio.
3. Spatial distributions – Nearest Neighbour Analysis, Rank Size Rule.
4. Simple Correlation and tests of significance.
5. Regression and Ratio of variation.
6. Residuals from regression – Maps of residuals.
7. Measures of inequality – Location quotient, Lorenz curve.
8. Network Analysis – Measures of centrality and connectivity.
9. Multivariate Analysis.

REFERENCES:

1. Elhance D. N. – Fundamentals of Statistic, Kitab Mahal Allahabad, 1972
2. Gregory S. – Statistical Method and the Geographer, Longman, London, 1963
3. Cole J. P. & King C. A. M. – Quantitative Methods in Geography, John Willey & Sons, New York, 1968.
4. Kafka F. & G. Simpson – Basic Statistics, Oxford & I.B.H. Publishing Co., Calcutta, 1971.
5. Jones P. A. – Field Work in Geography, Longman, London, 1968.
6. Johnston R. A. - Multivariate Statistical Analysis in Geography, Longman, London, 1978
7. King L. J. - Statistical Analysis in Geography, Prentice Hall, Englewood Cliffs, New Jersey, 1978.
8. Steve McKillup and Melinda Darbi Dyar – Geostatistics Explained, Cambridge University Press, UK, 2010.
9. Alan E. Gelfand, Peter J. Diggle, Montserrat Fuentes and Peter Guttorp – Hand book of Spatial Statistics, CRC Press, Taylor and Francis, New York and London, 2010.
10. Michael Sherman – Spatial Statistics and Spatio Temporal Data: Covariance Functions and Directional Properties, John Willey and Sons Ltd., 2011.
11. Brian D. Ripley – Spatial Statistics, John Willey and Sons Ltd., New York and London, 2004.
12. Carlo Gaetan and Xavier Guyon – Spatial Statica and Modeling, Springer, 2010.

PRACTICAL PAPER-III (GI-153P)

INTRODUCTION TO GIS **(1 Credit)**

1. Fundamentals of Computers, Components of Computers; Input unit, memory unit, Central processing unit & Output unit.
2. Computer Software Operating Systems & Commands.
3. Scanning and Digitization of Maps
4. Geo Referencing & Editing of layers
5. Creating Attribute Data and Editing
6. Creation of Maps – Choropleth & Dot Maps.
7. Fundamentals of GPS – Hand Held GPS and Differential GPS (Static and Kinematic Mode)
8. Identification of Location & Altitude with G.P.S.
9. Position fixing and route navigation using hand held GPS.
10. GPS for GIS and Mapping.

References:

1. Taylor D. R. F - GIS: The Microcomputer and Modern Cartography, Pergamon Press, Oxford
2. Lo C. P. and Yeung A. W. - Concepts and Techniques of Geographical Information Systems, Prentice Hall of India Pvt. Ltd., 2002.
3. Heywood I., Cornelius S. and Carrer S. - An Introduction to Geographical Information Systems, Pearson Education Pvt. Ltd., 2002.
4. Kang-Stung-Chang - Introduction to Geographical Information Systems, Tata McGraw Hill Publishing Co., 2002.
5. Agarwal, A. K. - Fundamentals of Global Positioning System.
6. Hfmann W. - GPS Theory and Practice, H. Lichtenegger & J. Collins, Springer-Wien, New York.
7. Bob Booth and Andy Mitchell – Getting Started with ArcGIS: GIS by ESRI, ESRI Publications, USA.
8. Gergory T. French – Understanding The GPS: An Introduction to Global Positioning System, GeoResearch Inc., USA, 1996.
9. Elliot D. Koplan and Christopher J. Hegarty – Understanding GPS: Principles and Applications, Artech House, Boston, London, 2006.
10. Ahmed El-Rabbani – Introduction to GPS: The Global Positioning System, Artech House, Boston, London, 2002.

PRACTICAL PAPER-IV (GI-154P)

FIELD SURVEY **(1 Credit)**

Importance of Field Survey – Principles & Applications with reference to:

1. Chain Survey – Triangulation method.
2. Plane Table Survey, Plan Preparation, Resection
3. Prismatic Compass Survey – Open & Closed Traverse; Elimination of Error.
4. Total Station Surveying.
5. GPS and DGPS Surveying.

REFERENCES:

1. Robinson , A.H. –1982 Elements of Cartography, John Willey and Sons , New York .
2. Sing R.L. – Elements of Practical Geography, Kalyani Publishers , New Delhi , 1994.
3. Lewis , Peter – Maps and Statistics , Methuen and Co., Ltd., London , 1977.
4. Mishra R. P. and Ramesh A – Fundamentals of Cartography, Concept Publishing Company, New Delhi, 1989.
5. Judith A. Tyner – Principles of Map Design, The Gulford Press, New York, London, 2010.
6. Getchen N. Peterson – GIS Cartography: A Guide to Effective Map Design, CRC Press, Taylor and Francis, New York and London, 2009.
7. John Krygier and Denis Wood – Making Maps: A Visual Guide to Map Design for GIS, The Guilford Press, New York and London, 2005.

M.Sc. – GEOINFOMATICS
SEMESTER – II

THEORY PAPER-I (GI-201T)
ADVANCED G.I.S. **(4 Credits)**

UNIT-I

1. Data Capture, Storing, Retrieval, Manipulation, Querying, Analysis and Graphical Display.
2. Types of Data used in G.I.S. – Spatial, Non-Spatial (Attribute) and Temporal.
3. Spatial Data Models and Structures: Raster Data Models and Vector Models – Spaghetti, Point Dictionary and Topology Models, Raster Data Compaction Methods – Chain Coding, Run-Length, Encoding, Block Coding and Quad-Tree-Raster, Vector Model Verses Raster Models, Non-Spatial Data Structures – Hierarchical, Network, Relational and Object-Oriented Methods.

UNIT-II

4. Geo-Referencing and Geo-Coding, Continuous, Direct, Relative and Discrete Georeferencing Systems, Addresses Geocoding.
5. Data Input Methods in GIS Environment: Key Board Entry, Manual Digitizing, Scanning and Automatic.
6. Digitizing Data Capturing with GPS and Digital Imageries – Detecting and Correcting Errors in GIS Data Types and Sources of Errors – Data Reduction and Generalization, Edge Matching and Rubber Sheeting.

UNIT-III

7. Spatial Data Analysis: Data Measurements Methods, Reclassification Single Layer Operations, Multiple Layer Operations, Data Query – Buffering, Network Proximity and Overlay Analysis.
8. Digital Terrain Modeling – Definitions – DTM, DSM, DEM, DTED, TIN – Approaches to Digital Terrain Data Sampling – Systematic and Adaptive – Characteristics of DEM and TIN.
9. Digital Terrain Visualization and Processing, Applications and uses of Digital Terrain Models.

UNIT-IV

10. G.I.S. Application areas – Resources Management, Urban Planning, Rural Development, Land Management, Forest Management, Demographic Studies, Property Development.
11. Decision making in a G.I.S. Context – Role of Information in the Decision Making Process of Data Transformation and Stages of Decision Making – DSS Characteristics – GIS as a Tool of Decision Making and Accelerating the Process.
12. Other forms of GIS in Specialized Fields: MIS, LIS, LIMS, FIS, ENVIS, RMIS
13. Recend trends in GIS: Open source GIS- Cloud computing, crowd sourcing and open geospatial consortium, Mobile GIS.

REFERENCES:

1. Goodchild M.F. and Kemp K – "Developing a Curriculum in GIS : The NCGIA Core Curriculum Project, University of California, Santa, Barbara 1990
2. Ian Haywood Cornelius and Steve Carver – An introduction to GIS, Longman, New York, 2000.
3. Misra HC – A Handbook on GIS, GIS India, Hyderabad, 1995.
4. Smith T.R. and Piquet, GIS, London Press, London, 1985.
5. Taylor DRF – GIS: The Microcomputer and Modern Cartography, Pergamon Press, Oxford, 1991.
6. Heywood I, et al, An Introduction to Geographical Information System, Longman, New Delhi, 1998.

7. Lo CP & Young AKW, Concepts & Techniques of Geographical Information System, Prentice Hall of India, New Delhi – 2003.

THEORY PAPER-II (GI-202T)
ENVIRONMENTAL STUDIES **(4 Credits)**

UNIT-I

1. Environmental Studies – Content, Scope and Relationship with other disciplines, Environmental Types and Components.
2. Eco System – Meaning of Eco System, Types of Eco System and Components of Eco System. Biodiversity
3. Biomes – Meaning of Biome, Biome Types – Terrestrial and Aquatic Biome.

UNIT-II

4. Environmental Degradation and Environmental Pollution – Meaning, Types of Environmental Degradation, Causes and Effects of Degradation – Definition of Pollution, Types of pollution - Air, Water, Soil and Noise Pollution.
5. Environmental Impact Assessment– Meaning and concept of EIA, Methods of EIA, various steps in EIA, Procedures for EIA.
6. Environmental Information System – Broad Objectives – Long Term and Short Term Objectives, Salient features of Environmental Information System.

UNIT-III

7. Application of G.I.S. and Remote Sensing in Environmental Protection – LULC Mapping, Flood Hazard Mapping and Zonation, Hydro-Morphological Studies and Wasteland Mapping.
8. Global Ecological Database.
9. Sustainable Development – Concept of Sustainable Growth and Development.

UNIT-IV

10. Environmental Movement and Policies in India – Bishnoi Movement, Chipko Movement, Narmada Bachao Andolan, Baliyapal Movement, Tehri Dam and Silent Valley. Environment Planning and Legislation in India.
11. Global Environmental Problems and International Conventions – Major Global Problems, Global Warming - Climate Changes and its Impact.
12. International Co-operations, Earth Summits, Kyoto Protocol.

REFERENCES:

1. David Harvey - Justice, Nature and Geography of Difference, Blackwell, 2000.
2. John Bellamy Foster - The Valuable Planet, Monthly Review Press, 1994.
3. Savindra Singh - Environmental Geography, PPB, 2000.
4. David Pepper - Eco-socialism: From Deep Ecology to Social Justice, Routledge, 1993.
5. Gadgil M. & R. Guha - This Fissured Land: An Ecological History of India, OUP, 1995.
6. Guha R. - The Unquiet Woods, OUP. 2000.
7. John McCormick - The Global Environmental Movement, JWS, 1995.
8. Reiner Grundmann - Marxism and Ecology, Clarendon Press, Oxford, 1991.
9. Desai V. & Potter R. B. (ed) - The Companion to Development Studies, 2002.
10. The Hindu - Survey of the Environment 2002.
11. Down to Earth-Science and Environment (Fortnightly Journal).
12. Bill McGuire, Ian Manson and Christopher Kilburn – Natural Hazards and Environmental Change, Oxford University Press Inc. New York, 2002.
13. John C. Pine – Natural Hazards Analysis: Reducing the Impact of Disasters, CRC Press, Taylor and Francis Group, London, New York. 2008.

THEORY PAPER-III (GI-203T)
PHOTOGRAMMETRY **(4 Credits)**

UNIT-I

1. Meaning, History and Purpose of Photogrammetry.
2. Atmospheric Window used for Aerial Photography.
3. Image Sources: Analogue and Digital.

UNIT-II

4. Photogrammetric Evaluation Methods (Geometric Aspects): Camera Position, Focal length, Image Orientation and Relative Camera Position (Stereo).
5. Classification of Aerial Photographs.
6. Ortho Photos, Stereo Pairs and Mosaics.

UNIT-III

7. Stereoscopic Vision & Depth Perception.
8. DTM Creation and DEM Extraction, Ortho photo Generation.
9. Aerial Triangulation, Coordinate Transformation in 2D and 3D.

UNIT-IV

10. Flight Planning & Acquisition of Aerial Photographs.
11. Errors in Aerial Photography.
12. Application of Aerial Photographs: Land use land cover mapping, Urban Studies, Topographic Mapping, Architecture, Engineering, and Geology.

REFERENCES:

1. David P.Paine – Aerial Photography &Image Interpretation for Resource Management, John Wiley & Sons, New York, 1981.
2. Dickinson G.G. Maps and Aerial Photographs, Edward Arnold Ltd., London, 1969.
3. Wolf P.R. Elements of Photogrammetry, McGraw Hill, New York, 1983.
4. Sloma C.C. Manual of Photogrammetry, American Society of Photogrammetry, Virginia, 1980.
5. Zhilin Li, Jun Chen and Emmanuel Baltsavias (Edt) - Advances in Photogrammetry, Remote Sensing and Spatial Information Science, ISPRS Congress Books, 2008.
6. Yves Egeles and Michael Kasser – Digital Photogrammetry, Taylor and Francis, London and New York, 2002.
7. Wilfried Linder – Digital Photogrammetry: A Practical Course (2^{nd} Edition), Springer, 2005.
8. Thomas M. Lillesand and Ralf W. Kiefer – Remote Sensing and Image Interpretation (4^{th} Edition) John Willey & Sons Inc.
9. Schenk T. – Digital Photogrammetry (Vol-1), Terra Science, 1999.
10. Linder Wilfried – Digital Photogrammetry: A Practical Course (3^{rd} Edition), Springer, 2009.

THEORY PAPER-IV (GI-204T)

PROGRAMMING LANGUAGES **(4 Credits)**

UNIT-I

1. Application and use of different Programming languages in GIS Environment (C, JAVA, Dot NET, SQL)
2. C. Language: - Introduction to C, Variables, Data types, if statements, if-else, Nested its statements (Conditional Statement), Interactive, Statements (Programs using Interactive Statements).
3. Concept of Arrays, 1-D, 2-D, 3-D, arrays, Concept of functions (functions), Recursive functions (Programs using these concepts).

UNIT-II

4. Structures, Unions, Files concept, Graph concept - Plotting concepts and Enumerated Data Types.
5. SQL: Spatial Data Queries, Data Manipulation, Transaction Controls, Data Definition, Data Control, Procedural Extensions, Editing Geodatabase Data in SQL, Creating Tables with SQL.
6. SQL Server: Creating Geodatabase in SQL Server.

UNIT-III

7. Visual Basic: Date types, G.U.I's concept (Designing Screens)
8. VB.Net: Data Base connectivity concept (connecting the front end tool with backend).
9. VB.Net: Writing procedures for retrieval of data, Developing Applications.

UNIT-IV

10. JAVA Programming.
11. Python Programming.
12. Arc Macro Language (A.M.L.) in Arc Info, Avenue (in ARCVIEW)

REFERENCES:

1. Let us C by Yashwanth Kanithkar
2. ESRI Publications
3. C Programming by Balaguru Swamy
4. C Programming by Kochan
5. Complete reference using C – C.C.R.
6. Practical V.B. 6 – Bob Reselmanu and Richard Peasley.
7. The complete reference VB 6 – Noel Jeske.

PRACTICAL PAPER-I (GI-251P)

COMPUTER PROGRAMMING LAB AND VISUAL COMPUTING **(1 Credit)**

1. C program that evaluates an algebraic expression after reading necessary values from the user.
2. C program that prints the given 3 integers in ascending order using IF-ELSE
3. C program Using WHILE statement to find the sum of 1 + 2 + 3+ 4 +…n
4. C program using FOR statement to find the following from a given set of 20 integers
5. C procedures to add, subtract, multiply and divide two complex numbers (x + y) and (a + ib). Also write the main program that uses these procedures.
6. Creating a class with private and public variables and declare constructors with and without parameters to the class.
7. C++ program that declares two classes as friends to each other and uses data from the friend class.
8. Arc GIS Applications
9. Using controls to build a form
10. Branching and Looping in VBA
11. Working with Variables and Functions in VBA
12. Adding layers to a map
13. Defining layer symbology
14. Querying data.
15. Creating ActiveX DLLs and added to the ArcGIS applications.
16. Coding in VB.Net
17. Introduction to ArcGIS Engine
18. Using the Map Control, TOC Control, Toolbar control.

REFERENCES:

1. Let us C by Yashwanth Kanithkar
2. ESRI Publications
3. C Programming by Balaguru Swamy
4. C Programming by Kochan
5. Complete reference using C – C.C.R.
6. Practical V.B. 6 – Bob Reselmanu and Richard Peasley.
7. The complete reference VB 6 – Noel Jeske.

PRACTICAL PAPER-II (GI-252P)

G.I.S. APPLICATIONS **(1 Credit)**

1. GIS Single layer operations - Clip, Split, Dissolve, Map Join, Buffering.
2. Overlay Functions in G.I.S. – Union, Intersect, Identity,
3. Simple and complex querying using GIS Data.
4. Network Analysis
5. Techniques of Interpolation.
6. Digital Elevation Models.

References:

5. Taylor D.R.F - GIS: The Micro Computer and Modern Cartography, Pergamon Press, Oxford
6. Lo C. P. and Yeung A. W. - Concepts and Techniques of Geographical Information Systems, Prentice Hall of India Pvt. Ltd., 2002.
7. Heywood I., Cornelius S. and Carrer S. - An Introduction to Geographical Information Systems, Pearson Education Pvt. Ltd., 2002.
8. Kang-Stung-Chang - Introduction to Geographical Information Systems, Tata McGraw Hill Publishing Co., 2002.
9. Bob Booth and Andy Mitchel – Getting Started with ArcGIS: GIS by ESRI, ESRI Publications, USA, 2012.

PRACTICAL PAPER-III (GI 253-P)
MAP INTERPRETATION AND TERRAIN ANALYSIS **(1 Credit)**

Map Interpretation

1. Interpretation of Indian Topographical Maps.
2. Interpretation of Weather Maps

Terrain Analysis

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.

References:

1. Monkhouse F. J. – Maps and Diagrams, Methuen and Co., London, 1967.
2. Robinson A. H. – Elements of Cartography, John Willey and Sons, New York, 1982.
3. Sing R. L. – Elements of Practical Geography, Kalyani Publishers, New Delhi, 1994.
4. Mishra R. P. and Ramesh - Fundamentals of Cartography, Concept Publication, New Delhi, 2002.

PRACTICAL PAPER-IV (GI 254-P)

AERIAL PHOTO INTERPRETATION **(1 Credit)**

1. Characteristics of Aerial Photographs.
2. Drawing of flight line.
3. Generating 3D view from Stereo Pairs and Interpretation
4. Digital Aerial Photo Interpretation.

ReferenceS:

1. Monkhouse F. J. – Maps and Diagrams, Methuen and Co., London, 1967.
2. Robinson A. H. – Elements of Cartography, John Willey and Sons, New York, 1982.
3. Sing R. L. – Elements of Practical Geography, Kalyani Publishers, New Delhi, 1994.
4. Mejal Veziroglu – Remote Sensing: Energy related studies, Hemisphere Publishing Corporation, Washington, 1975.
5. David P. Paine – Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York, 1981.
6. G. Dury & J. A. – The land from the Air: A Photographic Geography, London, 1978.
7. Gautam N. C. – Urban land use studies through Aerial photo interpretation techniques, Pink Publishing House, 1978.
8. David P. Paine – Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York, 1981.
9. Gautam N. C. - Urban landuse Studies through Aerial photo interpretation techniques, Pink Publishing, House, 1978.
10. Dickinson, G.G. – Maps and Aerial Photographs, Edward Amold Ltd., London, 1969.
11. Paul W. Wolf – Elements of Photogrammetry.
12. Zhilin Li, Jun Chen and Emmanuel Baltsavias (Edt) - Advances in Photogrammetry, Remote Sensing and Spatial Information Science, ISPRS Congress Books, 2008.
13. Yves Egeles and Michael Kasser – Digital Photogrammetry, Taylor and Francis, London and New York, 2002.
14. Wilfried Linder – Digital Photogrammetry: A Practical Course (2^{nd} Edition), Springer, 2005.
15. Thomas M. Lillesand and Ralf W. Kiefer – Remote Sensing and Image Interpretation (4^{th} Edition) John Willey & Sons Inc.

DEPARTMENT OF GEOGRAPHY, OSMANIA UNIVERSITY

M.Sc. GEOGRAPHY - Syllabus as per CBCS, w.e.f 2023-2024

Scheme of Instruction and Examination

S.No.	Subject Code	Paper	C O U R S E	(20) Marks IAE	(10) Marks Home Assignment	(70) Marks Theory	Total Marks (100)	CREDITS
		SEMESTER-III						
1.	**GG301T**	**Core- I**	Urban Geography	20	10	70	100	4
2.	**GG302T**	**Core-II**	Agricultural Geography	20	10	70	100	4
3.	**GG303T**	**Elective- I a**	Photogrammetry	20	10	70	100	4
		Elective- I b	Research methodology in Geographical Studies					
4.	**GG304T**	**Elective -II a**	Geopolitics with Special reference to Asia	20	10	70	100	4
		Elective-II b	Tourism Geography					
5.	**GG351P**	**Practical - I**	Techniques in Agriculture and Urban Analysis				25	1
6.	**GG352P**	**Practical II**	Aerial Photo Interpretation				25	1
7.	**GG353 SP**	**SP**	Seminar Presentation				50	2
	Total						**500**	**20**
		SEMESTER-IV						
1.	**GG401T**	**Core- I**	Principles of GPS and GNSS	20	10	70	100	4
2.	**GG402T**	**Core-II**	Regional Development Studies	20	10	70	100	4
3.	**GG403T**	**Elective- III a**	Rural Development and Planning	20	10	70	100	4
		Elective- III b	Principles of Cartography					
5.	**GG451P**	**Practical - I**	GPS Survey				25	1
	GG452P	**Practical II**	Demographic Analysis and Interpretation				25	1
6.	**GG453 (Project)**	**Project**	PROJECT WORK (Dissertation and Viva Voce)				150	6
	Total						**500**	**20**
		Grand Total Marks and Credits					**1000**	**40**

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f. 2023-2024
Scheme of Instruction & Examination

CORE-I (GG301T)
URBAN GEOGRAPHY (4 Credits)

UNIT-I

1. Meaning, Nature, Scope & Approaches of Urban Geography.
2. Classification of Towns –Functional Classification of towns & Morphology of Towns.
3. Process of Urbanization: Introduction factors of Urban Growth, Rural Urban Conflicts, Urban Sprawl, Urban Agglomeration.

UNIT-II

4. Urbanization in Developed and Developing Countries.
5. Urban Social Area Analysis, Growth of Informal sectors in Urban Areas, Social Exclusion and Segregation in Urban Areas .
6. Changing Urban Forms: Rural Urban fringe, Satellite Towns and Suburban, Rurban zone.

UNIT-III

7. Models of Urban Morphology: Concentric Zone, Sector Model, Multiple Nuclei model.
8. Urban Theories:Rank Size Rule, Concept of Primate City Christallers and Losch models of Central Place Theory
9. Concept of SMART city.

UNIT-IV

10. Impact of Urbanization: Rural settlements & Agriculture and Transportation.
11. Urban Environment Issues: Poverty, Slums, Housing, Livelihood.
12. Urban Planning & Policy : National Urban Policy and its Impact, Urban Land Use Planning & Master Plans, Case Study of Hyderabad Urban Planning Strategies and Challenges (HMDA)

REFERENCES:

1. Hall Tim - Urban Geography, Routledge, London, 1998.
2. Cherry Gordan E. - Urban Planning Problems, Leonard Hills Books, London, 1974.
3. Alam S. M. & Alikhan F. Eds - Poverty in Metropolitan Cities, Concept, New Delhi, 1974.
4. Alikhan F. - Urbanization in the Third World: An African Experience Book Links, Hyderabad, 1987.
5. Naidu Ratna - Old Cities New Predicaments, A Study of Hyderabad, Sage, New Delhi, 1990.
6. Sengupta Chandan - Urban Poverty & Vulnerability in India, Oxfam, India Trust, 2000.
7. Alam S. M. & Khan W. - Metropolitan Hyderabad and its Region, Allied, Bombay, 1972.
8. Alam S. M. – Hyderabad-Secunderabad, Twin Cities, Asia Publishing House, Bombay, 1964.
9. Carter H. - The Study of Urban Geography, Edward Arnold, London, 1972.
10. Singh K. and Steinberg F. (Eds) - Urban India in Crises, New Age Interims, New Delhi, 1998.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
CORE-II (GG302T)
AGRICULTURAL GEOGRAPHY (4 Credits)

UNIT-I

1. Definition, Scope, Significance and Approaches in Agricultural Geography
2. Origin and Development of Agriculture in different parts of the world.
3. Determinants of Agriculture - Physical, Socio-Economic, Cultural, Institutional, Technological.etc.

UNIT-II

4. Land Capability and Carrying Capacity
5. Major Agriculture systems, Whittlesey's Classification
6. Models in Agricultural Geography: Von Thunen's Agricultural Model, Olaf Jonasson's Agricultural Model

UNIT-III

7. Agricultural Regionalization
   i) Concept of Agriculture Region
   ii)Agricultural Region in India & World
   iii) Quantitative & Qualitative Techniques:-Crop Diverification,Crop Combination,Crop Intensity & Agricultural Efficiency.
8. Land Reforms in India - Green Revolution, Agricultural Growth, Performance and Policies
9. Agro Based Industries and Infrastructure Development , W. T. O. and Indian Agriculture

UNIT-IV

10. Food Security - Sustainable Agricultural Development
11. Problems and Prospects of Indian Agriculture
12. Application of Remote Sensing and GIS in Agricultural Studies.

REFERENCES:

1. Grigg D. B. - The Agricultural Systems of the World, Cambridge University Press, London,1974.
2. Majid Hussain - Agricultural Geography, Inter-India Publications, Delhi,1979.
3. K.S. Dhindsa and A.Sharma - Dynamics of Agricultural Development, COncept Science, 2001.
4. Noor Mohammed - New Dimensions in Agricultural Geography, Vol I-VIII, Concept Publishing Co.., New Delhi, 1992.
5. Chorley, B.J. & Hagget P. - Models in Geography, London, Methuen, 1971.
6. Mohammed Ali - Studies in Agricultural Geography, Rajesh Publications, New Delhi, 1978 7. Singh Jasbir - Agricultural Geography, Tata McGraw Hill Publishing and Co., Ltd., New Delhi, 1994.
8. Mamoria C.B. -Agricultural Problems in India, Kitab Mahal, Jurukshetra, 1975.
9. Singh Jasbir - Agricultural Atlas of India A Geographical Analysis of Vishal Publications, Kurukshetra, 1974.
10. Shukla L. Readings in Agricultural Geography, Scientific Publishers, Jodhpur, 1991.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Elective-I-a (GG303T)
PHOTOGRAMMETRY (4 Credits)

UNIT-I

1. Definition, Evolution & History of Photogrammetry.
2. Application of Electromagnetic Spectrum in Aerial Photography.
3. Types of Aerial Photographs (Vertical & Oblique), Difference between Topographical Maps, Aerial Photograph, Satellite Imagery.

UNIT-II

4. Principles of Photography – Comparism of Pinhole and lens camera, characteristics of photographic emulsions filters (Low Pass and High Pass).
5. Aerial Cameras: Types of Aerial Camera
6. Geometric aspects of Aerial Photos:-Focal length, Angle of coverage, Principle Point, Nadir Point and Isocentre.

UNIT-III

7. Depth Perception, Stereoscopic Vision and its Types, Scale and Measurement of Aerial photos
8. Aerial Mosaics & Orthophotos, Aerial Triangulation and Orientations
9. Principles and techniques of Aerial Photo Interpretation

UNIT-IV

10. Flight Planning / Acquisition of Aerial Photographs.
11. Applications of Aerial photographs: Land Use, Land Cover and Urban Studies.
12. Digital Photogrammetry-Components (Hardware & Software), – 3D Digitization and Analysis (DEM/DTM)

REFERENCES:

1. David P. Paine – Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York, 1981.
2. Gautam N. C. - Urban landuse Studies through Aerial photo interpretation techniques, Pink Publishing, House, 1978.
3. Dickinson, G.G. – Maps and Aerial Photographs, Edward Amold Ltd., London, 1969.
4. Paul W. Wolf – Elements of Photogrammetry.
5. Zhilin Li, Jun Chen and Emmanuel Baltsavias (Edt) - Advances in Photogrammetry, Remote Sensing and Spatial Information Science, ISPRS Congress Books, 2008.
6. Yves Egeles and Michael Kasser – Digital Photogrammetry, Taylor and Francis, London and New York, 2002.
7. Wilfried Linder – Digital Photogrammetry: A Practical Course (2nd Edition), Springer, 2005.
8. Thomas M. Lillesand and Ralf W. Kiefer – Remote Sensing and Image Interpretation (4th Edition) John Willey & Sons Inc.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Elective, I-b (GG303T)
RESEARCH METHODOLOGY IN GEOGRAPHICAL STUDIES (4 Credits)

UNIT-I

1. Meaning, Scope, Purpose, Importance of Research
2. Types of Research: Pure Research, Applied Research, Exploratory Research, Descriptive Study, Evaluation Studies, Action Research
3. Methods of Research: Experimental Research, Analytical Study, Historical Research, Survey.

Unit-II

4. Identification & Formulation of Research Problem, Objectives, Formulation of Hypothesis, Database & Methodology
5. Review of Literature – Need and Sources of Review Literature
6. Methods of Data collection: Meaning, Importance and Sources of Data – Methods and Tools of Collecting Primary Data - Use of Secondary Data.

Unit-III

7. Sampling: Sampling Techniques (Probable & Non Probable) Characteristics of Good Sample, Sampling errors.
8. Processing & Analysis of Data: Classification & Coding, Transcription and Tabulation, Statistical techniques of Research Analysis, Measures of Central Tendency, Dispersion, Association and Hypothesis Testing.
9. Research Report Format: Title Page, List of Contents - Tables/Graphs/Figures/Maps/Images, Acknowledgement, Chapterization, References & Bibliography.

Unit-IV

10. Advance Tools & Techniques in Research;
    Remote Sensing, GIS, GPS and their Applications
11. Spatial Analysis: Operators & Functions, Surface Analysis: Slope, Hydrological
12. Pre and Post Classification Techniques: Change Detection (Ground Truth)

References:-

1. Jagadish R Raiyani :- Research Methodology theory and techniques, new century publications New Delhi India 2012.
2.Chetan Agarwal – Vijay Sharma - Research Methodology in Geography, commonwealth publisher's pvt. Ltd, New Delhi, India, 2012.
3.H.N. Misra,Vijai P.Singh - Research Methodology in Geography, Rawat publications, Jaipur and New Delhi, 2002.
4. G.B.Singh - Research Methodology Advanced Techniques with statistical methods, paradise publishers,Jaipur,India,2011.
5. O.R.Krishna swami - Methodology of Research in Social sciences, Himalaya publishing house mumbais, India 2003.
6. R.Panneerselvam- Research Methodology, PHI learning pvt ltd, New Delhi, India,2011.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Elective- II-a (GG304T)
GEOPOLITICS WITH SPECIAL REFERENCE TO ASIA **credits -4**

Unit- I

1. Meaning, Nature and Scope of Political Geography
2. Concept of Nation, State and Nation State, Boundaries & Frontiers.
3. Approaches in the study of Political Geography.

Unit –II

4. Geography of Federalism, Concept of Buffer State
5. Global strategic model – Mahan's Sea Power Concept, Heartland Theory & Rim land Theory
6. Trends and development in Political Geography.

Unit-III

7. Introduction to Geopolitics in Asia: Understanding the Dynamics
8. The Cold War and its Impact on Asian Geopolitics
9. India's Geopolitical Footprint: Power, Influence and Regional Relations.

Unit –IV

10. Geopolitics Realities in Asia: China, Japan Korean Peninsula
11. Geopolitics of Indian Ocean
12. Geopolitics Challenges and Future Trends in Asia.

REFERENCES:

1. Dickinson R. E. - Makers of modern Geography, London Rouledge and Kegan Paul, 1969.
2. Hartshorne R. - Political Geography in the Modern World Journal of conflict Resolution vol. & pp. 52-67, 1960.
3. MVIR - Modern Political Geography London, Macmillan, 1975.
4. Prescott J. R. V. - Political Geography, London Methuen & Co. 1972.
5. Ponnda J. G. - Political Geography New York McGraw Hill, New York, 1972.
6. Robert E. Norris & L. Woyd Haring - Political Geography Charies E Morrill Publishing Lo-Ohio-US, 1980.
7. Isaih Bowman - Problems in Political Geography (Vo1.I&II), Print Well Publishers, Jaipur, 1989.
8. R. Ddikshit - Political Geography.
9. Haggett P. - Locational Analysis in Human Geography, London, Edward Arnold, 1965.
10. D. E. Blij H. J. - Systematic Political Geography, New York. John Wiley & Sons, 1973.
11. Das Gupta B. and W. H. Morris Jones - Patterns and Trends in Indian Politics, New Delhi, Allied publishers, 1975.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Elective-II-b (GG304T)
TOURISM GEOGRAPHY

Credits- 4

UNIT-I

1. Nature, Significance , Scope and Concepts of Tourism
2. Historical Development of Tourism
3. Growth and Development of Modern Tourism

UNIT-II

4. Inbound, Outbound, Inter-Regional and Intra-Regional Tourism
5. Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage
6. Impact of Tourism, Sustainable Tourism, Economic & Social Significance of Tourism

UNIT-III

7. National Tourism Policy, Planning and Management
8. Regional Dimensions of Tourism
9. Problems and Prospects of Indian Tourism

UNIT-IV

10. Role of travel agency in tourism
11. Types of travel Organizations
12. Origin, Location, Institutional Setup and Functions of various tourism organization
    a) National
    b) International

REFERENCES

1. Cooper, Fletcher et al.: Tourism Principles and Practices
2. Mill, R.C., Tourism: The International Business
3. Christopher J. Hollway: Longman; The Business of Tourism 4. Seth, P.N.: Successful Tourism Management (Vol 1 &2)
5. Tourism Policy of India, Govt. Of India.
6. Charles R. Goeldner & J. R. Brent Ritchie: TOURISM: Principles, Practices, Philosophies
7. Kamra & Mohinder Chand: Basics of Tourism
8. Ashworth, GJ.: The tourist Historic city: Retrospect and Prospect of Managing
9. Dr. S. P. Bansal, Sushma, Sonia & Chander Mohan: Tourism in the New Millenium.
10. Erlet Cater & Gwen Lowman: Ecotourism
11. Foster, D. S.: The Business of Travel Agency Operation and Administration
12. Local Agenda 21, U.N-World Tourism Organisation Malik, S.S.: Adventure Tourism
13. Inskeep, Edward: Tourism Planning, An Integrated and Sustainable Development Appraoch (1991)
14. S. N. Singh, Geography of Tourism and Recreation, New Delhi, 1954.
15. S. C. Chandra, Geography of Tourism. Rawat Publications, New Delhi 2002.
16. M. Simith and Nichola Macleod, Key Concepts in Tourist studies. 2010

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
PRACTICAL -I (GG351P)
TECHNIQUES IN AGRICULTURAL AND URBAN ANALYSIS

(1 Credit)

1. Determination of crop combination regions and calculation of crop concentration (Location Quotient Method).
2. Agricultural Efficiency and Productivity Analysis, Determination of Cropping Intensity and Crop Diversification.
3. Techniques and Analysis of Settlement Distribution – Rank size Rule, Primate City Index, Nearest Neighbour Analysis.
4. Functional Classification of Settlements (Nelson's Method)
5. Measurement of Centrality of Settlements – Index of Centrality and City Region Relationships – Gravity and Potential Models.

REFERENCES:

1. Majid Hussain - Agricultural Geography, Inter-India Publications, Delhi, 1979.
2. Noor Mohammed (ed) - Perspective in Agricultural Geography, Vol. I, II, III, IV, V. Concept Publishing Co., New Delhi, 1981.
3. Chorley B. J. & Hagget P. - Models in Geography, London, Methuen, 1971.
4. Mohammed Ali - Studies in Agricultural Geography, Rajesh Publications, New Delhi, 1978.
5. Hall Tim - Urban Geography, Routledge, London, 1998.
6. Cherry Gordan E. - Urban Planning Problems, Leonard Hills Books, London, 1974.
7. Naidu Ratna - Old Cities, New Predicaments: A Study of Hyderabad, Sage, New Delhi, 1990.
8. Alam S. M. & Khan W. - Metropolitan Hyderabad and its Region, Allied, Bombay, 1972.
9. Carter H. - The Study of Urban Geography, Edward Arnold, London, 1972.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
PRACTICAL-II (GG352P)
AERIAL PHOTO INTERPRETATION

(1 Credit)

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 and interpretation.

REFERENCES:

1. David P. Paine – Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York, 1981.
2. G. Dury & J. A. – The land from the Air: A Photographic Geography, London, 1978.
3. Gautam N. C. – Urban land Use Studies through Aerial Photo Interpretation Techniques, Pink Publishing House, 1978
4. Curran Paul J. - Principles of Remote Sensing, Longman Publications.
5. Thomas M. Lillesand and Ralf W. Kiefer - Remote Sensing & Image Interpretation, John Wiley & Sons.

M.Sc. Geography
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
SEMINAR PRESENTATION (GG353 SP)

(2) Credits

Geographical Aspects of

Unit-I

1. Rural Studies
2. Urban Studies
3. Agriculture Studies
4. Environmental Studies
5. Geomorphological Studies

Unit-II

6. Resource Management
7. Geospatial Technologies (GIS, RS, GPS)
8. Demographic Studies
9. Societal Development
10. Political Studies

REFERENCES:

1. NIRD - Rural Development in India: SOME FACTS, Hyderabad, 1981.
2. Mishra R. P. (ed) - Rural Development: Capitalist & Socialist Paths, Concept Publishing, New Delhi, Vol. 1 to 5, 1985.
3. Singh K. N. & Singh D. N. (ed) -Rural Development in India – Problems, strategies and approaches: NGSI,Var, 1985.
4. Grigg D. B. - The Agricultural Systems of the World, Cambridge University Press, London,1974.
5. Majid Hussain - Agricultural Geography, Inter-India Publications, Delhi,1979.
6. K.S. Dhindsa and A.Sharma - Dynamics of Agricultural Development, COncept Science, 2001.
7. Hall Tim - Urban Geography, Routledge, London, 1998.
8. Cherry Gordan E. - Urban Planning Problems, Leonard Hills Books, London, 1974.
9. Alam S. M. & Alikhan F. Eds - Poverty in Metropolitan Cities, Concept, New Delhi, 1974.
10. Dickinson R. E. - Makers of modern Geography, London Rouledge and Kegan Paul, 1969.
11. Hartshorne R. - Political Geography in the Modern World Journal of conflict Resolution vol. & pp. 52-67, 1960.
12. MVIR - Modern Political Geography London, Macmillan, 1975.

M.Sc. Geography
Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Core- I (GG401T)
PRINCIPLES OF GPS & GNSS (4 Credits)

UNIT -1

1. Definition, Concept and History of GPS
2. Concept of Geodesy :- Applications of Geodesy Earth's surface (Geoid, Ellipsoid, Datum)
3. Components of GPS: Space Segment, Control Segment, User Segment

UNIT-II

4. GPS Signals : Coarse/Acquisition code, Precision Code, Navigation Message Frequency Information, Modernized GPS signals
5. Working Principle of GPS: Simple Navigation Satellite Ranging, Calculating the distance to the Satellites - Error sources, Differentially Corrected position - (DGPS)
1. False Signals: Spoofing, Cryptographic concepts, Signal interface or Jamming

UNIT-III

2. Global Navigational satellites systems (GNSS) :GPS Galileo , Glonass , BeiDou
3. Regional navigation satellite systems (RNSS), NavIC, QZSS.
4. Geodetic Aspects: GPS coordinate systems Local coordinate systems-Map Projections and Plane coordinates - The Universal Transverse Mercator projection.

UNIT-IV

5. SBAS & GBAS: WAAS,EGNOS,MSAS,SDGM,GAGAN
6. GPS application in different fields: Military, Civilian, Aviation, Marine navigation transport, Crime tracking.
7. Integration of GPS with GIS and Remote sensing.

REFERENCES:

1. ESRI Arc Pad Manual.
1. Introduction to GPS (Global Positioning System) by Leica.
2. Essentials of GPS – by N. K. Agarwal.
3. Gergory T. French – Understanding the GPS: An Introduction to Global sitioning System, GeoResearch Inc., USA, 1996.
4. Elliot D. Koplan and Christopher J. Hegarty – Understanding GPS: Principles and Applications, Artech House, Boston, London, 2006.
5. Ahmed El-Rabbani – Introduction to GPS: The GPS, Artech House, Boston, London, 2002.

Websites: www.gpsworld.com; www.gps society.org; www.esri.com.

M.Sc. Geography
Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Core- II (GG402T)
REGIONAL DEVELOPMENT STUDIES (4 Credits)

UNIT-I

1. Concept of Region, Types – Physical, Culture & Consciousness.
2. Approaches to Regional Economic Development: Geographic Approach, Economic Approach, Sociological Approach, Holistic Approach.
3. Political economy of Regional Development during colonial and post-independence development in India.

UNIT-II

4. Resources, Industrialization, Urbanization, and Regional Development.
5. Rural Development: National Policies.
6. Socio, Economic, Demographic dimensions of Regional Development.

UNIT-III

7. Theory of Space and Spatial Development. Growth pole, Core-Periphery, Basic needs Strategy.
8. Regional Policies in changing time: National contexts, regional contexts, incentive policies, sub-plan approach, special area development programmes.
9. Telangana: Drought, Irrigational, Political, Economic, Cultural and Regional Movements.

UNIT-IV

10. Multi-level/ Micro-level Regional Planning; Regional Justice.
11. Regional Corridors: Golden Quadrilateral, Delhi-Mumbai, Chennai-Bangalore Industrial Corridor, North-South and East-West Corridor Regions; Core, Fringe and Periphery in a Region and its Planning.
12. Regional imbalances and inequalities.

REFERENCES:

1. Robert E. Dickinson - Regional Concept: The Anglo-American Leaders, Routledge & Kegan Pal, London, 1976.
2. Henri Lefebvre - The Production of Space, Blackwell, Oxford, 1991.
3. Jermy Alden and Robert Morgan - Regional Planning: A Comprehensive View, Leonard Hill Books, Beds, 1974.
4. R. Ramachandran - Urbanization and Urban Systems in India, OUP, 1991.
5. M. Hanjo (ed) - Urbanization and Regional Development, UNCRD, Nagoy, 1981.
6. Jennifer Walch and Micheal Dear (ed) - How Territory Shapes Social life, Unwin Hyman, London, 1989.
7. K. Bagchi - Political Economy of Under-development.
8. Govt. of A.P. Regional Development Plan of Rayalseema, Telangana, Hyd. 1970.
9. S. Simhardi & P. L. Vishweshwar Rao (ed) - Telangana: Dimensions of Underdevelopment, Centre for Telangana Studies, Hyderabad, 1997.
10. NIRD - Rural Development in India: Some Facets, Hyderabad, 1981.
11. G.R. Desai - Rural Sociology in India, Popular Prakasam, Bombay, 1987.
12. Sartaz Aziz - Rural Development: Learning from China, Mac Milan & Co. London, 1978.
13. R. P. Mishra & K. V. Sundaram - Multilevel Planning and Integrated Rural development in India, Hertitage Publishers, New Delhi, 1980.
14. R. P. Mishra – Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Science, 1992.
15. Derek Gregory and John Usry - Social Relations and Spatial Structures, Mac Millan, 1985.

M.Sc. Geography
Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Elective- III-a (GG403T)
RURAL DEVELOPMENT AND PLANNING (4 Credits)

UNIT-I

1. Concept of Development, Growth and Indicators.
2. Concept & approaches of Rural Development in India.
3. Dynamics of Rural Development in India.

UNIT-II

4. Rural Development –Basic needs, Housing, Health, Education, Nutrition, Water Supply, Rural Resource Utilization, Ecological and Environmental Issues & problems.
5. Unemployment and Poverty: Policies and approaches to Rural Development Programmes / Strategies / Suggestions.
6. Participation and role of Panchayats, Rural women and Child Welfare Development, role of voluntary organizations and public participation.

UNIT-III

7. Agricultural Development – Land Holding, Irrigation and land use, Land reforms, Marketing and Transportation.
8. Green Revolution: Socio, Economic changes.
9. Agricultural Allied Activities – Small and Cottage Industries of Rural India, Infrastructural Development

UNIT-IV

10. Theories of Development – Structural, Functional and Spatial Theories of Development.
11. Challenges of Rural Development: Technology Transmission, Monitoring & Evaluation, Marketing Infrastructure.
12. Recent Trends and Planning in Rural Development and Sustainability.

REFERENCES:

1. NIRD - Rural Development in India: SOME FACTS, Hyderabad, 1981.
2. Mishra R. P. (ed) - Rural Development: Capitalist & Socialist Paths, Concept Publishing, New Delhi, Vol. 1 to 5, 1985.
3. Singh K. N. & Singh D. N. (ed) -Rural Development in India – Problems, strategies and approaches: NGSI,Var, 1985.
4. Satendra IFS and Vinod K. Sharma – Sustainable Rural Development for Disaster Mitigation, Concept Publication, New Delhi, 2004.
5. V. Nath – Rural development and Planning in India, Concept publication, New Delhi, 2010.
6. Komol Singha (ed) – Rural Development in India: Retrospect and Prospect, Concept Publication, New Delhi, 2010.
7. Aziz and Sastry - Rural Development: Learn from China, Macmillan & Company, London, 1978.
8. Ronald H. Chillicothe - Theory of Development and Under Development. D. West View Press / Boulder and London, 1984.
9. Dubey S. C. - India’s Challenging Villages, Human factors in community development, Routledge and Kewgam Ltd., London, 1958.
10. Meir and Geralld M. - Leading issues in Economic Development, Oxford University Press, Delhi, 1986.
11. Kurukshetra: Journal of Rural development.
12. Rural Development, Journal of NIRD.

M.Sc. Geography
Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
ELECTIVE – III B (GG403T)
PRINCIPLES OF CARTOGRAPHY **(4 Credits)**

UNIT-I

1. History and evolution of Cartography: Concept of Representation, Concept of Distribution, Impact of Changing Technology.
2. Nature and Scope of Cartography: Need for Maps, Basic Characteristics of Maps.
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) Co-ordinate Systems: Concept, Definition and Types.
    c) Map projection: Definition, Types of Projection.
5. Cartographic Design and Planning: Map Design, Controls on Map Design, Elements of Map Design, Design Planning and Layout.
6. Cartographic Techniques and Methods – Choropleth, Isopleth, Dot, Choro-Chromatic and Flow Maps and Charts.

UNIT-III

7. Generalization: Elements, Controls and Manipulations of Generalization.
8. Symbolization: Types of Symbols (Qualitative and Quantitative), Measurement Levels, Feature Dimensions – Size, Shape, Colour and Patterns. Selection and Simplification of Symbols.
9. Colour and Patterns in Cartography – Nature of Colour Troll Chart, Dimension Colour, Vision, Functions of Colours and Patterns. Selection of Colours for Mapping.

UNIT-IV

10. Types of Graphs: Line Graph, Bar Graph, Combined Line and Bar, Compound Bar Graph, Polygraph, Band Graph, Climograph, Hythergraph, Ergograph.Importance using Graphs in Cartography.
11. Types of Diagrams: Star Diagram, Wheel Diagram, Wind Rose, Age and Sex Pyramid, Cartograms and Histograms. Importance of using Diagrams in Cartography.
12. Digital Cartography: Spatial and Attribute Data – Database Management Systems (DBMS), Organization, Comprehension, Manipulation, Analysis and Display of Digital Data, Automation of Maps and Map Reproduction.

REFERENCES:

1. Robinson A. Het al - Elements of Cartography, John Wiley & Sons. New York, 1978.
2. Monkhouse F. J. & Wilkinson - Maps & Diagrams, Methuen & Co. London, 1967.
3. Raitze Erwin - Principles of Cartography, McGraw Hill, New York, 1962.
4. Campbell John - Introductory Cartography, Prentice Hall Inc. Englewood Cliff, New York.
5. Lawrence G. R. P. - Cartographic Methods, Methuen, London, 1974.
6. Menno- Jan Keraak and Ferjan Ormeling – Cartography: Visualization of Spatial Data (3rd Edition), Prentice Hall, 2010.
7. Gretchen N. Peterson – GIS Cartography: Aguide to Effective Map Design, CRC Press, Taylor and Francis Group, 2009.

M.Sc. Geography
Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
PRACTICAL -I (GG-451P)
GPS SURVEY (1 Credit)

1. Introduction to GPS and initial setting Field procedures of GPS surveying
2. Point, Line, Area data collection using GPS and DGPS
3. Experting GPS data into desired formats.
4. Post processing of the GPS data
5. GPS and GIS integrations output preparation

References:

1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman , Harlow.

2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World.
3. Longman, Harlow.
4. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
5. Fraser Taylor, D.R. (ed.) (1983): Graphic Communication and Design in Contemporary Cartography. John Wiley and Sons, New York.
6. Kanetkar, T.P. and Kulkarni, S.V. (1967): Surveying and Levelling, Part II, A.V.G. Prakashan, Poona.
7. Keates, J.S. (1973): Cartographic Design and Production, Longman Group Ltd.
8. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and Sons Ltd.
9. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic Society, London.

M.Sc. Geography
Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
PRACTICAL -II (GG452P)

Demographic Analysis and Interpretation

(1 Credit)

1. Demographic Fundamentals: Age, Sex, Race, Measurements of Economic Activities.
2. Calculation of Human Development Index (HDI)
3. Models and Population Structures : Population Pyramid Types, Expansive Pyramid, Constructive Pyramid, Stable Pyramid.
4. Migration Types and measurement– Census Survival Ratio Method, Life Stable Survival Ratio Method, Composite method.
5.Collection of demographic data through Primary,Secondary Sources: Analysis, Representation and Interpretation.

REFERENCES:

1. Michael. P Torado, (1985): Economic Development in Third world's Third Edition.
2. Yaukey, David (1985): Demography – The study of Human population, New York, St. Martin's Press, Inc.
3. UNDP Reports.

DEPARTMENT OF GEOGRAPHY, OSMANIA UNIVERSITY
M.Sc. GEOINFORMATICS - **Syllabus as per CBCS, w.e.f 2023-2024**
Scheme of Instruction and Examination

S.No.	Subject Code	Paper	C O U R S E	(20) Marks IAE	(10) Marks Home Assignment	(70) Marks Theory	Total Marks (100)	CREDITS
		SEMESTER-III						
1.	**GI301T**	**Core- I**	Digital Image Processing	20	10	70	100	4
2.	**GI302T**	**Core-II**	Principles of GPS and GNSS	20	10	70	100	4
3.	**GI303T**	**Elective- I a**	Applications of RS and GIS in Resource Management	20	10	70	100	4
		Elective- I b	Research Methodology in Geospatial Studies					
4.	**GI304T**	**Elective -II a**	Geoinformatics in Societal Development	20	10	70	100	4
		Elective-II b	Information System and Management					
5.	**GI351P**	**Practical - I**	Image Analysis				25	1
6.	**GI352P**	**Practical II**	GPS Survey				25	1
7.	**GI353 SP**	**SP**	Seminar Presentation				50	2
	Total						**500**	**20**
		SEMESTER-IV						
1.	**GI401T**	**Core- I**	Urban and Regional Planning	20	10	70	100	4
2.	**GI402T**	**Core-II**	Disaster Management Studies	20	10	70	100	4
3.	**GI403T**	**Elective- III a**	Web GIS	20	10	70	100	4
		Elective- III b	Geoinformatics in Utility Management					
5.	**GI451P**	**Practical - I**	Techniques in Urban mapping & Analysis				25	1
	GI452P	**Practical II**	Open Source GIS				25	1
6.	**GI453 (Project)**	**Project**	PROJECT WORK (Dissertation and Viva Voce)				150	6
	Total						**500**	**20**
		Grand Total Marks and Credits					**1000**	**40**

M.Sc. Geoinformatics
Semester-III
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Scheme of Instruction & Examination
CORE –I (GI-301T)
DIGITAL IMAGE PROCESSING (4 Credits)

UNIT-I

1. Introduction to Digital Image Processing
2. Sources of Spatial Data Acquisition
   a) Top sheets (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 Techniques:
   a) Contrast Enhancement b) Density Slicing.
   c) Contrast Manipulation d) Pixel Intensity Transformation.
   e) Histogram Equalization and Matching f) Edge Sharpening.
6. FCC and TCC image preparation.

UNIT-III

7.Introduction to Image Classification:
Supervised classification (Training Sites Stage, Classification stage, Output Stage)
Unsupervised Classification(Classification Stage, Output Stage)

8. Supervised Classification Algorithms
   1. Parallelepiped Classifier 2. Maximum- Distance to mean classifier
   3.Maximum likelihood classifier
9. Unsupervised Classification Algorithms a)K-means clustering b) Isodata Clustering

UNIT-IV

10.Field data Collection and Equipment used
   a) GPS b)Radiometer
11. Classification Accuracy Assessment
12. Post classification:- Map Output, Interpretation.

REFERENCES:

1. Jensen J. R. - Introduction to Digital Image Processing, Prentice Hall.
2. Bernstein R. (Ed) - Digital Image Processing of Remotely Sensed Data, I.E.E.E. Press, 1978.
3. E. L. Hall - Computer Image Processing & Recognition, Academic Press, New York, 1979.
4. Hord R. M. - Digital Image Processing of Remotely Sensed Data, Academic Press, 1982.
5. Tou J. T. & Gonzalez R. C. - Pattern Recognition Principles, Addison - Wesley 1974.
6. Jain A. K. - Fundamentals of Digital Image Processing Prentice Hall, 1989.
7. Rosenfeld A. & Kak A. C. - Digital Image Processing, Academic Press, New York, 1982.
8. B. Bhatta - Remote Sensing and GIS, Oxford University Press, 2009.
9. Lillesand & Kiefer - Remote sensing and Image Interpretation, John Wiley & Sons Inc., 1994.
10. Castleman J. M. - Digital Image Processing, Englewood Cliff.
11. Paul M. Mather and Magaly Koch – Computer Processing of Remotely Sensed Images: An Introduction (4^{th} Edition), John Willey & Sons Ltd. 2011.
12. Jian Guo Liu and Philipa J. Mason – Essential Image Processing and GIS for Remote Sensing, Willey-Blackwell, John Willey & Sons Ltd., 2009.

M.Sc. Geoinformatics
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Core- II (GI302T)
PRINCIPLES OF GPS & GNSS (4 Credits)

UNIT -1

1. Definition, Concept and History of GPS
2. Concept of Geodesy :- Applications of Geodesy Earth's surface (Geoid, Ellipsoid, Datum)
3. Components of GPS: Space Segment, Control Segment, User Segment

UNIT-II

4. GPS Signals : Coarse/Acquisition code, Precision Code, Navigation Message Frequency Information, Modernized GPS signals
5. Working Principle of GPS: Simple Navigation Satellite Ranging, Calculating the distance to the Satellites - Error sources, Differentially Corrected position - (DGPS)
6. False Signals: Spoofing, Cryptographic concepts, Signal interface or Jamming

UNIT-III

7. Global Navigational satellites systems (GNSS) :GPS Galileo , Glonass , BeiDou
8. Regional navigation satellite systems (RNSS), NavIC, QZSS.
9. Geodetic Aspects: GPS coordinate systems Local coordinate systems-Map Projections and Plane coordinates - The Universal Transverse Mercator projection.

UNIT-IV

10. SBAS & GBAS: WAAS,EGNOS,MSAS,SDGM,GAGAN
11. GPS application in different fields: Military, Civilian, Aviation, Marine navigation transport, Crime tracking.
12. Integration of GPS with GIS and Remote sensing.

REFERENCES:

1. ESRI Arc Pad Manual.
2. Introduction to GPS (Global Positioning System) by Leica.
3. Essentials of GPS – by N. K. Agarwal.
4. Gergory T. French – Understanding the GPS: An Introduction to Global sitioning System, GeoResearch Inc., USA, 1996.
5. Elliot D. Koplan and Christopher J. Hegarty – Understanding GPS: Principles and Applications, Artech House, Boston, London, 2006.
6. Ahmed El-Rabbani – Introduction to GPS: The GPS, Artech House, Boston, London, 2002.

Websites: www.gpsworld.com; www.gps society.org; www.esri.com.

M.Sc. Geoinformatics
Semester-III
Syllabus as per CBCS, w.e.f. 2023-2024
Scheme of Instruction & Examination
Elective –I-A (GI-303T)
APPLICATION OF RS AND GIS IN RESOURCE MANAGEMENT (4 Credits)

UNIT I:

1. Natural Resources: Meaning, Definition and Scope.
2. Classification of Natural Resources: Biotic and Abiotic Resources, Renewable and Non-Renewable.
3. Natural Resources Evaluation a) Importance of Resource Evaluation b) Role of Geospatial Technologies in Resource Assessment and Resource Monitoring.

UNIT II:

4. Land Resources , Concept of Land Resources and its Significance.
5. Land units,Land Capability and Land classifications, Land Use Systems and Land Evaluation, Land Information System (LIS)
6. Water Resources Management: Types and Sources of Water Resources, Water Scarcity and Innovative Conservation Techniques, Adoption of smart Water Management Technologies, Sustainable Water Governance and Transboundary Water issues

UNIT III:

7. Natural Resource Management and Sustainable Development Gaols.
8. Forest Resources and Conservation: Types and functions of Forest Resources, Deforestation, Afforestation, and Reforestation , Conservation of Forest
9. Energy and Mineral Resources Management: Types and Distribution of energy and Mineral Resources on a global scale, Renewable Energy Resources and Energy-Efficient Technologies, Sustainable Mining Practices.

UNIT IV:

10. Capacity Building an approach to People-Centered Development
11. Community-Based Resource Management and Indigenous knowledge, Gender-Responsive Approaches to Resource Governance
12. Recent trends in Resource mangement through Geospatial Technologies, Big Data and Artificial Intelligence

Suggested reading list

1. Agarwal, A., & Narain, S. (Eds.). (1997). *Dying Wisdom: Rise, Fall, and Potential of India's Traditional Water Harvesting Systems*. Centre for Science and Environment.
2. Deshpande, R. S., &Bhale, N. L. (2014). *Land Resource Management: An Ecological and Environmental Framework*. PHI Learning.
3. Dove, M. R., & Carpenter, C. (2008). *Natural Resource Management: The Human Dimension*. Routledge.

4. Dror, Y. (2001). *The Capacity to Govern: A Report to the Club of Rome*. Routledge.
5. Farr, D. (2008). *Sustainable Urbanism: Urban Design With Nature*. Wiley.
6. Ghosh, A. (Ed.). (2018). *Natural Resource Management: Concepts and Practices*. Springer.
7. Ghosh, S., & Vyas, A. (Eds.). (2016). *Capacity Building for Environmental Law in the Asian and Pacific Region*. Springer.
8. Goudie, A. S. (2013). *The Human Impact on the Natural Environment: Past, Present, and Future*. Wiley.
9. Jagadish, K. S., & Sundararajan, M. (2019). *Integrated Land Use Planning and Management*. Cambridge University Press India.
10. Kumar, M. D., & Singh, S. K. (Eds.). (2019). *Spatial Analysis, GIS and Remote Sensing: Applications in the Health Sciences*. Springer India.
11. Loucks, D. P., & van Beek, E. (Eds.). (2005). *Water Resources Management*. Springer.
12. Malczewski, J. (2019). *GIS and Multicriteria Decision Analysis*. John Wiley & Sons.
13. Menon, A., & Bawa, K. S. (Eds.). (2011). *Applications of Remote Sensing in Biodiversity Conservation and Management*. Cambridge University Press India.
14. Parihar, J. S., & Singh, A. (Eds.). (2020). *Circular Economy in Textiles and Apparel: Processing, Manufacturing, and Design*. CRC Press.
15. Rich, M. J., & Stoker, R. P. (Eds.). (2010). *Collaborative Governance for Urban Revitalization: Lessons from Empowerment Zones*. Georgetown University Press.
16. Romm, J. (2019). *Climate Change: What Everyone Needs to Know*. Oxford University Press.
17. Sengupta, R., &Dasgupta, S. (Eds.). (2020). *Water Resources Management: Problems, Perspectives, and Challenges*. Springer India.
18. Singh, A. K. (2013). *Climate Change and India: Vulnerability Assessment and Adaptation*. Springer India.
19. Singh, N. M. (Ed.). (2011). *Gender and Natural Resource Management: Livelihoods, Mobility and Interventions*. SAGE Publications India.
20. Smil, V. (2017). *Energy and Civilization: A History*. MIT Press.
21. Sukumar, R. (2019). *The Story of Asia's Elephants*. Oxford University Press India.
22. Templer, P. H., &Helyar, K. R. (Eds.). (2010). *Land Resources: Now and for the Future*. Cambridge University Press.
23. Tischner, U. (Ed.). (2016). *Circular Economy: Global Perspectives*. Greenleaf Publishing.
24. Wohlleben, P. (2016). *The Hidden Life of Trees: What They Feel, How They Communicate - Discoveries from a Secret World*. Greystone Books.

M.Sc. Geoinformatics
Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
Elective, I-b (GI303T)
RESEARCH METHODOLOGY IN GEOSPATIAL STUDIES (4 Credits)

UNIT-I

1. Meaning, Scope, Purpose, Importance of Research
2. Types of Research: Pure Research, Applied Research, Exploratory Research, Descriptive Study, Evaluation Studies, Action Research
3. Methods of Research: Experimental Research, Analytical Study, Historical Research, Survey.

Unit-II

4. Identification & Formulation of Research Problem, Objectives, Formulation of Hypothesis, Database & Methodology
5. Review of Literature – Need and Sources of Review Literature
6. Methods of Data collection: Meaning, Importance and Sources of Data – Methods and Tools of Collecting Primary Data - Use of Secondary Data.

Unit-III

7. Sampling: Sampling Techniques (Probable & Non Probable) Characteristics of Good Sample, Sampling errors.
8. Processing & Analysis of Data: Classification & Coding, Transcription and Tabulation, Statistical techniques of Research Analysis, Measures of Central Tendency, Dispersion, Association and Hypothesis Testing.
9. Research Report Format: Title Page, List of Contents - Tables/Graphs/Figures/Maps/Images, Acknowledgement, Chapterization, References & Bibliography.

Unit-IV

10. Advance Tools & Techniques in Research;
    Remote Sensing, GIS, GPS and their Applications
11. Spatial Analysis: Operators & Functions, Surface Analysis: Slope, Hydrological
12. Pre and Post Classification Techniques: Change Detection (Ground Truth)

References:-

1. Jagadish R Raiyani :- Research Methodology theory and techniques, new century publications New Delhi India 2012.
2.Chetan Agarwal – Vijay Sharma - Research Methodology in Geography, commonwealth publisher's pvt. Ltd, New Delhi, India, 2012.
3.H.N. Misra,Vijai P.Singh - Research Methodology in Geography, Rawat publications, Jaipur and New Delhi, 2002.
4. G.B.Singh - Research Methodology Advanced Techniques with statistical methods, paradise publishers,Jaipur,India,2011.
5. O.R.Krishna swami - Methodology of Research in Social sciences, Himalaya publishing house mumbais, India 2003.
6. R.Panneerselvam- Research Methodology, PHI learning pvt ltd, New Delhi, India,2011.

M.Sc. Geoinformatics
Semester-III
Syllabus as per CBCS, w.e.f. 2023-2024
Scheme of Instruction & Examination
Elective-II-a (GI304T)
GEOINFORMATICS IN SOCIETAL DEVELOPMENT (4 Credits)

Unit-I

1. Geo-Demographics : Introduction, Scope, Mapping of Population Characteristics (Age, Gender, and Socio-Group)
2. Changing Pattern of Demography: GIS functionality
3. Mapping of Housing Pattern and Crime Analysis

Unit-II

4. Health GIS: Spatial epidemiology - RS and GIS in study epidemics and their control- Malaria, Leprosy, Polio, TB, Fileria, Dengue, Chikungunya, AID's, Cancer.
5. Spatial Analysis of Socio-Economic Vulnerability in covid 19, Bio-terrorism and disease surveillance and Infectious disease modeling.
6. Health Infrastructure and Facility Location Mapping, Planning for future health facility requirement-Telemedicine, Health and disease Atlas of India and Medical Geography, Internet and Health GIS.

Unit-III

7. Power: Site suitability assessment for power plants - and impact assessment. GIS in management of electricity distribution network, underground cable maintenance and management in power sector, GIS as decision support system,
8. Transportation :Transportation GIS - vehicle routing and scheduling, optimizing routes and schedules, delivery routing/fleet management, vehicle navigation, vehicle tracking system, intelligent transportation system
9. Telecommunication: Applications of GIS in telecommunication industry, internet GIS for telecommunication, facility management in telecommunication industry, optical fiber cable alignment.

Unit-IV

10. Business GIS : Competitive market analysis, trade area analysis site analysis and selection for distribution centers and shopping centers, customer service stations, facility management.
11. Market demographics- demographic analysis for marketing based on customer profiling, lifestyle matching and consumer behavior, sales promotion planning, advertisements targeting;
12. Geo-market segmentation by product category, sales territory rationalization, forecasting market potential and modeling sales.

References:

1. Efrain Turban, Decision Support & Export Systems: Management Support Systems, MacMillan, New York, 1993.Deshpandey, C.D., Regional Geography of India.
2. Kim T.J. Wiggins L.L. & Wright J.R. Expert System Applications to Urban Planning, Springer, New York, 1990.

M.Sc. Geoinformatics
Semester-III
Syllabus as per CBCS, w.e.f. 2023-2024
Scheme of Instruction & Examination
Elective –II-b (GI304T)
INFORMATION SYSTEMS AND MANAGEMENT

UNIT-I

1. Information Technology: Meaning, Scope & Development.
2. Information Systems: Concepts & Overview, Design Analysis & Management.
3. MIS and Business Community: 1. Structure and Linkages – 2.E-Commerce Fundamentals: Introduction to electronic commerce, online marketplaces, and e-commerce business models.

UNIT-II

4. Managerial Overview of Hardware, Software, People, Data & Institutional Linkage.
5. Data base Management Systems for Information Systems: Data Resources, Structure & Functional Aspects, Data Design Issues & Output Designs.
6. Data Management: Data vs Information vs Knowledge, Knowledge Management and Efficiency to Utilize the Data for Decision Making, Big Data Analytics, Artificial Intelligence (AI) and Machine Learning, Cloud Computing**,** IoT (Internet of Things).

UNIT-III

7. Internet & Information Management: Internet, Intranet & Extranet.
8. Innovating New Information Systems: Architecture, Planning, Design, Coding, Testing, Executing and Maintaining. Identifying Issues and Securing.
9. Electronic Communication Tools, Web Publishing & File Transfers.

UNIT-IV

10. Management Information System: Needs, Design & Action –
    1.Library Resource Information - Human Information Systems
    2.Ethical Issues in Information Systems: Privacy, data ethics, and responsible use of technology.
11. Security Failure and Future of MIS:
    1.Formal, Informal and Technical Security Aspects, Cyber Crime in Information Age
    2.Legal Framework: Overview of IT-related laws, intellectual property, and compliance requirements.
12. Information Decision Support System, Knowledge based Search Process -Corporate Governance: The role of information systems in corporate governance and compliance.

REFERENCES:

1. Introduction to Information Technology – Alexis Leond Mathews Leen.
2. Fundamentals of Information Technology – Deepak Bharikhoke.
3. Modern Systems Analysis & Design – J.A. Hoffer, Toy F. George and Joseph S. Velacich.
4. Fundamentals of Information Technology – Srivastava.
5. Information Technology for Management" by Turban, Volonino, and Wood.
6. Information Systems Today: Managing the Digital World" by Valacich and Schneider.
7. Database Management Systems" by Ramakrishnan and Gehrke
8. Big Data: A Revolution That Will Transform How We Live, Work, and Think" by Viktor Mayer-Schönberger and Kenneth Cukier.
9. Artificial Intelligence: A Guide to Intelligent Systems" by Michael Negnevitsky.
10. Information Architecture: For the Web and Beyond" by Louis Rosenfeld and Peter Morville.
11. IoT Inc: How Your Company Can Use the Internet of Things to Win in the Outcome Economy" by Bruce Sinclair.
12. Cybersecurity and Cyberwar: What Everyone Needs to Know" by P.W. Singer and Allan Friedman.

M.Sc. Geoinformatics
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Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
PRACTICAL -I (GI-351P)
IMAGE ANALYSIS (1Credit)

1. Comparison between Aerial Photographs and Satellite Imageries.
2. Elements of Image Characteristics and Visual Interpretation of Satellite Imagery.
3. Image Rectification-Geometric and Radiometric correction, Image Enhancement – contrast & Band Rationing.
4. Digital Image Classification-Supervised and Unsupervised
5. Identification of Land Use/Land Cover changes with Multi Date Imagery, Ground truth identification.

Reference:

1. Castleman J. M. - Digital Image Processing, Englewood Cliff,
2. David P. Paine – Aerial Photography and Image Interpretation for Resource Management, John Wiley & Sons, New York, 1981.
3. G. Dury & J. A. – The land from the Air: A Photographic Geography, London, 1978.
4. Gautam N. C. – Urban land Use Studies through Aerial Photo Interpretation Techniques, Pink Publishing House, 1978
5. Curran Paul J. - Principles of Remote Sensing, Longman Publications.
6. Thomas M. Lillesand and Ralf W. Kiefer - Remote Sensing & Image Interpretation, John Wiley & Sons.
7. Green W. B. - Digital Image Processing, Von Nas-Ir & Rein Told Co.
8. Castleman J. M. - Digital Image Processing, Englewood Cliff.
9. Paul M. Mather and Magaly Koch – Computer Processing of Remotely Sensed Images: An Introduction (4th Edition), John Willey & Sons Ltd. 2011.
10. Jian Guo Liu and Philipa J. Mason – Essential Image Processing and GIS for Remote Sensing, Willey-Blackwell, John Willey & Sons Ltd., 2009.
11. C. H. Chen (Edt). – Image Processing for Remote Sensing, CRC Press, Taylor & Francis Group, 2008.
12. Jay Gao – Digital Analysis of Remotely Sensed Imagery, McGraw Hill, 2009.
13. Kumar Navulur – Multispectral Image Analysis Using the Object Oriented Paradigm, CRC Press, Taylor and Francis, New York and London, 2007.
14. Steven M. D. Jong and Freek D van de Meer (Edt) – Remote Sensing Image Analysis, Introducing the Spatial Domain (Vol-5), Springer Science and Business Media Inc., 2004.
15. John A. Richards and Xiuping Jia – Remote Sensing Digital Image Analysis: An Introduction (4th Edition), Springer Verlag Berlin Heidelberg, 2006.

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Semester-III
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
PRACTICAL -II (GI-352P)
GPS SURVEY (1 Credit)

8. Introduction to GPS and initial setting Field procedures of GPS surveying
9. Point, Line, Area data collection using GPS and DGPS
10. Experting GPS data into desired formats.
11. Post processing of the GPS data
12. GPS and GIS integrations output preparation

References:

1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman , Harlow.
2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World.
3. Longman, Harlow.
4. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
5. Fraser Taylor, D.R. (ed.) (1983): Graphic Communication and Design in Contemporary Cartography. John Wiley and Sons, New York.
6. Kanetkar, T.P. and Kulkarni, S.V. (1967): Surveying and Levelling, Part II, A.V.G. Prakashan, Poona.
7. Keates, J.S. (1973): Cartographic Design and Production, Longman Group Ltd.
8. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and Sons Ltd.
9. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic Society, London.

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Scheme of Instruction & Examination
SEMINAR PRESENTATION (GI353 SP)

(2) Credits

Geospatial Aspects of

Unit-I

1. Rural Studies
2. Urban Studies
3. Agriculture Studies
4. Environmental Studies
5. Geomorphological Studies

Unit-II

6. Resource Management
7. Geospatial Technologies (GIS, RS, GPS)
8. Demographic Studies
9. Societal Development
10. Political Studies

REFERENCES:

1. NIRD - Rural Development in India: SOME FACTS, Hyderabad, 1981.
2. Mishra R. P. (ed) - Rural Development: Capitalist & Socialist Paths, Concept Publishing, New Delhi, Vol. 1 to 5, 1985.
3. Singh K. N. & Singh D. N. (ed) -Rural Development in India – Problems, strategies and approaches: NGSI,Var, 1985.
4. Grigg D. B. - The Agricultural Systems of the World, Cambridge University Press, London,1974.
5. Majid Hussain - Agricultural Geography, Inter-India Publications, Delhi,1979.
6. K.S. Dhindsa and A.Sharma - Dynamics of Agricultural Development, COncept Science, 2001.
7. Hall Tim - Urban Geography, Routledge, London, 1998.
8. Cherry Gordan E. - Urban Planning Problems, Leonard Hills Books, London, 1974.
9. Alam S. M. & Alikhan F. Eds - Poverty in Metropolitan Cities, Concept, New Delhi, 1974.
10. Dickinson R. E. - Makers of modern Geography, London Rouledge and Kegan Paul, 1969.
11. Hartshorne R. - Political Geography in the Modern World Journal of conflict Resolution vol. & pp. 52-67, 1960.
12. MVIR - Modern Political Geography London, Macmillan, 1975.

M.Sc. Geoinformatics
Semester-IV
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Scheme of Instruction & Examination
CORE-I (GI-401T)
URBAN AND REGIONAL PLANNING (4 Credits)

UNIT-I

1. Concepts: Urban, Urbanism, Urbanization, Urban Agglomeration, Regional Concept and Types.
2. Urban and Regional Planning Process, Presentation and Preparation.
3. Spatial theory and Urban Land Use Models: Growth Pole, Core periphery, Basic needs Strategy, Central Place Theory, Sector Model, Multiple Nuclei Model.

UNIT-II

4. Origin and Growth of Urbanization in the World.
5. Urban Problems: Pollution, Slum, Housing, Social wellbeing.
6. Urban Planning traditions: Anglo- American and European, Concept of Smart City.

UNIT-III

7. Globalization, Regional spaces and Development.
8. Regional/Rural Development practices- India and China.
9. Regional/Multilevel Planning.

UNIT-IV

10. Application of RS,GIS and GPS in Urban and Regional Planning.
11. Research Methods in Urban and Regional Studies.
12. Preparation of Master Plan- A Case Study of Hyderabad.

REFERENCES:

1. R. J. Chorley and P. Hayget - Socio-economic models in geography, 1967.
2. Lo F. and K. Salih - Growth Pole Strategy and Regional Development Policy, Oxford Pergaman press, 1978.
3. Harry W. Richardson - Regional and Urban Economics, 1978.
4. R. P. Mishra and K. V. Sundaram - Multilevel Planning and Integrated Rural Development in India, Heritage Publishers, 1980.
5. Lewis Keeble - Principles and Practice of Town and Country Planning, The Estimates Gazette Ltd., London, 1964.
6. Gideon Sjoberg - The Origin and Evolution of Cities, Scientific American, 1965.
7. John N. Jackson - The Urban Future, George Allen and Unwin Ltd., London, 1972.
8. Charles Korea - Report on the National Commission on Urbanization, 1988.
9. Peter Hall - Urban and Regional Planning, Penguin Books, Middlesex, 1976.
10. Gordon E. Cherry - Urban Planning Problems. Leonard Hill, London, 1974.
11. P. E. James and C.F. Jones - American Geography: Inventory and Prospect, Rawat, Jaipur.
12. Hyderabad 2020, Master plan for HMA, 2003.
13. Leonard Riesman - The Urban Process, Free Press, London, 1964.
14. Harold M. Mayer and Clyde F. Kohn - Readings in Urban Geography, University of Chicago, 1967.
15. Stanley D. Brunn and Jack F. Williams - Cities of the World, World Regional Urban Development, Harper and Row publishers, New York, 1983.

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Semester-IV
Syllabus as per CBCS, w.e.f 2023-2024
Scheme of Instruction & Examination
CORE-II (GI-402T)
DISASTER MANAGEMENT STUDIES (4 Credits)

UNIT-I

1. Definition and Concept of Hazards and Disasters.
2. Nature and Scope of Disaster Management Studies.
3. Classification of Hazards and Disasters:
   i. Natural Hazards: Thunder storm, Hail Storms, Tornadoes, Tsunami, Cyclones, Heat Waves and Cold Waves, Landslides, Forest Fires, Earthquakes.
   ii. Human Induced: Droughts, Floods, Desertification, Epidemics and Biological Disasters.
   iii. Accidental: Underground Coal Fires, Chemical Disasters, Nuclear Disasters, Air and Railway Accidents.

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: Natural, Human Induced & Accidental Hazards

UNIT-III

7. Risk Identification and Assessment: Evaluating Risks posed by Natural Hazards and divising strategies to mitigate their impact.
8. Disaster Preparedness: Drought Preparedness and Monitoring, Flood-Control and Management, Plantation and Afforestation.
9. Various National and Global Authorities, Agencies, Institutes and Organizations engaged in Disaster Management Practices:

UNIT-IV

10. Disaster Management Policies in India and 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:

1. Burton I., Kates R. W. and White G. F. - Environment as Hazard, 2nd edition, Guilford Press, New York, 1993.
2. Chakraborty S. C. - Natural Hazards and disaster management, Pragatishil Prakashak, Kolkata
3. Schneid T. and Collins L. - Disaster Management and Preparedness, Lewis Publishers, Washington D. C, 1998.
4. Bryant Edwards - Natural Hazards, Cambridge University Press, U.K., 2005.
5. Roy P. S., Van Westen, C. J., Jha V. K., Lakhera R. C. and Champati Ray P. K. - Natural Disaster and their Mitigation: Remote Sensing and Geographical Information System Perspectives, IIRS, Dehra Dun, Govt. of India, 2000.
   Hewitt K. - Regions of Risk: A Geographical Introduction to Disasters, Longman, London, 1997

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Scheme of Instruction & Examination
ELECTIVE –III-a (GI-403T)
WEB GIS (4 Credits)

UNIT-I

1. Web GIS Basics – Definition, Origin and Evolution.
2. The Potential of Web GIS – Server – Side Strategies , Client – Side Strategies, Combination and Hybrid Strategies
3. Mobile GIS and Web GIS.

UNIT-II

4. HTML5 and its uses in Web GIS – The Internet and World Wide Web (WWW)
5. A Brief History of the Internet , Intranets , Controlling Traffic on the Internet (TCP/IP)
6. Fundamentals of Computer Networking: Network Environment , Network Communication Models, IP Addresses , Routers and Packets.

UNIT-III

7. Web GIS and Internet GIS – Internet map servers
8. Collection of Geospatial Information :-Dissemination of Geospatial Information , Geospatial Analysis, Mapping and Query
9. Web GIS and E-Governance : Web GIS and E-Science.

UNIT-IV

10. Open source Web GIS Applications and tools
11. Open source GIS Applications:Vehicle Tracking System, Mobile Mapping, Location Based Services, Intelligent Transportation System (ITS)
12. Urban Planning, Resource Management, Real Estate.

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
3. The GIS Book (5th Edition): Korte G. B.,Onward Press, Australia, 2001.
4. Multimedia Cartography:CartwrightW., M.P. Peterson and G. Gartner (Eds), Berlin: Springer.
5. Web Cartography: Development and Prospects:Kraak M. and A. Brown, London, Taylor And Francies, 2001.
6. Cartography: Visualization of Geospatial Data:Kraak M. and F. Ormeling, Delhi, Pearson Education, 2003.

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ELECTIVE-III-b (GI-403T)
GEOINFORMATICS IN UTILITY MANAGEMENT

(4 Credits)

UNIT – I

1. Utilities, Description of all essential Services and Management.
2. Database Acquisition and Data Base Development in Utility Services.
3. Integrating Geospatial data in Utility Management.

UNIT - II

4. Utility Asset Management System.
5. Cloud base GIS in Utility Asset Management System.
6. Geospatial Technology Project, Management ,Query, Processing and Visualization

UNIT - III

7. Applications of GIS in Electricity, Gas, Transport, Telecommunication Management
8. GIS in Water supply, Sewerage System, Solid waste Management.
9. Geospatial Application in Public health and Safety, Crime Analysis, E-governance etc

UNIT - IV

10. Modelling in utility applications**,** Infrastructure aims and objectives,
11. Environmental law and regulations governing infrastructure utilities, Modern infrastructure tools
12. Mobile & Web GIS Application in Utility Management System.

REFERENCES:

1. Escritt, L. B., Water Supply and Building Sanitation, 4th Ed., Mac Donald and Evans Limited, 1972
2. Hammer, Mark J., Water and wastewater Technology, 2nd Ed., John Willey and Sons Inc., 1986.
3. Harries K (1999) Mapping Crime: Principle and Practice. Washington, DC: Crime Mapping Research Center, Department of Justice
4. Hodder I, Orton C (1979) Spatial Analysis in Archaeology. Cambridge: Cambridge University Press
5. Network Analysis in Geography. St Martin's Press Haggett P, Chorley R J
6. Spatial Processes: Models and Applications. Pion Cliff A D, Ord J K

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Scheme of Instruction & Examination

PRACTICAL -I (GI451P)

TECHNIQUES IN URBAN MAPPING & ANALYSIS

(1 Credit)

1. Techniques of Analysis of Settlement Distribution – Rank size Rule, Primate City Index: Nearest Neighbour Analysis.
2. Functional Classification of Settlements (Nelson's Method)
3. Measurement of Centrality of Settlements – Index of Centrality.
4. Centro Graphic Analysis – Mean Center and Median Center.
5. City Region Relationships – Gravity and Potential Models.

REFERENCES:

1. Majid Hussain - Agricultural Geography, Inter-India Publications, Delhi, 1979.
2. Noor Mohammed (ed) - Perspective in Agricultural Geography, Vol. I, II, III, IV, V. Concept Publishing Co., New Delhi, 1981.
3. Chorley B. J. & Hagget P. - Models in Geography, London, Methuen, 1971.
4. Mohammed Ali - Studies in Agricultural Geography, Rajesh Publications, New Delhi, 1978.
5. Hall Tim - Urban Geography, Routledge, London, 1998.
6. Cherry Gordan E. - Urban Planning Problems, Leonard Hills Books, London, 1974.
7. Naidu Ratna - Old Cities, New Predicaments: A Study of Hyderabad, Sage, New Delhi, 1990.
8. Alam S. M. & Khan W. - Metropolitan Hyderabad and its Region, Allied, Bombay, 1972.
9. Carter H. - The Study of Urban Geography, Edward Arnold, London, 1972.

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Scheme of Instruction & Examination
PRACTICAL -II (GI451P)
OPEN SOURCE GIS

(1 credit)

1. Creating and Exploring a Basic Map: An Overview of the Interface and Navigating QGIS
2. Basic GIS Operations in QGIS: Georeferencing, Creating Vector Data & Building Topology
3: Vector Analysis: Overlay Operations, Proximity Analysis
4. Raster Analysis: Changing Raster Overlay and Buffering
5. Preparation of Maps:

- Symbology
- Using Print Layout
- Creating a Dynamic Print Layout

REFERENCES:

1. NIRD - Rural Development in India: SOME FACTS, Hyderabad, 1981.
2. Mishra R. P. (ed) -Rural Development: Capitalist & Socialist Paths, Concept Publishing, New Delhi vol.1 to 5, 1985.
3. Desi I-P - History of Rural Development in India, Impex India, New Delhi, 1977.
4. Singh K. N. & Singh D. N. (ed) - Rural Development in India- Problems, strategies and approaches: NGSI, Varanashi, 1985.
5. Dube S. C. - India's challenging Villages, Human factors in community development, Routledge and Kewgam Ltd. London, 1955.
6. Meir and Geralld M. - Leading issues in Economic Development, Oxford Uni Press, Delhi, 1986.
7. C. P. Lo and A. K. W. Young – Concepts and Techniques in GIS.
8. Anji Reddy – RS and GS.
9. P. S. Ray, R. S. Dwivedi and D. Vijayan – Remote Sensing Applications, NRSC, Hyderabad, 2010.