DEPARTMENT OF GEOGRAPHY, OSMANIA UNIVERSITY

M.Sc. GEOGRAPHY - Syllabus (2016-17 & onwards) as per CBCS

Scheme of Instruction and Examination

S.No.	Subject Code	Paper	C O U R S E	Teaching Hrs (per week)	MARKS (20+80 Theory)	CREDITS
			SEMESTER-III			
1.	**GG301T**	**I**	Urban Geography and Planning	4	100	4
2.	**GG302T**	**II**	Agricultural Geography	4	100	4
3.	**GG303T**	**III**	Photogrammetry	4	100	4
4.	**GG304T****	**IV**	Natural Resource Management	4	100	4
	GG304T**	**IV**	Political Geography			
5.	**GG351P**	**I**	Techniques of Agricultural & Urban Analysis	4	50	2
6.	**GG352P**	**II**	Aerial Photo Interpretation & Image Analysis	4	50	2
7.	**GG353P**	**III**	Geoinformatics	4	50	2
8.	**GG354(ID)**	**IV**	**Environmental Studies**	4	50	2
	Total				**600**	**24**
			SEMESTER-IV			
1.	**GG401T**	**I**	Advanced GIS	4	100	4
2.	**GG402T**	**II**	Regional Development Studies	4	100	4
3.	**GG403T****	**III**	Rural Development and Planning	4	100	4
	GG403T**	**III**	Geography of Climate Change with special reference to India			
4.	**GG404T****	**IV**	Principles of GPS	4	100	4
	GG404T**	**IV**	Principles of Cartography			
5.	**GG451P**	**I**	G.P.S Survey	8	100	4
6.	**GG456 (Project)**	**II**	PROJECT(Dissertation and Viva Voce)	8	100	4
	Total				**600**	**24**
		Grand Total Marks and Credits			**2400**	**96**

ID: Inter Disciplinary Paper

** Elective Paper (Discipline Centric)

M.Sc. Geography
III- semester

THEORY PAPER-I (GG301T)
URBAN GEOGRAPHY AND PLANNING (4 Credits)

UNIT-I

1. Nature, Scope & Approaches (Demographic, Economic, Behavioral).
2. Urban Settlements - Processes, Patterns & Levels of Urbanization.
3. Urban Settlements Spectrum and Urban Settlement System at different scales: Growth of Megacities.

UNIT-II

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

UNIT-III

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

UNIT-IV

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

REFERENCES:

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.

THEORY PAPER-II (GG302T)

AGRICULTURAL GEOGRAPHY (4 Credits)

UNIT-I

1. Nature, Scope and Significance of Agricultural Geography.
2. Approaches to the Study of Agriculture in Geography.
3. Origin and Development of Agriculture in different parts of the world.

UNIT-II

4. Factors influencing Agriculture.
5. Major Agricultural systems of the World. Whittlesey's Agricultural Types, Characteristics, Distribution in the world.
6. Concept of land capability and carrying capacity.

UNIT-III

7. Agricultural Regionalization:
    i. Concept of Agricultural region.
    ii. Agricultural regions in India and World.
8. Quantitative methods in Agricultural Regionalization.
9. Green Revolution and Its Impact on Indian Agriculture.

UNIT-IV

10. Models in Agricultural Geography:
    i. Von Thunen's Agricultural Model.
    ii. Olaf Jonasson's Agricultural Model.
11. Problems and prospectus of Indian Agriculture (general treatment) Precision Farming its relevance in India context.
12. Applications of Remote Sensing and G.I.S. in Precision Farming.

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 Co., Ltd., New Delhi, 1994.
8. Mamoria C. B. - Agricultural Problems in India, Kitab Mahal, Jurukshetra, 1975.
9. Singh Jasbir - Agricultural Atlas of the India A Geographical Analysis of Vishal Publications, Kurukshetra, 1974.
10. Shukla L. - Readings in Agricultural Geography, Scientific Publishers, Jodhpur, 1991.

THEORY PAPER-III (GG303T)

PHOTOGRAMMETRY (4 Credits)

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

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 (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.

Elective (Discipline Centric)

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

UNIT-I

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

UNIT-I

3. Problems of Resource Utilization.
4. Resource Appraisal: Ground, remote sensing and G.I.S.

UNIT-I

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

UNIT-I

7. Institutions and Policy Making: Institutional arrangements; policy models; policy making and resource management.
8. Utilization, management problems and policies of natural resources in India.

REFERENCES:

1. Adams, W.M., 1990 : Green Development: Environment and Sustainability in the Third World, Routledge and Chapman Hall, New York.
2. Berkes, F.,(ed.),1989 : Common Property Resources: Ecology and Community Based Sustainable Development, Belhaven Press London.
3. Mather, A.S. and Chapman, K.,1995 : Environmental Resources, Longman, Harlow, England.
4. McClay, K.R., 1995 : Resource Management Information System : Process & Practice, Taylor Francis, London.
5. Mitchell B., 1988 : Geography and Resources Analysis, 2nd edition, Longman, London.
6. Mitchell,B., 1997 : Resource and Environmental Management, Longman, Harlow, England.
7. Newson, M.D., 1991 : Land, Water and Development: River Basin Systems and Management, Routledge,London.

8. Owen, S. and Owens, P.L.1991: Environment ,Resources and Conservation, Cambridge University Press, New York.
9. Redclift, M., 1987 : Sustainable Development: Exploring the Contradictions, Methuen, London.
10. Rees, J.1990: Natural Resources: Allocation, Economics and Policy, Routledge, London.
11. Saha, S.K., and Barrow, C.J., (ed.), 1981 : River Basin Planning : Theory and Practice, John Wiley and Sons, New York.

Elective (Discipline Centric)

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

UNIT-I

1. Meaning and Definition, History, Development, Nature and scope of Political Geography.
2. Approaches in the study of political Geography.
3. Relevance of Political Geography with other Disciplines.

UNIT-II

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

UNIT-III

7. Global Strategic views – Heartland –Rim land – Indian Ocean politics.
   International Relations –Multi National Organizations: Political, Economic and Cultural Blocks.
8. Geography of Federalism – Colonialism.
9. Concept of Buffer State.

UNIT-IV

10. Electoral studies in Political Geography.
11. Urban Political Geography and Public Policy.
12. Politics of the Environment.

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.

PRACTICAL PAPER-I (GG351P)

TECHNIQUES OF AGRICULTURAL AND URBAN ANALYSIS

(2 Credits)

1. Determination of crop combination regions.
2. Crop concentration (Location Quotient Method).
3. Agricultural efficiency and Productivity.
4. Determination of cropping intensity.
5. Determination of crop diversification.
6. Agricultural Productivity analysis.
7. Techniques of Analysis of Settlement Distribution – Rank size Rule, Primate City Index: Nearest Neighbour Analysis.
8. Functional Classification of Settlements (Nelson's Method)
9. Measurement of Centrality of Settlements – Index of Centrality.
10. Centro Graphic Analysis – Mean Center and Median Center.
11. 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.

PRACTICAL PAPER-II (GG352P)

AERIAL PHOTO INTERPRETATION AND IMAGE ANALYSIS

(2 Credits)

PHOTOGRAMMETRY

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

VISUAL IMAGE ANALYSIS:

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

DIGITAL IMAGE ANALYSIS.

10. Introduction to Digital Image Processing.
11. Image Rectification: Geometric and Radiometric Correction.
12. Image Enhancement: Contrast and Band Rationing.
13. Unsupervised Classification and Supervised Classification.

REFERENCES:

1. Mejal Veziroglu – Remote Sensing: Energy Related Studies, Hemisphere Publishing Corporation, Washington, 1975.
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.

PRACTICAL PAPER-III (GG353P)
GEOINFORMATICS

(2 Credits)

1. Introduction to Geoinformatics.
2. GIS Models and Structures.
3. Editing and Topology creation.
4. Spatial data Analysis.
5. Image Rectification, Restoration and Enhancement – Techniques.
6. Global positioning system – Static and Kinematics.
7. Land evaluation and Land use planning.
8. Urban area Analysis.
9. Open GIS and Virtual GIS.

WEB TECHNOLOGY

SIMPLE PROGRAMS USING

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

REFERENCES:

1. P.A.Burrough, principles of geographical information systems for land resources assessment.
2. Godchild, geographical information systems – principles, vol.1
3. Graeme F.Bossham caster, Geographical information system for Geoscientists.
4. Jensen, J.R., Introductory digital image processing : A Remote Sensing Perspective.
5. Lillesand, R.M., and R.W. Kiefer, Remote Sensing and Image Interpretation.
6. Sabins, F.F., and Remote Sensing: Principles and Interpretation.
7. N.k.Agarwal, essentials of GPS.
8. GIS India.
9. GIS @ Development.
10. Geospatial Today.
11. Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Networks,authored by Dr.
12. .Korte,G. B., (2001) The GIS book: 5th Edition, Onward press, Australia.
13. Cartwright, W., M.P. Peterson, G. Gartner (Eds) Multimedia Cartography, Berlm: Springer.
14. Kraak,M., and A.Brown (2001) Web Cartography: Development and Prospects, London: Taylor and Francies.
15. Kraak, M. and F. Ormeling (2003) Cartography: Visualization of Geospatial Data, Delhi: Pearson Education.

INTER DISCIPLINARY PAPER (ID)

Geography Department, O.U. offering Inter-disciplinary Course Under CBCS
SEMESTER – III
ID PAPER: ENVIRONMENTAL STUDIES (GG354)

(2 Credits)

UNIT -I

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

2. Concept of ecosystem – abiotic and biotic components

3. Environmental degradation and pollution – Land, Water & Air.

UNIT -II

4. Population growth and Resource depletion; Environmental – Economic development debate.

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

6. Concept of sustainable development – temporal and spatial dimensions

REFERENCES:

1. David Harvey, Justice, Nature and Geography of Difference, Blackwell, 2000
2. John Bellomy Foster, The Vulnerable Planet, Monthly Review Press, 1994.
3. Savindhra Singh, Environmental Geography, PPB, 2000
4. David Pepper, Eco-socialism: From Deep Ecology to Social Justice, Routledge, 1993.
5. Gadgil, M & Guha,R., This Fissured Land, An Ecological History of India,OUP,1995
6. Guha,R, The Unique Woods,OUP,2000
7.John Mc Cormick, The Global Enviromental Movement, JWS, 1995.
8. Reiner Grundmann, Marxism and Ecology, Clarendon Press, oxford, 1991.
9. Desai,V & Potter, RB.,(ed), The Companion to Development Studies, 2002.
10. The Hindu, Survey of the Environment 2000
11. Down to Earth-Science and Environment fortnightly.
12.Singh S., 1997: *Environmental Geography,* Prayag Pustak Bhawan. Allahabad.
13.UNEP, 2007: *Global Environment Outlook: GEO4: Environment For Development,* United Nations Environment Programme.

M.SC. GEOGRAPHY
IV- SEMESTER

THEORY PAPER-I (GG401T)
ADVANCED G.I.S. (4 Credits)

UNIT-I

1. Computer Fundamentals and Introduction to G.I.S.: Components of G.I.S.
2. Hardware and software used in GIS, GIS capabilities.
3. G.I.S. Data Types, Models and Structures: Spatial – Raster and Vector & non Spatial – Hierarchical, Relational and Network Models, Quad-Tree Structures.

UNIT-II

4. Methods and Elements of Data Input, Verification, Storage and Output.
5. Data Quality (Factors affecting data quality), Errors in G.I.S. and Editing – sources of errors, Errors resulting from natural variation, processing.
6. Geo referencing, Geo coding: Need for Geo coding, Errors in Geo coding.

UNIT-III

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

UNIT-IV

10. Global Positioning System – Concept, Methods (DGPS), Segments, Data Errors and Rectification, Advantages, Disadvantages.
11. Approaches to GIS and its Future.
12. G.I.S. Applications and Recent Trends.

REFERENCES:

1. Good child M.F. and Kemp K – Developing a curriculum in GIS: The NCGIA core curriculum project, University of California, Santa, Barbara 1992.
2. Ian Haywood Cornelius and Steve Carver – An introduction to GIS, Longman, New York, 2000.
3. Mishra H. C. – 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. Gottfried Konecny – Geoinformation: Remote Sensing, Photogrammetry and Geographic Information System, Taylor & Francis, London and New York, 2003.
7. M. Anji Reddy – A Text Book of Remote Sensing and Geographical Information Systems, BS Publications, Hyderabad, 2008.

THEORY PAPER-II (GG402T)
REGIONAL DEVELOPMENT STUDIES (4 Credits)

UNIT-I

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

UNIT-II

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

UNIT-III

7. Nationality identities and national articulations, and globalization.
8. State articulation of Regional question and civil societal response to regional identity-India and International scenario
9. Telangana: Drought, Irrigational backwardness, Political Economy of Development, Culture and Regional Movement.

UNIT-IV

10. Rural development in India and China: A comparative study.
11. Multi-level/ Micro-level Regional Planning; Regional Justice.

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.
16. Micheal Keating and John Loughten (ed) - The Political Economy of Regionalism, Frank Cass London, 1997.

Elective (Discipline Centric)

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

UNIT-I

1. Concept of Development, Indicators of Development: Growth and Development.
2. History of Rural Development in India.
3. Theories of Development – Structural, Functional and Spatial Theories of Development.

UNIT-II

4. Concept of Rural Development and Under Development.
5. Rural Development and its Relation with Other Subjects.
6. Rural Development and Five Year Plans.

UNIT-III

7. Rural Socio-Economic Structure, Social Stratification of Population, Population Characteristics, Social and Political Movements.
8. Agricultural Development – Land Holding, Irrigation and land use, Land reforms, Marketing and Transportation. Green Revolution and Socio-Economic Changes.
9. Agricultural Allied Activities – Small and Cottage Industries of Rural India, Infrastructural Development.

UNIT-IV

10. Rural Development – Problems, Basic needs: Housing, Health, Education, Nutrition, Water Supply, Rural Resource Utilization, Ecological and Environmental Issues.
11. Unemployment and Poverty: Policies and approaches to Rural Development Programmes / Strategies / Suggestions.
12. Participation and role of Panchayats, Rural women and Child Development, role of voluntary organizations and public participation.

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 Chllenging 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.

Elective (Discipline Centric)

THEORY PAPER-III (GG403T)

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

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

REFERENCES:

1.Derbyshire, E,(2010), Geomorphology and Climate, John Wiley and Sons, London
2.Khan, MZA et al. (2011), Global Climate Change: Causes and Consequences, Rawat publication, Jaipur
3.Lomborg B, (2010), Smart Solutions to Climate Change , Rawat Publication,

Jaipur
4.Singh, S, and Mohan, K.S (2012),Climate Change: An Asian Perspective, Rawat publication, Jaipur

Elective (Discipline Centric)

THEORY PAPER-IV (GG404T)

PRINCIPLES OF GPS (4 Credits)

UNIT-I

1. Definition, Concept, History and Utilities of GPS, Various GPS products and peripherals- Recent trends.
2. Basic GPS components:
   a. Space Segment: Satellite Constellations.
   b. Control Segment: Ground Stations.
   c. User Segment: Antennas, Receivers, Master Control stations, Monitor stations, Mobile receivers – Calibration.
3. GPS Systems.
   a. Wide Area Augmentation System (WAAS)
   b. Augmented GPS (AGPS)
   c. Space Based Augmentation System (SBAS)
   d. Ground Based Augmentation System (GBAS)
   e. Differential GPS (DGPS)

UNIT-II

4. Signals and Bands: S and P Bands, UHF bands (L, C and S) Code-phase, Carrier-phase, Code correlation techniques - C/A-code, P(Y)-code and Time Synchronization.
5. False Signals:
   a. False Signals (spoofing)
   b. Navigation Message Authentication (NMA)
   c. Public spreading Code Authentication
   d. Certificates of Authorization
   e. Signal Interference or Jamming
   f. Cryptographic Concepts
6. Working principles of GPS: Simple navigation –satellite ranging; calculating the distance to the satellites – error sources; differentially corrected position – reference, receiver – the rover receiver.

UNIT-III

7. International GPS Systems: GALILEO, GPS, NAVSTAR, GAGAN, COMPASS, GLONASS, GNSS, NAVIC.
8. Geodetic Aspects: GPS coordinate system –local coordinate system – map projections and plane coordinates – the universal transverse Mercator projection.
9. Surveying with GPS: GPS measuring Techniques- Static Surveys, Kinematic Surveys, RTK.

UNIT-IV

10. GPS Applications in Different Fields:
    a. Military, Government/Civilian, Railroad Systems, Aviation Control, Marine Navigation, Intelligent Transport System, Crime Tracking,
    b. Civilian: Mapping, Surveying, Offshore Oil and Gas Applications, Satellite phones, Cell Phone Navigation, Child Finder.
11. Integration of GPS and GIS- Role of GPS and GIS in Remote Sensing.

REFERENCES:

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

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

UNIT-I

1. History 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) Map projection: Definition, Types of Projection.
    c) Co-ordinate Systems: Concept, Definition and Types.
5. Cartographic Design and Methods: Map Design, Controls on Map Design, Elements of Map Design, Design Planning
6. Cartographic Techniques – 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 – Shape, Size, 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.
11. Types of Diagrams: Star Diagram, Wheel Diagram, Wind Rose, Age and Sex Pyramid, Cartograms and Histograms. Importance of using Graphs and 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. H. et 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.
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 (GG405P)

GPS SURVEY (4 Credits)

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

References:

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.

PROJECT (Dissertation and Viva Voce) (GG 456P)

(Credits 4)

S. No.	Topics to be covered
1	Problem identification and literature review
2	Data acquisition / collection
3	Field work
4	Data processing
5	Results and interpretation
6	Report writing
7	Presentation

M.Sc. GEOINFORMATICS - Syllabus (2016-17 & onwards) as per CBCS

Scheme of Instruction and Examination

S.No.	Subject Code	*C O U R S E*	*Teaching Hrs* per week	*MARKS* 20+80 (Theory)	*CREDITS*
		SEMESTER-III			
1.	GI-301T	Urban and Regional Planning	4	100	4
2.	GI-302T	Resource Management and GIS	4	100	4
3.	GI-303T	Principles of GPS	4	100	4
4.	GI-304T**	Web G.I.S.	4	100	4
	GI-304T**	Geodatabase for GIS	4	100	4
5.	GI-351P	Cartographic Applications (Terrain, Agricultural and Urban)	4	50	2
6.	GI-352P	GIS & Map Customization and Web Technology	4	50	2
7.	GI-353P	GPS Survey	4	50	2
8.	GI-354(ID)	Basics of Geoinformatics	4	50	2
	Total			600	24
		SEMESTER-IV			
1.	GI-401T	Digital Image Processing.	4	100	4
2.	GI-402T	Disaster Management Studies	4	100	4
3.	GI-403T**	Information Systems and Management	4	100	4
	GI-403T**	Urban GIS - Study of Hyderabad and HMDA			
4.	GI-404T**	RS & GIS Applications for Agriculture and Rural development	4	100	4
	GI-404T**	Geoinformatics in Utility Management			
5.	GI-451P	Image Analysis	8	100	4
6.	GI-456 (Project)	PROJECT (Dissertation and Viva Voce)	8	100	4
	Total			600	24
	Grand Total Marks and Credits			2400	96

ID: Inter Disciplinary Paper

** Elective Paper (Discipline Centric)

M.Sc. GEO INFORMATICS
SEMESTER III
THEORY PAPER-I (GI-301T)
URBAN AND REGIONAL PLANNING **(4 Credits)**

UNIT-I

1. Spatial theory and Urban Land Use Models: Growth Pole, Core periphery, Basic needs Strategy.
2. Concepts- Urban, Urbanism, Urbanization, Regional Concept and Types.
3. Planning process, presentation and preparation.

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 GIS, GPS and RS 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.
16. A. C. Mohapatra and Jayant K. Routray - Regional Development and Planning, Rawat, Jaipur, 1998.
17. Alam S. M. - Hyderabad – Secunderabad, Twin Cities, Asia publishing House, Bombay, 1964.

18. Curran Paul J. - Principles of R.S, English Language book society, London, 1988.
19. Gibbs and Jack P. - Urban Research Methods, East West Edition, New Delhi, 1966.

THEORY PAPER-II (GI-302T)

RESOURCE MANAGEMENT AND GIS **(4 Credits)**

UNIT-I

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

UNIT-II

3. Land Resources: Concept, Land Units, Land Capability and Limitations, Land Classifications and Land Use System, Land evaluation, Land Information System (LIS), DSS for Land use Planning.
4. Water Resources: Types, Sources, Consumption Pattern, Need for conservation, Sustainable Water Management

UNIT-III

5. Forest Resources: Types, Functions of Forests, Deforestation & Consequences and Conservation strategies
6. Energy & Mineral Resources: Types, Distribution –World; Resources Management & Sustainable Development, National & International level.

UNIT-IV

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

REFERENCES:

1. Ali S.A. Resources for Future Economic Growth, Vikas Publishing House, New Delhi, 1979.
2. Ress J. Natural Resources, Allocation, Economics & Policy, Rout ledge, London, 1990.
3. Turner R.K. Sustainable Environmental Management, Belhaven Press, London, 1988.
4. Venugopal Rao. C, Prof and Kamalaker Reddy. A Prof, *Readings in* Resource Management and Geoinformatics, 2005.
5. Zimmerman, E.W. Introduction to World Resources, Harper & Row, New York 1964.

THEORY PAPER-III (GI-303T)
PRINCIPLES OF GPS **(4 Credits)**

UNIT-I

12. Definition, Concept, History and Utilities of GPS, Various GPS products and peripherals- Recent trends.
13. Basic GPS components:
    d. Space Segment: Satellite Constellations.
    e. Control Segment: Ground Stations.
    f. User Segment: Antennas, Receivers, Master Control stations, Monitor stations, Mobile receivers – Calibration.
14. GPS Systems.
    f. Wide Area Augmentation System (WAAS)
    g. Augmented GPS (AGPS)
    h. Space Based Augmentation System (SBAS)
    i. Ground Based Augmentation System (GBAS)
    j. Differential GPS (DGPS)

UNIT-II

15. Signals and Bands: S and P Bands, UHF bands (L, C and S) Code-phase, Carrier-phase, Code correlation techniques - C/A-code, P(Y)-code and Time Synchronization.
16. False Signals:
    g. False Signals (spoofing)
    h. Navigation Message Authentication (NMA)
    i. Public spreading Code Authentication
    j. Certificates of Authorization
    k. Signal Interference or Jamming
    l. Cryptographic Concepts
17. Working principles of GPS: Simple navigation –satellite ranging; calculating the distance to the satellites – error sources; differentially corrected position – reference, receiver – the rover receiver.

UNIT-III

18. International GPS Systems: GALILEO, GPS, NAVSTAR, GAGAN, COMPASS, GLONASS, GNSS, NAVIC.
19. Geodetic Aspects: GPS coordinate system –local coordinate system – map projections and plane coordinates – the universal transverse Mercator projection.
20. Surveying with GPS: GPS measuring Techniques- Static Surveys, Kinematic Surveys, RTK.

UNIT-IV

21. GPS Applications in Different Fields:
    c. Military, Government/Civilian, Railroad Systems, Aviation Control, Marine Navigation, Intelligent Transport System, Crime Tracking,
    d. Civilian: Mapping, Surveying, Offshore Oil and Gas Applications, Satellite phones, Cell Phone Navigation, Child Finder.
22. Integration of GPS and GIS- Role of GPS and GIS in Remote Sensing.

REFERENCES:

7. ESRI Arc Pad Manual.

8. Introduction to GPS (Global Positioning System) by Leica.
9. Essentials of GPS – by N. K. Agarwal.
10. Gergory T. French – Understanding the GPS: An Introduction to Global sitioning System, GeoResearch Inc., USA, 1996.
11. Elliot D. Koplan and Christopher J. Hegarty – Understanding GPS: Principles and Applications, Artech House, Boston, London, 2006.
12. Ahmed El-Rabbani – Introduction to GPS: The Global Positioning System, Artech House, Boston, London, 2002.

Websites:

1. www.gpsworld.com
2. www.gps society.org
3. www.esri.com.

Elective (Discipline Centric)
THEORY PAPER-IV (GI-304T)
WEB GIS **(4 Credits)**

UNIT-I

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

UNIT-II

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

UNIT-III

3. Web GIS and Internet GIS – Mapping and Query – Collection of Geospatial Information – Dissemination of Geospatial Information – Geospatial Analysis. Web GIS and E-Governance – Web GIS and E-Science.

UNIT-IV

4. Web GIS Applications – Vehicle Tracking System, Mobile Mapping, Location Based Services, Intelligent Transportation System, 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: Cartwright W., 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.

Elective (Discipline Centric)
THEORY PAPER-IV (GI-304T)
GEODATABASE FOR GIS

(4 Credits)

UNIT-I

1. Introduction to DBMS – Brief history
2. Types of DBMS – data models – ER model: concepts – design.
3. GIS data model: Conceptualizing the real world in GIS.

UNIT-II

4. Relational Data Base Management Systems: Concepts – Constrains
5. Relational Data base Design – Relational Models Extended with ADT.
6. SQL – simple – complex –spatial join.

UNIT-III

7. Representation of Spatial Objects: Geographic space modeling
8. Representation Modes – Representing the Geometry of a Collection of objects – Spatial data formats and Exchange formats – Object Oriented GIS
9. Geodatabase: Arc Geodatabase – topology – defining the relationship class – geometric networks – Geocoding services – Building geodatabases with CASE tools

UNIT-IV

10. Emerging Trends: Data Mining: concepts – application of data mining
11. Data Warehousing: Characteristics of Data Ware house – applications
12. Intelligence Decision making: Artificial Intelligence, Decision support system, Expert system – design – applications.

References:

1. Korth, H.F., Silberschatz, A., and Sudarshan, S., (2002). Database System Concepts (5th Edition), McGraw - Hill Book Company, New York.
2. Rigaux, P., Scholl, M., and Voisard, A., (2002). Spatial Databases: with Application to GIS, Morgan Kaufmann, New York.
3. Ramez Elmasri, and Shamkant B. Navathe, (2002). Fundamentals of Database Systems, 5th Edition, Pearson Education, New Delhi.
4. Buliding Geodatabase, (2002). GIS, ESRI Publication, Red Lands, California.
5. Thomas Ott, and Frank Swiaczny, (2000). Time-Integrative Geographic Information Systems, Springer, Berlin.

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

Terrain

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

Agricultural

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

Urban

1. Techniques of Analysis of Settlement Distribution – Rank size Rule, Primate city Index – Nearest Neighbor 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. 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 Publication, New Delhi, 2002.
3. Majid Hussain - Agricultural Geography, Inter-India Publications, Delhi, 1979.
4. Noor Mohammed (ed) - Perspective in Agricultural Geography, Vol.I, II, III, IV, V. Concept Publishing Co., New Delhi, 1981.
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. Hall Tim -Urban Geography, Routledge, London, 1998.
8. Cherry and Gordan E. - Urban Planning Problems, Leonard Hills Books, London, 1974.
9. Naidu Ratna - Old Cities, New Predicaments: A Study of Hyderabad, Sage, New Delhi, 1990.

10. Alam S. M. & Khan W. - Metropolitan Hyderabad and its Region, Allied, Bombay, 1972.
11. Carter H. - The Study of Urban Geography, Edward Arnold, London, 1972.

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

(2 Credits)

Arc Objects and Map Objects

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

Web Technology

12. Simple Programs Using
13. HTML,
14. HTML EDITORS
15. XML
16. GML
17. ASP
18. MAP SERVER
19. Map display, Zoom using client server.

References:

1. Andrew Ford and Tim Dixon - Spinning the Web (2nd Edition), International Thomson Computer Press, 1996.
2. James A. Mohler - How to become Webmaster, Tech media, New Delhi, 1997.
3. ESRI Technical Publication and ESRI Online Help Resource.

PRACTICAL PAPER-III (GI-353P)
GPS SURVEY **(2 Credits)**

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

References:

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

INTER DISCIPLINARY PAPER (ID)

Geography Department, O.U. offering Inter-disciplinary Course Under CBCS
SEMESTER – III
ID PAPER: BASICS OF GEOINFORMATICS *(GI-354)*

(2 Credits)

UNIT – I

1. Geoinformatics technologies-GIS,RS and GPS – Scope and importance.

2. GIS data structures and Models

3. Remote Sensing: Energy Sources and radiation principles – Energy Interaction with earth and atmosphere – EMS

UNIT – II

4. Characteristics of Remote Sensors – Spectral, Temporal, Radiometric, Spatial resolution

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

6. GIS & GPS Applications.

REFERENCES:

1.Goodchild M.F. and Kemp K – 'Developing a curriculam in GIS: The NCGIA Core Curriculum Project', University of California, Santa, Barbara 1990.
2.Ian Haywood Corenelius and Steve Carver – An introduction to GIS, Longman, New York, 2000.
3. Smith T.R and Piquet, GIS, London Press, London, 1985.
4. Heywood I, et, An Introduction to Geographical Information System Longman, New Delhi 1998.
5. Lo CP & Young AKW, Concepts & Techniques of Geographical Information System, Prentice Hall of India, New Delhi – 2003.
6. Paul Curran – Principles of Remote Sensing, English language Book Society, London, 1998.
7. Robert,G.R.(Ed), Manual of Remote Sensing vol. I & II, American Society of Photogrammetry New York, 1978.
8. Swain & Davis, Remote Sensing; The Quantitative approach, Mc Graw Hill, 1978.
9. Thomas M.Lillesand & Ralph W.Kiefer, Remote Sensing & Image Interpretation, John Wiley & Sons, New York, 1987.
10. Agarwal, A.K., Fundamentals of Global Positioning System.
11. Hufmann Wellerhofb, GPS Theory and Practice, H.Lichtenegger & J.Collins, Springer-wein, New York, 177.
12. Leick.A.GPS Satellite Surveying, 2nd edn., Weily, New York, 1995.
13. Ferguson,M.,GPS Land Navigation, Glanford Publishing, Boise,Idaho, 1997.
14. Ganesh.A and Narayana Kumar R.GPS Principles and Applications, Satish Serial Publishing House, Delhi.

M.Sc. GEOINFORMATICS
SEMESTER- IV

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

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

REFERENCES:

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 (4th 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.
13. C. H. Chen (Edt). – Image Processing for Remote Sensing, CRC Press, Taylor & Francis Group, 2008.

THEORY PAPER-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:

UNIT-III

7. Risk Assessment: Preparedness and Management for various Natural Hazards.
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, 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, 2007.
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.
6. Hewitt K. - Regions of Risk: A Geographical Introduction to Disasters, Longman, London, 1997.
7. Rajib Shaw and R. R. Krishna Murthy (eds) - Disaster Management: Global Challenges and local solutions, University Press, Hyderabad, 2009.
8. D. B. N. Murthy - Disaster Management: Text and Case Studies, Publisher: Deep & Deep Publications.
9. Bergman E. F., Renwick W. H. and Vasantha Kumaran T. - Introduction to Geography: People, Places and Environment, Pearson Education Inc., 2008.
10. John Marshall and R. Alan Plumb – Atmosphere, Oceans and Climate Dynamics, Cambridge, Massachusetts, Elsevier Academic Press, 2008.
11. Bill McGuire, Ian Manson and Christopher Kilburn – Natural Hazards and Environmental Change, Oxford University Press Inc. New York, 2002.
12. John C. Pine – Natural Hazards Analysis: Reducing the Impact of Disasters, CRC Press, Taylor and Francis Group, London, New York. 2008.
13. Dr. Peter van Oosterom, Dr. Sikya Zlatanova and Elfiede M. Fendel (Ed) – Geo-Information for Disaster Management, Springer Berlin Heidelberg, 2005.
14. Damon P. Coppola – Introduction to International Disaster Management (2nd Edition), Eselvier Inc., 2011.
15. Virtual University for Small States of Common Wealth – Introduction to Disaster Management (Version 1.0), Common Wealth of Learning.

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

UNIT-I

1. Information Technology Meaning, Scope & Developments in I.T.
2. Information Systems: Concepts & Overview, Components of Information System, Design Analysis & Management.
3. MIS and Business Community: Structure and Linkages.

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, and Data Design Issues & Output Designs.
6. Data Management: Data vs Information vs Knowledge, Knowledge Management and Efficiency to Utilize the Data for Decision Making.

UNIT-III

7. Internet & Information Management: Internet, Intranet & Extranet.
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 – Library Resource Information - Systems, Human Information Systems.
11. Security Failure and Future of MIS: Formal, Informal and Technical Security Aspects, Cyber Crime in Information Age.
12. Information Decision Support System, Knowledge based Search Process.

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.

Elective (Discipline Centric)

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

UNIT-I

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

UNIT-II

4. Hyderabad Urban Structure: Land use dynamics
5. Infrastructure – utility mapping – process and change analysis – 2D and 3D
6. CBD – urban density – fringe dynamics – slums – urban sprawl.

UNIT-III

7. Hyderabad Urban Administration-GIS (GHMC & HMDA): Municipal and local administration – electoral application
8. Solid waste management – water supply and sanitation – recreation site identification – property tax – tax assessment
9. Network analysis – optimum route/ shortest route –traffic and parking studies – accident analysis – vehicle tracking - case studies.

UNIT-IV

10. Urban Modelling: Urban Growth Modelling
11. Expert Systems in Planning – Environmental quality – crime mapping – location based services (LBS)
12. 3D city modelling and applications.

References:

1. Harold Carter., (1995) The Study of Urban Geography, Arnold, A Division of Hodder Headline, PLC, London.
2. Jean-Paul Donnay, Mike J Barnsley and Paul A Longley., (2001) Remote Sensing and Urban Analysis. Taylor and Francis, London.
3. Fleming, Cory, (2005), The GIS Guide for Local Government Officials, International City/County Management association(ICMA),ESRI Press, Redlands, California
4. Sokhi B S and Rashid S M., (1999) Remote Sensing of Urban Environment. Manak Publications Private Limited.
5. William E Huxhold., (1991) An Introduction to Urban Geographic Information Systems. Oxford University Press.
6. Timothy.L.N and Piotr Jankowski., (2010) Regional and Urban GIS A Decision Support Approach, The Guilford press, New York
7. Nyerges and Jankowski, (2010) Regional and Urban GIS: A Decision Support Approach, Rawat Publication, Jaipur

Elective (Discipline Centric)

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

UNIT-I **(4 Credits)**

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

UNIT-II

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

UNIT-III

7. Role of Remote Sensing for Rural Problems Monitoring: LULC Mapping, Topographic Evaluation, Resource Availability and Distribution, Change Detection.
8. Role of GIS Technologies for Rural Development Planning: Agriculture, Irrigation, Watershed, Drinking Water Supply, Power Distribution Network, Literacy Assessment, Health Welfare Monitoring and Planning, Transportation Network Modeling, Strategic Market Information Management, GIS Technology as a DSS for Rural Development Planning.
9. Rural Land Management and Recreation of Land Parcels.

UNIT-IV

10. Rural Development – Problems, Basic needs: Housing, Health, Education, Nutrition, Water Supply.
11. Rural Resource Utilization, Ecological and Environmental issues. Rural Unemployment and Poverty.
12. Geoinformatics for Precision Farming: Importance and relevance to Indian Agriculture.

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.

Elective (Discipline Centric)

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

(4 Credits)

UNIT – I

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

UNIT - II

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

UNIT - II

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

UNIT - II

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

REFERENCES:

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

PRACTICAL PAPER-I (GI-451P)

IMAGE ANALYSIS **(4 Credits)**

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

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.

(GI-456P)

PROJECT (Dissertation and Viva Voce)

No. of Credits: 4

S.No.	Topics to be covered
1	Problem identification and literature review
2	Data acquisition / collection
3	Field work
4	Data processing
5	Results and interpretation
6	Report writing
7	Presentation