UNIVERSITY OF KALYANI

Syllabus for B.A./B.Sc. (Honours) Course

in

Geography

According to the

Choice Based Credit System (CBCS)

&

Semester System: I-VI

WITH EFFECT FROM THE ACADEMIC SESSION

2018-2019

COURSE STRUCTURE UNDER CHOICE BASED CREDIT SYSTEM FOR B.A./B.Sc. HONOURS COURSE IN GEOGRAPHY

Semester-wise course structure

(6 Credit: 75 Marks)

SEMESTER-I				
Course Code	**Course Nature**	**Course Title**	**Course wise Class (L+T+P)**	**Credit**
GEO/H/CC/T/01	Core	GEOTECTONICS AND GEOMORPHOLOGY	75L+15T	6
GEO/H/CC/T/02	Core	CARTOGRAPHIC TECHNIQUES AND GEOLOGICAL MAP STUDY	60T	4
GEO/H/CC/P/02			60P	2
GEO/H/GE/T/01/A or GEO/H/GE/T/01/B	GE	DISASTER MANAGEMENT **OR** GEOGRAPHY OF TOURISM	75L+15T	6
-	AECC	Environmental studies	-	2
Total		**4 courses**	**-**	**20**
SEMESTER-II				
Course Code	**Course Nature**	**Course Title**	**Course wise Class (L+T+P)**	**Credit**
GEO/H/CC/T/03	Core	HUMAN GEOGRAPHY	75L+15T	6
GEO/H/CC/T/04	Core	CARTOGRAMS, SURVEY AND THEMATIC MAPPING	60T	4
GEO/H/CC/P/04			60P	2
GEO/H/GE/T/02/A or GEO/H/GE/T/02/B	GE	GEOSPATIAL TECHNOLOGY **OR** REGIONAL DEVELOPMENT	75L+15T	6
-	AECC	Communicative English/ MIL	-	2
Total		**4 courses**	**-**	**20**
SEMESTER-III				
Course Code	**Course Nature**	**Course Title**	**Course wise Class (L+T+P)**	**Credit**
GEO/H/CC/T/05	Core	CLIMATOLOGY	75L+15T	6
GEO/H/CC/T/06	Core	STATISTICAL METHODS IN GEOGRAPHY	60T	4
GEO/H/CC/P/06			60P	2
GEO/H/CC/T/07	Core	GEOGRAPHY OF INDIA	75L+15T	6
GEO/H/GE/T/03/A or GEO/H/GE/T/03/B	GE	CLIMATE CHANGE: VULNERABILITY AND ADAPTATION **OR** RURAL DEVELOPMENT	75L+15T	6
GEO/H/SEC/P/01/A or GEO/H/SEC/P/01/B	SEC	COMPUTER BASIC AND COMPUTER APPLICATIONS **OR** REMOTE SENSING	60P	2
Total		**5 courses**	**-**	**26**

COURSE STRUCTURE UNDER CHOICE BASED CREDIT SYSTEM FOR B.A./B.Sc. HONOURS COURSE IN GEOGRAPHY

Semester-wise course structure

(6 Credit: 75 Marks)

SEMESTER-IV				
Course Code	**Course Nature**	**Course Title**	**Course wise Class (L+T+P)**	**Credit**
GEO/H/CC/T/08	Core	REGIONAL PLANNING AND DEVELOPMENT	75L+15T	6
GEO/H/CC/T/09	Core	ECONOMIC GEOGRAPHY	75L+15T	6
GEO/H/CC/T/10	Core	ENVIRONMENTAL GEOGRAPHY	60T	4
GEO/H/CC/P/10			60P	2
GEO/H/GE/T/04/A or GEO/H/GE/T/04/B	GE	INDUSTRIAL GEOGRAPHY **OR** SUSTAINABLE DEVELOPMENT	75L+15T	6
GEO/H/SEC/P/02/A or GEO/H/SEC/P/02/B	SEC	ADVANCE SPATIAL STATISTICAL TECHNIQUES **OR** FIELD WORK	60P	2
Total		**5 courses**	**-**	**26**
SEMESTER-V				
Course Code	**Course Nature**	**Course Title**	**Course wise Class (L+T+P)**	**Credit**
GEO/H/CC/T/11	Core	RESEARCH METHODOLOGY AND FIELD WORK	60T	4
GEO/H/CC/P/11			60P	2
GEO/H/CC/T/12	Core	REMOTE SENSING AND GIS	60T	4
GEO/H/CC/P/12			60P	2
GEO/H/DSE/T/01/A or GEO/H/DSE/T/01/B	DSE	URBAN GEOGRAPHY **OR** CULTURAL AND SETTLEMENT GEOGRAPHY	75L+15T	6x2=12
GEO/H/DSE/T/02/A or GEO/H/DSE/T/02/B	DSE	POPULATION GEOGRAPHY **OR** SOCIAL GEOGRAPHY	75L+15T	
Total		**4 courses**	**-**	**24**
SEMESTER-VI				
Course Code	**Course Nature**	**Course Title**	**Course wise Class (L+T+P)**	**Credit**
GEO/H/CC/T/13	Core	EVOLUTION OF GEOGRAPHICAL THOUGHTS	75L+15T	6
GEO/H/CC/T/14	Core	DISASTER MANAGEMENT	60T	4
GEO/H/CC/P/14			60P	2
GEO/H/DSE/T/03/A or GEO/H/DSE/T/03/B	DSE	FLUVIAL GEOMORPHOLOGY **OR** RESOURCE GEOGRAPHY	75L+15T	6x2=12
GEO/H/DSE/T/04/A or GEO/H/DSE/T/04/B	DSE	SOIL AND BIO GEOGRAPHY **OR** AGRICULTURAL GEOGRAPHY	75L+15T	
Total		**4 courses**	**-**	**24**
Total (All semesters)		***26 courses***	**-**	***140***

B.A./B.Sc. (Honours) Course in Geography

SEMESTER-I

CORE COURSE (CC):

GEO/H/CC/T/01: (Theory): Geotectonics and Geomorphology **6 Credits**

Unit-1: Geotectonics **2 Credits**

1. Earth's tectonic and structural evolution with reference to geological time scale
2. Earth's interior with special reference to seismology
3. Concept of Isostasy: Theories of Airy and Pratt
4. Earth movements: Plate tectonics; Types of folds and faults; Earthquakes and Volcanoes

Unit-2: Geomorphology **4 Credits**

1. Geomorphology: Nature and Scope
2. Degradation processes: Weathering; Mass wasting and resultant landforms
3. Models of landscape evolution: Views of Davis, Penck, King and Hack
4. Development of river network and landforms on uniclinal and folded structures
5. Evolution of Landforms (Erosional and Depositional): Fluvial, Karst, Aeolian, Glacial and Coastal

Reference Books:

- Bloom, A. L., 2001: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi
- Bridges, E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge
- Christopherson, R. W., 2011: Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
- Kale, V. S., and Gupta, A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad
- Knighton, A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London
- Selby, M. J., 2005: Earth's Changing Surface, Indian Edition, OUP
- Singh, S. 1998: Geomorphology, Prayag Pustak, Allahabad
- Skinner, B. J., and Stephen, C. P., 2000: The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons
- Thornbury, W. D., 1969: Principles of Geomorphology, Wiley

CC/02: Cartographic Techniques and Geological Map Study **6 Credits**

GEO/H/CC/T/02: (Theory): Cartographic Techniques and Geological Map Study
4 Credits

1. Cartography: Nature and Scope
2. Maps: Classification and Types; Components of a Map
3. Concept of Scales: Linear, Comparative, Diagonal and Vernier
4. Coordinate Systems: Polar and Rectangular; Concept of Geoid and Spheroid; Map Projections: Classification, Properties and Uses; Concept and Significance of UTM Projection
5. Survey of India Topographical Maps: Reference Scheme of Old and Open series
6. Types of Rocks and Minerals; Characteristics of Granite, Basalt, Dolerite, Pegmatite, Gneiss, Shale, Sandstone, Slate, Marble, Quartzite, Quartz, Feldspar, Mica, Limestone, Calcite, Bauxite, Magnetite, Hematite, Galena (using samples of rocks and minerals)
7. Concept of Bedding Plane, Unconformity and Non-conformity, Thickness of Bed, Dip, Throw, Hade, Heave

GEO/H/CC/P/02: (Practical): Cartographic Techniques and Geological Map Study
2 Credits

1. Construction of Scales: Linear, Comparative, Diagonal and Vernier
2. Construction of Projections: Polar Zenithal Stereographic Projection, Simple Conical with One Standard Parallel Projection, Bonne's Projection and Mercator's Projection
3. Construction and Interpretation of Relief Profiles (Superimposed, Projected and Composite), Preparation of Relative Relief Map, Average Slope Map (Wentworth Method), and Stream Ordering (After Strahler) on a Drainage Basin
4. Transect chart: Relation between physical and cultural features from topographical maps (Survey of India)
5. Geological Map (Problems related to Horizontal, Uniclinal, Folded and Faulted Structure); Drawing of Geological Section and Interpretation of the Map

***A Project File of exercises consisting of each theme is to be submitted**

Reference Books:

- Anson, R., and Ormelling, F. J., 1994: International Cartographic Association: Basic Cartographic Vol., Pregmen Press
- Gupta, K. K., and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi
- Mishra, R. P., and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi
- Monkhouse, F. J., and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London
- Robinson, A. H., 2009: Elements of Cartography, John Wiley and Sons, New York
- Sarkar, A. 2015: Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- Singh, R. L., and Singh, R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers

Generic Elective (GE):

[For Students other than Geography Honours]

GE/01: Disaster Management or Geography of Tourism — 6 Credits

GEO/H/GE/T/01/A: (Theory): Disaster Management — 6Credits

1. Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification of hazards
2. Disasters in India: (a) Flood: Causes, Impact, Distribution and Mapping; Landslide: Causes, Impact, Distribution and Mapping; Drought: Causes, Impact, Distribution and Mapping
3. Disasters in India: (b) Earthquake and Tsunami: Causes, Impact, Distribution and Mapping; Cyclone: Causes, Impact, Distribution and Mapping.
4. Manmade disasters: Causes, Impact, Distribution and Mapping of Soil erosion and Accidental release of toxic chemicals
5. Response and Mitigation to Disasters: Institutional set up, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During and Post Disasters

Reference Books:

- Government of India., 1997: Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
- Kapur, A., 2010: Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S., 2010: Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
- Singh Jagbir., 2007: "Disaster Management Future Challenges and Oppurtunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
- Singh, R. B. (ed.), 2006: Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
- Singh, R.B., 2005: Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
- Sinha, A., 2001: Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
- Stoltman, J.P. et al., 2004: International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.

OR

GEO/H/GE/T/01/B: (Theory): Geography of Tourism **6 Credits**

1. Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson
2. Types of Tourism: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage
3. Recent Trends of Tourism: International and Regional; Domestic (India); Eco-Tourism, Sustainable Tourism, Meetings, Incentives, Conventions and Exhibitions (MICE)
4. Impact of Tourism: Economy; Environment; Society
5. Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; National Tourism Policy

Reference Books:

- Dhar, P.N., 2006: International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
- Hall, M. and Stephen, P., 2006: Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
- Kamra, K. K. and Chand, M., 2007: Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
- Page, S. J., 2011: Tourism Management: An Introduction, Butterworth-Heinemann-USA. Chapter 2.
- Raj, R. and Nigel, D., 2007: Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
- Singh Jagbir., 2014: "Eco-Tourism" Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
- Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow

SEMESTER-II

CORE COURSE (CC):

GEO/H/CC/T/03 : (Theory): Human Geography **6 Credits**

Unit-1: Nature and Principles **2 Credits**

1. Introduction: Defining Human Geography; Major Themes; Contemporary Relevance
2. Evolution of Humans; Concept of Race and Ethnicity; Major Racial Groups of the World
3. Space, Society and Cultural Regions (Language and Religion)
4. Concept: Culture, Cultural Diffusion, Community, Society, Cultural Realms

Unit-2: Society, Demography and Ekistics **4 Credits**

1. Evolution of Human Society: Hunting and Gathering, Pastoral Nomadism, Subsistence Farming, Industrial and Urban Society
2. Population Growth and Distribution, Population Composition; Demographic Transition Model
3. Population–Resource Regions (Ackerman)
4. Population and Environment Relations with special reference to Development–Environment Conflict
5. Social Morphology and Rural House Types in India
6. Types and Patterns of Rural Settlements
7. Functional Classification of Urban Settlements
8. Trends and Pattern of World Urbanization

Reference Books:

- Bergman, E. F., 1995: Human Geography-Culture, Connections and Landscape, Prentice Hall, New Jersey
- Chandna, R. C., 2016: Geography of Population- Concepts, Dterminants and Patterns, Kalyani publishers
- Chisholm, 1975: Human Geography, Penguin Books, Hermondsworth
- Daniel, P. A., and Hopkinson, M. F., 1989: The Geography of Settlement, Oliver & Boyd, London
- Hussain, M., 2011: Human Geography, Rawat publication, Jaipur
- Johnston, R., Gregory, D., Pratt, G. et al., 2008: The Dictionary of Human Geography, Blackwell Publication
- Jordan-Bychkov, et al., 2006: The Human Mosaic: A Thematic Introduction to Cultural Geography, W. H. Freeman and Company, New York
- Pearce, D., 1995: Tourism Today: A Geographical Analysis, 2nd edition, Longman Scientific & Technical, London
- Pickering, K., and Owen, A. A., 1997: An Introduction to Global Environmental Issues, 2nd edition, Rutledge, London
- Raw, M., 1986: Understanding Human Geography: A Practical Approach, Bell and Hyman. London
- Rubenstein, J. M., 2002: The Cultural Landscape, 7th edition, Prentice Hall, Englewood Cliffs
- Smith, D. M., 1982: Human Geography: A Welfare Approach, Edward Arnold, London

CC/04: Cartograms, Survey and Thematic Mapping **6 Credits**

GEO/H/CC/T/04: (Theory): Cartograms, Survey and Thematic Mapping **4 Credits**

1. Concepts of Cartograms and Thematic Maps
2. Concept and Utility of Isopleth and Choropleth
3. Concept, utility and Interpretation of: Climograph, Hythergraph and Ergograph
4. Preparation and Interpretation of Demographic Charts and Diagrams (Age-Sex Pyramid)
5. Concepts of Bearing: Magnetic and True, Whole-circle and Reduced
6. Basic Concepts of Surveying and Survey Equipments: Abneys Level, Clinometer
7. Basic Concepts of Surveying and Survey Equipments: Prismatic Compass, Dumpy Level, Transit Theodolite
8. Interpretation of Landuse and landcover maps

GEO/H/CC/P/04: (Practical): Cartograms, Survey and Thematic Mapping **2 Credits**

1. Diagrammatic Representation of Data: Star and Age-sex Pyramid Diagram, Pie Diagram
2. Representation of Data on Map by Proportional Circles, Dots and Spheres, Isolines and Choropleth method
3. Survey: Traversing by Prismatic Compass and Dumpy Level with One Change Point (Profile Drawing)
4. Determination of Height of Objects using Transit Theodolite (Accessible bases)

***A Project File of exercises consisting of each theme is to be submitted**

Reference Books:

- Cuff, J. D., and Mattson, M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books
- Dent, B. D., Torguson, J. S., and Holder, T. W., 2008: Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education
- Gupta, K. K., and Tyagi, V. C., 1992: Working with Maps, Survey of India, DST, New Delhi
- Kraak, M.-J., and Ormeling, F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall
- Mishra, R. P., and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi
- Singh, R. L., and Singh, R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers
- Slocum, T. A., Mcmaster, R. B., and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall
- Tyner, J. A., 2010: Principles of Map Design, The Guilford Press
- Sarkar, A., 2015: Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

Generic Elective (GE):

[For Students other than Geography Honours]

GE/2: Geospatial Technology or Regional Development **6 Credits**

GEO/H/GE/T/02/A: (Theory): Geospatial Technology **6 Credits**

1. Definition, scope and historical development of geospatial technology
2. Concepts of spheroid, ellipsoid and projection systems. Significance of WGS 84 and UTM
3. Data types and structures in spatial technology
4. Classification of Remote Sensing platforms, sensors and resolution. IRS (Resourcesat and Cartosat) and Landsat systems
5. Concept and function of GPS, DGPS and Total Station
6. Functions of Spatial information system: Information retrieval; Topological modeling; Networks; Overlay; Data output
7. Visual and Digital techniques of image interpretation
8. Development of web-based spatial platforms with reference to Bhuvan and Google Earth
9. Application of Geospatial Technology

Reference Books:

- C. D. Tomlin, Geographic Information Systems and Cartographic Modeling, Prentice-Hall, Englewood Cliffs, NJ, 1990. ISBN 0-13-350927-3.
- C. Esperança and H. Samet, An overview of the SAND spatial database system, to appear in Communications of the ACM, 1997. http://www.cs.umd.edu/~hjs/pubs/sandprog.ps.gz
- G. Hjaltason and H. Samet, Ranking in Spatial Databases in Advances in Spatial Databases —4th Symposium, SSD'95, M. J. Egenhofer and J. R. Herring, Eds., Lecture Notes in Computer Science 951, Springer-Verlag, Berlin, 1995, 83-95. http://www.cs.umd.edu/~hjs/pubs/incnear.ps
- H. Samet and W. G. Aref, Spatial Data Models and Query Processing in Modern Database Systems: The Object Model, Interoperability, and Beyond, W. Kim, Ed., Addison-Wesley/ACM Press, 1995, 338-360. http://www.cs.umd.edu/~hjs/pubs/kim2.ps
- H. Samet, Applications of Spatial Data Structures: Computer Graphics, Image Processing, and GIS, Addison-Wesley, Reading, MA, 1990. ISBN 0-201- 50300-0. 6. H. Samet, The Design and Analysis of Spatial Data Structures, Addison-Wesley, Reading, MA, 1990. ISBN 0-201-50255-0.
- H. Samet, Spatial Data Structures in Modern Database Systems: The Object Model, Interoperability, and Beyond, W. Kim, Ed., Addison-Wesley/ACM Press, 1995, 361-385. http://www.cs.umd.edu/~hjs/pubs/kim.ps

OR

GEO/H/GE/T/02/B: (Theory): Regional Development **6 Credits**

1. Definition of Region, Evolution, Types and Need of Regional planning: Formal, Functional and Planning Regions and Regional Development
2. Regional Imbalances and Problems of Functional Regions
3. Choice of a Region for Planning: Characteristics of an Ideal Planning Region; Delineation of Planning Region; Regionalization of India for Planning (Agro Ecological Zones)
4. Strategies/Models for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context; Village Cluster
5. Problem Regions and Regional Planning: Backward Regions and Regional Plans- Special Area Development Plans in India; DVC-The Success Story and the Failures
6. Concept of Human Development and HDI (Human Development Index)

Reference Books:

- Adell, Germán., 1999: Literature Review: Theories and Models Of The Peri-Urban Interface: A Changing Conceptual Landscape, Peri-urban Research Project Team, Development Planning Unit, University College London at
- Bhatt, L.S., 1976: Micro Level Planning in India. KB Publication, Delhi
- Deshpande C. D., 1992: *India: A Regional Interpretation*, ICSSR, New Delhi.
- Dreze J. and A. Sen, Indian Development: Select Regional Perspectives (Oxford: Oxford University Press, 1996).
- Rapley, John., 2007: Understanding Development: Theory and Practice in the 3rd World. Lynne Rienner, London.
- Raza, M., Ed., 1988:. Regional Development. Contributions to Indian Geography. New Delhi, Heritage Publishers.
- Schmidt-Kallert, Einhard., 2005: A Short Introduction to Micro-Regional Planning, Food and Agriculture Organization of the United Nations (FAO) at
- Sdyasuk Galina and P Sengupta., 1967: *Economic Regionalisation of India*, Census of India
- Ses, Amratya., 2000: Development as Freedom. Random House, Toronto

SEMESTER-III

CORE COURSE (CC):

GEO/H/CC/T/05: (Theory): Climatology **6 Credits**

Unit-1: Elements of the Atmosphere **2 Credits**

1. Nature, Composition and Layering of the Atmosphere
2. Insolation: Controlling Factors. Heat Budget of the Atmosphere
3. Temperature: Horizontal and Vertical Distribution; Inversion of Temperature: Types, Causes and Consequences
4. Greenhouse Effect and Importance of Ozone Layer

Unit-2: Atmospheric Phenomena, Climate Change and Climatic Classification

4 Credits

1. Condensation: Processes and Forms; Mechanism of Precipitation: Bergeron-Findeisen Theory, Collision and Coalescence; Forms of Precipitation
2. Air mass: Typology, Origin, Characteristics and Modification
3. Fronts: Warm and Cold; Frontogenesis and Frontolysis
4. Weather: Stability and Instability; Barotropic and Baroclinic Conditions
5. Circulation in the Atmosphere: Planetary Winds; Jet Stream
6. Monsoon Circulation and Mechanism with reference to India
7. Tropical and Mid-latitude Cyclones
8. Climatic Classification after Köppen, Thornthwaite (1931 and 1948)

Reference Books:

- Barry, R. G., and Carleton, A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK
- Barry, R. G., and Chorley, R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York
- Critchfield, H. J., 1987: General Climatology, Prentice-Hall of India, New Delhi
- Lal, D. S., 1993: Climatology, 3rd edition, Chaitanya Pub. House, New Delhi
- Lutgens, F. K., Tarbuck, E. J., and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey
- Oliver, J. E., and Hidore, J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi
- Singh, S., 2013: Climatology, Prayag Pustak Bhawan, Allahabad
- Trewartha, G. T., and Horne L. H., 1980: An Introduction to Climate, McGraw

CC/06: Statistical Methods in Geography **6 Credits**

GEO/H/CC/T/06: (Theory): Statistical Methods in Geography **4 Credits**

Unit-1:

1. Importance and Significance of Statistics in Geography; Discrete and Continuous Data; Population and Samples; Scales of Measurement (Nominal, Ordinal, Interval and Ratio); Sources of Data
2. Collection of Data and Formation of Statistical Tables
3. Sampling: Need, Types, and Significance and Methods of Purposive, Random, Systematic and Stratified
4. Distribution: Frequency, Cumulative Frequency; Probability: Normal Distribution

Unit-2:

1. Central Tendency: Mean, Median, Mode, Partition Values
2. Measures of Dispersion: Range, Mean Deviation, Standard Deviation, Coefficient of Variation
3. Association and Correlation: Rank Correlation, Product Moment Correlation
4. Linear Regression and Time Series Analysis

GEO/H/CC/P/06: (Practical): Statistical Methods in Geography **2 Credits**

1. Construction of Data Matrix with each Row representing an Aerial Unit (Districts / Blocks / Mouzas / Towns) and Corresponding Columns of Relevant Attributes
2. Based on the above, a Frequency Table, Measures of Central Tendency and Dispersion would be Computed and Interpreted
3. Histograms and Frequency Curve would be Prepared on the Dataset
4. Based on the Sample Set and using Two Relevant Attributes, a Scatter Diagram and Regression Line would be Plotted and Residual from Regression would be Mapped with a short Interpretation

***A Project File of exercises consisting of each theme is to be submitted**

Reference Books:

- Berry, B. J. L., and Marble, D. F. (eds.): Spatial Analysis – A Reader in Geography
- Das, N. G., 2017: Statical Methods (combined volumes) Mc.Grew Hill Education
- Ebdon, D., 1977: Statistics in Geography: A Practical Approach
- Hammond, P., and McCullagh, P. S., 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press
- King, L. S., 1969: Statistical Analysis in Geography, Prentice-Hall
- Mahmood, A., 1977: Statistical Methods in Geographical Studies, Concept
- Pal, S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi
- Silk, J., 1979: Statistical Concepts in Geography, Allen and Unwin, London
- Spiegel, M. R.: Statistics, Schaum's Outline Series
- Yeats, M., 1974: An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York

GEO/H/CC/T/07: (Theory): Geography of India **6 Credits**

Unit-1: Geography of India **4 Credits**

1. Physical: Geology and Physiographic Divisions
2. Regionalisation of India: Physiographic (R.L. Sing); Socio-Cultural (Sopher) and Economic (Sengupta)
3. Climate, Soil and Vegetation: Characteristics and Classification
4. Population: Distribution, Growth, Structure and Policy
5. Distribution of Population by Race, Caste, Religion, Language, Tribes
6. Agricultural Regions; Green Revolution and its Consequences
7. Mineral and Power Resources: Distribution and Utilisation of Iron Ore, Coal, Petroleum, Natural Gas
8. Industrial Development: Automobile and Information Technology

Unit 2: Geography of West Bengal **2 Credits**

1. Physical Perspectives: Physiographic Divisions, Forest and Water Resources
2. Population: Growth, Distribution and Human Development
3. Resources: Mining, Agriculture and Industries
4. Regional Development: Darjeeling Hills, Sundarban Delta, Nadia and Murshidabad District

Reference Books:

- Deshpande, C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi
- Dutta, R., and Sundaram, K. P. M., 1999: Indian Economy. S. Chand and Company Limited, New Delhi
- Galina, S., and Sengupta, P., 1967: Economic Regionalisation of India, Census of India
- Johnson, B. L. C., (ed.), 2001: Geographical Dictionary of India, Vision Books, New Delhi
- Khullar, D. R., 2014: India: A Comprehensive Geography, Kalyani publishers
- Mamoria, C. B., 1996: Economic and Commercial Geography of India. Revised edition, Shivlal Aggarwala and Co., Agra
- Mandal, R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective, Vol. 3 – Indian Perspective
- Pathak, C. R., 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata
- Sharma, T. C., 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi
- Sharma, T. C., 2013: Economic Geography of India. Rawat Publication, Jaipur
- Singh, J., 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur
- Singh, R. L., 1971: India: A Regional Geography, National Geographical Society of India
- Spate, O. H. K., and Learmonth, A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen
- Tirtha, R., 2002: Geography of India, Rawat Publs., Jaipur & New Delhi
- Tiwari, R. C., 2007: Geography of India. Prayag Pustak Bhawan, Allahabad

Generic Elective (GE):

[For Students other than Geography Honours]

GE/3: Climate Change: Vulnerability and Adaptation or Rural Development

6 Credits

GEO/H/GE/T/03/A: (Theory): Climate Change: Vulnerability and Adaptation

6 Credits

1. Science of Climate Change: Understanding Climate Change; Green House Gases and Global Warming; Global Climatic Assessment- IPCC Reports
2. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability
3. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health
4. Adaptation and Mitigation: Global Initiatives with Particular Reference to South Asia
5. Key Concepts of National Action Plan of India on Climate Change; Role of Local Institutions (Urban Local Bodies, Panchayats) on Climatic Change Mitigation: Awareness and Action Programmes

Reference Books:

- IPCC. 2007: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
- IPCC. 2014: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- IPCC. 2014: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- OECD. 2008: Climate Change Mitigation: What Do we Do? Organisation and Economic Cooperation and Development.
- Palutikof, J. P., van der Linden, P. J. and Hanson, C. E. (eds.), Cambridge University Press, Cambridge, UK.
- Sen Roy, S. and Singh, R.B., 2002: Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH Pub., New Delhi.
- Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) 2014: Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
- UNEP. 2007: Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.

OR

GEO/H/GE/T/03/B: (Theory): Rural Development **6 Credits**

1. Defining Development: Inter-Dependence of Urban and Rural Sectors of the Economy; Need for Rural Development, Gandhian Approach of Rural Development
2. Rural Economic Base: Panchayatiraj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives, PURA
3. Area Based Approach to Rural Development: Drought Prone Area Programmes, PMGSY
4. Target Group Approach to Rural Development: SJSY, MNREGA, Jan Dhan Yojana and Rural Connectivity
5. Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care and Micro credit

Reference Books:

- Gilg A. W., 1985: *An Introduction to Rural Geography*, Edwin Arnold, London.
- Krishnamurthy, J. 2000: *Rural Development - Problems and Prospects*, Rawat Publs., Jaipur
- Lee D. A. and Chaudhri D. P. (eds.), 1983: *Rural Development and State*, Methuen, London.
- Misra R. P. and Sundaram, K. V. (eds.), 1979: *Rural Area Development: Perspectives and Approaches*, Sterling, New Delhi.
- Misra, R. P. (ed.), 1985: *Rural Development: Capitalist and Socialist Paths*, Vol. 1, Concept, New Delhi.
- Palione M., 1984: *Rural Geography*, Harper and Row, London.
- Ramachandran H. and Guimaraes J.P.C., 1991: *Integrated Rural Development in Asia – Leaning from Recent Experience*, Concept Publishing, New Delhi.
- Robb P. (ed.), 1983: *Rural South Asia: Linkages, Change and Development*, Curzon Press.
- UNAPDI 1986:*Local Level Planning and Rural Development: Alternative Strategies*. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
- Wanmali S., 1992: *Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India*, International Food Policy Research Institute, Washington, D.C.
- Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: *Studies in Village India: Issues in Rural Development*, Concept Publs. Co., New Delhi.

SKILL ENHANCEMENT COURSE (SEC):

GEO/H/SEC/P/01/A: (Practical): Computer Basics and Computer Applications

2 Credits

1. Numbering Systems; Binary Arithmetic
2. Data Computation, Storing and Formatting in Spreadsheets: Computation of Rank, Mean, Median, Mode, Standard Deviation, Moving Averages, Derivation of Correlation, Coefficient of Variation , Regression
3. Preparation of Annoted Diagrams and its Interpretation: Scatter Diagram and Histogram
4. Internet Surfing: Generation and Extraction of Information

***A Project File of exercises consisting of each theme is to be submitted**

Reference Books:

- Bartee, T. C., 1977: Digital Computer Fundamental; McGraw Hill
- Blissmer, 1996: Working with MS Word; Houghton Mifflin Co
- Chauhan, S., Chauhan, A., and Gupta, K., 2006: Fundamental of Computer; Firewall Media
- Flake, L. J., McClintock, C. E., and Turner, S., 1989: Fundamental of Computer Education; Wordsworth Pub. Co
- Johnson, S., 2007: Microsoft Power Point 2007; Pearson Paravia Bruno
- Leon, A., and Leon, M., 1999: A Beginners Guide to Computers, Vikas
- Leon, A., and Leon, M., 1999: Introduction to Computer, USB Publishers' Distributors Ltd
- Leon, A., and Leon, M., 1999: Introduction to Computer, USB Publishers' Distributors Ltd
- Malvino, A. P., Leach, D. P., 1981: Digital Principles and Applications; Tata McGraw Hill
- Mano, M. M., and Kime, C. R., 2004: Logic and Computer Design Fundamental; Prentice Hall
- Rajaraman, V., 2003: Fundamentals of Computer, Prentice Hall Publisher
- Rajaraman, V., 2008: Computer Primer; Prentice Hall of India Pvt. Ltd
- Sarkar, A., and Gupta, S. K., 2002: Elements of computer Science, S Chand and Company, New Delhi
- Sarkar, A., and Gupta, S. K., 2002: Elements of Computer Science, S Chand and Company, New Delhi
- Shepard, A., 2007: Perfect Pages; Shepard Publications
- Tyson, H. L., 2007: Microsoft Word 2007 Bible; John Wiley
- Walkenbach, J., 2007: Excel 2007 Bible; John Wiley

OR

GEO/H/SEC/P/01/B: (Practical): Remote Sensing **2 Credits**

1. Concepts and Principles of Remote Sensing (RS): Classification of RS Satellites and Sensors
2. Sensor Resolutions and Their Application with reference to IRS and Landsat Missions, Image Referencing Schemes and Data Acquisition
3. Preparation of False Colour Composites (FCC) from IRS LISS-III and Landsat TM, Landsat ETM; Principles of Image Rectification and Enhancement
4. Principles of Image Interpretation and Feature Extraction, Preparation of Inventories of Landuse/ landcover Features from Satellite Images

***A Project File of exercises consisting of each theme is to be submitted**

Reference Books:

- Bhatta, B., 2008: Remote Sensing and GIS, Oxford University Press, New Delhi
- Campbell, J. B., 2007: Introduction to Remote Sensing, Guildford Press
- Jensen, J. R., 2005: Introductory Digital Image Processing: A Remote Sensing Perspective, Pearson Prentice-Hall
- Joseph, G., 2005: Fundamentals of Remote Sensing, United Press India
- Li, Z., Chen, J., and Batsavias, E., 2008: Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences CRC Press, Taylor and Francis, London
- Lillesand, T. M., Kiefer, R. W., and Chipman, J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition)
- Mukherjee, S., 2004: Textbook of Environmental Remote Sensing, Macmillan, Delhi
- Nag, P., and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi
- Singh, R. B., and Murai, S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub

SEMESTER-IV

CORE COURSE (CC):

GEO/H/CC/T/08: (Theory): Regional Planning and Development 6 Credits

Unit-I: Regional Planning 2 Credits

1. Concept of region, Types and delineation: Formal, functional and planning regions
2. Types of planning, principles and techniques of regional planning
3. Needs of regional planning, multi level planning in India
4. Concept of metropolitan and urban agglomerations; Regionalisation of India for planning (Agro-Ecological Zones)

Unit-II: Regional Development 4 Credits

1. Development: Meaning, growth versus development
2. Theories and models for regional development: Growth pole model of Perroux; growth foci model in Indian context (R.P. Misra)
3. Theories and models for regional development: Cumulative causation (Myrdal), Core periphery (Hirschman, Rostow and Friedman)
4. Changing concept of development; concept of underdevelopment
5. Concept and indicators of regional imbalances in India
6. Significance of balanced development in India
7. Human development: Significance, Indicators and Measurement

Reference Books:

- Berry, BJ.L. and Horton, F.F. (1970): Geographic Perspectives on Urban Systems. Prentice Hall, New Jersey.
- Bhat L.S. (1972): Regional Planning in India, Statistical Publishing Society
- Blij H. J. De, (1971): Geography: Regions and Concepts, John Wiley and Sons.
- Chand, M and Puri V.K. (1983): Regional planning in India, allied publishers, New Delhi
- Claval P.l, (1998): An Introduction to Regional Geography, Blackwell Publishers, Oxford and Massachusetts.
- Dickinson, R.E. (1964): City and region, Rutledge, London.
- Datta, R. and Sundaraman, K.P.M.(2018): Indian Economy, S.Chand, India.
- Friedmann J. and Alonso W. (1975): Regional Policy - Readings in Theory and Applications, MIT Press, Massachusetts.
- Gore C. G. (1984): Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.

- Gore C. G., Köhler G., Reich U-P. and Ziesemer T. (1996): Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention, Metropolis- Verlag, Marburg.
- Hall, P. (1992): Urban and Regional Planning, Routledge, London.
- Haynes J. (2008): Development Studies, Polity Short Introduction Series.
- Johnson E. A. J. (1970): The Organization of Space in Developing Countries, MIT Press, Massachusetts.
- Kulshetra, S.K., (2012): Urban and Regional Planning in India: A hand book for Professional Practioners, Sage Publication, New Delhi
- Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.
- Misra, R.P, Sundaram K.V, PrakashRao, VLS (1974): Regional Development Planning in India, Vikas publication, New Delhi
- Misra, R.P (1992): Regional Planning: Concepts, techniques, Policies and case Studies, Concept, New Delhi
- Peet R. (1999): Theories of Development, The Guilford Press, New York.
- UNDP Human Development Report, Oxford University Press.
- World Development Report, World Bank, Oxford University Press.

GEO/H/CC/T/09: (Theory): Economic Geography **6 Credits**

Unit-I: Concept **2 Credits**

1. Meaning and approaches to Economic Geography
2. Concept in Economic geography: goods and services production, exchange and consumption
3. Factors influencing location of economic activity and forces of agglomeration
4. Determining factors of transport costs

Unit-II: Economic Activities **4 Credits**

1. Concept and classification of economic activities
2. Location theories with special reference to agriculture (Vonthunen), and industry (Weber)
3. Primary activities: Subsistence and commercial agriculture; forestry (types and management); fishing (distribution of world fishing zones); mining (role of mining in economic development) activity in India
4. Secondary activities: Manufacturing (Cotton textile in India and U.S.A., Iron and steel in India and Japan),
5. Concept of manufacturing region: special economic zones and technology parks
6. Tertiary activities: transport, trade and services
7. Agricultural systems: Case studies of tea plantation in India and mixed farming in Europe
8. Transnational sea-routes; railways and highways with reference to India

Reference Books:

- Alexander J. W. (1963): Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- Bagchi-Sen S. and Smith H. L. (2006): Economic Geography: Past, Present and Future, Taylor and Francis.
- Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. (2000): The Oxford
- Coe N. M., Kelly P. F. and Yeung H. W. (2007): Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
- Combes P., Mayer T. and Thisse J. F. (2008): Economic Geography: The Integration of Regions and Nations, Princeton University Press.
- Durand L. (1961): Economic Geography, Crowell.
- Hodder B. W. and Lee Roger (1974): Economic Geography, Taylor and Francis.
- Wheeler J. O. (1998): Economic Geography, Wiley.
- Willington D. E. (2008): Economic Geography, Husband Press.

GEO/H/CC/T/10: (Theory): Environmental Geography **4 Credits**

1. Environmental Geography: Concept and Scope
2. Perception of environment in different stages of civilization
3. Concept of holistic environment; concept of EIA
4. Ecosystem: concept, structure and functions
5. Environmental pollution and degradation: Land, water and air
6. Environmental issues related to agriculture
7. Urban environmental issues with special reference to waste management
8. Environmental programmes and policies: global (Earth summit, 1992; Montreal and Kyoto protocols), national and local levels.

GEO/H/CC/P/10: (Practical): Environmental Geography **2 Credits**

1. Preparation of questionnaire for perception survey on environmental problems
2. Environmental mapping; Quality assessment of soil using field kit: pH and NPK
3. Interpretation of air quality using CPCB/ WBPCB data
4. A project file consisting of two exercise each is to be submitted.

***A Project File of exercises consisting of each theme is to be submitted**

Reference Books:

- Chandna R. C. (2002): Environmental Geography, Kalyani, Ludhiana.
- Cunninghum W. P. and Cunninghum M. A. (2004): Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
- Goudie A. (2001): The Nature of the Environment, Blackwell, Oxford.
- Singh, R.B. (Eds.) (2009): Biogeography and Biodiversity. Rawat Publication, Jaipur
- Miller G. T. (2004): Environmental Science: Working with the Earth, Thomson BrooksCole, Singapore.
- MoEF, (2006): National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
- Singh, R.B. and Hietala, R. (Eds.) (2014): Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer
- Odum, E. P. et al, (2005): Fundamentals of Ecology, Ceneage Learning India.
- Singh S. (1997): Environmental Geography, Prayag Pustak Bhawan. Allahabad.
- UNEP (2007): Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme.
- Singh, R.B. (1998): Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub.

Generic Elective (GE):

[For Students other than Geography Honours]

GE/04: Industrial Geography or Sustainable Development **6 Credits**

GEO/H/GE/T/04/A: (Theory): Industrial Geography **6 Credits**

1. Nature and Scope of Industrial Geography
2. Classification of Industries; Geographical Characteristics: Small and Medium Industries, Heavy Industries, Agro-based Industries, Footloose Industries
3. Location of Industries: Importance and Weber's Theory of Industrial Location
4. Mega Industrial Complexes: Mumbai-Pune industrial Region, Bengaluru- Chennai Industrial Region, Chota Nagpur Industrial Region
5. Environmental Impact of Industrialisation in India
6. Industrial Policy in India (since 1991)

Reference Book:

- Datta, R. and Sundaraman, K.P.M.(2018): Indian Economy, S.Chand, India.
- Guha, J.L., and Chattaraj, P.R. (1989): A New Approach to Economic Geography; A study of Resources, World press, Kolkata, 8.
- Saxena, A..(1998).Perspectives in Industrial Geography, Concept publication.
- Sharma, T.C. (2013). Economic Geography of India.
- Siddhartha, K. (2016). Economic Geography, Kitab Mahal.
- Smith, D.M. (1971). Industrial Location: An Economic Geographical Analysis, John willey and Sons.
- Yusuf, S. (2010). Changing the Industrial Geography in asia, World Bank Publication.

OR

GEO/H/GE/T/04/B: (Theory): Sustainable Development 6 Credits

1. Sustainable Development: Historical Background, Definition, Components, Limitations
2. Sustainable Regional Development: Needs and significances
3. Inclusive Development: Education and Health
4. Climate change and sustainable development: Policies and global cooperation
5. Poverty and disease; Human right to health; Challenges of Universal Health Coverage
6. Sustainable Development - Policies and Programmes: The proposal for SDGs at Rio+20; Illustrative SDGs; Goal-Based Development
7. Sustainable Development: Financial issues
8. Good Governance for sustainable development
9. National Environmental Policy, Clean development mechanism
10. Sustainable regional resource development and livelihood security

Reference Book:

- Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
- Ayers, Jessica and David Dodman (2010) "Climate change adaptation and development I: the state of the debate". Progress in Development Studies 10 (2): 161-168.
- Baker, Susan (2006) Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "The concept of sustainable development").
- Brosius, Peter (1997) "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology 25: 47-69.
- Lohman, Larry (2003) "Re-imagining the population debate". Corner House Briefing 28.
- Martínez-Alier, Joan et al (2010) "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69: 1741-1747.
- Merchant, Carolyn (Ed.) (1994) Ecology. Atlantic Highlands, N.J: Humanities Press. (Introduction, pp 1-25.)
- Osorio, Leonardo et al (2005) "Debates on sustainable development: towards a holistic view of reality". Environment, Development and Sustainability 7: 501-518.
- Robbins, Paul (2004) Political Ecology: A Critical Introduction. Blackwell Publishing.
- Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.

SKILL ENHANCEMENT COURSE (SEC):

SEC/02: (Practical): Advance Spatial Statistical Techniques or Field Work

GEO/H/SEC/P/02/A: (Practical): Advance Spatial Statistical Techniques 2 Credits

1. Differences between Spatial and Non-spatial data, Nearest Neighbour Analysis
2. Concept of probability and Normal Distribution and their geographical application, Skewness (Pearson's Method)
3. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions, sampling estimates for large and small samples tests involving means and proportions
4. Correlation and Regression Analysis: Rank order correlation and product moment correlation; linear regression, residuals from regression
5. Time Series Analysis: Least Squares, Moving mean method, Time series components

Note: Any statistical software package may be used for practice. A project file consisting of five exercises on the above themes is to be submitted.

Reference Books:

- Bart James E and Gerld M.Barber (1996): Elementary Statistics for Geographers, The Guilford Press, London.
- Eldon, D. (1983): Statistics in Geography: A Practical Approach, Blackwell, London.
- Cressie, N.A.C. (1991): Statistics for Spatial Analysis, Wiley, New York.
- Gregory, S. (1978): Statistical Methods and the Geographer (4th Edition), Longman, London.
- Haining, R.P. (1990): Spatial Data Analysis in the Social and Environmental Science, Cambridge University Press, Cambridge.
- Mc Grew, Jr. and Cahrles, B. M. (1993): An Introduction to Statistical Problem Solving in Geography, W.C. Brocan Publishers, New Jersey.
- Mathews, J.A. (1987): Quantitative and Statistical Approaches to Geography: A Practical Manual Pergamon, Oxford.
- Pal,S.K. (1998): Statistics for Geoscientists: Techniques and Applications, Concept Publishing Company, New Delhi.
- Wei, W.S. (1990): Time Series Analysis: Variate and Multivariate Methods, Addison Wesley Publishing.
- Yeates, Maurice (1974): An Introduction to Quantitative Analysis in Human Geography, Mc Grawhill, New York

OR

GEO/H/SEC/P/02/B: (Practical): Field Work **2 Credits**

Students are required to carry out a comprehensive field work in a village/mouza/town/C.D.Block/ drainage basin selecting a particular **research problem**. There should be a clear-cut **Problem background, major Objectives, Methodology and Findings**. The text of the fieldwork should not exceed 5000 words and 15-20 pages of illustrations (A4 Pages). The fieldwork along with the diagrams and illustrations should be prepared in computer using the standard (Using MS-Word for typing and Excel for calculation and graphs). The cartographic and statistical techniques used in the fieldwork should be at par with the syllabus of the UG Course.

Guidelines for Fieldwork:

The following methods are to be followed for framework:

1. Preparation of questionnaire for assessing the physical/cultural/environment/socio-economic components. A filled-in questionnaire used in the survey should be attached with the report signed by the concerned teacher and the student.
2. Preparation of maps (hand-drawn) with suitable scale and latitude and longitude.
3. Preparation of charts/graphs in MS-Excel and duly labelled.
4. The report should be typed in MS-Word. The font size is fixed at 12 in Times New Roman and the line spacing 1.5.
5. Each field work should have a certificate of authenticity duly signed by the project supervisor.

SEMESTER-V

CORE COURSE (CC):

CC/11: Research Methodology and Field Work **6 Credits**

GEO/H/CC/T/11: (Theory): Research Methodology and Field Work **4 Credits**

Unit-I: Research Methodology **2 Credits**

1. Research in Geography: Meaning, types and significance
2. Significance of literature review and formulation of research design
3. Defining research problem, objectives and hypothesis; Research materials and methods
4. Structure of research report: Title, Acknowledgement, Abstract and Key-words, Introduction, Literature Survey, Methodology, Result and Discussion, Conclusion including Recommendations and Suggestions, References and Bibliography (APA style)

Unit-II: Fieldwork **2 Credits**

1. Fieldwork in Geographical studies – Role and significance; Selection of study area and objectives; Pre-field preparations; Ethics of fieldwork
2. Field techniques and tools: Observation (participant, non participant), questionnaires (open, closed, structured, non-structured); Interview with special reference to focused group discussions
3. Field techniques and tools: Landscape survey using transects and quadrants, relevant constructing sketches, diagrams, photographs and video recording
4. Designing a field report – Aims and Objectives, Methodology, Analysis, Interpretation and Writing the report

Reference Books:

- Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.
- Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
- Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
- Mukherjee, Neela 1993. Participatory Rural Appraisal: Methodology and Application. Concept Publs. Co., New Delhi.
- Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publs. Co., New Delhi
- Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
- Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
- Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
- Wolcott, H. 1995. The Art of Fieldwork. Alta Mira Press, Walnut Creek, CA.

GEO/H/CC/P/11: (Practical): Research Methodology and Field Work 2 Credits

1. Each student will prepare an individual report based on primary data collected from field survey and secondary data collected from different sources for either a rural area (mouza) or an urban area (municipal ward) based on cadastral or municipal maps to study specific problems.
2. The duration of the field work shall not exceed 10 days
3. The report should be hand written in English on A4 size paper in candidate's own words within 5,000 to 8,000 words excluding tables, diagrams, maps, photographs, references and appendices
4. A copy of the bound report on A4 size paper, duly signed by the concerned teacher, should be submitted
    i. Maps and Diagrams not exceeding 20 pages
    ii. Photographs not exceeding 5 pages
    iii. No dry letter to be permitted

Reference Books:

- Monkhouse, F.J. and Williamson, R.H. (1963): Maps and Diagrams: Their Compilation and Construction, Methuen, London
- Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata
- Sarkar, A. (2008): Practical Geography: A Systematic Approach, Orient Black Swan, Kolkata
- Narasinha Murthy, R.L. (2014) Research Methodology in Geography, Concept, New Delhi
- Yeats, M., (1974): An Introduction to Quantitative Analysis in Human Geography.

CC/12: Remote Sensing and GIS **6 Credits**

GEO/H/CC/T/12: (Theory): Remote Sensing and GIS **4 Credits**

Unit-I: Remote Sensing **2 Credits**

1. Definition and stages of Remote Sensing (RS); Platforms and Sensors
2. Sensor resolutions and their applications with reference to IRS and LANDSAT missions, image referencing schemes and data acquisition
3. Aerial Photographs: Types, Geometry and photo interpretation keys; Concept of FCC
4. Principles of Image interpretation (Visual and Digital)

Unit-II: Geographical Information Systems and Global Navigation Satellite System

2 Credits

1. GIS data structures: types (spatial and non - spatial), raster and vector
2. Principles of preparing attributes tables, data manipulation and overlay analysis
3. Principles of GNSS positioning and waypoint collection; Transferring of waypoints to GIS.

Reference Books:

- Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
- Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
- Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
- Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGrawHill.
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

GEO/H/CC/P/12: (Practical): Remote Sensing and GIS **2 Credits**

1. Georeferencing of map
2. Digitisation of features: Point, Line and Polygon
3. Data attachment overlay and preparation of thematic map (bargraph, pie-chart and choropleth)
4. Preparation of FCC using IRS LISS-III and/or LANDSAT (ETM+) data
5. Preparation of LULC map by Supervised Image Classification (Maximum Likelihood) using IRS LISS-III or LANDSAT (ETM+) data

[**Note: Using Q-GIS (open access) software**]

Discipline Specific Elective (DSE):

DSE/01: Urban Geography or Cultural and Settlement Geography **6 Credits**

GEO/H/DSE/T/01/A: (Theory): Urban Geography **6 Credits**

Unit-I **3 Credits**

1. Urban Geography: Nature, Scope, Approaches and recent trends
2. Theories of Urban Morphology: Concentric Zone Theory, Sector Theory and Multiple Nuclei Theory
3. Concept of Hierarchy; Christaller's Central Place Theory
4. Rank Size Rule; The Law of the Primate City
5. Patterns of urbanisation in developed and developing countries

Unit-II **3 Credits**

1. Ecological process of urban growth
2. City Region: Concept, Structure and Characteristics
3. Patterns and trends of urbanization in India
4. Case studies of Delhi, Kolkata with reference to Land use and Urban issues (housing, slum)
5. Urban renewal programme - JNNURM

Reference Books:

- Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
- Graham S. and Marvin S., 2001: Splintering Urbanism: Networked Infrastructures,Technological Mobilities and the Urban Condition, Routledge.
- Hall T., 2006: Urban Geography, Taylor and Francis.
- Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.
- Knox P. L. and McCarthy L., 2005: Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
- Knox P. L. and Pinch S., 2006: Urban Social Geography: An Introduction, Prentice-Hall.
- Pacione M., 2009: Urban Geography: A Global Perspective, Taylor and Francis.
- Sassen S., 2001: The Global City: New York, London and Tokyo, Princeton University Press.
- Ramachandran R., (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
- Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press, Delhi
- Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
- Singh, R.B. (Ed.) (2015) Urban development, challenges, risks and resilience in Asian megacities. Advances in Geographical and Environmental Studies, Springer

OR

GEO/H/DSE/T/01/B: (Theory): Cultural and Settlement Geography 6 Credits

Unit-I: Cultural Geography 3 Credits

1. Definition, Scope and Content of Cultural Geography
2. Development of cultural geography
3. Cultural Hearth and Realm; Cultural diffusion: process and types
4. Cultural segregation and cultural diversity; Culture, technology and development
5. Major racial groups of the world: Distribution and characteristics

Unit-II: Settlement Geography 3 Credits

1. Settlement Geography: Scope and Content
2. Morphology of rural settlements: layout-internal and external
3. Rural house types with reference to India
4. Urban Settlements: Census definitions (Temporal)
5. Urban morphology: Classical models-Burges, Homer Hoyt, Harris and Ullman, Functional classification of cities: Harris, Nelson and McKenzie

Reference Books:

- Banerjee Guha, S. ed (2004): Space, Society & Geography, Rawat Publication, Delhi
- Bardhan, P., 2003, Poverty, age structure & Political Economy in India, Oxford University Press
- Biswas, A.K., Jortajada, C., 2006, Apprising Sustainable development, Oxford University
- Dhanagare, D.N., 2004, Themes and Perspectives in Indian Sociology, Rawat Publication, Delhi
- Dohrs, I., Sommers, L., 1967, Cultural Geography. Thomas Crowell Company
- Fellmann, J.D., Getis, A., Getis, J., 2000, Human Geography-Landscape of Human Activity, McGraw Hill
- Fern, R.L., 2002, Nature, God and Humanity, Cambridge University Press
- Gadhil, M., Guha, R., 2000, The Use and Abuse of Nature, Oxford University Press
- Gregory, D., Urry, J.,1985, Social Relation and Spatial Structure, MacMillan
- Herbert, D.T., Jhonston, R.J., 1982, Geography and Urban Environment. John Willey & Sons
- Hussain, M., 2007, Models in Geography, Rawat Publication
- Jordan, T., Rowntree, L., 1990, human Mosaic, Harper Collins Publishers
- Knox, P., Pinch, S., 2000, Urban Social Geography, Pearson Education
- Mitchell, D. 2000, Cultural Geography- A Critical Introduction, Black well.

DSE/02: Population Geography or Social Geography **6 Credits**

GEO/H/DSE/T/02/A: (Theory): Population Geography **6 Credits**

Unit-I **2 Credits**

1. Development of Population Geography as a field of specialization; Relation between population geography and demography; Sources of population data with special reference to India (Census, Vital statistics and NSS)
2. World patterns determinants of population distribution and growth; Concept of optimum population
3. Demographic Transition Model; Theories of population growth: Malthusian and Marxian theory
4. Population distribution, density and growth profile in India

Unit-II **4 Credits**

1. Population Composition and Characteristics: Age-Sex Pyramid; Female-Male Ratio
2. Determinate measures of Fertility and Mortality
3. Population Composition of India: Rural and Urban, Occupational Structure as per Census of India
4. Migration: Theories, Causes and Types
5. Concept of Human Development Index
6. Population and development: population-resource regions
7. Population policies in Selected Countries: India and China
8. Contemporary Issues in Population: Health and Unemployment

Reference Books:

- Barrett H. R., 1995: Population Geography, Oliver and Boyd.
- Bhende A. and Kanitkar T., 2000: Principles of Population Studies, Himalaya Publishing House.
- Chandna R. C. and Sidhu M. S., 1980: An Introduction to Population Geography, Kalyani Publishers.
- Clarke J. I., 1965: Population Geography, Pergamon Press, Oxford.
- Jones, H. R., 2000: Population Geography, 3rd ed. Paul Chapman, London.
- Lutz W., Warren C. S. and Scherbov S., 2004: The End of the World Population Growth in the 21st Century, Earthscan
- Maurya S D (2009) Jansankya Bhugol, Sharda Putak Bhawan, Allahabad
- Newbold K. B., 2009: Population Geography: Tools and Issues, Rowman and Littlefield Publishers.
- Pacione M., 1986: Population Geography: Progress and Prospect, Taylor and Francis.
- Panda B P (1988): Janasankya Bhugol, M P Hindi Granth Academy,Bhopal
- Wilson M. G. A., 1968: Population Geography, Nelson.

OR

GEO/H/DSE/T/02/B: (Theory): Social Geography **6 Credits**

Unit-I **3 Credits**

1. Social Geography: Nature, Scope and Content
2. Social Groups and Social Behaviour
3. Concept of Social Structure and Process
4. Elements of Social Structure: Caste, Class, Religion, Race
5. Social Stratification in India
6. Contemporary Social-environmental Issues with references to India

Unit-II **3 Credits**

1. Concept of Social Well-being, Quality of Life
2. Indicators of Social Well-being after Knox and Smith
3. Social Geographies of Inclusion and Exclusion
4. Social Pathology: Crime and Violence
5. Social Impact Assessment (SIA): Concept and Importance
6. Social Policies in India: Sarva Shiksha Abhiyan (SSA) and National Rural Health Mission (NRHM)

Reference Books:

- Ahmed A., 1999: Social Geography, Rawat Publications.
- Casino V. J. D., Jr., (2009) Social Geography: A Critical Introduction, Wiley Blackwell.
- Cater J. and Jones T., 2000: Social Geography: An Introduction to Contemporary Issues, Hodder Arnold.
- Holt L., 2011: Geographies of Children, Youth and Families: An International Perspective, Taylor & Francis.
- Panelli R., 2004: Social Geographies: From Difference to Action, Sage.
- Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., 2001: Introducing Social Geographies, Oxford University Press.
- Smith D. M., 1977: Human geography: A Welfare Approach, Edward Arnold, London.
- Smith D. M., 1994: Geography and Social Justice, Blackwell, Oxford.
- Sopher, David (1980): An Exploration of India, Cornell University Press, Ithasa
- Valentine G., 2001: Social Geographies: Space and Society, Prentice Hall

SEMESTER-VI

CORE COURSE (CC):

GEO/H/CC/T/13: (Theory): Evolution of Geographical Thoughts 6 Credits

Unit-I: Nature of Pre Modern Geography 2 Credits

1. Development of Geography and contributions of Greek, Chinese and Indian geographers
2. Impact of 'Dark Age' on Geography and Arab contributions
3. Geography during the Age of 'Discovery' and 'Exploration' (Contributions of Portuguese Voyages, Columbus, Vasco da Gama, Magellen, Thomas Cook)
4. Transition from Cosmography to Scientific Geography (Contributions of Bernard Varenius and Immanuel Kant); Dualism and Dichotomies (General vs. Particular, Physical Vs. Human, Regional vs. Systematic, Determinism vs. Possibilism, Ideographic vs. Nomothetic)

Unit-II: Foundations of Modern Geography and Recent Trends 4 Credits

1. Evolution of Geographical thoughts in Germany, France, Britain and United States of America
2. Contributions of Humbolt and Ritter
3. Contributions of Ratzel, Richthofen and Hettner
4. Schools of Geographical thought: French, British and American
5. Trends of Geography in the post World War-II period
6. Evolution of Geographical thought in India
7. Quantitative Revolution and its impact; the perspectives of Behaviouralism, Systems approach, Radicalism and Feminism in Geography
8. Towards Post Modernism: Changing concept of space in Geography; Geography in the 21st Century

Reference Books:

- Adhikari, S. (2004): Fundamental of Geographical Thought, Orient Blackswan.
- Arentsen M., Stam R. and Thuijis R., 2000: Post-modern Approaches to Space, ebook.
- Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson
- Dikshit R. D., 1997: Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
- Hartshone R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
- Holt-Jensen A., 2011: Geography: History and Its Concepts: A Students Guide, SAGE.
- Hussain, M. (2014): Evolution of Geographical Thought, Rawat
- Johnston R. J., (Ed.): Dictionary of Human Geography, Routledge.
- Johnston R. J., 1997: Geography and Geographers, Anglo-American Human Geography since 1945, Arnold, London.
- Kapur A., 2001: Indian Geography Voice of Concern, Concept Publications.
- Martin Geoffrey J., 2005: All Possible Worlds: A History of Geographical Ideas, Oxford.
- Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.

CC14: Disaster Management **6 Credits**

GEO/H/CC/T/14: (Theory): Disaster Management **4 Credits**

Unit-I: Concepts **2 Credits**

1. Classification of Hazards and Disasters
2. Approaches to hazard study: Risk perception and vulnerability assessment; Hazard paradigms
3. Responses to hazards and disasters: Preparedness, trauma and aftermath; Resilience and capacity building
4. Hazards mapping: Data and techniques

Unit-II: Disaster Case Studies **2 Credits**

1. Earthquake: Factors, vulnerability, consequences and management
2. Landslide: Factors, vulnerability, consequences and management
3. Cyclone: Factors, vulnerability, consequences and management
4. Fire: Factors, vulnerability, consequences and management

Reference Books:

- Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
- Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
- Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
- Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
- Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
- Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.
- Singh Jagbir (2007) "Disaster Management Future Challenges and Oppurtunities", 2007. Publisher- I.K. International Pvt. Ltd. New Delhi.

GEO/H/CC/P/14: (Practical): Disaster Management **2 Credits**

An individual Project Report based on any one case study among the following disasters incorporating a preparedness plan in the vicinity of the candidate's institution or residence:

1. Thunderstorm
2. Landslide
3. Flood
4. Coastal / river bank erosion
5. Fire
6. Industrial accident
7. Structural collapse

Reference Books:

- Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
- Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
- Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
- Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
- Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
- Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.
- Singh Jagbir (2007) "Disaster Management Future Challenges and Oppurtunities", 2007. Publisher- I.K. International Pvt. Ltd. New Delhi.

Discipline Specific Elective (DSE):

DSE/03: Fluvial Geomorphology or Resource Geography **6 Credits**

GEO/H/DSE/T/03/A: (Theory): Fluvial Geomorphology **6 Credits**

1. Scope and significance of Fluvial Geomorphology; Concept of Fluvial Hydrosystem; Geographers approach to study of the rivers
2. Run off: components and controlling factors; Run off cycle
3. Channel pattern: types and controlling factors
4. Drainage basin and its significance as a hydrological unit
5. Linear, areal and altitudinal properties of drainage basin; Horton's stream laws; Hypsometric curve
6. Fluvial landforms: Terraces, alluvial fans, badlands and accretion topography
7. River bank erosion: management and its impact on land use
8. Integrated watershed management: Principles and significance

Reference Books:

- Bloom, A.L. 1998: Geomorphology: A Systematic analysis of Latre Cenozoic Landforms, 3rd Ed, Prentice Hall, Upper Saddle River, New Jersey
- Bridges, E.M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
- Charlton, R. 2016: Fundamentals of Fluvial Geomorphology, 2nd Ed., Routledge, London
- Chorley, R., Schumm, S. and Sugden, D.E. 1994: Geomorphology, Methuen, London
- Chorley, R.J. and Kennedy, B.A. 1971: Physical Geography: A Systems Approach, Prentice Hall, Upper Saddle River, New Jersey
- Faniran, A. and Jeje, L.K. 1983: Humid Tropical Geomorphology, Longman, London
- Goudie, A.S. (ed) 2004: Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge, London
- Gupta, A. 2011: Tropical Geomorphology, Cambridge University Press, Cambridge
- Gupta, A. (ed) 2008: Large Rivers, Willey, New York
- Hugget, R.J. 2011: Fundamentals of Geomorphology, Routledge, New York
- Kale V.S. and Gupta A. 2001: Introduction to Geomorphology, Orient Longman, Hyderabad
- Knighton, D. 1998: Fluvial Forms and Processes: A New Perspective, Arnold, London
- Morisawa, M. 1985: Rivers, Longman, London
- Petts, G.E. and Amoros, C (eds) 1996: Fluvial Hydrosystems, Chapman and Hall, London
- Selby, M.J. 1985: Earth's Changing surface, Oxford University Press, London

OR

GEO/H/DSE/T/03/B: (Theory): Resource Geography **6 Credits**

Unit-I **3 Credits**

1. Natural Resources: Concept and Classification
2. Approaches to resource utilisation :Utilitarian, conservational, community based adaptive
3. Conservation of Natural Resources – Need and Significance
4. Problems of resource depletion - Global scenario (forest, water, fossil fuels)

Unit-II **3 Credits**

1. Distribution, Utilisation, Problems and Management of Metallic Resources: Iron ore, Bauxite
2. Distribution, Utilisation, Problems and Management of Non-Metallic Mineral Resources: Mica, Gypsum
3. Problems and Management of Energy Resources: Conventional and non-conventional
4. Contemporary Energy Crisis and Future Scenario
5. Limits to Growth and Sustainable use of Resources

Reference Books:

- Cutter S. N., Renwich H. L. and Renwick W., 1991: Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resources Use, John Wiley and Sons, New York.
- Gadgil M. and Guha R., 2005: The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity, Oxford University Press. USA.
- Holechek J. L. C., Richard A., Fisher J. T. and Valdez R., 2003: Natural Resources: Ecology, Economics and Policy, Prentice Hall, New Jersey.
- Jones G. and Hollier G., 1997: Resources, Society and Environmental Management, Paul Chapman, London.
- Klee G., 1991: Conservation of Natural Resources, Prentice Hall, Englewood.
- Mather A. S. and Chapman K., 1995: Environmental Resources, John Wiley and Sons, New York.
- Mitchell B., 1997: Resource and Environmental Management, Longman Harlow, England.
- Owen S. and Owen P. L., 1991: Environment, Resources and Conservation, Cambridge University Press, New York.
- Rees J., 1990: Natural Resources: Allocation, Economics and Policy, Routledge. London.

DSE/04: Soil and Bio Geography or Agricultural Geography **6 Credits**

GEO/H/DSE/T/04/A: (Theory): Soil and Bio Geography **6 Credits**

1. Factors of soil formation; Man as an active agent of soil transformation
2. Concept of soil profile; origin and profile characteristics of Lateritic, Podzol and Chernozem soils
3. Definition and significance of soil properties: Texture, structure and moisture
4. Definition and significance of soil properties: pH, organic matter and NPK
5. Soil erosion and degradation: Factors, processes and mitigation measures
6. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification
7. Concepts of ecology, biosphere, ecosystem, biome, ecotone, community
8. Concept of trophic structure, food chain and food web; Energy flow in ecosystems
9. Geographical extent and characteristic features of Tropical rain forest, Taiga and Grassland biomes
10. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen
11. Deforestation: Causes, consequences and management
12. Bio-diversity: Definition, types, threats and conservation measures

Reference Books:

- Biswas, T.D. and Mukherjee, S.K. 1997: Textbook of Soil Science, TataMcGraw Hill
- Brady, N.C. and Weil, R.R. 1996: The Nature and Properties of Soil, 11th edition, Longman, London
- Floth, H.D. 1990: Fundamentals of Soil science, 8th edition, John Wiley and Sons, New York
- Morgen, R.P.C. 1995: Soil Erosion and Conservation, 2nd Edition, Longman, London
- Schwab, G.O., Fangmer, D.D. and Elliot, W.L. 1996: Soil and Water Management Systems, 4th edition, Jhon Eiley and sons Inc., New York
- Young, A. 2000: Land Resource: Now and Future, Cambridge University Press, Cambridge: 332p.
- Chapman, J.L. and Rens, M.J. 1993: Ecology: Principle and Applications, Cambridge University Press, Cambridge
- Chairas, D.D. Reganold, J.P. and Owen, O.S. 2002: National Resource Conservation and management for a Sustainable future, 8th edition, Prentice Hall, Lo-glewood cliffs
- Huggett, R. 1998: Fundamentals of Biogeography, Routledge, London
- Kormondy, E.J. 1996: Concept of Ecology, 4th edition, Prentice-Hall, India, New Delhi
- Myers, A.A. and Giller, P.S. (editors) 1998: Analytical Biogeography: an Integrated Approach to Study and Plant Distribution. Chapman and Hall, London

OR

GEO/H/DSE/T/04/B: (Theory): Agricultural Geography **6 Credits**

Unit-I **2 Credits**

1. Progress of Agricultural Geography with reference to allied disciplines; Approaches to study of Agricultural Geography
2. Origin and dispersal of agriculture; Role of agriculture on human society
3. Factors affecting agriculture; Classification of world agricultural systems
4. Location and characteristics of major agricultural types: Intensive subsistence, Extensive commercial and Plantation agriculture.

Unit-II **4 Credits**

1. Concept of cropping pattern, crop combination, gross and net cropped area, crop rotation
2. A critical review and contemporary perspective of Von Thunen's model
3. Definition and factors affecting yield; Measures of agricultural productivity
4. Role of irrigation in agriculture with special reference to India
5. Problems of agriculture with special reference to South Asian Countries
6. World patterns of agricultural production and food security
7. Land use survey and land classification (USDA)
8. Globalization and Agriculture with special reference to India

Reference Books:

- Basu, D.N., and Guha, G.S., 1996: Agro-Climatic Regional Planning in India, Vol.I & II, Concept Publication, New Delhi.
- Bryant, C.R., Johnston, T.R, 1992: Agriculture in the City Countryside, Belhaven Press, London.
- Burger, A., 1994: Agriculture of the World, Aldershot, Avebury.
- Grigg, D.B., 1984: Introduction to Agricultural Geography, Hutchinson, London.
- Hussain, M. (1996): Systematic Agricultural Geography, Rawat Publication
- Ilbery B. W., 1985: Agricultural Geography: A Social and Economic Analysis, Oxford University Press.
- Mohammad, N., 1992: New Dimension in Agriculture Geography, Vol. I to VIII, Concept Pub., New Delhi.
- Morgan, G.C. and Leong, G.C. (1982): Human and Economic Geography, Oxford University Press.
- Roling, N.G., and Wageruters, M.A.E., (ed.) 1998: Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge.
- Shafi, M., 2006: Agricultural Geography, Doring Kindersley India Pvt. Ltd., New Delhi
- Singh, J., and Dhillon, S.S., 1984: Agricultural Geography, Tata McGraw Hill, New Delhi.
- Tarrant J. R., 1973: Agricultural Geography, David and Charles, Devon.