

COTTON COLLEGE STATE UNIVERSITY

DEPARTMENT OF GEOGRAPHY

Postgraduate Geography Syllabus

DISTRIBUTION OF PAPERS/CREDITS (L+T+P format)

Semester – I

Paper Code	Paper Name	Credits
GPH 701C	Geomorphology	3 + 1 + 0
GPH 702C	Population and Settlement Geography	3 + 1 + 0
GPH 703C	Geographic Thought: History of Development and Contemporary Issues	3 + 1 + 0
GPH 704C	Cartographic Methods	2 + 1 + 1
Department will choose one of the following three elective papers		
GPH 705E	Environment and Development	2 + 1 + 0
GPH 706E	Water Resources	2 + 1 + 0
GPH 707E	Cartography and Geographical Information Systems	2 + 1 + 0

Semester – II

Paper Code	Paper Name	Credits
GPH 801C	Climatology	3 + 1 + 0
GPH 802C	Regional Geography of India	3 + 1 + 0
GPH 803C	Field and Instrumental Survey	2 + 1 + 1
GPH 804C	Quantitative Methods in Geography	2 + 1 + 1
Department will choose one of the following three elective papers		
GPH 805E	Geography in Tourism	2 + 1 + 0
GPH 806E	Natural Hazards and Disasters	2 + 1 + 0
GPH 807E	Natural Resource Management	2 + 1 + 0

Semester – III

Paper Code	Paper Name	Credits
GPH 901C	Soil and Biogeography	3 + 1 + 0
GPH 902C	Economic Geography	3 + 1 + 0
GPH 903C	Research Methodology in Geography	3 + 1 + 0
GPH 904C	Fundamentals of Geoinformatics	2 + 1 + 1
Department will choose one of the following three elective papers		
GPH 905E	Basic Foundations of Cartography	2 + 1 + 0
GPH 906E	Theoretical Basis of Agricultural Geography	2 + 1 + 0
GPH 907E	Drainage Basin Analysis and Hydrology	2 + 1 + 0
GPH 908E	Remote Sensing Principles and Techniques	2 + 1 + 0
GPH 909E	Basis of Regional Planning and Development	2 + 1 + 0
GPH 910E	Conceptual and Theoretical Framework of Social Geography	2 + 1 + 0

Semester – IV

Paper Code	Paper Name	Credits
GPH 1001C	Geography and Development of Northeast India	3 + 1 + 0
GPH 1002C	Cultural and Political Geography	3 + 1 + 0
GPH 1003C	Contemporary Issues in Human Geography	3 + 1 + 0
GPH 1004C	Dissertation on Special Papers	0 + 0 + 4
Department will choose one of the following three elective papers		
GPH 1005E	Modern Cartographic Techniques	2 + 1 + 0
GPH 1006E	Agricultural Geography of India	2 + 1 + 0
GPH 1007E	Channel Form and Processes	2 + 1 + 0
GPH 1008E	Principles and Applications GIS and GPS	2 + 1 + 0
GPH 1009E	Regional and Global Perspective of Development	2 + 1 + 0
GPH 1010E	Social Geography of India	2 + 1 + 0

M. A. / M. Sc. Programme in Geography of Cotton College State University comprises 20 courses, out of which 16 core courses (4 courses in each semester), and 2 courses as electives (one course each in 1st and 2nd Semester) and 2 courses as special papers (one course each in 3rd and 4th Semester). Core courses are of 4 credits and electives and special papers are of 3 credits, totalling 76 credits for the two year programme distributed in 4 semesters.

The two elective courses one each in 1st and 2nd Semester is open to the students of other disciplines also, the students of Geography may opt these elective courses or other courses in various disciplines in lieu of these two, which are relevant to their needs. There are 2 special papers to be chosen by the students of Geography from various options, one each in 3rd and 4th Semester. To make any special paper operational in the department, there should not be less than a group of 6 (six) students in each option of these special papers.

In the case of elective papers (of Semester-1 and Semester-2), initially one course out of the given three will be selected by the department to make it operational for the students of Geography and other disciplines. Hence for the geography students, the courses of 76 credits are compulsory out of which the courses of 6 credits are interdisciplinary in nature offered within or outside the department. These 6 credits courses with 3 credits in each semester are confined in the 1st and 2nd semester only.

The contact hours with the students by the teachers will be 240 hours per semester or 15 hours per week.

The elective and special papers will have various options. Initially 3 options are given for elective papers in the 1st Semester and 3 options for elective papers in the 2nd Semester. These options are likely to increase in future depending upon the availability of expertise and infrastructural facilities available in the University to cater the needs of interdisciplinary studies on emerging issues on various earth systems, climate change, environment, resources, development and social problems. Similarly, few options are available for the special papers in the 3rd and 4th semester and a dissertation on the respective papers in the 4th semester.

The course structure of each semester, followed by course outline and reading list are furnished below:-

SEMESTER-I

Paper: GPH 701C

GEOMORPHOLOGY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (8 lectures)

History of development of geomorphic ideas; Recent trends in geomorphology; Systems approach in geomorphology; Concepts of steady state, dynamic equilibrium and threshold.

UNIT II: (10 lectures)

Geomorphic processes: endogenetic and exogenetic; Mechanics of erosion, transportation, deposition and associated landforms in glacial, fluvial and aeolian environments; Morphogenetic regions.

UNIT III: (8 lectures)

Forces of crustal instability, Isostasy and Himalayan orogeny.

UNIT IV: (8 lectures)

Development of slopes: Slope elements and facets, slope forming processes and slope forms; Models of slope development- Slope decline, Slope replacement and Parallel retreat.

UNIT V: (8 lectures)

Applied Geomorphology: Palaeogeomorphology, Hydro-geomorphology, Environmental Geomorphology and Geomorphic hazards.

UNIT VI: (6 lectures)

Application of Geoinformatics in Geomorphology.

SUGGESTED READING LIST :

1. Bloom, Arthur L., 1978: *Geomorphology - A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Englewood Cliffs, New Jersey.
2. Dayal, P., 1996: *A Textbook of Geomorphology* (2nd edition), Shukla Book Depot, Patna
3. Embelton, C, Brunsden, D, and Jones, D.K.C., (ed), 1978: *Geomorphology: Present Problems and Future Prospects*, Oxford University Press, London.
4. Embleton, C. and Thorns, J. 1982: *Processes in Geomorphology*, Arnold Heinemann, First Indian Edition.
5. Engeln, O. D. Von, 1942: *Geomorphology*, McMillan, London.
6. Gregory, K.J., 1985: *The Nature of Physical Geography*, Edward Arnold, London.
7. Hart, M. G., 1986: *Geomorphology: Pure and Applied*, Allen & Unwin (Publishers), London.
8. Holmes, A., 1968: *Principles of Physical Geology*, Nelson, London.
9. Jensen, J. R., 2011: *Remote Sensing of the Environment – An Earth Resource Perspective*, 3rd Impression, **Chapter-14**, Pearson, New Delhi.
10. Penck, W., 1924: *Morphological Analysis of Landforms*, Mc Millan, London.
11. Sharma, V. K., 1986: *Geomorphology, Earth Surface Processes and Forms*, Tata Mc Graw Hill, New Delhi.
12. Steers, J. A., 1958: *The Unstable Earth*, Methuen, London.
13. Strahler, A.N., 1969: *Physical Geography*, 3rd edition, Wiley.

14. Thornbury, W. D. 1969: *Principles of Geomorphology*, 2nd ed., Wiley International Edition, Wiley Eastern Reprint.
15. Young, A., 1972: *Slope*, Longman, New York, Oliver and Boyd, Edinburgh.

FURTHER READINGS:

1. Ahmad, E., 1985: *Geomorphology*, Kalyani Publishers, New Delhi.
2. Chorley, Richard J., 1972: *Spatial Analysis in Geomorphology*, Harper & Row Publishers, New York, London.
3. Cooke, R. U. and Warren, A., 1973: *Geomorphology in Deserts*, Batsford, London.
4. Derbyshire, E. (ed), 1976: *Geomorphology and Climate*, Wiley, London
5. Dixit, K. R.(ed), 1983: *Contribution to Indian Geography/Geomorphology*, Heritage, New Delhi
6. Fairbridge, R.W. (ed), 1968: *Encyclopedia of Geomorphology*, Reinhold, New York.
7. Goudie, Andrew, et. Al. (eds), 1981: *Geomorphological Techniques*, George Allen & Unwin, London.
8. King. C. A. M., 1966: *Techniques in Geomorphology*, Edward Arnold, London.
9. Wooldridge, S. W. and Morgan, R. S., 1948: *The Physical Basis of Geography*, Longman (First Published in 1937).

SEMESTER-I

Paper: GPH 702C

POPULATION AND SETTLEMENT GEOGRAPHY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (6 lectures)

Defining the field of Population Geography; Conceptual bases of under population, optimum population, over population, population explosion and population pressure.

UNIT II: (10 lectures)

Components of population growth: fertility, mortality and migration; Population composition: literacy, age, sex, child sex ratio, ageing and associated issues; Demographic Transition models.

UNIT III: (6 lectures)

Population- resource relationship; population- resource regions; Global and local food security issues.

UNIT IV: (8 lectures)

Defining the field of settlement of geography; Site and situation; origin and growth of rural and urban settlements; Tribal settlements of North East India.

UNIT V: (8 lectures)

Function and morphology of rural and urban settlements; Rural- urban relationship: dichotomy and continuum; urban fringe.

UNIT VI: (10 lectures)

Urbanization in developed and developing countries: growth, processes, patterns and impacts; internal structure of cities; Functional classification of urban settlements; Settlement hierarchy with reference to central place theory: Measurement of centrality and hierarchy.

SUGGESTED READING LIST:

1. Ahmad, A., *et. al* (eds), 1997: *Demographic Transition: The Third Third-World Scenario*, Rawat Publications, Jaipur and New Delhi.
2. Chandna, R. C., 1986: *A Geography of Population*, Kaylani Publishers, New Delhi.
3. Carter, H., 1972: *The Study of Urban Geography*, Edward Arnold, London.
4. Christaller, W., 1933: *Central Places in Southern Germany*, Prentice-Hall International.
5. Hudson, F. S., 1970: *A Geography of Settlements*, Macdonald & Evans, London.
6. Money, D.C., 1972: *Patterns of Settlement*, Evan Brothers, London.
7. Singh, R. L. and Singh, K. N., (eds), 1975: *Readings in Rural Settlement Geography*, BHU, Varanasi.
8. Singh, R. Y., 1994: *Geography of Settlements*, Rawat Publications, Jaipur and New Delhi.
9. Sandram, K. V. and Nangia, S., (eds): *Population Geography*, Heritage Publishers, New Delhi. Inc., New York.
10. Zelinsky, W., 1966: *A Prologue to Population Geography*, Prentice-Hall, Englewood Cliffs, New Jersey.

FURTHER READINGS:

1. Clarke, J. I., 1972: *Population Geography*, Pergamon Press, Oxford.
2. Haggett, P., 1972: *Geography: A Modern Synthesis*, Harper & Row, New York.
3. Peters, G. L. and Larkin, R. P., 1979: *Population Geography: Problems, Concepts and Prospects*, Kendall/Hunt Iowa.
4. Trewartha, G. T., 1969: *A Geography of Population: World Pattern*, John Wiley & Sons.
5. Woods, R., 1979: *Population Analysis in Geography*, Longman, London.
6. Taylor, Griffith, 1949: *Urban Geography*, Methuen, London.
7. Robinson, H., 1981: *Population and Resources*, Macmillan Press, London.

SEMESTER-I

Paper: GPH 703C

GEOGRAPHIC THOUGHT: HISTORY OF DEVELOPMENT AND COMTEMPORARY ISSUES

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (6 lectures)

Place of geography in the classification of knowledge: Defining the field of geography, relation of geography with other natural and social sciences; Geography as a science of: (i) distributions; (ii) relationships; (iii) areal differentiation; and (iv) spatial organisation.

UNIT II: (8 lectures)

Geography through the ages: General character of geographic knowledge during the ancient and mediaeval period; Impact of discoveries and European renaissance on the emergence of modern geography.

UNIT III: (8 lectures)

Foundations of modern geography: Contribution of German (Humboldt, Ritter, Ratzel), French (Paul Vidal de la Blache), British and American geographers.

UNIT IV: (8 lectures)

Evolution of geographic thought (Determinism- the impact of Darwinism, Possibilism, Human Ecology, Morphology of Landscape).

UNIT V: (10 lectures)

Positivism and quantitative revolution, behaviouralism, radicalism, humanism and post-modernism.

UNIT VI: (8 lectures)

Models in geography and their applications; Impact of technological advances on geographic methodology.

SUGGESTED READING LIST:

1. Abler, R., Adams, J. and Gould, P., 1971: *Spatial Organization: The Geographers' View of the World*, Prentice-Hall, Englewood Cliff.
2. Ackerman, E. A., et al, 1965: *The Science of Geography*, Washington D.C., National Academy of Science / National Research Council Pub. No. 1277.
3. Adhikari, S., 1992: *Geographical Thought*, Chaitanya Pub. House, Allahabad.
4. Berry, B. J. L., 1973: 'A Paradigm for Modern Geography', in R. J. Chorley (ed), *Directions in Geography*, London Methuen.
5. Bunge, W., 1962: *Theoretical Geography*, Lund Studies in Geography, Lund, C.W.K. Gleerup.
6. Buttimar, A., 1978: 'On People, Paradigms and Progress in Geography', in D.R. Stoddart (ed), *Geography, Ideology and Social Concern*, Oxford, Blackwell.
7. Dickinson, R. E., 1969: *Makers of Modern Geography*, Routledge and Kegan Paul, London.
8. Dikshit, R. D., 1994: *The Art and Science of Geography*, Prentice Hall of India, New Delhi.
9. Dikshit, R. D., 1997: *Geographical Thoughts: A Contextual History of Ideas*, Prentice Hall of India, New Delhi.
10. Gold, J. R., 1980: *An Introduction to Behavioural Geography*, Oxford University Press.
11. Hartshorne, R., 1939: *The Nature of Geography*, Association of American Geographers, Lancaster, Penn.
12. Hartshorne, R., 1959: *Perspective on the Nature of Geography*, Rand Mckully, Chicago.
13. Harvey, D., 1989: *The Connection of Post modernity*, Oxford, Basil Blackwell.
14. Harvey, D., 1969: *Explanation in Geography*, St. Martin's Press, New York.
15. Harvey, Milton and Holly, Brian P.1989: *Themes in Geographic Thought*, Routledge, London.
16. James, P. E., 1972: *All Possible World: A History of Geographic Ideas*, The Odyssey Press, New York.
17. Johnston, R. J. (ed), 1983: *Geography and Geographers*, Edward Arnold, London.
18. Ley, S. and Samuels, M. S. (eds), 1978: *Humanistic Geography: Prospects and Problems*, Maaronfa Press, Chicago.
19. Peet, R., 1977: *Radical Geography*, Methuen, London.
20. Soja, E. W., 1990: *Postmodern Geography*, Verso, London.

FURTHER READINGS:

1. Ahmad, A. (ed), 1996: *Progress in Indian Geography (1992-1996)*, INSA, New Delhi.

2. Chorley, Richard, J., 1973: *Directions in Geography*, Methuen, London.
3. Chorley, Richard, J. and Hagget, Peter (eds), 1967: *Models in Geography*, Methuen, London.
4. Gosal, G. S.(ed), 1999: *Fourth Survey of Research in Geography*, Rawat Publishers, Jaipur and New Delhi.
5. Haggett, P., 1965: *Locational Analysis in Human Geography*, Arnold, London/ St. Martin's Press, New York.
6. Haggett, P., 1979: *Geography - A Modern Synthesis*, Harper and Row, New York.
7. Hussain, M., 1989: *Evolution of Geographic Thought*, Rawat Publications, Jaipur.
8. Johnston, R. J. et al. (eds), 1986: *The Dictionary of Human Geography*, Oxford, Basil Blackwell.
9. Knox, P. L., 1975: *Social Well-being: A Spatial Perspective*, Oxford University Press, London.
10. Sauer, C. O., 1969: *Land and Life*, University of California Press, Berkeley and Los Angeles.
11. Singh, J. (ed), 2000: *Progress in Indian Geography (1996-2000)*, INSA, New Delhi.
12. Smith, David. M., 1977: *Human Geography: A Welfare Approach*, Edward Arnold, London.
13. Yeates, M., 1968: *An Introduction to Quantitative Analysis in Economic Geography*, McGraw Hill Inc.

SEMESTER-I

Paper: GPH 704C

CARTOGRAPHIC METHODS

Credits: 4 (2+1+1)

UNIT I:

(A) THEORY: The science and art of Cartography; Significance of cartography in geography; traditional and digital cartography; Concept of three-dimensional representation of geographical data;

(B) PRACTICAL: (i) Cartogram for socio-economic or any other data; (ii) Preparation of one quantitative thematic map by using district level data of Assam; [2 exercises]

UNIT II:

(A) THEORY: Principles of mapping and base map preparation; Concept of generalization; Map design and layout; Choropleth and isopleth maps; Map reading and analysis.

(B) PRACTICAL: (i) Determination of the levels of economic development using simple composite index or Determination of levels of infrastructural development in North East India using simple composite index. (ii) Choropleth mapping of cropping intensity of N.E. India or Spatial analysis of crop concentration in N.E. India / Assam. (iii) Slope map by Wentworth's method; [3 exercises]

UNIT III:

(A) THEORY: Principles of drawing, analysis and interpretation of: Allometric growth / distance decay curves and representation techniques in Log-log and semilog graphs, Climograph, Hythergraph and Ergograph;

(B) PRACTICAL: (i) Construction of Ergograph (ii) Allometric growth / decay curves of any two selected variables; [2 exercises]

UNIT IV:

(A) THEORY: Methods of construction, analysis and interpretation of: Rainfall dispersion graph, variability and equiplies maps; Water deficiency and surplus graphs, Flow pattern of traffic, goods

and services using standard carto-statistical techniques.

(B) PRACTICAL: (i) Water deficiency and surplus graph; (ii) Rainfall dispersion graph, (iii) Goods/Traffic Flow Cartogram; [2 exercises]

UNIT V:

(A) THEORY: Basic problems of map projection (Earth's shape and size, scale and coordinate system); Developable and developed surfaces- types and properties and principles and methods of construction of Zenithal Gnomonic Projection (Equatorial case), Conical equal area projections; Concept of constant of the cone.

(B) PRACTICAL: (i) Lambert's conical equal-area projection; (ii) Conical projection with two standard parallels; (iii) Zenithal Gnomonic Projection (Equatorial case). [3 exercises]

UNIT VI:

(A) THEORY: Choice of map projections of the world, India and Assam/ NER; International Polyconic Projection – properties and uses.

(B) PRACTICAL: Construction of graticules and map thereon including properties uses and limitations: (i) Mercator's Projection; (ii) Mollwewide's Projection. [2 exercises]

SUGGESTED READING LIST:

1. Campbell, J., 1984: *Introductory Cartography*, Prentice Hall Inc., Englewood Cliffs, N.J.
2. Kellaway, G. P., : *Map Projections*, Methuen & Co., London
3. Lawrence, G. R. P., 1964: *Cartographic Methods*, Oxford University Press, London.
4. Misra, R. P., and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept Publishing co. New Delhi
5. Monkhouse, F. J., and Wilkinson, H. R., 1989: *Maps and Diagrams*, B. I., Publications Pvt. Ltd., New Delhi
6. Robinson, A. H., et al., 1995: *Elements of Cartography, 6th Edition*, John Wiley & Sons, New York.
7. Steers, J. A., 1965: *An Introduction to the Study of Map Projection*, University of London, London.
8. Talukder, S., 2008: *Introduction to Map Projections*, EBH Publishers (India), Guwahati.

FURTHER READINGS:

1. Cuff, D. J. and Mattson, M. T., 1982: *Thematic Maps: Their Design and Production*, Methuen, New Work
2. Lewis, P., 1967: *Maps and Statistics*, Methuen & Co. Ltd., London
3. Raisz, E.: *General Cartography*, McGraw Hill Co., London.
4. Raisz, E.: *Principles of Cartography*, McGraw Hill Co., London.
5. Singh, R. L.: *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
6. Sing, R. L. and Singh Rana, P. B., 1998: *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
7. Saha, P. K. and Basu, P., 2010: *Advanced Geography Practical – A Laboratory Manual*, Books and Allied (P) Ltd., Kolkata.

SEMESTER-I

Elective Paper: GPH 705E

ENVIRONMENT AND DEVELOPMENT

Credits: 3 (2+1+0)

(32 lectures)

UNIT I: (4 lectures)

Environment and development: Concept, approaches and philosophy; Sustainability and sustainable development; Mapping and evaluation of resources, Regional resource constraints.

UNIT II: (7 lectures)

Man- environment relationship: Historical perspectives on man's interaction with environment; population growth and environment; Global environmental problems: Types and extent of environmental problems, area-specific major environmental issues and problems.

UNIT III: (5 lectures)

Man and atmosphere: Man as a factor of climatic change; industrialization-urbanisation and climate; green house effect and global warming; Environmental hazards- vulnerability analysis.

UNIT IV: (7 lectures)

Regional development theories and models - Growth Pole, Rostow, Friedman; Centre periphery and Dependency theory.

UNIT V: (5 lectures)

Dimensions of development: Social, cultural, economic, political and technological; Characteristics of backward and developed regions, reasons for backwardness.

UNIT VI: (4 lectures)

Development policies and environmental protection policies of developed and developing countries - case studies of the USA and India.

SUGGESTED READING LIST:

1. Balakrishnan, M., 1998: *Environmental Problems and Prospects in India*, Oxford & IBH Publication, New Delhi.
2. Friedmann, J. and Alonso, W., 1966: *Regional Development and Planning: A Reader*, MIT Press, Massachusetts.
3. Friedmann, J. And Alonso, W., 1975: *Regional Policy: Readings in Theory and Applications*, MIT Press, Massachusetts.
4. Goudie, A., 1984: *The Nature of Environment*, Basil Blackwell, London.
5. Misra, R. P.,: *Regional Planning: Concepts, Techniques and Policies*, University of Mysore, Mysore.
6. Misra, et. al, 1974: *Regional Development Planning in India- A Strategy*, Institute of Development Studies, Mysore.
7. Park, C., 1997: *The Environment*, Routledge, London.
8. Pickering, K. T. & L. A. Owne, 1994: *An Introduction to Global Environmental Issues*, Routledge, London.
9. Singh, S., 1991: *Environmental Geography*, Prayag Pustak Bhawan, Allahabad.
10. Strahler, A. N. and A. H. Strahler, 1976: *Geography and Man's Environment*, John Willey, New York.

FURTHER READINGS:

1. Cantledge, B (ed), 1992: *Monitoring the Environment*, Oxford University Press, Oxford.
2. Rostow, W., 1960: *The Stages of Economic Growth: A Non-communist Manifesto*, Cambridge University Press, Cambridge.
3. Simon, I. G., 1982: *Biogeographical Process*, Allen & Unwin, London.
4. Newson, M., 1992: *Land, Water and Development*, Routledge, London.
5. Varma, P. S. and Agarwal, V. K., 1989: *Principles of Ecology*, S. Chand & Co., New Delhi.

SEMESTER-I

Elective Paper: GPH 706E

WATER RESOURCES

Credits: 3 (2+1+0)

(32 lectures)

UNIT I: (6 lectures)

Water as a focus of geographical interest, inventory and distribution of world's water resources (surface and subsurface); Water storages / depressions - glaciers, river channels, lakes and reservoirs; soil moisture, groundwater. The basic hydrologic cycle; runoff – factors and types.

UNIT II: (6 lectures)

Water demand, use, methods of estimation in agriculture; Soil-water-crop relationships; water balance and drought; methods of distribution of water to farms; water harvesting techniques; Soil water conservation. Water quality parameters; River and ground water pollution.

UNIT III: (6 lectures)

Industrial use of water, methods of estimation; demand for water in the industrial sector of India. Municipal use of water: general trends in water supply to the urban and rural communities in India, internal navigation, hydel-power and recreation.

UNIT IV: (6 lectures)

Problems of water resource management: Floods – magnitude / frequency, structural and non structural adjustment of flood hazards; land use regulation and insurance. Case studies of floods in Brahmaputra and Barak valley.

UNIT V: (4 lectures)

Conservation and planning for the development of water resources - social and institutional considerations; conjunctive use of surface and groundwater resources.

UNIT VI: (4 lectures)

International and inter-state river water disputes and treaties (Case studies of Cauvery and Teesta); River cleaning programmes.

SUGGESTED READING LIST:

1. Agarwal, Anil and Sunita Narain, 1997: *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System*. Centre for Science and Environment, New Delhi,
2. Gulhati, N. D., 1972: *Development of Inter-State Rivers: Law and Practice in India*. Allied Publishers., Bombay.
3. Jones, J. A., 1997: *Global Hydrology: Processes, Resources and Environmental Management*, Longman.
4. Michael. A. M., 1978: *Irrigation: Theory and Practices*, Vikas Publishing House Pvt. Ltd., New Delhi.
5. Matter, J. R., 1984: *Water Resources Distribution, Use and Management*, John Wiley, Marylane.
6. Newson, M., 1992: *Land, Water and Development River Basin Systems and their Sustainable Management*, Routledge, London.
7. Pereira, H. C., 1973: *Land use and Water Resources*, Cambridge University Press, Cambridge.
8. Rao, K. L., 1979: *India's Water Wealth*, Orient Longman, New Delhi.
9. Singh, R. A. and Singh, S. R., 1979: *Water Management: Principles and Practices*, Tara Publication, Varanasi.
10. Smith, K., 1972: *Water in Britain: A Study in Applied Hydrology and Resource Geography*, McMillan, London.
11. Tideman, E. M., 1996: *Watershed Management: Guidelines for Indian Conditions*, Omega, New Delhi.
12. Verghese, B. G., 1990: *Water of Hope: Integrated Water Resource Development and Regional Co-operation within the Himalayan-Ganga-Brahmaputra-Barak Basin*, Oxford IBH, New Delhi.

FURTHER READINGS:

1. Govt. of India, Ministry of Energy and Irrigation, Rashtriya Barh Ayog (*Report-National Commission on Floods*. Vol. I & II, New Delhi, 1980.
2. Guidelines for the preparation of *National Master Water Plans*, Govt. of India,
3. Krutilla, John V. and Eckstein, O., 1958: *Multiple purpose River Development: Studies in Applied Economic Analysis*, John Hopkin's Press, Boston.
4. Kates R.W. and Burton, I. (ed.), 1980: *Geography, Resources and Environment*, Ottawa.
5. Ministry of Agriculture, *Report of the Irrigation Commission*, Vol. I to IV, New Delhi, 1972.
6. Todd, D. K., 1959: *Ground Water Hydrology*, John Wiley, New York.
7. United Nations, 1989: *Economic and Social Commission for Asia and the Pacific*.
8. U.S.D.A., 1955: *The Year Book of Agriculture: Water*, Oxford and I.B.H. Publishing Co., New Delhi.

SEMESTER-I

Elective Paper: GPH 707E

CARTOGRAPHY AND GEOGRAPHICAL INFORMATION SYSTEMS

Credits: 3 (2+1+0)

(32 lectures)

UNIT I: (5 lectures)

The Earth: Shape, size and earth models; Referencing systems; Definition of map, map properties,

Cartography: The science and art of mapping; The role of mapping scale, mapping constraints and techniques, basic concepts on map projection.

UNIT II: (5 lectures)

GIS and maps: The map as an interface to GIS, Geospatial data, their characteristics and measurement scales, concept of metadata; GIS components and functions; Cartographic Components of GIS Packages; Basics of spatial and non-spatial / attribute database, relational database.

UNIT III: (8 lectures)

Data acquisition: The need to know acquisition methods - Terrestrial surveys, Photogrammetrical surveys, Satellite data, GPS data; Digitizing or scanning analogue maps; Sources, characteristics, uses and limitations of: Socio-economic database files, Geophysical data files, Environmental data files, Digital Vector Data (DVD) files, Digital elevation data – GLOBE, GTOPO30, SRTM.

UNIT IV: (4 lectures)

Georeferencing, Earth model and datum characteristics, selection of map projection, geometric transformation and generalization; Relief consideration in mapping; Vector data creation, editing elements, types of error and its handling.

UNIT V: (5 lectures)

Data measurement framework; Data integration and representation: Overlay techniques, Statistical mapping, 2-D surface modelling and 3-D visualization; Data Classification, cartographical data analysis, terrain representation; Application areas of GIS.

UNIT VI: (5 lectures)

Map design: Symbols to portray data related to points, lines, areas and volumes, graphic variables, typography, desktop mapping and map production, paper and electronic atlases and web maps.

SUGGESTED READING LIST:

1. Burrough, P. A. and McDonnell, R. A., 1998: *Principles of Geographical Information Systems*, Oxford University Press, Oxford.
2. Chrisman, N., 1997: *Exploring Geographic Information Systems*, John Wiley & Sons Inc., New York.
3. Chetry, N., 2001: *A Geographic Information System Approach to Surface Modelling*, In: Cotton College Research Journal, Vol. 1, Guwahati.
4. Chetry, N., 2004: *Visualization of Population Distribution Pattern in Assam by Geographic Information System Based Spatial Models*, Research Journal of Contemporary Concerns (RJCC), Vol. 2, Guwahati.
5. Cromley, R., 1992: *Digital Cartography*, Prentice-Hall Inc., Englewoods Cliffs, New Jersey.
6. De Mars, M. N., 1999: *Fundamentals of Geographic Information Systems*, John Wiley & Sons Inc., New York.
7. Kraak, M. and Ormeling, F., 2004: *Cartography Visualization of Geospatial Data*, Pearson Education, Delhi.
8. Robinson, A. H.; Morrison, J. L.; Muehrcke, P. C.; Kimerling, A. J. And Guptill, S. C., 1995: *Elements of Cartography*, John Wiley & Sons Inc, New York.

FURTHER READINGS:

1. Campbell, J., 1984: *Introductory Cartography*, Prentice Hall Inc., Englewood Cliffs, New Jersey.

2. Chetry, N., 2003: *Planning for Literacy Development in Assam: A Multi-criteria Approach Using GIS*, In: Population Environment and Challenges of Development (Ed: A. Saikia, ISBN 81-87606-34-7), Delhi.
3. Longley, P. A., Goodchild, M. F.; Maguire, D. J.; Rhind, D. W., 2001: *Geographic Information Systems and Science*, Wiley, Chichester.
4. Maguire, D. J.; Goodchild, M. F.; Rhind, D. W., 1991: *Geographic Information Systems*, Longman Scientific and Technical, Harlow.
5. Misra, R. P., and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept Publishing co. New Delhi.
6. Monkhouse, F. J., 1967: *Maps and Diagrams*. Methuen, London.

SEMESTER-II

Paper: GPH 801C

CLIMATOLOGY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (6 lectures)

Atmospheric energy and terrestrial radiation: Solar radiation; Mechanism of heat transfer; Distribution of solar radiation over the earth; Global radiation budget.

UNIT II: (8 lectures)

Temperature: Horizontal and vertical distribution of temperature; Urban heat islands, global warming. Spatio-temporal perspectives on global climate change and its effects on sea level, coastal flooding, livelihood, bio-diversity, migration and human health.

UNIT III: (10 lectures)

Atmospheric moisture and precipitation: Concept and measurement of atmospheric moisture; Condensation - forms of condensation; Hydrologic cycle; Formation and types of precipitation; Global distribution of precipitation; Extreme rainfall events.

UNIT IV: (8 lectures)

Pressure system and air circulation; Air masses and fronts: Types, characteristics and their influence on weather and climate.

UNIT V: (10 lectures)

Climatic disturbances: Cyclone, drought, El Nino and La Nina phenomena; Mechanism of development of monsoon and its distribution.

UNIT I: (6 lectures)

Applied climatology: Data collection, archiving, accessing, interpretation and generation of climatic information specially for water balance studies, soils, agriculture activities, house types and health.

SUGGESTED READING LIST:

1. Barry, R. G. and Chorley, R. J. 1971: *Atmosphere, Weather and Climate*, Methuen Co. Ltd, London.

2. Blair, T. A., 1954: ***Weather Elements***, Prentice-Hall, New York.
3. Critzfield, H. J., 1975: ***General Climatology***, Prentice Hall of India, New Delhi.
4. Das, P. K., 1968: ***The Monsoons***, National Book Trust, New Delhi.
5. Griffith, J. F., 1966: ***Applied Climatology***, Oxford University Press.
6. Hobbs, J. E., 1980: ***Applied Climatology***, Butterworths.
7. Keshavamurty, R. N., and Rao, M. S., 1992: ***The Physics of Monsoons***, Allied Publishers Ltd., New Delhi.
8. Lal, D. S., 1998: ***Climatology***, Sharda Pustak Bhawan, Allahabad.
9. Miller, A. A., 1953: ***Climatology***, Dutton.
10. Strahler, A. N., 1971: ***Physical Geography***, John Wiley, New York
11. Trewartha, G. T. and Horn, L. A., 1980: ***An Introduction to Climate***, International Series.
12. India Meteorological Department (IMD), 1968: ***Climatological Tables of Observatories in India***, Govt. of India.
13. Thompson, R. D. and Perry, A (ed.), 1997: ***Applied Climatology, Principles and Practice***, Routledge, London.

FURTHER READINGS:

1. Blair, R. A., 1942: ***Climatology-General and Regional***, Prentice Hall, New York
2. Lockwood, J.G., 1976: ***World Climatology: Environmental Approach***, Edward Arnold Ltd., 41 Bedford Square, WC 1B 3 Dq.
3. Lydolph, Paul, E., 1985: ***The Climate of the Earth***, Rawman and, Totowa, N.J.
4. Rumney, George, R., 1968: ***Climatology and World's Climates***, McMillan, London.
5. Sellers, W. D.: ***Physical Climatology***, Chicago University Press.
6. Stringer, E. N., 1982: Hoirn, L. A., 1980: ***An Introduction to Climate***, International Series.
7. Weiesner, C. J.: ***Hydrometeorology***, Chapman & Hall Ltd.

SEMESTER-II

Paper: GPH 802C

REGIONAL GEOGRAPHY OF INDIA

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (8 lectures)

India as a geographical entity; unity in diversity; physical background - relief, drainage, climate, soil and vegetation.

UNIT II: (8 lectures)

Basis of regionalization: Geo-political, climatic, agro-climatic, demographic, socio-economic, physiographic and historical dimensions of regionalization.

UNIT III: (8 lectures)

Mineral and power resources and development: Iron ore, coal, mineral and power resources and development: iron ore, coal, petroleum and hydro- electric power potential.

UNIT IV: (8 lectures)

Population and development issues: Population growth and its socio-economic implications, literacy, urbanization, occupation and social structure and development inequalities.

UNIT V: (8 lectures)

Regional disparities in economic development: Agriculture, industry and transport and communication.

UNIT VI: (8 lectures)

India's geo-economic position in Asia and the world; its economic development policies and international relations.

SUGGESTED READING LIST:

1. Agarwala, S. N., 1988 (First reprint): *India's Population Problems*, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. Bhatt, L. S., 1973: *Regional Planning in India*, Statistical Publishing Society, Calcutta.
3. Bose, A., (ed) 1967: *Pattern of population Changes in India- 1951-61*, Allied Publishers, Bombay.
4. Davis, K., 1951: *Population of India and Pakistan*, Princeton University Press, Princeton.
5. Deshpande, C. D., 1992: India: *A Regional Interpretation*, ICSSR, New Delhi.
6. Duncan, G., 1967: *Resource Utilization and the Conservation, Concept in Readings in Economic Geography*, New York.
7. Gananathan, V.S., 1967: *Economic Geography of India*, NBT, India, New Delhi.
8. Govt. of India, 1965: *The Gazetteers of India*, Publication Division, Ministry of Information and Broadcasting, New Delhi.
9. Singh, R. L., (ed), 1968: *India- Regional Studies*, 21st IGC, New Delhi
10. Singh, R. L., (ed), 1971: *India: A Regional Geography*, National Geographical Society of India, Varanasi.
11. Sharma, T. R., 1949: *Location of Industries in India*, Hind Kitab, Bombay.
12. Spate, O. H. K. and Learmonth, A. T. A., 1967: *India and Pakistan- Land, People and Economy*, Methuen & Co. London.
13. Srivastava, M. A., 1967: *Trade of India*, S. Chand & Co., Delhi.
14. Tirtha R. & Gopal Krishna, 1996: *Emerging India* Reprinted by Rawat Publications, Jaipur.

FURTHER READINGS:

1. Centre for Science & Environment (1988): *State of India's Environment*, New Delhi.
2. Deshpande C. D. 1992: *India: a Regional Interpretation*, ICSSR & Northern Book Centre.
3. Dreze, Jean & Amartya Sen (ed.), 1996: *India Economic Development and Social opportunity*, Oxford University Press, New Delhi.
4. Kundu A. Raza Moonis, 1982: *Indian Economy: the Regional Dimension*. Spectrum Publishers, New Delhi.
5. Robinson, Francis, 1989 : The *Cambridge Encyclopaedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives*. Cambridge University Press, London.

SEMESTER-II

Paper: GPH 803C

FIELD AND INSTRUMENTAL SURVEY

Credits: 4 (2+1+1)

UNIT I: Prismatic Compass

(A) **THEORY** - Importance, scope and purpose, principles and application of the survey instrument;

(B) **PRACTICAL**: (i) Closed traverse survey with minimum 4 stations and 8 - 12 offsets; (ii)

Open Traverse with minimum 3 -4 stations to map a part of campus / building.

UNIT II: Dumpy Level / Auto Level

(A) **THEORY** - Importance, scope and purpose, principles and application of the survey instruments;

(B) **PRACTICAL**: (i) Preparation of contour map of a selected terrain; (ii) Preparation of road profile / Terrain profile using change points.

UNIT III: Theodolite / Total Station

(A) **THEORY**- Importance, scope and purpose, principles of working and application of the survey instrument;

(B) **PRACTICAL**: (i) Determination of height of an inaccessible object (ii) Closed Traverse Survey Plotting by Independent coordinates

UNIT IV: GPS / DGPS

(A) **THEORY**- Importance, scope and purpose, principles of working and application of the survey instrument;

(B) **PRACTICAL**: Campus / field survey along with the location of important features

UNIT V: Digital Planimeter

(A) **THEORY**- Importance, scope and purpose, principles of working and application of the instrument;

(B) **PRACTICAL**: Measurement of area of a part of topographical map / drainage basin.

UNIT VI: Field Survey

(A) **THEORY** – Basic principles and practices of field survey.

(B) **PRACTICAL**: Field Report (to be submitted by the candidates on the day of End Semester Practical Examination)

Note: The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks each from Units 1, 2, 3, and 4. ANY ONE question carrying 20 marks from Unit-5 and 6. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.

SUGGESTED READING LIST:

1. Clendinning , J., 1958: *Principles and Use of Surveying Instruments*. 2nd edition, Blockie .
2. Clendinning , J., 1960: *Principles of Surveying* 2nd edition.
3. Curtis, H., 2000: *The GPS Accuracy Improvement Initiative*, GPS World, June, 2000.
4. Gopi, S., 2005: *Global Positioning System Principles and Applications*, Ta McGraw Hill, New Delhi.

5. Kanetkar, T. P. and Kulkarni, S. V., 1972: *Surveying and Levelling [Part-I &II]*, Vidyarthi Griha Prakashan, Pune.
6. Langley, R. B., 1991: *The GPS Receiver – An Introduction*, GPS World, 2(1).
7. Operation Manual of Placom Digital Planimeter.
8. Sandover, J. A., 1961: *Plane Surveying*, Arnold.
9. Saha, P. K. and Basu, P., 2010: *Advanced Geography Practical – A Laboratory Manual*, Books and Allied (P) Ltd., Kolkata.

FURTHER READINGS:

1. Leica Geosystems, 2000: *Geodetic RTK Receiver (Model SR 530), Operation Manual*.
2. Misra, R. P. and Ramesh A : *Fundamentals of Cartography* Revised Edition, Concept Publication, New Delhi.
3. Monkhouse, F. J., 1971: *Maps and Diagrams*, Methuen, London.
4. Negi, Balbir Singh, 1995: *Practical Geography*, 3rd revised Ed. Kedar Nath and Ram Nath, Meerut & Delhi.
5. Robinson, A. H.; Morrison, J. L.; Muehrcke, P. C.; Kimerling, A. J. And Guptill, S. C., 1995: *Elements of Cartography*, John Wiley & Sons Inc, New York.
6. Sing, R. L. and Singh Rana, P. B., 1998: *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
7. Singh & Karanjia, 1972: *Map work and Practical Geography*, Central Book Dept Allahabad.
8. Singh, R. L. and Dutt, P. K., 1968: *Elements of Practical Geography*, Students Friends, Allahabad.

SEMESTER-II

Paper: GPH 804C

QUANTITATIVE METHODS IN GEOGRAPHY

Credits: 4 (2+1+1)

UNIT I:

(A) THEORY: Methodological developments in geography: quantitative and qualitative; significance of quantification in geographical analysis; limitations of quantitative techniques; Descriptive and inferential statistics; Concept of spatial mean and median centre and standard distance.

(B) PRACTICAL: (i) Drawing of Lorenz curve and its interpretation. (ii) Preparation of Location Quotient map of selected variables and interpretation thereof.

UNIT II:

(A) THEORY: Geographic data matrix; nature and types of geographic data, levels of measurement, data sources and acquisition techniques; Sampling techniques and application of probability in sample selection;

(B) PRACTICAL: Preparation of Questionnaire for Sample survey on specific problem / Preparation of Geographic Data Matrix.

UNIT III:

(A) THEORY: Coefficient of variability and its uses, Nearest Neighbour Analysis (NNA), Inferential statistics – Chisquare (χ^2) analysis, Parametric tests - t -test, ANOVA, F-test;

(B) PRACTICAL: (i) Chisquare (χ^2) test for selected variables; (ii) F-test.

UNIT IV:

(A) THEORY: Theoretical distributions - Normal, Binomial and Poisson's.

(B) PRACTICAL: Fitting of curves and their interpretations - (i) Binomial distribution and (ii) Poisson's distribution.

UNIT V:

(A) THEORY: Correlation and regression (simple and multiple), Nonlinear relationships - Exponential and power function types with reference to spatial interaction and gravity and potential models;

(B) PRACTICAL: (i) Fitting of exponential model of population growth; (ii) Potential surface model of given attribute of point locations.

UNIT VI:

(A) THEORY: Elementary matrix algebra (types of matrices, minors and co-factors, determinant of a square matrix, inverse matrices, adjoint matrices, solutions of linear equations);

(B) PRACTICAL: (i) Setting up of regression equation of Y on X with the help of matrix algebra
(ii) Setting up regression equation of Y on X1 and X2.

Note: *The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks each from Units 1, 2, 3, and 4. ANY ONE question carrying 20 marks from Unit-5 and 6. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.*

SUGGESTED READING LIST:

1. Gregory, S., 1978: *Statistical Methods and the Geographer*, Longman, London.
2. Hammond R and P. S. McCullagh, 1974: *Quantitative Techniques in Geography: An Introduction*, Clarendon Press, Oxford.
3. Johnston R. J., 1973: *Multivariate Statistical Analysis in Geography*, Longman, London.
4. King, L. J., 1969: *Statistical Methods in Geographical Studies*, London.
5. Mahmood, A., 1977: *Statistical Methods in Geographical Studies*, Concept Publications, Delhi.
6. Maurice Yeats, 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw, Hill, New York.
7. Paul, S. K., 1998: *Statistics for Geoscientists*, Tata McGraw Hill, New Delhi.
8. Robinson, G. M., 1998: *Methods and Techniques in Human Geography*, John Wiley & Sons, Chichester.

FURTHER READINGS:

1. David Unwin, 1981: *Introductory Spatial Analysis*, Methuen, London.
2. John P. Cole and Cuchlaine A. M. King, 1968: *Quantitative Geography*, John Wiley, London.
3. Koutsoyiannis, 1973: *Theory of Econometrics*, Mcmillan, London.
4. Peter Haggett, Andrew D. Cliff, & Allan Frey, 1977: *Location Methods Vol. I and II*, Edward Arnold, London.

SEMESTER-II
Elective Paper: GPH 805E

GEOGRAPHY OF TOURISM

Credits: 3 (2+1+0)
(32 lectures)

UNIT I: (5 lectures)

Basics of tourism: Definition of tourism; Factors influencing tourism: historical, natural, socio-cultural and economic; motivating factors for pilgrimages: leisure, recreation; elements of tourism, tourism as an industry.

UNIT II: (5 lectures)

Spatial pattern of tourism: - its spatial affinity; areal and locational dimensions comprising physical, cultural, historical and economic; International travel destinations- cultural and historical.

UNIT III: (5 lectures)

Tourism types: cultural, ecotourism and adventure tourism, national and international tourism; globalization and tourism.

UNIT IV: (6 lectures)

Indian Tourism: regional dimensions of tourist attraction; evolution of tourism, promotion of tourism in important travel destinations of India- Dal lake, Goa, Garhwal Himalaya, Northern India, North East India.

UNIT V: (6 lectures)

Infrastructure and support system - accommodation and supplementary accommodation; other facilities and amenities; Tourism circuits-short and longer detraction - Agencies and intermediaries - Indian hotel industry.

UNIT VI: (5 lectures)

Impacts of tourism: physical, economic and social and perceptual positive and negative impacts; Environmental laws and tourism - current trends, spatial patterns and recent changes; Role of foreign capital & impact of globalization on tourism.

SUGGESTED READING LIST:

1. Bhatia, A. K., 1996: *Tourism Development: Principles and Practices*, Sterling Publishers, New Delhi.
2. Bhatia, A. K., 1991: *International Tourism - Fundamentals and Practices*, Sterling, New Delhi.
3. Chandra, R. H., 1998: *Hill Tourism: Planning and Development*, Kanishka Publishers, New Delhi.
4. Inskeep. E. 1991: *Tourism Planning: An Integrated and Sustainable Development Approach*, Van Nostrand and Reinhold, New York.
5. Kaul, R. K., 1985: *Dynamics of Tourism and Recreation*. Inter-India, New Delhi.
6. Milton, D., 1993: *Geography of World Tourism* Prentice. Hall, New York.
7. Pearce D. G., 1987: *Tourism To-day: A Geographical Analysis*, Harlow, Longman.
8. Sharma J. K. (ed.), 2000: *Tourism Planning and Development - A new perspective*, Kanishka Publishers, New Delhi.
9. Shaw G. and Williams A. M., 1994: *Critical issues in Tourism-A Geographical Perspective*, Oxford: Blackwell.
10. Sinha P. C. (ed.), 1998: *Tourism Impact Assessment*, Anmol Publishers, New Delhi.

11. Theobald W. (ed.), 1994: *Global Tourism: The Next decade*, Oxford, Butterworth, Heinemann, Oxford.

FURTHER READINGS:

1. Hunter, C and Green H., 1995: *Tourism and the Environment: A Sustainable Relationship*, Routledge, London.
2. Kaur, J., 1985: *Himalayan Pilgrimages and New Tourism*, Himalayan Books, New Delhi.
3. Lea, J., 1988: *Tourism and Development in the Third World*, Routledge, London.
4. Robinson, H., 1996: *A Geography of Tourism*. Macdonald and Evans, London, 1996.
5. Voase R., 1995: *Tourism: The Human Perspective*, Hodder & Stoughton, London, 1995.
6. Williams A.M. and Shaw G. (eds.): *Tourism and Economic Development - Western European Experiences*, Belhaven, London.
7. Williams Stephen, 1998: *Tourism Geography*, Routledge, Contemporary Human Geography Series, London.

SEMESTER-II

Elective Paper: GPH 806E

NATURAL HAZARDS AND DISASTERS

Credits: 3 (2+1+0)

(32 lectures)

UNIT I: (5 lectures)

Concept of hazards and disasters; Types of hazards: natural and man-made; Concept of risk and vulnerability; Analysis of risks and vulnerability.

UNIT II: (6 lectures)

Spatial dimension (global and regional) and distribution of natural hazards (Floods, drought and desertification, earthquakes, landslides, avalanches, cyclones, forest fires), frequency of occurrences and trends; Hazard / disaster prone zone identification.

UNIT III: (6 lectures)

Impact of natural hazards and disasters- displacement of people, loss of life and properties, infrastructure, health, economy and livelihood (with special reference to flood hazards in the Brahmaputra valley).

UNIT IV: (5 lectures)

Components of disaster management cycle (Concepts relating to the Pre-disaster phase, emergency phase, post-disaster phase); response to disasters by international, national, government and non-government agencies, media, community and individual;

UNIT V: (5 lectures)

Engineering, socio-economic, political framework of disaster mitigation and management plans, policies and implementing agencies.

UNIT VI: (5 lectures)

Disaster awareness plans and programmes: role of institutions, government and non-governmental agencies; technological advances.

SUGGESTED READING LIST:

1. Burton, I., Kates, W. And White, G. F., 1993: *Environment as Hazard*, Guildford Press, New York.
2. Blaikie, P., Cannon, T., Davis, I. Et al., 1994: *At Risk: Natural Hazards, People's Vulnerability and Disasters*, Routledge, London.
3. Framton, C., Hardwick and McNaught, 1999: *Causes, Consequences and Management of Disasters*, Hodder and Stoughton, London.
4. Godschalk, D. R. Et. Al., 1999: *Natural Hazard Mitigation Recasting Disaster Policy and Planning*, Island Press, Washington, D. C.
5. Gupta, M. C., Gupta, L.C., Tamini, B. K., Sharma, Vinod, K., 2000: *Manual on Natural Disaster Management in India*, National Disaster Management Centre, New Delhi
6. Hewitt, K., 1997: *Regions of Risk: A Geographical Introduction to Disasters*, Longman, London.
7. Kapur, Anu and Others, 2005: *Disasters in India: Studies of Grim Reality*, Rawat, Jaipur.
8. Paraswamam, S., Unnikrishnan, P. V., 2000: *India Disaster Report*, Oxford University Press, New Delhi.
9. Quarantelli, E. L. (ed), 1998: *What is Disaster? Perspective on the Question*, Routledge, London.
10. Schneid, T., and Collins, L., 1998: *Disaster Management and Preparedness*, Lewis Publishers, Washington, D.C.

SEMESTER-II

Elective Paper: GPH 807E

NATURAL RESOURCE MANAGEMENT

Credits: 3 (2+1+0)

(32 lectures)

UNIT I: (5 lectures)

Concept, models and approaches to natural resource management; problems of resource utilization; population pressure, development and resource use;

UNIT II: (5 lectures)

Use and misuse of resources: Global and Indian scenario; historical background and future prospects of various resources; soil, water, minerals, forests.

UNIT III: (6 lectures)

Conservation and management of resources: Meaning, principles, philosophy and approaches to conservation; resource conservation and management methods.

UNIT IV: (6 lectures)

Resource appraisal and policy making: appraisal of land resources, geophysical, geochemical, geobotanical.

UNIT V: (5 lectures)

Use of GIS and Remote Sensing in resource appraisal; institutional arrangements and policy models towards better management and conservation of resources.

UNIT VI: (5 lectures)

Resource Development: Sustainable resource management concept, methods, dimension and sustainable system; integrated resource development and its application.

SUGGESTED READING LIST :

1. Adams, W. M., 1990: *Green Development: Environment and Sustainability in the Third World*, Routledge & Chapman Hall, New York.
2. Burrough, P. A., 1986: *Principles of Geographical Information Systems in Land Resources Assessment*, Clarendon Press, Oxford.
3. Burrough, P. A. and Mc Donnel, R. A., 1998: *Principles of Geographical Information Systems*, Oxford University Press.
4. Holechek, J. L. et al., 2000: *Natural Resources: Eulogy Economics and Policy*, Prentice Hall, New Jersey.
5. Hooja, R. & Joshi, R., 1994: *Desert, Drought and Development, Studies in Resource Management and Sustainability*; Rawat Publication, Jaipur.
6. Howard, M. C. (ed), 1993: *Asia's Environmental Crisis*, Westview Press, Prouldar.
7. Kates, R. W. & Burton, I. (eds), 1986: *Geography, Resources and Environment*, Vol I & II, University of Chicago Press, Chicago.
8. Newson,; M. D., 1991: *Land, Water and Development: River Basin Systems and Management*, Routledge, London.
9. Rees, J., 1988: *Natural Resources: Allocation, Economics and Policy*, Methuen, London.
10. Peckford, John et. al. (ed.), 1994: *Water, Sanitation, Environment and Development*, IT Publication, London.

FURTHER READINGS:

- Granfelt, T. R., 1999: *Managing the Globalized Environment*, J. & L. Composition Ltd, New York.
- Mc Laren, D. J. and Skinnnet, B. J. (eds), 1986: *Resources and World Development*, John Wiley & Sons, New York.
- Owen, S. and Owens, P. L., 1991: *Environment Resources and Conservation, Cambridge University Press*, New York, 1991.
- Redclift, M., 1987: *Sustainable Development: Exploring the Contradiction*, Methuen, London.
- Simmons, I. G., 1991: *Earth, Air and Water: Resources and Environment in Late 20th Century*, Edward Arnold, New York.
- Thoman, Alan et. al., 2001: *Environmental Policies and NGO Influence*, Routledge, London.

SEMESTER-III

Paper: GPH 901C

SOIL AND BIOGEOGRAPHY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (10 lectures)

Soil forming factors: Parent material, organic, climatic, topographic, spatio-temporal dimensions; Processes of soil formation and soil development: Physical, biotic and chemical; Soil profile

development; soil catena, pedogenic regimes; podzolization, laterisation, calcification and gleezation.

UNIT II: (8 lectures)

Physical properties of soils: Morphology, texture, structure, water, air, temperature and other properties of soil; chemical properties of soil and soil reaction;

UNIT III: (6 lectures)

Soil organisms and their role; soil erosion, degradation, and conservation.

UNIT IV: (10 lectures)

Concept of Bio-diversity; Environment, Habitat and Plant-animal association in varying habitats and environments, biome types, Traditional ecological knowledge.

UNIT V: (8 lectures)

Energy flux in the ecosystem; material Cycles / bio- energy cycles in the terrestrial ecosystem.

UNIT VI: (6 lectures)

National Forest Policy of India, Conservation of biotic resources; Biodiversity hotspots; State of forest cover changes in India.

SUGGESTED READING LIST:

1. Bradshaw, M. J., 1979: *Earth and Living Planet*, ELBS, London.
2. Bunting, B. T., 1967: *The Geography of Soil*, Hutchinson, London.
3. Foth, H. D. and Turk, L. M. 1972: *Fundamentals of Soil Science*, John Wiley, New York.
4. Govinda Rajan, S. V. and Gopala Rao, H. G., 1978: *Studies on Soils of India*, Vikas, New Delhi.
5. Goudie, Andrew, 1981: *The Human Impact*, Basil Blackwell, Oxford.
6. Hugget, R. J., 1988: *Fundamentals of Biogeography*. Routledge, London.
7. Hugget, R. J., 1995: *Geocology: An Evolutionary Approach*, Routledge, London.
8. Hussain, M. (ed), 1994: *Biogeography (Part I&II)*, Anmol Publications Pvt. Ltd., New Delhi.
9. Newbiggin: *Plant and Animal Geography*.
10. Pears, N., 1985: *Basic Biogeography*. 2nd Edition, Longman, London.
11. Robinson, H., 1982: *Biogeography*, E.L.B.S., Mc Donald & Evans, London.
12. Russell, E.W., 1973: *Soil Condition and Plant Growth*, Longman, London.

FURTHER READINGS:

1. Barry, C., 1977: *Biogeography - An Ecological and Evolutionary Approach*, Cox Blackwell, Oxford.
2. Mc. Bride, M. B., 1999: *Environmental Chemistry of Soils*, Oxford University Press, New York
3. Odum, E. P., 1971: *Fundamentals of Ecology*, W.B. Saunders, Philadelphia.
4. Singh, S. 1991: *Environmental Geography*, Prayag Publications, Allahabad.
5. Simmons, I. G., 1974: *Biogeography: Natural and Cultural*, London.
6. Smith, R. L., 1977: *Ecology of Man- An Ecosystem Approach*.
7. Spellberg, I. F. & Sawyer, J. W. D., 1999: *An Introduction to Applied Biogeography*, Cambridge University Press.
8. Tivy, J. 1992: *Biogeography: A study of Plants in Ecosphere*, 3rd edn. Oliver and Boyd, U.S.A.
9. World Resources, 2001: *People and Ecosystems*; World Resources Institute, Washington.

SEMESTER-III

Paper: GPH 902C

ECONOMIC BIOGEOGRAPHY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (8 lectures)

Conceptual and theoretical development in economic geography. Approaches in economic geography: institutional approach and problem solving approach.

UNIT II: (8 lectures)

Factors of location of economic activities: Physical, social, economic and cultural; Concept and techniques of delimitation of agricultural regions, crop combination and diversification.

UNIT III: (10 lectures)

Economic geography of agriculture: Place of agriculture in global economy, critical study of large-scale and small-scale agriculture, regional pattern of agriculture of the U.S.A. and India, modernisation of Indian agriculture.

UNIT IV: (10 lectures)

Classification of industries; Resource based and footloose industries, Theories of industrial location- Weber, Losch and Isard; Case studies of selected industries Iron and Steel, Petrochemical and Textile

UNIT V: (6 lectures)

Economic geography of energy: Global pattern of energy production from conventional sources: water, coal and petroleum, and nonconventional sources: solar and nuclear.

UNIT VI: (8 lectures)

Economic geography of international trade in selected commodities: Food grain (wheat and rice), tea, petroleum, iron and steel; Special Economic Zones (SEZ); Technology and economic development: The relation between technology and development, regional aspects of technology and application, levels of economic development - global perspectives.

SUGGESTED READING LIST:

1. Alexander, J. W., 1986: *Economic geography*, Prentice Hall Inc. (E.E. Edition)
2. Bhalla, G. S. and Tyagi, D. S., 1989: *Indian Agricultural Development*, I.S.I.D., New Delhi.
3. Chaudhury, M. R., 1970: *Indian Industries: Development and Location*, Oxford & IBH, Calcutta
4. Das, M. M., 1984: *Peasant Agriculture in Assam*, Inter India Publications, New Delhi.
5. Forbes, D. K., 1984: *Geography of Under Development*, John Hopkins Univ. Press, Baltimore.
6. Gunner Alexanderson, 1988: *Geography of Manufacturing*, Prentice-Hall Inc, (E.E. Edition)
7. Isard, W., 1956: *Location and Space Economy*, MIT Press, Cambridge.
8. Losch, A., 1954: *The Economics of Location*, New Haven.
9. Miller, E. W., 1977: *Manufacturing: A Study of Industrial Location*, Pennsylvania State University Press, Pennsylvania.
10. Smith, David M., 1981: *Industrial Location: An Economic Geographical Analysis*, Wiley, New York
11. Symons, L., 1979: *Agricultural Geography*, West view Press, Colorado
12. Thomas, R. S. and Corbin, P. B., 1974: *The Geography of Economic Activity*, McGraw Hill, New York

13. Wheeler, J. O. and Muller, P. O., 1981: *Economic Geography*, John Wiley & Sons, New York

FURTHER READINGS:

1. Isard, W., 1975: *Introduction to Regional Sciences*, Engle Wood Cliffs
2. Mohammad, N. (ed), 1992: *New Destinations in Agricultural Geography*, Concept Publishing Co., New Delhi.
3. Pryde, P. R., 1983: *Non -Conventional Energy Resources*, Wiley, New York.
4. Rostow, W. W., 1960: *The Stages of Economic Growth*, Cambridge University Press, New York.
5. Roy. and Mukherjee, S. 1993 (2nd Edition): *Economic Geography*, Central Education Enterprises, Calcutta.
6. Sushkin, Yulian, G., 1980: *Economic Geography: Theory and Models*, Progress Publishers, Moscow.
7. Tarrant, J. R., 1980: *Agricultural Geography: Problems in Modern Geography*, Wiley, New York.

SEMESTER-III

Paper: GPH 903C

RESEARCH METHODOLOGY IN GEOGRAPHY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (6 lectures)

Definition of research, essential features of good research; Introduction to research methodology in geography; Formulation of a research problem.

UNIT II: (10 lectures)

Research design: Meaning, need and features of a good design, statement of the problem, objectives, and hypothesis/ research questions, methodology, significance, review of research works and referencing.

UNIT III: (8 lectures)

Inductive and deductive approaches in geographic research, concept development, model building and hypothesis testing.

UNIT IV: (8 lectures)

Questionnaire design, data collection, construction of indicators / variables, data processing and analysis.

UNIT V: (8 lectures)

Sources of geographic data: Conventional, Remote Sensing, GIS, GPS.

UNIT VI: (8 lectures)

Research ethics: Plagiarism; Data interpretation and Research write-up: Structure, components and presentation.

SUGGESTED READING LIST:

1. Ackoff, R. L., 1961: *The Design of Social Research*, University of Chicago Press, Chicago.
2. Goode William, J. and Hatt, Paul K., 1952: *Methods in Social Research*, McGraw Hill Company, Inc., New York.
3. Kothari, C. R., 1993: *Research Methodology: Methods and Techniques*, 2nd ed., Wiley Eastern Ltd., New Delhi.
4. Mishra, R. P., 1989: *Research Methodology: A Hand book*, Concept Publishing Company, New Delhi.
5. Misra, H. N. and Singh, V. P., 1998: *Research Methodology in Geography*, Concept Publishing Company, New Delhi.
6. Montello, Danial R. and Paul C. Sutton, 2006: *An Introduction to Scientific Research Methods in Geography*, Sage Publications, London.
7. Nalwa, V., 1992: *The A B C of Research for Behavioural and Social Sciences*, Wiley Eastern, New Delhi.
8. Prasad, H., 1992: *Research Methods and Techniques in Geography*, Rawat Publications, Jaipur.

FURTHER READINGS (GPH903C)

1. Harvey, David, 1969: *Explanation in Geography*, Arnold
2. Miller, D. C., 1977: *Hand Book of Research Design and Social Management*, 3rd ed., David McKay Company, Inc. New York.
3. Ralph, Berry, 1990: *The Research Project, How to Write it*, Routledge, London.
4. Selltitz, C. et al., 1959: *Research Methods in Social Relations*, rev. ed., Rinehart and Winston, Inc., New York.
5. Thomas, S. Kuhn, 1970: *The Structure of Scientific Revolution*, University of Chicago Press, Chicago.

SEMESTER-III

Paper: GPH 904C

FUNDAMENTALS OF GEOINFORMATICS

Credits: 4 (2+1+1)

UNIT I: (8 lectures)

(A) THEORY: A brief history of Geoinformatics; Geographic data and information, Types and structure of spatial data and their geometric characteristics; Introduction to Open Source and Professional GIS software systems and hardware tools for GIS.

(B) PRACTICAL: Georeferencing of map and creating, editing the spatial data (Points, Polylines and Polygons) with reference to WGS84 and Geographic (Lat-long) Coordinate System.

UNIT II: (10 lectures)

(A) THEORY: Database Basics: Definition of database, Database Management System (DBMS), Spatial database (Geodatabase), Attribute database and Relational Database Management System RDBMS).

(B) PRACTICAL: (i) Digitization of administrative boundaries (India/ North Eastern India/ Assam) as polygons and adding any two socio-economic attributes and preparing two thematic maps. [2 exercises] (ii) Geoprocessing of data: (a) Point buffering and the points and their attributes within various range of buffer distances (b) line buffering and the points and their attributes within various range of buffer distances. [3 exercises]

UNIT III: (8 lectures)

(A) THEORY: Aerial Photography: Aerial Cameras; Flight Planning; Geometry of vertical air photographs.

(B) PRACTICAL: Determination of Scale, relief displacements, use of stereo-pair for mapping attributes. [2 exercises]

UNIT IV: (10 lectures)

(A) THEORY: Remote Sensing: Sensors, platforms, EMR properties of earth materials, Data characteristics and uses; Visual techniques of interpretation of Remote Sensing data;

(B) PRACTICAL: (i) Visual interpretation of given satellite imagery / aerial photograph- one with prominent physical features and other with prominent cultural features. [2 exercises]

UNIT V: (8 lectures)

(A) THEORY: An introduction to Digital Image Processing (DIP) Systems; DIP Techniques: Image enhancements and - Supervised and Unsupervised, Post classification techniques.

(B) PRACTICAL: (i) Supervised and Unsupervised Digital image classification and derivation of statistics of classified data, [2 exercises] (ii) Vector / Raster conversions.

UNIT VI: (6 lectures)

(A) THEORY: Basic understanding of the working principles of GPS and DGPS, Concept of dilution of precision and trilateration, Errors involved in GPS data.

(B) PRACTICAL : GPS / DGPS data collection and mapping (using Map Source / any other GPS Software/ GIS Software) of a locality with prominent features. [2 exercises]

Note: The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks each from Units 1 or 2 and Unit-3 or 4. ANY ONE question carrying 20 marks from Unit-5 or 6. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.

SUGGESTED READING LIST:

1. Burrough, P. A., 1986: *Principles of Geographical Information Systems in Land Resources Assessment*, Clarendon Press, Oxford.
2. Burrough, P.A. and Mc Donnell, R. A., 1998: *Principles of Geographical Information Systems*, Oxford University Press.
3. Curran, Paul, J., 1985: *Principles of Remote Sensing*, Longman Group Ltd.
4. Curtis, H., 2000: *The GPS Accuracy Improvement Initiative*, GPS World, June, 2000.
5. De Mars, M. N., 1999: *Fundamentals of Geographic Information Systems*, John Wiley & Sons Inc., New York.
6. Gonzalez, R. C., Woods, R. E., 2000: *Digital Image Processing*, Fifth Indian Reprint, Addison Wesley Longman, Delhi.
7. Gopi, S., 2005: *Global Positioning System Principles and Applications*, Ta McGraw Hill, New Delhi.
8. Jensen, J. R., 2011: *Remote Sensing of the Environment – An Earth Resource Perspective*, 3rd Impression, **Chapter-14**, Pearson, New Delhi.
9. Langley, R. B., 1991: *The GPS Receiver – An Introduction*, GPS World, 2(1).
10. Maguire, D. J., Goodchild, M. and Rhind, D. J., 1990: *Geographical Information Systems: Principles and Applications*, Longman Science and Technology Publications.

11. Sabins, Floyd F., 1987: *Remote Sensing Principles and Interpretation*, W.H. Freeman and Company, New York.

FURTHER READINGS:

1. Colwell, R. N., 1983: *Manual of Remote Sensing*, Vol. I & II, American Society of Photogrammetry.
2. Gautam, N. C., 1970: *Urban Land use Study through Aerial Photo-interpretation Techniques*, Pink Publishing House, Mathura.
3. Lillesand, T. M. and Kiefer, R. W., 1987: *Remote Sensing and Image Interpretation*, John Wiley.
4. Star, J. and Ester, J., 1990: *Geographic Information System*, Prentice-Hall.
5. Hord, R. Michael., 1986: *Remote Sensing: Methods and Applications*, John Wiley.
6. Robinson, A. H., et al., 1995: *Elements of Cartography*, John Wiley.

SEMESTER-III

Elective Paper: GPH 905E

BASIC FOUNDATIONS OF CARTOGRAPHY

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (4 lectures)

(A) THEORY: Defining the field of Cartography; history of development and recent trends, Cartography today and tomorrow- impact of changing technology and information age mapping.

(B) PRACTICAL: NIL.

UNIT II: (7 lectures)

(A) THEORY: Basic Geodesy – Cartographic use of spherical, ellipsoidal and geoidal earth, geographical coordinates; Properties of the graticules – distance on the sphere and great circle, direction and area; Geodetic position determination – Geodetic latitude and longitude, horizontal control and vertical control network.

(B) PRACTICAL: NIL.

UNIT III: (5 lectures)

(A) THEORY: Fundamentals of spherical trigonometry: Spherical triangle, spherical excess, sine and cosine formulae, Napier's rule of five part circle, convergence of meridians.

(B) PRACTICAL: NIL.

UNIT IV: (5 lectures)

(A) THEORY: Principles of ground survey and positioning; geodetic and plane surveying; concept of triangulation survey, Automated survey systems- Total Stations, electronic positioning, basic concept and principles of surveying by Global Positioning Systems (GPS).

PRACTICAL: Surveying by Total Station/ GPS/DGPS. [2 exercises]

UNIT V: (7 lectures)

Basic problems of map projection (earth's shape and size, scale and coordinate system) and principles and methods of construction: Zenithal Oblique Gnomonic and Stereographic Projections

(THEORY & PRACTICAL); Alber's Conical Equal Area Projection and Gauss' Conformal Projection (THEORY & PRACTICAL); Homolosine Projection (THEORY & PRACTICAL); International projection. [4 exercises]

UNIT VI: (4 lectures)

THEORY: Methods of thematic map reproduction, problems, prospects and emerging issues in thematic cartography.

PRACTICAL: Two qualitative and two quantitative thematic map of (Assam /India / North East India). [4 exercises]

Note: *The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks each from Units 5 and 6. ANY ONE question carrying 20 marks from Unit-4. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.*

SUGGESTED READING LIST:

1. Clendinning, J., 1960: *Principles of Surveying* 2nd edition.
2. Curtis, H., 2000: *The GPS Accuracy Improvement Initiative*, GPS World, June, 2000.
3. Deetz, C. H. and Adams, O. G.: *Elements of Map Projections*, Govt. Printing Office, Washington.
4. Garnett, W.: *Map Projections*, George Phillip and Sons, London.
5. Gopi, S., 2005: *Global Positioning System Principles and Applications*, Ta McGraw Hill, New Delhi.
6. Hinks, A. R., 1921: *Map Projections*, Cambridge University Press, London.
7. Kanetkar, T. P. And Kulkarni, S. V., 1972: *Surveying and Levelling [Part-I &II]*, Vidyarthi Griha Prakashan, Pune.
8. Langley, R. B., 1991: *The GPS Receiver – An Introduction*, GPS World, 2(1).
9. Robinson, A. H.; Morrison, J. L.; Muehrcke, P. C.; Kimerling, A. J. And Guptill, S. C., 1995: *Elements of Cartography*, John Wiley & Sons Inc, New York.
10. Sandover, J. A., 1961: *Plane Surveying*, Arnold.
11. Steers, J. A., 1953: *An Introduction to the Study of Map Projections*, University of London Press, London

FURTHER READINGS:

1. Leica Geosystems, 2000: *Geodetic RTK Receiver (Model SR 530), Operation Manual*.
2. Misra, R. P. and Ramesh, A. : *Fundamentals of Cartography* Revised Edition, Concept Publication, New Delhi.
3. Monkhouse, F. J., 1971: *Maps and Diagrams*, Methuen, London.
4. Rhind, D. W. and Taylor, D. R. F. (eds), 1989: *Cartography, Past Present and Future*, Applied Science Publishers, London.
5. Robenborst, T. D., and McDermatt, P. D., 1989: *Applied Cartography: Source Material for Mapping*, Merrill Publishing Co. London.
6. Saha, P. K. and Basu, P., 2010: *Advanced Geography Practical – A Laboratory Manual*, Books and Allied (P) Ltd., Kolkata.

SEMESTER-III

Elective Paper: GPH 906E

THEORETICAL BASIS OF AGRICULTURE GEOGRAPHY

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) **THEORY:** Approaches to the study of Agricultural Geography: commodity, systematic, regional, inductive and deductive, modern trends in the study of Agricultural Geography.

(B) **PRACTICAL:** Origin and diffusion of agriculture in the world. [1 exercise]

UNIT II: (6 lectures)

(A) **THEORY:** Determinants of agriculture: Physical, economic, social, institutional and technological; Land holding and land tenure systems; Land reforms, land use policy and planning.

(B) **PRACTICAL:** Preparation of agricultural land use map. [2 exercises]

UNIT III: (6 lectures)

(A) **THEORY:** Selected agricultural concepts and their measurements: Cropping pattern, crop rotation, crop concentration, intensity of cropping, degree of commercialisation, diversification and specialization, efficiency and productivity, crop combination regions.

(B) **PRACTICAL:** Crop combination- Nelson's method and Weaver's method [2 exercises]; Crop concentration. [1 exercise]

UNIT IV: (5 lectures)

(A) **THEORY:** Agricultural productivity: concept and measurement, factors influencing crop productivity.

(B) **PRACTICAL:** Measurement of agricultural productivity: (a) Kendall's ranking coefficient method; (b) Sapre and Deshpande's method of weighted index; (c) Jasbir Singh's method and (d) Bhatia's method. [4 exercises]

UNIT V: (5 lectures)

(A) **THEORY:** Methods in agricultural geography: Von Thunen's model of agricultural location and its recent modification; Concept of agricultural region, agricultural types and agricultural systems.

(B) **PRACTICAL:** Nil.

UNIT VI: (5 lectures)

(A) **THEORY:** Agricultural classification according to Whittlesey, Richard Thoman and Peter Corbin; Land use and land capability classification.

(B) **PRACTICAL:** Nil.

Note: The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.

SUGGESTED READING LIST:

1. Alexander, J.W., 1963: *Economic Geography*, Prentice Hall, Englewood Cliffs, N. J.

2. Anderson, J.R., 1970: ***A Geography of Agriculture***, Iowa: WMC Brown Co.
3. Clark, Colin and Haswell, Margaret, 1964: ***The Economy of Subsistence Agriculture***, St. Martin's, London.
4. Chorley, R. J. and Haggett, P., 1971: ***Socio-Economic Models in Geography***, Methuen and Co. Ltd., London.
5. Dunn, E. S., 1954: ***The Location of Agricultural Production***, University of Florida Press, Gainesville.
6. Hussain, M., 2001: ***Systematic Agricultural Geography***, Rawat Publication, Jaipur and New Delhi.
7. Morgan, W.B. and Munton, R.J.C., 1971: ***Agricultural Geography***, Methuen, London.
8. Singh, J., 1974: ***Agricultural Atlas of India: A Geographical Analysis***, Vishal Publishers, Kurukhsetra.
9. Singh, J., 1976: ***Agricultural Geography***, Tata McGraw Hill Pub. Co., New Delhi.
10. Symons, L., 1967: ***Agricultural Geography***, G. Bells and Sons, London.
11. Tarrant, John, R., 1974: ***Agricultural Geography***, David and Charles, Newton.
12. Book House, Delhi.
13. Tiwari, 1991: ***Agricultural Geography***, International Book House, Delhi.
14. Whittlesey, D., 1936: '***Major Agricultural Regions of the World***', ***Annals of the Association of American Geographers***, 26.

FURTHER READINGS:

1. Sauer, Carl O., 1952: ***Agricultural Origin and Dispersals***, American Geographical Society (Bowman Memorial Lecture), New York.
2. Gregor, Howard, F., 1970: ***Geography of Agriculture: Themes in Research***, Prentice Hall, Englewood Cliffs, N. J.
3. Grigg, D.B., 1978: ***Agricultural Systems of the World: An Evolutionary Approach***, Cambridge University Press, Cambridge.
4. Ilbery, 1991: ***Agricultural Geography: Social and Economic Analysis***, International Book House, Delhi.
5. Mohammad, N. (ed), 1992: ***New Dimensions in Agricultural Geography*** (in 8 Volumes), Concept Publishing Company, New Delhi.
6. Wheeler, K. B., Ladley, A. M. and Leong, F. G., 1970: ***Studies in Agricultural Geography***, Bland Educational, London.

SEMESTER-III

Elective Paper: GPH 907E

DRAINAGE BASIN ANALYSIS AND HYDROLOGY

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY-Field and scope of Fluvial Geomorphology; recent advancements; relation between fluvial geomorphology and hydrology; concepts on river / drainage basin and health of the rivers, basic considerations on delineation of river basin; major fluvial regimes of India.

(B) PRACTICAL: (i) Delineation of a well defined drainage basin, computation of area; (ii) Drawing of drainage network and computation of basin length, river length and shape index. [2 exercises]

UNIT II: (6 lectures)

(A) THEORY: Drainage basin characteristics - shape, size, topographic, rock and soil, and vegetation; association between one to other basin characteristics; human interference in the basin: Dam construction and resultant affects.

(B) PRACTICAL: Nil.

UNIT III: (6 lectures)

(A) THEORY: Drainage basin as a morphometric unit; Drainage basin morphometry - linear, areal and relief aspects of the basin and associated laws of drainage morphometry; hypsometric analysis of the basin.

(B) PRACTICAL: (i) Verification of the Laws of Drainage Network Analysis-(a) drainage order and numbers, (b) order and length (c) order and area (ii) Drainage density and (iii) drainage frequency map, (iv) Basin circularity ratio and form factor, (v) Hypsometric curve. [7 exercises]

UNIT IV: (5 lectures)

(A) THEORY: Drainage basin as a fluvial system: hydrological cycle, input and output of the basin; runoff, components of runoff, factors affecting runoff, runoff estimation and urban flooding.

(B) PRACTICAL: Nil

UNIT V: (5 lectures)

(A) THEORY: Basic hydrological processes: precipitation, evapotranspiration, infiltration, interception; ground water - occurrence, types and movement; quality and quantity measures, principles of water balance and its application, with special reference to crop productivity.

(B) PRACTICAL: Nil.

UNIT VI: (5 lectures)

(A) THEORY: River basin planning and development- basic principles and practices; integrated drainage basin management, modern methods and techniques in fluvial geomorphological studies: Remote Sensing, GIS and computer application.

(B) PRACTICAL: Preparation of a DEM of hill / mountainous area from contours and computation of slopes and aspects. 3-D visualization of SRTM Data. [4 exercises]

Note: The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations

SUGGESTED READING LIST:

1. Chorley, R. J. (ed), 1969: **Water, Earth and Man**, Methuen, London.
2. Gregory, K. J. and Walling, D. E., 1973: **Drainage basin Form and Processes**, Arnold, London.
3. Jensen, J. R., 2011: **Remote Sensing of the Environment – An Earth Resource Perspective**, 3rd Impression, **Chapter-14**, Pearson, New Delhi.
4. Goudie, Andrew, et. Al. (eds), 1981: **Geomorphological Techniques**, George Allen & Unwin, London.
5. King. C. A. M., 1966: **Techniques in Geomorphology**, Edward Arnold, London.
6. Knighton, D., 1984: **Fluvial Forms and Processes**, Edward Arnold, London.
7. Leopold, L. B., Wolman, M. G., and Miller, J. P., 1964: **Fluvial Processes in Geomorphology**, W.H. Freeman, USA.
8. Morisawa, M., 1968: **Streams: Their Dynamics and Morphology**, McGraw Hill Book Company, New York.

9. Sabins, Floyd. F., 1978: *Remote Sensing: Principles and Interpretation*, H. W. Freeman and Company, San Francisco.
10. Smith, D. I. and Stopp, P., 1978: *The River Basin: An Introduction to the Study of Hydrology*, Cambridge.

FURTHER READINGS:

1. Chow, V. T., 1964: *Handbook of Applied Hydrology*, McGraw Hill Book
2. Fairbridge, R. W. (ed), 1968: *Encyclopedia of Geomorphology*, Reinhold, New York.
3. Mutreja, K. N., 1986: *Applied Hydrology*, McGraw Hill Book Company, New York.

SEMESTER-III

Elective Paper: GPH 908E

REMOTE SENSING PRINCIPLES AND TECHNIQUES

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY: Aerial photography – needs and applications, geometry of vertical air photographs – scale and height measurements, stereoscopic measurements of object height, digital orthoimages and their uses.

(B) PRACTICAL: NIL.

UNIT II: (5 lectures)

(A) THEORY: Aerial camera and film characteristics, planning aerial photography missions, elements of visual image / photo interpretation.

(B) PRACTICAL: (i) determination of scale and displacements of aerial photographs (ii) stereoscopic interpretation of aerial photos.

UNIT III: (5 lectures)

(A) THEORY: Earth observation satellites and remote sensing satellites; Types and characteristics of sensors, Remote sensing data products and characteristics – spatial, radiometric, spectral and temporal resolutions with reference to IRS, SPOT, Quickbird, GeoEye and LANDSAT data; Path – Row referencing system.

(B) PRACTICAL: Any two exercises on image characteristics and statistics, computation areas on image.

UNIT IV: (6 lectures)

(A) THEORY: Electromagnetic radiation principles, responses of earth materials – water, vegetation, urban landscape, soils and minerals; remote sensing of natural resource monitoring and management.

(B) PRACTICAL: (i) LU/LC Mapping and (ii) Identification of geomorphological features.

UNIT V: (5 lectures)

(A) THEORY: Principles of thermal, hyperspectral, microwave and LiDAR Remote Sensing.

(B) PRACTICAL: Nil.

UNIT VI: (6 lectures)

(A) THEORY: Digital image processing (DIP): Radiometric and geometric corrections, image registration / rectification, Enhancements and filtering techniques; Image classification and accuracy assessment methods.

(B) PRACTICAL: DIP- Unsupervised, Supervised Classification and reporting of statistics.

Note: The End Semester Practical Examination of 60 marks and 3 hour duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule of theory paper examinations.

SUGGESTED READING LIST:

1. Agarwal, C. S., and Garg, P. K., 2000: *Textbook on Remote Sensing in Natural Resources Monitoring and Management*, Wheeler Publishing, New Delhi.
2. Anderson, J. R., et al., 1976: *A Landuse / Landcover Classification System for Uses with Remote Sensing Data*, USGS Professional Paper.
3. Avery, T.E., 1963: *Interpretation of Aerial Photography*, Burgess Publishing Co., Minneapolis.
4. Gonzalez, R. C., Woods, R. E., 2000: *Digital Image Processing*, Fifth Indian Reprint, Addison Wesley Longman, Delhi.
5. Jensen, J. R., 2011: *Remote Sensing of the Environment – An Earth Resource Perspective*, 3rd Impression, Pearson, New Delhi.
6. Lillesand, T.M. and Kiefer, R.W., 1987: *Remote Sensing and Image Interpretation*, John Wiley.
7. Wolf, R., 1974: *Elements of Photogrammetry*, McGraw Hill, New York.

FURTHER READINGS:

1. American Society of Photogrammetry, 1960: *Manual of Photographic Interpretation*, Banta Publishing Co., Menasha, Wisconsin.
2. Barret, E. C. and Curtis, L.E., 1976: *Introduction to Environmental Remote Sensing*, Champman Hill, London.
3. Curran, Paul, J., 1985: *Principles of Remote Sensing*, Longman Group Ltd.
4. Sabins, Floyd F., 1987: *Remote Sensing Principles and Interpretation*, W.H. Freeman and Company, New York.

SEMESTER-III

Elective Paper: GPH 909E

BASIS OF REGIONAL PLANNING AND DEVELOPMENT

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY: Need and purpose of regional planning; Approaches to regional planning : Synoptic, functional and adhoc or specific.

(B) PRACTICAL: Nil

UNIT II: (5 lectures)

(A) THEORY: The concept of region, regionalization and regional development.

(B) PRACTICAL: Regionalisation using methods – (i) Overlapping of different themes, (ii) Combinational Analysis- Weaver's method and Nelson's method and (ii) Factor analysis. [4 exercises]

UNIT III: (7 lectures)

(A) THEORY Theories of spatial distribution: Central place Theory of Christaller, Growth Pole Theory of Perroux and Boudeville, Theory of Prebisch, Cumulative Causation Theory of Gunnar Myrdal and Multi-level Growth Foci concept of R. P. Misra.

(B) PRACTICAL: Nil.

UNIT IV: (5 lectures)

(A) THEORY Case studies of regional planning exercises: National Capital Region and North East India, River basin planning- a case study from India.

(B) PRACTICAL: Demarcation of nodal region. [3 exercises]

UNIT V: (4 lectures)

(A) THEORY: Decentralization and Multi-level planning - features of decentralised planning, decentralised planning in India, concept and procedures in multilevel planning; stages in the evolution of multi-level planning process, multi-level planning in India.

(B) PRACTICAL: Nil.

UNIT VI: (6 lectures)

(A) THEORY: Regional planning strategy under Five Year Plans.

(B) PRACTICAL: Disparity in concentration of different groups of population by (i) L. Q. Method; (ii) Lorenz Curve. [3 exercises]

Note: The End Semester Practical Examination of 60 marks and 3 hour duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule of theory paper examinations.

SUGGESTED READING LIST:

1. Alden J. and R. Morgan, 1974: **Regional Planning: A Comprehensive View**, Leonard Hills Books, U.K.
2. Bhat, L. S., 1976: **Micro-Level Planning: A Case Study of Kamal Area, Haryana**, Concept Publishing Co., New Delhi.
3. Chand, M. and Puri, V. K. 1993: **Regional Planning in India**, Allied Publishers Limited, B/M Asraf, Ali Road, New Delhi-110002.
4. Chandna, . R. C., 2000: **Regional Planning: A Comprehensive Text**, Kalyani Publishers, New Delhi .
5. Dickinson , R. E: **City, Region and Regionalism**,
6. Hall, P., 1975: **Urban and Regional Planning**, David and Charles, London.
7. Hilborst, J. G. M. (1971) : **Regional Planning: A System Approach**, Notterdam University Press.
8. Mishra, R. P, 1992: **Regional Planning: Concept, Techniques, Policies and Case Studies**, Concept Publications, New Delhi.

9. Mishra, R. P., Sundaram, K.V. and Roa, P.V.S, 1974: **Regional Development Planning in India: A New Strategy**, Vikas Publication, New Delhi.
10. Mohapatra, A. C. and Pathak , C.R., 2003: **Economic Liberalization and Regional Disparities in India-Special Focus on the North-Eastern Region**, Star Publishing House Shillong.
11. Sanyal, B. M, 2001: India: **Decentralized Planning**, Concept, New Delhi ,

FURTHER READINGS:

1. Isard, Walter et al, 1998: **Method of Interregional and Regional Analysis**, Ashgate Publishing Ltd, Aldershot
2. Perfect, Michael, Gordon , Power, 1997: **Planning for Urban Quality-Urban Design in Towns and cities**, Routledge, London.
3. Thakur, B.et al., 2005: **Urban and Regional Development in India Vol. I.& II**, Concept Publication Company, New Delhi.

SEMESTER-III

Elective Paper: GPH 910E

CONCEPTUAL AND THEORETICAL FRAMEWORK OF SOCIAL GEOGRAPHY

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I:

(A) THEORY: The nature and development of Social Geography, approaches of study, philosophical and methodological development and contemporary trends in Social Geography; development of Social Geography in India.

(B) PRACTICAL: Nil.

UNIT II:

(A) THEORY: Concepts of social space, social organization, social area analysis and factorial ecology, understanding society and its structure and process, geographical bases of social formations.

(B) PRACTICAL: Social area analysis by Principal Component Analysis (PCA). [2 exercises]

UNIT III:

(A) THEORY: Social groups, social structure and social development: an international perspective, processes of social change: modernization, urbanization, industrialization and other socio-economic and cultural processes.

(B) PRACTICAL: Distribution and concentration pattern among social groups. [6 exercises]

UNIT IV:

(A) THEORY: Conceptual basis of social well-being: Social well-being as reflected in the indicators: Literacy and education, health care, civic amenities and economic condition. Human development; measurement of human development with social, economic and environmental indicators.

(B) PRACTICAL: Socio-spatial relationships, disparity and gradient patterns. [4 exercises]

UNIT V:

(A) THEORY: Gender perspective in Social Geography: Status and role of women in a society, gender discrimination, participation in politics and enfranchisement.

(B) PRACTICAL: Nil.

UNIT V:

(A) THEORY: Gender perspective in Social Geography: Status and role of women in a society, gender discrimination, participation in politics and enfranchisement.

(B) PRACTICAL: Nil.

UNIT VI:

(A) THEORY: Gender gaps in social and public life: Education, wage differentials in economic activities, health care and nutrition. Scope for bridging gender gap: Empowerment of women with education and economic opportunities.

(B) PRACTICAL: Nil.

Note: The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.

SUGGESTED READING LIST:

1. Ahmad, A., 1999: **Social Geography**, Rawat Publications, Jaipur and New Delhi.
2. Ahmad, A., (ed), 1993: **Social Structure and Regional Development: A Social Geography Perspective**, Rawat Publications, Jaipur.
3. Eyles, J.: '**Social Geography**', in Johnston, R.J., et al, **The Dictionary of Human Geography**.
4. Jones, E. and Eyles, J., 1977: **An Introduction to Social Geography**, Oxford University Press, Oxford and New York.
5. Hannett, Caris. (eds), 1996: **Social Geography: A Reader**, Arnold, London.
6. Jones, E. (ed), 1975: **Readings in Social Geography**, Oxford University Press, Oxford. London.
7. Milton, Keynes, 1972: **Social Geography: New Trends in Geography**, Open University Press.
8. Taher, M., 1994: **Social Geography: Concept and Theories**, NEIGS, Guwahati.

FURTHER READINGS:

1. Carter, John and Trevor, Jones., 1989: **Social Geography: An Introduction to Contemporary Issues**, Edward Arnold, London.
2. Gregory, D. and Urry, J. (eds), 1985: **Social Relation and Social Structure**, Macmillan, London.
3. Harvey, D., 1972: **Social Justice and the City**, Arnold, London.
4. Jackson, P. and Smith, S., 1984: **Exploring Social Geography**, George Allen and Unirn (Publishers) Ltd., London
5. Knox, P., 1995: **Social Well-being: A Spatial Perspective**, Oxford University Press, Oxford.
6. Momsen, J. H. and Townsend, G., 1987: **Geography of Gender in the Third World**, Hutchinson, State University of New York Press, London, New York.
7. Sharma, H. N., 2000 : '**Social Geography**' in Singh, J.(ed.) **Progress in Indian Geography(1996-2000)**, INSA, New Delhi.
8. Smith, D. M., 1977 : **Human Geography : A Welfare Approach**, Edward Arnold,

SEMESTER-IV

Paper: GPH 1001C

GEOGRAPHY OF DEVELOPMENT OF NORTHEAST INDIA

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (8 lectures)

North East India: location and strategic significance; Socio-economic and trade relation with ASEAN countries.

UNIT II: (8 lectures)

Physical characteristics and their relation to development: Relief, drainage, climate, soil and vegetation and bio-diversity.

UNIT III: (8 lectures)

Natural resources, their utilization and development: Coal, petroleum, natural gas, water and forests in North East India.

UNIT IV: (8 lectures)

Population and Development: Population growth, composition and distribution, migration, population characteristics and their socio-economic implications.

UNIT V: (8 lectures)

Agriculture and Development: Agricultural modernization and strategies for future development; constraints of Industrial development; problems and prospects of tourism.

UNIT VI: (8 lectures)

Spatial pattern of socio-economic development and backwardness (state level), and strategies for future development.

SUGGESTED READING LIST:

1. Bhagabati, A. K. *et al*, 2001: *Geography of Assam*, Rajesh Publications, New Delhi.
2. Bhatt, L. S., 1973: *Regional Planning in India*, Statistical Publishing Society, Calcutta.
3. Census of India publications on India and North Eastern states.
4. Das, H. P., 1971: *Geography of Assam*, NBT, New Delhi.
5. Das, M. M., 1984: *Peasant Agriculture in Assam*, Inter India Publications, New Delhi.
6. Dutta Ray, B., et. al (eds), 2000: *Population, Poverty and Environment in North East India*, Concept Publishing Co., New Delhi.
7. Dhar, P. K., 1988 (2nd Edition): *The Economy of Assam*, Ashomi Prakashani
8. Misra, et. al, 1974: *Regional Development Planning in India- A Strategy*, Institute of Development Studies, Mysore.
9. Singh, R. L., (ed), 1968: *India- Regional Studies*, 21st IGC, New Delhi
10. Taher M. and Ahmed, P., 2000: *Geography of North East India*, Mani-Manik Prakash, Guwahati.

FURTHER READINGS:

1. Barua, P. C., 1990: *Development Planning of North East India*, Mittal Publications, New Delhi.
2. Duncan, G., 1967: *Resource Utilization and the Conservation, Concept in Readings in Economic Geography*, New York.

3. Mitra, Ashok, 1967: *Levels of Regional Development in India, Vol. I*, Census of India Publications, New Delhi.
4. North East India Geographical Society: *North Eastern Geographer*, Department of Geography, Gauhati University.
5. N.E.C.: *Statistics for North Eastern Region*, Shillong, 1990-91 onwards.
6. The Geographical Society of North Eastern Hill Region (India): *Hill Geographer*, Shillong.

SEMESTER-IV

Paper: GPH 1002C

CULTURAL AND POLITICAL GEOGRAPHY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (8 lectures)

The field and development of Cultural Geography; themes and concepts in cultural geography: Cultural area, cultural landscape, cultural history, cultural ecology, cultural diffusion and cultural integration.

UNIT II: (8 lectures)

Patterns of world cultural regions with reference to (a) language, (b) religion and (c) ethnicity; Indian cultural regions, diffusion of major world religions and languages.

UNIT III: (8 lectures)

Convergence and divergence in cultural processes; Cultural changes: Perception, behaviouralism, cultural adaptations and cultural relativism; social processes in the city.

UNIT IV: (8 lectures)

The field and recent developments in political geography; schools of thought: landscape school, ecology school and organismic school.

UNIT V: (8 lectures)

Concepts in political geography: lebensraum, state and nation, core - periphery and capital, frontier and boundary, buffer zone, rim-land, heartland and political economy.

UNIT VI: (8 lectures)

Political geography of contemporary North East India with special reference to the changing political map; stability & instability; Interstate issues (like water disputes & riparian claims), insurgency in the states, conflict resolutions; demands and emergence of new states.

SUGGESTED READING LIST:

Cultural Geography

1. Broek, J. C. and Webb, J. W., 1978: *A Geography of Mankind*, McGraw Hill, New York.
2. Crans, Mike, 1998: *Cultural Geography*, Routledge, London.
3. Jackson, Richard.H. and Hudman, Lloyel. E., 1990: *Cultural Geography*, West Publishing Company, New York.
4. Noble, A. G. and Dutt, A. K. (eds), 1982: *India: Cultural Pattern and Processes*, West View Press / Boulder, Colorado.
5. Sauer, Carl.O., 1963: *Land and Life*, University of California Press, Berkley.

6. Zelinsky, W., 1973: *The Cultural Geography of America*, Princeton University Press, Princeton, N. J.

Political Geography

1. Alexander, L. M., 1963: *World Political Patterns*, Ran McNally, Chicago.
2. De Blij, H. J. and Glassner, Martin, 1968: *Systematic Political Geography*, John Wiley, New York.
3. Dikshit, R. D., 1996: *Political Geography: A Contemporary Perspective*, Tata McGraw Hill, New Delhi..
4. Dikshit, R. D., 1999: *Political geography: A Century of progress*, Sage, New Delhi.
5. Sukhwai, B. L., 1968: *Modern Political Geography of India*, Sterling Publishers, New Delhi.
6. Pounds N. J. G. 1972: *Political Geography*, McGraw Hill, New York.
7. Prescott, J. R. V.: *The Geography of Frontiers and Boundaries*, Aldine, Chicago.
8. Deshpande C. D., 1992: *India - A Regional Interpretation*, Northern Book Centre, New Delhi.
9. Thomas, W. L. (ed.), 1959: *Man's Role in Changing the Face of the Earth*, University of Chicago Press, Chicago.

FURTHER READINGS:

Cultural Geography

1. Gritzer, Charion, F., 1984 : '*The Scope of Cultural Geography*', *Journal of Geography*, Volume 65, pp.4-11.
2. Duncan, J. and Ley, D. (eds) , 1992 : *Place/Culture/Representation*, Routledge, London.
3. Johnston, R. J., Gregory, Derek and Smith, David M. (eds), 1994 : *The Dictionary of Human Geography*, Blackwell, Oxford
4. Jordan, T. G. and Rowntree, L.: *The Human Mosaic: A Thematic Interpretation in Cultural Geography*.

Political Geography

1. Fisher Charles A, 1968: *Essays in Political Geography*, Methuen, London.
2. John R. S., 1982: *An introduction to Political Geography*, Routledge, London.
3. Moddie, A.E.: *Geography Behind Politics*, Hutchinson, London, Latest edition.
4. Muir, R., 1975: *Modern Political Geography*, Macmillan Ltd., London.
5. Taylor, Peter, 1985: *Political Geography*, Longman, London. 1985.
6. Panikkar K. M., 1959: *Geographical Factors in Indian History: 2 Volumes*. Asia Publishing House, Bombay.

SEMESTER-IV

Paper: GPH 1003C

CONTEMPORARY ISSUES IN HUMAN GEOGRAPHY

Credits: 4 (3+1+0)

(48 lectures)

UNIT I: (8 lectures)

Human Geography: Changing nature, issues and debates; social theory in human geography.

UNIT II: (8 lectures)

Conceptualizing space and place: Structure and dynamics of space; relational framework of space and place; social construction of space and time; ethics of space and place.

UNIT III: (8 lectures)

Geography of Difference and Exclusion: Geographies of identity and difference related to class, religion, caste, gender and location.

UNIT IV: (8 lectures)

Social justice and political geography of difference.

UNIT V: (8 lectures)

Geography of social action and movements: Reasons and approaches to social movements; aspects of social security; social-environmental movements in India.

UNIT VI: (8 lectures)

Social and ethnic diversity in North East India – Social groups, tribes, religion and social tensions.

SUGGESTED READING LIST:

1. Agnew, J. A. and Corbridge, S., 1995: *Mastering Space: Hegemony, Territory and International Political Economy*, Routledge, London.
2. Benko, G. and Strohmayr, U., 1997: *Space and Social Theory: Interpreting Modernity and Postmodernity*, Blackwell Publishers, Oxford, London.
3. Bhabha, H., 1994: *The Location of Culture*, Routledge, London and New York.
4. Derek, G., Martin, R., and Smith, G., 1994: *Human Geography: Society, Space and Social Science*, Macmillan Publishers, Cambridge.
5. Johnston, R. J., 1991: *A Question of Place: Exploring the Practice of Human Geography*, Blackwell Publishers, Cambridge.
6. Harvey, D., 1996: *Justice, Nature and Geography of Difference*, Blackwell Publishers, Cambridge.
7. Massey, D., 1998: *Space, Place and Gender*, Polity Press, Cambridge.
8. Massey, D., Allen, J., and Sarre, P., 1999: *Human Geography Today*, Blackwell Publishers, Cambridge.
9. Redcliff, M., and Benton, T., 1994: *Social Theory and Global Environment*, Routledge, London and New York.
10. Sibley, D., 1995: *Geographies of Exclusion: Society, and Difference in the West*, Routledge, London.

FURTHER READINGS:

1. Corbridge, S., Martin, R. and Thrift, N., 1997: *Money, Power and Space*, Blackwell, Oxford.
2. Morley, D. and Robins, K., 1995: *Spaces of Identity: Global Media, Electronic Landscapes and Cultural Boundaries*, Routledge, London.
3. Rogers, A. and Vertovec, S., 1995: *The Urban Context*, Berg, Oxford.
4. Sack, R. D., 1997: *Homo Geographicus: A Framework for Action, Awareness, and Moral Concern*, The John Hopkins University Press, London.
5. Werlen, B., 1993: *Society, Action and Space: An Alternative Human Geography*, Routledge, London.

SEMESTER-IV

Paper: GPH 1004C

DISSERTATION ON RESPECTIVE FIELD OF SPECIALIZATION

Credits: 4 (0+0+4)

(24 lectures)

UNIT I: (8 lectures)

Definition, aim, functions and indicators of a good research, research types, research design, selection of data and methodology.

UNIT II: (6 lectures)

Selection of a right problem for research; definition of a research problem, framing of objectives and formulating research questions / research hypothesis – an example.

UNIT III: (6 lectures)

Guidelines to prepare a research proposal in 700 – 1000 words on a given or chosen theme / problem by stating the background and significance of study, objectives, research questions / hypotheses, databases and methodology and probable outcomes and their usefulness to society.

UNIT IV: (4 lectures)

Important criteria and considerations while writing a good research report.

Note: The End Semester Theory Examination on this paper of 60 marks and 2 hours duration will be as per the schedule and the rule for theory paper examinations.

Course Code and Title: GPH1004C: Dissertation on respective field of specialization	
Stages	Dissertation Plan
1	Submission of synopsis to the guides / supervisors by students after identifying a research problem (in 3 rd Semester) – Formal submission by 1st week
2	Defining objectives of study, Literature Review, Organization of study - 2nd week
3	Formulation of hypothesis / research questions - presentation of project proposal in the department 2nd week.
4	Data collection (it may start from 3 rd Semester), processing and analysis (tutorial and guidance) - 3rd to 9th week
5	Chapter wise presentation to guide / supervisor- 10th week onwards to 14th week
6	Submission of dissertation to the department:1 week before the date of practical examination.

SUGGESTED READING LIST:

1. Ackoff, R. L., 1961: *The Design of Social Research*, University of Chicago Press, Chicago.
2. Goode William, J. and Hatt, Paul K., 1952: *Methods in Social Research*, McGraw Hill Company, Inc., New York.
3. Kothari, C. R., 1993: *Research Methodology: Methods and Techniques*, 2nd ed., Wiley Eastern Ltd., New Delhi.
4. Mishra, R. P., 1989: *Research Methodology: A Hand book*, Concept Publishing Company, New Delhi.

5. Misra, H.N. and Singh, V.P., 1998: *Research Methodology in Geography*, Concept Publishing Company, New Delhi.
6. Montello, Danial R. and Paul C. Sutton, 2006: *An Introduction to Scientific Research Methods in Geography*, Sage Publications, London.
7. Nalwa, V., 1992: *The A B C of Research for Behavioural and Social Sciences*, Wiley Eastern, New Delhi.
8. Prasad, H., 1992: *Research Methods and Techniques in Geography*, Rawat Publications, Jaipur.

FURTHER READINGS:

1. Harvey, David, 1969: *Explanation in Geography*, Arnold.
2. Miller, D. C., 1977: *Hand Book of Research Design and Social Management*, 3rd ed., David McKay Company, Inc. New York.
3. Ralph, Berry, 1990: *The Research Project, How to Write it*, Routledge, London.
4. Selltitz, C. et al., 1959: *Research Methods in Social Relations*, rev. ed., Rinehart and Winston, Inc., New York.
5. Thomas, S. Kuhn, 1970: *The Structure of Scientific Revolution*, University of Chicago Press, Chicago.

SEMESTER-IV

Elective Paper: GPH 1005E

MODERN CARTOGRAPHIC TECHNIQUES

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY: Development of Computer Assisted Cartography/ Digital Cartography; Map as data model, maps and data processing systems, maps and geometry, positional cartographic objects of zero, one two and three dimensions.

(B) PRACTICAL: Nil.

UNIT II: (5 lectures)

(A) THEORY: Data structure for modelling geographic reality: Vector data – geometric, topological and feature components, data hierarchy and encoding, modelling of surfaces and solids; Raster data model and TIN model – characteristics, use, relative advantages and disadvantages.

(B) PRACTICAL: Nil.

UNIT III: (6 lectures)

(A) THEORY: Data sources, characteristics and cartographic uses: Ground survey and Global Positioning Systems, aerial photography, remote sensing, census; Cartographic use, advantage and disadvantages of - Digital Cartographic databases of various agencies in U. S. A. and India, thematic databases, digital elevation data (GLOBE, GTOPO30, SRTM) from various sources.

(B) PRACTICAL: (i) Use of SRTM data for profiling and contour mapping; (ii) Construction of DEM from topographical map. [3 exercises]

UNIT IV: (6 lectures)

(A) THEORY: Data processing and analyzing system: GIS – Components, structure and functions;

Database management functions; Data entry, edit, validation, manipulation and analysis functions; data display and cartographic outputs; mapping of statistical data using GIS tools.

(B) PRACTICAL: (i) Digital vector mapping and representation of political boundaries, transport and communication lines, market centres, towns and district head quarters etc.; (ii) Any three thematic maps using vector polygons of given areas. [3 exercises]

UNIT V: (5 lectures)

(A) THEORY: Data processing and analyzing system: Digital Image Processing (DIP) – Image enhancement functions, band ratios – NDVI and Soil moisture index; Image classification techniques.

(B) PRACTICAL: (i) LU/LC map and (ii) NDVI Computation and mapping from IRS data /LANDSAT data using standard DIP software. [2 exercises]

UNIT VI: (5 lectures)

(A) THEORY: Cartographic abstraction, symbolization of feature attributes – point, line, area and volume. Basic mapping techniques; Understanding display colour models by electronic devices; Basic consideration of colour and pattern use in map design; typography and lettering the map – functions and positioning guidelines.

(B) PRACTICAL: (i) Drawing of cartograms using GIS tools/ manual drawing; (ii) Visual interpretation of satellite data. [2 exercises]

Note: *The End Semester Practical Examination of 60 marks and 3 hour duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.*

SUGGESTED READING LIST:

1. American Society of Photogrammetry, 1960: **Manual of Photographic Interpretation**, Banta Publishing Co., Menasha, Wisconsin.
2. Anderson, J. R., et al., 1976: **A Landuse / Landcover Classification System for Uses with Remote Sensing Data**, USGS Professional Paper.
3. Avery, T. E., 1963: **Interpretation of Aerial Photography**, Burgess Publishing Co., Minneapolis.
4. Cromely, R. G., 1992: **Digital Cartography**, Prentice Hall Inc., Engle Wood Cliffs, New Jersey.
5. Curtis, H., 2000: **The GPS Accuracy Improvement Initiative**, GPS World, June, 2000.
6. Gopi, S., 2005: **Global Positioning System Principles and Applications**, Ta McGraw Hill, New Delhi.
7. Jensen, J. R., 2011: **Remote Sensing of the Environment – An Earth Resource Perspective**, 3rd Impression, Pearson, New Delhi.
8. Robinson, A. H.; Morrison, J. L.; Muehrcke, P. C.; Kimerling, A. J. And Guptill, S. C., 1995: **Elements of Cartography**, John Wiley & Sons Inc, New York.

FURTHER READINGS:

1. Dickinson, G. C., 1973: **Statistical Mapping and Presentation of Statistics**, Edward Arnold, London.
2. Hord, R. Michael., 1986: **Remote Sensing: Methods and Applications**, John Wiley.
3. Keats, J. S., 1979: **Automation and Education in Cartography**, Cartographic Journal, Vol. II.
4. Leuder, D. R., 1959: **Aerial Photographic Interpretation**, McGraw Hill, New York.

SEMESTER-IV
Elective Paper: GPH 1006E
AGRICULTURAL GEOGRAPHY OF INDIA
Credits: 3 (2+0+1)
(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY: Place of Indian agriculture: in global economy, type, characteristics, growth, distribution and development; Critical appreciation of large scale and small scale agriculture, Agricultural regions of India and their characteristics.

(B) PRACTICAL: Agricultural regionalization: Linkage method and Composite Index method [2 Exercises]; Crop Diversification. [1 exercise]

UNIT II: (5 lectures)

(A) THEORY: Agricultural land use pattern and shifting cropping pattern in India; Regional variation in the levels of agricultural development in India - Food deficit and food surplus regions; nutritional index.

(B) PRACTICAL: Computation and mapping of nutritional Index of the states of India. [1 exercise]

UNIT III: (6 lectures)

(A) THEORY: Problems of Indian agriculture: crop and cropping hazards, sustainability of agricultural practices and production;

(B) PRACTICAL: Land use mapping. [2 exercises]

UNIT IV: (6 lectures)

(A) THEORY: Technological factors in Indian agriculture, Green revolution, White revolution; Government policy for agricultural policy and planning and agricultural trade in India.

(B) PRACTICAL: Intensity of cropping: Index of cropping intensity. [3 exercises]

UNIT V: (5 lectures)

(A) THEORY: Contemporary Issues of Indian agriculture: Food, nutrition and hunger, food security, food aid programmes; environmental degradation; role of irrigation, fertilizers, insecticides and pesticides, technological know-how.

(B) PRACTICAL: Composite Index of Agricultural development. [2 exercises]

UNIT VI: (5 lectures)

(A) THEORY: Agriculture in North East India – Agriculture as an economic basis of North East India; major food crops and cash crops produced; problems and prospects of agriculture in North East India with special reference to Assam

(B) PRACTICAL: Intensity of cropping in various districts of Assam. [1 exercise]

Note: The End Semester Practical Examination of 60 marks and 3 hour duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.

SUGGESTED READING LIST:

1. Bayliss Smith, T. P., 1987: *The Ecology of Agricultural Systems*. Cambridge University Press, London.

2. Berry, B. J. L. et. al., 1976 : *The Geography of Economic Systems*. Prentice Hall, New York, 1976.
3. Brown, L.R. : *The Changing World Food Prospects - The Nineties and Beyond*. World Watch Institute, Washington D.C., 1990.
4. Das, M. M., 1984: *Peasant Agriculture in Assam: A Structural Analysis*, Inter-India Publications, New Delhi.
5. Dyson, T. : *Population and Food - Global Trends and Future Prospects*. Routledge, London, 1996.
6. Singh, J. and Dhillon, S.S. : *Agricultural Geography*, Tata McGraw Hill Pub., New Delhi, 1988.
7. Sukla, S. P. and Agarwal, A.K.: *Agriculture in North East India*.
8. Whittlesey, D., 1936: *Major Agricultural Regions of the World*, Annals of the Association of American Geographers, 26.

FURTHER READINGS:

1. Morgan, W.B. : *Agriculture in the Third World - A Spatial Analysis*. Westview Press, Boulder, 1978

SEMESTER-IV

Elective Paper: GPH 1007E

CHANNEL FORM AND PROCESSES

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (7 lectures)

(A) THEORY: River channel processes-forces acting in channel, velocity distribution, types of flow and their characteristics; erosion, deposition, and transportation of sediment in channel, grain size analysis of sediment.

(B) PRACTICAL: (i) Discharge hydrograph, (ii) Stage –discharge relationship, (iii) Frequency Analysis of hydrologic event (flood / rainfall) by – (a) Plotting Position, (b) Log-Pearson Type-III distribution and (iii) Gumbel’s Extreme Value Distribution. [5 exercises]

UNIT II: (5 lectures)

(A) THEORY: Channel form - the longitudinal profile, grade, plan geometry, channel pattern- straight, meandering and braided, initiation and development of meandering channels, geometry of meanders, flow in meanders, mechanics and causes of braiding.

(B) PRACTICAL: (i) Identification and mapping of straight, sinuous, meandering and braided channels in satellite imagery or aerial photographs / topographical maps, (ii) Computation of Sinuosity Index (iii) Braiding Index and (iv) Longitudinal profile of river. [4 exercises]

UNIT III: (5 lectures)

(A) THEORY: Cross sectional form, hydraulic geometry analysis, variation in hydraulic characteristics at-a-station, and in a downstream direction.

(B) PRACTICAL: Width versus discharge, depth versus discharge and velocity versus discharge relationships from empirical data. [3 exercises]

UNIT IV: (5 lectures)

(A) THEORY: Fluvial landforms - processes and pattern of development of flood plain, alluvial fan and delta.

(B) PRACTICAL: Identification and mapping of fluvial landforms in satellite imagery or aerial photographs / topographical maps. [1 exercise]

UNIT V: (5 lectures)

(A) THEORY: Channel changes in time and over space. Fluvio – geomorphic hazards: Flood and bank erosion, sedimentation, landslides and soil erosion with special reference to North East India.

(B) PRACTICAL: Nil.

UNIT VI: (5 lectures)

(A) THEORY: Effects of man on channel processes - Dam and reservoir construction, channel straightening, bank stabilization, sand and gravel extraction.

(B) PRACTICAL: Nil.

Note: *The End Semester Practical Examination of 60 marks and 3 hour duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.*

SUGGESTED READING LIST:

1. Chorley, R. J. (ed), 1969: ***Water, Earth and Man***, Methuen, London.
2. Garde, R. J. and Ranga Raju, K.G.: ***Mechanism of Sediment Transportation***.
3. Goudie, Andrew, et. Al. (eds), 1981: ***Geomorphological Techniques***, George Allen & Unwin
4. Gregory, K. J. and Walling, D. E., 1973: ***Drainage basin Form and Processes***,
5. King. C. A. M., 1966: ***Techniques in Geomorphology***, Edward Arnold, London.
Unwin, London.
6. Leopold, Wolman and Miller, 1964: ***Fluvial Processes in Geomorphology***, W. H. Freeman and Company, San Francisco.
7. Morisawa, M., 1968: ***Streams: Their Dynamics and Morphology***, McGraw Hill Book Company, New York.

FURTHER READINGS:

1. Chow, V. T., 1964: ***Handbook of Applied Hydrology***, McGraw Hill Book
2. Petts, G. E. and Foster, I., 1985: ***Rivers and Landscape***, Edward Arnold, London.
3. Rao, K. L., 1975: ***India's Water Wealth***, Orient Longman, New Delhi.
4. Schumm, S. A., 1977: ***The Fluvial System***, Wiley Interscience, New York.
5. Schumm, S. A.(ed), 1977: ***Drainage Basin Morphology***.

SEMESTER-IV

Elective Paper: GPH 1008E

PRINCIPLES AND APPLICATIONS OF GIS AND GPS

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY: Geographical Information Sciences – a brief history; Definitions of GIS, Components of a GIS; Data models and their use; Referencing systems and earth models and geodetic aspects.

(B) PRACTICAL: Nil

UNIT II: (5 lectures)

(A) THEORY: Database structure and their organization in computer, Database Management Systems; Spatial data structures – the choice between vector and raster; Data input, verification, storage and output.

(B) PRACTICAL: (i) Georeferencing of Raster map / image and Coordinate transformation; (ii) Vector data creation and editing and presentation of thematic outputs. [2 exercises]

UNIT III: (5 lectures)

(A) THEORY: Creating continuous surfaces from point data; Methods for interpolation; Digital elevation models and their uses; Map overlays- arithmetic and weighted overlays.

(B) PRACTICAL: Point attribute mapping by (i) continuous raster grids and (ii) TIN; Line attribute mapping by (iii) continuous raster grids and (iv) TIN. [4 exercises]

UNIT IV: (5 lectures)

(A) THEORY: Spatial analysis and operations: The basic classes of operations for spatial analysis; Operations on the attributes of geographic entities.

(B) PRACTICAL: Geoprocessing / Proximity analysis (i) point buffering, (ii) line buffering; (iii) Raster Overlays of two or more layers; (iv) Thematic mapping of polygon attributes (any two) and their raster conversions. [5 exercises]

UNIT V: (7 lectures)

(A) THEORY: Introduction to GPS and its working principles – satellite position, ranging, time calculation, GPS errors and their corrections, GPS Receivers and its features, DGPS working principles, Accuracy in DGPS.

(B) PRACTICAL: GPS / DGPS coordinates mapping by using database / text files. [1 exercise]

UNIT VI: (5 lectures)

(A) THEORY: GPS surveying methods – absolute positioning and relative / differential positioning, static surveying and kinematic surveying; Real time kinematic (RTK) surveying; Topographic mapping and GIS applications for GPS / DGPS.

(B) PRACTICAL: (i) Surveying by GPS / DGPS for topographic mapping; (ii) Mapping of location based services / events by GPS/DGPS. [2 exercises]

Note: *The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.*

SUGGESTED READING LIST:

1. Burrough, P. A., 1986: *Principles of Geographical Information Systems in Land Resources Assessment*, Clarendon Press, Oxford
2. Burrough, P. A. and McDonnell, R. A., 1998: *Principles of Geographical Information Systems*, Oxford University Press, Oxford.
3. Curtis, H., 2000: *The GPS Accuracy Improvement Initiative*, GPS World, June, 2000.
4. Chrisman, N., 1997: *Exploring Geographic Information Systems*, John Wiley & Sons Inc.,
5. De Mars, M. N., 1999: *Fundamentals of Geographic Information Systems*, John Wiley & Sons Inc., New York.
6. Gopi, S., 2005: *Global Positioning System Principles and Applications*, Tata McGraw Hill, New Delhi.
7. Kraaak, M. and Ormelling, F., 2004: *Cartography Visualization of Geospatial Data*, Pearson Education, Delhi.

FURTHER READINGS:

1. Star, J. and Ester, J., 1990: *Geographic Information System*, Prentice-Hall.
2. Maguire, D. J., Goodchild, M. and Rhind, D. J., 1990: *Geographical Information Systems: Principles and Applications*, Longman Science and Technology Publications.
3. Robinson, A. H., et al., 1995: *Elements of Cartography*, John Wiley.

SEMESTER-IV

Elective Paper: GPH 1009E

REGIONAL AND GLOBAL PERSPECTIVE OF DEVELOPMENT

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

(A) THEORY: The concept of development, sustainable development and development indicators: per capita income, energy and demographic indicators.

(B) PRACTICAL: Regionalisation using methods of: (a) Overlapping of different themes (b) Ranking using mean and standard deviation. [2 exercises]

UNIT II: (5 lectures)

(A) THEORY: Theories of under development: Marxist, Centre-periphery and Dependency theories.

(B) PRACTICAL: Nil.

UNIT III: (5 lectures)

(A) THEORY: Regional development perspectives in the Netherlands Regional Development in Italy.

(B) PRACTICAL: Nil.

UNIT IV: (5 lectures)

(A) THEORY: Patterns of world economic development: agricultural, industrial, commercial and technological.

(B) PRACTICAL: Use of disparity index [**1 Exercise**], Urban land use models. [2 exercises]

UNIT V: (5 lectures)

(A) THEORY: Planning for problem areas in India: tribal sub-plan, drought prone areas and rural development.

(B) PRACTICAL: Distribution of economic activities and settlements. [2 exercises]

UNIT VI: (7 lectures)

(A) THEORY: New urbanism and smart growth, concept of smart city, urban renaissance of 1990s in UK; Urban policy and urban planning in India, Trend of urbanization in India; components of a physical plan; neighbourhood planning.

(B) PRACTICAL: Network analysis: Application of aggregate connectivity for regional Development using (a) alpha, beta, gamma and cyclomatic number and (b) Use of Accessibility and Detour Index. [4 exercises]

Note: *The End Semester Practical Examination of 60 marks and 3 hours duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule for theory paper examinations.*

SUGGESTED READING LIST:

1. Barua, P. C., 1990: *Development Planning of North East India*, Mittal Publications, New Delhi.
2. Chand, M. and Puri, V. K. 1993: *Regional Planning in India*, Allied Publishers Limited, B/M Asraf, Ali Road, New Delhi-110002.
3. Chandna, . R. C., 2000: *Regional Planning: A Comprehensive Text*, Kalyani Publishers, New Delhi.
4. Friedman, J. and William Alonso (eds), 1964: *Regional Development and Planning*, Cambridge, Mass. M.I.T. Press.
5. Friedman, J., 1973: *Utilization, Planning and National Development*, Bererly Hills, Sage Publications.
6. Kidwai, A. H., 1985: *Disparities in the Levels of Regional Development and Spatial Differentiation in India in the Historic Context*, CSRD, JNU, Mimeo.
7. Macinonis, and Parrillo, 2010: *Cities and Urban Life*, PHI Learning Pvt. Ltd., New Delhi.
8. Mukherjee, A., 1993: *A Perspective Plan for A Hill District*, Heritage, New Delhi.
9. Sandesara, J. C., 1992: *Industrial Policy and Planning, 1947-91: Tendencies, Interpretations and Issues*, Sage Publications, New Delhi.
10. Sivaramakrishnan, K. C., et al., 2005: *Handbook of Urbanization in India – an Analysis of Trends and Processes*, OUP, New Delhi.
11. Snallenbrock, A. J. H. and Spit, T. J. M., 1992: *Regions and Regionalization in the Netherlands*, Tijdschrift Voor, *Econ. En. Soc. Geografie*. 82 (3).

FURTHER READINGS:

1. Gogoi, J. K., 1978: The Government of India's Policy for Regional Development- A Summing Up and a Critique, *North Eastern Econ. Rev.* II (3), July- Sept.
2. Goswami, A., 1981: 'Assam's Industrial Development: Urgency of New Direction', *Econ. Pol. Weekly*, XVI (21)
3. Mukherjee, A., 1991: *Methodology and Database for Decentralized Planning*, Heritage, New Delhi.
4. Pannerselvam, A., 1999: *Regional Development in the Developing Countries: A Search for Appropriate Theory*, Space, 12 (2).
5. Ridell, R., 1985: *Regional Development Policy*, St. Martin's Press, New York.

SEMESTER-IV

Elective Paper: GPH 1010E

SOCIAL GEOGRAPHY OF INDIA

Credits: 3 (2+0+1)

(32 contact hours)

UNIT I: (5 lectures)

A) THEORY: Social differentiation and region formation, social structure and social stratification as reflected in race, tribe, caste, language, dialect and religion in India; Indian unity and diversity.

(B) PRACTICAL: Social survey methods. [4 exercises]

UNIT II: (4 lectures)

(A) THEORY: Social evolution in India: The pre-history and historic scene with special reference to the *Janapadas* of ancient India and the Mughal *Subahs*. Processes of social change in India: Sanskritization, westernization and modernization.

(B) PRACTICAL : Nil.

UNIT III: (8 lectures)

(A) THEORY: Social well-being: Concepts of social well-being, physical quality of life, Human development; measurement of human development with social, economic and environmental indicators; Rural urban deprivation in India with respect to health care; education and shelter; deprivation and discrimination issues relating to women and underprivileged groups; Patterns and bases of rural and urban society.

(B) PRACTICAL: Social area analysis by composite Z score. [2 exercises]

UNIT IV: (5 lectures)

(A) THEORY: Public policy and social planning in India: Review of Five year Plans and area plans towards social policy in India; Strategies to improve social well-being in tribal, hill, drought and flood prone areas; Social and environmental impact assessment of development projects.

(B) PRACTICAL: Nil.

UNIT V: (5 lectures)

(A) THEORY: Geographical diversity in social composition, problems of identity consciousness, questions of regionalism and nationalism in contemporary North-East India.

(B) PRACTICAL: Social interaction and diffusion patterns. [3 exercises]

UNIT VI: (5 lectures)

(A) THEORY: Cultural Diversity in North-east India: Bases of cultural diversity-race, religion and language. Ethnic groups and tribal groups of Northeast India: ethnic landscape and economy of the area

(B) PRACTICAL: Diversity Index (Simpson's Method). [3 exercises]

Note: *The End Semester Practical Examination of 60 marks and 3 hour duration will consist of ANY TWO questions carrying 15 marks and ANY ONE question carrying 20 marks from the portions marked as practical. Practical records and Viva-voce = 5+5 = 10 marks. The End Semester Theory Examination will be as per the schedule and the rule of theory paper examinations.*

SUGGESTED READING LIST:

1. Ahmad, A., 1999: *Social Geography*, Rawat Publication, Jaipur and New Delhi.
2. Ahmad, A. (ed), 1993: *Social Structure and Regional Development: A Social Geography perspective*, Rawat Publication, Jaipur.
3. Noble, A. G. and Dutta, A. K. (eds): *India: Cultural Pattern and Processes*, West View Press, Colorado.
4. Srinivas, M.N., 1986: *India: Social Structure*, Hindustan Publishing Corporation, Delhi.

FURTHER READINGS:

1. Pecion, M., 1987: *Social Geography: Process and Prospect*, Croom Helm, London.
2. Smith, D.M., 1977: *Human Geography: A Welfare Approach*, Edward Arnold, London.
3. Smith, D.M., 1979: *Where the Grass is Greener: Living in an Unequal World*, Penguin Books Australia Ltd, Victoria.
4. Sopher, D.E.(ed): *An Exploration Of India: Geographical Perspectives on Society and Culture*, Longman, London