

GAUHATI UNIVERSITY
Syllabus for M.A./M.Sc. Course in Geography
Details of Course Content

SEMESTER - I

Course No. : G 101
Course Title : Principles and Concepts in Geomorphology
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 25

Candidates are to answer 4 questions selecting one of 16 marks and three of 8 mark each within two and half hours of examination.

Course Content

1. History of development of geomorphic ideas; recent trends in geomorphology. (5 lectures)
2. Fundamental concepts in geomorphology: uniformitarianism and catastrophism, system concepts in geomorphology, steady state, and dynamic equilibrium. (8 lectures)
3. Concepts and techniques in applied geomorphology; palaeogeomorphology, environmental geomorphology. (6 lectures)
4. Thresholds in geomorphology. (3 lectures)
5. Quantitative applications in geomorphology. (3lectures)

Course No. : G 102
Course Title : Processes in Geomorphology
Total Marks : 50 (Including 10 marks allotted to internal assessment)
Total number of lectures : 25

Candidates are to answer 4 questions selecting one of 16 marks and three of 8 mark each within two and half hours of examination.

Course Content

1. Geomorphic processes: endogenetic and exogenetic; glacial, fluvial and aeolian. (8 lectures)
2. Relationship of climate, vegetation and soil with geomorphic Processes; morphogenetic regions. (6 lectures)
3. Development of slopes: slope forming processes and slope forms. (6 lectures)
4. Methods and techniques of geomorphic process study. (5 lectures)

Books recommended for Courses No. G101 and G102

Ahmad, E., 1985: *Geomorphology*, Kalyani Publishers, New Delhi
Bloom, Arthur L, 1978: *Geomorphology-A Systematic Analysis of Late Cenozoic Landforms*, Prentic Hall, Engelwood Cliffs, N.J.

- Chorley, Richard J, 1972: *Spatial Analysis in Geomorphology*, Harper & Row Publishers, New York, London.
- Chorley, Richard J. (ed), 1969: *Water, Earth and Man*, Methuen & Co. London. Chorley, R.J. (ed.), 1969: *Introduction to Geographical Hydrology*, Methuen & Co. London. Chorley, R.J. (ed), 1968: *Models in Geography*, Methuen & Co. London.
- Chow, V.T., 1964: *Handbook of Hydrology*, Mc Graw Hill
- Cooke, R.U.and Doornkamp, J.C., 1974: *Geomorphology in Environmental Management*
- Cooke, R.U.and Warren, A., 1973: *Geomorphology in Deserts*, Bats ford, London Cotton, C.A.1945: *Geomorphology*, John Wiley & sons Inc. New York Crickmay, C.H., 1974: *Work of the River*, The McMillan Press Ltd. London.
- Dayal, P. (2nd edition), 1996: *A Textbook of Geomorphology*, Shukla Book Depot, Patna Derbshire, E. (ed), 1976: *Geomorphology and Climate*, Wiley, London
- Dixit, K.R.(ed), 1983: *Contribution to Indian Geography/Geomorphology*, Heritage, New Delhi
- Doornkamp, J.C. and King, C.A.M. 1971: *Numerical Analysis in Geomorphology: An Introduction*, St. Martins Press, New York
- Dury, G.H., 1959: *The Face of the Earth*, Penguin Books.
- Dury, G.H.(ed), 1966: *Essays in Geomorphology*, William Heinmann, London. Embelton, C, Brunsten, D, and Jones, D.K.C., (ed), 1978: *Geomorphology: Present Problems and Future Prospects*, Oxford University Press, London.
- Embleton, C.and Thorns, J.1979: *Processes in Geomorphology*, Arnold Heinemann, First Indian Edition, 1982.
- Engeln, O.D.Von, 1942: *Geomorphology*, McMillan, London
- Fairbridge, R.W. (ed), 1968: *Encyclopedia of Geomorphology*, Reinhold, New York. Faniran, A. and Jeje, L.R., 1983: *Humid Tropical Geomorphology*, Longman, London. Goudie, Andrew, et. Al. (eds), 1981: *Geomorphological Techniques*, George Allen & Unwin, London.
- Gregory, K.J., 1985: *The Nature of Physical Geography*, Edward Arnold, London. Gregory, K, J. and Walling, D.E., 1973: *Drainage Basin- Form and Process*, Edward Arnold, London
- Hails John, R. (ed) 1978: *Applied Geomorphology*, Elseiver Scientific Publishing Company, Amsterdam, Oxford, New York.
- King, C.A.M., 1966: *Techniques in Geomorphology*, Edward Arnold, London. Leopold, L.B., Wolman, M.G. and Miller, J.P., 1964: *Fluvial Processes in Geomorphology*, Freeman, San Francisco.
- Lobeek, A.K., 1939: *Geomorphology*, Mc Graw Hill, New York. Morisawa, Marie M., 1968: *Streams, Their Dynamics and Morphology*, Mc Graw Hills, New York
- Morisawa, Marie M. (ed), 1981: *Fluvial Geomorphology*, George Allen & Unwin, London.
- Morisawa, Marie M., 1985: *River Forms and Process*, Longman, London and New York.
- Nelson, J. G. and Chambers, M. J. (ed): *Geomorphology: Processes and Methods*. Penck, W., 1924: *Morphological Analysis of Landforms*, Mc Millan, London. Petts, G.E. 1983: *Rivers (Sources and Methods in Geography)*, Butterworths, London- Boston.
- Petts, G.E.and I. Foster, 1985: *Rivers and Landscape*, Edward Arnold, London. Pitty, A.F., 1971: *Introduction to Geomorphology*, Barnes and Nobel, New York Richards, K, 1982: *Rivers*, Methuen, London.

- Scheidegger, A.E., 1970: *Theoretical Geomorphology*, Springer-Verlag, Berlin, Heidelberg, New Work.
- Schumm, S.A., (ed), 1977: *Drainage Basin Morphology*, Dowden Hutchinson & Ross Inc.
- Schumm, S.A., 1977: *The Fluvial Systems*, Wiley, New Work
- Sharma, H.S., (ed), 1982: *Perspectives in Geomorphology*, Vols I to IV, Concept, New Delhi.
- Sharma, V.K., 1986: *Geomorphology, Earth Surface Processes and Forms*, Tata Mc Graw Hill, New Delhi.
- Sparks, B.W. 1960: *Geomorphology*, Longman, London, Second Edition. Strahler, A.N., 1968: *The Earth Science*, Harper International Edition. Strahler, A.N., 1969: *Physical Geography*, 3rd edition, Wiley.
- Thomas, M.F., 1974: *Tropical Geomorphology*, McMillan, London.
- Thornbury, W.D. 1969: *Principles of Geomorphology*, 2nd ed., Wiley International Edition, Wiley Eastern Reprint, 1984.
- Woodrige, S.W. and Morgan, R.S., 1948: *The Physical Basis of Geography*, Longman (First Published in 1937).
- Worcester, P.G., 1965: *A Textbook of Geomorphology*, Van Nostrand, 2nd Edition, East West Edition, New Delhi.
- Young, A., 1972: *Slope*, Longman, New York, Oliver and Boyd, Edinburgh.

Course No.	: G 103
Title of the Course	: Climatology
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total Lectures	: 25

Candidates are requested to answer 4 questions selecting one question of 16 marks and three of 8 marks each within two and half hours of examination.

Course Content

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| 1. Insolation, pressure system and air circulation . | (3 lectures) |
| 2. Air mass and fronts: types, characteristics and their influence on weather and climate. | (5 lectures) |
| 3. Climatic disturbances: cyclone, drought, el nino. | (4 lectures) |
| 4. Classification of world climate of Koppen and Thornthwaite. | (4 lectures) |
| 5. Monsoon climate: origin, mechanism of development and distribution. | (3 lectures) |
| 6. Techniques of weather forecasting. | (3 lectures) |
| 7. Global climatic Change: spatio-temporal perspectives. | (3 lectures) |

Books recommended for Course No. G 103

- Barry, R.G. and Chorley, R.J. 1971: *Atmosphere, Weather and Climate*, Methuen Co. Ltd, London
- Blair, T.A., 1954: *Weather Elements*, Prentice-Hall.
- Blair, R.A., 1942: *Climatology-General and Regional*, Prentice Hall, New York
- Cristfield, H.J., 1975: *General Climatology*, Prentice Hall of India, New Delhi.

- Das, P.K., 1968: *The Monsoons*, National Book Trust, New Delhi. Gentili, J.A., 1958: *A Geography of Climate*.
- Griffith, J.F., 1966: *Applied Climatology*, Oxford University Press. Hobbs, J.E., 1980: *Applied Climatology*, Butterworths.
- Lockwood, J.G., 1976: *World Climatology: Environmental Approach*, Edward Arnold Ltd., 41 Bedford Square, Wc IB 3 Dq.
- Lal, D.S., 1998: *Climatology*, Sharda Pustak Bhawan, Allahabad.
- Lydolph, Paul, E., 1985: *The Climate of the Earth*, Rawman and, Totowa, N.J. Miller, A A. 1953: *Climatology*, Dutton.
- Rumney, George, R., 1968: *Climatology and World's Climates*, McMillan, London. Sellers, W.D.: *Physical Climatology*, Chicago University Press.
- Strahler, A.N., 1971: *Physical Geography*, John Wiley, New York
- Stringer, E.N., 1982: Hoirn, L.A., 1980: *An Introduction to Climate*, International Series.
- Trewartha, G.T. and Horn, L.A., 1980: *An Introduction to Climate*, International Series. Weiesner, C.J.: *Hydrometeorology*, Chapman & Hall Ltd.

Course No. : G 104
Title of the Course : Biogeography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total Lectures : 25

Candidates are required to answer 4 questions selecting one question of 16 marks and three others of 8 marks each within two and half hours of examination.

Course Content

1. Biogeography : development and significance. (3 lectures)
2. Approaches in biogeography: evolutionary and ecological. (4 lectures)
3. Bio- energy cycles in the terrestrial ecosystem. (3 lectures)
4. Soil characteristics and their biogeographical significance.(3 lectures)
5. Plant and animal association in varying habitats and environments. (5 lectures)
6. Concept of biodiversity; conservation of forest and wildlife; national forest and environment policy of India (7 lectures)

Books recommended for Course No. G 104

- Bradshaw, M.J., 1979: *Earth and Living Planet*, ELBS, London. Bunting, B.T., 1967: *The Geography of Soil*, Hutchinson, London. Goudie, Andrew, 1981: *The Human Impact*, Basil Blackwell, Oxford.
- Hussain, M. (ed), 1994: *Biogeography (Part I&II)*, Anmol Publications Pvt. Ltd. New Delhi.
- Newbiggin: *Plant and Animal Geography*.
- Odum, E.P., 1977: *Ecology*.
- Robinson, H., 1982: *Biogeography*, E.L.B.S., Mc Donald & Evans, London. Russell, E.W., 1973: *Soil Condition and Plant Growth*, Long man, London.

Smith, R.L., 1977: *Ecology of Man- An Ecosystem Approach*.
 Simmons, I.G., 1974: *Biogeography: Natural and Cultural*, London.
 Tiby, 1982: *Biogeography*, Longman.

Course No. : G 105
Title of the Course: Theoretical Basis of Economic Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total Lectures : 25

Candidates are required to answer 4 questions, selecting one of 16 marks and the remaining three of 8 marks each within two and half hours of examination.

Course Content

1. Conceptual and theoretical development in economic geography. (3 lectures)
2. Approaches in economic geography: institutional approach and theoretical approach. (3 lectures)
3. Concepts and models in economic geography: Ricardo's concept of economic rent and Von Thunen's theory of geographic rent, concept of spatial demand cone, Weberian model and growth-pole model. (11 lectures)
4. Technology and economic development: the relation between technology and development, regional aspects of technology and application, levels of economic development - global perspectives. (8 lectures)

Course No. : G 106
Title of the Course : Geography of Economic Activity
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total Lectures : 25

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and half hours of examination.

Course Content

1. 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. (8 lectures)
2. Economic geography of manufacturing: pattern and problems of manufacturing in the world with special reference to the U.S.A. and India. (5 lectures)
3. Economic geography of energy: global pattern of energy production from conventional sources: water, coal and petroleum, and non conventional sources: solar and nuclear. (6 lectures)
4. Economic geography of international trade in selected commodities: food grain (wheat and rice), tea, petroleum, iron and steel. (6 lectures)

Books recommended for Course No.105 and 106

- Alexander, 1986: *Economic geography*, Prentice Hall Inc. (E.E.Edition) Bhalla, G.S. and Tyagi, D.S., 1989: *Indian Agricultural Development*, I.S.I.D., Delhi New
- Chaudhury, M.R., 1970: *Indian Industries: Development and Location*, Oxford & IBH, Calcutta
- Das, M.M., 1984: *Peasant Agriculture in Assam*, Inter India Publications, New Delhi Forbes, D.K., 1984: *Geography of under Development*, John Hopkins Univ. Press, Baltimore
- Gunnar Alexanderson, 1988: *Geography of Manufacturing*, Prentice-Hall Inc, (E.E. Edition)
- Isard, W. 1956: *Location and Space Economy*, MIT Press, Cambridge Isard, W., 1975: *Introduction to Regional Sciences*, Engel wood, Cliffs. Losch, A., 1954: *The Economics of Location*, New Haven
- Miller, E.W., 1977: *Manufacturing: A study of Industrial Location*, Pennsylvania State University Press, Pennsylvania.
- Mohammad, N. (ed), 1992: *New Destinations in Agricultural Geography*, Concept Publishing Co., New Delhi
- Pryde, P.R., 1983: *Non -Conventional Energy Resources*, Wiley, New York. Rostov, w. w., 1960: *The Stages of Economic Growth*, Cambridge University Press, New York
- Roy, and Mukherjee, S. 1993 (2nd Edition): *Economic Geography*, Central Education Enterprises, Calcutta
- Sushkin, Yulian, G., 1980: *Economic Geography: Theory and Models*, Progress Publishers, Moscow
- Smith, David M., 1981: *Industrial Location: An Economic Geographical Analysis*, Wiley, New York
- Symons, L., 1979: *Agricultural Geography*, West view Press, Colorado Tarrant, J.R., 1980: *Agricultural Geography: Problems in Modern Geography*, Wiley, New York
- Thomas, R.S. and Corbin, P.B., 1974: *The Geography of Economic Activity*, McGraw Hill, New York
- Wheeler, J.O. and Muller, P.O., 1981: *Economic Geography*, John Wiley & Sons, New York

Course No.	: G 107
Title of the Course	: Practical (on Geomorphology)
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total Exercises	: 22

The candidates are required to answer three questions selecting one each from units I, II & III within three hours (including viva-voce) of examination

Course Content

Unit I: Morphometric Analysis

1. Profile drawing

10 marks
(3 exercises)

2. Relative relief maps based on Smith's method (2 exercises)
 3. Slope maps using Wentworth's method (2 exercises)

Unit II: Analysis of Basin Morphology **10 marks**

4. Drainage ordering, calculation of bifurcation ratio, length ratio basin circularity ratio, analysis of laws of stream number, stream length and drainage basin area (8 exercises)
 5. Preparation of drainage density, drainage frequency and drainage texture maps (3 exercises)

Unit III: Area-height relationship **10 marks**

6. Hypsometric curve and hypsometric integral (2 exercises)
 7. Altimetric frequency curve and histogram (2 exercises)

Unit IV: Practical note book **5 marks**
 Viva-voce **5 marks**

Books recommended for Course No. G107

- Chorley, Richard J. (ed), 1969: *Water, Earth and Man*, Methuen & Co. London. Chorley, R.J. (ed), 1968: *Models in Geography*, Methuen & Co. London. Doornkamp, J.C. and King, C.A.M. 1971: *Numerical Analysis in Geomorphology: An Introduction*, St. Martins Press, New York
- Fairbridge, R.W. (ed), 1968: *Encyclopedia of Geomorphology*, Reinhold, New York. Faniran, A. and Jeje, L.R., 1983: *Humid Tropical Geomorphology*, Longman, London. Goudie, Andrew, et. Al. (eds), 1981: *Geomorphological Techniques*, George Allen & Unwin, London
- Gregory, K, J. and Walling, D.E., 1973: *Drainage Basin- Form and Process*, Edward Arnold, London
- King, C.A.M., 1966: *Techniques in Geomorphology*, Edward Arnold, London Leopold, L.B., Wolman, M.G. and Miller, J.P., 1964: *Fluvial Processes in Geomorphology*, Freeman, San Francisco.
- Misra, R.P., and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept Publishing co. New Delhi
- Monkhouse, F.J., and Wilkinson, H.R., 1989: *Maps and Diagrams*, B. I., Publications Pvt. Ltd., New Delhi
- Petts, G.E. and I. Foster, 1985: *Rivers and Landscape*, Edward Arnold, London. Sing, R.L. and Singh Rana, P.B., 1998: *Elements of Practical Geography*, Kalyani Publishers, New Delhi
- Strahler, A.N., 1969: *Physical Geography*, 3rd edition, Wiley.

Course No. : G 108

Title of the Course : Practical (on climatology, Biogeography & Economic Geography)

Total Marks : 50 (including 10 marks allotted to Internal Assessment)

Total Exercises : 26

Candidates are required to answer 3 questions one each from units I, II, and III within three hours (including viva-voce, etc.) of examination.

Course Content

Unit-I: Climatology	(10 marks)
1. Climograph, Hythergraph and Ergograph	(3 exercises)
2. Rainfall dispersion graph, rainfall variability and equifluves maps	(3 exercises)
3. Water deficiency and surplus graphs	(2 exercises)
Unit-II: Biogeography	(10 marks)
4. Distribution maps of flora and fauna of the world and India	(2 exercises)
5. Biogeographical regions of the world and India	(2 exercises)
6. Mapping of regional biodiversity of India and North East India	(2 exercises)
7. Climate, soil and vegetation relationship in India and North East India---	(2 exercises)
Unit III: Economic Geography	(10 marks)
8. Spatial variation in landuse and cropping pattern of North East India using pie graph	(2 exercises)
9. Trend analysis of production of different commodities with the help of band graph and using moving average and least squares methods	(3 exercises)
10. Analysis of landholding and income pattern	(2 exercises)
11. Choropleth mapping of cropping intensity of N.E. India	(1 exercise)
12. Determination of the levels of economic development using simple composite index	(1 exercise)
13. Spatial analysis of crop concentration in N.E. India and Assam	(1 exercise)
Unit IV: Practical Note Book	(5 marks)
Viva- Voce	(5 marks)

Books recommended for Course No. G 108

- Anderson, T.W., 1958: *Introduction to Multivariate Statistical Method*, John Wiley & sons, New York.
- Berry, B.J.L. and Marble, D.F., 1968: *Spatial Analysis: A Reader in Statistical Geography*, Prentice-Hall, Inc.
- Chorley, R.J. and Haggett, P., (ed), 1968: *Models in Geography*, Methuen & Co. Ltd. Fitzgerald, Brian, P., (General editor): *Science in Geography*, Series 1 to 4, Oxford University Press.
- Gregory, S., 1978: *Statistical Methods and the Geographers*, Longman. Hammond, R. and Mc Cullagh, P., 1977: *Quantitative Techniques in Geography, An Introduction*, Clarendon Press.
- Johnston, R.J., 1978: *Multivariate Statistical Analysis in Geography*, Longman King, L.J., 1969: *Statistical Analysis in Geography*, Prentice Hall. Inc. Mahmood, A.: *Statistical Methods in Geographical Studies*,

Misra, R.P., and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept Publishing co. New Delhi

Monkhouse, F.J., and Wilkinson, H.R., 1989: *Maps and Diagrams*, B. I., Publications Pvt. Ltd., New Delhi

Ramasastry, A.A. 1984: *Weather and Weather Forecasting*, Publication Div. New Delhi
Sing, R.L. and Singh Rana, P.B., 1998: *Elements of Practical Geography*, Kalyani Publishers, New Delhi

SEMESTER - II

Course No. : G 201
Course Title : Geography of Development of India
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and half hours of examination.

Course content

1. India as a geographical entity; unity in diversity. (2 Lectures)
2. Physical background of regional development: relief, drainage, climate, soil and vegetation. (6 Lectures)
3. Mineral and power resources and development: iron ore, coal, petroleum and hydro- electric power potential. (4 Lectures)
4. Population and development issues: population growth and its socio-economic implications, literacy, urbanization, occupation and social structure and development inequalities. (6 Lectures)
5. Regional disparities in economic development: agriculture, industry and transport and communication. (5 Lectures)
6. India's geo-economic position in Asia and the world; its economic development policies and international relations. (3 Lectures)

Course No. : G 202
Course Title : Geography of Development of North East India
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 27

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and half hours of examination.

Course Content

1. North East India: location and strategic significance. (3 lectures)
2. Physical characteristics and their relation to development: relief, drainage, climate, soil and vegetation. (5 Lectures)
3. Natural resources, their utilization and development: coal, Petroleum, natural gas, water and forests. (5 lectures)
4. Population and development: population growth and distribution, Migration, population characteristics and their socio-economic Implications. (5 lectures)

5. Agriculture and development: agricultural modernization (problems and prospects) and economic development. (5 lectures)
6. Spatial pattern of socio-economic development (state level) and strategies for future development. (4 lectures)

Books recommended for Courses No. G 201 and No. G 202

- Agarwala, S.N., 1988(First reprint): *India's Population Problems*, Tata McGraw Hill Publishing Co. Ltd. New Delhi
- Barua, P.C., 1990: *Development Planning of North East India*, Mittal Publications, New Delhi.
- Bhagabati, A.K. *et al*, 2001: *Geography of Assam*, Rajesh Publications, New Delhi. Bhatt, L.S., 1973: *Regional Planning in India*, Statistical Publishing Society, Calcutta. Bose, A., (ed) 1967: *Pattern of population Changes in India- 1951-61*, Allied Publishers, Bombay.
- Census of India publications on India and north-eastern states. Das, H.P., 1971: *Geography of Assam*, NBT, New Delhi.
- Das, M.M., 1984: *Peasant Agriculture in Assam*, Inter India Publications, New Delhi. Dutta Ray, B., et. al (eds), 2000: *Population, Poverty and Environment in North East India*, Concept Publishing Co., New Delhi.
- Davis, K., 1951: *Population of India and Pakistan*, Princeton University Press, Princeton. Despande, C.D., 1992: *India: A Regional Interpretation*, ICSSR, New Delhi.
- Dhar, P.K., 1988 (2nd Edition): *The Economy of Assam*, Ashomi Prakashani Duncan, G., 1967: *Resource Utilization and the Conservation, Concept in Readings, in Economic Geography*, New York.
- Gananathan, V.S., 1967: *Economic Geography of India*, NBT, India, New Delhi. Govt. of India, 1965: *The Gazetteers of India*, Publication Division, Ministry of Information and Broadcasting, New Delhi. Isard, Walter, 1960: *Methods of Regional Analysis*, MIT Press.
- Kundu, A and Raza Moonis, 1982: *Indian Economy: Regional Dimension*, Center for Study of Regional Development, JNU, New Delhi.
- Mahapatra, A.C.and Routrey, J.K. (eds) 1998: *Regional Development and Planning*, Rawat Publications, New Delhi.
- Misra, R.P., : *Regional Planning: Concepts, Techniques and Policies*, University of Mysore, Mysore.
- Misra, et. al, 1974: *Regional Development Planning in India- A Strategy*, Institute of Development Studies, Mysore.
- Mitra, Ashok, 1967: *Levels of Regional Development in India, Vol. I*, Census of India Publications, New Delhi.
- Nag, P.and Sengupta, S., : *Geography of India*. N.E.C.: *Statistics for North Eastern Region*, Shillong, 1990-91 onwards. North East India Geographical Society: *North Eastern Geographer*, Department of Geography, Gauhati University.
- Rao, V.L.S.P., 1964: *Regional Planning*, Indian Statistical Institute and Asia Publishing House, Calcutta.
- Richardson, H.W., 1969: *Regional Economics*, Weidenfield and Nelson, London. Sdasyuk, G. and Sengupta, P., 1968: *Economic Regionalization of India*, Census of India Publications, New Delhi.
- Singh, R.L., (ed), 1968: *India- Regional Studies*, 21st IGC, New Delhi

Singh, R.L., (ed), 1971: *India: A Regional Geography*, National Geographical Society of India, Varanasi.

Sharma, T.R., 1949: *Location of Industries in India*, Hind Kitab, Bombay.

Spate, O.H.K. and Learmonth, A.T.A., 1967: *India and Pakistan- Land, People and Economy*, Methuen & Co. London.

Srivastava, M.A., 1967: *Trade of India*, S. Chand & Co. Delhi.

Taher M. and Ahmed, P., 2000: *Geography of North East India*, Mani-Manik Prakash, Guwahati.

The Geographical Society of North Eastern Hill Region(India): *Hill Geographer*, Shillong.

Course No. : G 203
Course Title : Theoretical basis of Environmental Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 24

Candidates are required to answer 4 questions; one of 16 marks and the other three of 8 marks each within two and half hours of examination.

Course content

1. Defining Environmental Geography: emergence of environmental geography as a branch of geography; scope and significance of environmental geography. (3 lectures)
2. Man- Environment Relationship: historical perspectives on man's interaction with environment; population growth and environment; approaches to the study of man – environment relationship. (5 lectures)
3. Ecosystem: concept and types of ecosystem; functioning of ecosystem; Energy flow in ecosystem; biogeochemical cycles; biosphere as an ecosystem. (7 lectures)
4. Man and Atmosphere: man as a factor of climatic change; industrialization-urbanisation and climate; green house effect and global warming. (5 lectures)
5. Environment and Development: concept of environment and development; sustainable development. (4 lectures)

Course No. : G 204
Course Title : Environmental Problems
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 25

Candidates are required to answer 4 questions; one of 16 marks and the other three of 8 marks each within two and half hours of examination.

Course content

1. Global Environmental Problems: types and extent of environmental

- problems, area-specific major environmental issues and problems. (5 lectures)
2. Environmental Pollution: factors of environmental pollution; types of pollution; major areas of environmental pollution; effects of environmental pollution. (6 lectures)
 3. Environmental Hazards and Disaster: meaning and types; tectonic disasters; climatic hazards; flood hazards with special reference to floods of Brahmaputra and Barak valleys, Assam. (8 lectures)
 4. Environmental Management: concept of environmental management; environmental impact assessment; approaches of environmental management; global and regional environmental programmes and policies. (6 Lectures)

Books recommended for Courses No. G 203 and No. G 204

Park, C., 1997: *The Environment*, Routledge, London.

Pickering, K.T. & L.A. Owne, 1994: *An Introduction to Global Environmental Issues*, Routledge, London.

Singh, S., 1991: *Environmental Geography*, Prayag Pustak Bhawan, Allahbad. Goudie, A., 1984: *The Nature of Environment*, Basil Blackwell, London. Strahler, A.N. & A.H. Strahler, 1976: *Geography and Man's Environment*, John Willey, New York.

Simon, I.G., 1982: *Biogeographical Process*, Allen & Unwin, London. Newson, M., 1992: *Land, Water and Development*, Routledge, London.

Varma, P.S. & V.K. Agarwal, 1989: *Principles of Ecology*, S.Chand & Co., New Delhi. Ress, J., 1985: *Natural Resources*, Routledge, London.

Cantledge, B (ed), 1992: *Monitoring the Environment*, Oxford University Press, Oxford.

Course No. : G 205
Course Title : Nature of Human Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 25

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and half hours of examination.

Course Content

1. Defining the field of human geography. (3 Lectures)
2. Development of human geography: pre-second world war, post second world war and contemporary development. (12 Lectures)
3. Explanation in human geography: traditional approaches- deterministic, possibilistic, human ecology, morphological and areal differentiation; modern approaches- locational, behavioural, humanistic, Marxist; and post- modern approaches. (10 Lectures)

Books recommended for Course No.205

- Chorley, R.J. and Haggett, p., 1967: *Models in Geography*, Methuen, London. Gregory, D., 1978: *Ideology, Science and Human geography*, Hutchinson, London. Haggett, P., 1965: *Locational Analysis in Human Geography*, Edward Arnold, London. Huntington, E., 1951: *Principles of Human Geography*, John Wiley & sons, Inc., New York.
- Husain, M., 1994: *Human Geography*, Rawat Publications, Jaipur And New Delhi. James, M.R. and Bacon, R.S., 1990: *The Cultural Landscape: An Introduction to Human Geography*, Prentice Hall, New Delhi.
- Johnston, R.J., et. al (eds), 1981: *The Dictionary of Human Geography*, Basil Blackwell, Oxford.
- Johnston, R.J., 1983: *Philosophy and Human Geography*, Edward Arnold, London. Johnes, E., 1972: *Human Geography*, Chatto & Windus, London
- Leong, G.C. and Morgan, G.C., 1992: *Human and Economic Geography*, Oxford University Press, Oxford.
- Ley, D. and Samuel, M.S. (eds), 1978: *Humanistic Geography: Prospects and Problems*, Croom Helm, London.
- Perpillou, A.M., 1977: *Human Geography*, Longman, New York. Smith, D.M., 1977: *Patterns in Human Geography*, Penguin Books Ltd., Middlesex, England.
- Smith, D.M., 1977: *Human Geography: A Welfare Approach*, Edward Arnold, London.

Course No.	: G 206
Course Title	: Population and Settlement Geography
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures:	26

Candidates are required to answer 4 questions selecting one of 16 marks (from group A) and the remaining three of 8 marks each (1 from group A and 2 from group B) within two and half hours of examination.

Course Content

A. Population Geography

1. Defining the field of Population Geography (2 lectures)
2. Components of population growth: fertility, mortality and migration; demographic and socio-economic characteristics of population and associated issues. (8 lectures)
3. Population- resource relationship, conceptual bases of under population, optimum population, over population and population explosion, population- resource regions. (5 lectures)

B. Settlement Geography

4. Defining the field of settlement of geography. (2 Lectures)
5. Origin and growth of rural and urban settlements. (3 Lectures)
6. Morphology of settlements. (2 Lectures)
7. Rural- urban relationship: dichotomy and continuum; settlement hierarchy with reference to central place theory. (4 lectures)

Books recommended for Course No.206

- Ahmad, A., *et. al* (eds), 1997: *Demographic Transition: The Third Third-World Scenario*, Rawat Publications, Jaipur and New Delhi.
- Chandna, R.C., 1986: *A Geography of Population*, Kaylani Publishers, New Delhi. Clarke, J.I., 1972: *Population Geography*, Pergamon Press, Oxford.
- Carter, H., 1972: *The Study of Urban Geography*, Edward Arnold, London. Haggett, P., 1972: *Geography: A Modern Synthesis*, Harper & Row, New York. Money.D.C., 1972: *Patterns of Settlement*, Evan Brothers, London.
- Peters, G.L. and Larkin, R.P., 1979: *Population Geography: Problems, Concepts and Prospects*, Kendall/Hunt Iowa.
- Robinson, H., 1981: *Population and Resources*, Macmillan Press, London.
- Singh, R.L. and Singh, K.N., (eds), 1975: *Readings in Rural Settlement Geography*, BHU, Varanasi.
- Singh, R.Y., 1994: *Geography of Settlements*, Rawat Publications, Jaipur and New Delhi. Sandram, K.V. and Nangia, S., (eds): *Population Geography*, Heritage Publishers, New Delhi.
- Trewartha, G.T., 1969: *A Geography of Population: World Pattern*, John Wiley & Sons, Inc., New York.
- Woods, R., 1979: *Population Analysis in Geography*, Longman, London. Zelinsky, W., 1966: *A Prologue to Population Geography*, Prentice-Hall, Englewood Cliffs.

Course No.	: G 207
Course Title	: Practical (on India, N.E. India and Environmental Geography)
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises:	19

Candidates are required to answer one question of 10 marks each from units I and II in addition to unit III and IV within three hours of examination.

Course Content

Unit I: Practicals on India and North East India	(10 marks)
1. Analysis of trend of population growth and food production in India.	(2 exercises)
2. Spatial pattern of population density (district level) and dispersion of population density in India (state level).	(2 exercises)
3. Mapping of population distribution of North East India and analysis of its relationship with relief	(2 exercises)
4. Analysis of connectivity and centrality of transport networks in North East India.	(2 exercises)
5. Determination of levels of infrastructural development in North East India using simple composite index.	(1 exercise)
6. Flow pattern of selected commodities of India and N.E. India using standard carto-statistical techniques.	(1 exercise)

Unit II: Practicals on Environmental Geography **(10 marks)**

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|--|---------------|
| 7. Mapping the major environmental problem-areas and their analysis | (2 Exercises) |
| 8. Analysis of the relationship between population pressure and environmental degradation in the context of India. | (2 Exercises) |
| 9. Status and types of forests in North East India. | (2 Exercises) |
| 10. Mapping the flood hazard zones of the Brahmaputra valley. | (1 exercise) |
| 11. Ecosystem mapping of a wetland of Assam. | (1 exercise) |
| 12. Environmental impact assessment in a micro Problem-area of Assam. | (1 exercise) |

Unit III: Field Report **(10 marks)**

Unit IV: Practical Note Book and Viva-voce **(10 marks)**

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|-------------------------|-----------|
| (i) Practical Note Book | (5 marks) |
| (ii) Viva-voce | (5 marks) |

Course No. : G 208
Course Title : Practical (on Human Geography)
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises: 18

Candidates are required to answer 3 questions of 10 marks each from unit-I in addition to all the questions of unit-II within three hours of examination.

Course Content

Unit –I: Human Geography **(30 marks)**

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|---|---------------|
| 1: Population concentration and density pattern in North East India and Assam | (4 exercises) |
| 2. Trend of population growth and population projection | (3 exercises) |
| 3. Determination of spatial mean center of population and settlements of selected areas. | (3 exercises) |
| 4. Distribution pattern of services/economic activities/settlements using Nearest Neighbour Statistic | (2 exercises) |
| 5. Determination of settlement hierarchy using centrality index | (2 exercises) |
| 6. Distance-Decay Analysis | (2 exercises) |
| 7. Mapping volume and direction of population migration in North East India | (2 exercises) |

Unit- II: Practical Note Book and Viva-voce **(10 marks)**

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|-------------------------|-----------|
| (i) Practical Note Book | (5 marks) |
| (ii) Viva-voce | (5 marks) |

Books recommended for Courses No. G 207 and G 208

- Berry, B.J.L. and Marble, D.F., 1968: *Spatial Analysis, A reader in Statistical Geography*, Prentice Hall, Inc., Englewood Cliffs, J.N.
- Chorley, R.J. and Haggett, P., 1967: *Models in Geography*, Methuen, London. Cole, J.P. and King, C.A.M., 1968: *Quantitative Methods in Geography*, John Wiley & Sons, New York.
- Duncan, O and Others, 1961: *Statistical Geography, Problems in Analysing Areal Data*, Free Press of Glencoe, New York
- Graham, Upton and Elingleton, B., 1985: *Spatial Data Analysis by Example*, John Wiley & Sons, New York.
- Gregory, S., 1963: *Statistical Methods and the Geographer*, Longman, London. Haggett, P. and Mc Cullagh, P., 1977: *Quantities Techniques in Geography: An Introduction*, Clarendon.
- Isard, W., 1960: *Methods of Regional Analysis*, MIT Press.
- Johnston, R.J., 1978: *Multivariate Statistical Analysis in Geography*, Longman, London. King, L.J., : *Statistical Analysis in Geography*, Prentice Hall, Englewood Chaffs.
- Misra, R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept Publishing Co. New Delhi.
- Monkhouse, F.J. and Wilkinson, H.R., 1989: *Maps and Diagrams*, B.I. Publications Pvt. Ltd., New Delhi.
- Neft, David S., 1966: *Statistical Analysis for Areal Distribution*, Regional Science Research Institute, Philadelphia.
- Singh, R.N. and Kanaujia, L.R.S.: *Map Work and Practical Geography*, Central Book Depot, Allahabad.
- Singh, R.L. and Singh, Rana P.B., 1998: *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
- Yeats, M.H., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill Book Co.
- Zamir Alvi, 1996: *A Textbook of Practical Geography*, Vikas Publishing House Pvt. Ltd.

Syllabus for M.A./M. Sc. Course in Geography Details of Course Content

SEMESTER - III

Course No. : G 301
Course Title : Geographic Thought: Historical Development
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 25

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Place of geography in the classification of knowledge: defining the field of geography, relation of geography with other natural and social sciences. (4Lectures)
2. 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. (8 Lectures)
3. Foundations of modern geography: contribution of German (Humboldt, Ritter, Ratzel), French (Paul Vidal de la Blache), British and American geographers. (5 Lectures)
4. Evolution of geographic thought (Determinism, Possibilism, Human Ecology, Morphology of Landscape, Areal differentiation) and their impact in the development of the field. (8 Lectures)

Course No. : G 302
Course Title : Geographic Thought: Contemporary Trends
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 25

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Emergence of New Geography: quantitative revolution, school of locational analysis, reactions to nomothetic geography; behavioural, radical and humanistic approaches. (8 Lectures)
2. Post modern geography: socio- spatial dialectic and gender perspective, new environmentalism, applied geography. (6 Lectures)

3. Present trend in Indian geography. (5 Lectures)
4. Models in geography and their applications. (6 Lectures)

Books recommended for Course No. G 301 and G 302

- Abler, R..., Adams, J. and Gould, P.P., 1971: *Spatial Organization: The Geographers' View of the World*, Prentice-Hall, Englewood Cliff.
- Ackerman, E.A., et al, 1965: *The Science of Geography*, Washington D.C., National Academy of Science/ National Research Council Pub. No. 1277.
- Adhikari, S., 1992: *Geographical Thought*, Chaitanya Pub. House, Allahabad. Ahmad, A. (ed), 1996: *Progress in Indian Geography (1992-1996)*, INSA, New Delhi.
- Berry, B.J.L.,1973: 'A Paradigm for Modern Geography', in R.J. Chorley (ed), *Directions in Geography*, London Methuen.
- Brunhes, J., 1920: *Human Geography*, Chicago tens T.C. le and edited by Isaisah Bowman. Bunge, W.,1962: *Theoretical Geography*, Lund Studies in Geography, Lund, C.W.K. Gleerup.
- Buttimar, A., 1978: 'On People, Paradigms and Progress in Geography', in D.R. Stoddart (ed), *Geography, Ideology and Social Concern*, Oxford, Blackwell
- Chorley, Richard, J.,1973: *Directions in Geography*, Methuen, London.
- Chorley, Richard, J. and Hagget, Peter (eds), 1967: *Models in Geography*, Methuen, London.
- Dickinson, R.E.,1969: *Makers of Modern Geography*, Routledge and Kegan Paul, London.
- Dikshit, R.D., 1994: *The Art and Science of Geography*, Prentice Hall of India, New Delhi.
- Dikshit, R.D., 1997: *Geographical Thoughts: A Contextual History of Ideas*, Prentice Hall of India, New Delhi.
- Gold, J.R.,1980: *An Introduction to Behavioural Geography*, Oxford University Press. Gosal, G.S.(ed),1999: *Fourth Survey of Research in Geography*, Rawat Publishers, Jaipur and New Delhi,1999.
- Haggett, P.,1965: *Locational Analysis in Human Geography*, Arnold, London/ St. martin's press, new York
- Haggett, P.,1979: *Geography - A modern synthesis*, Harper and Row, New York. Hartshorne, R.,1939: *The Nature of Geography*, Association of American Geographers, Lancaster, Penn.
- Hartshorne, R.,1959: *Perspective on the Nature of Geography*, Rand Mckully, Chicago. Harvey, D., 1989: *The Connection of Post modernity*, Oxford, Basil Blackwell. Harvey, D., 1969: *Explanation in Geography*, St. Martin's Press, New York,1969. Harvey, Milton and Holly, Brian P.,1989: *Themes in Geographic Thought*, Routledge, London.
- Hussain, M., 1989: *Evolution of Geographic Thought*, Rawat Publications, Jaipur. James, P.E., 1972: *All Possible World: A History of Geographic Ideas*, The Odyssey Press, New York.
- Johnston, R.J. et al.(eds), 1986: *The Dictionary of Human Geography*, Oxford, Basil Blackwell.
- Johnston, R.J. (ed),1983: *Geography and Geographers*, Edward Arnold, London. Knox, P.L., 1975: *Social Well-being: A Spatial Perspective*, Oxford University Press, London.
- Ley, S. and Samuels, M.S. (eds), 1978: *Humanistic Geography: Prospects and Problems*, Maaronfa Press, Chicago.

Peet, R., 1977: *Radical Geography*, Methuen, London.

Sauer, C.O., 1969: *Land and Life*, University of California Press, Berkeley and Los Angeles.

Singh, J. (ed), 2000: *Progress in Indian Geography (1996-2000)*, INSA, New Delhi. Smith, David.M., 1977: *Human Geography: A Welfare Approach*, Edward Arnold, London.

Soja, E.W., 1990: *Postmodern Geography*, Verso, London.

Yeates, M., 1968: *An Introduction to Quantitative Analysis in Economic Geography*, McGraw Hill Inc.

Course No. : G 303
Course Title : Quantitative Methods in Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 28

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Methodological developments in geography: quantitative and qualitative; significance of quantification in geographical analysis; limitations of quantitative techniques. (4 lectures)
2. Geographic data matrix; nature and types of geographic data, levels of measurement, data source and acquisition techniques. (4 lectures)
3. Sampling techniques; application of probability in sample selection and sample data analysis. (4lectures)
4. Application of inferential statistics in hypothesis testing; parametric and non-parametric tests, selection of significance level. (4lectures)
5. Conceptual basis of quantitative techniques in spatial distribution and concentration, spatial relationship, spatial interaction, spatial diffusion and regional pattern analysis. (12 lectures)

Books recommended for Course No. G 303

Berry, B.J.L. and Marble, D.F., 1968: *Spatial Analysis: A Reader in Statistical Geography*, Prentice-Hall Inc., Englewood Cliff, J.N.

Chorley, R.J. and Haggett, P. (eds), 1967: *Models in Geography*, Methuen, London. Cole, J.P. and King, C.A.M., 1968: *Quantitative Methods in Geography*, Willey and Sons, New York.

Duncan, O.D., et al, 1961: *Statistical Geography: Problems in Analysing Areal Data*, Free Press of Glencee, New York.

Davis, P., 1988: *Data Description and Presentation (Science in Geography series)*, Oxford University Press, Oxford.

Elhance, D.N., 1972: *Fundamental of Statistics*, Kitab Mahal, Allahabad.

- Eyles, J. and Smith, D.M.(eds),1988: *Quantitative Methods in Human Geography*, Polity Press, Oxford.
- Gregory, S.,1963: *Statistical Methods and the Geographers*, Longman, London.
- Hagget, P. and Mc Cullagh, P., 1965: *Locational Analysis in Human Geography*, Arnold, London.
- Hammond, R. and McCullagh, P.,1965: *Quantitative Techniques in Geography*, Clarendon Press, Oxford.
- Jonston, R.J., 1978: *Multivariate Statistical Analysis in Geography*, Longman, London. King, L.J., *Statistical Analysis in Geography*, Prentice Hall, Engle wood cliff, N.J. Mahmood, A., 1999: *Statistical Methods in Geographical Studies*, Rajesh Publications, New Delhi.
- Mathews, J.A., 1981: *Quantitative and Statistical Approaches to Geography: A Practical Manual*, Pergamon Press, Oxford.
- Mc Cullagh, P., 1988: *Data Use and Interpretation (Science in Geography Series, Part-4)*, Oxford University press, Oxford.
- Pal, S.K., 1998: *Statistics for Geoscientists: Techniques and Applications*, Concept Publishing Company, New Delhi.
- Smith, D.M., 1975: *Patterns in Human Geography*, Penguin Book.
- Yeates, M.H., 1974: *An introduction to Quantitative Analysis in Human Geography*, McGraw Hill Inc.

Course No. : G 304
Course Title : Cartographic Methods in Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Significance of cartography in geography; traditional and digital cartography. (4 lectures)
2. Principles of surveying; field survey techniques and mapping. (5 lectures)
3. Principles of mapping; base map preparation; concept of point, line and area; concept of generalization; scale factor; choice of map projection; map design and layout. (6lectures)
4. Thematic mapping: meaning and type; principles of thematic mapping; basic ideas of isopleth, choropleth and choro-chromatic mapping; concept of three-dimensional representation of geographical data. (6lectures)
5. Techniques of physical and socio-economic data representation and mapping. (5 lectures)

Books recommended for Course No. G 304

Bygott, J.: *An Introduction to Map Work and Practical Geography*.

Campbell, J., 1984: *Introductory Cartography*, Prentice Hall Inc., Englewood Cliffs, N.J. Cuff, D.J. and Mattson, M.T., 1982: *Thematic Maps: Their Design and Production*, Methuen, New York

Kanetkar, T.P. and Kulkarni, S.U.: *Surveying and Levelling*, Vol. I & II, Vidyarthi Gritha Prakashan, Pune.

Kellaway, G.P.: *Map Projections*, Methuen & Co., London

Lawrence, G.R.P., 1964: *Cartographic Methods*, Oxford University Press, London. Lewis, P., 1967: *Maps and Statistics*, Methuen & Co. Ltd., London

Misra, R.P. and Ramesh, A., 1995: *Fundamentals of Cartography*, Concept Publishing Company, New Delhi.

Monkhouse, F.J. and Wilkinson, H.R., 1989: *Maps and Diagrams*, B.I. Publications, New Delhi

Nag, P., 1992: *Thematic Cartography and Remote Sensing*, Concept publishing Co., New Delhi

Nag, P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept Publishing Co., New Delhi

Patel, A.N. and Singh, S., 1999: *Principles of Remote Sensing*, Scientific Publishers (India), Jodhpur.

Raisz, E.: *General Cartography*, McGraw Hill Co., London. Raisz, E.: *Principles of Cartography*, McGraw Hill Co., London.

Robinson, A.H., et al: *Elements of Cartography*, John Wiley & Sons, New York. Singh, R.L.: *Elements of Practical Geography*, Kalyani Publishers, New Delhi. Steers, J.A., 1965: *An Introduction to the Study of Map Projection*, University of London, London.

Course No.	: G 305
Course Title	: Fundamentals of Social and Cultural Geography
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures:	26

Candidates are required to answer 2 questions from group-A selecting one of 16 marks and another of 8 marks and two from group-B of 8 marks each within two and a half hours of examination.

Course content

Group A: Social Geography

1. Defining the field of social geography; development of social geography in Anglo- American countries and India. (4 lectures)
2. Concept of social space, social group, social structure, social differentiation, social diversity, and plurality and social well-being.(6 lectures)
3. Social problems and socio- spatial inequalities; patterns in developed and under developed countries. (4 lectures)

Group B: Cultural Geography

1. Definition and development of cultural geography. (2lectures)
2. Themes and concepts in cultural geography: cultural area, cultural landscape, cultural history, cultural ecology, cultural diffusion and cultural integration. (5lectures)
4. Patterns of world cultural regions with reference to (a) language, (b) religion and (c) ethnicity. (5lectures)

Books recommended for Course No. G 305**Social Geography**

- Ahmad, A., 1999: *Social Geography*, Rawat Publications, Jaipur and New Delhi. Ahmad, A., (ed), 1993: *Social Structure and Regional development: A Social Geography Perspective*, Rawat Publications, Jaipur.
- Carter, John and Trevor, Jones.,1989: *Social Geography: An Introduction to Contemporary Issues*, Edward Arnold, London.
- Eyles, J.: 'Social Geography', in Johnston, R.J., et al, *The Dictionary of Human Geography*. Jones, E. and Eyles, J., 1977: *An Introduction to Social Geography*, Oxford University Press, Oxford and New York.
- Jones, E.(ed), 1975: *Readings in Social Geography*, Oxford University Press, Oxford. Sharma, H.N.,2000 : 'Social Geography' in Singh, J.(ed.) *Progress in Indian Geography (1996-2000)*, INSA, New Delhi.
- Smith, D.M.,1977 : *Human Geography : A Welfare Approach*, Edward Arnold, London. Sopher, D.E.(ed), 1980: *An Exploration of India : Geographical Perspectives on Society and Culture*, Longman, London.
- Srinivas, M.N. .1986 : *India : Social Structure*, Hindustan Publishing Corporation, Delhi. Taher, M.,1994: *Social Geography : Concept and Theories* , NEIGS, Guwahati.

Cultural Geography

Crans, Mike,1998 : *Cultural Geography*, Routledge, London.

Dancan, J. and Ley, D. (eds) , 1992 : *Place/Culture/Representation*, Routledge, London. Gritzer, Charion, F.,1984 : 'The Scope of Cultural Geography', *Journal of Geography*, Volume 65, pp.4-11.

Jackson, Richard.H.and Hudman, Lloyel. E.,1990 : *Cultural Geography* ,West Publishing Company, New York.

Johnston, R.J., Gregory, Derek and Smith, David M. (eds),1994 : *The Dictionary of Human Geography*, Blackwell, Oxford.

Jordan, T.G. and Rowntree, L. : *The Human Mosaic: A Thematic Interpretation in Cultural Geography*.

Noble, A.G. and Dutt, A.K. (eds),1982 : *India: Cultural Pattern and Processes* , West View Press / Boulder, Colorado.

Sauer, Carl.O., 1963: *Land and Life*, University of California Press, Berkley.

Thomas, W.L. (ed.), 1959: *Man's Role in Changing the Face of the Earth*, University of Chicago Press, Chicago.

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

Course No. : G 306
Course Title : Fundamentals of Political Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 25

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Defining the field of political geography. (2 lectures)
2. Historical development of political geography; schools of thought: landscape school, ecology school and organismic school. (6 lectures)
3. Approaches to the study of political geography: historical, morphological and functional. (3 lectures)
4. Concepts in political geography: lebensraum, state and nation, core- periphery and capital, frontier and boundary, buffer zone, rim-land , heartland and political economy, (10lectures)
5. Geopolitical problems in global and Indian context. (4 lectures)

Books recommended for Course No. G 306

Adhikari , S.,1996 : *Political Geography*, Rawat Publications, Jaipur and New Delhi. De Blij, H.J.,1972 : *Systematic Political Geography*, John Wiley , New York.
 Dikshit, R.D.,1982 : *Political Geography : A Contemporary Perspective*, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
 Muir, R.,1975 : *Modern Political Geography* , Macmillan Ltd.,London. Pounds, N.J.G.,1972 : *Political Geography*, McGraw Hill , New York. Prescott, J.R.V.,1972 : *Political Geography*, Methuen, London.
 Sukhwai, B.L.,1979 : *Modern Political Geography of India*, Sterling, New Delhi. Taylor, P.J., 1989 : *Political Geography*, Longman, London.

Course No. : G 307
Course Title : Practical on Quantitative Methods in Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises: 28

Candidates are required to answer the questions of all the units of 10 marks each within three hours of examination.

Course content

- Unit-I** (10 Marks)
1. Application of elementary matrix algebra in multivariate data analysis. (3 Exercises)

2. Methods of sampling in geographical data collection from the field and preparation of sample design. (2 Exercises)
3. Application of probability distributions (normal, poisson and binomial) in geographical analysis. (3 Exercises)

Unit-II (10 Marks)

1. Application of relevant hypothesis testing techniques (parametric and nonparametric) in geographical data analysis; use of z, t, f and χ^2 (Chi-square) statistics. (5 Exercises)
2. Simple and multiple correlation and regression analysis; non-linear relationship (rank-size relationship and distance decay) analysis. (5 Exercises)

Unit-III (10 Marks)

1. Spatial interaction, population potential surface, spatial diffusion, shape index and transport network analysis. (6 Exercises)
2. Techniques of multivariate analysis in areal classification and regionalisation : (a) Triangular graph and combination analysis (b) Composite scores - composite z score and principal component analysis. (4 Exercises)

Unit-IV (10 Marks)

1. Evaluation of practical note-book. (5 Marks)
2. Viva-voce. (5 Marks)

Books recommended for Course No. G 307

Same as given for Course No. G 303.

Course No. : G 308
Course Title : Practicals on Cartographic Methods in Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises: 26

Candidates are required to answer the questions of all the units of 10 marks each within three hours of examination.

Course content

Unit-I (10 Marks)

1. Traversing and topographic surveying with the help of prismatic compass and theodolite. (2 Exercises)
2. Contouring and profile levelling with the help of dumpy level. (2 Exercises)

Unit-II (10 Marks)

1. Construction of map projections (5 Exercises)
 - (i) Zenithal gnomonic (Equatorial case)
 - (ii) Lambert's conical equal-area projection
 - (iii) Gall's cylindrical stereographic projection
 - (iv) Mercator's projection
 - (v) Mollweide's projection

Unit-III (10 Marks)

1. Map reading and analysis, preparation of base map. (3 Exercises)
2. Grouping of data by equal step, parameters of normal distribution, nested means, quartiles and equal-area methods and preparation of choropleth maps. (5 Exercises)
3. Representation of physical and socio-economic data using band graph, pie graph, sphere diagram, flow chart, isolines and transect chart. (6 Exercises)
4. Representation of land and population by topological space diagram (grid cells) for comparative study. (3 Exercises)

Unit-IV (10 Marks)

1. Evaluation of practical note-book. (5 Marks)
2. Viva-voce. (5 Marks)

Books recommended for Course No. G 308

Same as given for Course No. G 304.

SEMESTER - IV

Course No. : G 401
Course Title : Fundamentals of Remote Sensing and GIS
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 30

Candidates are required to answer 2 questions from group 'A' selecting one of 16 marks and another of 8 marks, and two from group 'B' of 8 marks each within two and a half hours of examination.

Course content**Group A: Remote Sensing in Geography**

1. Remote sensing- basic concepts and principles (4 lectures)
2. Data characteristics and data products of aerial and satellite remote sensing. (3 lectures)
3. Visual interpretation techniques of aerial photographs and Satellite imagery. (4 lectures)
4. Application of remote sensing in geomorphology, landuse, Settlements and urban planning. (4 lectures)
5. Introduction to digital image processing. (2 lectures)

Group B: GIS in Geography

1. GIS environment: hardware and software. (2 lectures)
2. Basic concepts of GIS. (3 lectures)
3. Data types and their structures. (2 lectures)
4. Spatial analysis techniques and thematic representation in GIS. (3 lectures)
5. Application of GIS in environment and regional development planning. (3 lectures)

Books recommended for Course No. G 401 and 408

Burrough, P.A.,1986: *Principles of Geographical Information Systems in Land Resources Assessment*, Clarendon Press, Oxford.

Burrough, P.A. and Mc Donnel, R.A.,1998: *Principles of Geographical Information Systems*, Oxford University Press.

Colwell, R.N.,1983: *Manual of Remote Sensing*, Vol. I & II, American Society of Photogrammetry.

Curran, Paul, J., 1985: *Principles of Remote Sensing*, Longman Group Ltd. Gautam, N.C.,1970: *Urban Landuse Study through Aerial Photo- interpretation Techniques*,Pink Publishing House, Mathura.

Star, J. and Ester, J., 1990: *Geographic Information System*, Prentice-Hall. Lilesand, T.M. and Kiefer, R.W., 1987: *Remote Sensing and Image Interpretation*, John Wiley.

Hord, R. Michael., 1986: *Remote Sensing: Methods and Applications*, John Wiley. Maguire, D. J., Goodchild, M. and Rhind, D. J., 1990: *Geographical Information Systems: Principles and Applications*, Longman Science and Technology Publications. Robinson, A. H., et al., 1995: *Elements of Cartography*, John Wiley.

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

Course No. : G 402
Course Title : Research Methodology in Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures: 28

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Introduction to research methodology in geography. (3 lectures)
2. Formulation of a research problem. (4 lectures)
3. Research design: statement of the problem, objectives, and hypothesis/ research questions, methodology, significance, review of research works and referencing. (10 lectures)
4. Inductive and deductive approaches in geographic research, concept development, model building and hypothesis testing. (5 lectures)
5. Questionnaire design, data collection, data processing and analysis (3 lectures)
6. Research write-up (3 lectures)

Books recommended for Course No. G 402

Ackoff, R. L., 1961: *The Design of Social Research*, University of Chicago Press, Chicago. Goode William, J. and Hatt, Paul K., 1952: *Methods in Social Research*, McGraw Hill Company, Inc., New York.

Kothari, C. R., 1993: *Research Methodology: Methods and Techniques*, 2nd ed., Wiley Eastern Ltd., New Delhi.

Miller, D. C., 1977: *Hand Book of Research Design and Social Management*, 3rd ed., David McKay Company, Inc. New York.

Mishra, R. P., 1989: *Research Methodology: A Hand book*, Concept Publishing Company, New Delhi.

Misra, H.N. and Singh, V.P., 1998: *Research Methodology in Geography*, Concept Publishing Company, New Delhi.

Selltiz, C. et al., 1959: *Research Methods in Social Relations*, rev. ed., Rinehart and Winston, Inc., New York.

OPTIONAL PAPERS

Optional Paper (Cartography)

Course No. : G 403
Course title : Fundamentals of Cartography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 27

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Defining the field of cartography; history of development and recent trends. (5 lectures)
2. Fundamentals of spherical trigonometry: spherical triangle, spherical excess, sine and cosine formulae, Napier's rule of five part circle, great circle distance and convergence of meridians. (5 lectures)
3. Basic problems of map projection (earth's shape and size, scale and coordinate system) and principles and methods of construction: (10lectures)
 - (a) Alber's Conical Equal Area projection.
 - (b) Gauss' Conformal projection.
 - (c) Mercator's projection.
 - (d) Homolosine projection.
 - (e) International projection.
4. Cartographic design – graphic representation, design, and lay out of maps. (4lectures)
5. Map types and map series – general classification, map types and map series of India, International map series. (3lectures)

Course No. : G 404
Course title : Surveying and Thematic Cartography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Principles of ground survey; geodetic and plane surveying; concept of triangulation survey. (4 lectures)
2. Techniques of topographic surveying and mapping; preparation of base map. (5 lectures)

3. Development of thematic cartography; approaches in thematic cartography – regional approach and information approach. (5 lectures)
4. Concept of point, line, area and volume, data representation in thematic cartography. (5 lectures)
5. Methods of thematic map reproduction. (4 lectures)
6. Problems, prospects and emerging issues in thematic cartography. (3 lectures)

Course No. : G 405
Course title : Modern Techniques in Cartography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Fundamentals of aerial photography – photogrammetric principles, techniques of air photo interpretation and mapping. (5 lectures)
2. Principles of satellite remote sensing, techniques of data acquisition and management, interpretation and mapping. (5 lectures)
3. An introduction to GIS and its applications in spatial data management and analysis. (7 lectures)
4. Fundamentals of digital cartography – principles of computer assisted plotting of spatial data (point, line and area) and thematic mapping. (7 lectures)
5. Role of Remote Sensing and GIS in modern cartography. (2 lectures)

Course No. : G 406
Course title : Dissertation on Optional Paper Cartography
Total Marks : 50 (including 10 marks allotted to internal assessment)

Course No. : G 407
Course title : Practical on Optional Paper Cartography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises : 25

Candidates are required to answer three questions carrying 10 marks each from unit I, II and III within three hours of examination along with evaluation of practical note-book and viva-voce under unit IV.

Course content

- Unit I** (10 Marks)
1. Construction of map projections.
 - (a) Zenithal Oblique Gnomonic and Stereographic Projections.
 - (b) Albers' Conical Equal Area Projection.
 - (c) Gauss' Conformal Projection.
 - (d) Mercator's Projection.
 - (e) Homolosine and International Projection. (8 exercises)

- Unit II** (10 Marks)
2. Thematic mapping of physical and socio- economic data using various cartographic techniques (Choropleth, isopleth etc.) (5 exercises)
 3. Map reading and analysis. (3 exercises)
 4. Triangulation and topographic surveying and mapping using Prismatic Compass, Dumpy's Level and Theodolite. (3 exercises)

- Unit III** (10 Marks)
5. Air photo interpretation and mapping. (3 exercises)
 6. Satellite imagery interpretation and mapping. (3 exercises)

- Unit IV** (10 Marks)
7. Practical Notebook Assessment.
 8. Viva-voce.

Books recommended for Course No. G 403 to G407

- American Society of Photogrammetry, 1960: *Manual of Photographic Interpretation*, Banta Publishing Co., Menasha, Wisconsin.
- Anderson, J. R., et al., 1976: *A Landuse/ Landcover Classification System for Uses with Remote Sensing Data*, USGS Professional Paper.
- Avery, T.E., 1963: *Interpretation of Aerial Photography*, Burgess Publishing Co., Minneapolis.
- Barret, E.C. and Curtis, L.E., 1976: *Introduction to Environmental Remote Sensing*, Chapman Hill, London.
- Birch, T.W.: *Maps: Topographical and Statistical*, Clarendon Press, Oxford. Campbell, J., 1984: *Introductory Cartography*, Prentice Hall, New Jersey.
- Cude, W. C., 1962: Automation in Mapping, in *Surveying and Mapping*, Vol. 23. Cuff, D. J. and Marks, T. M., 1973: *Thematic Maps: Their Design and Production*, Longman, London.
- Deetz, C. H. and Adams, O.G.: *Elements of Map Projections*, Govt. Printing Office, Washington.
- Dickinson, G. C., 1973: *Statistical Mapping and Presentation of Statistics*, Edward Arnold, London.
- Dury, G.H., 1960: *Map Interpretation*, Edward Arnold, London. Garnett, A., 1945: *Geographical Interpretation of Topographical Maps*, Harraper & Co., London.
- Garnett, W.: *Map Projections*, George Phillip and Sons, London.
- Hinks. A.R., 1921: *Map Projections*, Cambridge University Press, London. Hodykess, A. G., 1970: *Maps for Books and Theses*, David and Charles, New York.
- Jameson, A.H. and Orms, M.T.H.: *Mathematical Geography*, Vol. I & II, Issac Pitman& Sons, London.

- John, L., 1980: *Practical Map Projections*, Wiley International.
- Kanetkar, T. P.: *Surveying and Levelling*, Vol. I&II, Pune Vidyarthi Griha, Pune. Keats, J. S., 1973: *Cartographic Design and Production*, Longman, London. Keats, J. S., 1979: *Automation and Education in Cartography*, Cartographic Journal, Vol. II
- Kellaway, G. P.: *Map Projections*, Methuen & Co. London. Killford, W. K., 1963: *Elementary Air Survey*, Pitman, London.
- Kingsbury, R. C., 1969: *Creative Cartography: An Introduction to Effective Thematic Map Design*, Indiana University, Indiana.
- Lawrence, G.R.P., 1969: *Cartographic Methods*, Methuen, London.
- Leuder, D.R., 1959: *Aerial Photographic Interpretation*, McGraw Hill, New York. Lewis, P., 1977: *Maps and Statistics*, Methuen & Co. London.
- Masood, M.: *Map Projections*, Rao & Raghvan Co. Mysore.
- Mishra, R.P. and Ramesh, A., 1997: *Fundamentals of Cartography*, Concept Publishing Co. New York.
- Monkhouse, F.J. and Wilkinson, H.R.: *Maps and Diagrams*, Methuen & Co., London. Muehrch, P.C., 1978: *Map Use: Reading, Analysis and Interpretation*, J.P. Publications, Wisconsin, USA.
- Nag, P. (ed), 1992: *Thematic Cartography and Remote Sensing*, Concept Publishing Co. New Delhi.
- Narayan, L.R.A., 1999: *Remote Sensing and Its Applications*, University Press (India) Ltd. Hyderabad.
- NATMO, Kolkata: All Volumes of *Cartography for Development of Outing States and Islands of India*, Seminar Paper, Etc.
- Patel, A.N. and Singh, S., 1999: *Principles of Remote Sensing*, Scientific Publishers (India), Jodhpur.
- Raisz, E., 1962: *Principles of Cartography*, McGraw Hill, New York.
- Ramamurthy, K., 1982: *Map Interpretation: Indian Landscapes Through Survey of India Topographical Maps*, K. Krishnamurthy, 220 R.K. Mutt Road, Chennai.
- Rhind, D.W. and Taylor, D.R.F. (eds), 1989: *Cartography, Past Present and Future*, Applied Science Publishers, London.
- Robenborst, T. D. and McDermatt, P.D., 1989: *Applied Cartography: Source Material for Mapping*, Merrill Publishing Co. London.
- Robert, G. Cromley, 1992: *Digital Cartography*, Prentice Hall, New Jersey. Robinson, A.H. et al.: *Elements of Cartography*, John Wiley and Sons, New York. Singh, R.L. and Dutta, P. K.: *Elements of Practical Geography*, Students' Friend, Allahabad.
- Singh, R.N. and Kananjia, R.S.: *Map Work and Practical Geography*, Central Book Depot, Allahabad.
- Steers, J.A., 1953: *An Introduction to the Study of Map Projections*, University of London Press, London
- Taylor, D.R.F. (ed), 1980: *Progress in Contemporary Cartography*, John Wiley, Chichester, UK.
- Taylor, D.R.F. (ed), 1983: *Graphic Communication and Design in Contemporary Cartography*, John Wiley and Sons, Ltd., New York.
- Todhunter, I. and Leathen, J. G., 1994: *Spherical Trigonometry*, McMillan & Co. Ltd., London.
- Tooley, R.V.: *Maps and Map Makers*, B.T. Batsford, London.
- Wolf, R., 1974: *Elements of Photogrammetry*, McGraw Hill, New York.

Optional Paper (Fluvial Geomorphology)

Course No. : G 403
Course Title : Concepts and Techniques in Fluvial Geomorphology
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Meaning, scope and evolution of fluvial geomorphology;
Relation between fluvial geomorphology and hydrology. (4lectures)
2. Modern methods and techniques in fluvial geomorphological studies: sedimentological techniques, remote sensing, GIS and computer applications. (6lectures)
3. Drainage basin as a fluvial system: inputs and outputs in the basin; drainage basin as a fundamental geomorphic unit. (6lectures)
4. Runoff estimation in the basin and factors controlling runoff. (5lectures)
5. Channel at grade: concept of grade, attainment of grade, channel equilibrium. (5lectures)

Course No. : G 404
Course Title : Forms and Processes in Fluvial Geomorphology
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Channel process: forces acting in channel, velocity distribution, flow types and water and sediment discharge in channel, channel erosion and deposition. (6 lectures)
2. Channel form: cross-section geometry, long profile and plan geometry. (4 lectures)
3. Hydraulic geometry analysis: at-a-station case and downstream case, relationship of water discharge with velocity, depth width and sediment discharge. (7lectures)
4. Channel patterns: straight, meandering and braided; geometry of meanders, development and causes of meandering; mechanics and causes of braiding. (6lectures)
5. Channel changes in time and over space. (3lectures)

Course No. : G 405
Course Title : Applied Fluvial Geomorphology
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Flood Geomorphology: flood as a geomorphic agent, flood frequency analysis, causes and effects of floods; formation of floodplain. (5 lectures)
2. Human impact on river basins and fluvial systems: effects of basin, landuse and landcover changes and dam construction on catchment ecosystem, hydrology and channel morphology. (5lectures)
3. Fluvial –geomorphic hazards: flood and bank erosion, sedimentation, landslides and soil erosion with special reference to north east India. (6lectures)
4. Fluvial Geomorphology of the Brahmaputra Valley (6lectures)
5. River basin planning and development. (4lectures)

Course No. : G 406
Course title : Dissertation on Optional Paper Fluvial Geomorphology
Total Marks : 50 (including 10 marks allotted to internal assessment)

Course No. : G 407
Course title : Practical on Optional Paper Fluvial Geomorphology 50
Total Marks : (including 10 marks allotted to internal assessment) 25
Total No. of Exercises :

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

- Unit I (30 Marks)**
1. Preparation and interpretation of stage, discharge, hydrographs and unit hydrograph. (8 exercises)
 2. Analysis of the relationship between (6 exercises)
 - (i) basin area and stream discharge and
 - (ii) water discharge and sediment load (sediment rating curves) taking examples from the Brahmaputra and its tributaries
 3. Flood frequency analysis using (6 exercises)
 - (i) Plotting position method
 - (ii) Log Pearson Type III distribution and
 - (iii) Gumbel's Extreme value distribution Method

4. Grain-size analysis of alluvial sediments in the laboratory and fluvio-geomorphic interpretation of the results. (5 exercises)

Unit II (10 Marks)

5. Practical Notebook Assessment.
6. Viva-voce.

Books recommended for Course No. G 403 to G407

- Bhagabati, A. K., Bora, A. K. and Kar, B. K. (ed), 2001: *Geography of Assam*, Rajesh Publications, New Delhi.
- Chorley, Wolman and Millerm, 1969: *Fluvial Processes in Geomorphology*, W.H. Freeman and Company, San Francisco.
- Chorley, R. J. (ed), 1969: *Water, Earth and Man*, Methuen, London.
- Chouhan, T. S., 1995: *Remote Sensing: Principles and Interpretation*, H.W. Freeman and Company, San Francisco.
- Chow, V. T., 1964: *Handbook of Applied Hydrology*, McGraw Hill Book Company, New York.
- Folk, R. L., 1980: *Petrology of Sedimentary Rocks*, Hemphill Publishing Co. Austin, Tx. Garde, R. J. and Ranga Raju, K.G.: *Mechanism of Sediment Transportation*.
- Gregory, K. J. and Walling, D. E., 1973: *Drainage basin Form and Processes*, Arnold, London.
- Kanidhton, D., 1984: *Fluvial Forms and Processes*, Edward Arnold, London.
- Leopold, Wolman and Miller, 1964: *Fluvial Processes in Geomorphology*, W. H. Freeman and Company, San Francisco.
- Morisawa, M., 1968: *Streams: Their Dynamics and Morphology*, McGraw Hill Book Company, New York.
- Mutreja, K. N., 1986: *Applied Hydrology*, McGraw Hill Book Company, New York.
- Pettijohn, F. J., 1975: *Sedimentary Rocks*, Harper and Raw Publishers, New York. Petts, G. E. and Foster, I., 1985: *Rivers and Landscape*, Edward Arnold, London. Rao, K. L., 1975: *India's Water Wealth*, Orient Longman, New Delhi.
- Sabnis, Floyd. F., 1978: *Remote Sensing: Principles and Interpretation*, H. W. Freeman and Company, San Francisco.
- Schumm, S. A., 1977: *The Fluvial System*, Wiley Interscience, New York.
- Schumm, S. A.(ed), 1977: *Drainage Basin Morphology*.
- Smith, D.I. and Stopp, P., 1978: *The River Basin: An Introduction to the Study of Hydrology*, Cambridge.

Optional Paper (Population Geography)

Course No.	: G 403
Course Title	: Theoretical and Conceptual Basis of Population Geography
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures :	26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. The field of population geography: nature, development and approaches; its relation with demography. (3 lectures)
2. Sources of population data; problems associated with reliability and comparability of data; problems of mapping population data; and techniques of population projection. (4 lectures)
3. Population theories: ideas of Malthus, Ricardo and Marx. (4lectures)
4. Models and theories: vital rates, migration and population growth; demographic transition; laws of migration –Raveinstein and Lee; and theories of migration –Reilly, Zipf, Staufer, Hagerstrand and Wolpert. (10 lectures)
5. Population and resource relationship: concept of under population, optimum population, over population, population explosion and population pressure. (5lectures)

Course No. : G 404
Course Title : Population Geography : World perspective
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 28

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Growth and distribution of world population. (4 lectures)
2. International migration –push and pull factors and consequences of migration. (4lectures)
3. Comparative study of population characteristics of the developed and less developed countries: vital rates, age and sex composition, life expectancy and demographic transition; literacy and education, rural and urban composition, and occupational structure. (10 lectures)
4. Population – Resource regions. (4 lectures)
5. Contemporary population problems in the developed and developing countries; population policies and programmes in the pro-natalist countries (France, U.S.A. and Japan) and anti-natalist countries (China, India and Egypt). (6lectures)

Course No. : G 405
Course Title : Population Geography of India.
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 28

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Demographic and socio-economic characteristics of population: vital rates, population growth, age-sex composition, literacy and education, social composition and occupational structure; socio-economic well being of population and population regions. (10 lectures)
2. Rural-Urban composition of population, differential characteristics of rural-urban population. (3 lectures)
3. International and internal migration; consequences of migration; migration problems in North East India. (6 lectures)
4. Population growth and associated problems in demographic, social and economic fronts, population growth and food problems with special reference to North East India. (4 lectures)
5. Population pressure and growing environmental, housing and unemployment problems. (5 lectures)

Course No. : G 406
Course title : Dissertation on Optional Paper Population Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)

Course No. : G 407
Course title : Practical on Optional Paper Population geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises : 28

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

- Unit I** (30 Marks)
1. Mapping of population distribution, density and concentration in World and India. (6 exercises)
 2. Population growth trend analysis and population projections in World and India. (4 exercises)
 3. Mapping of Rural-Urban population and population potential surfaces in India. (4 exercises)
 4. Representation of demographic, social and economic characteristics of population. (6 exercises)
 5. Population- Resource Regions in the World. (2 exercises)
 6. Levels of socio-economic well-being and demographic

- zones in India. (3 exercises)
 7. Application of field survey methods in population studies (3 exercises)

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- Unit II** (10 Marks)
 8. Practical notebook.
 9. Viva-voce

Books recommended for Course No. G 403 to G407

- Agarwal, S. N., 1988: *India's Population Problems*, Tata McGraw Hills Publishing Publishing Co. Ltd. New Delhi.
 Ahmad, A. et al (eds), 1997: *Demographic Transition: The Third World Scenario*, Rawat Publications, Jaipur and New Delhi.
 Beaujeu- Garnier, J., 1966: *Geography of Population*, Longman, London.
 Bhende, A. and Kanitkar, T.: *Principles of Population Studies*, Himalaya Publishing House, Bombay.
 Chandna, R. C., 1988: *A Geography of Population*, Kalyani publishers, New Delhi. Clark, J.I., 1971: *Population Geography and Developing Countries*, Pergamon Press, Oxford.
 Clark, J. I., 1972: *Population Geography*, Pragamon Press, Oxford.
 Demko, G. J. et al, 1970: *Population Geography: A Reader*, McGraw Hill, New York. Gosal, G. S., 1984: *Population Geography in India*, in *Geography and Population, Approaches and Applications*, John I. Clarke (ed), Pergamon Press, Oxford. Mehta, S., 1990: *Migration, A Spatial Perspective*, Rawat Publications, Jaipur and New Delhi.
 Raza, M. and Ahmad, A., 1990: *An Atlas of Tribal India*, Concept Publishing Company, New Delhi.
 Robinson, H., 1983: *Population and Resources*, Macmillan Press, London. Trewartha, G. T., 1969: *A Geography of Population: World Pattern*, John Wiley, New York.
 Woods, R., 1979: *Population Analysis in Geography*, Longman, London. Zelinsky, W., 1966: *A Prologue to Population Geography*, Prentice- Hall, Englewood Cliffs.

Optional Paper: Geography of Rural Development

- Course No.** : G 403
Course Title : Rural Development: Concepts and Theories
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 24

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Rural development: concept and significance. (6 lectures)
 2. The rural context: characteristics in developed and less developed economies, rural-urban relations. (8 lectures)

Theoretical basis of rural development: evolution, size and spacing of rural settlements ;rural spatial organization, central place theory, diffusion of development in rural areas.

(10lectures)

Course No. : G 404
Course Title : Rural Development: Process, Pattern and Problems
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 24

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Rural development processes: infrastructure for rural development, components of development process: agriculture, livestock, fishing, industries, trade and their role in rural change, sustainable development, rural development plans and policies. (9 lectures)
2. Pattern of rural development: relation between process and pattern, identification of spatial and temporal patterns of rural development. (6 lectures)
3. Problems of rural development: inequalities in rural development, social and environmental problems associated with rural development, the question of social justice in rural development. (9 lectures)

Course No. : G 405
Course Title : Rural Development in India
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Trends in rural development in India: spatio –temporal perspectives on achievement and failure of rural development programmes in India since 1951. (6 lectures)
2. Inequalities in rural development in India: concept of inequality , patterns, causes and consequences of inequality, inequality in rural development in N. E. India. (10lectures)
3. Strategies for balanced rural development in India: concept

of balanced development, intersectoral relation in rural development, indicators of rural development, formulation of strategies for balanced rural development in India.

(10lectures)

Course No. : G 406
Course title : Dissertation on Optional Paper Rural Development
Total Marks : 50 (including 10 marks allotted to internal assessment)

Course No. : G 407
Course title : Practical on Optional Paper Geography of Rural Development
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises : 24

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

Unit I (30 Marks)

1. Size and spacing of rural areas: application of rank-size rule and nearest neighbour statistic. (4 exercises)
2. Identification of complimentary areas of central places: application of Gravity Model and Central Place Model. (4 exercises)
3. Mapping of rural infrastructure: road network by applying Nearest Neighbour Statistic; distribution of services – education, post and telegraph, medical facilities, etc. (6 exercises)
4. Mapping of Rural Development Patterns: agricultural development, industrial development, development of trade and commerce by applying suitable statistical techniques. (6 exercises)
5. Mapping of rural inequalities: income and social well-being by applying suitable statistical techniques including Z-scores. (4 exercises)

Unit II (10 Marks)

6. Practical Notebook Assessment.
7. Viva-voce.

Books recommended for Course No. G 403 to G407

- Alam, S. M. et al., 1982: *Settlement Systems of India*, Oxford and IBH Publishing Co., New Delhi.
- Bhat, L. S., 1976: *Micro-Level Planning: A Case Study of Karnal Area, Haryana*, Concept Publishing Co., New Delhi.
- Blaikie, P. M., 1971: *Spatial Organisation of Agriculture in North Indian Village*, Trans. Inst. British Geographer, Vol. 50.
- Chisholm, M., 1966: *Geography of Economics*, Bell, London.
- Chisholm, M., 1967: *Rural Settlements and Land Use*, John Wiley, New York.
- Chorley, R. J. and Hagget, P., 1967: *Models in Geography*, Methuen, London.
- Christaller, W.: *The Central Places in Southern Germany*, Translated by C.W. Baskin, Prentice Hall, Englewood Cliffs, N. J.
- Friedmann, J. and Alonso, W., 1969: *Regional Development and Planning- A Reader*, M.I.T. Press, Cambridge, Mass.

- Ginsburg, Norton, (ed), 1960: *Geography and Economic Development*, Research Paper Vol. 62, University of Chicago Press, Chicago.
- Graham, E.R., 1944: *Natural Principles of Landuse*, Oxford University press, New York. Gosal, G. S. and Krishan, G., 1984: *Regional Disparities in Levels of Socio-economic Development in Punjab*, Vishal Publications, Kurukshetra.
- Hirschman, A., 1958: *The Strategy of Economic Development*, University Press, Yale, New Haven.
- Kundu, A. and Raza, M., 1982: *Indian Economy: The Regional Dimension*, Center for the Study of Regional Development, Jawararlal Nehru University, New Delhi.
- McRae, S. G. et al., 1981: *Land Evaluation*, Oxford Clarendon Press, Oxford. Misra, R. P. et al.: *Rural Area Development Perspectives and Approaches*, Starling, New Delhi.
- Misra, R. P., 1985: *Rural Development: Capitalist and Socialist Patterns*, 5 Volumes, Concept Publishing Co., New Delhi.
- Misra, G. K. et al., 1980: *Regional Planning at the Micro-Level: A Case Study for Electrification in Bastar*, IIPA, New Delhi.
- Myrdal, G., 1957: *Economic Theory and Under-Development Regions*, Gerald Duckworth, London.
- Ramachandran, H., 1980: *Village Clusters and Rural Development*, Concept Publishing Co. New Delhi.
- Richardson, H. W., 1969: *Regional economics*, Weidenfeld and Nicolson, London
- Sen, Lalit K., (ed), 1972: *Readings in Micro-level Planning and Rural Growth Centers*, N.I.C.D., Hyderabad.
- Singh, J., 1974: *An Agricultural Atlas of India- A Geographical Analysis*, Vishal Publications, Kurukshetra.
- Steward, G.S., 1968: *Land Evaluation*, MacMillan of Australia.
- Tarrant, J. R., 1974: *Agricultural Geography*, Newton Abbot, David and Charles. Wanmali, S., 1983: *Service Centers in Rural India*, B.R. Publishing Corporation, Delhi.

Optional Paper: Social Geography

Course No.	: G 403
Course Title	: Theoretical and Conceptual Framework of Social Geography.
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures :	26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. The field of social geography, social Geography and Sociology, approaches of study, philosophical and methodological development and contemporary trends in Social Geography. (4 lectures)
2. Concepts of social space, social organization, social area analysis and factorial ecology. (5 lectures)

3. Social groups, social structure and social development: an international perspective. (5 lectures)
4. Methods in spatial distribution and concentration, spatial relationship and interaction in social geography ; spatial diffusion, social gradient ,social disparity , principal component and factor analysis . (7 lectures)
5. Sociological and social geographic models. (5 lectures)

Course No. : G 404
Course Title : Social Welfare and Social Change.
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Conceptual basis of social well-being: social well-being as reflected in the indicators like literacy and education, health care, civic amenities and economic condition. (5lectures)
2. Social development and human development: An overview of the world scenario. (5lectures)
3. Processes of social change: modernization, urbanization, industrialization and other socio-economic and cultural processes. (6lectures)
4. Socio-economic inequalities: problems of poverty and hunger, deprivation, injustice and social discrimination. (5lectures)
5. Gender perspective in social geography: status and role of women in a society, gender discrimination. (5lectures)

Course No. : G 405
Course Title : Social Geography of India.
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

1. Development of social geography in India. (3 lectures)
2. Social evolution in India: The pre-history and historic scene with special reference to the *Janapadas* of ancient India and the Mughal *Subahs*, transformation of Indian regional structure during the British colonialism. (6 lectures)
3. Social structure and social stratification as reflected in race, tribe, caste, language, dialect and religion. (5 lectures)

4. Processes of social change in India:
 (a) Sanskritization
 (b) Westernization
 (c) Modernization. (4 lecturers)
- Nature and direction of social change in India (3 lectures)
5. Socio-spatial inequalities: patterns and problems. (3 lectures)
6. Geographical diversity in social composition, problems of identity consciousness, questions of regionalism and nationalism in contemporary North-East India. (5 lectures)

Course No. : G 406
Course title : Dissertation on Optional Paper Social Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)

Course No. : G 407
Course title : Practical on Optional Paper Social Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises : 26

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

- Unit I (30 Marks)**
1. Distribution and concentration pattern among social groups. (6 exercises)
 2. Socio-spatial relationships, disparity and gradient patterns. (4 exercises)
 3. Social interaction and diffusion patterns. (6 exercises)
 4. Social area analysis by composite Z score and Principal Component analysis. (6 exercises)
 5. Social Survey Methods. (4 exercises)
- Unit II (10 Marks)**
6. Practical Notebook Assessment.
 7. Viva-voce.

Books recommended for Course No. G 403 to 407

- Ahmad, A., 1999: *Social Geography*, Rawat Publication, Jaipur and New Delhi.
 Ahmad, A. (ed), 1993: *Social Structure and Regional Development: A Social Geography perspective*, Rawat Publication, Jaipur.
 Carter, J and Turner, J., 1989: *Social Geography: An Introduction to Contemporary Issues*, Edward Arnold, London.
 Eyles, J., 1983: *Social Geography in International Perspective*, Croom Helm, Sydney.

- Eyles, J., 1981: *Social Geography*, in Jonston, R.J. et al, *The Dictionary of Human Geography*, Basil Blackwell, Oxford.
- Jones, E. and Eyles, J., 1977: *An Introduction to Social Geography*, Oxford University Press, Oxford and New York.
- Gregory, D. and Urry, J. (eds), 1985: *Social Relation and Social Structure*, Macmillan, London.
- Harvey, D., 1972: *Social Justice and the City*, Arnold, London.
- Hannett, Caris. (eds), 1996: *Social Geography: A Reader*, Arnold, London. Jackson, P. and Smith, S., 1984: *Exploring social Geography*, George Allen and Unwin (Publishers) Ltd., London.
- Jones, E. (ed), 1975: *Reading in Social Geography*, Oxford University Press, Oxford. Knox, P., 1995: *Social Well-being: A Spatial Perspective*, Oxford University Press, Oxford. Milton, Keynes, 1972: *Social Geography: New Trends in Geography*, Open University Press.
- Noble, A. G. and Dutta, A. K. (eds): *India: Cultural Pattern and Processes*, West View Press, Colorado.
- Pecionb, M., 1987: *Social Geography: Process and Prospect*, Croom Helm, London. Sharma, H. N., 2001: *Social Geography*, Singh, J. (ed), *Progress in Geography (1996-2000)*, INSA, New Delhi.
- Smith, D.M., 1977: *Human Geography: A Welfare Approach*, Edward Arnold, London. Smith, D.M., 1973: *A Geography of Social Well-being*, McGraw Hill, New York. Smith, D.M., 1979: *Where the Grass is Greener: Living in an Unequal World*, Penguin Books Australia Ltd, Victoria.
- Sopher, D.E. (ed): *An Exploration Of India: Geographical Perspectives on Society and Culture*, Longman, London.
- Srinivas, M.N., 1986: *India: Social Structure*, Hindustan Publishing Corporation, Delhi. Taher, M., 1994: *Social Geography: Concept and Theories*, NEIGS, Guwahati.

Optional Paper: Regional Development and Planning

Course No.	: G 403
Course Title	: Theoretical and Conceptual Basis of Regional Development and Planning.
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures :	28

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

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| 1. The concept of region and regional development. | (4 lectures) |
| 2. Identification of resource regions; conservation and management of resources for regional development | (4 lectures) |
| 3. Approaches to regional planning: synoptic, functional and adhoc or specific. | (3 lectures) |

4. Theories of spatial distribution: Central Place Theory of Christaller, Growth Pole Theory of Perroux and Boudeville, Center- Periphery Theory of Prebisch,R., Cumulative Causation Theory of Gunnar, M. Myrdal and Multi-level Growth Foci concept of Misra, R.P. (7lectures)
5. Methods of regionalisation and techniques in regional planning. (6lectures)
6. Decentralization and multi-level planning. (4lectures)

Course No. : G 404
Course Title : Regional Development and Planning: A Global Perspective.
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 25

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. The concept of development, sustainable development and development indicators: per capita income, energy and demographic indicators. (5lectures)
2. Theories of underdevelopment: Marxist, Center- periphery and Dependency theories. (6lectures)
3. Regional development perspectives in the Netherlands and Israel. (6lectures)
4. Patterns of world economic development: agricultural, industrial, commercial and technological. (8lectures)

Course No. : G 405
Course Title : Regional Development and Planning in India
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Regional planning strategy under Five Year Plans. (4 lectures)
2. Planning for problem areas: tribal sub-plan, drought prone areas and rural development. (6 lectures)
3. Case studies of regional planning exercises: National Capital Region and North East India. (5 lectures)
4. Urban policy and urban planning in India, components of a physical plan; neighborhood planning. (5 lectures)
5. Spatial pattern of agricultural and industrial development. (6 lectures)

Course No.	: G 406
Course title	: Dissertation on Optional Paper Regional Development and Planning
Total Marks	: 50 (including 10 marks allotted to internal assessment)

Course No.	: G 407
Course Title	: Practical on optional paper Regional Development and Planning
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises	: 24

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

Unit I (30 Marks)

1. Regionalisation using methods of: (6 exercises)
 - (a) Overlapping of different themes
 - (b) Ranking using mean and standard deviation.
 - (c) Factor analysis.
2. Network analysis (6 exercises)
 - (a) Application of aggregate connectivity for regional Development using alpha, beta, gamma and cyclomatic number
 - (b) Application of shape and tortuosity indices for developing planning strategy (4 exercises)
3. Delimiting influence areas of nodal centers using:
 - (a) Breaking point method
 - (b) Gravity potential method.
4. Application of input-output analysis for prediction of short-range change in regional development. (4 exercises)
5. Exercises on shift share analysis for regional studies. (4 exercises)

Unit II (10 Marks)

4. Practical Notebook Assessment.
5. Viva-voce.

Books recommended for Course No. G 403 to G407

- Banerjee, A. and Kar. B., 1999: *Economic Planning and development of North Eastern States*, Kanishka Publications, New Delhi.
- Choud, M. and Puri, V. K., 1983: *Regional Planning in India*, Allied Publications, New Delhi.
- Deb, B. J., 1995: *Regional Development in North East India*, Reliance Publications, New Delhi.

- Friedman, J. and William Alonso (eds), 1964: *Regional Development and Planning*, Cambridge, Mass. M.I.T. Press.
- Friedman, J., 1973: *Utilization, Planning and National Development*, Bererly Hills, Sage Publications.
- Gallion, A. B. and Simon Eisner, 1974: *The Urban Pattern: City Planning and Design*, East West Press Pvt. Ltd., New Delhi and Van Norstrand Reinhold Co.
- Glasson, J., 1974: *An Introduction to Regional Planning*, Hutchinson Educational Ltd., London.
- 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.
- Goswami, A., 1981: Assam's Industrial Development: Urgency of New Direction, *Econ. Pol. Weekly*, XVI (21)
- Hilhorst, J.G.M. and Dunham, D.M., 1971: *Issues in Regional Planning*, Institute of Social Studies, The Hague.
- Holier, G. P., 1988: Regional Development, in Michael Pacione (ed.), *The Geography of the Third World: Progress and Prospect*, Rutledge, London and New York.
- Isard, Walter et al, 1998: *Methods of Interregional and Regional Analysis*, Ashgate Publishing Ltd., Aldershot.
- Kidwai, A. H., 1985: *Disparities in the Levels of Regional Development and Spatial Differentiation in India in the Historic Context*, CSRD, JNU, Mimeo.
- Mishra, R. P., Sundaram, K.V. and Rao, P., V.L.S., 1974: *Regional Development Planning in India; A New Strategy*, Vikas Publications, New Delhi.
- Mishra, R.P., 1992: *Regional Planning; Concept, Techniques, Policies and Case Studies*, Concept Publications, New Delhi.
- Mohapatra, A.C., 1985: The Concept of region, *Hill Geographer*, IV (1) Mohapatra, A.C. and Rooray, J.K., 1998: *Regional Development and Planning*, Rawat, Jaipur.
- Mukherjee, A., 1991: *Methodology and Database for Decentralized Planning*, Heritage, New Delhi.
- Mukherjee, A., 1993: *A Perspective Plan for A Hill District*, Heritage, New Delhi. Pannerselvam, A., 1999: Regional Development in the Developing Countries: A Search for Appropriate Theory, *Space*, 12 (2).
- Ridell, R., 1985: *Regional Development Policy*, St. Martin's Press, New York. Sandesara, J.C., 1992: *Industrial Policy and Planning, 1947-91: Tendencies, Interpretations and Issues*, Sage Publications, New Delhi.
- Sanyal, B. M., 2001: *India: Decentralized Planning*, Concept, New Delhi. Smith, B.C., 1965: *Regionalism*, Action Society Trust, London.
- Snallenbrock, A. J. H. and Spit, T. J. M., 1992: Regions and Regionalization in the Netherlands, *Tijdschrift Voor, Econ. En. Soc. Geografie*. 82 (3).

Optional Paper (Agricultural Geography)

Course No.	: G 403
Course title	: Principles and Concepts of Agricultural Geography
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures :	26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Field of agricultural geography and its significance (3 lectures)
2. Trends in the study of agricultural geography (3 lectures)
3. Approaches to the study of agricultural geography: commodity, systematic, regional, inductive and deductive (4 lectures)
4. Determinants of agriculture: physical, economic, social, institutional and technological (3 lectures)
5. Factors of agricultural production: land, labour, capital, organization and govt. policy (3 lectures)
6. Methods in agricultural geography: Von Thunen's model of agricultural location and Franklin's type of farming model (4 lectures)
7. Concept of agricultural region, agricultural types and agricultural systems (3 lectures)
8. Concept of large-scale and small-scale agriculture (3 lectures)

Course No.	: G 404
Course title	: Applied Agricultural Geography
Total Marks	: 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures :	26

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Methods of agricultural regionalization: crop-combination, crop concentration and diversification, crop intensity, crop rotation and agricultural efficiency (6 lectures)
2. Agricultural productivity: concept and measurement, factors influencing crop productivity (4 lectures)
3. Cropping pattern, factors influencing cropping pattern, shifting in cropping pattern, crop and cropping hazards, crop and cropland management (5lectures)
4. Agricultural classification: according to Whittlesey, Richard Thoman and Peter Corbin (3lectures)
5. Land use and land capability classification (2lectures)
6. Regional analysis of agriculture in the USA, Japan and Israel (6lectures)

Course No. : G 405
Course title : Agricultural Geography of India
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Lectures : 28

Candidates are required to answer 4 questions selecting one of 16 marks and the remaining three of 8 marks each within two and a half hours of examination.

Course content

1. Indian agriculture: type, characteristics, growth, distribution and development and position of Indian agriculture in the world agricultural scenario (6lectures)
2. Agricultural regions of India and their characteristics (3lectures)
3. Agricultural land use pattern in India (2lectures)
4. Regional variation in the levels of agricultural development in India, problems of Indian agriculture: crop and cropping hazards, sustainability of agricultural practices and production (6lectures)
5. Technological factors in Indian agriculture, Green revolution (3 lectures)
7. Political-economy of Indian agriculture (2lectures)
8. Government policy for agricultural planning and development in India (3lectures)
9. Indian agriculture in the context of globalization and free economic market (3lectures)

Course No. : G 406
Course title : Dissertation on Optional Paper Agricultural Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)

Course No. : G 407
Course Title : Practical on optional paper Agricultural Geography
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises: 24

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

- Unit I (30 Marks)**
1. Crop combination- Nelson's method and Weaver's method (2 exercises)
 2. Crop combination and Diversification: Location quotient, Lorenz curve and Diversification index (6 exercises)
 3. Intensity of cropping: Index of cropping intensity, relationship between cropping intensity and causal factors (4 exercises)

4. Agricultural productivity and efficiency: Methods of Kendal,
Sapre and Despande, J. Singh and Bhatia (4 exercises)
5. Land use mapping (4 exercises)
6. Agricultural regionalization: linkage method and Composite
Index method (4 exercises)

Unit II**(10 Marks)**

7. Practical Notebook assessment.
8. Viva-voce.

Books recommended for Course No. G 403 to G407

- Alexander, J.W., 1963: *Economic Geography*, Prentice Hall, Englewood Cliffs, N. J. Anderson, J.R., 1970: *A Geography of Agriculture*, Iowa: WMC Brown Co.
- Clark, Colin and Haswell, Margaret, 1964: *The Economy of Subsistence Agriculture*, St. Martin's, London.
- Chorley, R. J. and Haggett, P., 1971: *Socio-Economic Models in Geography*, Methuen and Co.Ltd., London.
- Das, M. M., 1984: *Peasant Agriculture in Assam: A Structural Analysis*, Inter-India Publications, New Delhi.
- Dunn, E. S., 1954: *The Location of Agricultural Production*, University of Florida Press, Gainesville.
- Gregor, Howard, F., 1970: *Geography of Agriculture: Themes in Research*, Prentice Hall, Englewood Cliffs, N. J.
- Grigg, D.B., 1978: *Agricultural Systems of the World: An Evolutionary Approach*, Cambridge University Press, Cambridge.
- Hussain, M., 2001: *Systematic Agricultural Geography*, Rawat Publication, Jaipur and New Delhi.
- Mohammad, N. (ed), 1992: *New Dimensions in Agricultural Geography* (in 8 Volumes), Concept Publishing Company, New Delhi.
- Morgan, W.B. and Munton, R.J.C., 1971: *Agricultural Geography*, Methuen, London. Sauer, Carl O., 1952: *Agricultural Origin and Dispersals*, American Geographical Society (Bowman Memorial Lecture), New York.
- Singh, J., 1974: *Agricultural Atlas of India: A Geographical Analysis*, Vishal Publishers, Kurukhsetra.
- Singh, J., 1976: *Agricultural Geography*, Tata McGraw Hill Pub. Co., New Delhi. Sukla, S. P. and Agarwal, A.K.: *Agriculture in North East India*.
- Symons, L., 1967: *Agricultural Geography*, G. Bells and Sons, London. Tarrant, John, R., 1974: *Agricultural Geography*, David and Charles, Newton.
- Wheeler, K.B., Ladley, A.M. and Leong, F.G., 1970: *Studies in Agricultural Geography*, Bland Educational, London.
- Ilbery, 1991: *Agricultural Geography: Social and Economic Analysis*, International Book House, Delhi.
- Tiwari, 1991: *Agricultural Geography*, International Book House, Delhi.
- Whittlesey, D., 1936: *Major Agricultural Regions of the World*, Annals of the Association of American Geographers, 26.
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Course No. : G 408
Course title : Practical on Remote Sensing and GIS (General Course)
Total Marks : 50 (including 10 marks allotted to internal assessment)
Total No. of Exercises : 24

Candidates are required to answer three questions carrying 10 marks each from unit I within three hours of examination along with evaluation of practical note-book and viva-voce under unit II.

Course content

Unit I (30 Marks)

1. Fundamentals of Photogrammetry: determination of photo scale, object height, slope between two points and relief displacement (6 exercises)
2. Interpretation of aerial photographs and preparation of land use map, settlement map and road map (4 exercises)
3. Interpretation of satellite imagery and preparation of land use/land cover and fluvial-geomorphic maps (4 exercises)
4. Digitization of different layers of spatial information (Point, line and polygon) and their thematic representation (5 exercises)
5. Study of changing land use and river course using remote sensing and GIS techniques (5 exercises)

Unit II (10 Marks)

6. Evaluation of Practical Notebook
7. Viva-voce
