

Banaras Hindu University
Faculty of Science
Department of Geography
M.Sc. Geography: 2 Years Semester Course Outline, 2013-2014

NOTE: The courses for M.Sc. and M.A. are identically the same, except code GRM/ GRA.

SEMESTER - I

Paper Code	Explanation	TITLE	Credits
GRM101	Theory	Emerging Geographical Thought	4
GRM102	Theory	Physical Landscape and Hydrology	4
GRM103	Theory	Advanced Geography of India	4
GRM104	Practical	Physical Diagrams, Hydrology and Map Projections	2
GRM105	Practical	Spatial Analysis: Locational and Network	2
GRM106		Assignment- Based Seminar I	2
TOTAL			18

SEMESTER -II

Paper Code	Explanation	TITLE	Credits
GRM201	Theory	Advanced Geomorphology	4
GRM202	Theory	Geography of Resources	4
One paper of the special group to be selected from the following:			
GRM203A GRM203B GRM203C	Theory	Population Geography Resource Planning Advanced Cartography	4
GRM204	Practical	Statistical Methods and Data Processing	2
The corresponding practical of special group to be selected from the following:			
GRM205A GRM205B GRM205C	Practical	Population Geography Resource Planning Advanced Cartography	2
GRM206M *#	Theory	Fundamentals of Remote Sensing (Minor Elective)*#	2
GRM207		Assignment- Based Seminar II	2
TOTAL			20

SEMESTER - III

Paper Code	Explanation	TITLE	Credits
GRM301	Theory	GIS and Its Application	4
GRM302	Theory	Environmental Studies	4
One paper of the special group to be selected from the following:			

GRM303A GRM303B GRM303C	Theory	Geography of Rural Settlements Regional Planning Aerial Photo Interpretation.	4
GRM304	Practical	Remote Sensing and GIS; Soil, Water and Air Analysis	2
The corresponding practical of special group to be selected from the following:			
GRM305A GRM305B GRM305C	Practical	Geography of Rural Settlements Regional Planning Aerial Photo Interpretation and GIS	2
GRM306M *#	Theory	Population and Development (Minor Elective)	2
GRM307	Practical	Field Study and Geographical Excursion	2
GRM308		Assignment- Based Seminar III	2
TOTAL			22

SEMESTER - IV

Paper Code	Explanation	TITLE	Credits
GRM401	Theory	Interdisciplinary Research Methods and Techniques	4
One paper of the special group to be selected from the following:			
GRM402A GRM402B GRM402C	Theory	Urban Geography Rural and Urban Planning Satellite Image Interpretation.	4
The corresponding practical of the special group to be selected from the following:			
GRM403A GRM403B GRM403C	Practical	Urban Geography Rural and Urban Planning Satellite Image Interpretation	2
GRM404	Practical	Instrumental and Socio-economic (2+2 Credits)	4
GRM405		Assignment- Based Seminar IV	2
GRM406	Practical	Field Work Dissertation and Viva Voce: (2+2 Credits)	4
TOTAL			20

*# **Minor Electives : GRM 206 M and GRM 306M**

Department of Geography, Banaras Hindu University, Varanasi, UP 221005

M.Sc. Geography. SEMESTER – I GRM101: Emerging Geographical Thought

Credits: 4

Number of Lectures: 52

UNIT I

Basic Frame and Concepts. Man-environment interaction: New environmentalism; Concepts: space, place, environment, time, and spatial organisation; Region and regional typology; Culture and cultural landscape.

UNIT II

Modern Approaches. Quantitative revolution and challenges; Philosophy and geography: Contributions of Vidal de la Blache, and Carl Sauer; Humanistic and phenomenological geography: contributions of Yi-Fu Tuan; Literary geography: landscape as text.

UNIT III

Contemporary Trends. Qualitative paradigm; Behavioural revolution: perception and cognition, mental maps; Marxism; Postmodernism; Poststructuralism and Postcolonialism.

UNIT IV

Indian Geography: Base and Trends. Postcolonialism and Indian geography; Gandhi's contribution and Indian geography; Gaia theory and links to Indian literature; Ancient Indian geography and scientific outlook (e.g. cultural astronomy); Future of Indian geography: problems, perspectives and prospects.

Books Recommended

- Adams, P., Steven, H. and Karel, T. (eds.) (2001): *Texture of Place. Exploring Humanistic Geographies.* University of Minnesota Press, Minneapolis.
- Anderson, K., Domosh, M., Pile, S. and Thrift, N. (eds.) (2003): *Handbook of Cultural Geography.* Sage Publications, London.
- Barnes, T. and Gregory, D. (eds.) (1997): *Readings in Human Geography: The Poetics and Politics of Inquiry.* Arnold, London.
- Bunkše, E. V. (2004): *Geography and the Art of Life.* John Hopkins University Press, Baltimore.
- Buttimer, A. (1971): *Society and Milieu in the French Geographic Tradition.* Rand McNally, Chicago.
- Daniels, P., Bradshaw, M., Shaw, D. and Sidaway, J. (2000): *An Introduction to Human Geography. Issues for the 21st Century.* Prentice Hall, London.
- Dear, M. J. and Flusty, S. (2002): *The Spaces of Postmodernity: Readings in Human Geography.* Blackwell Publishers, Oxford.
- Dikshit, R. D. (2004): *Geographical Thought. A Critical History of Ideas.* Prentice-Hall of India, New Delhi. (in English and Hindi).
- Doel, M. (1999): *Poststructuralist Geographies. The Diabolical Art of Spatial Science.* Edinburgh University Press, Edinburgh
- Gaile, G. and Wilmott, C. (eds.) (2003): *Geography in America at the Dawn of the 21st Century.* Oxford University Press, Oxford and New York.
- Harvey, D. (1969): *Explanation in Geography.* Arnold, London.
- Harvey, M. E. and Holly, P.B. (2002): *Themes in Geographic Thought.* Rawat Publications., Jaipur and New Delhi.
- Hubbard, P., Kitchin, R., Bartley, B. and Fuller, D. (2002): *Thinking Geographically: Space, Theory and Contemporary Human Geography.* Continuum, London.
- Johnston, R, Gregory D, Pratt G, Watts M. and Whatmore S. (2003): *The Dictionary of Human Geography.* Blackwell Publishers, Oxford. 5th edition.
- Johnston, R.J. (1985): *The Future of Geography,* Methuen and Company Ltd., New York. (2003 edition published).
- Johnston, R.J. and Sidaway, J.D. (2004): *Geography and Geographers.* 6th edition, Edward Arnold, London.
- Kapur, A. (ed.) (2001): *Indian Geography – Voice of Concern.* Concept Publishing. Company, New Delhi.
- Martin, G. (2005): *All Possible Worlds. A History of Geographical Ideas.* 4th edition, Oxford University Press, New York.
- Mathews, J. A. and Herbert, D. T. (eds.) (2004): *Unifying Geography. Common Heritage, Shared Future.* Routledge, London.
- Peet, R. (1998): *Modern Geographical Thought.* Blackwell Publishers Inc, Massachusetts.
- Sack, R. D. (ed.) (2002): *Progress. Geographical Essays.* John Hopkins University Press, Baltimore.
- Sauer, C. O. (1963): *Land and Life.* University of California Press, Berkeley.
- Singh, R. L. and Singh, Rana P.B. (eds.) (1990): *Literature and Humanistic Geography.* National Geographical Society of India, BHU, Varanasi, Publication number 37
- Singh, R. L. and Singh, Rana P.B. (eds.) (1992): *The Roots of Indian Geography: Search and Research.* National Geographical Society of India, B.H.U., Varanasi, Publication number 39.

- Singh, Rana P.B. (ed.) (1993): Environmental Ethics. National Geographical. Society of India, BHU, Varanasi, Publication number 40.
- Singh, Rana P.B. (ed.) (1994): The Spirit and Power of Place. National Geographical Society of India, BHU, Varanasi, Publication number 41.
- Singh, Rana P. B. (2004): Cultural Landscapes and the Lifeworld. Indica Books, Varanasi.
- Soja, E. (1989): Post-modern Geographies. Verso Press, London. Reprinted 1997: Rawat Publications, Jaipur and New Delhi.
- Taylor, G. (ed.) (1953): Geography in the Twentieth Century. Methuen and Company Ltd. and Company, London.
- Tuan, Yi-Fu (1977): Space and Place. The Perspective of Experience. Edward Arnold, London.
- Singh, Ravi S (ed.) 2009. Indian Geography: Perspectives, Concerns and Issues. Jaipur/New Delhi: Rawat Publications
- Singh, Ravi S (ed.) 2009. Indian Geography in the 21st Century: The Young Geographers Agenda. New Castle upon Tyne, UK: Cambridge Scholars Publishing

M.Sc. Geography SEMESTER - I.

GRM102: Physical Landscape and Hydrology

Credits: 4

Number of Lectures: 52

UNIT I

Bases of Physical Landscape. Concept and types of physical landscape; Significance of geomorphic processes including plate tectonics in landforms development; Geological structure and climatic factors in the development of landforms.

UNIT II

Landforms Development. Interruption in the evolution of landforms: tectonic, climatic, and base-level changes; Development of landforms in various areas: humid, coastal, karsts, and peri-glacial; River terraces: concept and types; Regional geomorphology: Indo-Gangatic plain, and Rajmahal Hills.

UNIT III

Bases of Hydrology. Meaning, scope and development of Hydrology; Hydrological cycle; Man's influence on the hydrological cycle; Precipitation types, characteristics and measurements; Evaporation: factors affecting evaporation from free water surface and soil; Evapotranspiration: estimation and its control.

UNIT IV

Water and Its Disposition. Soil moisture and its zones; Infiltration; Groundwater: occurrence, storage, recharge and discharge; Runoff: its sources and components, factors affecting runoff; River regimes; Hydrograph: components and separation.

Books Recommended

- Bernhard, H. and James, M. A. (1944): Climatology. McGraw Hill Company, New York.
- Chorley, R. J. (1995): Atmosphere, Weather and Climate. Methuen and Company Ltd. and Company Ltd., London.
- Chow, V. T., (ed.) (1954): Handbook of Applied Hydrology: A Compendium of Water Resources Technology. McGraw Hill, New York.
- Critchfield, H. J. (2003): General Climatology. Prentice-Hall of India, New Delhi.
- Rai, V.K.(1993): Water Resource Planning and Development, Deep and Deep Publication, New Delhi
- Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing Company, New Delhi.
- Reddy, J. P. (1988): A Textbook of Hydrology. Laxmi Publication., New Delhi. 4th edition.
- Singh, M. B. (1999): Climatology and Hydrology. Tara Book Agency, Varanasi. (In Hindi).
- Singh, M. B. (2002): Physical Geography. Tara Book Agency, Varanasi. (In Hindi).
- Singh, S., (1998): Geomorphology. Prayag Pustak Bhavan, Allahabad.

- Sparks, B.W., (1986): Geomorphology. Longman, London.
- Thornbury, W.D., (2005): Principles of Geomorphology. John Wiley and Sons, New York.
- Trewartha, G. T. (1980): An Introduction to Climatology. McGraw Hill Student edition, New York.
- Ward, R.C. and Robinson, M. (2000): Principles of Hydrology. McGraw Hill, New York.
- Weisberg, J. S. (1974): Meteorology. Houghton Mifflin Company, Boston.
- Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography- An Outline of Geomorphology. Longmans Green, London.

M.Sc. Geography SEMESTER - I.
GRM103: Advanced Geography of India

Credits: 4

Number of Lectures: 52

UNIT I

Introduction. Making of India through geological times, structure and relief; Drainage systems and watersheds; Physiographic divisions; Climate characteristics: mechanism of the Indian Monsoon; Forests: types, distribution and utilisation.

UNIT II

Population Characteristics. Population growth: trends and pattern; Population: distribution and density; Ageing of population; Sex and literacy differentials; Ethnic groups; Trends of urbanisation; National population policy - 2000.

UNIT III

Agricultural Scene. Agricultural characteristics and trends; Land holdings, land tenure, land consolidation and land reforms; Infrastructure: irrigation, power, fertiliser, HYV seeds and farm technology; Green, white, blue and yellow revolutions.

UNIT IV

Industrial Resource Base. Regional distribution and development potentials of mineral and power resources; New industrial policy: Globalisation and liberalisation; Industrial complexes and industrial regions; Transport development: rail and road; Geographical regions; Detailed study of the Middle Ganga plain and Karnataka plateau region.

Books Recommended.

- Chapman, G. and Baker, K.M. (eds.) (1992): The Changing Geography of Asia. Routledge, London.
- Farmer, B.H. (1983): Introduction to South Asia. Methuen and Company Ltd. and Company Ltd., London.
- Ganguly, S. and Neil, DeVotta (eds.) (2003): Understanding Contemporary India. Lynne Rienner Publishers., Boulder and London.
- Gole, P. N. (2001): Nature Conservation and Sustainable Development in India. Rawat publications, Jaipur and New Delhi.
- Johnson, B. L. C. (ed.) (2001): Geographical Dictionary of India. Vision Books, New Delhi.
- Johnson, B.L.C. (1983): Development in South Asia. Penguin Books, Harmondsworth.
- Khullar, D. R. (2006): India. A Comprehensive Geography. Kalyani Publishers., New Delhi.
- Krishnan, M. S. (1968): Geology of India and Burma. 4th edition. Higgin Bothams Private. Ltd., Madras.
- Nag, P. and Gupta S. S. (1992): Geography of India. Concept Publishing. Company, New Delhi.
- Sharma, T. C. (2003): India: Economic and Commercial Geography. Vikas Publication., New Delhi.
- Singh, J. (2003): India: A Comprehensive and Systematic Geography. Gyanodaya Prakashan, Gorakhpur.
- Singh, R. L. (ed.) (1971): India. A Regional Geography. National Geographical Society of India, Varanasi.
- Spate, O.H.K., Learmonth, A.T.A. and Farmer, B. H. (1979): India and Pakistan. Methuen and

- Company Ltd. and Company Ltd., London.
Subbarao, B. (1959): The Personality of India. University of Baroda Press, Baroda.
Sukhwai, B.L. (1987): India. Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi.
Tirtha, R. (2002): Geography of India. Rawat Publications., Jaipur and New Delhi.
Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad
Wadia, D. N. (1959): Geology of India. MacMillan and Company, London and Madras. Student edition.
Ahmed, Waqar, Amitabh Kundra and Richard Peet (eds.) 2010. India's New Economic Policy: A Cractical Analysis, Jaipur/ Dew Delhi: Rawat Publications

M.Sc. Geography SEMESTER - I.

GRM104: Practical: Physical Diagrams, Hydrology and Map Projections

Credits: 2

Number of Lectures: 52

- 1. Physical Diagrams and Hydrology.** Advanced exercises on geological maps: folded and faulted structures, unconformable rock series; Hypsographic and clinographic curves; Drainage basin analysis; Drawing of climatological water balance graph and determination of the components; Calculation of climatic indices: rainfall-runoff relationship; Hydro-graphs: components and separation; Unit hydrograph.
- 2. Map Projections.** Determination of azimuth, retro-azimuth and great circle distances on the earth: Determination of percentage of error in scale and area on selected projections.

M.Sc. Geography SEMESTER - I.

GRM105: Practical: Spatial Analysis: Locational and Network

Credits: 2

Number of Lectures: 52

- 1. Locational Analysis.** Absolute and relative location: spacing, indices of randomness, deviation and nature of dispersion; Nodes-population clusters: the size continuum, size and shape; Hierarchies: functional hierarchy of settlements and ordering; Interaction: movement and distance models; Service area and territory – serial polygons, interactions zones; Case of agricultural and industrial location.
- 2. Network Analysis.** Topologic structures: branching, circuit and barrier networks; Geometric structures: Networks shape and density, pattern and order; Flow and network efficiency; Location of network routes and boundaries; Pattern of spatial evolution and network transformation.

M.Sc. Geography SEMESTER - I.

GRM106: Assignment Based Seminar

Credits: 2

M.Sc. Geography SEMESTER - II

GRM201: Advanced Geomorphology

Credits: 4
Number of Lectures: 52

UNIT I

Concepts. A critique on fundamental concepts of geomorphology; Concept of time: cyclic, graded and steady state; Concept of morphogenetic region; Concept of dynamic equilibrium; Recent trends in geomorphology.

UNIT II

Drainage Basin and Related Aspects. Drainage basin as a geomorphic unit: morphometric laws; Denudation and morpho-chronology and dating of landscapes; Soil erosion and its measurement.

UNIT III

Theories and Techniques. Theories of hill-slope evolution; Erosion surfaces; Geomorphic mapping techniques; Systems in geomorphology; Models in geomorphology.

UNIT IV

Application in Various Fields. Geomorphic hazards and mitigation measures; Geomorphology and economic deposits; Geomorphology in engineering construction; Geomorphology in groundwater studies; Soils and geomorphology.

Books Recommended

1. Ahmed, E. (1985): Geomorphology. Kalyani Publishers, New Delhi.
2. Bloom, A. L. (1998/ 2001): Geomorphology. 3rd edition. Prentice Hall of India, New Delhi.
3. Chorley, R.J., Schumm S A and Sugden D E. (1984): Geomorphology. Methuen and Company Ltd., London.
4. Dayal, P. (1994): A Text Book of Geomorphology. Kalyani Publishers, New Delhi.
5. Fairbridge, R.W. (ed.) (1968): Encyclopaedia of Geomorphology, Reinhold Book Corporation., New York
6. Gregory, K.J. and Walling, D.E. (1973): Drainage Basin Form and Process. Edward Arnold, London.
7. Jog, S. R. (ed.) (1995): Indian Geomorphology (2 vols.). Rawat Publications, Jaipur
8. Kale, V. and Gupta, A. (2001): Introduction to Geomorphology. Orient Longman, Hyderabad.
9. King, C.A.M. (1966): Techniques in Geomorphology. Edward Arnold, London.
10. Pethick, J. (1984): An Introduction to Coastal Geomorphology. Arnold, London. Indian reprint 2000.
11. Sharma, P. R. (ed.), (1993): Applied Geomorphology in Tropics. Rishi Publications, Varanasi.
12. Singh, S. (2004): Geomorphology. Prayag Pustak Bhawan, Allahabad.
13. Sparks, B.W. (1986): Geomorphology. Longmans, London.
14. Thornbury, W.D. (2005): Principles of Geomorphology. John Wiley and Sons, New York.
15. Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography- An Outline of Geomorphology. Longman, London.

M.Sc. Geography SEMESTER - II.
GRM202: Geography of Resources

Credits: 4
Number of Lectures: 52

UNIT I

Introduction and Bases. Concept and scope of Resource Geography; World resources: distribution and pattern; Non-conventional sources of energy; Human resources; Resource base and its dynamism as related to stages of cultural, technological and economic development.

UNIT II

Resource Use. The limits to growth and critique; Resource scarcity hypothesis; World energy crisis; Resource conservation and management; Watershed management; Sustainable development; Resources, development and international politics.

UNIT III

Theories of Resource Use. Theories of agricultural location; Theories of industrial location: Weber, and Lösch; Trade blocs.

UNIT IV

Regional Perspectives. Resource regionalisation; World economic development; Concept of developed and developing nations; Concepts of North-South and First, Second, Third and Fourth Worlds.

Books Recommended

1. Burton, I. and Kates, R.W. (1978): Readings in Resource Management and Conservation. McGraw Hills, New York
2. Clark, G. L., Feldman, M.P. and Gertler, M.S. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, Oxford and New York.
3. Ehrlich, P.R., Ehrlich, R.H. and Holdren, J.P. (1998): Ecoscience: Population, Resources and Development. 2nd edition. Freeman and Company, San Francisco.
4. Sheppard E. and Treror I. B. (ed.) (2003): A Companion to Economic Geography, Blackwell Publication, U.K. and USA.
5. McCarty, H.M. and James B.L. (1976): A Preface to Economic Geography. Prentice Hall, New Jersey.
6. Mitra, A. (2000): Resource Studies; Shridhar Publishers., Kolkata.
7. Ramesh, A. (ed.) (1984): Resource Geography. Heritage Publishers, New Delhi.
8. Singh, J. (2000): *Sansadhan Bhoogol*, Gyanodaya Prakashan, Gorakhpur
9. Singh, K.N. and Singh, J. (2003): *Arthik Bhoogol Ke Mool Tatva*, Gyanodaya Prakashan, Gorakhpur.
10. Todaro M.P. and Smith S.C. (2004): Economic Development, Pearson Education, (Singapore) Private Ltd. Singapore

M.Sc. Geography SEMESTER -II GRM203A: Population Geography

Credits: 4

Number of Lectures: 52

UNIT I

Bases: Concepts, scope and methodology of population geography; Data sources; Population dynamics: fertility, mortality and migration; Concepts of ageing: young, stationary and stable population.

UNIT II

Theories: Theories of Population Growth: Malthus, Marx, Optimum and Demographic transition; Migration theories: Ravenstien and Everetts Lee.

UNIT III

Population Resource: Problems of under, over, declining and zero population; Population resource regions of the world; Concept of human development.

UNIT IV

Case of India: Characteristics of population: age-sex structure, rural-urban, literacy, work force and occupational structure; National population policy.

Books Recommended

- Bhende, A. A. and Kanetkar T. (2003): Principles of Population Studies, Himalaya Publishing House, Mumbai.
- Bose, A. (ed.) (2001): Population in India's Development, 1947-2000. Vikas Publications, New Delhi.
- Champion, T. (ed.) (1993): Population Matters. Paul Chapman, London.
- Chandna, R. C. (2006): Geography of Population. Kalyani Publishers., New Delhi.

- Clark, J. I. (1972): Population Geography. Pergamon Press, Oxford.
- Dube, K.K. and Singh, M.B. (1994): *Jansankhya Bhoogol*, Rawat Publications, Jaipur and New Delhi.
- Ehrlich, P.R. and Ehrlich, A.H. (1996): *Ecoscience: Population, Resources, Environment*. 6th ed. W.H. Freeman and Company, San Francisco.
- Garnier, B.J. (1993): *Geography of Population*. 3rd edition. Longman, London.
- Jones, H. R. (2000): *Population Geography*. 3rd edition. Paul Chapman, London.
- Pathak, L. P. (ed.) (1998): *Population Studies*. Rawat Publications., Jaipur and New Delhi.
- Peters, G. L. and Larkin, R.P. (1983): *Population Geography. Problems, Concepts and Prospects*. Kendall/Hunt, Dubuque, IA.
- Poston, D. L. and Michael, M. (2005): *Handbook of Population*, Springer Heidelberg, Germany.
- Ross, John A. (ed.) (1982): *International Encyclopaedia of Population*. Free Press, New York.
- Singh, K.N. and Singh, D.N. (eds.) (1992): *Population Growth, Environment and Development*. EDSC, Varanasi.
- Srinivasan, K, and Vlassoff, M. (2001): *Population Development Nexus in India: Challenges for the New Millennium*. Tata McGraw Hill, New Delhi.
- Trewartha, G.T. (1985): *A Geography of Population. World Patterns*. John Wiley and Sons, New York.
- Woods, R. (1979): *Population Analysis in Geography*. Longman, London.
- Zelinsky, W., Kosinski, L. A. and Prothero M. R. (eds.) (1970): *Geography and a Crowding World*. Oxford University Press, New York and Oxford.
- Zelinsky, W. (1966): *A Prologue to Population Geography*. Prentice Hall, Englewood Cliffs, New Jersey.

M.Sc. Geography SEMESTER - II.

GRM203B: Resource Planning

Credits: 4

Number of Lectures: 52

UNIT I

Basic Framework. Meaning, purpose and scope of resource planning; Methods and techniques of resource appraisal; Concepts and approaches of sustainable development; Human resource development.

UNIT II

Resource Conservation. Principles of resource conservation; Resource management; Conservation and planning of resources: land, water, forest, and minerals (with special reference to India).

UNIT III

Indian Perspective. Resource utilisation and development; Impact of resource utilisation on environment; Environmental planning and policy in India; Resource potentials and resource regions; Agriculture regions; Population resource regions.

UNIT IV

Case Study of India. Resource planning units and development strategies: Damodar Valley and National Capital Region(NCR).

Books Recommended

- Adam, M.G.(2000a): *Kumasi Natural Resources Management*, Final Technical Report, Natural Resources Institute, University of Greenwich-UK
- Adams, W. M. (1990): *Green Development: Environment and Sustainability in the Third World*. Routledge and Chapman Hall, London.
- Alam, S. Manzoor and Kidwai, Atiya Habeeb (eds.) (1987): *Regional Imperatives in Utilization and Management of Resources: India and the U.S.S.R*. Concept Publishing. Company, New Delhi.
- Burton, I. and Kates, R.W. (1978): *Readings in Resource Management and Conservation*. McGraw Hills, New York.
- Corbridge, S., (ed.) (1995): *Development Studies: A Reader*. Arnold, London.

- Ehrlich, P.R., Ehrlich, R.H. and Holdren, J.P. (1998): *Ecoscience: Population, Resources and Development*. 2nd ed. Freeman and Company, San Francisco.
- Frayser, D.W., (1965): *World Economic Development*. McGraw Hill, New York.
- Freeman, T.W. (1972): *Geography and Planning*. Freeman and Company, New York.
- Gupta, P., and Sdasyuk, G. (1968): *Economic Regionalization of India: Problems and Prospects*. Census of India, New Delhi
- Holechek, J. L., Cole, R., Fisher, J., and Valdez, R. (2000): *Natural Resources: Ecology, Economics and Policy*. Prentice-Hall, New Jersey..
- Mitchell, B. (1979): *Geography and Resource Analysis*. Longman, London
- Mitchell, B. (1997): *Geography and Environmental Management*. Longman, Harlow and London.
- Mitra, A. (1999): *Resource Studies*; Shridhar Publications., Calcutta.
- Prasad, H. et al.(eds.) (2005): *Sustainable Management of Water Resources*, Tara Book Agency, Varanasi
- Preston, P. W. (1996): *Development Theory: An Introduction*. Blackwell Publications, Oxford.
- Rao, P. K. (2001): *Sustainable Development: Economics and Policy*. Blackwell Publications., Oxford.
- Raza, M. (ed.) (1989): *Renewable Resources for Regional Development: The Indian and the Soviet Experience*. Concept Publishing Company, New Delhi.
- Rees, J. (1985): *Natural Resources: Allocation, Economics and Policy*. Methuen and Company Ltd., London.
- Reid, S. (2000): *Global Environmental Outlook*. Earthscan, London.
- Reid, S. (1995): *Sustainable Development*. Earthscan, London.
- Simon, D. and Nārman, A. (eds.) (1999): *Development Theory and Practice*. Longman.
- Simon, D. (ed.) (2005): *Fifty Key Thinkers on Development*. Routledge, London.
- Singh, M. B. et. al. (eds.) (2005): *Sustainable Management of Natural Resources*. Tara Book Agency, Varanasi.
- Sundaram, K.V., (1983): *Geography of Under Development*. Concept Publishing Company, New Delhi.
- Sundaram, K.V.; Mani, M. and Jha, M.M. (eds.) (2004): *Natural Resource Management and Livelihood Security*. Concept Publishing Company, New Delhi.
- Thakur, B., (ed.) (2003): *Perspectives in Resource Management in Developing Countries*. Vol. I: *Resource Management: Theory and Techniques*, Concept Publishing Company, New Delhi.
- Trivedi, P.R., Singh, U.K., Sudershan, K., Tuteja, T.K. (1994): *International Encyclopedia of Ecology and Environment*. Vol. 5: *National Resource Conservation*, Indian Institute of Ecology and Environment, New Delhi.
- UNDP (2001-04): *UNDEP Human Development Report*. Oxford University Press.
- Valdiya, K. S. (1987): *Environmental Geology: Indian Context*. Tata McGraw Hill Publishing Company. Ltd., New Delhi
30. World Bank (2001-05): *World Development Report*. Oxford University Press, New York.

M.Sc. Geography SEMESTER - II.

GRM203C: Advanced Cartography

Credits: 4

Number of Lectures: 52

UNIT I

Measuring the Earth. Properties of sphere; The Earth: its shape and size; Coordinate reference system on the sphere; Celestial coordinates: Equatorial system, Horizon system; Geographical coordinates and grid system; UTM grids.

UNIT II

Survey. Curvature of the earth and its effect on survey and levelling; Geographical Positioning System (GPS); Trigonometrical surveying; Calculation of height by Levelling.

UNIT III

Map Projections. Choice and classification of map projections; Derivations of formulae for construction of: Conical equal area with One and Two standard parallels (Lambert's and Alber's); International Map projection.

UNIT IV

Science of Cartography. History and development of Cartography; Science of cartography and communication theory; Sources of cartographic data; Cartographic techniques and methods in preparation of diagrams and maps; Thematic mapping; soil and vegetation maps, Environmental maps and Population maps (rural and urban); Atlas Mapping; Pre- and -post census mapping; Automation and computer cartography.

Books Recommended

- Bailey, T. and Gatrell, A. C. (1995): *Interactive Spatial Data Analysis*. Longman , Harlow.
- Dorling, D. and Fairborn, D. (1997): *Mapping. Ways of Representing the World*. Longman, Harlow.
- Fraser Taylor, D.R. (1980): *The Computer in Contemporary Cartography*. John Wiley and Sons, New York.
- Fraser Taylor, D.R. (ed.) (1983): *Graphic Communication and Design in Contemporary Cartography*. John Wiley and Sons, New York.
- Griffith, D. A. and Amehein (1997): *Multivariate Statistical Analysis for Geographers*. Prentice Hall, Englewood Cliffs, New Jersey.
- Griffith, D. A. and Amehein (1997): *Statistical Analysis for Geographers*. Prentice Hall, Englewood Cliffs, New Jersey.
- Kanetkar, T.P. and Kulkarni, S.V. (1967): *Surveying and Levelling, Part II*, A.V.G. Prakashan, Poona.
- Keates, J.S. (1973): *Cartographic Design and Production*, Longman Group Ltd.
- Mailing, D.H. (1973): *Co-ordinate Systems and Map Projections*. George Philip and Sons Ltd.
- Monkhouse, F.J. and Wilkinson, H. R (1962): *Maps and Diagrams*, Methuen and Company Ltd. and Company Ltd., London.
- Nag, P. (ed.) (1984): *Census Mapping Survey*, Concept Publishing Company, New Delhi.
- Nair, N. B. (1996): *Encyclopaedia of Surveying, Mapping and Remote Sensing*. Rawat Publications., Jaipur and New Delhi.
- Raisz, E. (1962): *Principles of Cartography*. McGraw Hill Books Company, Inc., New York.
- Misra, R.P. and Ramesh, A. (1999): *Fundamentals of Cartography*. Concept Publishing Company, New Delhi.
- Rhind, B. and Adams, T. (ed.) (1983): *Computers in Cartography*. British Cartographic Society, London.
- Rice Oxley, M.K. and Shearer, W.V. (1929): *Astronomy for Surveyors*. Methuen and Company Ltd. and Company, London.
- Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984): *Elements of Cartography*. 6th edition John Wiley and Sons, New York.
- Shaw, G. and Wheeler, D. (1994): *Statistical Techniques in Geographical Analysis*. Prentice Hall, Englewood Cliffs, New Jersey.
1. Singh, R. L. and Singh, Rana P.B. (1993): *Elements of Practical Geography*. Kalyani Publishers, Ludhiana and New Delhi. (English and Hindi editions).
- Strahler, A.N. (1971): *The Earth Sciences*. Harper and Row Publishers; New York.
- Thrower, N. (1996): *Maps and Civilisation. Cartography, Culture and Society*. University of Chicago Press, Chicago.
- Unwin, D. (1982): *Introductory Spatial Analysis*. Methuen and Company Ltd., London.
- Walford, N. (1995): *Geographical Data Analysis*. John Wiley and Sons, Chichester.

M.Sc. Geography SEMESTER - II.

GRM204: Practical: Statistical Methods and Data Processing

Credits: 2

Number of Lectures: 52

1. Statistical Methods. The normal frequency distribution curve and its characteristics; Curve fitting;

Sampling procedures: random, stratified random, systematic and cluster; Test of significance: Chi-square test, Student's t-test, F-test, Analysis of variance; Analysis of time series.

2. **Data Processing.** Collection of data: methods, sources and types; Classification and tabulation of data; Computer languages; Excel and SPSS

M.Sc. Geography SEMESTER - II.

GRM 205A: Practical: Population Geography

Credits: 2

Number of Lectures: 52

1. Population growth of India and the world using arithmetic and semi-log scales; Population distribution map of India using dot and sphere/circle, cubes, combined; Density map of India by Choropleth; Age-sex structure of rural-urban population of India by Superimposed pyramid; Literacy Level by Compound pyramid; Occupational structure of India by Divided rectangle; Fertility, mortality and natural growth of population by Polygraph.
2. Population potential map by Isoleth; Scatter diagram; Life table calculation; Computation of HDI for India; Migration by Flow diagram; Centographic analysis of population growth; Measurement of population concentration by cumulative curve..

M.Sc. Geography SEMESTER - II.

GRM205B: Practical: Resource Planning

Credits: 2

Number of Lectures: 52

Population Resource region – a case study; Computation of human development Index: a case study; Demographic transition model: a case study; Agricultural productivity; Agricultural efficiency and Delineation of crop combination regions: National Capital Region: A resource appraisal planning unit; Relationship between energy, human resource and economic development.

M.Sc. Geography SEMESTER - II.

GRM205C: Practical: Advanced Cartography

Credits: 2

Number of Lectures: 52

1. **Survey and Map Projections.** Calculation of height by levelling and Theodolite; Contour planning; Construction of map projections (mathematical method): Conical equal area with one and two standard parallels (Lambert's and Alber's), International and Gnomonic Equatorial.
2. **Cartographic Methods.** Computer aided cartography; Designing and preparation of a map on various scales; Representation of statistical data by various cartographic methods; Preparation of one general purpose map and one special purpose map.

M.Sc. Geography SEMESTER - II.

GRM206M: Fundamentals of Remote Sensing (Elective Minor)

Credits: 2

Number of Lectures: 52

UNIT I

Fundamentals. Remote sensing: definition and scope; Electro-magnetic radiation: characteristics, interaction with matter, Remote sensing regions and bands; Spectral signature; Types of remote sensing.

UNIT II

Aerial Photographs. Aerial photos: types, scale, resolution; Geometric properties of aerial photos;

Stereoscopy; Stereoscopic parallax; Relief displacement.

UNIT III

Satellite Imagery. General orbital characteristics of remote sensing satellites; General characteristics of remote sensing sensors; Characteristics of MSS, HRV, LISS; Characteristics of raw remote sensing data.

UNIT IV

Interpretation and Application. Elements of image interpretation; Image processing techniques: Visual and digital; Remote sensing data: pre-processing operations, enhancements and classifications; Remote sensing in resource mapping and environmental monitoring.

Books Recommended

- Campbell, J. B. (2002): Introduction to Remote Sensing. 5th edition. Taylor and Francis, London.
- Cracknell, A and Hayes, L. (1990): Remote Sensing Year Book, Taylor and Francis, London.
- Curran, P.J. (1985): Principles of Remote Sensing, Longman, London.
- Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.
- Floyd, F. and Sabins, Jr. (1986): Remote Sensing: Principles and Interpretation, W.H. Freeman, New York.
- Guham, P. K. (2003): Remote Sensing for Beginners. Affiliated East-West Press Private Ltd., New Delhi.
- Hallert, B. (1960): Photogrammetry, McGraw Hill Book Company Inc., New York
- Harry, C.A. (ed.) (1978): Digital Image Processing, IEEE Computer Society, California
- Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data, Academic Press, New York.
- Leuder, D.R. (1959): Aerial Photographic Interpretation: Principles and Application. McGraw Hill, New York.
- Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4th edition. John Wiley and Sons, New York.
- Nag, P. (ed.) 1992: Thematic Cartography and Remote Sensing, Concept Publishing. Company, New Delhi.
- Reeves, R.G. (ed.) (1983): Manual of Remote Sensing, Vols. 1 and 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
- Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology, John Wiley and Sons, New York.
- Silver, M. and Balmori, D. (eds.) (2003): Mapping in an Age of Digital Media. Wiley-Academy, New York and Chichester.
- Spurr, R. (1960): Photogrammetry and Photo Interpretation, The Roland Press Company, London.
- Survey of India, (1973): Photogrammetry, Survey of India, Dehradun.
- Swain, P.H. and Davis, S.M. (ed.), (1978): Remote Sensing: The Quantitative Approach. McGraw Hill, New York.

M.Sc. Geography SEMESTER II GRM207: Assignment Based Seminar

Credits: 2

M.Sc. Geography SEMESTER - III GRM301: GIS and Its Application

Credits: 4

Number of Lectures: 52

UNIT I

Definition and Evolution of GIS; Components of GIS; Issues in GIS: user, technology, data and application; Recent trends in GIS; Mobile GIS

UNIT II

Geographical data: types and characteristics; Spherical and plane coordinate systems in GIS; Implications of earth's shape and datum in geo-referencing,

UNIT III

Digital representation of geographic data: Data structure, spatial data model, raster and vector models; GIS data standards: concepts and components; Digital Elevation Model (DEM): characteristics and applications.

UNIT IV

Integration of Remote sensing and GIS; GIS project design and planning methodologies; GIS data base management systems; GIS information products; Applications of GIS.

Books Recommended

- Bonham, Carter G.F. (1995): Information Systems for Geoscientists – Modelling with GIS. Pergamon, Oxford.
- Burrough, P.A. and McDonnell, R. (1998): Principles of Geographic Information Systems. Oxford University Press, Oxford.
- Chang, K.T. (2003): Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
- Chauniyal, D. D. (2004): Remote Sensing and Geographic Information Systems. (in Hindi). Sharda Pustak Bhawan, Allahabad.
- Demers, M. N. (2000): Fundamentals of Geographic Information Systems. John Wiley and Sons, Singapore.
- ESRI (1993): Understanding GIS. Redlands, USA
- Fraser Taylor, D.R. (1991): Geographic Information Systems. Pergamon Press, Oxford.
- George, J. (2003): Fundamentals of Remote Sensing. Universities Press Private Ltd, Hyderabad.
- Girard, M. C. and Girard, C. M. (2003): Processing of Remote Sensing Data. Oxford and IBH, New Delhi.
- Glen, E. M. and Harold, C. S. (1993): GIS Data Conversion Handbook. Fort Collins, Colorado, GIS Word Inc.
- Goodchild, M.F.; Park, B. O. and Steyaert, L. T. (eds.) (1993): Environmental Modelling with GIS. Oxford University Press, Oxford.
- Guptill, S.C., and Morrison, J.L. (1995): Elements of Spatial Data Quality. Elsevier/ Pergamon, Oxford.
- Heywood, I. (2003): An Introduction to Geographical Information Systems. 2nd edition, Pearson Publishing Company, Singapore.
- Korte, G. M. (2002): The GIS Book. On Word Press: Thomson Learning, New York and Singapore.
- Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
- Longley, P. and Batty, M. (eds.) (1996): Spatial Analysis: Modelling in a GIS Environment. GeoInformation International, Cambridge.
- Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley and Sons, New York.
- Maguirre, D. J.; Michael F. G. and David W. R. (1999): Geographical Information Systems: Principles and Application. Geo Information International, Vol.2, Longman Publication., New York.
- Martin, D. (1996): Geographic Information Systems: Socioeconomic Implications. Routledge, London.
- Michael F. G. and Karan K. K. (ed.) (1990): Introduction to GIS. NCGIA, Santa Barbara, California.
- Ralston, B. A. (2002): Developing GIS Solutions with Map Objects and Visual Basic. OnWord Press: Thompson Learning, New York and Singapore.

- Reddy, M. A. (2001): Textbook of Remote Sensing and Geographic Information Systems. B. S. Publications., Hyderabad.
- Ripple, W. J. (ed.) (1989): Fundamentals of Geographic Information Systems: A Compendium. ASPRS/ ACSM, Falls Church.
- Siddiqui, M.A. (2005): Introduction to Geographical Information Systems, Sharda Pustak Bhawan, Allahabad.
- Star, J. and Estes, J. (1990): Geographic Information Systems – An Introduction. Prentice-Hall, Englewood Cliffs, New Jersey.
- Worboys, M. F. (1995): GIS: A Computing Perspective. Taylor and Francis, London.
27. Bhatta, B. (2010), Remote Sensing and GIS, Oxford University Press, New Delhi

M.Sc. Geography SEMESTER - III

GRM302: Environmental Studies

Credits: 4

Number of Lectures: 52

UNIT I

Bases. Meaning and scope of environmental geography; Approaches to study of environment; Types of environment, Environment and society, Environment and development, Environmental perception and cognitive maps.

UNIT II

Biogeography and Ecosystem. Definition, scope and significance of biogeography; Basic ecological principles; Geo-biochemical cycles: carbon, nitrogen, oxygen and phosphorus cycles; Biome and biomass; World distribution of plants and animals; Biodiversity: depletion and conservation.

UNIT III

Hazards and Changes. Environmental hazards; Natural hazards: landslides, soil erosion, droughts and floods, earthquakes; Man-made hazards: technological hazards, global climatic changes, global warming, green house effects, ozone depletion, sedimentation in rivers and reservoirs.

UNIT IV

Pollution and Management. Environmental pollution: pollutants, sources and types of pollution; Water, soil, air, and noise pollution; Solid waste disposal; Environmental pollution and health; Environmental education; Environmental impact analysis; Environmental monitoring and standards; Environmental policy and legislation; Environmental management.

Books Recommended

- Anjuneyulu, Y. (2002): Environmental Impact Assessment Methodologies. B. S. Publications, Hyderabad.
- Anjuneyulu, Y. (2004): Introduction to Environmental Science. B. S. Publications, Hyderabad.
- Athavale, R. N. (2003): Water Harvesting and Sustainable Supply in India. Rawat Publications., Jaipur.
- Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing. Company, New Delhi.
- Blaikie, P., Cannon, T. and Davis, I. (eds.) (2004): At Risk: Natural Hazards, Peoples Vulnerability and Disasters. Routledge, London.
- Clarke, J. I., Curson, P., Kayastha S. L. and Nag P. (eds.) (1991): Population and Disaster. Basil Blackwell, USA
- Gautam, A. (2007): Environmental Geography, Sharda Pustak Bhawan, Allahabad
- Huggett, R. J. (1998): Fundamental of Biogeography. Routledge, London.
- Kayastha, S.L. and Kumra V.K. (1986): Environmental Studies. Tara Book Agency, Varanasi.
- Khoshoo, T. N. (1981): Environmental Concerns and Strategies. Ashish Publishing House, New Delhi
- Kumra, V.K. (1982): Kanpur City. A Study in Environmental Pollution. Tara Book Agency, Varanasi.

- Mathur, H. S. (2003): Essentials of Biogeography. Pointer Publication, Jaipur.
- Nag, P., Kumra, V.K. and Singh, J. (1990): Geography and Environmental Issues at Local, Regional and National Levels. (in 3 vols.), Concept Publishing Company, New Delhi.
- Odum, E.P. (1975): Ecology. Rowman and Littlefield, Lanham USA.
- Rajagopalan, R. (2005): Environmental Studies: From Crisis to Cure, Oxford University Press, New Delhi.
- Reddy, M. A. (2004): Geoinformatics for Environmental Management. B. S. Publishers., Hyderabad.
- Saxena, K.K. (2004): Environmental Studies. University Book House Private Ltd., Jaipur
- Saxena, H. M. (1999): Environmental Geography. Rawat Publications., Jaipur and New Delhi.
- Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.
- Singh, A.K., Kumra, V.K. and Singh, J. (1986): Forest Resource, Economy and Environment. Concept Publishing. Company, New Delhi.
- Singh, D.N., Singh, J. and Raju, K.N.P. (eds.) (2003): Water Crisis and Sustainable Management, Tara Book Agency, Varanasi
- Singh, J. (2001): *Paryavaran Evam Samvikas*. Gyanodaya Prakashan, Gorakhpur.
- Singh, O., Nag P., Kumra V.K. and Singh J. (eds.) (1993): Frontier in Environmental Geography. Concept Publishing Company, New Delhi.
- Singh, O., Kumra V.K. and Singh J. (1988): India's Urban Environment. Pollution, Perception and Management. Tara Book Agency, Varanasi.
- Singh, R. B. (ed.) (1990): Environmental Geography. Heritage Publication, New Delhi.
- Singh, R. B. (ed.) (1995): Studies in Environment and Development. Rakesh Prakashan, Varanasi.
- Singh, Rana P.B. (ed.) (1993): Environmental Ethics: Discourses and Cultural Traditions. National Geographical Society of India, BHU, Varanasi.
- Singh, S. (2006): Environmental Geography. Prayag Pustak Bhawan, Allahabad.
- Singh, S. (2007): *Paryavaran Bhugol*. Prayag Pustak Bhawan, Allahabad.
- Singh, S. N. (1993): Elements of Environmental Geography and Ecology in Hindi, Tara Book Agency, Varanasi
- Wrigley, N. (1985): Categorical Data Analysis for Geographers and Environmental Scientists. Longman, London.

M.Sc. Geography SEMESTER - III

GRM303A: Geography of Rural Settlements

Credits: 4

Number of Lectures: 52

UNIT I

Bases, Evolution and Models. Nature, scope, definition and significance of Rural Settlement Geography; Human settlement as a system; Concepts and characteristics of rural settlements; Theories and models of settlement diffusion: Eric Bylund (Sweden), Gunnar Olsson (Sweden), David Grossman (Nigeria), John Hudson (USA), Contributions of Banaras School.

UNIT II

Spatiality and Histogenesis. Evolution and growth of rural settlements and their causes: Old and New Worlds; Siting and location of rural settlements; Distribution, spacing, and nature of dispersion; Types and patterns; Morphology of village: examples from Germany, Japan, Israel, African countries; Rural-service centres: nature, hierarchy, service area, and interaction.

UNIT III

Rural Dwellings. Traditional and folk rural house types: origin, evolution and characteristics; Typology based on building materials, plans, uses and architectural style; House types and their characteristics in different geographical environments: Monsoon Asia and Arid zone.

UNIT IV

Indian Village. Evolution and multiplicity; Regional morphological characteristics; Morphological interaction models: religio-ritual, secular-economic, and sacred-economic interlocking system;

Transformation and planning of Indian village: models and plans.

Books Recommended

- Daniel, P. (2002): Geography of Settlement. Rawat Publications., Jaipur and New Delhi.
- Eidt, R. C., Singh, K. N. and Singh, Rana, P.B., (eds.) (1977): Man, Culture and Settlement. Kalyani Publishers., New Delhi.
- Ghosh, S. (1999): A Geography of Settlements. Orient Longman, Kolkata.
- Hudson, F. S. (1976): A Geography of Settlements. MacDonald and Evans, New York.
- Mitra, A. (1960): Report on House Types and Village Settlement Patterns in India. Publication Division, Govt. of India, New Delhi.
- Mosley, M.J. (2005): Rural Development: Principles and Practice. Sage Publication, London.
- Oliver, P. (1987): Dwellings. The House across the World. University of Texas Press, Austin.
- Rapoport, A. (1969): House, Form and Culture. Prentice-Hall, Inc., Englewood Cliffs, NJ.
- Rykwert, J. (ed.) (2004): Settlements. University of Pennsylvania Press, University Park, USA.
- Singh, R.L. (eds.) (1973): Rural Settlements in Monsoon Asia, National Geographical Society of India, Varanasi.
- Singh, R. L., Singh, K.N. and Singh, Rana P.B., (eds.) (1975): Readings in Rural Settlement Geography, National Geographical Society of India, Varanasi.
- Singh, R. L. and Singh, Rana P. B. (eds.) (1978): Transformation of Rural Habitat in Indian Perspective, National Geographical Society of India, Varanasi, Pub. 19.
- Singh, R.L. and Singh, Rana P.B., (eds.) (1979): Place of Small Towns in India. National Geographical Society of India, Varanasi,
- Singh, R.L., Singh, K.N and Singh Rana P.B., (eds.) (1976): Geographic Dimensions of Rural Settlements. National Geographical Society of India, Varanasi,
- Singh, Rana P.B. (1977): Clan Settlements in the Saran Plain, National Geographical Society of India, Varanasi,
- Singh, Rana P.B. and Singh, R.B. (1981): Changing Frontiers of Indian Village Ecology. National Geographical Society of India, Varanasi, Pub. 27.
- Singh, R.Y. (2005): Geography of Settlements. Rawat Publications, Jaipur and New Delhi.
- Singh, S.B. (1977): Rural Settlement Geography. U.B.B.P., Publications, Gorakhpur.
- Tiwari, R. C. (2000): Settlement Geography; in Hindi. Prayag Pustak Bhawan Allahabad.
- Wanmali, S. (1983): Service Centres in Rural India. B.R. Publications Corporation, New Delhi.
- Wood, M. (2005): Rural Geography: Processes, Responses and Experiences of Rural Restructuring. Sage Publication, London.

M.Sc. Geography SEMESTER – III

GRM303B: Regional Planning

Credits: 4

Number of Lectures: 52

UNIT I

Fundamentals. Concept, nature and scope of Regional Planning; Different approaches to regional planning; Planning regions: concept and types; Planning regions of India; Regional policies in India.

UNIT II

Conceptual Outlook. Regional planning and national development; Economic development and regional development; Regional economic complexes; Inter-regional and intra-regional functional interactions; Regional disparities in India.

UNIT III

Approaches. Approaches to integrated regional planning at different levels: local, regional and national; Multi-level planning in India: State, District and Block level planning; Planning for tribal, agricultural, industrial and urban (metropolitan) regions.

UNIT IV

Development Perspective. Service and market centres planning; Growth centre and regional development with reference to India and France; Decentralised planning: themes and issues; Regional

planning: Development strategies in the 21st century.

Books Recommended

- Chandna, R. C. (2000): *Regional Planning: A Comprehensive Text*. Kalyani Publishers., New Delhi.
- Chaudhuri, J. R. (2001): *An Introduction to Development and Regional Planning with special reference to India*. Orient Longman, Hyderabad.
- Cowen, M.P. and Shenton, R.W. (1996): *Doctrines of Development*. Routledge, London.
- Doyle, T. and McEachern, D. (1998): *Environment and Politics*. Routledge, London.
- Friedmann, J. (1992): *Empowerment: The Politics of Alternative Development*. Blackwell, Cambridge MA and Oxford.
- Friedmann, J. and Alonso, W. (ed.) (1973): *Regional Development and Planning*. The MIT Press, Mass.
- Hettne, B.; Inotai, A. and Sunkel, O. (eds.) (1999 – 2000): *Studies in the New Regionalism*. Vol. I-V. Macmillan Press, London.
- Isard, W. (1960): *Methods of Regional Analysis*. MIT Press, Cambridge, MA.
- Kuklinski, A. R. (1972): *Growth Poles and Growth Centres in Regional Planning*. Mouton and Co., Paris.
- Kuklinski, A.R. (ed.) (1975): *Regional Development and Planning: International Perspective*, Sijthoff-Leydor.
- Leys, C. (1996): *The Rise and Fall of Development Theory*. Indian University Press, Bloomington, and James Curry, Oxford.
- Mahapatra, A.C. and Pathak, C. R. (eds.) (2003): *Economic liberalisation and Regional Disparities in India. Special Focus on the North Eastern Region*. Star Publishing House, Shillong.
- Kane, M. and William M.K.T.(2007): *Concept Mapping for Planning and Evaluation*, Sage Publications, London.
- Misra, R. P. (ed.) (1992): *Regional Planning: Concepts, Techniques, Policies and Case Studies*. 2nd edition. Concept Publishing Company., New Delhi.
- Misra, R.P. and Natraj, V.K. (1978): *Regional Planning and National Development*. Vikas, New Delhi.
- Misra, R.P., Sundaram, K. V. Pradasa Rao, V. L. S. (1976): *Regional Development Planning in India*. Vikas Publishers, New Delhi.
- Moseley, M.J., (1974): *Growth Centres in Spatial Planning*. Pergamon Press, Oxford.
- Närman, A. and Karunanayake, K. (eds.) (2002): *Towards a New Regional and Local Development Research Agenda*. Dept. of Geography, Göteborg University (Sweden), series B, No100 and Centre for Development Studies, University of Kelaniya (Sri Lanka), No. 1.
- Norgaard, R. B. (1994): *Development Betrayed. The End of Progress and a Coevolutionary Revisioning of the Future*. Routledge, London.
- Pathak, C. R. (2003): *Spatial Structure and Processes of Development in India*. Regional Science Association., Kolkata.
- Sanyal, B. M. (2001): *Decentralised Planning: Themes and Issues*. Concept Publishing. Company, New Delhi.
- Sharma, P. V., Rao, V. L., and Pathak, C. R. (eds.) (2000): *Sustainable Regional Development (with special reference to Andhra Pradesh)*. Regional Science. Association, Kolkata and School of Economics, Andhra University, Vishakapatnam.
- Sen, A. (1999): *Development as Freedom*. Oxford University Press, Oxford.
- Sen, A. and Dreze, J. (eds.) (1996): *Indian Development: Selected Regional Perspectives*. Oxford University Press, Oxford.
- Smith, D. and Närman, A. (eds.) (1999): *Development Theory and Practice: Current Perspectives on Development and Development Co-operation*. Longman, London.
- Stöhr, W. B. and Taylor, D.F.R. (eds.) (1981): *Development from Above and Below? The Dialectics of Regional Planning in Developing Countries*. John Wiley and Sons, Chichester.
- Sundaram, K. V. (1997): *Decentralized Multilevel Planning: Principles and Practice (Asian and African Experiences)*. Concept Publishing Company, New Delhi.

- Sundaram, K. V. (2004): The Trodden Path: Essays on Regional and Micro Level Planning. Anaanya Publications., New Delhi.
- Toye, J. (1987): Dilemmas of Development. Reflections on the Counterrevolution in Development Theory and Policy. Basil Blackwell, Oxford.
- Verhelst, T. (1990): No Life Without Roots – Culture and Development. Zed Books, London.
- World Bank (2000): Attacking Poverty. World Development Report 2000-01. The World Bank and Oxford University Press, New York; see website: www.worldbank.org/poverty/wdrpoverty/
- World Bank (2000): Entering the 21st Century. World Development Report. The World Bank and Oxford University Press, New York and Oxford.
- Yugandhar, B. N. and Mukherjee, A. (eds.) (1991): Readings in De-centralised Planning (with special reference to District Planning), 2 vols. Concept Publishing. Company, New Delhi.

M.Sc. Geography SEMESTER – III

GRM303C: Aerial Photo Interpretation

Credits: 4
Number of Lectures: 52

UNIT I

Relief displacement; Stereoscopic parallax; Parallax equation and its approximation; Digital photogrammetry and orthophotos.

UNIT II

Qualitative information, philosophy and sequence in air photo interpretation; Elements of air photo pattern : landforms, drainage, erosion details, gray-tones, vegetation; Elements of image interpretation.

UNIT III

Interpretation keys and their types; Aerial mosaics; Multi-spectral aerial photographs; Ground control for mapping from aerial photos; Rectification methods in aerial photos.

UNIT IV

Aerial photo interpretation in general resource evaluation; Geomorphic studies and mapping. Land use/Land cover mapping; Hydro-geomorphic mapping; Environmental monitoring and mapping.

Books Recommended

1. Cracknell, A. and Ladson, H (1990): Remote Sensing Year Book. Taylor and Francis, London.
2. Curran, P.J. (1988): Principles of Remote Sensing. ELBS Longman, Essex, U.K.
3. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.
4. Floyd, F. S. Jr. (1997): Remote Sensing: Principles and Interpretation. W.H. Freeman, New York.
5. Hallert, B. (1960): Photogrammetry. McGraw Hill Book Company. Inc. New York
6. Leuder, D.R. (1959): Aerial Photographic Interpretation: Principles and Application, McGraw Hill, New York.
7. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4th ed. John Wiley and Sons, New York.
8. Rampal, K.K. (1999): Handbook of Aerial Photography and Interpretation. Concept Publishing. Company, New Delhi.
9. Reeves, R.G. (ed.) (1983): Manual of Remote Sensing. Vols. 1 and 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
10. Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology. John Wiley and Sons, New York.

11. Spurr, R. (1960): Photogrammetry and Photo Interpretation. The Roland Press Company, London.
12. Survey of India, (1973): Photogrammetry. Survey of India, Dehradun.
13. Swain, P.H. and Davis, S.M. (ed.) (1978): Remote Sensing: The Quantitative Approach. McGraw- Hill, New York.
14. Wolf P.R. and Dewitt, B. A. (2000): Elements of Photogrammetry with Applications in GIS. McGraw-Hill, New York.

M.Sc. Geography SEMESTER - III
**GRM304: Practical: Remote Sensing and GIS; Soil, Water and Air
 Analysis**

Credits: 2

Number of Lectures: 52

Stereoscopic test; Interpretation of stereograms and stereopairs; Mapping for land use/ land cover; Determination of photoscale; Border information on Landsat/ IRS Images; Visual interpretation of satellite images (Landsat/ IRS); Scanning, digitisation and editing; Base map preparation.

Soil analysis: texture and structure; Water analysis: physical and chemical characteristics; Air analysis: estimation of SPM.

M.Sc. Geography SEMESTER – III
GRM305A: Practical: Geography of Rural Settlements

Credits: 2

Number of Lectures: 52

1. **Spatial Systems.** Size classification of rural settlements by scatter diagrams; Rural settlement distribution and types in India; Density function and pattern analysis of distribution of settlements: randomness and spacing indices, Testing Christaller's theory; Theoretical models of rural settlements and testing of different models.
2. **Studies from India.** Typological classification of rural settlements from maps; Rural service centres: indices, hierarchy, classification and ordering; Mapping the morphology of Indian villages; Planning of Indian villages: models, plans and case studies.

M.Sc. Geography SEMESTER – III
GRM305B: Practical: Regional Planning

Credits: 2

Number of Lectures: 52

Regional planning of a given area: District planning; Service centre planning: Micro level planning; Central place hierarchy and growth centre in regional development; Delineation of city region/ Umland: a case study; Identification and demarcation of axial growth: a case study.

M.Sc. Geography SEMESTER – III
GRM305C: Practical: Aerial Photo Interpretation and GIS

Credits: 2

Number of Lectures: 52

Identification of objects and features; Determination of height of objects from single photographs; Preparation of thematic maps on lithology and structure, Land use/ Land cover, Forest types, soil and soil erosion, Hydrogeomorphic mapping.

GIS: Geo-referencing; creation of PGDB, creation of shape files; on-screen digitization of polygons, points and lines and adding attributes

M.Sc. Geography SEMESTER - III
GRM306M: Population and Development (Elective Minor)

Credits: 2

Number of Lectures: 52

UNIT I

Conceptual Frame. Population as resource; Population and development: a debate; Population and ecosystem; Demographic transition.

UNIT II

Historical Background and Characteristics. History of human population; Relationship between population, food and energy; Debate on The Limits to Growth; Population characteristics: developed and developing countries (case study of India).

UNIT III

Problems and Policies. Optimum population; Family welfare and planning; Population policies in developed and developing countries (case study of India).

UNIT IV

Population - Development Conflict. Concepts of rich and poor worlds and their global perspectives; Neo-Malthusian theory; Future perspectives: Growth scenario and relationship with development.

Books Recommended

- Champion, T. (ed.) (1993): Population Matters. Paul Chapman, London.
- Ehrlich, P.R. and Ehrlich, A.H. (1996): Ecoscience: Population, Resources, Environment. 6th edition, W.H. Freeman and Company, San Francisco.
- Firor, J. and Jacobsen, J. E. (2003): The Crowded Greenhouse: Population, Climatic Change and Creating a Sustainable World. Universities Press (India) Private. Ltd., Hyderabad.
- Haggett, P. (2001): Geography, A Modern Synthesis. 5th edition, Harper and Row, New York.
- Hammett, C. (eds.) (1996): Social Geography: A Reader. Arnold, London.
- Meadow, D.H., Meadows D.L., Randers J., and Behrens W.W. III.(1973): The Limits to Growth. I Report of the Club of Rome. The New American Library, New York.
- Meadows, D.H., Meadows, D.L. and Randers, J. (1992): Beyond the Limits. Confronting Global Collapse, Envisioning a Sustainable Future. (A sequel to The Limits to Growth). Chelsea Green Publishers, Post Mills VT, USA.
- Mesarovic, M. and Pester, E. (1974): Mankind at the Turning Point. II Report of the Club of Rome. The New American Library, New York.
- Middleton, N. and O'Keefe, P. (2001): Redefining Sustainable Development. Pluto Press, London.
- Ross, J. A. (ed.) (1982): International Encyclopaedia of Population. Free Press, New York.
- Sharma, P. R. (ed.) (1991): Perspectives on the Third World Development. Rishi Publications., Varanasi.
- Sharma, P. R. (ed.) (1994): Regional Policies and Development in the Third World. Rishi Publications, Varanasi.
- Simon, J. L. (1977): The Economics of Population Growth. Princeton University. Press, Princeton.
- Thakur, B. (ed.) (2004): Population, Resources and Development. Vol. II, Perspectives in Resource Management in Developing Countries. Concept Publishing. Company, New Delhi.

Tinbergen, J. (1976): RIO. Reshaping the International Order. III Report of the Club of Rome. The New American Library, New York.

U.N.C.E.D. (1987): Our Common Future. UNCED The Centre for Our Common Future, Geneva.

M.Sc. Geography SEMESTER – III
GRM307: Field Study and Geographical Excursion

Credits: 2

Duration: 2-3 weeks; **Area, India:** South / Northwest / North

M.Sc. Geography SEMESTER – III
GRM308: Assignment Based Seminar

Credits: 2

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M.Sc. Geography SEMESTER -IV  
**GRM401: Interdisciplinary Research Methods and Techniques**

**Credits: 4**

**Number of Lectures: 52**

**UNIT I**

**Introduction to research in Geography:** Concept and significance of research in geography; Philosophy and methods; Naturalism and anti-naturalism; realism and idealism.

**UNIT II**

**Scientific Research; Inductive and deductive approaches;** Research design; Formulation of research problem; Development and testing of hypothesis; Techniques of data collection; Sampling and field survey.

**UNIT III**

Qualitative research: Qualitative research design; Case study; Ethnography; Phenomenology and participatory research.

**UNIT IV**

**Data Analysis, interpretation and report writing:** Data classification and tabulation; Data analysis and interpretation; Writing thesis, project report and research paper.

**Books Recommended**

Ahuja, R. (2001): Research Methods, Rawat Publications, Jaipur and New Delhi.

Bhattacharyya, D. K. (2005): Research Methodology, Excel Books, New Delhi

Blackburn, J. and Holland, J. (eds.) (1998): Who Changes? Institutionalising Participation in Development. IT Publications, London.

Blaxter, L.; Hughes, C. and Tight, M. (1996): How to Research. Open University Press, Buckingham.

Crang, Mike 1999. Cultural Geography. Routledge, London.

Daniels, P., Bradshaw, M., et al. (2000): Human Geography: Issues for the 21st Century. Prentice Hall, London, and Pearson Publishers., Singapore. Indian reprint, 2003.

Denzin, N. K. and Lincoln, Y.S., (eds.) (2000): Handbook of Qualitative Research. Thousand Oaks CA. Sage Publications.

Dikshit, R. D. (2003): The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.

Dorling, D. and Simpson, L. (eds.) (1999): Statistics in Society. Edward Arnold, London.

Fisher, P. and Unwin, D., (eds.) (2002): Virtual Reality in Geography. Taylor and Francis, London.

Flowerdew, R. and Martin, D. (eds.) (1997): Methods in Human Geography. A Guide for

- Students Doing a Research Project. Longman, Harlow.
- Hay, I. (ed.) (2000): *Qualitative Research Methods in Human Geography*. Oxford University Press, New York.
- Henn, M., Mark W., and Nick F. (2006): *A Short Introduction to Social Research*, Vistaar Publications, New Delhi
- Eyles J. and Smith D. M. (1988): *Qualitative Methods in Human Geography*, Polity Press, Dales Brewer Cambridge.
- Kitchin, R. and Tate, N., (2001): *Conducting Research into Human Geography. Theory, Methodology and Practice*. Prentice-Hall, London.
- Kitchin, R. and Fuller, D., (2003): *The Academic's Guide to Publishing*, Vistaar Publications, New Delhi
- Limb, M. (2001): *Qualitative Methodologies for Geographers. Issue and Debates*. Edward Arnold, London.
- Lofland, J. and Lofland, L.H. (1995): *Analysing Social Setting. A Guide to Qualitative Observation and Analysis*. Wadsworth, Belmont, CA.
- Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): *Geographic Information Systems. Principles, Techniques, Management, Applications*. John Wiley and Sons, New York.
- Maso, I., Atkinson, P.A. Delamont, S. and Verhoeven, J.C. (eds.) (1995): *Openness in Research. The Tension between Self and Other*. Van Gorcum, Assen, Netherlands.
- Mikkelsen, B. (2005): *Methods for Development Work and Research: A New Guide for Practitioners*. Sage Publications, London.
- Mukherjee, N. (1993): *Participatory Rural Appraisal: Methodology and Application*. Concept Publishing Company, New Delhi.
- Mukherjee, N. (2002): *Participatory Learning and Action: with 100 Field Methods*. Concept Publishing Company, New Delhi.
- O' Leary, Z. (2005): *The Essential Guide in Doing Research*, Vistaar Publications, New Delhi
- Pacione, M., (ed.) (1999): *Applied Geography: Principle and Practice*. Routledge, London.
- Parsons, T. and Knight, P. G., (1995): *How to Do Your Dissertation in Geography and Related Disciplines*. Chapman and Hall, London.
- Patrick M. and Chapman S. (1990): *Research Methods(Third Edition)*, Routledge, London
- Peet, R. and Thrift, N. (ed.) (1989/ 2002): *New Models in Geography (2 vols.)*. Rawat Publishers., Jaipur and New Delhi.
- Rachel, P. et al. (2001): *Introducing Social Geographies*. Arnold Hodder Group, London, and Oxford University Press, Oxford.
- Robson, C. (1993): *Real World Research. A Resource for Social Scientists and Practitioners-Researchers*. Blackwell Publishers, Oxford.
- Rogers, A. and Viles, H. A. (2003): *The Student's Companion to Geography*. Blackwell Publishers, Oxford. Indian reprint available.
- Sheskin, Ira, M. (1987): *Survey Research for Geographers*, Scientific Publishers, Jodhpur.
- Silverman, D. (1993): *Interpreting Qualitative Data. Methods for Analysing Talk, Text and Interaction*. Sage Publications, London.
- Singh, R. L. and Singh, Rana P.B. (1993): *Elements of Practical Geography*. Kalyani Publishers, Ludhiana and New Delhi. (English and Hindi editions).
- Singh, Rana P.B. and Singh, R. B. (1981): *Changing Frontiers of Indian Village Ecology*. National Geographical Society of India, BHU, Varanasi, Publication number 27.
- Turkle, S. (1996): *Life on the Screen: Identity in the Age of Internet*. Weidenfeld and Nicolson, London.
- Wolcott, H. (1995): *The Art of Fieldwork*. AltaMira Press, Walnut Creek, CA.
- Wright, D.B. (1997): *Understanding Statistics. An Introduction for the Social Sciences*. Sage Publications, London.
- Sharma, P.R., Yadava, R.S. and Sharma, V.N., (2011), *Interdisciplinary Research Methods: Concepts and Studies*, R.K. Books Publishers, New Delhi.

M.Sc. Geography SEMESTER – IV  
**GRM402A: Urban Geography**

**Credits: 4**

**Number of Lectures: 52**

**UNIT I**

**Bases.** Meaning, scope and recent trends in urban geography; Urban population: characteristics, processes and trends of urbanisation; Methodology in urban studies; Origin and evolution of urban settlements; Distribution of urban centres.

**UNIT II**

**Characteristics.** Characteristics of cities in different historical periods (both industrial and pre-industrial); Functions and functional classification of towns; Urban transportation; Contributions of Banaras School.

**UNIT III**

**Spatiality and Models.** Size and spacing of cities: Rank-size rule; Law of the primate city; Urban hierarchies; Central Place Theory (Christaller and Lössch); Urban land use and functional morphology: functional areas and Peri-urban areas; Theories of urban structure (Burgess, Hoyt, Harris and Ullman, Mann, White).

**UNIT IV**

**Issues and Planning.** Urban problems: environmental, poverty, slums, transportation, housing, crime; Planned cities: Chandigarh and Jaipur; National Urban Policy and Urban land use planning, Master Plans: A case study of Varanasi.

**Books Recommended**

1. Bridge, B. and Watson, S. (eds.) (2000): A Companion to the City. Blackwell, Oxford.
2. Carter, H. (1995): The Study of Urban Geography. 4<sup>th</sup> ed. Reprinted in 2002 by Rawat Publications, Jaipur and New Delhi.
3. Dubey, K.K. (1976): Use and Misuse of Land in KAVAL Towns. National Geographical Society of India, Varanasi.
4. Dubey, K.K. and Singh, A.K. (1983): Urban Environment in India. Deep and Deep, New Delhi.
5. Dutt, A. Allen, K, Noble, G., Venugopal G. and Subbiah S. (eds.) (2003): Challenges to Asian Urbanisation in the 21<sup>st</sup> Century. Kluwer Academic Publishers, Dordrecht and London.
6. Hall, P. (1992): Urban and Regional Planning. Routledge, London.
7. Hall, T. (2001): Urban Geography. 2<sup>nd</sup> edition. Routledge, London.
8. Haughton, G and Hunter, C. (1994): Sustainable Cities. Jessica Kingsley, London.
9. Jacquemin, A. (1999): Urban Development and New Towns in the Third World – A Lesson from the New Bombay Experience. Ashgate, Aldershot, UK.
10. Johnson, J.H. (1981): Urban Geography, Pergaman Press, Oxford.
11. Mayer, H. and Cohn, C. F. (1959): Readings in Urban Geography, University. of Chicago Press, Chicago.
12. Paddison, R. (ed.) (2001): Handbook of Urban Studies. Sage, London.
13. Pacione, M. (2005): Urban Geography: A Global Perspective, Routledge, London and New York.
14. Ramachandran, R., (1991): Urbanisation and Urban Systems in India. Oxford University Press, Delhi.
15. Rao, B. P. and Sharma, N. (2007): *Nagariya Bhoogol*, Vasundhara Prakashan, Gorakhpur.
16. Singh. H. H. (1972): Kanpur: A Study in Urban Geography, Indrasini Publications, Varanasi
17. Singh, K. and Stainberg, F. (eds.) (1998): Urban India in Crisis. New Age International, New Delhi.
18. Singh, O. P. (1987): *Nagariya Bhoogol*, Tara Book Agency, Varanasi
19. Singh, R.L. (1955): Banaras. A Study in Urban Geography. Nand Kishore and Brothers, Banaras.
20. Singh, R.L. and Singh, Rana P.B., (eds.) (1979): Place of Small Towns in India. National Geographical Society of India, Varanasi,
21. Singh, Rana P.B. and Rana, P.S. (2002): Banaras Region. Indica Books , Varanasi.
22. Singh, S. B. (ed.) (1996): New Perspectives in Urban Geography. M.D. Publications, New Delhi



23. Singh, T.D. (1985): Spatial Pattern of Population in the Cities of U.P. Tara Book Agency, Varanasi
24. Stanley, B., Jack, W. and Donald, Z. (eds.) (2003): Cities of the World. Rowman and Littlefield, New York and Oxford.

**M.Sc. Geography SEMESTER – IV**  
**GRM402B: Rural and Urban Planning**

**Credits: 4**

Number of Lectures: 52

**(A) Rural Planning**

**UNIT I**

Meaning, concept and scope of rural development and planning; rural development: Approaches, policies and paradigms; Basic infrastructures for rural development; People's participation in rural planning and rural industrialisation.

**UNIT II**

Rural Land use: Concepts, principles and classification; Rural land use systems and changes; Carrying capacity of land; Agricultural efficiency.

**Urban Planning**

**UNIT III**

Meaning, concept and scope of urban planning; Urban planning: methods and techniques; Urban land use: models and planning; Urban renewal and re-development of towns; Urban transportation planning.

**UNIT IV**

Optimum city-size; New and Satellite towns; City planning in India: principles and approaches; Urban planning: case studies of Chandigarh and Varanasi.

**Books Recommended**

1. Bhat, L.S. (1976): Micro Level Planning in India, K.B. Pub. New Delhi.
2. Bhat, L.S. (1988): Strategy for Integrated Area Development. Case Study of North Kanara District (Karnataka). Concept Publishing. Company, New Delhi.
3. Chambers, R. (1997): Whose Reality Counts? Putting the First Last. Intermediate Technology Publications, London.
4. Chisholm, M. (1962): Rural Settlement and Land Use. Hutchinson, London.
5. Desai, A. R. (1990): Rural Development, Popular Prakashan, Bombay.
6. Desai, V. and Potter, R. (eds.) (2002): The Arnold Companion of Development Studies. Arnold, London.
7. Found, W.C. (1982): Theoretical Approach to Rural Land Use Pattern. Methuen and Company Ltd., London.
8. Hall, P. (1992): Urban and Regional Planning. Routledge, London.
9. Jr. Chapin S. F., Kaiser, E. J. Godschalk, D. R. (1995): Rural and Urban Land-use Planning, University of Illinois Press Urbana and Chicago
10. Krishnamurthy, J. (2000): Rural Development. Problems and Prospects. Rawat Publications, Jaipur.
11. Learmonth, A.T.A. (1962): Sample Villages in Mysore. Liverpool Univ. Press.
12. Lejonhud, K. (2003): Indian Villages in Transformation. A Longitudinal Study of Three Villages in Uttar Pradesh. Karlstad University Studies, Karlstad.
13. Long, C. (2001): Participation of the Poor in Development Initiatives: Taking Their Rightful Place. Earthscan, London.
14. Misra, R. P. and Achyutha, R. N. (1998): Micro-Level Rural Planning: Principles, Methods and Case Studies. Concept Publishing. Company, New Delhi.
15. Misra, R. P. and Misra, K. (eds.) (1998): Million Cities of India, Sustainable Development Foundation, New Delhi.

16. Racine, J. (ed.) (1990): Calcutta 1981: The City, its Crisis, and the Debate on Urban Planning and Development. Concept Publishing Company, New Delhi.
17. Sachdev, V. and Tillotson, G. (2002): Building Jaipur: The Making of an Indian City. Reaktion Books, London.
18. Sharma, P. R. (ed.) (1991): Perspectives on the Third World Development. Rishi Publications, Varanasi.
19. Sharma, P. R. (ed.) (1994): Regional Policies and Development in the Third World. Rishi Publications, Varanasi.
20. Singh, B. N. (1988): Integrated Rural Area Development and Planning. Anupama Publications., Delhi.
21. Singh, R. L. and Singh, Rana P. B. (eds.) (1980): Rural Habitat Transformation in World Frontiers. National Geographical Society of India, Varanasi, Pub. 30.
22. Singh, R. L. and Singh, Rana P. B. (eds.) (1984): Environmental Appraisal and Rural Habitat Transformation. National Geographical Society of India, Varanasi, Pub. 32.
23. Sundaram, K.V. (1977): Urban and Regional Planning in India. Vikas, New Delhi.
24. UNAPDI (1986): Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian and Pacific Development Institute, Bangkok). Concept Publishing Company, New Delhi.
25. UNDP (United Nations Development Programme) (2004): Human Development Report 2004. UNDP and Oxford University Press, New York, available at website: [www.undp.org/hdro/HDR2004/html](http://www.undp.org/hdro/HDR2004/html)
26. Yugandhar, B. N. and Mukherjee, N. (eds.) (1991): Studies in Village India: Issues in Rural Development. Concept Publishing. Company, New Delhi.

**M.Sc. Geography SEMESTER – IV**  
**GRM402C: Satellite Image Interpretation**

**Credits: 4**

Number of Lectures: 52

**UNIT I**

**Fundamentals.** Spectral characteristics of common natural objects; Atmospheric effects on remote sensing data; Spectral signatures and spectral response patterns; Resolutions of remote sensing data.

**UNIT II**

**Sensors and Platforms.** Indian Remote Sensing Satellites and sensors; Microwave remote sensing-SLAR and geometric characteristics of SLAR imagery.

**UNIT III**

**Image Processing (IP) Techniques.** Visual (VIP) and Digital (DIP); Image rectification/pre-processing operations; Image enhancement (contrast enhancement, spatial filtering and band ratioing); Image classification: supervised and unsupervised.

**UNIT IV**

**Applications.** Satellite image interpretation in terrain and resource mapping and evaluation; Lithology and structure; Land use/ land cover and space use mapping; Forest types; Environmental monitoring; Remote sensing and GIS.

**Books Recommended:**

1. Campell, J. B. (2003): Introduction to Remote Sensing. 4<sup>th</sup> ed. Taylor and Francis, London.
2. Cracknell, A. and Ladson, H (1990): Remote Sensing Year Book. Taylor and Francis, London.
3. Curran, P.J. (1985): Principles of Remote Sensing. Longman, London.
4. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.
5. Floyd, F. and Sabins, Jr. (1986): Remote Sensing: Principles and Interpretation. W.H. Freeman, New York.

6. Gautam, N.C. and Raghavswamy, V. (2004): Land Use/ Land Cover and Management Practices in India. B.S. Publications., Hyderabad.
7. Harry, C.A. (ed.) (1987): Digital Image Processing. IEEE Computer Society, California.
8. Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data. Academic Press, New York.
9. Jensen, J.R. (1986): Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice-Hall, Englewood Cliffs, New Jersey.
10. Jensen, J.R. (2004): Remote Sensing of the Environment: An Earth Resource Perspective. Prentice-Hall, Englewood Cliffs, New Jersey. Indian reprint available.
11. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. John Wiley and Sons, New York.
12. Nag, P. (ed.) (2000): Thematic Cartography and Remote Sensing. Concept Publishing Company, New Delhi.
13. Nag, P. and Kudrat, M (1998): Digital Image Processing, Concept Publishing Company, New Delhi.
14. Rampal, K.K. (1999): Handbook of Aerial Photography and Interpretation. Concept Publishing Company, New Delhi.
15. Reeves, R.G. (ed.) (1983): Manual of Remote Sensing, Vols. 1 and 2. American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
16. Renz, A.N. (ed.) (1999): Remote Sensing for the Earth Sciences: Manual of Remote Sensing. American Society of Photogrammetry and Remote Sensing, and John Wiley and Sons, New York.
17. Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology. John Wiley and Sons, New York.
18. Swain, P.H. and Davis, S.M. (ed.) (1978): Remote Sensing: The Quantitative Approach. McGraw Hill, New York.

M.Sc. Geography SEMESTER – IV  
**GRM403A: Practical: Urban Geography**

**Credits: 2**  
 Number of Lectures: 52

**1. Global Perspective.** Theoretical models of urban growth, infrastructure, community zone based study of maps; Functional interpretation of urban morphology and town plan through the ages; Functional classification of towns based on occupational data, population size and centrality.

**2. Indian Perspective.** Structural and growth analysis of Indian cities and conurbations; Determination of urban hierarchy in Indian region; Determination of population density gradient in urban areas; Application of rank-size rule in a selected area of India; Urban survey and mapping of functional areas of cities.

M.Sc. Geography SEMESTER – IV  
**GRM403B: Practical: Rural and Urban Planning**

**Credits: 2**  
 Number of Lectures: 52

**1. Rural Planning.** Rural land use maps (India and UK); International colour scheme and its applicability in Indian context; Intensive rural land use survey and application of locational theories; Land capability: its determination and mapping; Sample field mapping and planning of land use in given rural areas.

**2. Urban Planning.** Preparation of urban land use maps from topo-sheets; Diagrammatic representation of internal structure of urban centres based on traditional theories; Examination of Master Plans of towns from different areas; Planning a new town (considering urban land use),

neighbourhood and community centre plan; Preparation of redevelopment and development sketch plan.

M.Sc. Geography SEMESTER – IV

**GRM403C: Practical: Satellite Image Interpretation**

**Credits: 2**

**Number of Lectures: 52**

Preparation of keys from satellite images; Preparation of thematic maps on lithology and structure, geomorphology, land use/land cover, soils and soil erosion, forest types, hydro-geomorphologic mapping and ground water potential zones.

Digital Image Processing (DIP): Image enhancements; Georeferencing; Mosaic preparation; Image classification: supervised and unsupervised.

M.Sc. Geography SEMESTER – IV

**GRM404: Field Survey: Instrumental and Socio-economic**

**Credits: 4**

**Number of Lectures: 52**

**A. Instrumental.** Surveying with the help of Theodolite and levelling by Dumpy Level; Solution of advanced survey problems; Use of GPS and Total Stations.

**B. Socio-Economic.** Making questionnaire format; Conducting village and household survey and report writing.

M.Sc. Geography SEMESTER – IV

**GRM405: Assignment Based Seminar**

**Credits: 2**

M.Sc. Geography SEMESTER – IV

**GRM406: Dissertation** (Thematic as per Specialization Group)

**Credits: 4**