

Modified and approved in BOS meeting held on 28-04-2012: 02.00PM.

**BANARAS HINDU UNIVERSITY**  
**Department of Geography, 2012-13, & 2013-14**

**NOTE: The courses for B.Sc. and B.A. are identically the same, except code GRB/ GRA.**

**B. Sc./ B.A. First Year**  
**I SEMESTER**

Paper Code	Explanation	Title of the Paper	Credit
GRB101	Theory	Physical Basis of Geography	4
GRB102	Practical	Map: Reading and Interpretation	2
<b>Total</b>	<b>Semester I</b>		<b>6</b>

**II SEMESTER**

Paper Code	Explanation	Title of the Paper	Credit
GRB 201	Theory	Human Geography	4
GRB 202	Practical	Elementary Statistics	2
GRB 203A*	Theory	Man and Environment ( <b>Ancillary Course</b> )	2
<b>Total</b>	<b>Semester II</b>		<b>8</b>

**B. Sc. Second Year**  
**III SEMESTER**

Paper Code	Explanation	Title of the Paper	Credit
GRB 301	Theory	Economic Geography	4
GRB 302	Practical	Map Projection and Weather Map	2
<b>Total</b>	<b>Semester III</b>		<b>6</b>

**IV SEMESTER**

Paper Code	Explanation	Title of the Paper	Credit
GRB 401	Theory	Regional Study of Developed and Developing Countries: U.S.A. and China	4
GRB 402	Practical	Surveying	2
GRB 403A*	Theory	Basics of Remote Sensing ( <b>Ancillary Course</b> )	2
<b>Total</b>	<b>Semester IV</b>		<b>8</b>

**B. Sc. Third Year**  
**V SEMESTER**

Paper Code	Explanation	Title of the Paper	Credit
GRB 501	Theory	Geomorphology	4
GRB 502	Theory	Geography of India	4
GRB 503	Practical	Representation of Geographical Data	4

GRB 504	Practical	Field Study, Field Trip and Report Writing	4
<b>Students may select any ONE from the following Elective (Theory) Papers</b>			
GRB 505	Theory	Population Geography *	4
GRB 506	Theory	Social Geography	4
GRB 507	Theory	Agricultural Geography	4
GRB 508	Assignment-based Seminar	Paper offered in V semester	2
<b>Total Semester V</b>			<b>22</b>

\* Currently GRB 505 Elective Paper Will Be Offered Only

### VI SEMESTER

Paper Code	Explanation	Title of the Paper	Credit
GRB 601	Theory	Climatology	4
GRB 602	Theory	Evolution of Geographical Thought	4
GRB 603	Practical	Geological Map and Map Projection	4
GRB 604	Practical	Elementary Remote Sensing	4
<b>Students may select any ONE from the following Elective (Theory) Papers</b>			
GRB605	Theory	Regional Development and Planning *	4
GRB606	Theory	Political Geography	4
GRB607	Theory	Industrial Geography	4
GRB 608	Assignment-based Seminar	Paper offered in VI semester	2
<b>Total Semester V I</b>			<b>22</b>

\* Currently GRB 605 Elective Paper will only be offered.

### I Semester

#### B. Sc./ B.A. Geography, GRB 101. Theory, Paper: 1. Physical Basis of Geography

CREDITS : 4

Number of Lectures : 52

#### Unit I

Origin of the earth (James and Jeffrey, Russell, Lytleton, Lemaitre); Interior of the earth; Rocks: origin and classification; Earth's movements.

#### Unit II

Major landforms: mountains, plateaus and plains; Gradational processes: weathering and erosion; Works of running water, glacier and wind.

#### Unit III

Composition and structure of the atmosphere; Insolation; Temperature: vertical and horizontal distribution; Pressure and pressure belts; Winds: planetary, periodic and local.

#### Unit IV

Theories of origin of ocean basin (Tetrahedral); Physical properties of sea water: temperature and salinity; Ocean currents; Tides and Coral reefs.

#### Books Recommended

1. Barry, R. G. and Chorley, R. J. (1998): Atmosphere, Weather and Climate. Routledge, London.

2. Bryant, H. Richard (2001): Physical Geography Made Simple, Rupa and Company. New Delhi
3. Bunnnett, R.B. (2003): Physical Geography in Diagrams, Fourth GCSE edition, Pearson Education (Singapore) Private Ltd.
4. Garrison, T. (1998): Oceanography, Wordsworth Company., Belmont.
5. Lake, P. (1979): Physical Geography (English and Hindi editions), Cambridge University Press, Cambridge.
6. Leong Goh Cheng (2003): Certificate Physical and Human Geography, Oxford University Press, New Delhi.
7. Monkhouse, F.J. (1979): Physical Geography. Methuen, London
8. Singh, S. (2003): Physical Geography. (English and Hindi editions.). Prayag Pustak Bhawan, Allahabad;
9. Trewartha, G.T., Robinson, A.H., Hammond, E.H., and Horn, A.T. (1976/1990): Fundamentals of Physical Geography, 3rd edition. MacGraw-Hill, New York.
10. Singh, M.B. (2001): *Bhoutik Bhugol*, Tara Book Agency, Varanasi
11. Strahler, A.N. and Stahler, A.M. (1992): Modern Physical Geography. John Wiley and Sons, New York.
12. Wooldridge, S.W. and Morgan, R.S. (1939): The Physical Basis of Geography- An Outline of Geomorphology. Longman, London. Recent edition and Reprint.

### ***I Semester***

#### **B.Sc.**

#### **GRB 102. Practical, Paper: 1. Map: Reading and Interpretation**

CREDITS : 2

Number of Lectures : 52

Construction of scale: simple, diagonal and comparative; Map reading and Interpretation of topographic sheets, Relief features and profiles (serial, superimposed, projected and composite); Reduction and enlargement of maps.

#### **Books Recommended**

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
2. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5<sup>th</sup> edition.
3. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
4. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3<sup>rd</sup>. edition.
5. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
6. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.

### ***II Semester***

#### **B.Sc.**

#### **GRB 201. Human Geography**

CREDITS : 4

Number of Lectures : 52

#### **Unit I**

Meaning, nature and scope of human geography; Concepts of human geography; Man-environment relationships: determinism, possibilism and probabilmism, and environmentalism.

#### **Unit II**

Evolution of man; Classification of races; Characteristics of races and their broad distribution; Human adaptation to environment: Eskimo, Masai and Bushman; Primitive people of India: Tharu, Naga and Bhil.

#### **Unit III**

Growth of population; Distribution of population; Major human agglomerations; Types of Migration; Trends of Urbanization.

#### Unit IV

Rural settlements: characteristics, types and regional pattern; Urban settlements: evolution and classification; Rural houses in India: types, classification and regional pattern.

#### Books Recommended

1. Chisholm, M. (1985): Human Geography, 2nd edition, Penguin Books, London.
2. de Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2nd edition. John Wiley and Sons, New York,
3. Fellman, J. D., Arthur, G., Judith, G., Hopkins, J. and Dan, S. (2007): Human Geography: Landscapes of Human Activities. McGraw-Hill, New York. 10<sup>th</sup> edition.
4. Haggett, P. (2004): Geography: A Modern Synthesis. 8th edition, Harper and Row, New York.
5. Hussain, M. (1994): Human Geography, Rawat Publications, Jaipur.
6. Johnston, R. J., Gregory, D., Pratt, G. and Watts, M. (2009): The Dictionary of Human Geography. 5th edition, Basil Blackwell Publishers, Oxford.
7. Kaushik, S.D. and Sharma, A.K. (1996): Principles of Human Geography (in Hindi), Rastogi Publication, Meerut.
8. Norton, W. (2008): Human Geography, Oxford University Press, New York. 5<sup>th</sup> ed.
9. Singh, K. N. and Singh, J. (2001): *Manav Bhugol*. Gyanodaya Prakashan, Gorakhpur. 2<sup>nd</sup> edition.
10. Singh, L.R. (2005): Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad
11. Smith, D. M.(1977): Human Geography- A Welfare Approach, Edward Arnold (Publishers) Ltd., London
12. Stoddard, R.H., Wishart, D.J. and Blouet, B.W. (1986): Human Geography. Prentice-Hall, Englewood Cliffs, New Jersey.

### II Semester

#### B. Sc. Part I

#### GRB 202 : Practical . Elementary Statistics

CREDITS : 2

Number of Lectures : 52

Sources of data; classification and Tabulation of data.

Measures of central tendency: mean, median and mode, and quartile.

Measures of dispersion: mean deviation, standard deviation.

Correlation (Karl Pearson and Spearman).

#### Books Recommended

1. Bhagwathi, V. and Pillai, R.S.N. (2003): Practical Statistics, Sultan Chand and Company, New Delhi
2. Ebdon, D. (1977): Statistics in Geography: A Practical Approach, Blackwell Publishers Inc., Massachusetts
3. Gregory, S. (1973): Statistical Methods and the Geographer, Longman, London.
4. Gupta, S.P. (1998): Advanced Practical Statistics, Sultan Chand and Company, New Delhi
5. Mahmood, A. (1986): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi
6. Zamir, A. (2002): Statistical Geography: Methods and Applications, Rawat Publications, Jaipur.

#### GRB 203 A\*

#### Ancillary Theory Paper; Man and Environment

CREDITS: 2

#### Unit I :

Evolution of Man; Human Race: Bases and classification; Human Adaptation in different environment: selected tribes.

**Unit II :**

Man's interaction in environment, Biomes: Meaning and types; Major Biomes: Rainforest, Savannah, Tundra.

**Unit III :**

Environment: Meaning and Components; Food Pyramid; Forms and Functions of Ecosystems: Terrestrial, Aquatic; Biodiversity; Climatic Change; Environmental Conservation and Management.

**Books Recommended**

1. Chisholm, M. (1985): Human Geography, 2nd edition, Penguin Books, London.
2. de Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2nd edition. John Wiley and Sons, New York.
3. Johnston, R. J., Gregory, D., Pratt, G. and Watts, M. (2000): The Dictionary of Human Geography. 4th edition, Basil Blackwell Publishers, Oxford.
4. Kaushik, S.D. and Sharma, A.K. (1996): Principles of Human Geography (in Hindi), Rastogi
5. Odum, P. E. and Barret, W. G. (2005): Fundamentals of Ecology, Thomson Asia Pvt Ltd, Singapur.
6. Huggett, R. J. (1998): Fundamentals of Biogeography, Routledge, London.
7. Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.

**III Semester**

**B.Sc. Part II  
GRB 301. Economic Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

Meaning and approaches to economic geography; Main concepts of economic geography; Resource: concept and classification; Resource conservation.

**Unit II**

Natural resources: soil, forest and water; Mineral resources: iron ore and bauxite; Power resources: coal and petroleum; Principal crops: wheat, rice and cotton.

**Unit III**

Agricultural regions of the world (Derwent Whittlesey); Theory of agricultural location (Von Thunen); Theory of industrial location (Weber); Major industries: iron and steel, and cotton textiles.

**Unit IV**

World transportation: major trans-continental railways, and sea routes; WTO and International trade: patterns and trends; Major trade blocs: EEC, ASEAN; Effect of globalization on developing countries.

**Books Recommended**

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.

3. Clark, G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava*, Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff, New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.
11. Sokal, Martin 2011. Economic Geographies of Globalisation: A short Introduction. Cheltenham, UK : Edward Elgar

### **B.Sc. III Semester**

#### **GRB 302: Practical. Map Projection and Weather Map**

Credits: 2

Number of Lectures: 52

**Map Projection:** Conical: simple conic with one and two standard parallels, Bonne's; Cylindrical: simple and equal area; Zenithal (Polar case): equidistant and equal area.

**Weather Map:** Weather symbols, Representation of atmospheric features, Interpretation of Indian daily weather maps (July, October and January)

#### **Books Recommended**

1. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London.
2. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5<sup>th</sup> edition.
3. Robinson, A., Sale, R. Morrison, J. and Muehrcke, P. C. (1984): Elements of Cartography, John Wiley and Sons, New York
4. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
5. Sharma, J. P. (2001): *Prayogik Bhugol*. Rastogi Publication, Meerut 3<sup>rd</sup> edition.
6. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,

### **B.Sc. IV Semester**

#### **GRB 401**

#### **Regional Study of Developed and Developing Countries: USA and China**

Credits: 4

Number of Lectures: 52

#### **Unit I**

Concepts, bases and characteristics of developed and developing countries; Indicators and Levels of development: Developed, Developing, Under-developed, and Least-developed worlds.

#### **Unit II**

Physical resource base: landforms, climate, soils, vegetation, power and mineral resources

#### **Unit III**

Cultural resource base: population, agriculture, industries.

#### **Unit IV**

Agricultural and industrial regions of USA; Agricultural and geographical regions of China.

### **Books Recommended**

1. di Blij, H. and Muller, O. (1993): *Geography: Regions and Concepts*. John Wiley and Sons, New York..
2. Jackson, R. H. and Husman, L. E. (1991): *World Regional Geography: Issues for Today*. John Wiley and Sons, New York.
3. Jones, P. and Bryan, P. (1954): *North America: An Historical, Economic and Regional Geography*, Methuen and Company. Ltd, London.
4. Kolb, A. (1971): *East Asia, China, Japan, Korea, Vietnam*, Methuen, London.
5. Rai, Gayatri (2007): *Vishwa Ka Pradeshik Bhugol*, Mishra Trading Corporation, Varanasi
6. Sharma, P. R. (ed.) (1991): *Perspectives on Third World Development*. Rishi Publication, Varanasi.
7. Stamp, L. D. (1976): *Asia: A Regional and Economic Geography*, Methuen, London.

### IV Semester

### **GRB 402 : Practical. Surveying**

Credits: 2

Number of Lectures: 52

Surveying: meaning, classification and significance.

Chain and Tape surveying; Plane Table surveying; Prismatic Compass, Abney Level and Indian Clinometer

### **Books Recommended**

1. Davis, R.E. and Foote, F.S. (1953): *Surveying*, 4<sup>th</sup> edition, McGraw Hill Publication, New York
2. Jones, P.A.(1968): *Fieldwork in Geography*, Longmans, Green and Company Ltd., First Publication, London
3. Kanetker, T.P. and Kulkarni, S.V.(1967): *Surveying and Levelling*, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): *Advanced Surveying*, B.I. Publications., Mumbai.
5. Pugh, J.C. (1975): *Surveying for Field Scientists*, Methuen and Company Ltd., London, First Publication.
6. Punmia, B.C.(1994): *Surveying*, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Shephard, F.A. (1968): *Surveying Problems and Solutions*, Edward Arnold (Publishers) Ltd, London
8. Singh, R.L. and Singh, Rana P.B. (1993): *Elements of Practical Geography*. (Hindi and English editions), Kalyani Publishers, Ludhiana and New Delhi.
9. Venkatramaiah, C. (1997): *A Text Book of Surveying*, Universities Press, Hyderabad.

### **GRB 403 A\***

### Ancillary Theory paper. **Basics of Remote Sensing**

CREDITS : 2

#### **Unit I**

Remote Sensing: Concept and Scope; Electro-magnetic Radiation: Characteristics, Spectral regions and Bands; Interaction with earth surface features and atmosphere; Spectral Signature

#### **Unit II**

Types of Remote Sensing: Air borne and Space borne; Aerial photos: Types and Characteristics; Remote Sensing satellites: Platforms and sensors

#### **Unit III**

Visual and Digital image processing techniques; Remote Sensing application in resource mapping and environmental monitoring

**Books Recommended**

1. Curran, P.J. (1985): Principles of Remote Sensing, Longman, London
2. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4<sup>th</sup> edition. John Wiley and Sons, New York
3. Campbell, J.B. (2002): Introduction to Remote Sensing. 5<sup>th</sup> edition, Taylor and Francis, London
4. Bhatta, B. (2010): Remote Sensing and GIS, Oxford University Press, New Delhi.
5. Nag Prithvish and Kudrat M. (1998): Digital Remote Sensing, Concept Publishing Company, New Delhi

**B. Sc. Part III. V Semester**  
**GRB 501. Geomorphology**

Credits: 4

Number of Lectures: 52

**Unit I**

Nature and scope of geomorphology; Principles and basis of geological time scale; Fundamental concepts: uniformitarianism and dynamic equilibrium, relief and differential rates of geomorphic processes.

**Unit II**

Cycle of erosion and slope evolution: contributions of Davis, Penck and King; Isostasy, Plate tectonics, Earthquakes; Folded structure and topography; Faulted structure and topography.

**Unit III**

Mass wasting and different geomorphic agents and processes— fluvial water, Aeolian, glacial, marine and karst.

**Unit IV**

Evolution and development of river valleys; Drainage patterns and their significance; concept of graded stream; river channels — form, pattern and dynamics; Regional geomorphology of Uttarakhand Himalaya and Middle Ganga Plain.

**Books Recommended**

1. Bloom, A. L. (1992): Geomorphology—A Systematic Analysis. Prentice-Hall India, New Delhi.
2. Chorley, R. J., Schumm, S. A. and Sugden D.E.(1984): Geomorphology. Methuen, London
3. Holmes, A. (1987): Principles of Physical Geology. Nelson, New York, 3<sup>rd</sup> edition.
4. Sparks, B.W.(1969) : Geomorphology. Longman, London.
5. Stoddard, D. R. (ed.)(1996): Process and Form in Geomorphology. Routledge, London,.
6. Kale, V. and Gupta, A. (2001): Elements of Geomorphology. Oxford University Press, Delhi.
7. Thornbury, W. D. (1990): Principles of Geomorphology. Wiley Eastern Edition, New York,.
8. Singh, S. (2000): Geomorphology. (in Hindi). Vasundhra Prakashan, Gorakhpur.
9. Singh, S. (2004): Geomorphology, Prayag Pustak Bhawan, Allahabad
10. Skinner, B. J. and Porter, S.C. (1996): The Dynamic Earth. John Wiley and Sons, New York,.
11. Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography: An Outline of Geomorphology. Longman, London, several reprints.

**B. Sc. Part III. V Semester**  
**GRB 502. Geography of India**

Credits: 4

Number of Lectures: 52

**Unit I**

Geology; Physiographic divisions; Drainage systems; Climate and climatic regions; Soil and vegetation.



**Unit II**

Minerals and power resources (iron ore, and coal); Multipurpose projects: Damodar Valley, and Bhakhra Nangal; Irrigation; Major industries (iron and steel, cotton textile, and sugar).

**Unit III**

Crops (rice, wheat, cotton, sugarcane, and tea); Agricultural regions; Green revolution and its consequences

**Unit IV**

Meso-regions of India (Karnataka plateau, and Uttarakhand) and their characteristics; Transport and communication; Trade: composition and recent changes.

**Books Recommended**

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): *An Introduction to South Asia*. Methuen, London
3. Gautam, A. (2006): *Advanced Geography of India*, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): *Development in South Asia*. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): *Geology of India and Burma*, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): *Geography of India*, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat ke Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): *Economic and Commercial Geography of India*, Vikas Publishing House Private Ltd. New Delhi.
10. Singh, J. (2003): *India: A Comprehensive Systematic Geography*. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhougolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): *India: A Regional Geography*. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): *India, Pakistan and Sri Lanka*. Methuen, London, 7<sup>th</sup> edition.
14. Sukhwai, B.L. (1987): *India: Economic Resource Base and Contemporary Political Patterns*. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): *Geography of India*, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

**B.Sc. Semester V****GRB 503: Practical. Representation of Geographical Data**

Credits: 4

Number of Lectures: 52

**Graphical Representation**

Bar diagram, Frequency polygon, Frequency curve. Rainfall dispersion diagram, Water balance graph, Climograph.

**Cartographic Representation**

Distribution maps: Dot, Isopleth, Choropleth; Pie diagram. Cartogram: Traffic flow diagram, Isochronic cartogram.

**Books Recommended**

1. Monkhouse, F. J. (1985): *Maps and Diagrams*. Methuen, London.
2. Raisz, E. (1962): *Principles of Cartography*, McGraw Hill, New York.
3. Robinson, A. H., Sale. R. D., Morrison, J. L. and Muehrcke, P. C. (1984): *Elements of Cartography*. 5th edition, John Wiley and Sons, Inc. New York.

4. Sarkar, A. K. (1997): *Practical Geography: A Systematic Approach*. Orient Longman, Kolkata.
5. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3<sup>rd</sup>. edition.
6. Singh, R.L. and Singh Rana P.B. (1993): *Elements of Practical Geography*. (Hindi and English editions). Kalyani Publishers, New Delhi.

### **GRB 504: Practical Field Study, Field Trip and Report Writing**

Credits: 4

Number of Lectures: 52

**Fieldwork:** Meaning, types and objectives of fieldwork; Fieldwork methods and techniques; Importance of fieldwork in geography, Field work-based report writing.

**Field Trip:** Uttarakhand, Vindhyan Plateau, Thar Desert.

#### **Books Recommended**

1. Archer, J.E. and Dalton, T.H. (1968): *Field Work in Geography*. William Clowes and Sons Ltd. London and Beccles.
2. Bolton, T. and Newbury, P.A. (1968): *Geography through Fieldwork*. Blandford Press, London.
3. Jones, P. A. (1968): *Field Work in Geography*. Longmans, Green and Company Ltd., London and Harlow.
4. Lousenbury, J. F. and Aldrich, F.T. (1986): *Introduction to Geographic Field Methods and Techniques*. Charles E. Merrill Publishing. Company, Colombus.
5. Pugh, J.C. (1975): *Surveying for Field Scientists*. Methuen and Company Ltd. London.
6. Knight, Peter G. and Parsons, Tony (2003): *How to do your Essays Exams & Coursework in Geography and Related Disciplines*. Nelson Thornes, Cheltenham U.K.
7. Parsons, Tony and Knight, Peter G. (2005): *How to do your Dissertation in Geography and Related Disciplines*. Routledge, London. 2<sup>nd</sup> Ed.
8. Kitchen, Rob and Tate, Nicholas J. (2009): *Conducting Research into Human Geography: Theory, Methodology & Practice*. Prentice Hall-Pearson, Harlow U.K. 2<sup>nd</sup> Ed.
9. Kitchen, Rob and Fuller, Duncan (2005): *The Academic's Guide to Publishing*. Vistaar Pubs. (Sage), New Delhi.
10. Hay, Iain (ed.) (2005): *Qualitative Research Methods in Human Geography*. Oxford University Press, Melbourne. 2<sup>nd</sup> Ed.
11. Hay, Iain (ed.) (2004): *Communicating in Geography and the Environmental Sciences*. Oxford University Press, Melbourne. 2<sup>nd</sup> Ed.
12. Stoddard, Robert H. (1982): *Field Techniques and Research Methods in Geography*. Kendall/Hunt Pub. Dubuque IO.

### **B.Sc. Semester V. Optional Paper GRB 505: Elective Theory Paper Population Geography**

Credits: 4

Number of Lectures: 52

#### **Unit I**

Nature and scope of population geography; Sources and types of population data: census, sample survey and vital registration system.

#### **Unit II**

World population: growth, causes and consequences; Factors affecting population distribution; Migration: types and determinants; Urbanization: trends and pattern

#### **Unit III**

Population dynamics: fertility and mortality, age and sex structure; Occupational structure; Demographic transition theory; human resource development: indicators and patterns.

#### **Unit IV**

**INDIA:-** Population growth; Distribution of population; Density types; Population problems; Population Policy.

#### **Books Recommended**

1. Chandna, R. C. (2006): Geography of Population. Kalyani Publishers, New Delhi.
2. Clarke, J.I. (1972): Population Geography. Pergamon Press, Oxford.
3. Demko, G.J., Rose, H.M., and Schnell, G.A. (1970): Population Geography: A Reader. McGraw-Hill, New York.
4. Dube, K.K. and Singh, M.B.(1994): *Jansankhya Bhoogol*, Rawat Publications, Jaipur.
5. Garnier, B.J. (1993): Geography of Population. 3rd edition. Longman, London.
6. Jones, H. R. (1981): A Population Geography. Harper and Row, New York.
7. Peters, G. L. and Larkin, R.P. (1983): Population Geography: Problems, Concepts and Prospects. Kendall/Hunt, Dubuque, IA.
8. Trewartha, G.T. (1985): A Geography of Population: World Patterns. John Wiley and Sons, New York.
9. Zelinsky, W. (1966): A Prologue to Population Geography. Prentice Hall, New Jersey.

### **B.Sc. Semester V. Optional Paper GRB 506: Elective Theory Paper Social Geography**

Credits: 4

Number of Lectures: 52

#### **Unit I**

Meaning and scope of social geography; Concept of social space; Social differentiation and stratification; Social morphology.

#### **Unit II**

Social differentiation and region formation: Bases of social region formation; Evolution of socio-cultural regions of India; Role of race, caste, tribe, religion and languages; India — unity in diversity

#### **Unit III**

Concept of social wellbeing; Physical quality of life; Human development: concept and measurements; Rural-urban interfaces in India: health care, education and shelter; Gender issues in India

#### **Unit IV**

Public policy and social planning in India; Appraisal of Five-Year Plans and social policies in India; Social policy and planning for drought and flood prone areas; Social impact assessment of development projects

#### **Books Recommended**

1. Ahmad, A. (1999): Social Geography. Rawat Publications, Jaipur and New Delhi.
2. Anderson, K. (2006): Race and Crises of Human Development. Routledge, London and New Delhi.
3. Betizlle, A.(1983): Equality and Inequality, Oxford University Press, New Delhi
4. Brewer, J.D. (2000): Ethnography, Open University Press, Buckingham, Philadelphia, First Edition.
5. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): Geography and Inequality, Oxford University Press, Oxford, London.
6. Eyles, J. (ed.) (1986): Social Geography in International Perspective. Rowman and Littlefield, New Jersey and Los Angeles.
7. Dubey. S.C. (1991): Indian Society. National Book Trust, New Delhi.

8. Forde, C. D. (1934): *Habitat, Economy and Society*, Methuen and Company London
9. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*. McMillan, London
10. Gore, M.S. (1985): *Social Aspects of Development*, Rawat Publications, Jaipur
11. Jackson, P. and Susan, J. S. (1984): *Exploring Social Geography*, George Allan Unwin, Boston and Sydney.
12. Jones, E. (ed.) (1975) : *Readings in Social Geography*, Oxford University Press, London.
13. Haq, M. (2000): *Reflections on Human Development*. Oxford University Press, New Delhi.
14. Maloney, C. (1974): *People of South Asia*. Winston Norton, New York.
15. Moseley, W. G., Lanegran, D. A. and Pandit, K. (eds.) (2007): *The Introductory Reader in Human Geography. Contemporary Debates and Classic Writings*. Blackwell Publishers., Oxford.
16. Norton, W. (2006): *Cultural Geography. Environments. Landscapes. Identities. Inequalities*. Oxford University Press, Toronto. 2<sup>nd</sup> edition.
17. Planning Commission, Government of India (1981): *Report on Development of Tribal Areas*. New Delhi.
18. Sahlins, M. D. (1968): *Tribesmen*, Prentice Hall, New York.
19. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi, first edition.
20. Smith, D. (1977): *Geography: A Welfare Approach*. Edward Arnold, London.
21. Sopher, D. (1980): *An Exploration of India: Geographical Perspectives on Society and Culture*, Cornell University Press, Ithaca, New York, first edition.
22. Subba, R. B. (1958): *Personality of India: Pre- and Proto- Historic Foundation of India and Pakistan*. 2<sup>nd</sup> edition. M.S. University Baroda, Vadodara.
23. Stump, Roger W. (2008): *The Geography of Religion: Faith, Place, and Space*. Rowman & Littlefield Publs., Lanham USA.
24. Valentine, G. (2001): *Social Geographies: Space and Society*. Prentice Hall, Harlow, UK.

**B.Sc. Semester V. Optional Paper**  
**GRB 507: Elective Theory Paper**  
**Agricultural Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

Meaning and scope of agricultural geography; Approaches to agricultural geography; Physical, cultural and institutional factors affecting agriculture.

**Unit II**

Crop concentration and crop diversification; Delineation of crop combination regions; Agricultural regions of the world; Detailed study of subsistence, plantation, commercial and mixed farming.

**Unit III**

Agricultural land-use and carrying capacity; Land use pattern with special reference to India; Measures of agricultural efficiency and agricultural productivity.

**Unit IV**

Agro-climatic regions of India, Green revolution in India; Second generation reforms in Indian agriculture: Land and institutional reforms; Organic and contract farming; Agricultural planning and policies in India.

**Books Recommended**

1. Dumont, R.(1970): *Types of Rural Economy: Studies in World Agriculture*, Douglas Manin, London Methuen
2. Gregor, H. P. (1970): *Geography of Agriculture*. Prentice-Hall, New York.

3. Husain, M. (1996): Systematic Agricultural Geography, Rawat Publications, Jaipur.
4. Misra, R. P. (1967): Diffusion of Agricultural Innovations, University of Mysore, Mysore.
5. Mohammad, A.(1978): Studies in Agricultural Geography, Rajesh Publications, New Delhi
6. Morgan, W. B. and Norton, R.J.C. (1971): Agricultural Geography. Methuen, London.
7. Sauer, O. C. (1969): Agricultural Origins and Dispersals. MIT Press, Cambridge.
8. Shafi, M. (2006): Agricultural Geography, Pearson Education, New Delhi.
9. Sen, Sudhir (1975): Reaping the Green Revolution. Tata McGraw-Hill, New Delhi
10. Shafi, M.(2000): Agricultural Geography of South Asia, McMillan, Delhi
11. Singh, B.B. (1979) : *Krishi Bhugol*. Tara Publications, Varanasi.
12. Singh, J. and Dhillon, S.S. (2000): Agricultural Geography. Tata McGraw Hill, New Delhi.
13. Singh, S. (1994): Agricultural Development in India: A Regional Analysis, Kaushal Publications, Shillong.
14. Symons, L. (1967): Agricultural Geography. George Bell and Sons, London.
15. Tarrant J. R. (1974): Agricultural Geography. John Wiley and Sons, New York.

B.Sc. Semester V  
**GRB 508: Assignment-based Seminar**

Credits: 2

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 B. Sc. Part III. Semester VI  
**GRB 601. Climatology**

Credits: 4  
 Number of Lectures: 52

**Unit I**

Meaning and scope of climatology; Atmosphere: Composition and structure; Insolation: determinants and distribution; Temperature: Controlling factors and Distribution; Processes of heating and cooling of the atmosphere.

**Unit II**

Heat budget of earth and atmosphere; Temperature change; Air stability and its importance; Laws of Horizontal Motion and general Atmospheric Circulation, Monsoon, Jet Stream and their significance with reference to India

**Unit III**

Precipitation: Theories of Precipitation Formation, forms and types; Air Masses: classification and modification; Fronts: source regions, types and associated weather

**Unit IV**

Cyclones: tropical and temperate; Climatic classification: Köppen and Thornthwaite; Climatic change: evidences and theories; Global Warming: causes and consequences.

**Books Recommended**

1. Barry, R.G. and Carleton, M. (2001): Synoptic and Dynamic Climatology, Routledge, London.
2. Chorley, R.J. (2001): Atmosphere, Weather and Climate. Methuen, London.
3. Critchfield, H.J. (2002): General Climatology. Prentice-Hall of India, New Delhi..
4. Finch, J. C. and Trewartha, G. T.: Elements of Weather and Climate. Prentice-Hall, London.
5. Kendrew, W.C. (1998): Climatology. Edward Arnold, London. 5<sup>th</sup> edition.
6. Lal, D.S.(1986): Climatology. Chaitanya Publications, Allahabad.
7. Oliver, J.E. and Hidore, J.J. (2003): Climatology: An Atmospheric Science, Pearson Education Private Ltd, Patparganj, Delhi.
8. Robinson, P. J. and Henderson, S. (1999): Contemporary Climatology, 2nd edition, Pearson Education Ltd., Harlow, UK.
9. Singh, M.B. (1998): *Jalvayu Avam Samudra Vigyan*. Tara Book Agency, Varanasi.
10. Singh, M.B. (1999): *Jalvayu Avam Jal Vigyan*. Tara Book Agency, Varanasi,.

11. Singh, S. (2005): *Climatology*. Prayag Pustak Bhawan, Allahabad.
12. Singh, S. (2006): *Jalvayu Vigyan*. Prayag Pustak Bhawan, Allahabad.

## B. Sc. Part III. Semester VI

### GRB 602. Evolution of Geographical Thought

Credits: 4  
Number of Lectures: 52

#### Unit I

The field of geography; Geography as a discipline: natural science vs. social science; Approaches to geography; Relevance of geography

#### Unit II

Classical contributions to geographical thought: Greek, Roman, Indian, Arab; Geography rethought: Varenus and Immanuel Kant.

#### Unit III

Foundations of geography: major contributions of Alexander von Humboldt, Carl Ritter, and Frederick Ratzel; Dualism and Unity in geography

#### Unit IV

Schools of geographical thought: French, British and American; Recent trends in geography; Evolution of geography in India: formative periods, establishments and emerging scenario.

#### Books Recommended

1. Ali, S.M. (1960): *Arab Geography*, Institute of Islamic Studies, Aligarh Muslim University, Aligarh, First Edition.
2. Daniel, P., Bradshaw, M., Shaw, D. and Sidaway, J. (2000): *Human Geography. Issues for the 21st Century*. Prentice Hall, London.
3. Diddee, J. (ed.) (1990): *Indian Geography*, Institute of Indian Geographers, Pune, first edition.
4. Dikshit, R. D. (2003): *Geographical Thought. A Critical History of Ideas*. Prentice-Hall of India, New Delhi. (in English and Hindi).
5. Dube, B. (1967): *Geographical Concepts in Ancient India*, National Geographical Society of India, Varanasi
6. Getice, A., Getis, J. and Fellman, J. D. (2007): *Introduction to Geography*. 10<sup>th</sup> edition. McGraw Hill, New York.
7. Hartshorne, R. (1959): *Perspective on the Nature of Geography*, John Murray, London
8. Harvey, D. (1969): *Explanations in Geography*. Arnold, London.
9. Holt-Jensen, A. (1980): *Geography: Its History and Concepts*. Harper and Row Publishers, London.
10. Husain, Majid. (2002): *Evolution of Geographical Thought*, Rawat Publications, Jaipur.
11. Johnston, R., Gregory, D., Pratt, G., Watts, M. and Whatmore, S. (2003): *The Dictionary of Human Geography*. Blackwell Publishers, Oxford. 5th edition.
12. Johnston, R. and Sidaway, J.D. (2004): *Geography and Geographers: Anglo-American Human Geography Since 1945*, Arnold Publishers, London.
13. Rawling, E. and Daugherty, R. (eds.) (2005): *Geography into the Twenty-first Century*. 2<sup>nd</sup> edition. John Wiley and Sons, Chichester.
14. Singh, Rana P.B. 2009: *Uprooting Geographic Thoughts in India: Toward Ecology and Culture in 21<sup>st</sup> Century*. Planet Earth & Cultural Understanding Series, Pub. 1. Cambridge Scholars Publishing, New Castle upon Tyne (UK).
15. Singh, Rana P.B. 2009: *Geographical Thoughts in India: Snapshots and Vision for the 21<sup>st</sup> Century*. Planet Earth & Cultural Understanding Series, Pub. 2. Cambridge Scholars Publishing, Newcastle upon Tyne (UK).
16. Singh, Ravi S. (ed.) 2009: *Indian Geography in the 21<sup>st</sup> Century: The Young Geographers Agenda*. Cambridge Scholars Publishing, New Castle upon Tyne (UK).
17. Singh, Ravi S. (ed.) 2009: *Indian Geography: Perspectives, Concerns and Issues*. Rawat

Publications, Jaipur/New Delhi.

18. Taylor, G. (ed.) (1953): Geography in the Twentieth Century. Methuen and Company, London.

## B. Sc. Part III. Semester VI

### GRB 603: Practical. Geological Map and Map Projection

Credits: 4

Number of Lectures: 52

**Geological Map:** Conformable and folded geological structure and their description.

**Map Projection:** Conical: Polyconic, and Sinusoidal; Cylindrical: Gall's and Mercator's; Zenithal: Gnomonic; International Map Projection

#### Books Recommended

1. Hinks, A. R. (1921): Map Projection, Cambridge University Press, London.
2. Misra, R.P. and Ramesh A. (1989): Fundamentals of Cartography, Concept Publishing Company, New Delhi.
3. Raisz, E. (1962): Principles of Cartography, McGraw Hill, New York..
4. Robinson, A. H., Sale, R., Morrison, J. and Muehrcke, P. C (1984): Elements of Cartography. 5th edition, John Wiley and Sons, New York,
5. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions), Kalyani Publishers, New Delhi.
6. Steers, J. A. (1965): An Introduction to the Study of Map Projection. University of London Press, London.

## B. Sc. Part III. Semester VI

### GRB 604: Practical. Elementary Remote Sensing

Credits: 4

Number of Lectures: 52

Fundamentals of remote sensing; Interpretation of aerial photographs and satellite imageries; Determination of scale, Basic principles of photogrammetry; Elements of photo/image interpretation; Identification of geomorphic features from stereogram; Application of remote sensing in natural resource studies and monitoring environmental changes.

#### Books Recommended

1. Campell, J. B. (2003): Introduction to Remote Sensing. 4<sup>th</sup> edition. Taylor and Francis, London.
2. Chaunial, D. D. (2004): Remote Sensing and Geographical Information System(in Hindi), Sharda Pustak Bhawan, Allahabad
3. Cracknell, A. and Ladson, H. (1990): Remote Sensing Year Book. Taylor and Francis, London.
4. Curran, P.J. (1985): Principles of Remote Sensing. Longman, London.
5. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.
6. Floyd, F. and Sabins, Jr. (1986): Remote Sensing: Principles and Interpretation. W.H. Freeman, New York.
7. Gautam, N.C. and Raghavswamy, V. (2004). Land Use/ Land Cover and Management Practices in India. B.S. Publication., Hyderabad.
8. Jensen, J.R. (2004): Remote Sensing of the Environment: An Earth Resource Perspective. Prentice-Hall, Englewood Cliffs, New Jersey. Indian reprint available.
9. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. John Wiley and Sons, New York.
10. Nag, P. (ed.) (1992): Thematic Cartography and Remote Sensing. Concept Publishing Company, New Delhi.

11. Rampal, K.K. (1999): Handbook of Aerial Photography and Interpretation. Concept Publishing. Company, New Delhi.

**B.Sc. Part III. Semester VI. Elective Theory Paper**  
**GRB 605: Regional Development and Planning**

Credits: 4

Number of Lectures: 52

**Unit I.**

Meaning, concepts and scope of regional development and planning; Approaches to Regional Development; Approaches to Regional Planning; Theories of regional development (Myrdal and Perroux).

**Unit II**

Evolution of Regional Planning in India; Concepts and types of regions; Schemes of regionalization; Macro micro planning regions of India; Multi-level planning; Participatory planning.

**Unit III**

Regional development in India: patterns and imbalances; Planning for regional development; Role of agriculture, industry and infrastructure (transport and power) in regional development.

**Unit IV**

Area development and planning: National Capital Region; Local-level planning and Panchayati Raj; Planning for Eastern Uttar Pradesh and North-East India.

**Books Recommended**

1. Bhat, L.S. (1972): Regional Planning in India, Indian Statistical Institute, Calcutta.
2. Bhat, L.S. (2003): Micro Planning: A Case Study of Karnal Area, KB Publications, New Delhi.
3. Chand, M. and Puri, V.K. (2004): Regional planning in India; Allied Publishers, New Delhi, reprint.
4. Chandana, R. C. (2005): Regional Development and Planning. Kalyani Publishers, New Delhi.
5. Dube, K.K. and Singh, M.B. (1986): *Pradeshik Niyojan*. Tara Book Agency, Varanasi.
6. Friedman, J. and Alonse, W. (eds.) (1968): Regional Development and Planning, M.I.T. Press, Cambridge-Massachusetts.
7. Gopalakrishnan, R. 1991. *North-East India: Land, Economy and People*. New Delhi: Har-Anand Publication.
8. Gopalakrishnan, R. 1990. *Political Geography of North-East India*. New Delhi: Har-Anand Publication.
9. Kuklinski, A.R. (ed.) (1975): Regional Development and Planning: International Perspectives, Sijthoff-Leyder.
10. Kuklinski, A.R. (1972): Growth Centres in Regional Planning. Mouton and Company, Paris.
11. Misra, R.P, Sundaram, K.V., and Prakasrao, V.L.S. (1976): Regional Development Planning in India, Vikas Publishers., New Delhi.
12. Misra, R.P. (1969): Regional Planning. University of Mysore, Mysore.
13. Misra, R.P. (2002): Regional Planning, Concepts, Techniques, Policies and Case Studies. Concept Publishing Company, New Delhi.
14. Sharma, P.R. (ed.) (1993): Regional Policies and Development in the Third World. Rishi Publication., Varanasi.
15. Singh, Ravi S. 2005. Paths of Development in Arunachal Pradesh. New Delhi: Northern Book Centre.
16. Sundaram, K.V. (1977): Urban and Regional Planning in India, Vikas Publishers. New Delhi.
17. Sundaram, K.V. (1997): Decentralized Multilevel Planning: Principles and Practice. Asian and African Experience. Concept Publishing Company, New Delhi



**B.Sc. Part III. Semester VI. Elective Theory Paper**  
**GRB 606: Political Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

Meaning, approaches, historical development, recent trends in political geography; geopolitics.

**Unit II**

Nations, states and nation states; Frontiers and boundaries; Capital cities, core and periphery regions.

**Unit III**

Geographical basis of international relations; Conflict resolution; Strategic locations, routes and raw material; Geostrategic regions of the world; Theories of Heartland and Rimland

**Unit IV**

Geopolitical and geo-economic significance of:- Indian Ocean, West Asia and Central Asia; Problems of nation building in India; Geopolitics of energy and resources.

**Books Recommended**

1. Cohen, Samuel (1964): Geography and Politics in Divided World. Random House, New York.
2. De Blij, H. J. and Glassner, M. (1968): Systematic Political Geography. John Wiley and Sons, New York.
3. Dikshit, R.D. (1987): Political Geography and Geopolitics. Tata McGraw Hill, New Delhi.
4. Dikshit, R.D. (2000): Political Geography: A Contemporary Perspective. Prentice-Hall, New Delhi.
5. Siddiq, M. (1997): Indian in the Indian Ocean: A Geopolitical Study, Rawat Publications, Jaipur
6. Moddie, A.E. (1961): Geography Behind Politics. Hutchinson, London.
7. Pannikar, K.M. (1959): Geographical Factors in Indian History. 2 vols. Asia Publishing House, Bombay.
8. Pearcy, G. E. and Fifield, R. (1948): World Political Geography, Thomas Y Crowell, New York
9. Pounds, N.J.G. (1972): Political Geography. McGraw Hill Publication., New York.
10. Short, John R. (1982): An Introduction to Political Geography. Routledge, London
11. Singh, T. D. (1988): *Hind Mahasagar Avam Parimandaliya Rashtra: Ek Bhougolik Adhyayan*, Tara Book Agency, Varanasi.
12. Sukhwai. B.L. (1987): Modern Political Geography of India. Sterling Publication, New Delhi.

**B.Sc. Part III. Semester VI. Elective Theory Paper**  
**GRB 607: Industrial Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

Meaning and scope of industrial geography; Industrialization; Concept of industrial revolution with reference to Britain and India.

**Unit II**

Factors of industrial location; Theories of industrial location: Weber, Hoover, Lösch and Smith.

**Unit III**

Distribution, growth, production trends and problems of: iron and steel, cotton textile, and sugar industries; Industrial policies in India; Role of industries in regional development.

**Unit IV**

Concept and methods of industrial regionalization; Major industrial regions of the world; Structure of major industrial complexes: Mid -Atlantic coastal region of USA, Ruhr Industrial region, Mumbai -Ahmedabad industrial region.

**Books Recommended**

1. Alexanderson, C. (1967): Geography of Manufacturing. Prentice-Hall of India, New Delhi.
2. Hoover, E. M. (1948): Location and Space Economy. McGraw Hill, New York.
3. Lodha, R.M.(2005): *Audyogika Bhoogol*, Rajasthan Hindi Granth Academy, Jaipur
4. Miller, E. (1962): A Geography of Manufacturing. Prentice-Hall, Englewood Cliffs, New Jersey.
5. Riley, R. C. (1973): Industrial Geography, Chatto and Windus Ltd. London.
6. Singh, M. B. (1990): New Perspectives in Industrial Geography. Lotus Publication, Varanasi.
7. Singh, M. B. (1988): Industrial Geography. Lotus Publication, Varanasi.

**B.Sc. Part III. Semester VI.  
GRB 608. Assignment-based Seminar  
(Papers offered in VI Semester)**

Credits: 2

**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         |
| <b>TOTAL</b> |             |                                                  | <b>18</b> |

**SEMESTER -II**

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

**SEMESTER - III**

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

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

### 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<br>GRM402B<br>GRM402C                                                       | Theory      | Urban Geography<br>Rural and Urban Planning<br>Satellite Image Interpretation. | 4         |
| The corresponding practical of the special group to be selected from the following: |             |                                                                                |           |
| GRM403A<br>GRM403B<br>GRM403C                                                       | Practical   | Urban Geography<br>Rural and Urban Planning<br>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         |
| <b>TOTAL</b>                                                                        |             |                                                                                | <b>20</b> |

\*# **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

1. Adams, P., Steven, H. and Karel, T. (eds.) (2001): *Texture of Place. Exploring Humanistic Geographies.* University of Minnesota Press, Minneapolis.
2. Anderson, K., Domosh, M., Pile, S. and Thrift, N. (eds.) (2003): *Handbook of Cultural Geography.* Sage Publications, London.
3. Barnes, T. and Gregory, D. (eds.) (1997): *Readings in Human Geography: The Poetics and Politics of Inquiry.* Arnold, London.
4. Bunkše, E. V. (2004): *Geography and the Art of Life.* John Hopkins University Press, Baltimore.
5. Buttimer, A. (1971): *Society and Milieu in the French Geographic Tradition.* Rand McNally, Chicago.
6. Daniels, P., Bradshaw, M., Shaw, D. and Sidaway, J. (2000): *An Introduction to Human Geography. Issues for the 21st Century.* Prentice Hall, London.
7. Dear, M. J. and Flusty, S. (2002): *The Spaces of Postmodernity: Readings in Human Geography.* Blackwell Publishers, Oxford.
8. Dikshit, R. D. (2004): *Geographical Thought. A Critical History of Ideas.* Prentice-Hall of India, New Delhi. (in English and Hindi).
9. Doel, M. (1999): *Poststructuralist Geographies. The Diabolical Art of Spatial Science.* Edinburgh University Press, Edinburgh
10. Gaile, G. and Wilmott, C. (eds.) (2003): *Geography in America at the Dawn of the 21st Century.* Oxford University Press, Oxford and New York.
11. Harvey, D. (1969): *Explanation in Geography.* Arnold, London.
12. Harvey, M. E. and Holly, P.B. (2002): *Themes in Geographic Thought.* Rawat Publications., Jaipur and New Delhi.
13. Hubbard, P., Kitchin, R., Bartley, B. and Fuller, D. (2002): *Thinking Geographically: Space, Theory and Contemporary Human Geography.* Continuum, London.
14. Johnston, R, Gregory D, Pratt G, Watts M. and Whatmore S. (2003): *The Dictionary of Human Geography.* Blackwell Publishers, Oxford. 5th edition.
15. Johnston, R.J. (1985): *The Future of Geography,* Metheun and Company Ltd., New York. (2003 edition published).
16. Johnston, R.J. and Sidaway, J.D. (2004): *Geography and Geographers.* 6<sup>th</sup> edition, Edward Arnold, London.
17. Kapur, A. (ed.) (2001): *Indian Geography – Voice of Concern.* Concept Publishing. Company, New Delhi.
18. Martin, G. (2005): *All Possible Worlds. A History of Geographical Ideas.* 4<sup>th</sup> edition, Oxford University Press, New York.
19. Mathews, J. A. and Herbert, D. T. (eds.) (2004): *Unifying Geography. Common Heritage, Shared Future.* Routledge, London.
20. Peet, R. (1998): *Modern Geographical Thought.* Blackwell Publishers Inc, Massachusetts.
21. Sack, R. D. (ed.) (2002): *Progress. Geographical Essays.* John Hopkins University Press, Baltimore.
22. Sauer, C. O. (1963): *Land and Life.* University of California Press, Berkeley.
23. Singh, R. L. and Singh, Rana P.B. (eds.) (1990): *Literature and Humanistic Geography.* National Geographical Society of India, BHU, Varanasi, Publication number 37
24. 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.
25. Singh, Rana P.B. (ed.) (1993): Environmental Ethics. National Geographical. Society of India, BHU, Varanasi, Publication number 40.
  26. Singh, Rana P.B. (ed.) (1994): The Spirit and Power of Place. National Geographical Society of India, BHU, Varanasi, Publication number 41.
  27. Singh, Rana P. B. (2004): Cultural Landscapes and the Lifeworld. Indica Books, Varanasi.
  28. Soja, E. (1989): Post-modern Geographies. Verso Press, London. Reprinted 1997: Rawat Publications, Jaipur and New Delhi.
  29. Taylor, G. (ed.) (1953): Geography in the Twentieth Century. Methuen and Company Ltd. and Company, London.
  30. Tuan, Yi-Fu (1977): Space and Place. The Perspective of Experience. Edward Arnold, London.
  31. Singh, Ravi S (ed.) 2009. Indian Geography: Perspectives, Concerns and Issues. Jaipur/New Delhi: Rawat Publications
  32. Singh, Ravi S (ed.) 2009. Indian Geography in the 21<sup>st</sup> Centaury: 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

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

10. Singh, S., (1998): Geomorphology. Prayag Pustak Bhavan, Allahabad.
11. Sparks, B.W., (1986): Geomorphology. Longman, London.
12. Thornbury, W.D., (2005): Principles of Geomorphology. John Wiley and Sons, New York.
13. Trewartha, G. T. (1980): An Introduction to Climatology. McGraw Hill Student edition, New York.
14. Ward, R.C. and Robinson, M. (2000): Principles of Hydrology. McGraw Hill, New York.
15. Weisberg, J. S. (1974): Meteorology. Houghton Mifflin Company, Boston.
16. 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.**

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

India, Varanasi.

13. Spate, O.H.K., Learmonth, A.T.A. and Farmer, B. H. (1979): India and Pakistan. Methuen and Company Ltd. and Company Ltd., London.
14. Subbarao, B. (1959): The Personality of India. University of Baroda Press, Baroda.
15. Sukhwal, B.L. (1987): India. Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi.
16. Tirtha, R. (2002): Geography of India. Rawat Publications., Jaipur and New Delhi.
17. Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad
18. Wadia, D. N. (1959): Geology of India. MacMillan and Company, London and Madras. Student edition.
19. Ahmed, Waquar, 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. 3<sup>rd</sup> 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. 2<sup>nd</sup> 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

1. Bhende, A. A. and Kanetkar T. (2003): Principles of Population Studies, Himalaya Publishing House, Mumbai.
2. Bose, A. (ed.) (2001): Population in India's Development, 1947-2000. Vikas Publications, New Delhi.

3. Champion, T. (ed.) (1993): Population Matters. Paul Chapman, London.
4. Chandna, R. C. (2006): Geography of Population. Kalyani Publishers., New Delhi.
5. Clark, J. I. (1972): Population Geography. Pergamon Press, Oxford.
6. Dube, K.K. and Singh, M.B. (1994): *Jansankhya Bhoogol*, Rawat Publications, Jaipur and New Delhi.
7. Ehrlich, P.R. and Ehrlich, A.H. (1996): *Ecoscience: Population, Resources, Environment*. 6<sup>th</sup> ed. W.H. Freeman and Company, San Francisco.
8. Garnier, B.J. (1993): Geography of Population. 3rd edition. Longman, London.
9. Jones, H. R. (2000): Population Geography. 3<sup>rd</sup> edition. Paul Chapman, London.
10. Pathak, L. P. (ed.) (1998): Population Studies. Rawat Publications., Jaipur and New Delhi.
11. Peters, G. L. and Larkin, R.P. (1983): Population Geography. Problems, Concepts and Prospects. Kendall/Hunt, Dubuque, IA.
12. Poston, D. L. and Michael, M. (2005): *Handbook of Population*, Springer Heidelberg, Germany.
13. Ross, John A. (ed.) (1982): *International Encyclopaedia of Population*. Free Press, New York.
14. Singh, K.N. and Singh, D.N. (eds.) (1992): *Population Growth, Environment and Development*. EDSC, Varanasi.
15. Srinivasan, K, and Vlassoff, M. (2001): *Population Development Nexus in India: Challenges for the New Millennium*. Tata McGraw Hill, New Delhi.
16. Trewartha, G.T. (1985): *A Geography of Population. World Patterns*. John Wiley and Sons, New York.
17. Woods, R. (1979): *Population Analysis in Geography*. Longman, London.
18. Zelinsky, W., Kosinski, L. A. and Prothero M. R. (eds.) (1970): *Geography and a Crowding World*. Oxford University Press, New York and Oxford.
19. 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**

1. Adam, M.G.(2000a): *Kumasi Natural Resources Management, Final Technical Report*, Natural Resources Institute, University of Greenwich-UK
2. Adams, W. M. (1990): *Green Development: Environment and Sustainability in the Third World*. Routledge and Chapman Hall, London.

3. 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.
4. Burton, I. and Kates, R.W. (1978): Readings in Resource Management and Conservation. McGraw Hills, New York.
5. Corbridge, S., (ed.) (1995): Development Studies: A Reader. Arnold, London.
6. Ehrlich, P.R., Ehrlich, R.H. and Holdren, J.P. (1998): Ecoscience: Population, Resources and Development. 2<sup>nd</sup> ed. Freeman and Company, San Francisco.
7. Frayer, D.W., (1965): World Economic Development. McGraw Hill, New York.
8. Freeman, T.W. (1972): Geography and Planning. Freeman and Company, New York.
9. Gupta, P., and Sdasyuk, G. (1968): Economic Regionalization of India: Problems and Prospects. Census of India, New Delhi
10. Holechek, J. L., Cole, R., Fisher, J., and Valdez, R. (2000): Natural Resources: Ecology, Economics and Policy. Prentice-Hall, New Jersey..
11. Mitchell, B. (1979): Geography and Resource Analysis. Longman, London
12. Mitchell, B. (1997): Geography and Environmental Management. Longman, Harlow and London.
13. Mitra, A. (1999): Resource Studies; Shridhar Publications., Calcutta.
14. Prasad, H. et al.(eds.) (2005): Sustainable Management of Water Resources, Tara Book Agency, Varanasi
15. Preston, P. W. (1996): Development Theory: An Introduction. Blackwell Publications, Oxford.
16. Rao, P. K. (2001): Sustainable Development: Economics and Policy. Blackwell Publications., Oxford.
17. Raza, M. (ed.) (1989): Renewable Resources for Regional Development: The Indian and the Soviet Experience. Concept Publishing Company, New Delhi.
18. Rees, J. (1985): Natural Resources: Allocation, Economics and Policy. Methuen and Company Ltd., London.
19. Reid, S. (2000): Global Environmental Outlook. Earthscan, London.
20. Reid, S. (1995): Sustainable Development. Earthscan, London.
21. Simon, D. and Nārman, A. (eds.) (1999): Development Theory and Practice. Longman.
22. Simon, D. (ed.) (2005): Fifty Key Thinkers on Development. Routledge, London.
23. Singh, M. B. et. al. (eds.) (2005): Sustainable Management of Natural Resources. Tara Book Agency, Varanasi.
24. Sundaram, K.V., (1983): Geography of Under Development. Concept Publishing Company, New Delhi.
25. Sundaram, K.V.; Mani, M. and Jha, M.M. (eds.) (2004): Natural Resource Management and Livelihood Security. Concept Publishing Company, New Delhi.
26. Thakur, B., (ed.) (2003): Perspectives in Resource Management in Developing Countries. Vol. I: Resource Management: Theory and Techniques, Concept Publishing Company, New Delhi.
27. 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.
28. UNDP (2001-04): UNDEP Human Development Report. Oxford University Press.
29. 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, NewYork.

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 co-ordinates 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**

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

21. Thrower, N. (1996): Maps and Civilisation. Cartography, Culture and Society. University of Chicago Press, Chicago.
22. Unwin, D. (1982): Introductory Spatial Analysis. Methuen and Company Ltd., London.
23. 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 Isopleth; Scatter diagram; Life table calculation; Computation of HDI for India; Migration by Flow diagram; Centrographic 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**

1. Campbell, J. B. (2002): Introduction to Remote Sensing. 5<sup>th</sup> edition. Taylor and Francis, London.
2. Cracknell, A and Hayes, L. (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. Guham, P. K. (2003): Remote Sensing for Beginners. Affiliated East-West Press Private Ltd., New Delhi.
7. Hallert, B. (1960): Photogrammetry, McGraw Hill Book Company Inc., New York
8. Harry, C.A. (ed.) (1978): Digital Image Processing, IEEE Computer Society, California
9. Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data, Academic Press, New York.
10. Leuder, D.R. (1959): Aerial Photographic Interpretation: Principles and Application. McGraw Hill, New York.
11. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4<sup>th</sup> edition. John Wiley and Sons, New York.
12. Nag, P. (ed.) 1992: Thematic Cartography and Remote Sensing, Concept Publishing. Company, New Delhi.
13. Reeves, R.G. (ed.) (1983): Manual of Remote Sensing, Vols. 1 and 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
14. Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology, John Wiley and Sons, New York.
15. Silver, M. and Balmori, D. (eds.) (2003): Mapping in an Age of Digital Media. Wiley-Academy, New York and Chichester.
16. Spurr, R. (1960): Photogrammetry and Photo Interpretation, The Roland Press Company, London.
17. Survey of India, (1973): Photogrammetry, Survey of India, Dehradun.
18. 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**

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**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**

1. Bonham, Carter G.F. (1995): Information Systems for Geoscientists – Modelling with GIS. Pergamon, Oxford.
2. Burrough, P.A. and McDonnell, R. (1998): Principles of Geographic Information Systems. Oxford University Press, Oxford.
3. Chang, K.T. (2003): Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
4. Chauniyal, D. D. (2004): Remote Sensing and Geographic Information Systems. (in Hindi). Sharda Pustak Bhawan, Allahabad.
5. Demers, M. N. (2000): Fundamentals of Geographic Information Systems. John Wiley and Sons, Singapore.
6. ESRI (1993): Understanding GIS. Redlands, USA
7. Fraser Taylor, D.R. (1991): Geographic Information Systems. Pergamon Press, Oxford.
8. George, J. (2003): Fundamentals of Remote Sensing. Universities Press Private Ltd, Hyderabad.
9. Girard, M. C. and Girard, C. M. (2003): Processing of Remote Sensing Data. Oxford and IBH, New Delhi.
10. Glen, E. M. and Harold, C. S. (1993): GIS Data Conversion Handbook. Fort Collins, Colorado, GIS Word Inc.
11. Goodchild, M.F.; Park, B. O. and Steyaert, L. T. (eds.) (1993): Environmental Modelling with GIS. Oxford University Press, Oxford.
12. Guptill, S.C., and Morrison, J.L. (1995): Elements of Spatial Data Quality. Elsevier/ Pergamon, Oxford.
13. Heywood, I. (2003): An Introduction to Geographical Information Systems. 2<sup>nd</sup> edition, Pearson Publishing Company, Singapore.
14. Korte, G. M. (2002): The GIS Book. On Word Press: Thomson Learning, New York and Singapore.



15. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
16. Longley, P. and Batty, M. (eds.) (1996): Spatial Analysis: Modelling in a GIS Environment. GeoInformation International, Cambridge.
17. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley and Sons, New York.
18. 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.
19. Martin, D. (1996): Geographic Information Systems: Socioeconomic Implications. Routledge, London.
20. Michael F. G. and Karan K. K. (ed.) (1990): Introduction to GIS. NCGIA, Santa Barbara, California.
21. Ralston, B. A. (2002): Developing GIS Solutions with Map Objects and Visual Basic. OnWord Press: Thompson Learning, New York and Singapore.
22. Reddy, M. A. (2001): Textbook of Remote Sensing and Geographic Information Systems. B. S. Publications., Hyderabad.
23. Ripple, W. J. (ed.) (1989): Fundamentals of Geographic Information Systems: A Compendium. ASPRS/ ACSM, Falls Church.
24. Siddiqui, M.A. (2005): Introduction to Geographical Information Systems, Sharda Pustak Bhawan, Allahabad.
25. Star, J. and Estes, J. (1990): Geographic Information Systems – An Introduction. Prentice-Hall, Englewood Cliffs, New Jersey.
26. 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**

1. Anjuneyulu, Y. (2002): Environmental Impact Assessment Methodologies. B. S. Publications, Hyderabad.

2. Anjuneyulu, Y. (2004): Introduction to Environmental Science. B. S. Publications, Hyderabad.
3. Athavale, R. N. (2003): Water Harvesting and Sustainable Supply in India. Rawat Publications., Jaipur.
4. Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing. Company, New Delhi.
5. Blaikie, P., Cannon, T. and Davis, I. (eds.) (2004): At Risk: Natural Hazards, Peoples Vulnerability and Disasters. Routledge, London.
6. Clarke, J. I., Curson, P., Kayastha S. L. and Nag P. (eds.) (1991): Population and Disaster. Basil Blackwell, USA
7. Gautam, A. (2007): Environmental Geography, Sharda Pustak Bhawan, Allahabad
8. Huggett, R. J. (1998): Fundamental of Biogeography. Routledge, London.
9. Kayastha, S.L. and Kumra V.K. (1986): Environmental Studies. Tara Book Agency, Varanasi.
10. Khoshoo, T. N. (1981): Environmental Concerns and Strategies. Ashish Publishing House, New Delhi
11. Kumra, V.K. (1982): Kanpur City. A Study in Environmental Pollution. Tara Book Agency, Varanasi.
12. Mathur, H. S. (2003): Essentials of Biogeography. Pointer Publication, Jaipur.
13. 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.
14. Odum, E.P. (1975): Ecology. Rowman and Littlefield, Lanham USA.
15. Rajagopalan, R. (2005): Environmental Studies: From Crisis to Cure, Oxford University Press, New Delhi.
16. Reddy, M. A. (2004): Geoinformatics for Environmental Management. B. S. Publishers., Hyderabad.
17. Saxena, K.K. (2004): Environmental Studies. University Book House Private Ltd., Jaipur
18. Saxena, H. M. (1999): Environmental Geography. Rawat Publications., Jaipur and New Delhi.
19. Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.
20. Singh, A.K., Kumra, V.K. and Singh, J. (1986): Forest Resource, Economy and Environment. Concept Publishing. Company, New Delhi.
21. Singh, D.N., Singh, J. and Raju, K.N.P. (eds.) (2003): Water Crisis and Sustainable Management, Tara Book Agency, Varanasi
22. Singh, J. (2001): *Paryavaran Evam Samvikas*. Gyanodaya Prakashan, Gorakhpur.
23. Singh, O., Nag P., Kumra V.K. and Singh J. (eds.) (1993): Frontier in Environmental Geography. Concept Publishing Company, New Delhi.
24. Singh, O., Kumra V.K. and Singh J. (1988): India's Urban Environment. Pollution, Perception and Management. Tara Book Agency, Varanasi.
25. Singh, R. B. (ed.) (1990): Environmental Geography. Heritage Publication, New Delhi.
26. Singh, R. B. (ed.) (1995): Studies in Environment and Development. Rakesh Prakashan, Varanasi.
27. Singh, Rana P.B. (ed.) (1993): Environmental Ethics: Discourses and Cultural Traditions. National Geographical Society of India, BHU, Varanasi.
28. Singh, S. (2006): Environmental Geography. Prayag Pustak Bhawan, Allahabad.
29. Singh, S. (2007): *Paryavaran Bhugol*. Prayag Pustak Bhawan, Allahabad.
30. Singh, S. N. (1993): Elements of Environmental Geography and Ecology in Hindi, Tara Book Agency, Varanasi
31. 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**

1. Daniel, P. (2002): Geography of Settlement. Rawat Publications., Jaipur and New Delhi.
2. Eidt, R. C., Singh, K. N. and Singh, Rana, P.B., (eds.) (1977): Man, Culture and Settlement. Kalyani Publishers., New Delhi.
3. Ghosh, S. (1999): A Geography of Settlements. Orient Longman, Kolkata.
4. Hudson, F. S. (1976): A Geography of Settlements. MacDonald and Evans, New York.
5. Mitra, A. (1960): Report on House Types and Village Settlement Patterns in India. Publication Division, Govt. of India, New Delhi.
6. Mosley, M.J. (2005): Rural Development: Principles and Practice. Sage Publication, London.
7. Oliver, P. (1987): Dwellings. The House across the World. University of Texas Press, Austin.
8. Rapoport, A. (1969): House, Form and Culture. Prentice-Hall, Inc., Englewood Cliffs, NJ.
9. Rykwert, J. (ed.) (2004): Settlements. University of Pennsylvania Press, University Park, USA.
10. Singh, R.L. (eds.) (1973): Rural Settlements in Monsoon Asia, National Geographical Society of India, Varanasi.
11. Singh, R. L., Singh, K.N. and Singh, Rana P.B., (eds.) (1975): Readings in Rural Settlement Geography, National Geographical Society of India, Varanasi.
12. 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.
13. Singh, R.L. and Singh, Rana P.B., (eds.) (1979): Place of Small Towns in India. National Geographical Society of India, Varanasi,
14. Singh, R.L., Singh, K.N and Singh Rana P.B., (eds.) (1976): Geographic Dimensions of Rural Settlements. National Geographical Society of India, Varanasi,
15. Singh, Rana P.B. (1977): Clan Settlements in the Saran Plain, National Geographical Society of India, Varanasi,
16. Singh, Rana P.B. and Singh, R.B. (1981): Changing Frontiers of Indian Village Ecology. National Geographical Society of India, Varanasi, Pub. 27.
17. Singh, R.Y. (2005): Geography of Settlements. Rawat Publications, Jaipur and New Delhi.
18. Singh, S.B. (1977): Rural Settlement Geography. U.B.B.P., Publications, Gorakhpur.
19. Tiwari, R. C. (2000): Settlement Geography; in Hindi. Prayag Pustak Bhawan Allahabad.

20. Wanmali, S. (1983): Service Centres in Rural India. B.R. Publications Corporation, New Delhi.
21. 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 21<sup>st</sup> century.

**Books Recommended**

1. Chandna, R. C. (2000): Regional Planning: A Comprehensive Text. Kalyani Publishers., New Delhi.
2. Chaudhuri, J. R. (2001): An Introduction to Development and Regional Planning with special reference to India. Orient Longman, Hyderabad.
3. Cowen, M.P. and Shenton, R.W. (1996): Doctrines of Development. Routledge, London.
4. Doyle, T. and McEachern, D. (1998): Environment and Politics. Routledge, London.
5. Friedmann, J. (1992): Empowerment: The Politics of Alternative Development. Blackwell, Cambridge MA and Oxford.
6. Friedmann, J. and Alonso, W. (ed.) (1973): Regional Development and Planning. The MIT Press, Mass.
7. Hettne, B.; Inotai, A. and Sunkel, O. (eds.) (1999 – 2000): Studies in the New Regionalism. Vol. I-V. Macmillan Press, London.
8. Isard, W. (1960): Methods of Regional Analysis. MIT Press, Cambridge, MA.
9. Kuklinski, A. R. (1972): Growth Poles and Growth Centres in Regional Planning. Mouton and Co., Paris.
10. Kuklinski, A.R. (ed.) (1975): Regional Development and Planning: International Perspective, Sijthoff-Leydor.
11. Leys, C. (1996): The Rise and Fall of Development Theory. Indian University Press, Bloomington, and James Curry, Oxford.
12. 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.
13. Kane, M. and William M.K.T.(2007): Concept Mapping for Planning and Evaluation, Sage Publications, London.
14. Misra, R. P. (ed.) (1992): Regional Planning: Concepts, Techniques, Policies and Case Studies. 2<sup>nd</sup> edition. Concept Publishing Company., New Delhi.

15. Misra, R.P. and Natraj, V.K. (1978): Regional Planning and National Development. Vikas, New Delhi.
16. Misra, R.P., Sundaram, K. V. Pradasa Rao, V. L. S. (1976): Regional Development Planning in India. Vikas Publishers, New Delhi.
17. Moseley, M.J., (1974): Growth Centres in Spatial Planning. Pergamon Press, Oxford.
18. 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.
19. Norgaard, R. B. (1994): Development Betrayed. The End of Progress and a Coevolutionary Revisioning of the Future. Routledge, London.
20. Pathak, C. R. (2003): Spatial Structure and Processes of Development in India. Regional Science Association., Kolkata.
21. Sanyal, B. M. (2001): Decentralised Planning: Themes and Issues. Concept Publishing. Company, New Delhi.
22. 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.
23. Sen, A. (1999): Development as Freedom. Oxford University Press, Oxford.
24. Sen, A. and Dreze, J. (eds.) (1996): Indian Development: Selected Regional Perspectives. Oxford University Press, Oxford.
25. Smith, D. and Närman, A. (eds.) (1999): Development Theory and Practice: Current Perspectives on Development and Development Co-operation. Longman, London.
26. 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.
27. Sundaram, K. V. (1997): Decentralized Multilevel Planning: Principles and Practice (Asian and African Experiences). Concept Publishing Company, New Delhi.
28. Sundaram, K. V. (2004): The Trodden Path: Essays on Regional and Micro Level Planning. Anaunya Publications., New Delhi.
29. Toye, J. (1987): Dilemmas of Development. Reflections on the Counterrevolution in Development Theory and Policy. Basil Blackwell, Oxford.
30. Verhelst, T. (1990): No Life Without Roots – Culture and Development. Zed Books, London.
31. 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/](http://www.worldbank.org/poverty/wdrpoverty/)
32. World Bank (2000): Entering the 21<sup>st</sup> Century. World Development Report. The World Bank and Oxford University Press, New York and Oxford.
33. 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. 4<sup>th</sup> 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**

1. Champion, T. (ed.) (1993): Population Matters. Paul Chapman, London.
2. Ehrlich, P.R. and Ehrlich, A.H. (1996): Ecoscience: Population, Resources, Environment. 6<sup>th</sup>

- edition, W.H. Freeman and Company, San Francisco.
3. Firor, J. and Jacobsen, J. E. (2003): The Crowded Greenhouse: Population, Climatic Change and Creating a Sustainable World. Universities Press (India) Private. Ltd., Hyderabad.
  4. Haggett, P. (2001): Geography, A Modern Synthesis. 5<sup>th</sup> edition, Harper and Row, New York.
  5. Hammett, C. (eds.) (1996): Social Geography: A Reader. Arnold, London.
  6. 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.
  7. 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.
  8. Mesarovic, M. and Pester, E. (1974): Mankind at the Turning Point. II Report of the Club of Rome. The New American Library, New York.
  9. Middleton, N. and O'Keefe, P. (2001): Redefining Sustainable Development. Pluto Press, London.
  10. Ross, J. A. (ed.) (1982): International Encyclopaedia of Population. Free Press, New York.
  11. Sharma, P. R. (ed.) (1991): Perspectives on the Third World Development. Rishi Publications., Varanasi.
  12. Sharma, P. R. (ed.) (1994): Regional Policies and Development in the Third World. Rishi Publications, Varanasi.
  13. Simon, J. L. (1977): The Economics of Population Growth. Princeton University. Press, Princeton.
  14. Thakur, B. (ed.) (2004): Population, Resources and Development. Vol. II, Perspectives in Resource Management in Developing Countries. Concept Publishing. Company, New Delhi.
  15. Tinbergen, J. (1976): RIO. Reshaping the International Order. III Report of the Club of Rome. The New American Library, New York.
  16. 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**

1. Ahuja, R. (2001): Research Methods, Rawat Publications, Jaipur and New Delhi.
2. Bhattacharyya, D. K. (2005): Research Methodology, Excel Books, New Delhi
3. Blackburn, J. and Holland, J. (eds.) (1998): Who Changes? Institutionalising Participation in Development. IT Publications, London.
4. Blaxter, L.; Hughes, C. and Tight, M. (1996): How to Research. Open University Press, Buckingham.
5. Crang, Mike 1999. Cultural Geography. Routledge, London.
6. Daniels, P., Bradshaw, M., et al. (2000): Human Geography: Issues for the 21st Century. Prentice Hall, London, and Pearson Publishers., Singapore. Indian reprint, 2003.
7. Denzin, N. K. and Lincoln, Y.S., (eds.) (2000): Handbook of Qualitative Research. Thousand Oaks CA. Sage Publications.
8. Dikshit, R. D. (2003): The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
9. Dorling, D. and Simpson, L. (eds.) (1999): Statistics in Society. Edward Arnold, London.
10. Fisher, P. and Unwin, D., (eds.) (2002): Virtual Reality in Geography. Taylor and Francis, London.
11. Flowerdew, R. and Martin, D. (eds.) (1997): Methods in Human Geography. A Guide for Students Doing a Research Project. Longman, Harlow.
12. Hay, I. (ed.) (2000): Qualitative Research Methods in Human Geography. Oxford University Press, New York.
13. Henn, M., Mark W., and Nick F. (2006): A Short Introduction to Social Research, Vistaar Publications, New Delhi
14. Eyles J. and Smith D. M. (1988): Qualitative Methods in Human Geography, Polity Press, Dales Breweing Cambridge.
15. Kitchin, R. and Tate, N., (2001): Conducting Research into Human Geography. Theory, Methodology and Practice. Prentice-Hall, London.
16. Kitchin, R. and Fuller, D., (2003): The Academic's Guide to Publishing, Vistaar Publications, New Delhi
17. Limb, M. (2001): Qualitative Methodologies for Geographers. Issue and Debates. Edward Arnold, London.
18. Lofland, J. and Lofland, L.H. (1995): Analysing Social Setting. A Guide to Qualitative Observation and Analysis. Wadsworth, Belmont, CA.
19. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley and Sons, New York.
20. 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.
21. Mikkelsen, B. (2005): Methods for Development Work and Research: A New Guide for Practitioners. Sage Publications, London.
22. Mukherjee, N. (1993): Participatory Rural Appraisal: Methodology and Application. Concept Publishing Company, New Delhi.
23. Mukherjee, N. (2002): Participatory Learning and Action: with 100 Field Methods. Concept Publishing Company, New Delhi.
24. O' Leary, Z. (2005): The Essential Guide in Doing Research, Vistaar Publications, New Delhi
25. Pacione, M., (ed.) (1999): Applied Geography: Principle and Practice. Routledge, London.
26. Parsons, T. and Knight, P. G., (1995): How to Do Your Dissertation in Geography and Related Disciplines. Chapman and Hall, London.
27. Patrick M. and Chapman S. (1990): Research Methods(Third Edition), Routledge, London

28. Peet, R. and Thrift, N. (ed.) (1989/ 2002): *New Models in Geography* (2 vols.). Rawat Publishers., Jaipur and New Delhi.
29. Rachel, P. et al. (2001): *Introducing Social Geographies*. Arnold Hodder Group, London, and Oxford University Press, Oxford.
30. Robson, C. (1993): *Real World Research. A Resource for Social Scientists and Practitioners-Researchers*. Blackwell Publishers, Oxford.
31. Rogers, A. and Viles, H. A. (2003): *The Student's Companion to Geography*. Blackwell Publishers, Oxford. Indian reprint available.
32. Sheskin, Ira, M. (1987): *Survey Research for Geographers*, Scientific Publishers, Jodhpur.
33. Silverman, D. (1993): *Interpreting Qualitative Data. Methods for Analysing Talk, Text and Interaction*. Sage Publications, London.
34. Singh, R. L. and Singh, Rana P.B. (1993): *Elements of Practical Geography*. Kalyani Publishers, Ludhiana and New Delhi. (English and Hindi editions).
35. 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.
36. Turkle, S. (1996): *Life on the Screen: Identity in the Age of Internet*. Weidenfeld and Nicolson, London.
37. Wolcott, H. (1995): *The Art of Fieldwork*. AltaMira Press, Walnut Creek, CA.
38. Wright, D.B. (1997): *Understanding Statistics. An Introduction for the Social Sciences*. Sage Publications, London.
39. 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**

**Banaras Hindu University**  
**Department of Geography**  
**Course work for Ph.D. in Geography**

**I Semester**

**A. (ScP). Common Course (given at Faculty level) ..... 3 credits**

**ScP-01.** Ethics, Concept and significance of research

**ScP-02.** Methods of Research & Good Laboratory Practices

**ScP-03.** Science Communication

**B. Department Specific Course: ..... 7 credits (4+3)**

**GRP-101. Theory: I. Research Strategy & Orientation in Geography..... 4 credits**  
*(details given in the sequence)*

**GRP-301. Practical: I ..... 3 credits**

- i. Application and relevance of statistical and cartographic techniques;
- ii. Application of computer, remote sensing, GIS and GPS; and
- iii. Framing Pilot/ research project; use of writing manuals

**II Semester**

**C. Research theme specific course ..... 10 credits (3+3+4)**

Each research scholar keeping in view of research topic will undergo any two of the following courses and project writing as identified by RPC under the following broad schemes:

**GRP- 201 to 215. Theory: II and III (OPTIONAL) ..... 6 credits (3 + 3)**

From the Optional Papers (201 to 215), student can opt any **TWO** papers (*see details*).

**GRP-302. Field Survey and Analysis ..... 2 credits**

- i. Introduction of research problems, objectives and research methodology.
- ii. Critical review of the thematic literatures.
- iii. Data collection and generation (indices, indicators); Field survey (sampling, design, representation, selection, overview); Analysis and interpretation of data and maps.

**GRP-303. Practical II:** Preparation of thematic appraisal of research paper and its presentation (Seminar); Preparation of **Synopsis** (Objectives; Methodology and approaches, Appraisal of the thematic and recent literature; Hypotheses/ theoretical framework; Specific Remarks about the theme: Details and sequence of the Chapters (chapterisation); and References in detail)

..... **2 credits**

**GRP: Course work for Ph.D. in Geography**  
**I Semester**  
**Core (compulsory paper), Theory**  
**GRP-101. Research Strategy & Orientation in Geography**

CREDITS : 4  
 Number of Lectures : 48

**UNIT I**

**Planning research.** Data sources: collection and generation; Primary data and Secondary data; Data collection and arrangement; Collection of data: methods, sources and types; Data processing; Characteristics and component of a computer system.

**UNIT II**

**Research design.** Participatory research; Sampling: methods, techniques and procedures; Making and designing of sSurvey-questionnaire; Variable and indices: selection, identification and application.

**UNIT III**

**Data interpretation.** Production and arrangement of data; Classification and tabulation of data; Analysis of data and maps; Model making.

**UNIT IV**

**Theoretical Construction.** Appraisal of System theory; Quantitative and Qualitative interpretations; Framing pilot/ research project; Application and relevance of statistical and cartographic techniques.

**Suggested Readings**

1. Ahuja, Ram 2001. *Research Methods*. Rawat Publications, Jaipur and New Delhi.
2. Bolton, T. and Newbury, P.A. 1968. *Geography through Fieldwork*. Blandford Press, London.
3. Denzin, N. K. and Lincoln, Y.S. (eds.) 2000. *Handbook of Qualitative Research*. Sage Publ., Thousand Oaks CA.
4. Flowerdew, R. and Martin, D. (eds.) 1997. *Methods in Human Geography. A Guide for Students Doing a Research Project*. Longman, Harlow.
5. Hay, Iain (ed.) 2004. *Communicating in Geography and the Environmental Sciences*. Oxford University Press, Melbourne. 2<sup>nd</sup> Ed.
6. Hay, Iain (ed.) 2005. *Qualitative Research Methods in Human Geography*. Oxford University Press, Melbourne. 2<sup>nd</sup> Ed.
7. Kitchen, Rob and Fuller, Duncan 2005. *The Academic's Guide to Publishing*. Vistaar Pubs. (Sage), New Delhi.
8. Kitchen, Rob and Tate, Nicholas J. 2009. *Conducting Research into Human Geography: Theory, Methodology & Practice*. Prentice Hall-Pearson, Harlow U.K. 2<sup>nd</sup> Ed.
9. Knight, Peter G. and Parsons, Tony 2003. *How to do your Essays Exams & Coursework in Geography and Related Disciplines*. Nelson Thornes, Cheltenham U.K.
10. Lee, Roger Smith, David M. (eds.) 2004. *Geographies and Moralities: International Perspectives on Development, Justice and Place*. Wiley-Blackwell, Oxford.
11. Limb, Mclanie 2001. *Qualitative Methodologies for Geographers. Issue and Debates*. Arnold, London.
12. Lofland, J. and Lofland, L.H. 1995. *Analysing Social Setting. A Guide to Qualitative Observation and Analysis*. Wadsworth, Belmont, CA.



13. Lousenbury, J. F. and Aldrich, F.T. 1986. *Introduction to Geographic Field Methods and Techniques*. Charles E. Merrill Publishing. Company, Colombus.
14. Mikkelsen, B. 1995. *Methods for Development Work and Research: A Guide for Practitioners*. Sage, London.
15. Mukherjee, Neela 2002. *Participatory Learning and Action: with 100 Field Methods*. Concept Publs. Co., New Delhi.
16. O'Leary, Zina 2004. *The Essential Guide to Doing Research*. The Vistaar Publ., New Delhi.
17. Parsons, Tony and Knight, Peter G. 2005. *How to do your Dissertation in Geography and Related Disciplines*. Routledge, London. 2<sup>nd</sup> Ed.
18. Singh, R.L. and Singh, Rana P.B. 1993. *Elements of Practical Geography*. Kalyani Publishers, Ludhiana and New Delhi. (English and Hindi editions; several editions).
19. Singh, Rana P.B. 2009. *Uprooting Geographic Thought in India: Toward Ecology and Culture in 21<sup>st</sup> Century*. Planet Earth & Cultural Understanding Series Pub. 1. Cambridge Scholars Publishing, Newcastle upon Tyne U.K.
20. Singh, Rana P.B. 2009. *Geographical Thoughts in India: Snapshots and Vision for the 21<sup>st</sup> Century*. Planet Earth & Cultural Understanding Series Pub. 2. Cambridge Scholars Publishing, Newcastle upon Tyne U.K.
21. Singh, Rana P.B. and Singh, R.B. 1981. *Changing Frontiers of Indian Village Ecology*. National Geographical Society of India, Varanasi, Pub. 27.
22. Stoddard, Robert H. 1982. *Field Techniques and Research Methods in Geography*. Kendall/Hunt Pub. Dubuque IO.

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**Course work for Ph.D. in Geography**  
**II Semester**

**List of Optional Theory Papers (201 to 215):**  
**ONLY TWO** to be opted by the student.

| <i>Course Code</i> | <i>Name of the Optional Paper, II Semester [details given below]</i><br><i>Each one (3 credits) of the papers is divided into Three Units</i> |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| GRP-201            | Advances in Geomorphology                                                                                                                     |
| GRP-202            | Applied Hydrology                                                                                                                             |
| GRP-203            | Environmental Problems and Strategic Management                                                                                               |
| GRP-204            | Remote Sensing & GIS as tools in Geographical Research                                                                                        |
| GRP-205            | Population Dynamics and Family Welfare Programmes                                                                                             |
| GRP-206            | Geography of Human Resource Development                                                                                                       |
| GRP-207            | Health, Space and Ecology                                                                                                                     |
| GRP-208            | Rural Geography: Theory and Practice                                                                                                          |
| GRP-209            | Urban Studies                                                                                                                                 |
| GRP-210            | Peri-Urban Interface and its Dynamics                                                                                                         |
| GRP-211            | Regional Development and Globalisation                                                                                                        |
| GRP-212            | Geography of Tourism and Heritage                                                                                                             |
| GRP-213            | Industrialization and Regional Development                                                                                                    |
| GRP-214            | Applied Climatology                                                                                                                           |
| GRP-215            | Agricultural Geography and Rural Development                                                                                                  |

## **II Semester (optional), Theory**

### **GRP-201. Advances in Geomorphology**

CREDITS : 3

Number of Lectures : 36

**Unit I**

A critical analysis of fundamental concepts; Concept of Dynamic Equilibrium versus Davis' and Penck's concepts; Time, Space and Causality in Geomorphology; Recent Trends in Geomorphology

**Unit II**

Climatic Geomorphology; Environmental Geomorphology; Mapping Techniques in Geomorphology; Systems in Geomorphology; Models in Geomorphology

**Unit III**

Geomorphology and Economic Deposits; Geomorphology in Ground water studies; Geomorphology in Soil Studies and Mapping; Geomorphology in Engineering Construction; Alluvial Fans and Flood Plains—their morphology, materials and Processes.

**Suggested Readings**

1. Ahmed, E. 1985. *Geomorphology*. Kalyani Publishers, New Delhi.
2. Allison, Robert J. (ed.) 2002. *Applied Geomorphology: Theory and Practice*. John Wiley, Chichester UK.
3. Bloom, A. L. 1998/ 2001. *Geomorphology*. 3<sup>rd</sup> edition. Prentice Hall of India, New Delhi.
4. Chorley, R.J., Schumm, S. A. and Sugden, D. E. 1984. *Geomorphology*. Methuen and Company Ltd., London.
5. Fairbridge, R.W. (ed.) 1968. *Encyclopaedia of Geomorphology*. Reinhold Book Corporation., New York
6. Goudie, Andrew (ed.) 2004. *Encyclopedia of Geomorphology*. Volume 2. Routledge, London.
7. Gregory, K.J. and Walling, D.E. 1973. *Drainage Basin Form and Process*. Edward Arnold, London.
8. Jog, S. R. (ed.) 1995. *Indian Geomorphology* (2 vols.). Rawat Publications, Jaipur
9. Kale, V. and Gupta, A. 2001. *Introduction to Geomorphology*. Orient Longman, Hyderabad.
10. King, C.A.M. 1966. *Techniques in Geomorphology*. Edward Arnold, London.
11. Kondolf, G. Mathias and Piégay, Hervé (eds.) 2003. *Tools in Fluvial Geomorphology*. John Wiley, Chichester UK.
12. Marchetti, Mauro and Rivas, Victoria (eds.) 2001. *Geomorphology and Environmental Impact Assessment*. Swets & Zeitlinger, the Netherlands.
13. Pethick, J. 1984. *An Introduction to Coastal Geomorphology*. Arnold, London. Indian reprint 2000.
14. Sparks, B.W. 1986. *Geomorphology*. Longmans, London.
15. Thornbury, W.D. 2005. *Principles of Geomorphology*. John Wiley, New York. Rev. Ed.
16. Wooldridge, S.W. and Morgan, R.S. 1959. *The Physical Basis of Geography: An Outline of Geomorphology*. Longman, London.

## **II Semester (optional), Theory**

### **GRP-202. Applied Hydrology**

CREDITS : 3

Number of Lectures : 36

**Unit I**

Hydrology as emerging discipline of earth science, hydrological cycle, man's intervention in hydrological cycle, major components of hydrological cycle: precipitation, evapotranspiration, infiltration, surface and ground water runoff.

**Unit II**

Hydrograph: components and separation, unit hydrograph, estimation of evapotranspiration, river basin/water shed as planning unit for integrated water resource development and management, conservation of water resources.

### Unit III

Water crisis in India, water resource management in India with special reference to irrigation for food security, problems associated with water: droughts and floods in India, water balance graph and its application with special reference to seasonal crop management.

### Suggested Readings

1. Bedient, Philip B. and Huber, Wayne Charles 2002. *Hydrology and Floodplain Analysis*. Prentice Hall, Englewood Cliffs NJ.
2. Bilas, Ram 1988. *Rural Water Resource Utilization and Planning*. Concept Publishing Company, New Delhi.
3. Chorley, R. J. 1995. *Atmosphere, Weather and Climate*. Methuen and Company Ltd. and Company Ltd., London.
4. Chow, Ven Te (ed.) 1964. *Handbook of Applied Hydrology: A Compendium of Water Resources Technology*. McGraw Hill, New York.
5. Chow, Ven Te; Maidment, David R. and Mays, Larry W. 1988. *Applied Hydrology*. McGraw-Hill, New York.
6. Fetter, C. W. 2001. *Applied Hydrogeology*. Pearson Education, San Francisco.
7. Krešić, Neven 2008. *Groundwater Resources: Sustainability, Management, and Restoration*. McGraw Hill Professional, New York.
8. Poehls, D. J. and Smith, Gregory John 2009. *Encyclopedic Dictionary of Hydrogeology*. Academic Press, New York.
9. Rai, Vinay K. 1993. *Water Resource Planning and Development*. Deep and Deep Publication, New Delhi
10. Reddy, J. P. 1988. *A Textbook of Hydrology*. Laxmi Publication., New Delhi. 4<sup>th</sup> edition.
11. Schwartz, Franklin W. and Zhang, Hubao 2003. *Fundamentals of Ground Water*. Wiley Science, Chichester UK.
12. Singh, M. B. 1999. *Climatology and Hydrology*. Tara Book Agency, Varanasi. (In Hindi).
13. Ward, R.C. and Robinson, M. 2000. *Principles of Hydrology*. McGraw Hill, New York.

## II Semester (optional), Theory

### GRP-203. Environmental Problems and Strategic Management

CREDITS : 3

Number of Lectures : 36

#### Unit I

**Introduction:** Meaning and Concept of Environment, Pollution, Types of Pollution and Environmental Degradation; Environmental Quality Indices: Air, Water, Soil, Noise and Solid Waste; Environmental Management: Meaning, Concept and Approaches

#### Unit II

**Environmental Problems:** Environmental Problems at Global, National and Regional level: Air Pollution and Global Climatic Change, Water Pollution and its Crisis, Land Degradation and Biodiversity, Natural Hazard and Mapping; Human Response and Attitude towards Environmental Problems; Environmental Quality and Health

#### Unit III

**Environmental Management:** Strategies for Environmental Management, Environmental Monitoring, Environmental Education and People's Participation, Environmental Laws and Role of International Bodies, EIA of Development Schemes: some case studies, National Environmental Policy.

**Suggested Readings**

1. Anjaneyulu, Y. 2002. Environmental Impact Assessment Methodology, B.S Publications, Hyderabad
2. Blodgett, J. 2000. Environmental Protection: New Approaches, CRS Report, National Council for Science and the Environment
3. Commoner, B. 1988. Rapid Population Growth and Environmental Stress in Developing Countries. Proceedings of the United Nations Expert Group meeting, 23-26th August 1988, United Nations, New York.
4. Copeland, C. 2006. Water Quality: Implementing the Clean Water Act, CRS Report, National Council for Science and the Environment
5. Cruz, W. and Gills, C. 1990. Resource Policy Reform in the Context of Population Pressure in D. Chapman (ed.). Arresting Renewable Resource Degradation in the Third World. World Bank Environment Working Paper No. 44. Washington, DC: the World Bank
6. Hardoy, J. E. et al. 1997. Environmental Problems in Third World Cities, Earthscan Publications limited, London
7. Inhaber, H. et. al. 1976. Environmental Indices, A Wiley-Inter Science Publication
8. Jain, R.K. et. al. 1977. Environmental Impact Analysis A New Dimension in Decision making, Van Nostrand Reinhold Company, New York
9. Khoshoo, T. N. 1981. Environmental Concerns and Strategies, Ashish Publishing House, New Delhi
10. Kumra, V.K. 1982. Kanpur City: A Study in Environmental Pollution, Tara Book Agency, Varanasi
11. Lohani, Bindu N. 1984. Environmental Quality Management, South Asian Publisher, New Delhi
12. Manners Ian R. and Mikesell Marvin W. 1974. Perspectives on Environment, edited by Association of American Geographers
13. Nag, P., Kumra, V.K. and Singh, J. 1997. Geography and Environment: National, Regional and Local Issues (3 Volumes), Concept Publishing Company, New Delhi
14. Singh, D.N., Singh, J., and Raju, K.N.P. ed. 2003. Water Crisis and Sustainable Management, Tara Book Agency, Varanasi.
15. Singh, M.B. et. al. (ed.) 2005. Sustainable Management of Natural Resources ( Land, Water and Forest), Tara Book Agency, Varanasi
16. Singh, O. ; Kumra, V.K. and Singh, J. 1993. Frontiers in Environmental Geography, Concept Publishing Company, New Delhi
17. Singh, S.K. et. al. 2010. Strategic Management of Energy, Environment and Disaster for Sustainable Management, Proceedings of the International Conference on Strategic Management of Energy, Environment and Disaster for Sustainable Management, Faculty of Management Studies, BHU, Varanasi, January 11-15 2010.
18. Southgate, D. 1988. The Economics of Land Degradation in the Third World. World Bank Environment Department Working Paper No. 2. Washington, DC: the World Bank.
19. Tolba, M.K. et al. 1992. The World Environment, 1972-1992: Two Decades of Challenges, Chapman and Hall, London

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## **II Semester (optional), Theory**

### **GRP-204. Remote Sensing & GIS as tools in Geographical Research**

CREDITS : 3

Number of Lectures : 36

**Unit I**

Nature of Geographical Data; Conventional methods of geographical data collection vis-à-vis remote sensing and GIS; Some aspects of geodesy of earth and their implications in GIS; Spectra of common natural objects; Mechanism of remote sensing data acquisition.

**Unit II**

Models of geographic data representation in GIS; Spatial Data quality and error analysis; Conceptual and Logical Data Modelling; Some important characteristics of Remote Sensing Data; Nature of image patterns and their interpretation

**Unit III**

DEM and Derivatives; GIS as spatial decision support system; Information extraction procedures from remote sensing data—manual and digital; Application of remote sensing and GIS in Land use, hydro-geomorphological and integrated rural and urban development studies.

**Suggested Readings**

1. Burrough, P.A. and McDonnell, R. 1998. Principles of Geographic Information Systems. Oxford University Press, Oxford.
2. Campell, J. B. 2003. Introduction to Remote Sensing. 4<sup>th</sup> ed. Taylor and Francis, London.
3. Chang, K.T. 2003. Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
4. Chauniyal, D. D. 2004. Remote Sensing and Geographic Information Systems. in Hindi). Sharda Pustak Bhawan, Allahabad.
5. Demers, M. N. 2000. Fundamentals of Geographic Information Systems. John Wiley and Sons, Singapore.
6. Gautam, N.C. and Raghavswamy, V. 2004. Land Use/ Land Cover and Management Practices in India. B.S. Publications., Hyderabad.
7. Girard, M. C. and Girard, C. M. 2003. Processing of Remote Sensing Data. Oxford and IBH, New Delhi.
8. Goodchild, M.F., Park, B. O. and Steyaert, L. T. (eds.) 1993. Environmental Modelling with GIS. Oxford University Press, Oxford.
9. Heywood, I. 2003. An Introduction to Geographical Information Systems. 2<sup>nd</sup> edition, Pearson Publishing Company, Singapore.
10. Jensen, J.R. 1986. Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice-Hall, Englewood Cliffs, New Jersey.
11. Jensen, J.R. 2004. Remote Sensing of the Environment: An Earth Resource Perspective. Prentice-Hall, Englewood Cliffs, New Jersey. Indian reprint available.
12. Lillesand, T.M. and Kiefer, R.W. 2000. Remote Sensing and Image Interpretation. John Wiley and Sons, New York.
13. Lo, C.P. and Yeung, A. K. W. 2002. Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
14. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. 1999. Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley and Sons, New York.
15. 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.
16. Martin, D. 1996. Geographic Information Systems: Socioeconomic Implications. Routledge, London.
17. Reddy, M. A. 2001. Textbook of Remote Sensing and Geographic Information Systems. B. S. Publications., Hyderabad.

18. Reeves, R.G. (ed.) 1983. Manual of Remote Sensing, Vols. 1 and 2. American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
  19. Ripple, W. J. (ed.) 1989. Fundamentals of Geographic Information Systems: A Compendium. ASPRS/ ACSM, Falls Church.
  20. Siddiqui, M.A. 2005. Introduction to Geographical Information Systems, Sharda Pustak Bhawan, Allahabad.
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## II Semester (optional), Theory

### GRP-205. Population Dynamics and Family Welfare Programmes

CREDITS : 3

Number of Lectures : 36

#### Unit I

**Introduction and Conceptualization.** Concept and Components of Population Dynamics; Distribution of Population; Population Growth: Trends and Theories; Mortality Patterns and Trends; HIV/AIDS Pandemic, Fertility: Trend, Patterns and Determinants; Migration: Trends and Patterns; Population and Resource Relationship; World Population: Major Issues for the 21st century.

#### Unit II

**A Case Study of India.** Population Dynamics: Regional Variation and Determinants; Fertility, Mortality and Migration: Trend and Determinant, Urbanization: Challenges and Opportunities; Population Dividend for India; Comparative Analysis of Kerala and U.P.; Family Welfare Programmes in India: A Critical Appraisal; National Population Policy 2000; Comparative Study of Population Policies: India and China.

#### Unit III

**Measures and Indices.** Data Sources, Error & Adjustment; Measures of Population change (arithmetic, geometric and exponential) and distribution (density, population potential, Lorenze curve); Measures of Mortality: Adjusted and Unadjusted and Lifetable); Measures of period and Cohort Fertility, Measures and Models of Migration (indirect estimation of internal migration and Ravenstein's law, Zipf's gravity, Todaro's rural-urban); Population Estimates and Projections.

#### Suggested Readings

1. Behura, Nab Kishore and Mohanty, Ramesh P. 2005. *Family Welfare in India: A Cross-Cultural Study*. Discovery Publs. House, New Delhi.
2. Birdsall, Nancy; Kelley, Allen C. and Sinding, Steven W. (eds.) 2001. *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*. Oxford University Press, Oxford.
3. Cassen, R. (ed.) 1994. *Population and Development: Old Debates, New Conclusions*. Transaction Publishers. New Brunswick and Oxford.
4. Chandra, Shanta Kohli 1987. *Family Planning Programme in India: Its Impact in Rural and Urban Areas*. Mittal Publs., New Delhi.
5. Chu, C.Y. Cyrus 1998. *Population Dynamics: A New Economic Approach*. Oxford University Press, New York.
6. Dyson, Tim (ed.) 1989. *India's Historical Demography: Studies in Famine, Disease and Society*. Curzon Press. London.
7. Dyson, Tim; Cassen, Robert and Visaria, Leela 2005. *Twenty-First Century India: Population, Economy, Human Development, and the Environment*. Oxford University Press, Oxford and New Delhi.

8. Guilмото, Christophe and Rajan, Sebastian I. (eds.) 2005. *Fertility Transition in South India*. Sage, New Delhi and London.
9. Hummel, Diana 2008. *Population Dynamics and Supply Systems: A Transdisciplinary Approach*. Campus Verlag, Frankfurt.
10. Hunter, Lori M. 2000. *The Environmental Implications of Population Dynamics*. Rand Corporation, New York.
11. Kar, Bimal Kumar 2002. *Women Population of North East India: A Study in Gender Geography*. Regency Publications, New Delhi.
12. Macbeth, Helen M. and Collinson, Paul (eds.) 2002. *Human Population Dynamics: Cross-Disciplinary Perspectives*. Cambridge University Press, Cambridge.
13. Namboodiri, Narayanan Krishnan 1996. *A Primer of Population Dynamics*. Springer, New York.
14. Prasad, B.K. 2004. *Population and Family Life Education*. Anmol Pubs., New Delhi.
15. Ranade, Prabha Shastri 1990. *Population Dynamics in India*. APH Publishing, New Delhi.
16. Shanthi. K. 2005. *Women in India: Retrospect and Prospect*. Anmol Pubs., New Delhi.
17. Srinivasan, Venkatesh 2001. *Health and Family Welfare Programmes in Developing Countries: Study of Innovations in an Indian State*. Aalekh Publishers, New Delhi.
18. Turchin, Peter 2003. *Complex Population Dynamics: A Theoretical/Empirical Synthesis*. Princeton University Press, Princeton.
19. Unruh, Jon Darrel; Krol, Maarten S. and Kliot Nurit 2004. *Environmental Change and its Implications for Population Migration*. Springer, New York.
20. Weeks, John R. 2005. *Population: An Introduction to Concepts and Issues*. Wadsworth, Belmont, CA. 9<sup>th</sup> Ed.

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## II Semester (optional), Theory

### GRP-206: Geography of Human Resource Development

CREDITS : 3

Number of Lectures : 36

#### Unit I

Nature, scope and significance of Human Resource Development; Definition and classification of Human Resources, Human Resource Development, Human Development and Human Resource Utilization; Human Resource Development in space and time; Dimensions and characteristics of Human Resources Development – Quantitative and Qualitative; Process of human resource development.

#### Unit II

Concepts and Methods in studying Human Resource Development; Human Resource Development Indicators relating to Literacy, education, health, disease, food and nutrition, etc.; Types and sources of human resource development data; Managing human resource development data and devising indices; Concept and Computation of HRD or HDI; Amenities and Planning for human resources development.

#### Unit III

Problems of Human Resource Development; Spatial and Societal variation in human resource development; Human Resources in India: Potential, Utilized and Un-utilized; Development and Utilization of Primary, Secondary and Tertiary Human Resources in India; Deterioration and

Conservation of Human Resources; Human Resources Development, Quality of life and Social well being.

### Suggested Readings

1. Budhwar, Pawan S. and Debrah, Yaw A. 2004. *Managing Human Resources in Asia-Pacific*. Roulledge, London and New Delhi.
  2. Gilley, Jerry W.; Eggland, Steven A.; Maycunich, Ann and Gilley, Ann Maycunich 2003. *Principles of Human Resource Development*. Perseus, New York.
  3. Harbison, F.H. 1973. *Human Resources as the Wealth of Nation*. Oxford University Press, London.
  4. Harbison, F.H. and Myers, C.A. 1964. *Education, Manpower and Economic Strategies of Human Resources Development*. McGraw Hills Book Company, New York
  5. Hargreaves, Pat and Jarvis, Peter 2000. *The Human Resource Development Handbook*. Kogan Page Publishers, London. Revised edition.
  6. Joy-Matthews, Jennifer; Megginson, David and Surtees, Mark 2004. *Human Resource Development*. Kogan Page Publishers, London. 3<sup>rd</sup> Ed.
  7. Kamble, N.D. 1980. *Structure and Determination of Manpower Resources*. Ashish Publishing House, New Delhi.
  8. Kaul, Parminder 1996. *Human Resource Development for Rural Development*. Arnold Publication Ltd., New Delhi.
  9. Kumar, B. and Hansra, B.S. 2000. *Extension Education for Human Resource Development*. Concept Pub. Co., New Delhi.
  10. Mahadevan, K. (ed.) 2002. *Health Education for Quality of Life*. B.R. Publishing Corporation, Delhi.
  11. Misra, R.P. 2007. *Geography of Health: A Treatise on Geography of Life and Death in India*. Concept Publishing Company, New Delhi.
  12. Nalder, L. 1994. *The Hand Book of Human Resource Development*. John Wiley and Sons, New York.
  13. Park, K. 2009. *Park's Textbook of Preventive and Social Medicine*. Banarsidas Bhanot Publishers, Jabalpur.
  14. Rowley, Chris and Benson, John (eds.) 2004. *The Management of Human Resources in the Asia Pacific Region: Convergence Reconsidered*. Frank Cass Publ., London.
  15. Sims, Ronald R. 2006. *Human Resource Development: Today and Tomorrow*. Information Age Publications, San Francisco.
  16. Singh, Sanjeev Kumar 2008. *Human Resource Development*. Atlantic Pub. Gr., New Delhi.
  17. Swanson, Richard A. and Holton, Elwood F. 2009. *Foundations of Human Resource Development*. Berrett Koehler Publ., San Francisco. 2<sup>nd</sup> Ed.
  18. T.V. Rao 2000. *Human Resource Development, Experiences, Interventions Strategies*. Sage Publication, New Delhi.
  19. U.N.O. 1967. *Development and Utilisation of Human Resources in Developing Countries*. Year Book of the UNO. Secretary General Office of the Public Information, New York.
  20. Werner, Jon M. and DeSimone, Randy L. 2008. *Human Resource Development*. South-Western (Cengage) Publ., Mason OH. 5<sup>th</sup> Ed.
  21. Zanko, Michael 2002. *The Handbook of Human Resource Management Policies and Practices in Asia-Pacific Economies*. Volume 1. Edward Elgar Publ., Cheltenham UK.
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## II Semester (optional), Theory

### GRP-207. Health, Space and Ecology

CREDITS : 3

Number of Lectures : 36

**UNIT I**

Concept of mortality, morbidity and health; Political economy of health; Colonial and Post-colonial conception of health and medicine; Health as a commodity; Health and Quality of life; Social capital approach to health-care; Market, State and Social Opportunity; Linkage between health and ecology; Political ecology of disease; scope of Political Ecology of Disease;

**UNIT II**

Pattern of morbidity- world, and India; Geographical aspect of distribution of major diseases in India- communicable and non-communicable; Regional variation in Prevalence of diseases; sources of infection, modes of transmission and creation of Disease Network and the correlates; Spatial epidemiology; Disease Mapping; Geo-statistical methods of Health issues;

**UNIT III**

Structure of health care services in India; Health inequality; Problem of access and utilisation; Investment in Health; Public and Private Initiatives in health-care provisions; Health Policy in Pre-independent India; Health Policies and Programmes in independent India; Nongovernmental initiatives and case studies of these initiatives like Khanna, Matlab etc.

**Suggested Readings**

1. Choudhary, B.K., *Tuberculosis in India: A Political Ecology Approach*, VDM Verlag, 2008
2. Clark, M., Riben, P. & Nowgesic, E., The association of housing density, isolation and tuberculosis in Canadian First Nations communities, *International journal of epidemiology*, vol. 31, no. 5, pp. 940-936. 2002
3. Cohen, M.L., Changing patterns of infectious disease, *Nature*, vol. 406, no. 6797, pp. 762-767. 2000
4. Elliott, P., Wakefield, J., Best, N., and D. Briggs, *Spatial Epidemiology: Methods and Applications*, Oxford University Press, 2000
5. Eyles, J. & Litva, A., Coming out: exposing theory in medical geography, *Health and Place*, vol. 1, pp. 5-14. 1993
6. Farmer, Paul. *Infections and Inequalities: the Modern Plagues*. Berkeley: University of California Press. 1999
7. Kalipeni, E., Craddock, S., Oponng, J.R., Ghosh, J., ed), *HIV and AIDS in Africa: Beyond Epideminology*, Blackwell Publishing Ltd, Oxford, 2004,
8. Kearns, R. & Moon, G., From medical to health geography: novelty, place and theory after a decade of change, *Progress in Human Geography*, vol. 26, no. 5, pp. 605-625. 2002
9. Lankinen, S.K. (ed) et. al, *Health and Disease in Developing Countries*, Macmillan Education Ltd, London and Oxford, 1994
10. McMichael, A.J., Environmental and social influences on emerging infectious diseases: past, present and future, *Philosophical transactions of the Royal Society of London. Series B: Biological sciences*, vol. 359, no. 1447, pp. 1049-1058. 2004
11. Meade, M.S., Earickson, R.J, *Medical Geography, 2nd Edition*, The Guilford Press, London, UK, 2000.
12. Naidoo, J., Wills, J., *Introduction To Health Studies*, Pal grave New York, 2001
13. Phillips, D.R., Varhasset, Y. eds), *Health and Development*, Routledge, London, 1994

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## II Semester (optional), Theory

### GRP-208. Rural Geography: Theory and Practice

CREDITS : 3

Number of Lectures : 36

**UNIT I**

Rural communities; Rural space, society, and rurality; Governanance and globalization; Revisiting landownership and property rights; Theories and Models of rural settlement and its diffusion.

**UNIT II**

Theorization of culture, politics, space and poverty in rural contexts; Rise of productivist farming ways of conceptualising agricultural change; Institutional-strengthening issues; Rural future and globalisation; Food supply and food security; Challenges of sustainability.

**UNIT III.**

[Indian Scenario]-- Indian Village: Concept, attributes, and historical context and multiplicity; Regional morphological characteristics; Morphological interaction models: Religio-ritual, Secular-economic, Rural Housing and Architecture Rural-urban linkages: Peri-urban interface; Role of service centres; Transformation and Planning of Indian village: models and plans.

**Suggested Readings**

1. Akroyd, H. David 2003. *Agriculture and Rural Development Planning: A Process in Transition*. Ashgate Publishing, Aldershoot UK.
2. Brouwer, Floor C. and der Heide, Martijn van (eds.) 2009. *Multifunctional Rural Land Management: Economics and Policies*. Earthscan, London.
3. Chauhan, Brij Raj 2009. *Rural Life: Grass Roots Perspectives: Based on Field Experiences and Assessment of Published Work over Eight Decades of Intensive Studies in Villages of Uttar Pradesh*. Concept Publishing Co., New Delhi.
4. Cloke, Paul J.; Marsden, Terry and Mooney, Patrick H. (eds.) 2006. *Handbook of Rural Studies*. Sage, London.
5. Clout, Hugh D. and Munton, R. J. C. 2007. *Contemporary Rural Geographies: Land, Property, and Resources In Britain*. Routledge, London.
6. Eidt, Robert C., Singh, K.N. and Singh, Rana, P.B. (eds.) 1977. *Man, Culture and Settlement*. Kalyani Publ., Delhi.
7. Essex, Stephen 2005. *Rural Change and Sustainability: Agriculture, The Environment and Communities*. CABI International, Oxfordshire UK.
8. Gallent, Nick; Juntti, Meri and Kidd, Sue 2008. *Introduction to Rural Planning*. Routledge, London.
9. Holloway, Lewis and Kneafsey, Moya 2004. *Geographies of Rural Cultures and Societies*. Ashgate Publishing, Aldershot UK.
10. Maye, Damian; Holloway, Lewis and Kneafsey, Moya (eds.) 2007. *Alternative Food Geographies: Representation and Practice*. Emerald Group Publishing, New York.
11. Morris, Joe (ed.) 2001. *Rural Planning and Management*. Managing the Environment for Sustainable Development series. . Edward Elgar Publishing, Cheltenham UK.
12. Mosley, Maclohm J. 2005. *Rural Development: Principles and Practice*. Sage, London.
13. Pacione, Michael 1984. *Rural Geography*. Harper & Row, San Francisco.
14. Singh, R. L., Singh, K.N. and Singh, Rana P.B. (eds.) 1975. *Readings in Rural Settlement Geography*. NGS. Varanasi.
15. Singh, R.L. and Singh, Rana P.B. (eds.) 1979. *Place of Small Towns in India*. N.G.S.I., Varanasi.
16. Singh, Rana P.B. 2009. *Geographical Thoughts in India: Snapshots and Vision for the 21st Century*. Cambridge Scholars Publishing, Newcastle upon Tyne UK.

17. Singh, Rana P.B. and Singh, R.B. 1981. *Changing Frontiers of Indian Village Ecology*. National Geographical Society of India, Varanasi, Pub. 27.
18. Wilson, Geoffrey Alan 2007. *Multifunctional Agriculture: A Transition Theory Perspective*. CABI International, Oxfordshire UK.
19. Woods, Michael 2005. *Rural Geography: Processes, Responses and Experiences in Rural Restructuring*. Sage, London.
20. Woods, Michael 2010. *Rural (Key Ideas in Geography)*. Routledge, London.

## II Semester (optional), Theory

### GRP- 209. Urban Studies

CREDITS : 3

Number of Lectures : 36

#### Unit I

**Conceptual Issues in Urban Studies:** Urbanisation in space and time; Theories and Approaches of urban studies: locational, regional, spatio-structural, eco system and environmental perception; Dimensions of urban studies in India: geographical and non geographical; problem ,policy, sand evaluation oriented.

#### Unit II

**Urban Issues and Challenges:** Urban society: Urban Structure, Social Space and urban crime; Urban environment: water, sanitation, solid waste and slums; urban economy.s

#### Unit III

**Urban Management and Governance:** Urban planning: Governance and Managements; urban development policies; Implications of 74<sup>th</sup> CAA on urban governance; Future governance structure PPP, capacity building for better service delivery. .

#### Suggested Readings

1. Dutt, Ashok et. al. 1994. *The Asian Cities: Processes of Development, Characteristics and Planning*. GeoJournal Library, London.
2. Fyfe, Nicholas R. and Kenny, Judith T. (eds.) 2005. *The Urban Geography Reader*. Routledge, London.
3. Gallien,A.B. and S.Eisner 1963. *Urban Pattern*, New York.
4. HUDCO-HSMI. 2001. *The States of Indian Cities*, HUDCO HSMI, New Delhi.
5. Jha,R. and Nasreen Siddiqui 2000. *Towards People Friendly Cities* ,UNICEF Maharashtra State Office, Mumbai.
6. Knox, Paul and Pinch, Steven 2006. *Urban Social Geography*. Pearson Prentice-Hall, Englewood Cliffs NJ. 5<sup>th</sup> Ed.
7. Kumar,B. and R.B.Singh 2003. *Urban Development and Anthropogenic Climatic Change*. Manak Publications, New Delhi.
8. Kundu,A. 2005. *Urban Development and Urban Research in India*, Khama Publishers, New Delhi.
9. Mathur,M.P. 2007. *Norms and Standards of Municipal Basic Services in India*, National Institute of Urban Affairs, New Delhi available on [www.niua.org](http://www.niua.org) accessed on 1<sup>st</sup> June 2010.
10. Pacione, Michael 2005. *Urban Geography: A Global Perspective*. 2<sup>nd</sup> ed. Routledge, London.
11. Prakasa Rao,V.L.S. 1983. *Urbanisation in India: Spatial Dimensions*, Concept, New Delhi.

12. Misra. R.P. and Misra, K. (eds.) 1998. Million Cities of India Vol.I/II Sustainable Foundation, New Delhi.
  13. Ramachandran, R. 1989. Urbanisation and Urban System in India, Oxford University Press, New Delhi.
  14. Singh, R.L. 1955. Bananas: A Study in Urban Geography, Nand Kishor and Brothers, Bananas.
  15. Sivaramakrishnan, K.C. et al. 2005. A Hand Book of Urbanisation in India, Oxford University Press, New Delhi.
  16. UNCHS-UN HABITAT 2001. Cities in a Globalising World. Global Report on Human Settlement, Earthscan, London and Sterling, VA.
  17. UN-HABITAT 2003. Water and Sanitation in World Cities: Local Action for Global Goals, Earthscan London.
  18. Vaidya, Chetan 2009. Urban Issues, Reforms and Way Forward in India working paper No. 4/2009-DEA available on www.niua.org accessed on 1<sup>st</sup> June 2010.
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## II Semester (optional), Theory

### GRP-210 Peri-Urban Interface and its Dynamics

CREDITS: 3

Number of Lectures: 36

#### Unit I

**Theoretical Base.** Evolution of the PUIs; Basic concepts: urban, rural, urbanization, urban growth, urban sprawl, spatial hybridization, etc.; Typology and processes; PUI Studies: major trends and emerging issues; Methodologies and techniques: qualitative, quantitative, and GIS & Remote Sensing; Approaches: descriptive, explanatory, normative, critical, participatory, and predictive.

#### Unit II

**Application.** PUIs and their characteristics: developed vs. developing world; Migration, urbanization and peri-urbanization; Production systems in the PUIs; the PUI impacts land use, biodiversity, environment, agriculture, resources, livelihood, and infrastructure. and conflicts; Challenges: management, planning, and sustainability.

#### Unit III

**Indian Scenario.** Metropolization and Peri-Urban growth; Metropolitan growth: regional comparison; Impacts in PUIs: Land use, environmental, resources livelihood, infrastructure; Peri-urban governance; Case studies: Delhi, Chennai, Varanasi.

#### Suggested Readings

1. Adu-Ampong E., Cudjoe F., Edusah A. R., Hoogsteen M., Oteng L., Vlek F., Wijtten Z., van de Water E. 2008. *Socio-Economic Transitions: Changing livelihoods in the peri-urban interface. A case study of Ahenemah Kokoben and Tikrom in the peri-urban interface of Kumasi.* TSPA-project report no.
2. Brook, R. M. and Dávila, J. D. (eds.) 2000. The peri-urban interface: a tale of two cities. School of Agricultural and Forest Sciences. University of Wales and Development Planning Unit, University College London.
3. Brook, R., Purushothaman, S. & Hunshal, C. (eds.) 2003. *Changing Frontiers—The Peri Urban Interface Hubli Dharwad, India.* Books for Change, Bangalore.
4. Champion T. & Hugo G. (eds.) 2004. *New Forms of Urbanization: Beyond the Urban-Rural Dichotomy.* Ashgate, Aldershot.

5. Champion T., Hugo G. & Lattes A. 2003. Towards a New Conceptualization of Settlement for Demography: Beyond the Urban/Rural Dichotomy. *Population and Development Review*, June 2003.
6. Drechsel, P. and D. Kunze (eds.) 2001. *Waste Composting for Urban and Peri-Urban Agriculture*. CABI Publishing, Oxfordshire.
7. Dupont, Veronique (ed.) 2005. Peri-urban Dynamics: Population, Habitat and Environment on the Peripheries of Large Indian Metropolises--A Review of Concepts and General Issues. CSH Occasional Paper No. 14. Publication of the French research institutes in India, New Delhi.
8. Dupont, Véronique & N. Sridharan (ed.) 2006. Peri-urban dynamics: case studies in Chennai, Hyderabad and Mumbai. CSH Occasional Paper No. 17. Publication of the French Research Institute in India, New Delhi.
9. Hoggart, Keith (ed.) 2005. *The City's Hinterland: Dynamism and Divergence in Europe's Peri-Urban Territories Perspectives on Rural Policy and Planning*. Ashgate, Aldershot.
10. Kaushik, S.P., 2006. Impact of the development of farmhouses on the land aspects: A case study of peri-urban space of National Capital Territory of Delhi. *Transactions of the Institute of Indian Geographers*, Vol. 28 (1): 67-75.
11. Kundu, A., Pradhan, B.K. & Subramanian, A. 2002. Dichotomy or Continuum: Analysis of Impact of Urban Centres on Their Periphery. *Economic and Political Weekly*, vol. 37, no. 14, pp. 5039-46.
12. Lawrence, Benjamin 2007. *Locality, Mobility, and Nation: Periurban Colonialism in Togo's Eweland 1900-1960*. Rochester. University of Rochester Press. New York.
13. McGee, T.G. 1991. The emergence of Desakota in Asia – expanding a hypothesis. In: Ginsberg, N. et al. (eds.) *The extended metropolis-Settlement transition in Asia*. University of Hawaii Press, Honolulu.
14. McGregor, D. Simon, D. and D. Thompson 2006. *Peri-Urban Interface: Approaches to Sustainable Natural and Human Resource Use*. Earthscan Publications Ltd., London, UK.
15. Oliveau, S. 2005. *Peri-urbanisation in Tamil Nadu. A quantitative approach*. CSH Occasional Paper, no. 15. Centre de Sciences Humaines, New Delhi.
16. Ramachandran, R. 1991. *Urbanization and Urban System in India*. Delhi, Oxford University Press.
17. Shaw, A. 2005. Peri-urban interface of India cities. Growth, governance and local initiatives. *Economic and Political Weekly* 40 (2), 129–136.
18. Shekhar Shashi et. al. 2000. Changing face of the Rural Hinterland of a fast growing town. Case study: Gurgaon and its Hinterland. *Indian Journal of Regional Science*, 32 (1): 106-117.
19. Singh, Rana P.B. and Sen, Chandra 2001. The Structure of Peri-Urban Agricultural Environment in Varanasi Development Region. *National Geographical Journal of India*, 49 (4): 61-72.

## II Semester (optional), Theory

### GRP-211 Regional Development and Globalisation

Credits: 3

Number of Lectures: 36

#### UNIT I

**Conceptual Issues:** Process of globalisation; Impact of Globalisation in different sphere of economic and political life; Changing paradigm of Planning in Post-globalised era; Changing Nature of State Intervention and Process of Regional Development; Natural, Economic and Planning Regions; Aspects of Concentration and Dispersal of economic activities Polarization

and Spread. ; Multiplier Effect in Spatial terms; Regional variation in productivity of capital and labour; Diversity and Disparity.

## UNIT II

**Theories:** Spatial aspect of development: a. Basic Theories of Spatial Economic Structure – Richardson and Smith; b. Dependency Theory – Andre Günter Frank; c. World System Approach – Wallerstien and Samir Amin; d. Linkage between World-Trade and Regional Development – Krugman

## UNIT III

**Measurement of Developmental Processes and Examples:** Dimensions, Variables and Indicators; Choice of indicators; Alternative approaches of compositing of different indicators: Principal Component Analysis; Gravity Model; Simulations; Input-output Model; Regionalisation – Clustering; Process of Economic Concentration and Relocation - China, Venezuela, India; Problem Regions- Eastern UP, Bundelkhand; Regional policy of Balanced development.

## Suggested Readings

1. Barkin and King 1970. *Regional Economic Development*, Cambridge University Press.
  2. Basu, K. 2000. *Analytical Development Economics: The Less Developed Economy Revisited*. OUP.
  3. Behrman, J. and Srinivas, T. N. 1998. *Handbook of Development Economics*, Vol. III
  4. Berberoglu, B. 1992. *The Political Economy of Development*, State University of New York Press.
  5. Bhat, L.S. 1972. *Regional Planning in India*. Indian Statistical Institute, Calcutta.
  6. Bhat, L.S. 2003. *Micro Planning: A Case Study of Karnal Area*. KB Pubs., New Delhi.
  7. Crush, J. 1995. *Power of Development*. Routledge, London.
  8. Datta, B. 1997. *Indian Planning at Crossroad*, OUP
  9. Friedman, J. and Alonse, W. eds. 1968. *Regional Development and Planning*. M.I.T. Press, Cambridge-Massachusetts.
  10. Harrish, J 2004. *Depoliticizing Development*, Left World
  11. Kuklinski, A.R. ed. 1975. *Regional Development and Planning: International Perspectives*, Sijthoff-Leyder.
  12. Misra, R.P. 2002. *Regional Planning, Concepts, Techniques, Policies and Case Studies*. Concept Publishing Company, New Delhi.
  13. Munshi, S.K 1984. *India Resource Regions and Regional Disparity*, PPH
  14. Rajalakshmi, N. 2000. *Environment and Economic Development*, Manak
  15. Ray Choudhary, J 2001. *An Introduction to Development and Regional planning*, Orient Longman
  16. Saunders, P. 1998. *Capitalism: A social Audit, World View*.
  17. Sharma, P.R. (ed.) 1991. *Perspectives on the Third World Development*. Rishi Pubs., Varanasi.
  18. Sharma, P.R. (ed.) 1994. *Regional Policies and Development in the Third World*. Rishi Publications, Varanasi.
  19. Singh, B.N. 1988. *Integrated Rural Area Development and Planning*. Anupama Pubs., Delhi.
  20. Sundaram, K.V. 1977. *Urban and Regional Planning in India*, Vikas Publishers. New Delhi.
  21. UNO 1998. *Background to an Integrated Plan of Action on Human Resource Development*.
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## II Semester (optional), Theory

### GRP-212. Geography of Tourism and Heritage

CREDITS : 3

Number of Lectures : 36

**Unit I**

Development of the Geography of Tourism and Heritage; Basic concepts: Tourism Studies: Concepts and Principles; Methodologies and Approaches:

**Unit II**

Geography of Tourism: National, Regional and Global scenarios; Alternative tourism and Prospects: Ecotourism, Sustainable tourism, Heritage Tourism; Tourism Management, heritage issues and prospects: policy and planning - global, and national. .

**Unit III**

INDIAN SCENARIO:- Tourism and Heritage resources, Tourism as industry and economy: national, state and local contexts; Heritage Planning and Master Plan, Varanasi: Heritage Zoning, identification and planning, Types of tourism: domestic, international, local, pilgrimages; Tourism policies, perspectives, and plans.

**Suggested Readings**

1. Aitchison, Cara; MacLeod, Nicola E. and Shaw, Stephen J. 2000. *Leisure and Tourism Landscape: Social and Cultural Geographies*. Routledge, London.
2. Ashworth, G.J. and Dietvorst, A.G.J. (eds.) 1995. *Tourism and Spatial Transformations: Implications for Policy and Planning*. CAB International, Warwick UK.
3. Ateljevic, Irena; Morgan, Nigel and Pritchard, Annette (eds.) 2011. *The Critical Turn in Tourism Studies: Creating an Academy of Hope*. Routledge, London.
4. Coles, Tim; Duval, David Timothy and Shaw, Gareth 2011. *Student's Guide to Writing Dissertations and Theses in Tourism Studies and Related Disciplines*. Routledge, London.
5. Collins-Kreiner, Noga 2006. *Christian Tourism to the Holy Land: Pilgrimage during Security Crises*. Ashgate Publ., Farnham U.K.
6. Girard, Luigi F. and Nijkamp, Peter (eds.) 2009. *Cultural Tourism and Sustainable Local Development*. Ashgate Publ., Farnham U.K.
7. Gössling, Stefan; Hall, C. Michael and Weaver, David (eds.) 2008. *Sustainable Tourism Futures: Perspectives on Systems, Restructuring and Innovations*. Routledge, London.
8. Hall, C. M. and Page, S.J. 2008. *The Geography of Tourism and Recreation: Environment, Place and Space*. Routledge, London. 4<sup>th</sup> Ed.
9. Henderson, Carol and Weisgrau, Maxine (eds.) 2007. *Raj Rhapsodies: Tourism, Heritage and Seduction of History*. Ashgate Publ., Farnham U.K.
10. Higham, James 2007. *Critical Issues in Ecotourism: understanding a complex tourism phenomenon*. Butterworth-Heinemann, Oxford.
11. Honey, Martha 2008. *Ecotourism and Sustainable Development*. Island Press, Seattle.
12. Jamal, Tazim and Robinson, Mike (eds.) 2009. *The SAGE Handbook of Tourism Studies*. Sage, London.
13. Pearce, Douglas and Butler, Richard W. (eds.) 1999. *Contemporary Issues in Tourism Development*. Routledge, London.
14. Raj, Razaq and Morpeth, Nigel D. (eds.) 2007. *Religious Tourism and Pilgrimage Festivals Management: An International Perspective*. CABI, London.
15. Singh, Rana P.B. 2009. *Banaras, Making of India's Heritage City*. Cambridge Scholars Publishing, Newcastle upon Tyne UK.
16. Singh, Rana P.B. 2009. *Where the Buddha Walked. A Companion to the Buddhist Places of India*. Indica Books, Varanasi. 2<sup>nd</sup> Ed.

17. Singh, Rana P.B. and Rana, Pravin S. 2009. *Banaras Region: a Spiritual and Cultural Guide*. Indica Books, Varanasi. 2<sup>nd</sup> Ed.
18. Singh, S.N. 1986. *Geography of Tourism and Recreation with special reference to Varanasi*. Inter-India Publ., New Delhi.
19. Timothy, Dallen J. (ed.) 2007. *The International Library of Essays in Tourism, Heritage and Culture: 3-Volume Set*. Ashgate Publ., Farnham U.K.
20. Timothy, Dallen J. and Olsen, Daniel H. (eds.) 2006. *Tourism, Religion and Spiritual Journeys*. Routledge, London.

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## II Semester (optional), Theory

### GRP-213. Industrialization and Regional Development

CREDITS : 3

Number of Lectures : 36

#### Unit I

**Concepts and theories:** Meaning of industrialization; Processes of industrialization; Structuralist view, Neo-classical view, Radical view; Theories of industrial location — Weber, Smith and Allen Pred; Industrial linkages, Role of industries in regional development.

#### Unit II

**Techniques of spatial and structural analysis:** Indicators of industrialization; Location Quotient, Localization Coefficient and Localization Curve; Regional specialization and Diversification; Level of industrialization.

#### Unit III

**Industrialization in India:** Evolution and growth of industries; Industrial regions and complexes; Factors and trend of regional diversification, Industrial policies, Rural industrialization, Industries and environmental degradation.

#### Suggested Readings

1. Agrawal, M.K. 1996. *Agriculture- Industry Linkages in the Economy of U.P.* Northern Book center, New Delhi
2. Behari, Bepin, 1976. *Rural Industrialization in India*. Vikas Publishing House Pvt. Ltd. New Delhi,
3. Clark, G. L., Gertler, M. S. and Feldman, M. P. (eds.) 2000. *The Oxford Handbook of Economic Geography*. Oxford University Press, USA.
4. Coe, N. 2007. *Economic Geography: A Contemporary Introduction*. Blackwell Publishers, Inc., Massachusetts.
5. Dicken, P. and Lloyd, P. 1990/1977. *Location in Space*. New York: Harper & Row.
6. Guha, J. S. and Chattoraj, P.R. 2002. : *A New Approach to Economic Geography: A Study of Resources*. The World Press Private Limited, Kolkata.
7. Hudson, R. 2005. *Economic Geographies: Circuits, Flows and Spaces*. Sage Publications, London.
8. Krugman, P. 1995. *Development, Geography, and Economic Theory*. Cambridge: MIT Press.
9. Mackinnon, D. and Cumbers, A. 2007. *Introduction to Economic Geography: Globalization, Uneven Development and Place*. Prentice Hall, Inc., New York
10. Mathur, P. and Kalia, S., 2005. *Fundamentals of Industrial Geography*, Ritu Publications, Jaipur,
11. Misra, R.P (ed.) 1985. *Rural Industrialization in Third World Countries*. Sterling Publishing Co. New Delhi.



12. Riley R. C. 1973. *Industrial Geography*, Chatto and Windus Ltd. London.
13. Roy, P.K. 2005. *Economic Geography, A Study of Resources*. New Central Book Agency P. Ltd, Kolkata.
14. Sharma, V.N. 2001. *Industrial Development and Planning in India*. Radha Publications, New Delhi.
15. Sheppard, E. and Barnes, T.J. (eds.) 2002. *A Companion to Economic Geography*. Blackwell Publishers, Inc., Massachusetts.
16. Singh, M.B. 1983. *Industrial Development Patterns and Potentials in Eastern U.P.*, Lotus Publication, Varanasi.

## II Semester (optional), Theory

### GRP-214. APPLIED CLIMATOLOGY

CREDITS : 3

Number of Lectures : 36

#### Unit I

Meaning and Scope of Climatology, Difference between weather and climate, climatology and meteorology, elements of weather and climate, Temperature: Their distribution and controlling factors, laws of horizontal motion of air and general atmospheric circulation

#### Unit II

Monsoon, jet streams and their significance with reference to India, precipitation: spatio-temporal variation and distribution in India, Tropical Cyclone: origin and associated weather, cyclone prone areas in India, climatic classification: Koppen and Thorthwaite .

#### Unit III

Water balance parameters and their use in climatic classification, seasonal computation of aridity, humidity and moisture indices and their application in crop and irrigation management, agro-climatic regions of India: delineation and characteristics, climatic change: evidences and theories, global warming: causes and consequences.

#### Suggested Readings

1. Barry, R.G. and Carleton, M. (2001): *Synoptic and Dynamic Climatology*, Routledge, London.
2. Chorley, R.J. (2001): *Atmosphere, Weather and Climate*. Methuen, London.
3. Critchfield, H.J. (2002): *General Climatology*. Prentice-Hall of India, New Delhi..
4. Oliver, J.E. and Hidore, J.J. (2003): *Climatology: An Atmospheric Science*, Pearson Education Private Ltd, Patparganj, Delhi.
5. Robinson, P. J. and Henderson, S. (1999): *Contemporary Climatology*, 2nd edition, Pearson Education Ltd., Harlow, UK.
6. Singh, M.B. (1998): *Jalvayu Avam Samudra Vigyan*. Tara Book Agency, Varanasi.
7. Singh, S. (2005): *Climatology*. Prayag Pustak Bhawan, Allahabad.

## II Semester (optional), Theory

### GRP-215. AGRICULTURE GEOGRAPHY AND RURAL DEVELOPMENT

CREDITS : 3

Number of Lectures : 36

**Unit I**

Concept, approach and methodology of agricultural geography; Agricultural land-use and carrying capacity; Measures of agricultural efficiency and agricultural productivity. Agro-climatic regions of India, Green revolution in India; Second generation reforms in Indian agriculture, Agricultural planning and policies in India.

**Unit II**

Concept and approach of rural development: Five Year Plans and rural development in India; rural development policies and programmes: Integrated area development and rural development programmes; rural development planning: problem, policy and target group oriented approach.

**Unit III**

Rural development and poverty amelioration in India; Five Year Plans and poverty removal strategy and planning; poverty and rural development target groups and planning in India; policy, programme and implementation at the local level planning/micro level planning; People's participation in rural development and planning; role of Panchayati Raj.

**Suggested Readings**

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. Desai, A. R. (1990): Rural Development, Popular Prakashan, Bombay.
4. Gregor, H. P. (1970): Geography of Agriculture. Prentice-Hall, New York.
5. Krishnamurthy, J. (2000): Rural Development. Problems and Prospects. Rawat Publications, Jaipur.
6. Long, C. (2001): Participation of the Poor in Development Initiatives: Taking Their Rightful Place. Earthscan, London.
7. Misra, R. P. and Achyutha, R. N. (1998): Micro-Level Rural Planning: Principles, Methods and Case Studies. Concept Publishing. Company, New Delhi.
8. Morgan, W. B. and Norton, R.J.C. (1971): Agricultural Geography. Methuen, London.
9. Sen, Sudhir (1975): Reaping the Green Revolution. Tata McGraw-Hill, New Delhi
10. Shafi, M. (2006): Agricultural Geography, Pearson Education, New Delhi.
11. Singh, B. N. (1988): Integrated Rural Area Development and Planning. Anupama Publications., Delhi.
12. Singh, B.B. (1979) : *Krishi Bhugol*. Tara Publications, Varanasi.
13. Singh, J. and Dhillon, S.S. (2000): Agricultural Geography. Tata McGraw Hill, New Delhi.
14. Singh, S. (1994): Agricultural Development in India: A Regional Analysis, Kaushal Publications, Shillong.
15. UNAPDI (1986): Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian and Pacific Development Institute, Bangkok). Concept Publishing Company, New Delhi.
16. Yugandhar, B. N. and Mukherjee, N. (eds.) (1991): Studies in Village India: Issues in Rural Development. Concept Publishing. Company, New Delhi.

## One Year P.G. Dip. in Remote Sensing and GIS

Banaras Hindu University

Department of Geography, Faculty of Science

### Distribution of Courses and Credits in Various Semesters

#### Semester-I

| Course Code  | Title                                       | Credits   |
|--------------|---------------------------------------------|-----------|
| GID101       | Fundamentals of Geomorphology & Cartography | 5         |
| GID102       | Principles of Remote Sensing                | 5         |
| GID103       | Fundamentals of GIS                         | 5         |
| GID104       | Remote Sensing I (Practical)                | 3         |
| GID105       | GIS Analysis I (Practical)                  | 3         |
| <b>Total</b> |                                             | <b>21</b> |

#### Semester-II

| Course Code                   | Title                               | Credits   |
|-------------------------------|-------------------------------------|-----------|
| GID201                        | Advances in Remote Sensing and GIS  | 5         |
| GID202                        | Digital Image Processing            | 5         |
| GID203                        | Remote Sensing and GIS Applications | 5         |
| GID204                        | Remote Sensing II (Practical)       | 3         |
| GID205                        | GIS Analysis II (Practical)         | 3         |
| GID206                        | Project/Dissertation*               | 6         |
| <b>Total</b>                  |                                     | <b>27</b> |
| <b>Grand Total of Credits</b> |                                     | <b>48</b> |

\*to be submitted 35-45 days after the last theory/practical examination whichever is later, but 15 days before the official reopening of the university after summer vacation

## One Year PG Diploma in Remote Sensing and GIS

Department of Geography, Banaras Hindu University Varanasi-221005, U.P.

### FIRST SEMESTER

#### **GID101- Fundamentals of Geomorphology and Cartography (5 Credits)**

Lithosphere: Earth's Interior and Crust; Rocks; Volcanism; Earthquakes; Faults, Folds and Topography; Mountain Building; Types of Mountains.

Geomorphic Processes and Landforms: Geomorphic Processes—Weathering, Mass Movements, Erosion, Transportation and Deposition; Anthropogenic Process; Landforms in Humid, Arid, Karst, Glacial and Coastal Environments; Geomorphic Processes and Landforms in relation to Natural Resources, Natural Hazards and Disasters, Human Settlements and Economic Activities.

Cartography: Earth's Size and Shape—Spheroidal and Geoidal Earth; Spheroidal and Geoidal Datums; Co-ordinate Systems—Cartesian, Rectangular and Geographical; Grid Systems; Map Projections—Polyconic, Albers Conical Equal Area, LCC, Mercator and UTM.

**Reference & Text Books:**

1. Bloom, A.L. 2001 Geomorphology, Prentice Hall of India, New Delhi.
2. Burton, I. and Rates, R.W. 1978 Readings in Resource Management and Conservation, McGraw Hill, NY.
3. Clark, G.L., Feldman, M.P. and Gertler, M.S., (Ed.) 2000 The Oxford Handbook of Economic Geography, Oxford University Press, Oxford.
4. Ehrlich, P.R., Ehrlich, R.H. and Holdren, J.P., 1998 Ecoscience: Population, Resources and Development, Freeman & Co., San Francisco.
5. Fairbridge, R.W. (Ed.) 1968 Encyclopaedia of Geomorphology,
6. King, C.A.M., 1966 Techniques in Geomorphology, Edward Arnold, London.
7. Maling, D.H., 1973 Co-ordinate Systems and Map Projections, George Philip & Son Ltd.
8. Raisz, E., 1962 Principles of Cartography, McGraw Hill Books Co., Inc. NY.
9. Rhind, B. and Adams, T. (Ed.) Computers in Cartography, British Cartographic Society, London.
10. Robinson A.H. et al., 2002 Elements of Cartography, John Wiley & Sons, NY.
11. Sparks, B.W., 1960 Geomorphology, Longmans, London.
12. Strahler, A.N., 1971 The Earth Science, Harper and Row, NY.
13. Thornbury, W.D., 2001, Principles of Geomorphology, John Wiley, NY.
14. Wooldridge, S.W. and Morgan, R.S., 1959 The Physical Basis of Geography, Longman, London.

**GID102 - Principles of Remote Sensing (5 Credits)**

Basics: Electromagnetic Radiation as Remote Sensing Medium—Interactions with atmosphere and matter, Remote Sensing Regions and Bands; General Mechanism of Remote Sensing Data Recording; General Characteristics of Remote Sensing Platforms; General Characteristics of Remote Sensing Sensors

Data Characteristics: Spectral Characteristics of Common Natural Objects; Atmospheric Effects on Remote Sensing Data; Spectral Signatures and Spectral Response Patterns; Resolutions of Remote Sensing Data; Characteristics of Raw Remote Sensing Data

Aerial Photos: Basic Infrastructure and specification of Aerial photographs; Types, Scale, Resolution; Geometric properties of Single Aerial Vertical Aerial Photo; Stereoscopy; Stereoscopic Parallax; Relief Displacement

Remote Sensing Data Interpretation: Nature of Qualitative Information and Sequence in Interpretation; Elements of Image Interpretation; Elements of Image Patterns—Landforms, Drainage, Erosion Details;

**Reference & Text Books:**

1. Campbell, J. B. (2002): *Introduction to Remote Sensing*. 5<sup>th</sup> ed. Taylor & Francis, London.
2. Cracknell, A. et al. (1990): *Remote Sensing Year Book*, Taylor and Francis, London.
3. Curran, P.J. (1985): *Principles of Remote Sensing*, Longman, London.
4. Deekshatulu, B.L. & Rajan, Y.S. (ed.) (1984): *Remote Sensing*. Indian Acad. of Science, Bangalore.
5. Floyd, F., Sabins, Jr. (1986): *Remote Sensing : Principles and Interpretation*, W.H. Freeman, New York.
6. Guham, P. K. (2003): *Remote Sensing for Beginners*. Affiliated East-West Press Pvt. Ltd., New Delhi.

7. Hallert, B. (1960): *Photogrammetry*, McGraw Hill Book Co. Inc.
8. Harry, C.A. (ed.) (1978): *Digital Image Processing*, IEEE Computer Society.
9. Hord, R.M. (1982): *Digital Image Processing of Remotely Sensed Data*, Academic Press, New York.
10. Leuder, D.R. (1959): *Aerial Photographic Interpretation: Principles and Application*. McGraw Hill, New York.
11. Lillesand, T.M. and Kiefer, R.W. (2000): *Remote Sensing and Image Interpretation*. 4<sup>th</sup> ed. John Wiley and Sons, New York.
12. Nag, P. (Ed.) 1992: *Thematic Cartography and Remote Sensing*, Concept Pub. Co., New Delhi.
13. Reeves, R.G. (ed.) (1983): *Manual of Remote Sensing*, Vols. 1 & 2, American Society of Photogrammetry & Remote Sensing, Falls Church, Virginia.
14. Siegel, B.S. and Gillespie, R. (1985): *Remote Sensing in Geology*, John Wiley and Sons, New York.
15. Silver, M. & Balmori, D. (eds.) (2003): *Mapping in an Age of Digital Media*. Wiley-Academy, New York & Chichester.
16. Spurr, R. (1960): *Photogrammetry and Photo Interpretation*, The Roland Press Co., London.
17. Survey of India, (1973): *Photogrammetry*, Survey of India, Dehradun.
18. Swain, P.H. and Davis, S.M. (ed.), (1978): *Remote Sensing: The Quantitative Approach*. McGraw Hill, New York.

### **GID103 - Fundamentals of GIS (5 Credits)**

Basics: Definitions of GIS and Related Terms; Development of GIS; Components of GIS; Geographical Data Characteristics and GIS; Coordinate Systems, Datums and Projections in GIS.

Data Structures and Data Base Design: Digital representation of Geographic Data; Raster and Vector models for Geographic Data Representation and Conversion; Digitization—Methods and Errors; Topology Building; GIS Data Standards—Concepts and Components; Data and Information Sources for GIS; GIS Data Base Management Systems--Conceptual and Logical Data Modelling; Spatial Data Quality and Error Analysis; GIS Customization.

Application Methodologies: Spatial Analysis through GIS; DEM/DTM and Derivatives; Remote Sensing Data and GIS Integration; GIS Project Design and Planning Methodologies; GIS Information Products.

#### **Reference & Text Books:**

1. Bonham, Carter G.F. (1995): *Information Systems for Geoscientists – Modelling with GIS*. Pergamon, Oxford.
2. Burrough, P.A. and McDonnell, R. (1998): *Principles of Geographic Information Systems*. Oxford University Press, Oxford.
3. Chang, K.T. (2003): *Introduction to Geographic Information Systems*. Tata McGraw Hill Publications Co., New Delhi.
4. Demers, M. N. (2000): *Fundamentals of Geographic Information Systems*. John Wiley & Sons, Singapore.
5. Fraser Taylor, D.R. (1991): *Geographic Information Systems*. Pergamon Press, Oxford.
6. George, J. (2003): *Fundamentals of Remote Sensing*. Universities Press (Pvt.) Ltd, Hyderabad.

7. Girard, M. C. and Girard, C. M. (2003): *Processing of Remote Sensing Data*. Oxford & IBH, New Delhi.
8. Goodchild, M.F.; Park, B. O. and Steyaert, L. T. (eds.) (1993): *Environmental Modelling with GIS*. Oxford University Press, Oxford.
9. Heywood, I. (2003): *An Introduction to Geographical Information Systems*. 2<sup>nd</sup> ed. Pearson Publ. Co., Singapore.
10. Lo, C.P. and Yeung, A. K. W. (2002): *Concepts and Techniques of Geographic Information Systems*. Prentice Hall of India, New Delhi.
11. Longley, P. and Batty, M. (eds.) (1996): *Spatial Analysis: Modelling in a GIS Environment*. GeoInformation International, Cambridge.
12. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): *Geographic Information Systems. Principles, Techniques, Management, Applications*. John Wiley & Sons, New York.
13. Maguirre, D. J.; Michael F. G. and David W. R. (1999): *Geographical Information Systems: Principles and Application*. Geo Information International, Vol.2, Longman Pub., New York.
14. Martin, D. (1996): *Geographic Information Systems: Socioeconomic Implications*. Routledge, London.
15. Michael F. G. and Karan K. K. (ed.) (1990): *Introduction to GIS*. NCGIA, Santa Barbara, California.
16. Ripple, W. J. (ed.) (1989): *Fundamentals of Geographic Information Systems: A Compendium*. ASPRS/ ACSM, Falls Church.
17. Star, J. and Estes, J. (1990): *Geographic Information Systems – An Introduction*. Prentice-Hall, Englewood Cliffs, New Jersey.
18. Worboys, M. F. (1995): *GIS, a Computing Perspective*. Taylor and Francis, London.

### **GID104 - Remote Sensing-I (3 Credits)**

Identification of Forms and Features from Stereograms; Preparation of Thematic Maps from Remote Sensing Data—Lithology, Structure, Geomorphic Mapping; Land Use, Soils, Groundwater Potential Zones through on-screen digitization

### **GID105 – GIS-I (3 Credits)**

Georeferencing; Creation of PGDB; Creation of Shape Files, Layers; On-Screen Digitization of Polygons, Points and Lines and adding Attributes; Conversions and Topology; Spatial Analysis

## **SECOND SEMESTER**

### **GID201 - Advances in Remote Sensing and GIS (5 Credits)**

Thermal and Microwave Remote Sensing: Factors affecting Thermal Imagery; Thermal Data Interpretation—Qualitative and Quantitative; Principles of Microwave Remote Sensing; Characteristics of Microwave Remote Sensing Data

Recent Advances in Remote Sensing: Hyperspectral Remote Sensing; LIDAR; Image Fusions; Object oriented classification; Digital Photogrammetry and Information Extraction Techniques

Spatial Analysis and Modeling: Network Analysis and Shortest Route Characteristics; Spatial Decision Support System; Multi-criteria Decision Analysis; Spatial Data Infrastructures (NSDIs)

Recent Advances in GIS: 3D Virtual GIS; Internet and WEB GIS; GPS in GIS Applications; Mobile Computing; Interoperability and Open GIS; Internet GIS; Cartographic Animation.

### Reference and Text Books:

1. Campbell, J. B. (2002): *Introduction to Remote Sensing*. 5<sup>th</sup> ed. Taylor & Francis, London.
2. Curran, P.J. (1985): *Principles of Remote Sensing*, Longman, London.
3. Floyd, F., Sabins, Jr. (1986): *Remote Sensing : Principles and Interpretation*, W.H. Freeman, New York.
4. Guham, P. K. (2003): *Remote Sensing for Beginners*. Affiliated East-West Press Pvt. Ltd., New Delhi.
5. Harry, C.A. (ed.) (1978): *Digital Image Processing*, IEEE Computer Society.
6. Hord, R.M. (1982): *Digital Image Processing of Remotely Sensed Data*, Academic Press, New York.
7. Leuder, D.R. (1959): *Aerial Photographic Interpretation: Principles and Application*. McGraw Hill, New York.
8. Lillesand, T.M. and Kiefer, R.W. (2000): *Remote Sensing and Image Interpretation*. 4<sup>th</sup> ed. John Wiley and Sons, New York.
9. Reeves, R.G. (ed.) (1983): *Manual of Remote Sensing*, Vols. 1 & 2, American Society of Photogrammetry & Remote Sensing, Falls Church, Virginia.
10. Swain, P.H. and Davis, S.M. (ed.), (1978): *Remote Sensing: The Quantitative Approach*. McGraw Hill, New York.
11. Burrough, P.A. and McDonnell, R. (1998): *Principles of Geographic Information Systems*. Oxford University Press, Oxford.
12. George, J. (2003): *Fundamentals of Remote Sensing*. Universities Press (Pvt.) Ltd, Hyderabad.
13. Girard, M. C. and Girard, C. M. (2003): *Processing of Remote Sensing Data*. Oxford & IBH, New Delhi.
14. Heywood, I. (2003): *An Introduction to Geographical Information Systems*. 2<sup>nd</sup> ed. Pearson Publ. Co., Singapore.
15. Lo, C.P. and Yeung, A. K. W. (2002): *Concepts and Techniques of Geographic Information Systems*. Prentice Hall of India, New Delhi.

### GID202 - Digital Image Processing (5 Credits)

Pre-processing Operations: History and Architecture of Computer; Digital Image, Digital Data Format, LUT; Image Restoration; Noise Reduction; Radiometric Correction of Data; Geometric Correction of Data; Linear and Non-linear Transformations for Geometric Corrections; Histogram Significance

Image Enhancements: Radiometric Enhancement; Spatial Enhancements; Contrast stretching—Linear and Non-linear Methods; Multi-band Enhancement Techniques—Band Ratios, Vegetation Indices, PCA, Spatial Filtering; Resolution Merge Techniques or Image Fusion

Thematic Information Extraction Procedures: Multi-spectral Patterns; Spectral Discrimination and Signature Bank; Parametric and Non-parametric Classifiers; Supervised and Unsupervised Classification Methods; Multi-date Data Analysis and Change Detection Processes, Accuracy Assessment

### Reference and Text Books:

1. Campbell, J. B. (2002): *Introduction to Remote Sensing*. 5<sup>th</sup> ed. Taylor & Francis, London.
2. Cracknell, A. *et al.* (1990): *Remote Sensing Year Book*, Taylor and Francis, London.
3. Deekshatulu, B.L. & Rajan, Y.S. (ed.) (1984): *Remote Sensing*. Indian Acad. of Science, Bangalore.
4. Floyd, F., Sabins, Jr. (1986): *Remote Sensing : Principles and Interpretation*, W.H. Freeman, New York.
5. Harry, C.A. (ed.) (1978): *Digital Image Processing*, IEEE Computer Society.
6. Hord, R.M. (1982): *Digital Image Processing of Remotely Sensed Data*, Academic Press, New York.
7. Jensen, R.J. 1986 *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall, Englewood Cliffs, NJ.
8. Lillesand, T.M. and Kiefer, R.W. (2000): *Remote Sensing and Image Interpretation*. 4<sup>th</sup> ed. John Wiley and Sons, New York.
9. Reeves, R.G. (ed.) (1983): *Manual of Remote Sensing*, Vols. 1 & 2, American Society of Photogrammetry & Remote Sensing, Falls Church, Virginia.
10. Siegel, B.S. and Gillespie, R. (1985): *Remote Sensing in Geology*, John Wiley and Sons, New York.

### **GID203 - Remote Sensing and GIS Applications (5 Credits)**

Remote Sensing Applications: Natural Resource Mapping; Environmental Mapping and Monitoring; Geomorphic/Geological Mapping—Lithology and Structure; Mineral Resource Identification and Assessment; Land Use Mapping; Evaluation of Surface Water Resources; Ground Water Exploration; Flood Zones; Surface Runoff Estimation; Glacier Mapping; Disease and Stress Detection; Soils and Soil Salinity Mapping; Crop Types and Crop Yield Estimations.

GIS Applications: Rural and Urban Land Use; Rural and Urban Change; Rural and Urban Information System; GIS in Planning; Forest Fire Mapping; GIS in Health Services and Disease Mapping; Solid Waste Management; Wild Life Habitat Suitability Studies; Shortest Path Characteristics; Spatial Decision Support System.

#### **Reference and Text Books:**

1. Campbell, J. B. (2002): *Introduction to Remote Sensing*. 5<sup>th</sup> ed. Taylor & Francis, London.
2. Curran, P.J. (1985): *Principles of Remote Sensing*, Longman, London.
3. Floyd, F., Sabins, Jr. (1986): *Remote Sensing : Principles and Interpretation*, W.H. Freeman, New York.
4. Harry, C.A. (ed.) (1978): *Digital Image Processing*, IEEE Computer Society.
5. Hord, R.M. (1982): *Digital Image Processing of Remotely Sensed Data*, Academic Press, New York.
6. Lillesand, T.M. and Kiefer, R.W. (2000): *Remote Sensing and Image Interpretation*. 4<sup>th</sup> ed. John Wiley and Sons, New York.
7. Reeves, R.G. (ed.) (1983): *Manual of Remote Sensing*, Vols. 1 & 2, American Society of Photogrammetry & Remote Sensing, Falls Church, Virginia.
8. Siegel, B.S. and Gillespie, R. (1985): *Remote Sensing in Geology*, John Wiley and Sons, New York.
9. Swain, P.H. and Davis, S.M. (ed.), (1978): *Remote Sensing: The Quantitative Approach*. McGraw Hill, New York.



10. Bonham, Carter G.F. (1995): *Information Systems for Geoscientists – Modelling with GIS*. Pergamon, Oxford.
11. Burrough, P.A. and McDonnell, R. (1998): *Principles of Geographic Information Systems*. Oxford University Press, Oxford.
12. Fraser Taylor, D.R. (1991): *Geographic Information Systems*. Pergamon Press, Oxford.
13. Girard, M. C. and Girard, C. M. (2003): *Processing of Remote Sensing Data*. Oxford & IBH, New Delhi.
14. Goodchild, M.F.; Park, B. O. and Steyaert, L. T. (eds.) (1993): *Environmental Modelling with GIS*. Oxford University Press, Oxford.
15. Lo, C.P. and Yeung, A. K. W. (2002): *Concepts and Techniques of Geographic Information Systems*. Prentice Hall of India, New Delhi.
16. Longley, P. and Batty, M. (eds.) (1996): *Spatial Analysis: Modelling in a GIS Environment*. GeoInformation International, Cambridge.

### **GID204 - Remote Sensing-II (3 Credits)**

Data Import; Geometric Corrections and Geo-referencing of Data; Enhancements; Subsetting; Vegetation Indices; Use of Filters and PCA; Supervised and Unsupervised Classifications; Map Composition; Microwave Data Processing and Interpretation; DEM/DTM creation and 3D Visualization and Virtual Image

### **GID205 – GIS-II (3 Credits)**

Coverages in ArcInfo; Editing of Coverages; Source Data Registration; Spatial Modeling and Analysis; Query building; Network Analysis; TIN/DEM models and derivatives; 3D Virtual GIS; GPS and Total Station Survey and Plotting

### **GID206 - Project Work/Dissertation\* (6 Credits)**

To be finalized and assigned at the end of First Semester; laboratory and/or field work based; to be done in the department/elsewhere; to be submitted 35 to 45 days after the last theory/practical examination whichever is later but definitely 15 days before the reopening of the university after summer vacation

#### **\*Specialization in:**

- (i) GIS data organization and analysis
- (ii) GIS Web Services
- (iii) Natural Resource & Environment Mapping and Monitoring
- (iv) Spatial Decision Support System
- (v) Digital Image Analysis and Accuracy Assessment
- (vi) Automated Information Extraction Methods
- (vii) Rural and Urban Land Use Planning

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