

**Banaras Hindu University**  
**Institute of Science, Department of Geography**  
**B. Sc./B.A. Three-Year Semester Course Outline, 2019-20**

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

**Semester-I**

<b>Paper Code</b>	<b>Type</b>	<b>Title of the Paper</b>	<b>Credits</b>
GRB/GRA101	Theory	Physical Geography	4
GRB/GRA102	Practical	Map Reading and Interpretation	2
<b>Total</b>			<b>6</b>

**Semester-II**

<b>Paper Code</b>	<b>Type</b>	<b>Title of the Paper</b>	<b>Credits</b>
GRB/GRA 201	Theory	Human Geography	4
GRB/GRA 202	Practical	Map Projection and Weather Map	2
GRB/GRA 203-A	Theory	Man and Environment (Ancillary Course)	2
<b>Total</b>			<b>8</b>

**B. Sc./B.A. Second Year**

**Semester-III**

<b>Paper Code</b>	<b>Type</b>	<b>Title of the Paper</b>	<b>Credits</b>
GRB/GRA 301	Theory	Economic Geography	4
GRB/GRA 302	Practical	Cartographic Representation of Data	2
<b>Total</b>			<b>6</b>

**Semester-IV**

<b>Paper Code</b>	<b>Type</b>	<b>Title of the Paper</b>	<b>Credits</b>
GRB/GRA 401	Theory	Regional Geography of Developed and Developing World (U.S.A. and China)	4
GRB/GRA 402	Practical	Surveying	2
GRB 403-A	Theory	Basics of Remote Sensing (Ancillary Course)	2
<b>Total</b>			<b>8</b>

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**B. Sc./B.A. Third Year**

**Semester-V**

<b>Paper Code</b>	<b>Type</b>	<b>Title of the Paper</b>	<b>Credits</b>
GRB/GRA 501	Theory	Geomorphology	4
GRB/GRA 502	Theory	Geography of India	4
GRB/GRA 503	Practical	Quantitative Methods	4
GRB/GRA 504	Practical	Geographical Field Training	4
<b>Students will select only ONE from the following elective Theory Papers (GRB/GRA 505 and GRB/GRA 506)</b>			
<b>GRB/GRA 505</b>	<b>Theory</b>	<b>Oceanography</b>	<b>4</b>
<b>GRB/GRA 506</b>	<b>Theory</b>	<b>Population Geography</b>	<b>4</b>
GRB/GRA 507	Theory	Social Geography	4
GRB/GRA 508	Theory	Cultural Geography	4
GRB/GRA 509	Theory	Agricultural Geography	4
<b>Total</b>			<b>20</b>

**Semester-VI**

<b>Paper Code</b>	<b>Type</b>	<b>Title of the Paper</b>	<b>Credits</b>
GRB/GRA 601	Theory	Evolution of Geographical Thought	4
GRB/GRA 602	Theory	Climatology	4
GRB/GRA 603	Practical	Geological Map and Map Projection	4
GRB/GRA 604	Practical	Remote Sensing	4
<b>Students will select only ONE from the following elective Theory Papers (GRB/GRA 607 and GRB/GRA 608)</b>			
GRB/GRA 605	Theory	Biogeography	4
GRB/GRA 606	Theory	Settlement Geography	4
<b>GRB/GRA 607</b>	<b>Theory</b>	<b>Political Geography</b>	<b>4</b>
<b>GRB/GRA 608</b>	<b>Theory</b>	<b>Regional Planning</b>	<b>4</b>
GRB/GRA 609	Theory	Industrial Geography	4
<b>Total</b>			<b>20</b>

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**First Year: Semester I**  
**GRB/GRA 101: Theory**  
**Physical Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**The Earth System:** Earth in the solar system; Hypotheses of the origin of the Earth (Jeans and Jeffreys, Russel, Hoyle and Lyttleton); Relevance of rotation, revolution and inclination of the earth; Interior of the earth.

**Unit II**

**Lithosphere:** Earth's movements; Major landforms: mountains, plateaus and plains; Rocks: origin and classification; Gradational processes: weathering and erosion; Works of running water, glacier and wind; Normal cycle of erosion;

**Unit III**

**Atmosphere:** Composition and structure of atmosphere; Insolation; Temperature: vertical and horizontal distribution; Pressure belts and wind systems.

**Unit IV**

**Hydrosphere:** Theories of origin of ocean basin (Tetrahedral); Temperature and salinity of ocean water; Ocean currents; Tides; 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. Bunnett, 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, M.B. (2001): *Bhoutik Bhugol*, Tara Book Agency, Varanasi
9. Singh, S. (2003): Physical Geography. (English and Hindi editions.). Prayag Pustak Bhawan, Allahabad;
10. Strahler, A.N. and Stahler, A.M. (1992): Modern Physical Geography. John Wiley and Sons, New York.
11. 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.

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**First Year: Semester I**  
**GRB/GRA 102: Practical**  
**Map Reading and Interpretation**

Credits: 2

**Scale and Profile:** Construction of scale: simple, diagonal and comparative; Profiles (serial, superimposed, projected and composite).

**Relief and Toposheets:** Survey of India Maps: nomenclature, indexing and numbering of topographical sheets; Interpretation of topographical sheets; **Relief features.**

**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.

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**First Year: Semester II**  
**GRB/GRA 201: Theory**  
**Human Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic concepts:** Meaning, nature and scope of human geography; Principles of human geography; Schools of thought in human geography: determinism, possibilism, neo-determinism and probablism.

**Unit II**

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

**Unit III**

**Population Characteristics:** Growth of population; Distribution of population; Major human agglomerations; Types of migration; Trends of urbanization.

**Unit IV**

**Human settlements:** Rural settlement: 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.

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**First Year: Semester II**  
**GRB/GRA 202: Practical**  
**Map Projection and Weather Map**

Credits: 2

**Map Projection (Graphical Method):** Classification and choice of map projections; Construction, characteristics and use of cylindrical (equal area), conical (One and two standard parallels, Bonne's) and zenithal: Perspective (gnomonic, stereographic and orthographic) and non-perspective (equal area and equidistant) projections.

**Weather Map:** Weather symbols, representation of atmospheric features, interpretation of Indian daily weather maps (July and January).

**Books Recommended**

1. Misra, R.P. and Ramesh A. (1989): Fundamentals of Cartography, Concept Publishing Company, New Delhi.
2. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London.
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. 5<sup>th</sup> edition, John Wiley and Sons, New York,
5. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
6. Sharma, J. P. (2001): *Prayogik Bhugol*. Rastogi Publication, Meerut 3<sup>rd</sup> edition.
7. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,
8. Hinks, A. R. (1921): Map Projection, Cambridge University Press, London.
9. Steers, J. A. (1965): An Introduction to the Study of Map Projection. University of London Press, London.

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**First Year: Semester II**  
**Ancillary Paper**  
**GRB 203-A: Theory**  
**Man and Environment**

Credits: 2  
Number of Lectures: 26

**Unit I**

**Evolution of Man:** Evolution of man; Human race: bases and classification; Human interaction with environment; Characteristics of primitive societies: Bushmen, Eskimo, Naga and Jarawa.

**Unit II**

**Natural Environment:** Meaning and components; Food chain and food web; Forms and functions of ecosystems: terrestrial, aquatic; Biomes: meaning and types.

**Unit III**

**Environmental Issues:** Biodiversity: types, depletion and conservation; Climate change; Environmental conservation and management.

**Books Recommended**

1. Chisholm, M. (1985): Human Geography, 2<sup>nd</sup> edition, Penguin Books, London.
2. De Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2<sup>nd</sup> edition. John Wiley and Sons, New York.
3. Johnston, R. J., Gregory, D., Pratt, G. and Watts, M. (2000): The Dictionary of Human Geography. 4<sup>th</sup> 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.
8. Sharma, P.R., Yadava, R.S. and Sharma, V.N. (ed.) (2013): Interdisciplinary Advances in Environmental and Earth System Studies, R.K. Books, New Delhi.
9. Sinha, B.R.K. (2009): Population, Environment and Development, New Century Publication, New Delhi.

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**Second Year: Semester III**  
**GRB/GRA 301: Theory**  
**Economic Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning, concepts and approaches of economic geography; Classification of economic activities; Spatial organization of economic activities; Economic organization of space; Resource: meaning, concept and classification.

**Unit II**

**Primary economic activities:** Forestry, fishing and mining; agricultural typologies, agricultural land use model (J.H. Von Thunen); agricultural region of the world (Derwent Whittlesey).

**Unit III**

**Secondary economic activities:** Types of industries; Factors of location of industries; iron and steel, cotton textiles and sugar; Theories of industrial location (Alfred Weber).

**Unit IV**

**Tertiary economic activities:** World transportation: Sea routes and major trans-continental railways; WTO and International trade: Patterns and trends; 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 (3<sup>rd</sup> 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 Geographics of Globalisation: A short Introduction. Cheltenham, UK : Edward Elgar



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**Second Year: Semester III**  
**GRB/GRA 302: Practical**  
**Cartographic Representation of Data**

Credits: 2

**Representation of Data:** Nature and types of data; Representation of data: bar diagram, histogram, frequency curve, ogive; Traffic flow diagram; Slope analysis: Smith and Wentworth.

**Distribution Maps and Diagrams:** Rainfall dispersion diagram, water balance graph; Distribution maps: dot, isopleth, choropleth, chorochromatic and choroschematic.

**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.

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**Second Year: Semester IV**  
**GRB/GRA 401: Theory**  
**Regional Geography of Developed and Developing World (U.S.A. and China)**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Concepts of region and development, bases and approaches of classifying world into developed and developing countries; Characteristics of developed and developing world; Levels of development: developed, developing, under-developed and least-developed world.

**Unit II**

**Physical Elements:** Landforms, climate, soils, vegetation, power and mineral resources of USA and China.

**Unit III**

**Cultural Elements:** Population, agriculture, industries of USA and China.

**Unit IV**

**Regions of Developed and Developing World:** Agricultural and industrial regions of USA; Agricultural and geographical regions of China.

**Books Recommended**

1. Pulsipher and Pulsipher, (2008): *World Regional Geography: Global Patterns, Local Lives*, Fourth Edition, W.H. Freeman and Company, New York.
2. Hepner, G. F. and McKee, O. Jesse (1992): *World Regional Geography: A Global Approach*, West publishing Company, New York.
3. Harm J. de Blij, Jan Nijman, Peter O. Muller, (1993): *Geography: Realms, Regions, and Concepts*, Wiley, New York
4. Jackson, R. H. and Husman, L. E. (1991): *World Regional Geography: Issues for Today*. John Wiley and Sons, New York.
5. Jones, P. and Bryan, P. (1954): *North America: An Historical, Economic and Regional Geography*, Methuen and Company. Ltd, London.
6. Kolb, A. (1971): *East Asia, China, Japan, Korea, Vietnam*, Methuen, London.
7. Rai, Gayatri (2007): *Vishwa Ka Pradeshik Bhugol*, Mishra Trading Corporation, Varanasi
8. Sharma, P. R. (ed.) (1991): *Perspectives on Third World Development*. Rishi Publication, Varanasi.
9. Stamp, L. D. (1976): *Asia: A Regional and Economic Geography*, Methuen, London.

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**Second Year: Semester IV**  
**GRB/GRA 402: Practical**  
**Surveying**

Credits: 2

**Basics of Surveying:** Surveying: meaning, classification, merits and demerits.

**Instrumental Survey:** Survey with Chain Tape, Plane Table, Prismatic Compass, Clinometer and GPS.

**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.
6. Punmia, B.C. (1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3<sup>rd</sup>. edition.
8. Shephard, F.A. (1968): Surveying Problems and Solutions, Edward Arnold (Publishers) Ltd, London
9. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions), Kalyani Publishers, Ludhiana and New Delhi.
10. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

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**Second Year: Semester IV**

**Ancillary Paper**  
**GRB 403-A: Theory**  
**Basics of Remote Sensing**

Credits: 2  
Number of Lectures: 26

**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: platform and sensors.

**Unit III**

**Remote Sensing data processing and applications:** Visual and digital image processing techniques; Remote Sensing applications in resource mapping and environmental monitoring.

**Books Recommended**

1. Bhatta, B. (2010): Remote Sensing and GIS, Oxford University Press, New Delhi.
2. Campbell, J.B. (2002): Introduction to Remote Sensing. 5<sup>th</sup> edition, Taylor and Francis, London
3. Chauniyal, D. D. (2004): Remote Sensing and Geographic Information Systems. (in Hindi). Sharda Pustak Bhawan, Allahabad.
4. Curran, P.J. (1985): Principles of Remote Sensing, Longman, London
5. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4<sup>th</sup> edition. John Wiley and Sons, New York
6. Nag Prithvish and Kudrat M. (1998): Digital Remote Sensing, Concept Publishing Company, New Delhi.

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**Third Year: Semester-V**  
**GRB/GRA 501: Theory**  
**Geomorphology**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning and scope of geomorphology; Principles and basis of geological time-scale; Fundamental concepts: uniformitarianism and dynamic equilibrium; Relief and differential rate of geomorphic process.

**Unit II**

**Instability of the Earth:** Isostasy; continental drift theory; plate tectonics; mountain building theory (Kober and Holmes); earthquakes, vulcanicity.

**Unit III**

**Gradation Processes:** Cycle of erosion: contributions of Davis and Penck; Interruption in cycle of erosion; Geomorphic agents and processes: fluvial, aeolian, glacial, peri-glacial, marine and karst; Mass wasting; Types and patterns of drainage.

**Unit IV**

**Applied Geomorphology and Regional Landscape:** Geomorphology and hazard management; Geomorphology and soil; 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. Dayal, P. (1994): A text book of Geomorphology, Kalyani Publishers, New Delhi.
4. Holmes, A. (1987): Principles of Physical Geology. Nelson, New York, 3<sup>rd</sup> edition.
5. Kale, V. and Gupta, A. (2001): Elements of Geomorphology. Oxford University Press, Delhi.
6. Singh, S. (2000): Geomorphology. (in Hindi). Vasundhra Prakashan, Gorakhpur.
7. Singh, S. (2004): Geomorphology, Prayag Pustak Bhawan, Allahabad
8. Skinner, B. J. and Porter, S.C. (1996): The Dynamic Earth. John Wiley and Sons, New York,
9. Sparks, B.W. (1969) : Geomorphology. Longman, London.
10. Stoddard, D. R. (ed.)(1996): Process and Form in Geomorphology. Routledge, London.
11. Thornbury, W. D. (1990): Principles of Geomorphology. Wiley Eastern Edition, New York.
12. Sharma, P. R. and Mishra, S.P. (eds.), (1993): Applied Geomorphology in Tropics. Rishi Publications, Varanasi.

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**Third Year: Semester-V**  
**GRB/GRA 502 : Theory**  
**Geography of India**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Physiography and Resources:** Geology; Physiographic division; Drainage systems; Climate and climatic regions; Soils and natural vegetation; Mineral and power resources: iron ore and coal.

**Unit II**

**Agriculture:** Means of irrigation; Major crops: rice, wheat, cotton, sugar cane and tea; Agricultural regions; Green Revolution and its consequences; Multipurpose projects: Damodar valley and Bhakhra Nangal.

**Unit III**

**Industry, Transport and Trade:** Major industries: iron and steel, cotton textile and sugar; Transport network and trade: structure and recent trends; Special Economic Zones and Exclusive Economic Zones.

**Unit IV**

**Regionalization:** Geographic: R. L. Singh; Economic: P. Sen Gupta and Cultural: N. K. Bose; Regional studies: Garhwal Himalaya and Great Indian desert.

**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: Bhaugolik 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.

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**Third Year: Semester-V**  
**GRB/GRA 503: Practical**  
**Quantitative Methods**

Credits: 4

**Central Tendency:** Frequency distribution; Mean, median, mode; Measures of dispersion: mean deviation, standard deviation.

**Correlation and Regression:** Correlation (Karl Pearson and Spearman) and Scatter diagram; Regression analysis; Location quotient, Lorenz curve, Ginni coefficient.

**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.

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**Third Year: Semester-V**  
**GRB/GRA 504: Practical**  
**Geographical Field Training**

Credits: 4

**Principles of Field Training:** Meaning and objectives of field training; Field as laboratory of geography; Contents of field training: physical, social, economic and cultural; Field training techniques; Field training based report writing.

**Field Visit:** Students will visit any one of the following geographical regions for field training for duration of one to two weeks: Himalayan Region, Vindhyan Plateau, Thar Desert and Aravali Hills, Coastal region of India, North-eastern India and Nepal.

**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. Parsons, Tony and Knight, Peter G. (2005): *How to do your Dissertation in Geography and Related Disciplines*. Routledge, London. 2<sup>nd</sup> Ed.
7. 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.
8. Hay, Iain (ed.) (2005): *Qualitative Research Methods in Human Geography*. Oxford University Press, Melbourne. 2<sup>nd</sup> Ed.
9. Hay, Iain (ed.) (2004): *Communicating in Geography and the Environmental Sciences*. Oxford University Press, Melbourne. 2<sup>nd</sup> Ed.
10. Stoddard, Robert H. (1982): *Field Techniques and Research Methods in Geography*. Kendall/Hunt Pub. Dubuque IO.



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**Third Year: Semester-V**  
**Optional Paper**  
**GRB/GRA 505: Theory**  
**Oceanography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts of Oceans:** Meaning and scope of oceanography; Origin of oceans; Ocean basins: continental shelf, continental slope, deep sea plains, ocean deeps, submarine canyons.

**Unit II**

**Properties and Circulation:** Physical and chemical properties of sea water: temperature, density, salinity; Circulation of ocean water: tides and currents.

**Unit III**

**Marine Life and Deposits:** Coral reefs: origin, types, characteristics and theories; Classification and distribution of marine deposits.

**Unit IV**

**Human Ocean Relation:** Mineral and energy resources; Indian ocean realm; Geo-politics of Indian ocean; Maritime security; Global warming and sea level change.

**Books recommended**

1. Sverdrup, Keith A., Duxbury, Alyn C., Duxbury, Alison B. (2006). Fundamentals of Oceanography, McGraw-Hill
2. Sverdrup, Harald Ulrik; Johnson, Martin Wiggo; Fleming, Richard H. (1942). The Oceans, Their Physics, Chemistry, and General Biology. New York: Prentice-Hall.
3. Cuchlaine A.M. King, (1965), Oceanography for geographers, Edward Arnold Ltd, London.
4. Gerhard Neumann, Willard J. Pierson, Jr. (1966), Principles of Physical Oceanography, Prentice-Hall, Inc. Englewood Cliffs, N.J.
5. Lal, D.S. (2009), Climatology and Oceanography, Sharda Pustak Bhavan, Allahabad.
6. McPherson, Kenneth. (1993). The Indian Ocean: A History of People and the Sea. Oxford: Oxford University Press.
7. Pearson, Michael. (2003). The Indian Ocean. Routledge, London.
8. Vatal, M., Sharma, R.C. (2011), Oceanography for Geographers, Chaitanya Publishing House, Allahabad.
9. Talley L.D., Pickard G.L., Emery W.J. and Swift J.H. (2011). Descriptive Physical Oceanography: An Introduction (Sixth Edition), Elsevier, Boston.

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**Third Year: Semester-V**  
**Optional Paper**  
**GRB/GRA 506: Theory**  
**Population Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning, nature, scope and development of population geography; Approaches in studying population geography; Sources and types of population data: census, sample survey, vital registration system and miscellaneous.

**Unit II**

**World Population:** Growth, causes and consequences; Population distribution; Migration: concept, types, determinants and consequences; Urbanization: trends and patterns.

**Unit III**

**Population Dynamics:** Fertility and mortality; Demographic Transition Theory; Human resource development: indicators and patterns; Population problems.

**Unit IV**

**Indian Population:** Growth and distribution of population; Density types; Literacy; Age and sex structure; Occupational structure; 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.

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**Third Year: Semester-V**  
**Optional Paper**  
**GRB/GRA 507: Theory**  
**Social Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning, scope and approaches of social geography; Concept of tribe, ethnicity, society, gender, social space; Social differentiation and stratification; Social morphology.

**Unit II**

**Social Regionalization:** Social differentiation and region formation; Bases of social region formation; Racism and racial discriminations; Ethnicity, identity and urban segregation; Social stratification and exclusion.

**Unit III**

**Social Structure in India:** Peopling of India; Evolution of social regions; Tribes and their distribution; Caste: concept & hierarchy; Unity in diversity; Gender and human development.

**Unit IV**

**Social Well-being in India:** Concept of social wellbeing; Social issues: crime, health care, education and housing; Gender issues; Social policies and planning; Social impact assessment.

**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. Norton, W. (2006): Cultural Geography. Environments. Landscapes. Identities. Inequalities. Oxford University Press, Toronto. 2<sup>nd</sup> edition.
16. Sharma, K.L. (1980): Essays on Social Stratification, Rawat Publications, Jaipur and New Delhi, first edition.
17. Smith, D. (1977): Geography: A Welfare Approach. Edward Arnold, London.
18. Sopher, D. (1980): An Exploration of India: Geographical Perspectives on Society and Culture, Cornell University Press, Ithaca, New York, first edition.
19. 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.
20. Stump, Roger W. (2008): *The Geography of Religion: Faith, Place, and Space*. Rowman & Littlefield Publs., Lanham USA.
21. Valentine, G. (2001): Social Geographies: Space and Society. Prentice Hall, Harlow, UK.

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**Third Year: Semester-V**  
**Optional Paper**  
**GRB/GRA 508: Theory**  
**Cultural Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Concepts and Approaches:** Meaning, scope and approaches; Concepts: culture, society, civilization, cultural hearth, culture area, core, domain, sphere; Major contributions: German, French, British and American.

**Unit II**

**Evolution of Culture:** Evolution of early human groups, beginnings of civilizations; Cultural regions: world regions, vernacular regions; Cultural landscapes: development and adaptation; Cultural globalization; Cultural turn.

**Unit III**

**Cultural Issues:** Language: Classification and regions, language and identity, language and nationalism; Language in landscape: toponyms; Religions: classification and regions, religion, identity and conflict, religious landscapes.

**Unit IV**

**Indian Cultural Issues:** Linguistic regions of India; Multilingual states; National language: myth and reality; Cultural regions of India; Minority languages and dialects; Indigenous religious belief systems; Folk cultures; Food cultures.

**Books Recommended**

1. Appadurai, A. 1996: *Modernity At Large: Cultural Dimensions Of Globalization*. Minneapolis: University of Minnesota Press.
2. Barber, C.L. 1965. *The Story of Language*. London: The English Language Book Society and Pan Books Ltd.
3. Bhardwaj, S.M. 1973. *Hindu Places of Pilgrimage in India*. Berkeley: University of California Press.
4. Blunt, A., Gruffudd, P., May, J. and Ogborn, M. 2003: *Cultural geography in practice*. London: Arnold.
5. Crang, M. 1998: *Cultural Geography*. London: Routledge.
6. Kosambi, D.D. 1972. *The Culture and Civilization of Ancient India in Historical Outline*. New Delhi: Vikas Publications.
7. Maloney, C. 1974. *People of South Asia*. New York: Winston Norton.
8. Norton, W. 2006. *Cultural Geography. Environments. Landscapes. Identities. Inequalities* (2<sup>nd</sup>ed.). Toronto: Oxford University Press.
9. Parekh, B. 2000: *Multiculturalism: Cultural Diversity and Political Theory*. London: Macmillan Press.
10. Singh, Rana P.B. 2004. *Cultural Landscapes and the Lifeworld: Literary Images of Banaras*. Varanasi: Indica Books.
11. Sopher, David E., ed. 1980. *An Exploration of India: Geographical Perspectives on Society and Culture*. Ithaca, New York: Cornell University Press.
12. Stump, Roger W. 2008. *The Geography of Religion: Faith, Place, and Space*. Lanham (USA): Rowman& Littlefield Publishers.
13. Subbarao, B. 1958. *Personality of India: Pre- and Proto- Historic Foundation of India and Pakistan*. 2<sup>nd</sup> edition. M.S. University Baroda, Vadodara.
14. Wagner, P. and M. Mikesell, eds, 1962. *Readings in Cultural Geography*. Chicago: The University of Chicago
15. Weber, Max. 1965. *The Sociology of Religion*. London: Methuen & Co.

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**Third Year: Semester-V**  
**Optional Paper**  
**GRB/GRA 509: Theory**  
**Agricultural Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning and scope; Approaches to study of agricultural geography; Physical, cultural and institutional factors affecting agriculture; Von Thunen model.

**Unit II**

**Agricultural Patterns:** Agricultural type and typology; Subsistence, plantation, commercial and mixed farming; Crop concentration and crop diversification; Delineation of crop combination regions; Agricultural regions of the world.

**Unit III**

**Agricultural Measures:** Land use pattern; concept of carrying capacity of land; Measures of agricultural efficiency and agricultural productivity.

**Unit IV**

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

**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.

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**Third Year: Semester-VI**  
**GRB/GRA 601: Theory**  
**Evolution of Geographical Thought**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basics of Geographical Thought:** Philosophy of geography; Place of geography in the knowledge system; Fundamental concepts of geography: location, space, place, region, time; Geography as a science; Approaches to the study of geography.

**Unit II**

**Geographical Thought:** Greek, Roman, Arab; Geography re-thought: Varenus and Immanuel Kant; Modern period of classical geography: Humboldt and Ritter.

**Unit III**

**Schools of Geographical Thought:** German, French, British and American; Quantitative revolution and its challenges; Dualism and Dichotomy in geography.

**Unit IV**

**Evolution of Geography as a Discipline in India:** Geography in ancient and medieval India; Development of geography in colonial period, post-independence scenario; Indian geography: contemporary trends.

**Books Recommended**

1. Ali, S.M. (1960): Arab Geography, Institute of Islamic Studies, Aligarh Muslim University, Aligarh, First Edition.
2. Diddee, J. (ed.) (1990): Indian Geography, Institute of Indian Geographers, Pune, first edition.
3. Dikshit, R. D. (2003): Geographical Thought. A Critical History of Ideas. Prentice-Hall of India, New Delhi. (in English and Hindi).
4. Dube, B. (1967): Geographical Concepts in Ancient India, National Geographical Society of India, Varanasi
5. Getice, A., Getis, J. and Fellman, J. D. (2007): Introduction to Geography. 10<sup>th</sup> edition. McGraw Hill, New York.
6. Hartshorne, R. (1959): Perspective on the Nature of Geography, John Murray, London
7. Harvey, D. (1969): Explanations in Geography. Arnold, London.
8. Holt-Jensen, A. (1980): Geography: Its History and Concepts. Harper and Row Publishers, London.
9. Husain, Majid. (2002): Evolution of Geographical Thought, Rawat Publications, Jaipur.
10. Johnston, R. and Sidaway, J.D. (2004): Geography and Geographers: Anglo-American Human Geography Since 1945, Arnold Publishers, London.
11. Johnston, R., Gregory, D., Pratt, G., Watts, M. and Whatmore, S. (2003): The Dictionary of Human Geography. Blackwell Publishers, Oxford. 5th edition.
12. Rawling, E. and Daugherty, R. (eds.) (2005): Geography into the Twenty-first Century. 2<sup>nd</sup> edition. John Wiley and Sons, Chichester.
13. Sharma, P.R., Yadava, R.S., Sharma, V.N., (ed.) 2013: Inter Disciplinary Advances in Geography, R.K. Books, New Delhi.
14. 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).
15. 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).
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

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**Third Year: Semester-VI**  
**GRB/GRA 602: Theory**  
**Climatology**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Bases of Climatology:** Meaning and scope; Development and recent trends in climatology; Subdivisions of climatology; Elements of weather and climate; Climate and human health.

**Unit II**

**Functions of Atmosphere:** Composition and structure of atmosphere; Determinants and distribution of insolation, temperature and humidity; Heat budget of earth and atmosphere; Air stability and its importance; Laws of horizontal motion and general atmospheric circulation; Air Masses: classification and characteristics.

**Unit III**

**Weather Phenomena:** Clouds and Precipitation: formation and types; Fronts: source regions, types and associated weather; Cyclones: tropical and temperate; Monsoon, jet-stream and their significance with reference to India.

**Unit IV**

**Climate and Human Response:** Climatic classification: Köppen and Thornthwaite; Climate change: causes, evidences and hypotheses; 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.

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**Third Year: Semester-VI**  
**GRB/GRA 603: Practical**  
**Geological Map and Map Projection**

Credits: 4

**Geological Map:** Outcrop map, strike, dip; Conformable geological structure and their description.

**Map Projections (Mathematical Method):** Conical: Bonne's, Sinusoidal and Polyconic; Cylindrical: Mercator's; Zenithal: Gnomonic (Equatorial); International 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. 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.
7. Steers, J. A. (1965): An Introduction to the Study of Map Projection. University of London Press, London.



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**Third Year: Semester-VI**  
**GRB/GRA 604: Practical**  
**Remote Sensing**

Credits: 4

**Element of Remote Sensing:** Fundamentals of remote sensing; Interpretation of aerial photographs and satellite imageries; Elements of aerial photograph and image interpretation.

**Interpretation of Aerial photograph and Imagery:** Stereoscopic vision test; Determination of photo scale, identification and interpretation of geomorphic features and land use/land cover map from stereogram and satellite images.

**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.

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**Third Year: Semester-VI**  
**Optional Paper**  
**GRB/GRA 605: Theory**  
**Bio-geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basics of Biogeography:** Meaning and scope of biogeography; Concept and components of ecosystem; Biosphere as an ecosystem; Concept of bio-geo-chemical cycles; Geological time-scale and evolution of life; Theories of evolution-natural selection and mutation.

**Unit II**

**Spatial Patterns of Flora and Fauna:** Dispersal of plants and animals; Factors affecting distribution of flora & fauna; Bio-geographical regions: meaning and concept, phyto-geographical and zoogeographical regions of the world, bio-geographical regions of India.

**Unit III**

**Terrestrial and Marine Biogeography:** Major biomes of the world: tundra, temperate forests and grasslands, tropical forests and savannah grasslands, mangrove forest and swamps; Distribution of marine biological communities; Island biogeography: dispersal of species.

**Unit IV**

**Biodiversity and Environmental Conservation:** Effects of human activities on plants and animals; Biodiversity: concept, extinction and conservation, biodiversity hotspots of India; Environmental conservation in India: national parks, wildlife sanctuaries, bio-reserves.

**Books Recommended**

1. Cox, C.B. and P.D. Moore, *Biogeography: An ecological and evolutionary Approach*. Oxford: Blackwell, 2005,
2. Dansereau, P. M., 1957: *Biogeography: An ecological Perspective*, Ronald Press.
3. Darlington, P., *Zoogeography*, New York.
4. Huggett, R.J., *Fundamentals of Biogeography*, Routledge, U.S.A, 1998.
5. MoEF, 2006: *National Environmental Policy-2006*, Ministry of Environment and Forests, Government of India.
6. Jones, R.L., *Biogeography: Structure, Process Pattern and Change within a Biosphere*.
7. Lomolino M. V., Riddle B. R., Whittaker R., and Brown J. H., 2010: *Biogeography*, Sinauer Associates.
8. Mathur H. S., 1998: *Essentials of Biogeography*, Anuj Printers, Jaipur.
9. Millington A., Blumer M. and Schickhoff U., 2011: *Sage Handbook of Biogeography*, Sage.
10. Newbigin, M.I., *Plant and Animal Geography*, London.
11. Odum, E. P. et al, 2005: *Fundamentals of Ecology*, Cengage Learning India.
12. Sharma, P.R., Yadava, R.S. and Sharma, V.N. (ed.) (2013): *Interdisciplinary Advances in Environmental and Earth System Studies*, R.K. Books, New Delhi.
13. Simmon, I.G., *Biogeography: Natural and Cultural*, Longman, London 1974.
14. Tivy J., 1977: *Biogeography: A Study of Plants in the Ecosphere*, Oliver & Boyd, Edinburg.
15. Watts, David, *Principles of Biogeography*, London.

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**Third Year: Semester-VI**  
**Optional Paper**  
**GRB/GRA 606: Theory**  
**Settlement Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basics Concepts:** Meaning, nature and scope; Approaches to study of settlement geography; Human settlement as a system; Central Place Theory (Christaller).

**Unit II**

**Rural Settlement:** Definition, characteristics, types and regional pattern; Factors affecting rural settlements (physical, social, economic); Rural houses: types and regional patterns.

**Unit III**

**Urban Settlement:** Evolution, growth and classification of towns; Internal structure of cities (classical models); Trend and patterns of urbanization in developed and developing world.

**Unit IV**

**Planning and Policy in India:** Morphological characteristics of Indian villages and cities (Delhi, Lucknow and Varanasi); Rural housing planning and policies; Urban problems related to housing and slums; Urban policies.

**Books Recommended**

1. Daniel, P. (2002): Geography of Settlement. Rawat Publications., Jaipur and New Delhi.
2. Ghosh, S. (1999): A Geography of Settlements. Orient Longman, Kolkata.
3. Hudson, F. S. (1976): A Geography of Settlements. MacDonald and Evans, New York.
4. Singh, R.L. (eds.) (1973): Rural Settlements in Monsoon Asia, National Geographical Society of India, Varanasi.
5. Singh, R. L., Singh, K.N. and Singh, Rana P.B., (eds.) (1975): Readings in Rural Settlement Geography, National Geographical Society of India, Varanasi.
6. Singh, R.Y. (2005): Geography of Settlements. Rawat Publications, Jaipur and New Delhi.
7. Tiwari, R. C. (2000): Settlement Geography; in Hindi. Prayag Pustak Bhawan Allahabad.
8. Wood, M. (2005): Rural Geography: Processes, Responses and Experiences of Rural Restructuring. Sage Publication, London.
9. 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.
10. Pacione, M. (2005): Urban Geography: A Global Perspective, Routledge, London and New York.
11. Ramachandran, R., (1991): Urbanisation and Urban Systems in India. Oxford University Press, Delhi.
12. Rao, B. P. and Sharma, N. (2007): *Nagariya Bhoogol*, Vasundhara Prakashan, Gorakhpur.
13. Singh, O. P. (1987): *Nagariya Bhoogol*, Tara Book Agency, Varanasi
14. Stanley, B., Jack, W. and Donald, Z. (eds.) (2003): Cities of the World. Rowman and Littlefield, New York and Oxford.

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**Third Year: Semester-VI**  
**Optional Paper**  
**GRB/GRA 607: Theory**  
**Political Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning, scope, approaches, historical development, recent trends in political geography; Geopolitics.

**Unit II**

**Emerging Issues:** Nations, states and nation states; Frontiers and boundaries; Capital cities, core and periphery regions.

**Unit III**

**Bases of Relations:** Geographical basis of international relations; Conflict resolution; Strategic locations, routes and raw material; Geostrategic regions of the world; Heartland and Rimland: changing concepts and contemporary issues.

**Unit IV**

**Geo-politics in Indian context:** Geo-political and geo-economic significance of Indian Ocean, West Asia and Central Asia; Problems of nation building in India; Geopolitics of 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. Percy, G. E. and Fifiield, 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.

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**Third Year: Semester-VI**  
**Optional Paper**  
**GRB/GRA 608: Theory**  
**Regional Planning**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Concepts:** Nature, scope and approaches to the study of regional planning; Theoretical bases of regional planning: cumulative causation, growth pole and growth foci; Multi level planning and participatory approach to planning.

**Unit II**

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

**Unit III**

**Regional Planning:** Evolution of Regional Planning in India; Schemes of regionalization; Macro and Meso planning regions of India; Institutional arrangement for regional planning.

**Unit IV**

**Planning and Policy in India:** Local-level planning and Panchayati Raj; National Capital Region; Planning for Eastern Uttar Pradesh; Dandakaranya region.

**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 Prakasarao, 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. Sharma, V.N. (2001): *Industrial Development and Planning in India*, Radha Publications, New Delhi,
16. Singh, Ravi S. 2005. *Paths of Development in Arunachal Pradesh*. New Delhi: Northern Book Centre.
17. Sundaram, K.V. (1977): *Urban and Regional Planning in India*, Vikas Publishers. New Delhi.
18. Sundaram, K.V. (1997): *Decentralized Multilevel Planning: Principles and Practice*. Asian and African Experience. Concept Publishing Company, New Delhi

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**Third Year: Semester-VI**  
**Optional Paper**  
**GRB/GRA 609: Theory**  
**Industrial Geography**

Credits: 4  
Number of Lectures: 52

**Unit I**

**Basic Concepts:** Meaning and scope of industrial geography; Recent trends in industrial geography; Classification of industries; Concepts of industrialization, industrial complex and industrial estate; Role of industries in regional development.

**Unit II**

**Location Factors and Theories:** Factors of industrial location; Linkage in Industries; Theories of industrial location: Weber, Hoover, Lösch and Smith.

**Unit III**

**Spatial Arrangement of Industries:** Localization and distribution of iron & steel, cotton textile and sugar industries; Bases of identification of industrial regions; Industrial regions of U.S.A. and West Europe.

**Unit IV**

**Industrialization in India:** Industrial development and policies; Industrial regions and complexes; Impact of globalization on industries; Problems of industrialization; Environmental impact of industrialization; Tourism as an industry; Tourism in Uttar Pradesh.

**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): Geography of Manufacturing. Prentice-Hall, Englewood Cliffs, New Jersey.
5. Riley, R. C. (1973): Industrial Geography, Chatto and Windus Ltd. London.
6. Sharma, V.N. (2001): Industrial Development and Planning in India, Radha Publications, New Delhi,
7. Singh, M. B. (1990): New Perspectives in Industrial Geography. Lotus Publication, Varanasi.
8. Singh, M. B. (1988): Industrial Geography. Lotus Publication, Varanasi.