

**Undergraduate Syllabus  
for  
BSc (Hons) Course in Geography  
Choice Based Credit System (CBCS)**

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**EFFECTIVE FROM  
ACADEMIC SESSION 2017-18**



**Jadavpur University**

**Kolkata 700032**

## Scheme of CBCS Curriculum

### Credit Distribution across Courses

Course Type	Total papers	Credits
		Theory + Practical
Core Courses	14	14*4 =56 14*2 =28
Discipline Specific Electives	4	4*4=16 4*2=8
Generic Electives	4	4*4=16 4*2=8
Ability Enhancement Courses	2	2*2=4
Skill Enhancement Courses	2	2*2=4
<b>Total</b>	<b>26</b>	<b>140</b>

## Scheme of UG Course in Geography under Choice Based Credit System (CSBS)

### A: Courses for Honours Students

Semester	Course	Paper Code	Title	Credit	Remarks
<b>I</b>	UG/Sc/Core/Geog/T/01	C101T	Geotectonics and Geomorphology	06	Compulsory
	UG/Sc/Core/Geog/T/02	C102T	Cartographic Techniques	04	
	UG/Sc/Core/Geog/P/02	C102P	Cartographic Techniques (lab)	02	
	UG/Sc/GE/01	GE101	-	06	Any one of the following Physics/Chemistry/ Statistics/Geology
	UG/Sc/AECC/01	AE101	Communicative English	06	Compulsory
<b>II</b>	UG/Sc/Core/Geog/T/03	C 203 T	Human Geography	06	Compulsory
	UG/Sc/Core/Geog/T/04	C 204 T	Cartograms and Thematic Mapping	04	
	UG/Sc/Core/Geog/P/04	C204 P	Cartograms and Thematic Mapping (Lab)	02	
	UG/Sc/GE/02	GE 202	Mathematics	06	Compulsory
	UG/Sc/AECC/02	AE202	Environment Studies	02	Compulsory
<b>III</b>	UG/Sc/Core/Geog/T/05	C305 T	Climatology	06	Compulsory
	UG/Sc/Core/Geog/T/06	C306 T	Geography of India	06	
	UG/Sc/Core/Geog/T/07	C307 T	Statistical Methods in Geography	04	
	UG/Sc/Core/Geog/P/07	C307 P	Statistical Methods in Geography Lab	02	
	UG/Sc/GE/03	GE303	Mathematics	06	Compulsory
	UG/Sc/SEC/01	SE301	Computer Basics	02	Compulsory

IV	UG/Sc/Core/Geog/T/08	C408 T	Regional Planning and Development	04	Compulsory
	UG/Sc/Core/Geog/P/08	C408 P	Regional Planning and Development (Lab)	02	
	UG/Sc/Core/Geog/T/09	C409 T	Economic Geography	06	
	UG/Sc/Core/Geog/T/10	C410 T	Environmental Geography	04	
	UG/Sc/Core/Geog/P/10	C 410 P	Environmental Geography (Lab)	02	
	UG/Sc/GE/04	G404	-	06	Any one of the following Physics/Chemistry Statistics/Geology
	UG/Sc/SEC/02	SE402	Remote Sensing Techniques and Applications	02	Compulsory
V	UG/Sc/Core/Geog/T/11	C511 T	Field Work and Research Methodology	04	Compulsory
	UG/Sc/Core/Geog/P/11	C511P	Field Work and Research Methodology (Lab)	02	
	UG/Sc/Core/Geog/T/12	C 512 T	Remote Sensing and GIS	04	Compulsory
	UG/Sc/Core/Geog/P/12	C 512 P	Remote Sensing and GIS (Lab)	02	
	UG/Sc/DSE/01	DE 501T	A. Soil and Biogeography	04	Students to choose any two courses (one from UG/Sc/DSE/01 and another from UG/Sc/DSE/02)
		DE 501P	A. Soil and Biogeography (Lab)	02	
		DE 502T	B. Hydrology and Oceanography	06	
	UG/Sc/DSE/02	DE503T	C. Urban Geography	04	
		DE503P	C. Urban Geography (Lab)	02	
		DE504T	D. Geography of Health and Wellbeing	06	
UG/Sc/Core/Geog/T/13	C 613T	Evolution of Geographical Thought	06	Compulsory	
UG/Sc/Core/Geog/T/14	C614T	Disaster Management	04	Compulsory	

<b>VI</b>	UG/Sc/Core/ Geog/P/14	C614P	Disaster Management Lab	02	Compulsory
	UG/Sc/DSE/03	DE605T	A. Social Geography	06	Students to choose any two courses from UG/Sc/DSE/03
		DE606T	B. Population Geography	06	
		DE607T	C. Fluvial Geomorphology	04	
		DE607P	C. Fluvial Geomorphology (Lab)	02	
	UG/Sc/DSE/04	DE608	Project Report based on Fieldwork	06	Compulsory

**B: Generic Electives**  
**For students opting Geography as Generic elective**

Semester	Code	Course Title	Credits	Remarks
I	UG/Sc/GE/01	Cartographic Techniques	04+02= 06	For the students who will choose Geography as Generic Elective
IV	UG/Sc/GE/04	Regional Planning and Development	04+02= 06	-do-

**Mark Distribution of the mentioned papers is as follows:**

COURSE	CREDITS	MARKS
Core Course	$14 \times 6 = 84$	$14 \times 50 = 700$
Discipline Specific Elective Course	$4 \times 6 = 24$	$4 \times 50 = 200$
Generic Elective Course	$4 \times 6 = 24$	$4 \times 50 = 200$
Ability Enhancement Course	$2 \times 2 = 4$	$2 \times 50 = 100$
Skill Enhancement Course	$2 \times 2 = 4$	$2 \times 50 = 100$
<b>TOTAL</b>	<b>140</b>	<b>1300</b>

**Geography (Honours)**  
**Semester I**  
**Core Courses**  
**Paper – C101T: Geotectonics and Geomorphology (6 Credits)**  
**Full marks: 50**

**Unit I: Geotectonics**

**2 Credits**

1. Earth's tectonic and structural evolution with reference to geological time scale
2. Earth's interior with special reference to seismology. Isostasy: Models of Airy and Pratt
3. Plate Tectonics: Processes at constructive, conservative, destructive margins and hotspots; resulting landforms
4. Folds and Faults—origin and types

**Unit II: Geomorphology**

**4 Credits**

1. Degradational processes: Weathering, mass wasting and resultant landforms
2. Processes of entrainment, transportation and deposition by different geomorphic agents. Role of humans in landform development.
3. Development of river network and landforms on uniclinal and folded structures
4. Landforms on igneous rocks with special reference to Granite and Basalt
5. Karst landforms: Surface and sub-surface or Coastal processes and landforms
6. Glacial and fluvio-glacial processes and landforms; fluvio-glacial landforms
7. Aeolian and fluvio-aeolian processes and landforms; fluvio-aeolian processes
8. Models on landscape evolution: Views of Davis, Penck, King and Hack

**Reference Books**

- Bloom A. L., 2001: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, Third edition, New Delhi.
- Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
- Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
- Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.
- Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.
- Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP
- Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons
- Thornbury W. D., 1969: Principles of Geomorphology, Wiley.

**Paper – C102T: Cartographic Techniques (4 Credits)**

**Full Marks: 30**

1. Maps: Classification and types. Components of a map.
2. Concept and application of scales: Plain, Comparative, Diagonal and Vernier
3. Coordinate systems: Polar and rectangular. Concept of geoid and spheroid
4. Concept of generating globe. Grids: angular and linear systems of measurement
5. Bearing: Magnetic and true, whole-circle and reduced.
6. Map projections: Classification, properties and uses. Concept and significance of UTM projection.
7. Basic concepts of surveying and survey equipment: Prismatic compass, dumpy level, theodolite, Abney level, clinometer.
8. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps

**Reference Books**

- Anson R. and Ormelling F. J., 1994: International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
- Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
- Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
- Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
- Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
- Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
- Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
- Sarkar, A. (2015) Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

**Paper – C102P: Cartographic Techniques (2 Credits)**

**Full Marks: 20**

*A Project File, comprising one exercise each is to be submitted*

1. Graphical construction of scales: Plain, Comparative, Diagonal and Vernier
2. Construction of projections: Polar Zenithal Stereographic, Simple Conic with Two Standard Parallels, Bonne's, Cylindrical Equal Area, and Mercator's.
3. Delineation of drainage basin from Survey of India topographical map. Construction and interpretation of relief profiles (superimposed, projected and composite), relative relief map, slope map (Wentworth), and stream ordering (Strahler) on a drainage basin.
4. Correlation between physical and cultural features from Survey of India topographical maps using transect chart

## **Semester II Core Courses**

### **Paper – C203T: Human Geography (6 Credits)**

**Full Marks: 50**

#### **Unit I: Nature and Principles**

**2 Credits**

1. Nature and scope and recent trends. Elements of Human Geography
2. Approaches to the study of Human Geography; Resource, Locational, Landscape, Environmental
3. Evolution of humans. Concept of race and ethnicity
4. Space, society and cultural regions (language and religion)

#### **Unit II: Society, Demography and Ekistics**

**4 Credits**

1. Evolution of human societies: Hunting and food gathering, pastoral nomadism, subsistence farming, industrial and urban societies
2. Human adaptation to environment: Eskimo, Masai, Jarwa, Gaddi, Santhals.
3. Population growth and distribution, population composition; demographic transition model
4. Population–Resource regions (Ackerman)
5. Human population and environment with special reference to development–environment conflict
6. Social morphology and rural house types in India
7. Types and patterns of rural settlements
8. Types and patterns of urban settlements

#### **Reference Books**

- Bergman, E.F (1995): Human Geography-Culture, Connections and Landscape, Prentice Hall, New Jersey
- Chisholm. (1975): Human Geography, Penguin Books, Hermondsworth.
- Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
- Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
- Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.
- Norton. W. (2001): Human Geography, 4th Edition Oxford University press, Oxford
- Pearce D. (1995): Tourism Today: A Geographical Analysis, 2nd edition, Longman Scientific & Technical, London
- Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.
- Raw, M. (1986): Understanding Human Geography: A Practical Approach, Bell and Hyman. London
- Rubenstein, J.M. (2002), The Cultural Landscape, 7th edition, Prentice Hall, Englewood Cliffs
- Smith D M (1982): Human Geography: A Welfare Approach, Edward Arnold, London



**Paper – C204T: Cartograms and Thematic Mapping (4 Credits)**

**Full Marks: 30**

1. Concepts of rounding, scientific notation, logarithm and anti-logarithm, natural and log scales
2. Diagrammatic representation of data: Line, Bar, and Circle
3. Representation of point data: Isopleths.
4. Representation of area data: Dots and spheres, proportional circles and Choropleth
5. Preparation and interpretation of large scale thematic maps: Geomorphological maps
6. Preparation and interpretation of large scale thematic maps: Climatological maps
7. Preparation and interpretation of large scale thematic maps: Land use/ land cover maps
8. Preparation and interpretation of large scale thematic maps: Socio-economic maps

**Reference Books**

- Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books
- Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education
- Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
- Kraak M.-J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
- Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi.
- Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
- Slocum T. A., McMaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
- Tyner J. A., 2010: Principles of Map Design, The Guilford Press.
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

**Paper – C204P: Cartograms and Thematic Mapping (2 Credits)**

**Full Marks: 20**

*A Project File, comprising one exercise each is to be submitted*

1. Traverse survey using Prismatic Compass
2. Levelling by Dumpy Level and Prismatic Compass
3. Thematic maps: Proportional squares, pie diagrams with proportional circles, dots and spheres
4. Thematic maps: Choropleth, isoline map, chorochromatic map

## Semester III

### Core Courses

#### Paper – C305T: Climatology (6 Credits)

Full Marks: 50

#### Unit I: Elements of the Atmosphere

2 Credits

1. Nature, composition and layering of the atmosphere,
2. Insolation: controlling factors. Heat budget of the atmosphere.
3. Temperature: horizontal and vertical distribution. Inversion of temperature: types, causes and consequences.
4. Greenhouse effect and importance of ozone layer.

#### Unit II: Atmospheric Phenomena and Climatic Classification

4 Credits

1. Condensation: Process and forms. Mechanism of precipitation: Bergeron-Findeisen theory, collision and coalescence. Forms of precipitation.
2. Air mass: Typology, origin, characteristics and modification.
3. Fronts: warm and cold; frontogenesis and frontolysis.
4. Weather: stability and instability; barotropic and baroclinic conditions.
5. Circulation in the atmosphere: Planetary winds, jet stream, index cycle
6. Tropical and mid-latitude cyclones
7. Monsoon circulation and mechanism with reference to India
8. Climatic classification after Köppen, Thornthwaite and Oliver

#### Reference Books

- Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
- Barry R. G. and Corley R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York.
- Critchfield H. J., 1987: General Climatology, Prentice-Hall of India, New Delhi
- Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey.
- Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi.
- Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw-Hill

**Paper – C306T: Geography of India (6 Credits)**

**Full Marks: 50**

**Unit I: Geography of India**

**4 Credits**

1. Tectonic and stratigraphic provinces, physiographic divisions
2. Climate, soil and vegetation: Characteristics and classification
3. Population: Distribution, growth, structure and policy
4. Distribution of population by race, caste, religion, language, tribes and their correlates
5. Agricultural regions. Green revolution and its consequences
6. Mineral and power resources distribution and utilisation of iron ore, coal, petroleum, gas;
7. Industrial development: Automobile and information technology
8. Regionalisation of India: Physiographic (R. L. Singh), Socio-cultural (Sopher) and Economic (Sengupta)

**Unit II: Geography of West Bengal**

**2 Credits**

1. Physical perspectives: Physiographic divisions, forest and water resources
2. Population: Growth, distribution and human development
3. Resources: Mining, agriculture and industries
4. Regional Problem: Darjeeling Hills, Jangalmahal and Sundarban

**Reference Books**

- Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
- Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
- Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.
- Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
- Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
- Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
- Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
- Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.
- Tirtha, Ranjit 2002: Geography of India, Rawat Publication, Jaipur & New Delhi.
- Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
- Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
- Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur.

## Paper – C307T: Statistical Methods in Geography (4 Credits)

Full Marks: 30

### Unit I

2 Credits

1. Importance and significance of Statistics in Geography. Discrete and continuous data, population and samples, scales of measurement (nominal, ordinal, interval and ratio), sources of data
2. Collection of data and formation of statistical tables
3. Sampling: Need, types, and significance and methods of random sampling
4. Theoretical distribution: frequency, cumulative frequency, normal and probability

### Unit II

2 Credits

1. Central tendency: Mean, median, mode, partition values
2. Measures of dispersion range, mean deviation, quartile deviation, standard deviation, coefficient of variation
3. Association and correlation: Rank correlation, product moment correlation
4. Regression (linear and non-linear ) and time series analysis (moving average)

### Reference Books

- Berry B. J. L. and Marble D. F. (eds.): Spatial Analysis – A Reader in Geography.
- Ebdon D., 1977: Statistics in Geography: A Practical Approach.
- Hammond P. and McCullagh P. S., 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press.
- King L. S., 1969: Statistical Analysis in Geography, Prentice-Hall.
- Mahmood A., 1977: Statistical Methods in Geographical Studies, Concept.
- Pal S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
- Sarkar, A. (2013) Quantitative geography: techniques and presentations. Orient Black Swan Private Ltd., New Delhi
- Silk J., 1979: Statistical Concepts in Geography, Allen and Unwin, London.
- Spiegel M. R.: Statistics, Schaum's Outline Series.
- Yeats M., 1974: An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

## Paper – C307P: Statistical Methods in Geography (2 Credits)

Full Marks: 20

*A Project File, comprising one exercise each is to be submitted*

1. Construction of data matrix with each row representing an areal unit (districts/ blocks/ *mouzas*/ towns) and corresponding columns of relevant attributes.
2. Based on the above, a frequency table, measures of central tendency and dispersion would be computed and interpreted.
3. Histograms and frequency curve would be prepared on the dataset.
4. From the data matrix a sample set (20%) would be drawn using, random, systematic and stratified methods of sampling and locate the samples on a map with a short note on methods used.
5. Based on of the sample set and using two relevant attributes, a scatter diagram and regression line would be plotted and residual from regression would be mapped with a short interpretation.

## Semester IV Core Courses

### Paper – C408T: Regional Planning and Development (4 Credits)

**Full Marks: 30**

#### **Unit I: Regional Planning**

**2 Credits**

1. Concept of regions: Types of regions and their delineation.
2. Types of planning, principles and objectives of regional planning, multi-level planning in India
3. Tools and techniques of regional planning, need for regional planning in India
4. Metropolitan concept: metropolitan areas, and urban agglomerations

#### **Unit II: Regional Development**

**2 Credits**

1. Development: Meaning, growth versus development; Concept and strategies of regional development with reference to India
2. Theories and models for regional development: Growth pole model of Perroux; growth centre model in Indian context
3. Changing concept of development, concept of underdevelopment; efficiency-equity debate
4. Indicators of development: Economic, social and environmental. Human development

#### **Reference Books**

- Berry, B.J.L. and Horton, F.F. (1970): *Geographic Perspectives on Urban Systems*. Prentice Hall, New Jersey.
- Bhat L.S. (1972): *Regional Planning In India*, Statistical Publishing Society
- Blij H. J. De, 1971: *Geography: Regions and Concepts*, John Wiley and Sons.
- Chand ,M and Puri V.K. ( 1983) : *Regional planning In India* , allied publishers , New Delhi
- Claval P.I, 1998: *An Introduction to Regional Geography*, Blackwell Publishers, Oxford and Massachusetts.
- Dickinson, R.E. (1964): *City and Region*, Rutledge, London.
- Friedmann J. and Alonso W. (1975): *Regional Policy - Readings in Theory and Applications*, MIT Press, Massachusetts.
- Gore C. G., 1984: *Regions in Question: Space, Development Theory and Regional Policy*, Methuen, London.
- Gore C. G., Köhler G., Reich U-P. and Ziesemer T., 1996: *Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention*, Metropolis- Verlag, Marburg.
- Hall, P. (1992): *Urban and Regional Planning*, Routledge, London.
- Kulshetra ,S.K,( 2012) : *Urban and Regional Planning in India : A hand book for Professional Practitioners* , Sage Publication , New Delhi
- Kundu, A. (1992): *Urban Development Urban Research in India*, Khanna Publ. New Delhi.
- Misra , R.P, Sundaram K.V, PrakashRao , VLS( 1974): *Regional Development*

Planning in India , Vikas Publication , New Delhi

- Misra, R.P (1992): Regional Planning: Concepts , techniques , Policies and Case Studies , Concept , New Delhi
- Peet R., 1999: Theories of Development, The Guilford Press, New York.
- UNDP 2001-04: Human Development Report, Oxford University Press.
- World Bank 2001-05: World Development Report, Oxford University Press, New Delhi

**Paper – C408P: Regional Planning and Development (2 Credits)**

**Full Marks: 20**

*A Project File, comprising one exercise each is to be submitted*

1. Delineation of Regions according to given criteria using Weavers method and Residual Mapping
2. Sphere of influence by Gravity Model.
3. Measurement of Inequality by Lorenz Curve and Location quotient.
4. Regional Disparity: Rank-size distribution of population.

**Paper – C409T: Economic Geography (6 Credits)**

**Full Marks: 50**

**Unit I: Concepts**

**2 Credits**

1. Meaning and approaches to Economic Geography, new Economic Geography
2. Concepts in Economic Geography: Goods and services, production, exchange and consumption
3. Concept of economic man, theories of choices
4. Economic distance and transport costs

**Unit II: Economic Activities**

**4 Credits**

1. Concept and classification of economic activities
2. Factors affecting location of economic activity with special reference to agriculture (Von Thunen), and industry (Weber).
3. Primary activities: Subsistence and commercial agriculture, forestry, fishing and mining
4. Secondary activities: Manufacturing (cotton textile, iron and steel), concept of manufacturing regions, special economic zones and technology parks
5. Tertiary activities: transport, trade and services
6. Agricultural systems: Case studies of tea plantation in India and mixed farming in Europe
7. Transnational sea-routes, railways and highways with reference to India
8. International agreements and trade blocs: GATT and OPEC

**Reference Books**

- Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
- Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis.
- Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.
- Wheeler J. O., 1998: Economic Geography, Wiley..
- Durand L., 1961: Economic Geography, Crowell.
- Bagchi-Sen S. and Smith H. L., 2006: Economic Geography: Past, Present and Future, Taylor and Francis.
- Willington D. E., 2008: Economic Geography, Husband Press.
- Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: The Oxford

## **Paper – C410T: Environmental Geography (4 Credits)**

**Full Marks: 30**

1. Geographers' approach to environmental studies
2. Perception of environment in different stages of civilization
3. Concept of holistic environment and system approach
4. Ecosystem: Concept, structure and functions
5. Environmental pollution and degradation: Land, water and air
6. Space–time hierarchy of environmental problems: Local, regional and global
7. Urban environmental issues with special reference to waste management
8. Environmental programmes and policies – Global, national and local levels

### **Reference Books**

- Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
- Cunningham W. P. and Cunningham M. A., 2004: Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
- Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford.
- Miller G. T., 2004: Environmental Science: Working with the Earth, Thomson BrooksCole, Singapore.
- MoEF, 2006: National Environmental Policy-2006, Ministry of Environment andForests, Government of India.
- Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer
- Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India.
- Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
- Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate Change and Biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer

## **Paper – C410P: Environmental Geography (2 Credits)**

**Full Marks: 20**

*A Project File, comprising one exercise each is to be submitted*

1. Preparation of questionnaire for perception survey on environmental problems
2. Preparation of check-list for Environmental Impact Assessment of an urban/ industrial project
1. Quality assessment of soil and water using field kit: pH, hardness (water) and NPK
2. Interpretation of air quality using CPCB / WBPCB data

### **Reference Books**

- Gilpin.A ( 1994) Environmental Impact Assessment: Cutting Edge for the 21<sup>st</sup> Century (EIA : Cutting Edge for the Twenty-First Century, Cambridge University Press
- Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub.



**Semester V**  
**Core Courses**

**Paper – C511T: Field Work and Research Methodology (4 Credits)**

**Full Marks: 30**

**Unit I: Research Methodology**

**2 Credits**

1. Research in Geography: Meaning, types and significance
2. Literature review and formulation of research design
3. Defining research problem, objectives and hypothesis. Research materials and methods
4. Techniques of writing scientific reports: Preparing notes, references, bibliography, abstract and keywords

**Unit II: Fieldwork**

**2 Credits**

1. Fieldwork in Geographical studies – Role and significance. Selection of study area and objectives. Pre-field preparations. Ethics of fieldwork
2. Field techniques and tools: Observation (participant, non-participant), questionnaires (open, closed, structured, non-structured). Interview with special reference to focused group discussions.
3. Field techniques and tools: Landscape survey using transects and quadrants, constructing a sketch, photo and video recording.
4. Positioning and collection of samples. Preparation of inventory from field data. Post-field tasks.

**Reference Books**

- Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.
- Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi.
- Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
- Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publs. Co., New Delhi
- Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
- Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
- Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
- Wolcott, H. 1995. The Art of Fieldwork. Alta Mira Press, Walnut Creek, CA

**Paper – C511P: Field Work and Research Methodology (2 Credits)**

**Full Marks: 20**

1. Each student will prepare an individual report based on primary data collected from field survey and secondary data collected from different sources for either a rural area (*mouza*) or an urban area (municipal ward) based on cadastral or municipal maps to study specific problems.
2. The duration of the field work shall not exceed 10 days
3. The report should be hand written in English on A4 size paper in candidate's own words within 5,000 to 8,000 words excluding figures, tables, photographs, maps, references and appendices
4. A copy of the bound report, duly signed by the concerned teacher, should be submitted

**Reference Books**

- Monkhouse, F.J. and Williamson, R.H. (1963): Maps and Diagrams: Their Compilation and Construction, Methuen, London
- Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata
- Sarkar, A. (2008): Practical Geography: A Systematic Approach, Orient Black Swan, Kolkata
- Narasinha Murthy, R.L. (2014) Research Methodology in Geography, Concept, New Delhi
- Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata
- Sarkar, A. (2008): Practical Geography: A Systematic Approach, Orient BlackSwan, Kolkata
- Yeates M., 1974: An Introduction to Quantitative Analysis in Human Geography.

## Paper – C512T: Remote Sensing and GIS (4 Credits)

Full Marks: 30

### Unit I: Remote Sensing

2 Credits

1. Principles of Remote Sensing (RS): Types of RS satellites and sensors
2. Sensor resolutions and their applications with reference to IRS and Landsat missions, image referencing schemes and data acquisition.
3. Preparation of False Colour Composites from IRS LISS-3 and Landsat TM and OLI data.
4. Principles of image interpretation. Preparation of inventories of landuse land cover (LULC) features from satellite images.

### Unit II: Geographical Information Systems and Global Navigation

2 Credits

#### Satellite System

1. GIS data structures: types (spatial and non-spatial), raster and vector
2. Principles of preparing attribute tables, data manipulation and overlay analysis
3. Principles of GNSS positioning and waypoint collection
4. Transferring of waypoints to GIS. Area and length calculations from GNSS data.

### Reference Books

- Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
- Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
- Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
- Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw- Hill.
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

## Paper – C512P: Remote Sensing and GIS (2 Credits)

Full Marks: 20

*A Project File, comprising one exercise each is to be submitted*

1. Georeferencing of maps and images
2. Image enhancement. Preparation of reflectance libraries of LULC features across different image bands of IRS L3 or Landsat OLI data
3. Image classification, post-classification analysis and class editing
4. Digitisation of features. Data attachment, overlay and preparation of thematic map

## **Discipline Specific Elective Courses**

### **Paper – DE501T: Soil and Biogeography (4 Credits)**

**Full Marks: 30**

1. Factors of soil formation; Origin and profile characteristics of Lateritic, Podzol and Chernozem soils
2. Definition and significance of soil properties: Texture, structure and moisture,
3. Definition and significance of soil properties: p<sup>H</sup>, organic matter and NPK
4. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification.
5. Concepts of biosphere, ecosystem, ecotone, community and ecology, biogeochemical cycles (carbon and nitrogen)
6. Geographical extent and characteristic features of biomes: Tropical rain forest, Taiga and Grassland biomes
7. Soil erosion and degradation; Deforestation: Causes, consequences and management
8. Bio-diversity: Definition, types, threats and conservation measures

#### **Reference Books**

- Biswas, T.D. and Mukherjee, S.K. 1997: Textbook of Soil Science, Tata McGraw Hill
- Brady, N.C. and Weil, R.R. 1996. The Nature and Properties of Soil, 11th edition, Longman, London
- Floth, H.D. 1990. Fundamentals of Soil science, 8th edition, John Wiley and Sons, New York.
- Morgan, R.P.C. 1995 Soil Erosion and Conservation, 2nd Edition, Longman, London
- Young, A. 2000. Land Resource: Now and Future, Cambridge University Press, Cambridge: 332p. Chapman J.L. and Rens, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press, Cambridge
- Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGraw Hill, New Delhi
- Huggett, R. 1998. Fundamentals of Biogeography, Routledge, London
- Kormondy, E.J. 1996. Concept of Ecology, 4th edition, Prentice- Hall, New Delhi

### **Paper – DE501P: Soil and Biogeography (2 Credits)**

**Full Marks: 20**

1. Preparation of Participatory Biodiversity Register
2. Soil sample preparation (collection from field, drying, grinding), textural analysis
3. Preparation of a brief report on biodiversity conservation

#### **Reference Books**

- Biswas, T.D. and Mukherjee, S.K. 1997: Textbook of Soil Science, Tata McGraw Hill
- Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub

## Paper – DE502T: Hydrology and Oceanography (6 Credits)

Full Marks: 50

### Hydrology

2 Credits

1. Systems approach in hydrology. Global hydrological cycle: Its physical and biological role
2. Run off: controlling factors. Infiltration and evapotranspiration. Run off cycle
3. Drainage basin as a hydrological unit. Principles of water harvesting and watershed management
4. Groundwater: Occurrence and storage. Factors controlling recharge, discharge and movement

### Oceanography

4 Credits

1. Major relief features of the ocean floor: characteristics and origin according to plate tectonics.
2. Physical and chemical properties of ocean water
3. Water mass, T–S diagram
4. Air-Sea interactions, ocean circulation, wave and tide.
5. Ocean temperature and salinity: Distribution and determinants.
6. Coral reefs: Formation, classification and threats.
7. Marine resources: Classification and sustainable utilisation
8. Sea level change: Types and causes

### Reference Books

- Andrew. D. Ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis Publishers, CRC Press.
- Karanth, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata- McGraw Hill, New Delhi.
- Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
- Rao, K.L., 1982: India's Water Wealth 2nd edition, Orient Longman, Delhi,
- Singh, Vijay P. (1995): Environmental Hydrology. Kluwer Academic Publications, the Netherlands.
- Anikouchine W. A. and Sternberg R. W., 1973: The World Oceans: An Introduction to Oceanography, Prentice-Hall.
- Garrison T., 1998: Oceanography, Wordsworth Company, Belmont.
- Kershaw S., 2000: Oceanography: An Earth Science Perspective, Stanley Thornes, And UK.
- Pinet P. R., 2008: Invitation to Oceanography (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
- Sverdrup K. A. and Armrest, E. V., 2008: An Introduction to the World Ocean, McGraw Hill, Boston.
- Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Landscape ecology and water management. Proceedings of IGU Rohtak Conference, Volume 2. Advances in Geographical and Environmental Studies, Springer

**Paper – DE503T: Urban Geography (4 Credits)**

**Full Marks: 30**

**Unit I**

**2 Credits**

1. Urban Geography: nature and scope, different approaches and recent trends in urban geography
2. Theories of Urban Evolution and Growth: Hydraulic Theory, Economic Theory; Origin of urban places in Ancient, Medieval, Modern and Post-Modern periods
3. Aspects of urban places: Location, site and situation, Size and Spacing of Cities: The Rank Size Rule, The Law of the Primate City
4. Urban Hierarchies : Central Place Theory; August Loch's theory of Market Centres

**Unit II**

**2 Credits**

1. Ecological processes of urban growth; Urban fringe; City- Region
2. Theories of city structure-concentric zone theory, sector theory, multiple nuclei theory
3. Patterns of urbanisation in developed and developing countries with special reference to India; Urban landscape change in post-liberalized India
4. Case studies of Delhi, Kolkata, and Chandigarh with reference to urban morphology

**Reference Books**

- Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.
- Knox P. L. and McCarthy L., 2005: Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
- Knox P. L. and Pinch S., 2006: Urban Social Geography: An Introduction, Prentice-Hall.
- Pacione M., 2009: Urban Geography: A Global Perspective, Taylor and Francis.
- Sassen S., 2001: The Global City: New York, London and Tokyo, Princeton University Press.
- Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
- Ramachandran, R., 1992: The Study of Urbanisation, Oxford University Press, Delhi
- Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
- Singh, R.B. (Ed.) (2015) Urban development, challenges, risks and resilience in Asian megacities. Advances in Geographical and Environmental Studies, Springer.

**Paper – DE503P: Urban Geography (2 Credits)**

**Full Marks: 20**

1. Preparation of Morphological map of any town of India
2. Preparation of brief status report on physical or social environment of your city

**Paper – DE504T: Geography of Health and Wellbeing (6 Credits)**

**Full Marks: 50**

**6 Credits**

1. Definition, scope and trends of Geography of Health in relation to allied disciplines
2. Linkages of health with environment and development
3. Geographical perspective of health in developed and developing countries
4. Factors influencing health and wellbeing
5. Parameters of health and wellbeing
6. Health in relation to population dynamics and urbanization
7. Health in relation to inequality, malnutrition and poverty
8. Exposure and Health Risks: Air pollution; household wastes; water; housing; workplace.
9. Health and disease pattern in Environmental Context with special reference to India
10. Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases).
11. Climate change and morbidity. Biological agents of disease
12. WHO programmes of health and wellbeing

**Reference Books**

- Akhtar Rais (Ed.), 1990: Environment and Health Themes in Medical Geography, Ashish Publishing House, New Delhi.
- Avon Joan L. and Jonathan A Patzed.2001: Ecosystem Changes and Public Health, Baltimin, John Hopling Unit Press(Ed).
- Bradley, D., 1977: Water, Wastes and Health in Hot Climates, John Wiley Chichesten.
- Christaler George and Hristopoulos Dionissios, 1998: Spatio Temporal Environment Health Modelling, Boston Kluwer Academic Press.
- Cliff, A.D. and Peter, H., 1988: Atlas of Disease Distributions, Blackwell Publishers, Oxford.
- Gatrell, A., and Loytonen, 1998: GIS and Health, Taylor and Francis Ltd, London.
- Hardham T. and Tannav M., (Eds): Urban Health in Developing Countries; Progress, Projects, Earthgoan, London.
- Murray C. and A. Lopez, 1996: The Global Burden of Disease, Harvard University Press.
- Phillips, D.and Verhasselt, Y., 1994: Health and Development, Routledge, London.
- Tromp, S., 1980: Biometeorology: The Impact of Weather and Climate on Humans and their Environment, Heydon and Son.

## Paper – C613T: Evolution of Geographical Thought (6 Credits)

Full Marks: 50

### Unit I: Nature of Pre Modern Geography

2 Credits

1. Development of Geography and contributions of Greek, Chinese, and Indian geographers.
2. Impact of 'Dark Age' on Geography and Arab contributions
3. Geography during the Age of 'Discovery' and 'Exploration' (Contributions of Portuguese Voyages, Columbus, Vasco da Gama, Magellan, Thomas Cook)
4. Transition from Cosmography to Scientific Geography (Contributions of Bernard Varenus and Immanuel Kant); Dualism and Dichotomies (General vs. Particular, Physical vs. Human, Regional vs. Systematic, Determinism vs. Possibilism, Ideographic vs. Nomeothetic)

### Unit II: Foundations of Modern Geography and Recent Trends

4 Credits

1. Evolution of Geographical thoughts in Germany, France, Britain and United States of America.
2. Contributions of Humboldt and Ritter
3. Contributions of Richthofen, Hettner and Ratzel
4. Schools of geographical thought: French, British and American;
5. Trends of Geography in the post World War-II period
6. Evolution of Geography in India: formative periods, establishments and emerging trends
7. Quantitative Revolution and its impact, behaviouralism, systems approach, radicalism, feminism
8. Towards Post Modernism: Changing concept of space in geography. Geography in the 21st Century

### Reference Books

- Arentsen M., Stam R. and Thuijss R., 2000: Post-modern Approaches to Space, ebook.
- Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson
- Bonnett A., 2008: What is Geography? Sage.
- Dikshit R. D., 1997: Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
- Hartshorn R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
- Holt-Jensen A., 2011: Geography: History and Its Concepts: A Students Guide, SAGE.
- Johnston R. J., (Ed.): Dictionary of Human Geography, Routledge.
- Johnston R. J., 1997: Geography and Geographers, Anglo-American Human Geography since 1945, Arnold, London.
- Kapur A., 2001: Indian Geography Voice of Concern, Concept Publications.
- Martin Geoffrey J., 2005: All Possible Worlds: A History of Geographical Ideas, Oxford.
- Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.



## Paper – C614T: Disaster Management (4 Credits)

Full Marks: 30

### Unit I: Concepts

2 Credits

1. Classification of hazards and disasters.
2. Approaches to hazard study: Risk perception and vulnerability assessment. Hazard paradigms.
3. Responses to hazards: Preparedness, trauma and aftermath. Resilience and capacity building.
4. Hazards mapping: Data and techniques.

### Unit II: Disaster Case Studies

2 Credits

1. Earthquake: Factors, vulnerability, consequences and management
2. Landslide: Factors, vulnerability, consequences and management
3. Cyclone: Factors, vulnerability, consequences and management
4. Fire: Factors, vulnerability, consequences and management

### Reference Books

- Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
- Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
- Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
- Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
- Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
- Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.
- Singh Jagbir (2007) Disaster Management Future Challenges and Opportunities, 2007.
- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India ([www.ikbooks.com](http://www.ikbooks.com)).

## **Paper – C614P: Disaster Management (2 Credits)**

**Full Marks: 20**

*An individual Project Report based on any one case study among the following disasters incorporating a preparedness plan in the vicinity of the candidate's institution or residence:*

1. Thunderstorm
2. Landslide
3. Flood
4. Coastal / riverbank erosion
5. Fire
6. Industrial accident
7. Structural collapse

### **Reference Books**

- Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
- Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
- Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
- Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
- Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
- Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.

**Paper – DE605T: Social Geography (6 Credits)**

**Full Marks: 50**

**Unit I**

**3 credits**

1. Social Geography: Concept, Origin, Nature and Scope
2. Concept of Space, Social differentiation and stratification; social processes
3. Social Categories: Caste, Class, Religion, Race and Gender and their Spatial distribution
4. Basis of Social region formation; Evolution of social-cultural regions of India
5. Peopling Process of India: Technology and Occupational Change; Migration.
6. Social groups, social behaviour and contemporary social environmental issues with special reference to India

**Unit II**

**3 credits**

1. Concept of Social Well-being, Quality of Life, Gender and Social Well-being
2. Measures of Social Well-being: Healthcare, Education, Housing, Gender Disparity
3. Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts and Crime.
4. Social Planning during the Five Year Plans in India
5. Social Policies in India: Education and Health
6. Social Impact Assessment (SIA): Concept and importance

**Reference Books**

- Ahmed A., 1999: Social Geography, Rawat Publications.
- Casino V. J. D., Jr., 2009) Social Geography: A Critical Introduction, Wiley Blackwell.
- Cater J. and Jones T., 2000: Social Geography: An Introduction to Contemporary Issues, Hodder Arnold.
- Holt L., 2011: Geographies of Children, Youth and Families: An International Perspective, Taylor & Francis.
- Panelli R., 2004: Social Geographies: From Difference to Action, Sage.
- Rachel P., Burke M., Fuller D., Gough J., Macfarlane R. and Mowl G., 2001: Introducing Social Geographies, Oxford University Press.
- Smith D. M., 1977: Human geography: A Welfare Approach, Edward Arnold, and London.
- Smith D. M., 1994: Geography and Social Justice, Blackwell, Oxford.
- Smith S. J., Pain R., Marston S. A., Jones J. P., 2009: The SAGE Handbook of Social Geographies, Sage Publications.
- Sopher, David (1980): An Exploration of India, Cornell University Press, Ithasa
- Valentine G., 2001: Social Geographies: Space and Society, Prentice Hall.

## Paper – DE606T: Population Geography (6 Credits)

Full Marks: 50

### Unit I

2 Credits

1. Development of Population Geography as a field of specialization. Relation between population geography and demography. Sources of population data, their level of reliability and problems of mapping.
2. Population distribution: density and growth. Classical and modern theories in population distribution and growth, Demographic transition model.
3. World patterns determinants of population distribution and growth. Concept of optimum population.
4. Population distribution, density and growth profile in India.

### Unit II

4 Credits

1. Population Composition and Characteristics– Age-Sex Composition; Rural and Urban Composition; Literacy.
2. Measurements of fertility and mortality. Concept of cohort and life table
3. Population composition of India. Urbanisation, Occupational structure.
4. Migration: Causes and types
5. National and international patterns of migration with reference to India.
6. Population and development: population-resource regions. Concept of human development index and its components.
7. Population policies in developed and less development countries. India's population policies, population and environment, implication for the future.
8. Contemporary Issues – Ageing of Population; Declining Sex Ratio; Population and environment dichotomy, HIV/AIDS.

### Reference Books

- Barrett H. R., 1995: Population Geography, Oliver and Boyd.
- Bhende A. and Kanitkar T., 2000: Principles of Population Studies, Himalaya Publishing House.
- Chandna R. C. and Sidhu M. S., 1980: An Introduction to Population Geography, Kalyani Publishers.
- Clarke J. I., 1965: Population Geography, Pergamon Press, Oxford.
- Jones, H. R., 2000: Population Geography, 3rd ed. Paul Chapman, London.
- Lutz W., Warren C. S. and Scherbov S., 2004: The End of the World Population Growth in the 21st Century, Earthscan
- Newbold K. B., 2009: Population Geography: Tools and Issues, Rowman and Littlefield Publishers.
- Pacione M., 1986: Population Geography: Progress and Prospect, Taylor and Francis.
- Wilson M. G. A., 1968: Population Geography, Nelson.

**Paper – DE607T: Fluvial Geomorphology (4 Credits)**

**Full Marks: 30**

**4 Credits**

1. Run off: components and controlling factors. Run off cycle
2. Drainage basin and its significance as a hydrological unit
3. Models of channel initiation and network development
4. Fundamentals of Rosgen stream classification system
5. Fluvial morphodynamics: Adjustment of channel forms to tectonic, climatic, sea level and land use changes
6. Fluvial landforms: Terraces, alluvial fans, badlands and accretion topography
7. Human intervention on fluvial systems: Types and consequences
8. Integrated watershed management: Principles and significance

**Reference Books**

- Bloom, A. L. 1998: *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, 3rd Ed., Prentice Hall, Upper Saddle River, New Jersey
- Bridges, E. M., 1990: *World Geomorphology*, Cambridge University Press, Cambridge
- Brown, A.G. 1997: *Alluvial Geochronology*, Cambridge University Press
- Burbank, D.W and Anderson, R.S. 2012: *Tectonic Geomorphology*, Wiley-Blackwell
- Charlton, R. 2016: *Fundamentals of Fluvial Geomorphology*, 2nd Ed., Routledge, London
- Chorley, R., Schumm, S. and Sugden, D.E. 1994: *Geomorphology*, Methuen, London
- Chorley, R.J. and Kennedy, B.A. 1971: *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
- Goudie, A.S. (ed) 2004: *Encyclopaedia of Geomorphology*, vol. 1 & 2, Routledge, London
- Gupta, A. 2011: *Tropical Geomorphology*, Cambridge University Press, Cambridge
- Huggett, R.J. 2011: *Fundamentals of Geomorphology*, Routledge, New York
- Kale V.S. and Gupta A. 2001. *Introduction to Geomorphology*, Orient Longman, Hyderabad
- Knighton, D. 1998: *Fluvial Forms and Processes: A New Perspective*, Arnold, London
- Morisawa, M. 1985: *Rivers*, Longman, London
- Petts, G.E. and Amoros, C (eds). 1996: *Fluvial Hydrosystems*, Chapman and Hall, London
- Selby, M.J. 1985: *Earth's Changing Surface*, Oxford University Press, London
- Sen, P.K. 1993: *Geomorphological Analysis of Drainage Basins*, University of Burdwan, Bardhaman

**Paper – DE607P: Fluvial Geomorphology (2 Credits)**

**Full Marks: 20**

1. Linear, areal and altitudinal properties of drainage basin and their relationship: Bifurcation ratio, stream frequency, drainage density, constant of channel maintenance, relative relief, dissection index.
2. Computation and significance of hypsometric curve and integer
3. Derivation of channel sinuosity index and braiding index

**Paper – DE608: Project Report based on Fieldwork (6 Credits)**

**Full Marks: 50**

*Project work (6 Credits) is compulsory for completing B.Sc Honours course in Geography. Project Work is intended to provide an opportunity to the candidate to field test the learning.*

*The Project report should be based on field work on some specified topics as suggested by the Department and should include an introduction, literature review, project goals and objectives, methodology, results and discussion and recommendations and implications and references. It should not exceed 20 to 25 pages (A4 pages) including maps, diagrams, and photographs etc.*

## Skill Enhancement Courses

### Paper – SE402: Remote Sensing Techniques and Applications (2 Credits)

**Full Marks: 20**

*A project file consisting of four exercises on the above themes is to be submitted*

1. Principles of Remote Sensing (RS): Classification of RS satellites and sensors
2. Sensor resolutions and their applications with reference to IRS and Landsat missions, image referencing schemes and data acquisition.
3. Preparation of False Colour Composites from IRS LISS-3 and Landsat TM and OLI data. Principles of image rectification and enhancement.
4. Principles of image interpretation and feature extraction. Preparation of inventories of land use land cover features from satellite images.

#### Reference Books

- Bhatta, B. 2008. Remote Sensing and GIS, Oxford University Press, New Delhi.
- Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press
- Jensen, J. R. (2005) Introductory Digital Image Processing: A Remote Sensing Perspective, Pearson Prentice-Hall.
- Joseph, G. 2005: Fundamentals of Remote Sensing United Press India.
- Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
- Li, Z., Chen, J. and Batsavias, E. (2008) Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences CRC Press, Taylor and Francis, London
- Mukherjee, S. (2004) Textbook of Environmental Remote Sensing, Macmillan, Delhi.
- Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
- Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.

# GENERIC ELECTIVES

## Paper – UG/Sc/GE/T/01: Cartographic Techniques (4 Credits)

Full Marks: 30

1. Maps: Classification and types. Components of a map.
2. Concept and application of scales: Plain, Comparative, Diagonal and Vernier
3. Coordinate systems: Polar and rectangular. Concept of geoid and spheroid
4. Concept of generating globe. Grids: angular and linear systems of measurement
5. Bearing: Magnetic and true, whole-circle and reduced.
6. Map projections: Classification, properties and uses. Concept and significance of UTM projection.
7. Basic concepts of surveying and survey equipment: Prismatic compass, dumpy level, Theodolite, Abney level, Clinometer.
8. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps

### Reference Books

- Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.
- Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.
- Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
- Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
- Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
- Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
- Sarkar, A. (2015) Practical Geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

## Paper – UG/Sc/GE/P/01: Cartographic Techniques (2 Credits)

Full Marks: 20

*A Project File, comprising one exercise each is to be submitted*

1. Graphical construction of scales: Plain, Comparative, Diagonal and Vernier
2. Construction of projections: Polar Zenithal Stereographic, Simple Conic with Two Standard Parallels, Bonne's, Cylindrical Equal Area, and Mercator's.
3. Delineation of drainage basin from Survey of India topographical map. Construction and interpretation of relief profiles (superimposed, projected and composite), relative relief map, slope map (Wentworth), and stream ordering (Strahler) on a drainage basin.
4. Correlation between physical and cultural features from Survey of India topographical maps using transect chart



**Paper – UG/Sc/GE/T/04: Regional Planning and Development (4 Credits)**

**Full Marks: 30**

**Unit I: Regional Planning**

**2 Credits**

5. Concept of regions: Types of regions and their delineation.
6. Types of planning, principles and objectives of regional planning, multi-level planning in India
7. Tools and techniques of regional planning, need for regional planning in India
8. Metropolitan concept: metropolitan areas, and urban agglomerations

**Unit II: Regional Development**

**2 Credits**

5. Development: Meaning, growth versus development; Concept and strategies of regional development with reference to India
6. Theories and models for regional development: Growth pole model of Perroux; growth centre model in Indian context
7. Changing concept of development, concept of underdevelopment; efficiency-equity debate
8. Indicators of development: Economic, social and environmental. Human development

**Reference Books**

- Bhat L.S. (1972): Regional Planning In India, Statistical Publishing Society
- Blij H. J. De, 1971: Geography: Regions and Concepts, John Wiley and Sons.
- Chand ,M and Puri V.K. ( 1983 ) : Regional planning In India, Allied Publishers
- Gore C. G., 1984: Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
- Hall, P. (1992): Urban and Regional Planning, Routledge, London.
- Kulshetra ,S.K,( 2012) : Urban and Regional Planning in India : A hand book for Professional Practioners , Sage Publication , New Delhi
- Misra, R.P, Sundaram K.V, PrakashRao , VLS( 1974): Regional Development Planning in India , Vikas Publication , New Delhi
- Misra, R.P (1992): Regional Planning: Concepts, Techniques, Policies and Case Studies , Concept , New Delhi
- UNDP 2001-04: Human Development Report, Oxford University Press.
- World Bank 2001-05: World Development Report, Oxford University Press

**Paper – UG/Sc/GE/P/04: Regional Planning and Development (2 Credits)**

**Full Marks: 20**

*A Project File, comprising one exercise each is to be submitted*

1. Delineation of Regions according to given criteria using Weavers method and Residual Mapping
2. Sphere of influence by Gravity Model.
3. Measurement of Inequality by Lorenz Curve and Location quotient.
4. Regional Disparity: Rank-size distribution of population.