



Draft CBCS Syllabus for Undergraduate Courses in Geography

TO BE EFFECTIVE FROM THE ACADEMIC SESSION 2018-19

West Bengal State University
March, 2018

Choice Based Credit System (CBCS): Syllabus in Geography

INTRODUCTION: In compliance with recent directives from the University Grants Commission, the undergraduate syllabus for Geography is reframed into Choice Based Credit System following the model syllabus prepared by the West Bengal State Council of Higher Education.

The main objective of this new curriculum is to give the students a holistic understanding of the subject putting equal weightage to the core content and techniques used in Geography. The syllabus tries to give equal importance to the two main branches of Geography: Physical and Human.

The principal goal of the syllabus is to enable the students to secure a job at the end of the undergraduate programme. Keeping this in mind and in tune with the changing nature of Geography, adequate emphasis is rendered on applied aspects of the subject such as emerging techniques of mapping and field-based data generation. The syllabus emphasises on development of basic skills of the subject, so that everyone need not go for higher studies in search of professional engagement or employment.

LEARNING OUTCOMES: This syllabus is designed to impart basic knowledge on geography as a spatial science and train the undergraduates to secure employment in the sectors of geospatial analysis, development and planning, mapping and surveying.

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1. Scheme for the CBCS Curriculum for Geography Honours (B.Sc.)

Credit Distribution across Courses

Course Type B.Sc. Honours	Total Courses	Credits	
		THEORY + PRACTICAL	THEORY + TUTORIAL*
Core Course: Geography (C)	14	14×4=56 14×2=28	14×5 = 70 14×1 = 14*
Discipline Specific Electives (DSE)	4	4×4 = 16 4×2=08	4×5 = 20 4×1 = 04*
Generic Electives (GE)	4	4×4 = 16 4×2=08	4×5 = 20 4×1 =0 4*
Ability Enhancement Compulsory Courses (AECC)	2	2×2 = 04	2 × 2=04
Skill Enhancement Courses (SEC)	2	2×2 = 04	2 × 2=04
Total	26	140	140

*Tutorials of 1 Credit will be conducted in case there is no practical component

Computation of work-load per week

Type of Course	Credit	Duration of Periods
Tutorial Class	1	1 Theoretical class of 1 hour duration
Theory (T)	1	1 Theoretical class of 1 hour duration
Practical (P)	1	1 Practical class of 2 hour duration
Semester Duration: 15 weeks of direct teaching		

List of Generic Elective subjects to be offered with Geography Honours

1. Political Science	4. Statistics
2. Economics	5. Zoology
3. Mathematics	6. Anthropology or Computer Science

Any 2 (two) GE subjects to be chosen from the above list and from each subject two courses to be taken.

Distribution of Courses across semesters for Geography Honours (B.Sc.)

Semester	Course	Course Code	Title	Credit	Marks	Remarks
I	Core	GEOACOR01T	Geotectonics and Geomorphology	04	50	Compulsory
		GEOACOR01P	Geotectonics and Geomorphology (Lab)	02	25	Compulsory
	Core	GEOACOR02T	Cartographic Techniques	04	50	Compulsory
		GEOACOR02P	Cartographic Techniques (lab)	02	25	Compulsory
	GE	XXXHGEC01T		06	75	One course of a subject (Eg. A) chosen from the list of subjects given in section 1.3
	AECC	ENGSaec01M	Communicative English	02	25	Compulsory
II	Core	GEOACOR03T	Human Geography	06	75	Compulsory
	Core	GEOACOR04T	Cartograms and Thematic Mapping	04	50	Compulsory
		GEOACOR04P	Cartograms and Thematic Mapping (Lab)	02	25	Compulsory
	GE	XXXHGEC02T		06	75	Second course of the same subject (A) taken as XXXHGEC01T
	AECC	ENVSAEC02T	Environment Studies	02	25	Compulsory
III	Core	GEOACOR05T	Climatology	04	50	Compulsory
		GEOACOR05P	Climatology (Lab)	02	25	
	Core	GEOACOR06T	Geography of India	06	75	
	Core	GEOACOR07T	Statistical Methods in Geography	04	50	Compulsory
		GEOACOR07P	Statistical Methods in Geography Lab	02	25	
	GE	XXXHGEC03T		06	75	One course of a subject (Eg. B) chosen from the list of subjects given in section 1.3
	SEC	GEOSSEC01M	Remote Sensing	02	25	Compulsory

IV	Core	GEOACOR08T	Regional Planning and Development	06	75	Compulsory
	Core	GEOACOR09T	Economic Geography	06	75	Compulsory
	Core	GEOACOR10T	Environmental Geography	04	50	Compulsory
		GEOACOR10P	Environmental Geography (Lab)	02	25	
	GE	XXXAGEC04T		06	75	Second course of the same subject (B) taken as XXXHGEC03T
	SEC	GEOSSEC02M	Advanced Spatial Statistical Techniques	02	25	Compulsory
V	Core	GEOACOR11T	Field Work and Research Methodology	04	50	Compulsory
		GEOACOR11P	Field Work and Research Methodology (Lab)	02	25	
	Core	GEOACOR12T	Remote Sensing and GIS	04	50	Compulsory
		GEOACOR12P	Remote Sensing and GIS (Lab)	02	25	
	DSE	GEOADSE01T	Soil and Biogeography	06	75	Compulsory
	DSE	GEOADSE02T	Settlement Geography	06	75	Students to choose any one of the two courses (02T or 03T)
		GEOADSE03T	Population Geography	06	75	
VI	Core	GEOACOR13T	Evolution of Geographical Thought	06	75	Compulsory
	Core	GEOACOR14T	Disaster Management	04	50	Compulsory
		GEOACOR14P	Disaster Management (Lab)	02	25	Compulsory
	DSE	GEOADSE04T	Hydrology and Oceanography	06	75	Compulsory
		GEOADSE05T	Social Geography	06	75	Students to choose any one of the two courses (05T or 06T)
	DSE	GEOADSE06T	Resource Geography	06	75	

Core Subjects

Code (Theory)	Code (Practical)	Course name
GEOACOR01T	GEOACOR01P	Geotectonics and Geomorphology
GEOACOR02T	GEOACOR02P	Cartographic Techniques
GEOACOR03T		Human Geography
GEOACOR04T	GEOACOR04P	Cartograms and Thematic Mapping
GEOACOR05T	GEOACOR05P	Climatology
GEOACOR06T		Geography of India
GEOACOR07T	GEOACOR07P	Statistical Methods in Geography
GEOACOR08T		Regional Planning and Development
GEOACOR09T		Economic Geography
GEOACOR10T	GEOACOR10P	Environmental Geography
GEOACOR11T	GEOACOR11P	Field Work and Research Methodology
GEOACOR12T	GEOACOR12P	Remote Sensing and GIS
GEOACOR13T		Evolution of Geographical Thought
GEOACOR14T	GEOACOR14P	Disaster Management

Choices for Four Discipline Specific Electives

Code	Course name
GEOADSE01T	Soil and Biogeography
GEOADSE02T	Settlement Geography
GEOADSE03T	Population Geography
GEOADSE04T	Hydrology and Oceanography
GEOADSE05T	Social Geography
GEOADSE06T	Resource Geography

Choices for Four Generic Electives for Honours Students of Other Disciplines

Code	Course name
GEOHGEC01T	Physical Geography
GEOHGEC02T	Human Geography
GEOHGEC03T	General Cartography
GEOAGEC04T	Environmental Geography

Choices for Two Skill Enhancement Courses

Code	Course name
GEOSSEC01M	Remote Sensing
GEOSSEC02M	Advanced Spatial Statistical Techniques

2. Core Course Syllabus

GEOACOR01T – Geotectonics and Geomorphology ✧

4 Credits, 50 Marks [60 classes]

Unit I: Geotectonics

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 as a unified theory of global tectonics: Processes and landforms at plate margins and hotspots
4. Folds and Faults—origin and types

Unit II: Geomorphology

5. Degradational processes: Weathering, mass wasting and resultant landforms
6. Development of river network and landforms on uniclinal and folded structures
7. Development of landforms on granites, basalts and limestones.
8. Coastal processes and landforms
9. Glacial and glacio-fluvial processes and landforms
10. Aeolian and fluvio-aeolian processes and landforms
11. Models on landscape evolution: Views of Davis, Penck and Hack

Reading List

- Billings, M.P. 1971. Structural Geology, Pearson.
- Frisch, W., Meschede, M., Blakey, R.C. 2011. Plate Tectonics: Continental Drift and Mountain Building. Springer.
- Goudie, A.S. (Ed) 2004. Encyclopaedia of Geomorphology, vol. 1 & 2, Routledge.
- Gregory, K.J., Lewin, J. 2014. The Basics of Geomorphology: Key Concepts, Sage.
- Harvey, A. 2012. Introducing Geomorphology: A Guide to Landforms and Processes, Dunedin Academic Press.
- Kale, V.S., Gupta, A. 2001. Introduction to Geomorphology, Orient Longman.
- Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India.
- Knighton, A.D. 1984. Fluvial Forms and Processes, Edward Arnold.
- Selby, M.J. 1986. Earth's Changing Surface, Oxford University Press.
- Strahler, A. 2016. Introducing Physical Geography, 6th ed, Wiley.
- Summerfield, M.J. 2003. Global Geomorphology: An Introduction to the Study of Landforms, Longman.
- Thornbury, W.D. 1969. Principles of Geomorphology, 2nd ed, Wiley-India / CBS.

GEOACOR01P – Geotectonics and Geomorphology ✨

2 Credits, 25 Marks [60 classes]

1. Megascopic identification of (a) *mineral samples*: Bauxite, calcite, chalcopyrite, feldspar, galena, gypsum, hematite, magnetite, mica, quartz, talc, tourmaline; and (b) *rock samples*: Granite, basalt, dolerite, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite, marble
2. Interpretation of geological maps with unconformity and intrusions on uniclinal and folded structures

Reading List

Farndon, J. 2012. The Illustrated Guide to Rocks & Minerals, Southwater.

McCullough, P.K. 1978. Modern Concept in Geomorphology, Oxford University Press.

Pillent, C. 2002. Smithsonian Handbooks: Rocks & Minerals, Dorling Kindersley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Sen, P.K. 1989. Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.

Sorrell, C.A. Rocks and Minerals: A Guide to Field Identification, St. Martin's Press.

GEOACOR02T – Cartographic Techniques ✨

4 Credit, 50 Marks [60 classes]

1. Maps: Classification and types. Components of a map
2. Concept and application of scales: Plain, comparative, diagonal and vernier
3. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps
4. Coordinate systems: Polar and rectangular
5. Concept of generating globe and UTM projection
6. Grids: angular and linear systems of measurement
7. Map projections: Classification, properties and uses

Reading List

Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.

Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Vaidyanadhan, R., Subbarao, K.V. 2014. Landforms of India from Topomaps and Images, Geological Society of India.

GEOACOR02P – Cartographic Techniques (Lab)

2 Credits, 25 Marks [90 classes]

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.

Reading List

- Kennedy, M., Kopp, S. 2001. Understanding Map Projections, Esri Press.
- Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. 2011. Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.
- Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.
- Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.
- Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.
- Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.
- Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

GEOACOR03T – Human Geography

6 Credits, 75 Marks [90 classes]

Unit I: Nature and Principles

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

Unit II: Society, Demography and Ekistics

5. Evolution of human societies: Hunting and food gathering, pastoral nomadism, subsistence farming and industrial society
6. Human adaptation to environment: Eskimo, Masai and Maori
7. Population growth and distribution, composition; demographic transition
8. Population–Resource regions (Ackerman)
9. Types and patterns of rural settlements
10. Morphology of urban settlements

Reading List

- Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.
- Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley.
- Ghosh, S. 1998. Introduction to Settlement Geography, Sangam Books Ltd.
- Gould, W.T.S. 2015. Population and Development, Routledge.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.
- Knox, P.L., Marston, S.A. 2014. Human Geography: Places and Regions in Global Context, 6th ed, Pearson Education Limited.
- Knox, P.L., McCarthy, L.M. 2011. Urbanization: An Introduction to Urban Geography, 3rd ed, Pearson Education Ltd.
- Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company.
- Moseley, W.G., Perramond, E., Hapke, H.M., Laris, P. 2013. An Introduction to Human-Environment Geography: Local Dynamics and Global Processes, Wiley-Blackwell.
- Norton, W. 2014. Human Geography, 8th ed, Oxford University Press.
- Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.
- Rubenstein, J.M. 2016. The Cultural Landscape: An Introduction to Human Geography, 12th ed, Pearson Education Limited.
- Short, R.J. 2017. Human Geography: A Short Introduction, 2nd ed, Oxford University Press.

GEOACOR04T – Cartograms and Thematic Mapping ✦

4 Credits, 50 Marks [60 classes]

1. Concepts of rounding, scientific notation, logarithm and anti-logarithm, natural and log scales
2. Diagrammatic representation of data: Line, Bar, Isopleths
3. Representation of area data: Dots and spheres, proportional circles and Choropleth
4. Preparation and interpretation of land use land cover maps
5. Preparation and interpretation of socio-economic maps
6. Bearing: Magnetic and true, whole-circle and reduced
7. Basic concepts of surveying and survey equipment: Prismatic Compass, Dumpy Level, Theodolite

Reading List

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Bolton. T. 2009 (reprint). Geological Maps: Their Solution and Interpretation, Cambridge University Press.

Kanetkar, T.P., Kulkatni, S.V. 1988. Surveying and Levelling, Part I, Pune VidyarthiGrihaPrakashan.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press

GEOACOR04P – Cartograms and Thematic Mapping (Lab) ✧

2 Credits, 25 Marks [60 classes]

1. Thematic maps:

- Choropleth showing density of population
- Dots and Spheres diagram showing distribution of rural and urban population.
- Proportional pie-diagrams representing economic data and land use data

2. Traverse survey using prismatic compass

Profile survey using dumpy Level

Reading List

Basak, N.N. 2017. Surveying and Levelling, 2nd ed, McGraw Hill Education.

Bolton. T. 2009 (reprint). Geological Maps: Their Solution and Interpretation, Cambridge University Press.

Kanetkar, T.P., Kulkarni, S.V. 1988. Surveying and Levelling, Part I, Pune VidyarthiGrihaPrakashan.

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. 1995. Elements of Cartography, 6th ed, Wiley.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Subramanian, R. 2012. Surveying and Levelling, 2nd ed, Oxford University Press

GEOACOR05T – Climatology ⇨

4 Credits, 50 Marks [60 classes]

Unit I: Elements of the Atmosphere

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

5. Condensation: Process and forms. Mechanism of precipitation: Bergeron-Findeisen theory, collision and coalescence. Forms of precipitation
6. Air mass: Typology, origin, characteristics and modification
7. Fronts: warm and cold; frontogenesis and frontolysis
8. Weather: stability and instability; barotropic and baroclinic conditions
9. Circulation in the atmosphere: Planetary winds, jet stream, index cycle
10. Tropical and mid-latitude cyclones
11. Monsoon circulation and mechanism with reference to India
12. Climatic classification after Köppen, Thornthwaite (1955) and Oliver

Reading List

BOOKS

- Ahrens, C.D. 2012. Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning.
- Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
- Barry, R.G, Chorley R.J. 2009. Atmosphere Weather and Climate. 9th Ed, Routledge.
- Critchfield, H. J. 1983. General Climatology. Prentice Hall India Ltd (2010 Reprint).
- Lal, D.S. 2012. Climatology. Sharda Pustak Bhawan.
- Lutgens, F.K., Tarbuck, E.J. 1998. The Atmosphere: An Introduction to Meteorology, 9th Ed, Prentice-Hall Inc.
- Oliver, J.E., Hidore J.J. 2002. Climatology: An Atmospheric Science, Pearson Education India

GEOACOR05T – Climatology ✧

2 Credits, 25 Marks [60 classes]

1. Interpretation of daily weather map of India (any two): Pre-Monsoon, Monsoon and Post-Monsoon
2. Construction and interpretation of hythergraph and climograph (G. Taylor)
3. Construction and interpretation of wind rose
4. A Project File, comprising of one exercise from each of the following is to be prepared and submitted

Reading List

Monkhouse, F.J., Wilkinson, H.R. 1971. Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

GEOACOR06T – Geography of India ✨

6 Credits, 75 Marks [90 classes]

Unit I: Geography of India

1. Tectonic and stratigraphic provinces, physiographic divisions
2. Climate, soil and vegetation: Characteristics and classification
3. Population: Distribution, growth, structure and policy
4. Tribes of India with special reference to Gaddi, Toda, Santal and Jarwa
5. Agricultural regions. Green revolution and its consequences
6. Mineral and power resources distribution and utilisation of iron ore, coal, petroleum and natural gas
7. Industrial development: Automobile and information technology
8. Regionalisation of India: Physiographic (R.L. Singh) and economic (P. Sengupta)

Unit II: Geography of West Bengal

9. Physical perspectives: Physiographic divisions, forest and water resources
10. Resources: Agriculture, mining, and industry
11. Population: Growth, distribution and human development
12. Regional Issues: Darjeeling Hills and Sundarban

Reading List

- Bandyopadhyay, S., Kar, N.S., Das, S., Sen, J. 2014. River system and water resources of West Bengal: A Review. In: Vaidyanadhan, R. (Ed) Rejuvenation of Surface Water Resources of India: Potential, Problems and Prospects, Geological Society of India Special Publication.
- Dhara, M.K., Basu, S.K., Bandyopadhyay, R.K., Roy, B., Pal, A.K. (Eds.) 1999. Geology and Mineral Resources of the States of India, Part-1: West Bengal. Geological Survey of India Miscellaneous Publication.
- Ghurey, G.S. 1963. The Scheduled Tribes of India, 1980 reprint, Transaction Books.
- Johnson, B.L.C. (Ed) 2001. Geographical Dictionary of India, Vision Books.
- Khullar, D.R. 2011. India: A Comprehensive Geography, Kalyani Publishers
- Mandal, H., Mukherjee, S., Datta, A. 2002. India: An Illustrated Atlas of Tribal World, Anthropological Survey of India.
- Pathak, C.R. 2003. Spatial Structure and Processes of Development in India, Regional Science Association-Kolkata.
- Sharma, T.C. 2012. Economic Geography of India, Rawat Publications.
- Singh, J. 2003. India-A Comprehensive & Systematic Geography, Gyanodaya Prakashan.
- Singh, R.L. 1971. India: A Regional Geography, National Geographical Society of India.
- Spate, O.H.K., Learmonth, A.T.A. 1967. India and Pakistan: A General and Regional Geography, Methuen.
- Tiwari, R.C. 2007. Geography of India, Prayag Pustak Bhawan.
- Valdiya, K.S. 2010. The Making of India: Geodynamic Evolution, Macmillan Publishers India Ltd.

GEOACOR07T – Statistical Methods in Geography ✨

4 Credits, 40 Marks [60 classes]

Unit I: Frequency Distribution and Sampling

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

Unit II: Numerical Data Analysis

7. Central tendency: Mean, median, mode, partition values
8. Measures of dispersion range: mean deviation, standard deviation, coefficient of variation
9. Association and correlation: Rank correlation, product moment correlation
10. Regression: Linear and non-linear
11. Time series analysis: Moving average

Reading List

Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.

Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.

McGrew Jr., J.C., Lembo Jr., A.J., Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.

Pal S. K., 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.

Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

GEOACOR07P – Statistical Methods in Geography (Lab) ✦

2 Credits, 25 Marks [60 classes]

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 using histogram and frequency curve
3. 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
4. Based on the sample set and using two relevant attributes, a scatter diagram and linear regression line would be plotted and residual from regression would be mapped with a short interpretation

Reading List

- Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.
- Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.
- McGrew Jr., J.C., Lembo Jr., A.J., Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.
- Pal S. K., 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.
- Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.
- Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan.

GEOACOR08T – Regional Planning and Development

6 Credits, 75 Marks [90 classes]

Unit I: Regional Planning

1. Concept of regions: Types of regions and their delineation
2. Regional Planning: Types, principles, objectives, tools and techniques
3. Need for regional planning in India, multi- level planning in India
4. Metropolitan concept and urban agglomerations

Unit I: Regional Development

5. Concepts of growth and development, growth versus development
6. Indicators of development: Economic, social and environmental
7. Human development: Concept and measurement
8. Theories and models for regional development: Cumulative causation (Myrdal)
9. Theories and models for regional development: Stages of development (Rostow), growth pole model (Perroux).
10. Concept and causes of underdevelopment
11. Regional development in India: Disparity and diversity
12. Need and measures for balanced development in India

Reading List

- Bhargava, G. 2001. Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.
- Chand, M., Puri, V.K. 2000. Regional Planning In India, Allied Publishers Ltd.
- Chandana, R.C. 2016. Regional Planning and Development, 6th ed, Kalyani Publishers.
- Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.
- Gore, C. 2011. Regions in Question: Space, Development Theory, and Regional Policy, Routledge.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.
- Hall, P., Tewdwr-Jones, M. 2010. Urban and Regional Planning, Routledge.
- Higgins, B., Savoie, D.J. 2017. Regional Development: Theories and Their Application, Routledge.
- Kulshetra, S.K. 2012. Urban and Regional Planning in India: A Handbook for Professional Practitioners, Sage Publication.
- Kumar, A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.
- Misra, R.P. 1992. Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Publishing.
- Ray, J. 2001. Introduction to Development & Regional Planning, Orient Blackswan.

GEOACOR09T — Economic Geography ✨

6 Credits, 75 Marks [90 classes]

Unit I: Concepts

1. Meaning and approaches to 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

5. Concept and classification of economic activities
6. Factors affecting location of economic activity with special reference to agriculture (Von Thünen), and industry (Weber).
7. Primary activities: Agriculture, forestry, fishing and mining
8. Secondary activities: Manufacturing (cotton textile, iron and steel), concept of manufacturing regions, special economic zones and technology parks
9. Tertiary activities: Transport, trade and services
10. Agricultural systems: Case studies of tea plantation in India and mixed farming in Europe
11. Transnational sea-routes, railways and highways with reference to India
12. International trade and economic blocs: WTO, GATT and BRICS: Evolution, structure and functions

Reading List

- Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey
- Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.
- Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
- Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.
- Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. Economic Geography, 3rd ed, Wiley.
- Willington D. E., 2008: Economic Geography, Husband Press.
- Wood, A., Roberts, A. 2010. Economic Geography: Places, Networks and Flows, Routledge.

GEOACOR10T—Environmental Geography ✨

4 Credits, 50 Marks [60 classes]

Concepts

1. Geographers' approach to environmental studies
2. Concept of holistic environment and systems approach
3. Ecosystem: Concept, structure and functions
4. Space–time hierarchy of Environmental problems: Local, regional and global

Environmental problems and policies

5. Environmental pollution and degradation: Land, water and air
6. Urban environmental issues with special reference to waste management
7. Environmental policies – National Environmental Policy, 2006, Earth Summits (Stockholm, Rio, Johannesburg)
8. Global initiatives for environmental management (special reference to Montreal Protocol, Kyoto Protocol, Paris Climate Summit)

Reading List

- Basu, R. and Bhaduri, S. (Eds) 2007. Contemporary Issues and Techniques in Geography, Progressive Publishers.
- Chandna, R.C. 2002. Environmental Geography, Kalyani Press.
- Chapman, J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.
- Cunningham, W.P., Cunningham, M.A. 2004. Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill.
- Gilpin, A., 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press.
- Goudie, A. 2001. 2013. The Human Impact on the Natural Environment: Past, Present, and Future, 7th ed, Wiley-Blackwell.
- Miller, G.T. 2004. Environmental Science: Working with the Earth, Thomson Brooks.
- Odum, E.P., Barrett, G.W. 2005. Fundamentals of Ecology, Ceneage Learning.
- Raven, P.H., Hassenzahl, D.M., Hager, M.C., Gift, N.Y., Berg, L.R. 2015. Environment, 9th ed, Wiley.
- Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.
- Singh, S. 2013. Environmental Geography, PrayagPustakBhawan.
- Withgott, J.H., Laposata, M. 2017. Environment: The Science behind the Stories, 6th ed, Pearson.

GEOACOR10P—Environmental Geography ✧

2 Credits, 25 Marks [60 classes]

1. Preparation of questionnaire for perception survey on environmental problems
2. Preparation of check-list for Environmental Impact Assessment of an urban/industrial project
3. Interpretation of air quality using CPCB / WBPCB data

Reading List

Gilpin, A., 1994. Environmental Impact Assessment: Cutting Edge for the 21st Century, Cambridge University Press.

WEBSITES:

BBC – Science & Environment: www.bbc.com/news/science_and_environment

Central Pollution Control Board: www.cpcb.nic.in

Centre for Science and Environment: www.cseindia.org

Ministry of Environment, Forest and Climate Change: www.envfor.nic.in

The Energy and Resources Institute: www.teriin.org

The World Bank – Environment: www.worldbank.org/en/topic/environment

United Nations Environment Programme: www.unenvironment.org

West Bengal Pollution Control Board: www.wbpcb.gov.in

GEOACOR11T – Fieldwork and Research Methodology ✧

4 Credits, 50 Marks [60 classes]

Unit I: Research Methodology

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

Unit II: Fieldwork

6. Fieldwork in Geographical studies: Role and significance. Selection of study area and objectives. Pre-field academic preparations. Ethics of fieldwork
7. Field techniques and tools: Observation (participant, non participant), questionnaires (open, closed, structured, non-structured). Interview
8. Field techniques and tools: Landscape survey using transects and quadrants, constructing a sketch, photo and video recording.
9. Positioning and collection of samples. Preparation of inventory from field data.
10. Post-field tabulation, processing and analysis of quantitative and qualitative data

Reading List

- Clifford, N., Cope, M., Gillespie, T.W., French, S. (Eds) 2016. *Key Methods in Geography*, 3rd ed, Sage.
- Gomes, B., Jones III, J.P. (Eds) 2010. *Research Methods in Geography: A Critical Introduction*, Wiley-Blackwell.
- Lenon, B., Cleves, P. 2015. *Geography Fieldwork and Skills*, Harper-Collins.
- Montello, D.R, Sutton, P. 2012. *An Introduction to Scientific Research Methods in Geography and Environmental Studies*, 2nd ed, Sage.
- Murthy, K.L.N. 2004. *Research Methodology in Geography: A Text Book*, Concept Publishing Co.
- Northey, N., Draper, D., Knight, D.B. 2015. *Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing*, 6th ed, Oxford University Press.
- Parsons, T., Knight, P.G. 2015. *How To Do Your Dissertation in Geography and Related Disciplines*, 3rd ed, Routledge.
- Phillips, R., Johns, J. 2012. *Fieldwork for Human Geography*, Sage.
- Riordan, D. 2013. *Technical Report Writing Today*, 10th ed, Wadsworth Publishing.
- Thornbush, M.J., Allen, C.D., Fitzpatrick, F.A. (Eds) 2014. *Geomorphological Fieldwork*, Elsevier.

GEOACOR11P – Fieldwork and Research Methodology (Lab) ✦

2 Credits, 25 Marks [60 classes]

Every student needs to participate in fieldwork and prepare a field report according to the following guideline, failing which he/she will not be evaluated for Core P11.

1. Each student will prepare a report based on primary data collected from field survey and secondary data collected from different sources.
2. Students will select either one rural area (*mouza*) or an urban area (municipal ward) for the study, with the primary objective of evaluating the relation between physical and cultural landscape.
3. The fieldwork should be completed within seven days.
4. The report should be handwritten in English on A4 size paper in candidate's own words within 5,000 words (Introductory Chapter: 1000 words; Physical Aspects: 1500 words; Socio-economic Aspects: 1500 words; Concluding Chapter: 500 words, approximately) excluding tables, photographs, maps, diagrams, references and appendices.
5. Maps and diagrams should not exceed 15 pages.
6. All sections of the report should contain relevant maps, diagrams and photographs using primary and secondary data, clearly citing sources.
7. A copy of the bound report, duly signed by the concerned teacher, will be submitted during examination.

GEOACOR12T – Remote Sensing and GIS

4 Credits, 50 Marks [60 classes]

Unit I: Remote Sensing

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
3. Preparation of False Colour Composites from IRS LISS-3 and Landsat TM and OLI data.
4. Principles of image correction and interpretation. Preparation of inventories of land use land cover (LULC) features from satellite images.

Unit II: Geographical Information Systems and Global Navigation Satellite System

5. Concept of GIS and its applicability; GIS data structures: types: spatial and non-spatial, raster and vector
6. Principles of preparing attribute tables and data manipulation and overlay analysis
7. Principles of GNSS positioning and waypoint collection
8. Transferring waypoints to GIS. Area and length calculations from GNSS data.

Reading List

- Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.
- Bhatta, B. 2011. Remote Sensing and GIS, 2nd ed, Oxford Univ. Press.
- Bolstad, P. 2016. GIS Fundamentals: A First Text on Geographic Information Systems, 5th ed, XanEdu Publishing.
- Brewer, C.A. 2015. Designing Better Maps: A Guide for GIS Users, 2nd ed, Esri Press.
- Harvey, F. 2015. A Primer of GIS: Fundamental Geographic and Cartographic Concepts, 2nd ed, The Guilford Press.
- Jensen, J.R., 2013. Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education India.
- Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.
- Lillesand, T.M., Kiefer, R.W. and Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.
- Sarkar, A. 2015. Practical Geography: A Systematic Approach. 2nd ed, Orient Black Swan Private Ltd.

GEOACOR12P – Remote Sensing and GIS

2 Credits, 25 Marks [60 classes]

1. Georeferencing of maps and images using Open Source software
2. Preparation of FCC and identification of features using standard FCC and other band combinations
3. Digitisation of features. Data attachment, overlay and preparation of annotated thematic maps (choropleth, pie chart and bar graphs).
4. Note: All exercises to be done using QGIS (2.10 and above)

Reading List

WEBSITES:

International Society for Photogrammetry and Remote Sensing: www.isprs.org

NASA Landsat Science: www.landsat.gsfc.nasa.gov

National Remote Sensing Centre: www.nrsc.gov.in

USGS Global Visualization Viewer: www.glovis.usgs.gov

GEOACOR13T – Evolution of Geographical Thought

6 Credits, 75Marks [90 classes]

Unit I: Nature of Pre Modern Geography

1. Development of Geography: Contributions of Greek and Chinese geographers
2. Impact of 'Dark Age' in Geography and Arab contributions
3. Geography during the age of 'Discovery' and 'Exploration' (contributions of Columbus, Vasco da Gama, Magellan, Thomas Cook)
4. Transition from cosmography to scientific Geography (contributions of Bernard Varenus and Immanuel Kant). Dualism and Dichotomies (Ideographic vs. Nomothetic, Physical vs. Human, Regional vs. Systematic, Determinism vs. Possibilism,)

Unit II: Foundations of Modern Geography and Recent Trends

5. Evolution of Geographical thoughts in Germany, France, Britain and United States of America
6. Contributions of Humboldt and Ritter
7. Contributions of Richthofen, Hettner, Ratzel and Vidal deLaBlaché
8. Trends of geography in the post-World War-II period: Quantitative Revolution, systems approach.
9. Evolution of Critical Geography: Behavioural, humanistic and radical.
10. Changing concept of time-space in geography in the 21st Century

Reading List

- Adhikari, S. 2015. Fundamentals of Geographical Thought, Orient Blackswan.
- Clifford, N. Holloway S.L., Rice, S.P., Valentine, G. 2009. Key Concepts in Geography, 2nd ed, Sage.
- Couper, P. 2015. A Student's Introduction to Geographical Thought: Theories, Philosophies, Methodologies, Sage.
- Cresswell, T. 2013. Geographic Thought: A Critical Introduction, Wiley-Blackwell.
- Dikshit, R.D. 2004. Geographical Thought: A Contextual History of Ideas, Prentice Hall India.
- Holt-Jensen, A. 2011. Geography: History and Concepts: A Student's Guide, Sage.
- Husain, M. 2015. Evolution of Geographical Thought, 6th ed, Rawat Publications.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.
- Pete, R. 1998. Modern Geographical Thought, Wiley-Blackwell.

GEOACOR14T – Disaster Management

4 Credits, 50 Marks [60 classes]

Unit I: Concepts

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 geospatial techniques (for hazards enlisted in Unit II and Core 14P)

Unit II: Hazard-specific Study with focus on India

5. Earthquake: Factors, vulnerability, consequences and management
6. Landslide: Factors, vulnerability, consequences and management
7. Tropical Cyclone: Factors, vulnerability, consequences and management
8. Riverbank erosion: Factors, vulnerability, consequences and management
9. Radioactive fallout: Factors, vulnerability, consequences and management

Reading List

- Coch, N.K. 1994. Geohazards: Natural and Human, Pearson College.
- Coenraads, R. (Ed.) 2006. Natural Disasters and How We Cope, Millennium House.
- Cutter, S.L. 2006. Hazards Vulnerability and Environmental Justice, Routledge
- Government of India. 1997. Vulnerability Atlas of India, Revised ed, Building Materials & Technology Promotion Council, Ministry of Urban Development.
- Hyndman, D., Hyndman, D. 2016. Natural Hazards and Disasters, 5th ed, Brooks Cole.
- Kapur, A. 2010. Vulnerable India: A Geographical Study of Disasters, Sage.
- Keller, E.A., DeVecchio, D.E. 2014. Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes, 4th ed, Routledge.
- Pine, J.C. 2014. Hazards Analysis: Reducing the Impact of Disasters, 2nd ed, CRC Press.
- Robbins, P., Hintz, J., Moore, S.A. 2014. Environment and Society: A Critical Introduction 2nd ed, Wiley.
- Smith, K. 2013. Environmental Hazards: Assessing Risk and Reducing Disaster, 6th ed, Routledge.
- Websites:
- AGU landslide Blog: blogs.agu.org/landslideblog
- Disaster News Network: secure.disasternews.net
- India Meteorological Department Cyclone Page: www.rsmcnewdelhi.imd.gov.in/index.php?lang=en
- USGS Earthquake Hazards Programme: www.earthquake.usgs.gov

GEOACOR14P – Disaster Management

2 Credits, 25 Marks [60 classes]

An individual Project Report is to be prepared and submitted based on any one case study among the following disasters of West Bengal incorporating a preparedness plan

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

One case study will be done by a group of five students. Different groups may choose different case studies from any one or different types of disasters. The report should be prepared on secondary data and handwritten on A4 page in candidates' own words not exceeding 2000 words excluding references. The report should contain a proper title. The report should incorporate relevant tables, maps, diagrams and references not exceeding five pages. Photographs are not required. A copy of the stapled report in a transparent front file, duly signed by the concerned teacher, will be submitted during examination. Without the report the candidates will not be evaluated for Core P14.

3. Department Specific Elective Subjects Syllabus

GEOADSE01T– Soil and Biogeography ✨

6 Credit, 75 Marks [90 classes]

Unit I: Soil Geography

1. Factors of soil formation. Man as an active agent of soil transformation.
2. Soil profile. Origin and profile characteristics of Lateritic, Podzol and Chernozem soils
3. Definition and significance of soil properties: Texture, structure and moisture,
4. Definition and significance of soil properties: pH, organic matter and NPK
5. Soil erosion and degradation: Factors, processes and mitigation measures
6. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification.

Unit II: Biogeography

7. Concepts of biosphere, ecosystem, biome, ecotone, community, niche, succession and ecology
8. Concepts of trophic structure, food chain and food web. Energy flow in ecosystems
9. Geographical extent and characteristic features of: Tropical rain forest, Taiga and Grassland biomes
10. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen
11. Spatial distribution of world fauna.
12. Measures for conservation of bio-diversity in India: Man and Biosphere Programme

Reading List

- Chapman J.L., Reiz, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press.
- Chiras, D.D., Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future. Pearson.
- Cox, B., Moore, P.D., Ladle, R. 2016. Biogeography: An Ecological and Evolutionary Approach, Wiley-Blackwell.
- Daji, J.A., Kadam, J.R., Patil, N.D. 1996. A Textbook of Soil Science, Media Promoters and Publishers Pvt Ltd.
- Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGrawHill, New Delhi
- Dey, N. K., Ghosh.P. 1993. India: A Study in Soil Geography, Sribhumi Publishing Company.
- Franzmeier, D.P., McFee, W.W., Graveel, J.G., Kohnke, H. 2016. Soil Science Simplified, 5th ed, Waveland Press.
- Huggett, R. 1998. Fundamentals of Biogeography, Routledge, London:
- Lomolino, M.V., Riddle, B.R., Whittaker, R.J. 2016. Biogeography, 5th ed, Oxford University Press.
- MacDonald, G. 2001. Biogeography: Introduction to Space, Time, and Life, Wiley
- Morgan, R.P.C. 1995. Soil Erosion and Conservation, 2nd edition, Longman.
- Santra. A. 2006. Handbook on Wild and Zoo Animals, International Book Distributing Co.
- Sharma, P.D. 2011. Ecology and Environment, Rastogi Publications.
- Weil, R.R. and Brady, N.C. 2016. The Nature and Properties of Soil, 15th edition, Pearson.
- White, R. 2006. Principles and Practice of Soil Science: The Soil as a Natural Resource, Blackwell.

GEOADSE02T –Settlement Geography ✨

6 Credit, 75 Marks [90 classes]

Unit I Rural Settlement

1. Scope and content of Settlement Geography; rural, urban and peri-urban areas
2. Rural Settlement: Definition, nature and characteristics
3. Morphology of rural settlements: site and situation, layout-internal and external
4. Rural house types with reference to India, Social segregation in rural areas; Census categories of rural settlements.
5. Problems and policies related to rural infrastructure with reference to India

Unit II Urban Settlement

6. Urban Settlements :Census definition (Temporal) and categories in India
7. Urban morphology: Classical models: Burgess, Homer Hoyt, Harris and Ullman Metropolitan concept.
8. City-region and Conurbation, Functional classification of cities: Harris, Nelson and McKenzie
9. Aspects of urban places: Location, site and situation, Size and spacing of cities: the rank size rule, the law of the primate city
10. Urban hierarchies : Central Place Theory; August Lösch's theory of market centres

Reading List

- Banerjee Guha, S. (Ed.) 2004. Space, Society and Geography, Rawat Publication.
- Bjelland, M.D., Montello, D.R., Fellmann, J.D., Getis, A., Getis, J. 2000. Human Geography: Landscape of Human Activity, McGraw Hill.
- Carter, H. 1995. The Study of Urban Geography, 4th ed, Arnold.
- Dhanagare, D.N. 2004. Themes and Perspectives in Indian Sociology, Rawat Publication.
- Fern, R.L. 2002. Nature, God and Humanity, Cambridge University Press.
- Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley
- Ghosh, S. 1998. Introduction to Settlement Geography, Sangam Books Ltd.
- Gottdiener, M., Budd, M. Lehtovuori, P. 2016. Key Concepts in Urban Studies, 2nd ed, Sage.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, Wiley.
- Hudson, F.S. 1970. Geography of Settlements, Macdonald and Evans Ltd.
- Hussain, M. 2007. Models in Geography, Rawat Publication.
- Jordan, T., Rowntree, L. 1990. Human Mosaic, Harper Collins Publishers.
- Knox, P., Pinch, S. 2000. Urban Social Geography, Pearson Education.
- Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company.
- Mitchell, D. 2000. Cultural Geography: A Critical Introduction, Blackwell.
- Singh, R.Y. 2000. Geography of Settlements, Rawat Publication.

GEOADSE03T – Population Geography ✧

75 Marks 6Credits

Unit I: Population Dynamics

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: Population and Development

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

Reading List

- Barrett, H.R. 1995. Population Geography, Oliver and Boyd.
- Bartram, D. Poros, M. Monforte, P. 2014. Key Concepts in Migration, Sage.
- Binde, N., Kanitkar, H. 2000. The Principle of Population Studies, Himalaya Publications.
- Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.
- Dyson, T. 2011. Population and Development: The Demographic Transition, Rawat Publications.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.
- Hassan, M.I. 2005. Population Geography, Rawat publications.
- Hussain, M. 1994. Human Geography, Rawat publications.
- Jhingan, M.L., Bhatt, B.K., Desai, J.N. 2014. Demography, Vrinda Publications.
- Jones, H. R. 2000. Population Geography, 3rd ed, Chapman.

- Lutz, W., Warren, C.S., Scherbov, S. 2004. The End of the World Population Growth in the 21st Century, Earthscan.
- Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.
- Mukherji, S. 2013. Migration in India: Links to Urbanization, Regional Disparities and Development Policies, Rawat Publications
- Newbold, K.B. 2017. Population Geography: Tools & Issues, 3rd ed, Rowman & Littlefield Publishers.
- Pacione, M. 2012. Population Geography: Progress and Prospect, Routledge.

GEOADSE04T – Hydrology and Oceanography ✨

6 Credits, 75 Marks [90 classes]

Unit-I: Hydrology

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

Unit-II: Oceanography

5. Major relief features of the ocean floor: characteristics and origin according to plate tectonics
6. Physical and chemical properties of ocean water
7. Water mass, T–S diagram
8. Ocean temperature and salinity: Distribution and determinants
9. Marine resources: Classification and sustainable utilisation
10. Sea level change: Types and causes

Reading List

- Dingman, S.L. 2015. Physical Hydrology, 3rd ed, Macmillan Publishing Co.
- Fitts, C.R. 2002. Groundwater Science, Elsevier.
- Garrison, T. 2016. Oceanography: An Invitation to Marine Science, 9th ed, Cengage Learning.
- Kearey, P., Klepeis, K.A., Vine, F.J. 2011. Global Tectonics, 3rd ed, Wiley-India.
- Karant, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
- Pinet, P.R. 2014. Invitation to Oceanography. 7th ed, Jones and Barlett Publishers.
- Pinneker, E.V. 2010. General Hydrogeology, Cambridge University Press.
- Pugh, D., Woodworth, P. 2014. Sea-Level Science: Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes, 2nd ed, Cambridge University press.
- Raghunath, H.M. 2006. Hydrology: Principles, Analysis, Design, 3rd ed, New Age International Publishers.
- Reddy, P.J.R. 2014. A Textbook of Hydrology, University of Science Press.
- Subramanya, K. 2013. Engineering Hydrology, McGraw Hill Education.
- Sverdrup, K.A., Armrest, E.V. 2010. An Introduction to the World Oceans, 10th ed, McGraw Hill.
- Todd, D.K., Larry, W.M. 2004. Groundwater Hydrology, John Wiley & Sons.
- Ward, A.D., Trimble, S.W., Burckhard, S.R., Lyon, J.G. 2016. Environmental Hydrology, 3rd ed, CRC Press.

GEOADSE05T – Social Geography ✨

6 Credits, 75 Marks [90 classes]

Unit I: Society, Identity and Crisis

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: Social Wellbeing and Planning

7. Concept of Social Well-being, Quality of Life, Gender and Social Well-being
8. Measures of Social Well-being: Healthcare, Education, Housing, Gender Disparity
9. Social Geographies of Inclusion and Exclusion, Slums, Gated Communities, Communal Conflicts and Crime.
10. Social Planning during the Five Year Plans in India
11. Social Policies in India: Education and Health
12. Social Impact Assessment (SIA): Concept and importance

Reading List

- 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.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.
- Holt, L., 2011. Geographies of Children, Youth and Families: An International Perspective, Taylor & Francis.
- Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.
- Mukherji, S. 2013. Migration in India: Links to Urbanization, Regional Disparities and Development Policies, Rawat Publications
- 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., 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.
- Valentine, G. 2014. Social Geographies: Space and Society, Routledge.

GEOADSE06T – Resource Geography ✨

75 Marks, 6 Credits [90 classes]

Unit I: Resource and Development

1. Natural Resources: Concept and classification
2. Approaches to Resource Utilization: Utilitarian, Conservational, Community based adaptation
3. Significance of Resources: Backbone of Economic growth and development
4. Pressure on resources. Appraisal and Conservation of Natural Resources
5. Problems of resource depletion—global scenario (forest, water, fossil fuels).
6. Sustainable Resource Development

Unit II: Resource Conflict and Management

7. Distribution, Utilisation, Problems and Management of Mineral Resources: Bauxite and Iron Ore.
8. Distribution, Utilisation, Problems and Management of Energy Resources: Conventional and Non-Conventional
9. Contemporary Energy Crisis and Future Scenario
10. Limits to Growth and Sustainable Use of Resources; Concept of Resource sharing: Water

Reading List

- Chiras, D.D., Reganold, J.P. 2009. Natural Resource Conservation: Management for a Sustainable Future, 10th ed, Pearson.
- Cutter, S.N., Renwick, H.L., Renwick, W. 1991. Exploitation, Conservation, and Preservation: A Geographical Perspective on Natural Resources Use, John Wiley and Sons.
- Gadgil, M., Guha, R. 2005. The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity, Oxford University Press.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.
- Holechek, J.L.C., Richard, A., Fisher, J.T., Valdez, R. 2003. Natural Resources: Ecology, Economics and Policy, Prentice Hall.
- Jones, G., Hollier, G. 1997. Resources, Society and Environmental Management, Paul Chapman.
- Klee, G. 1991. Conservation of Natural Resources, Prentice Hall.
- Mather, A.S., Chapman, K. 1995. Environmental Resources, John Wiley and Sons.
- Mitchell, B. 1997. Resource and Environmental Management, Longman Harlow.
- Owen, S., Owen, P.L. 1991. Environment, Resources and Conservation, Cambridge University Press.
- Rees, J. 1990. Natural Resources: Allocation, Economics and Policy, Routledge.

4. Generic Elective Subjects Syllabus for Honours Students of Other Disciplines

GEOHGEC01T– Physical Geography ✧

6 Credit, 75 Marks [90 classes]

Unit I: Geotectonics and Geomorphology

1. Physical Geography – Definition and Scope, Components of Earth System.
2. Internal Structure of Earth based on Seismic Evidence, Plate Tectonics and its associated Features.
3. Influence of rocks on topography: Limestone and Granite
4. Evolution of landforms under fluvial process, Normal Cycle of Erosion of Davis
5. Formation of erosional and depositional landforms by coastal and aeolian processes

Unit II: Climatology and Oceanography

6. Insolation and Heat Balance.
7. Horizontal and Vertical distribution of temperature and pressure
8. Planetary wind system, characteristics of Monsoon and Tropical Cyclone
9. Climatic Classification: Köppen
10. Hydrological Cycle, Ocean Bottom Relief Features, ocean currents.

Reading List

Conserva H. T., 2004: Illustrated Dictionary of Physical Geography, Author House, USA.

Gabler R. E., Petersen J. F. and Trapasso, L. M., 2007: Essentials of Physical Geography (8th Edition), Thompson, Brooks/Cole, USA.

Garrett N., 2000: Advanced Geography, Oxford University Press.

Goudie, A., 1984: The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.

Hamblin, W. K., 1995: Earth's Dynamic System, Prentice Hall, N.J.

Husain M., 2002: Fundamentals of Physical Geography, Rawat Publications, Jaipur.

Monkhouse, F. J. 2009: Principles of Physical Geography, Platinum Publishers, Kolkata.

Strahler A. N. and Strahler A. H., 2008: Modern Physical Geography, John Wiley & Sons, New York.

GEOHGEC02T – Human Geography ✧

6 Credit, 75 Marks [90 classes]

Unit I Population and Social Geography

1. Factors of Growth and distribution of world population. Demographic Transition Theory.
2. World Population Composition: Age, Gender and Literacy.
3. Migration: Types, causes and consequences.
4. Space and Society: Cultural Regions; Race; Religion and Language
5. Contemporary social issues: Illiteracy and Poverty

Unit II Economic and Settlement Geography

6. Sectors of the economy: primary, secondary, tertiary and quaternary
7. Types of agriculture: Intensive subsistence rice farming, Plantation agriculture (Tea and Coffee)
8. Location, problems and prospects of Indian industries— Cotton textile, Petroleum refining, Locomotive
9. Types and Patterns of Rural Settlements
10. Classification of Urban Settlements; Trends and Patterns of World Urbanization

Reading List

- Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
- Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
- Ghosh, S. (2015) Introduction to settlement geography. Orient Black Swan Private Ltd., Kolkata
- Hussain, Majid (2012) Human Geography. Rawat Publications, Jaipur
- 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.
- Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
- Maurya, S.D. (2012) Manav Bhugol, Sharda Pustak Bhawan. Allahabad.

GEOHGEC03T – General Cartography ✨

4 Credits, 50 Marks [60 classes]

Cartographic Techniques

1. Concept of map scale: Types and Application. Reading distances on a map.
2. Map Projections: Criteria for choice of projections. Attributes and properties of: Zenithal Gnomonic Polar Case, Zenithal Stereographic Polar Case, Cylindrical Equal Area, Mercator's Projection, Bonne's Projection. Concept of UTM projection
3. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps.
4. Representation of Data – Symbols, Dots, Choropleth, Isopleth and Flow Diagrams, Interpretation of Thematic Maps.

Reading List

Dent B. D., 1999: *Cartography: Thematic Map Design*, (Vol. 1), McGraw Hill.

Gupta K. K and Tyagi V. C., 1992: *Working with Maps*, Survey of India, DST, New Delhi.

Mishra R. P. and Ramesh A., 1989: *Fundamentals of Cartography*, Concept Publishing.

Robinson A., 1953: *Elements of Cartography*, John Wiley.

Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers.

Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers

Singh R. L., 1998: *Prayogic Bhoogol Rooprekha*, Kalyani Publications.

Steers J. A., 1965: *An Introduction to the Study of Map Projections*, University of London.

GEOHGEC03P – General Cartography ✨

2 Credits, 25 Marks [60 classes]

Cartographic Techniques

1. Graphical construction of scales: Plain and comparative. [10]
2. Construction of projections: Zenithal Gnomonic Polar Case, Zenithal Stereographic Polar Case, Cylindrical Equal Area, Mercator's Projection, Bonne's Projection. [30]
3. Construction and interpretation of relief profiles from Survey of India topographical map — superimposed, projected and composite, relative relief map, slope map (Wentworth), and Correlation between physical and cultural features from Survey of India topographical maps using transect chart.

GEOHGEC04T – Environmental Geography ✧

6 Credits, 75 Marks [90 classes]

Concepts

1. Environmental Geography: Concepts and Approaches;
2. Human-Environment Relationship in equatorial, desert, mountain and coastal regions
3. Concept of holistic environment and system approach
4. Ecosystem: Concept, structure and functions

Environmental problems and policies

5. Environmental Problems and Management: Air Pollution; Water pollution; Biodiversity Loss; Solid and Liquid Waste.
6. Environmental problems and management: Desertification and soil erosion
7. Environmental Programmes and Policies: Developed Countries; Developing Countries.
8. New Environmental Policy of India.

Reading List

- Casper J.K. (2010) *Changing Ecosystems: Effects of Global Warming*. Infobase Pub. New York.
- Hudson, T. (2011) *Living with Earth: An Introduction to Environmental Geology*, PHI Learning Private Limited, New Delhi.
- Miller, G.T. (2007) *Living in the Environment: Principles, Connections, and Solutions*, Brooks/ Cole Cengage Learning, Belmont.
- Singh, R.B. (1993) *Environmental Geography*, Heritage Publishers, New Delhi.
- UNEP (2007) *Global Environment Outlook: GEO4: Environment For Development*, United Nations Environment Programme. University Press, Cambridge.
- Wright R. T. and Boorse, D. F. (2010) *Toward a Sustainable Future*, PHI Learning Pvt Ltd, New Delhi.
- 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

1. Scheme for the CBCS Curriculum for Geography General (B.Sc.)

Credit Distribution across Courses

Course Type B.Sc. General	Total Papers	Credits	
		THEORY + PRACTICAL	THEORY + TUTORIAL*
Core Course: 04 courses from each of the 03 disciplines of choice	12	12×4 = 48 12×2 = 24	12×5 = 60 12×1 = 12*
Elective Courses: 02 papers from each discipline of choice	6	6×4 = 24 6×2 = 12	6×5 = 30 6×1 = 06*
Ability Enhancement Courses: 02 papers of 02 credits	2	2×2 = 04	2 × 2=04
Skill Enhancement Courses: 04 papers of 02 credits each	4	4×2 = 08	4 × 2=08
		120	120

*Tutorials of 1 Credit will be conducted in case there is no practical component

Computation of work-load per week

Type of Course	Credit	Duration of Periods
Tutorial Class	1	1 Theoretical class of 1 hour duration
Theory (T)	1	1 Theoretical class of 1 hour duration
Practical (P)	1	1 Practical class of 2 hour duration
Semester Duration: 15 weeks of direct teaching		

List of subjects to be offered with Geography General

1. Political Science	4. Statistics
2. Economics	5. Zoology
3. Mathematics	6. Anthropology or Computer Science

Any 2 (two) subjects to be chosen from the above list and from each subject four papers to be taken as Core Course and two papers as Elective Course as mentioned in Table 3.2.

Distribution of Courses across semesters for Geography General (B.Sc.)

Semester	Course	Course Code	Title	Credit	Marks	Remarks
I	Core (DSC 1A)	GEOGCOR01T	Physical Geography	06	75	From Geography
	Core (DSC 2A)	XXXGCOR01T		06	75	Subject 2 apart from Geography
	Core (DSC 3A)	XXXGCOR01T		06	75	Subject 3 apart from Geography
	AEC	ENGSaec01M	Communicative English	02	25	Shared course
II	Core (DSC 1B)	GEOGCOR02T	Human Geography	06	75	From Geography
	Core (DSC 2B)	XXXGCOR02T		06	75	Subject 2 apart from Geography
	Core (DSC 3B)	XXXGCOR02T		06	75	Subject 3 apart from Geography
	AEC	ENVSAEC02T	Environment Studies	02	25	Shared course
III	Core (DSC 1C)	GEOGCOR03T	General Cartography	04	50	From Geography
		GEOGCOR03P	General Cartography (Lab)	02	25	
	Core (DSC 2C)	XXXGCOR03T		04	50	Subject 2 apart from Geography
	Core (DSC 3C)	XXXGCOR03T		06	75	Subject 3 apart from Geography
	SEC1	XXXSSEC01M	Remote Sensing	02	25	Shared course

IV	Core (DSC 1D)	GEOGCOR04T	Environmental Geography	06	75	From Geography
	Core (DSC 2D)	XXXGCOR04T		06	75	Subject 2 apart from Geography
	Core (DSC 3D)	XXXGCOR04T		06	75	Subject 3 apart from Geography
	SEC2	XXXSSEC02M	Advanced Spatial Statistical Techniques	06	75	Shared course
V	DSE1A	GEOGDSE01T	A. Soil and Biogeography			Any one course among A, B and C from Geography
		GEOGDSE02T	B. Regional Development			
		GEOGDSE03T	C. Disaster Management			
	DSE2A	XXXGDSE01T				Subject 2 apart from Geography
	DSE3A	XXXGDSE01T				Subject 3 apart from Geography
	SEC3					Shared course
VI	DSE1B	GEOGDSE04P	Project Report Based on Field Work	06	75	Compulsory from Geography
	DSE2B	XXXGDSE01T		02	25	Subject 2 apart from Geography
	DSE3B	XXXGDSE01T		06	75	Subject 3 apart from Geography
	SEC3			06	75	Shared course

Core Subjects

Code (Theory)	Code (Practical)	Course Name
GEOGCOR01T		Physical Geography
GEOGCOR02T		Human Geography
GEOGCOR03T	GEOGCOR03P	General Cartography
GEOGCOR04T		Environmental Geography

Choices for Two Discipline Specific Electives

Code (Theory)	Course Name
GEOGDSE01T	A. Soil and Biogeography
GEOGDSE02T	B. Regional Development
GEOGDSE03T	C. Disaster Management
GEOGDSE04P	Project Report Based on Field Work

Choices for Two Skill Enhancement Courses

Code (Theory)	Course Name
XXXSSEC01M	Remote Sensing
XXXSSEC02M	Advanced Spatial Statistical Techniques

2. Core Course Syllabus

(4 compulsory papers)

GEOGCOR01T– Physical Geography ✨

6 Credit, 75 Marks [90 classes]

Unit I: Geotectonics and Geomorphology

6. Physical Geography – Definition and Scope, Components of Earth System.
7. Internal Structure of Earth based on Seismic Evidence, Plate Tectonics and its associated Features.
8. Influence of rocks on topography: Limestone and Granite
9. Evolution of landforms under fluvial process, Normal Cycle of Erosion of Davis
10. Formation of erosional and depositional landforms by coastal and aeolian processes

Unit II: Climatology and Oceanography

11. Insolation and Heat Balance.
12. Horizontal and Vertical distribution of temperature and pressure
13. Planetary wind system, characteristics of Monsoon and Tropical Cyclone
14. Climatic Classification: Köppen
15. Hydrological Cycle, Ocean Bottom Relief Features, ocean currents.

Reading List

Conserva H. T., 2004: Illustrated Dictionary of Physical Geography, Author House, USA.

Gabler R. E., Petersen J. F. and Trapasso, L. M., 2007: Essentials of Physical Geography (8th Edition), Thompson, Brooks/Cole, USA.

Garrett N., 2000: Advanced Geography, Oxford University Press.

Goudie, A., 1984: The Nature of the Environment: An Advanced Physical Geography, Basil Blackwell Publishers, Oxford.

Hamblin, W. K., 1995: Earth's Dynamic System, Prentice Hall, N.J.

Husain M., 2002: Fundamentals of Physical Geography, Rawat Publications, Jaipur.

Monkhouse, F. J. 2009: Principles of Physical Geography, Platinum Publishers, Kolkata.

Strahler A. N. and Strahler A. H., 2008: Modern Physical Geography, John Wiley & Sons, New York.

GEOGCOR02T – Human Geography ✧

6 Credit, 75 Marks [90 classes]

Unit I Population and Social Geography

1. Factors of Growth and distribution of world population. Demographic Transition Theory.
2. World Population Composition: Age, Gender and Literacy.
11. Migration: Types, causes and consequences.
12. Space and Society: Cultural Regions; Race; Religion and Language
13. Contemporary social issues: Illiteracy and Poverty

Unit II Economic and Settlement Geography

14. Sectors of the economy: primary, secondary, tertiary and quaternary
15. Types of agriculture: Intensive subsistence rice farming, Plantation agriculture (Tea and Coffee)
16. Location, problems and prospects of Indian industries— Cotton textile, Petroleum refining, Locomotive
17. Types and Patterns of Rural Settlements
18. Classification of Urban Settlements; Trends and Patterns of World Urbanization

Reading List

- Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
- Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
- Ghosh, S. (2015) Introduction to settlement geography. Orient Black Swan Private Ltd., Kolkata
- Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur
- 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.
- Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
- Maurya, S.D. (2012) Manav Bhugol, Sharda Pustak Bhawan. Allahabad.

GEOGCOR03T – General Cartography ✨

4 Credits, 50 Marks [60 classes]

Cartographic Techniques

4. Concept of map scale: Types and Application. Reading distances on a map.
5. Map Projections: Criteria for choice of projections. Attributes and properties of: Zenithal Gnomonic Polar Case, Zenithal Stereographic Polar Case, Cylindrical Equal Area, Mercator's Projection, Bonne's Projection. Concept of UTM projection
6. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps.
5. Representation of Data – Symbols, Dots, Choropleth, Isopleth and Flow Diagrams, Interpretation of Thematic Maps.

Reading List

Dent B. D., 1999: *Cartography: Thematic Map Design*, (Vol. 1), McGraw Hill.

Gupta K. K and Tyagi V. C., 1992: *Working with Maps*, Survey of India, DST, New Delhi.

Mishra R. P. and Ramesh A., 1989: *Fundamentals of Cartography*, Concept Publishing.

Robinson A., 1953: *Elements of Cartography*, John Wiley.

Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers

Steers J. A., 1965: *An Introduction to the Study of Map Projections*, University of London.

GEOGCOR03P – General Cartography ✨

2 Credits, 25 Marks [60 classes]

Cartographic Techniques

4. Graphical construction of scales: Plain and comparative. [10]
5. Construction of projections: Zenithal Gnomonic Polar Case, Zenithal Stereographic Polar Case, Cylindrical Equal Area, Mercator's Projection, Bonne's Projection. [30]
6. Construction and interpretation of relief profiles from Survey of India topographical map — superimposed, projected and composite, relative relief map, slope map (Wentworth), and Correlation between physical and cultural features from Survey of India topographical maps using transect chart.

GEOGCOR04T – Environmental Geography ✨

6 Credits, 75 Marks [90 classes]

Concepts

9. Environmental Geography: Concepts and Approaches
10. Human-Environment Relationship in equatorial, desert, mountain and coastal regions
11. Concept of holistic environment and system approach
12. Ecosystem: Concept, structure and functions

Environmental problems and policies

13. Environmental Problems and Management: Air Pollution; Water pollution Biodiversity Loss; Solid and Liquid Waste.
14. Environmental problems and management: Desertification and soil erosion
15. Environmental Programmes and Policies: Developed Countries; Developing Countries.
16. New Environmental Policy of India.

Reading List

- Casper J.K. (2010) Changing Ecosystems: Effects of Global Warming. Infobase Pub. New York.
- Hudson, T. (2011) Living with Earth: An Introduction to Environmental Geology, PHI Learning Private Limited, New Delhi.
- Miller, G.T. (2007) Living in the Environment: Principles, Connections, and Solutions, Brooks/ Cole Cengage Learning, Belmont.
- Singh, R.B. (1993) Environmental Geography, Heritage Publishers, New Delhi.
- UNEP (2007) Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme. University Press, Cambridge.
- Wright R. T. and Boorse, D. F. (2010) Toward a Sustainable Future, PHI Learning Pvt Ltd, New Delhi.
- 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

3. Discipline Specific Elective

(2 Compulsory papers)

GEOGDSE01T – Soil and Biogeography

6 Credits, 75 Marks [90 classes]

Unit I: Soil Geography

1. Factors of soil formation.
2. Soil profile. Origin and profile characteristics of Lateritic and Chernozem soils
3. Definition and significance of soil properties: Texture, structure and moisture, pH and organic matter
4. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification.

Unit II: Biogeography

5. Concepts of biosphere, ecosystem, biome, ecotone, community, niche and succession.
6. Concepts of food chain and food web. Energy flow in ecosystems
7. Geographical extent and characteristic features of: Tropical rain forest and Grassland biomes
8. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen.

Reading List

Biswas, T.D. and Mukherjee, S.K. 1997: Textbook of Soil Science, TataMcGraw Hill,

Brady, N.C. and Weil, R.R. 1996. The Nature and Properties of Soil, 11th edition, Longman, London :

Chapman J.L. and Reiss, M.J. 1993. Ecology: Principle and Applications, Cambridge University Press, Cambridge:

Dash, M.C., 2001. Fundamental of Ecology, 2nd edition, Tata McGrawHill, New Delhi

Huggett, R. 1998. Fundamentals of Biogeography, Routledge, London:

Kormondy, E.J. 1996. Concept of Ecology, 4th edition, Prentice- Hall, India, New Delhi

Myers, A. A. and Giller, P.S. (editors) 1988. Analytical Biogeography: an Integrated Approach to the Study of Animal and Plant Distribution. Chapman and Hall, London

GEOGDSE02T – Regional Development

6 Credits, 75 Marks [90 classes]

Concepts of Regions and Regional Planning

1. Definition of Region. Types and Need of Regional planning:
2. Choice of a Region for Planning: Characteristics of an Ideal Planning Region; Delineation of Planning Region
3. Regionalization of India for Planning (Agro Ecological Zones)
4. Strategies/Models for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context.
5. Problem Regions and Regional Planning: Backward Regions and Special Area Development Plans in India.

Regional Development

6. Changing concept of development and underdevelopment;
7. Indicators of development: Economic, social and environmental. Concept of human development
8. Development and regional disparities in India since Independence: Disparities in agricultural development and industrial development
9. Development and regional disparities in India since independence : Disparities in human resource development in terms of education and health

Reading List

- Bhargava, G. 2001. Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.
- Bhatt, L.S. 1976 Micro Level Planning in India. KB Publication, Delhi
- Chand, M., Puri, V.K. 2000. Regional Planning In India, Allied Publishers Ltd.
- Chandana, R.C. 2016. Regional Planning and Development, 6th ed, Kalyani Publishers.
- Deshpande C. D., 1992: *India: A Regional Interpretation*, ICSSR, New Delhi.
- Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.
- Gregory, D., Johnston, R., Pratt, G., Watts., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography.
- Hall, P., Tewdwr-Jones, M. 2010. Urban and Regional Planning, Routledge.
- Higgins, B., Savoie, D.J. 2017. Regional Development: Theories and Their Application, Routledge.
- Kulshetra, S.K. 2012. Urban and Regional Planning in India: A Handbook for Professional Practitioners, Sage Pub.
- Kumar, A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.
- Misra, R.P. 1992. Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Publishing.
- Rapley, J. 2007. Understanding Development: Theory and Practice in the Third World, Lynne Rienner.
- Rapley, John (2007) Understanding Development: Theory and Practice in the 3rd World. Lynne Raza, M., Ed. (1988). Regional Development. Contributions to Indian Geography. New Delhi,
- Ray, J. 2001. Introduction to Development & Regional Planning, Orient Black swan.
- Raza, M. (Ed.) 1988. Regional Development: Contributions to Indian Geography, Heritage Publishers.

GEOGDSE03T – Disaster Management

6 Credits, 75 Marks [90 classes]

Unit I: Concepts

1. Hazards, risk, vulnerability and disasters: definition and concepts.
2. Approaches to hazard study: risk perception and vulnerability assessment. Hazard paradigms.
3. Response and mitigation to disasters: mitigation and preparedness, NDMA and NIDM; indigenous knowledge and community-based disaster management; do's and don'ts during disasters.

Unit II: Hazard-specific Study with focus on India

4. Disasters in india: (a) causes, impact, distribution and mapping: flood, drought and cyclone
5. Disasters in india: (b) causes, impact, distribution and mapping: earthquake, tsunami and landslide
6. Human induced disasters: causes, impact, distribution and mapping: radioactive fallout.

Reading List

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 Oppurtunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

GEOGDSE04P – Project Report based on Field Work

6 Credits, 75 Marks

Project work is compulsory for completing B.Sc 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.

Each student will prepare an individual report based on primary and secondary data collected during field work.

The duration of the field work should not exceed 10 days.

The word count of the report should be about **8000** excluding figures, tables, photographs, maps, references and appendices.

The report should include an introduction, literature review, project aims and objectives, methodology, results and discussion and references.

It should not exceed 20 to 25 pages (A4 pages) including maps, diagrams, and photographs etc.

One copy of the report on A 4 size paper should be submitted prior to examination.

4. Skill Enhancement Course Syllabus

(For both Honours and General courses)

GEOSSEC01M – Remote Sensing ✨

2 Credits, 25 Marks [30 classes]

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.

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

Reading List

Bhatta, B. 2011. Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others, CRC Press.

Jensen, J.R., 2013. Remote Sensing of the Environment: An Earth Resource Perspective, Pearson Education India.

Joseph, G. and Jegannathan, C. 2018. Fundamentals of Remote Sensing, 3rd ed, Universities Press.

Lillesand, T.M., Kiefer, R.W. and Chipman, J.W., 2015. Remote Sensing and Image Interpretation, 7th ed, Wiley.

WEBSITES:

International Society for Photogrammetry and Remote Sensing: www.isprs.org

NASA Landsat Science: www.landsat.gsfc.nasa.gov

National Remote Sensing Centre: www.nrsc.gov.in

USGS Global Visualization Viewer: www.glovis.usgs.gov

GEOSSEC02M – Advanced Spatial Statistical Techniques ✧

2 Credits, 25 Marks [30 classes]

1. Probability theory, probability density functions with respect to Normal, Binomial and Poisson distributions and their geographical applications.
2. Sampling: Sampling plans for spatial and non-spatial data, sampling distributions. Sampling estimates for large and small samples tests involving means and proportions.
3. Correlation and Regression Analysis: Rank order correlation and product moment correlation; linear regression, residuals from regression, and simple curvilinear regression. Introduction to multi-variate analysis.
4. Time Series Analysis: Time Series processes; Smoothing time series; Time series components.

Any statistical Software Package (e.g., SPSS, MS Excel, R, etc.) may be used for practice. A project file consisting of four exercises on the above themes is to be submitted.

Reading List

- Acevedo, M.F. 2012. Data Analysis and Statistics for Geography, Environmental Science and Engineering, CRC Press.
- Harris, R., Jarvis, C. 2011. Statistics for Geography and Environmental Science, Prentice Hall.
- McGrew Jr., J.C., Lembo Jr., A.J., Monroe, C.B. 2014. An Introduction to Statistical Problem Solving in Geography, 3rd ed, Waveland Press.
- Pal S. K., 1998. Statistics for Geoscientists: Techniques and Applications, Concept Pub Co.
- Rogerson, P.A. 2015. Statistical Methods for Geography: A Student's Guide, 4th ed, Sage.

