Syllabus for B.A./ B.Sc. Honours

Course in Geography

Based on CBCS

Department of Geography

Raiganj University

Scheme for CBCS Curriculum

1.1 Credit Distribution across Courses

Course Type	Total Papers	Credits	
		Theory + Practical	Theory**
Core Courses	14	(14*4) =56	14*5 =70
		14*2 =28	14*1=14
Discipline Specific Electives	4	4*4=16	4*5=20
		4*2=8	4*1=4
Generic Electives	4	4*4=16	4*5=20
		4*2=8	4*1=4
Ability Enhancement Language Courses	1	1*2=2	1*2=2
Skill Enhancement Courses	2	2*2=4	2*2=4
Ability Enhancement Compulsory Course (Environmental Studies)	1	1*4=4	1*4=4
Total	26	142	142

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

CHOICE BASED CREDIT SYSTEM : SYLLABUS IN GEOGRAPHY

The syllabus for Geography at under graduate level using the Choice Based Credit System has been framed in compliance with the model syllabus given by UGC.

The main objective of framing this new syllabus is to give the students a holistic understanding of the subject giving equal weight age to the core content and main branches of geography i.e. Physical and Human.

The ultimate goal of the syllabus is that the students at the end are able to secure a job. Keeping this in mind and in tune with the changing nature of the subject adequate emphasis has been given on the new techniques of mapping and understanding of the subject. The syllabus has been framed in such a way that the basic skills of the subject are taught to the students, so everyone need to go in for higher studies and the scope for securing a job after graduation will increase.

However the syllabus provided by UGC is not offering much choice of electives in physical geography. So from the subject syllabus committee we have incorporated two physical geography oriented electives namely Soil and Biogeography and Fluvial Geomorphology.

Learning Outcomes

This new syllabus will train the undergraduates to get jobs in the information and technology areas as there is a great demand for preparation of digital maps and retrieval of geospatial data.

1.2 Scheme for CBCS Curriculum

Sem-ester	Course Name and Code	Course Detail	Credits
I	Ability Enhancement Compulsory Course – I (AECC - 1)	Environmental Studies	4
	Core course – I (GEOHC - 1)	Geotectonic and Geomorphology	4
	Core course – I Practical (GEOHC - 1)	Cartographic Techniques Lab.	2
	Core course – II (GEOHC - 2)	Cartographic Techniques	4
	Core course – II Practical (GEOHC - 2)	Cartographic Techniques Lab	2
	Genetic Elective – 1		4
	Generic Elective – 1 Practical		2
	Total		**22**
II	Ability Enhancement Compulsory Course – II (AECC - 2)	English communication / MIL	2
	Core course – III (GEOHC - 3)	Human Geography	4
	Core course – III Practical (GEOHC - 3)	Thematic Cartography	2
	Core course – IV (GEOHC - 4)	Cartograms and Thematic Mapping	4
	Core course – IV Practical (GEOHC - 4)	Cartography Lab	2
	Generic Elective – 2		4
	Generic Elective – 2 Practical		2
	Total		**20**
III	Core course – V GEOHC - 5)	Climatology	4
	Core course – V Practical (GEOHC - 5)	Weather Map interpretation and Use of Weather instrument	2
	Core course – VII (GEOHC - 6)	Statistical Methods in Geography	4
	Core course – VII Practical (GEOHC - 6)	Statistical Methods in Geography Lab	2
	Core course – VI (GEOHC - 7)	Geography of India	4
	Core course – VI Practical (GEOHC - 7)	Representation of Population, socioeconomic & agricultural data	2
	Skill Enhancement Course – 1(GEOHSEC-1)	Computer basics & computer applications	2
	Generic Elective – 3		4
	Generic Elective – 3 Practical		2
	Total		**26**

IV	Core course – VIII (GEOHC - 8)	Regional Planning and Development	4
	Core course – VIII Practical (GEOHC - 8)	Regional Planning and Development Lab	2
	Core course – IX (GEOHC - 9)	Economic Geography	4
	Core course – IX Practical (GEOHC - 9)	Economic Data Representation & analysis	2
	Core course – X (GEOHC - 10)	Environmental Geography	4
	Core course – X Practical (GEOHC - 10)	Environmental Geography Lab	2
	Skill Enhancement Course-2 (GEOHSEC - 2)	Advanced spatial statistical techniques	2
	Generic Elective – 4		4
	Generic Elective – 4 Practical		2
	Total		**26**
V	Core course – XI (GEOHC - 11)	Field Work and Research Methodology	4
	Core course – XI Practical (GEOHC - 11)	Field Work and Research Methodology Lab	2
	Core course – XII (GEOHC - 12)	Remote Sensing and GIS	4
	Core course – XII Practical (GEOHC - 12)	Remote Sensing and GIS Lab	2
	Discipline Specific Elective – 1 (GEODSE - 1)	Urban Geography	4
	Discipline Specific Elective – 1 Practical (GEODSE - 1)	Urban Geography	2
	Discipline Specific Elective – 2 (GEODSE - 2)	Hydrology and Oceanography	4
	Discipline Specific Elective – 2 Practical (GEODSE - 2)	Hydrology and Oceanography	2
	Total		**24**
VI	Core course – XIII (GEOHC - 13)	Evolution of Geographical Thought	4
	Core course – XIII Practical (GEOHC - 13)	Project Work on Geographical thought *	2
	Core course – XIV (GEOHC - 14)	Disaster Management	4
	Core course – XIV Practical (GEOHC - 14)	Disaster Management based Project Work	2
	Discipline Specific Elective – 3 (GEODSE - 3)		4
	Discipline Specific Elective – 3 Practical (GEODSE - 3)		2
	Discipline Specific Elective – 4 (GEODSE - 4)		4
	Discipline Specific Elective – 4 Practical (GEODSE - 4)		2
	Total		**24**

2. Core Subjects Syllabus

2.1 Core T1 - Geotectonics and Geomorphology (GEOHC-1)

Geotectonics and Geomorphology..... 4 Credits

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.....2 Credits

1. Degradational processes: Weathering, mass wasting and resultant landforms.
2. Development of river network and landforms on uniclinal and folded structures & Models on landscape evolution: Views of Davis, Penck, King and Hack.
3. Glacial and fluvio-glacial processes and landforms; fluvio-glacial landforms.
4. Aeolian and fluvio-aeolian processes and landforms; fluvio-aeolian processes.

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.

2.2 Core P1–Practicals on Geotectonics and Geomorphology (GEOHC-1)

Cartographic Techniques.....2 Credits

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

1. Interpretation of Geological Maps – uniclinal, folded structure.
2. Topographical Map – Interpretation of a Mountain area with the help of Cross and Longitudinal Profiles.
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.

2.3 Core T2 – Cartographic Techniques (GEOHC-2)

Cartographic Techniques.....4 Credits

1. Maps: Classification and types. Components of a map.
2. Concept construction and application of scales: Plain, Diagonal, Comparative 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. Map projections: Classification, properties and uses. Concept and significance of UTM projection.
6. Bearing: Magnetic and true, Whole-Circle and Reduced.
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.

2.4 Core P2 – Practicals on Cartographic Techniques (GEOHC-2)

Cartographic Techniques.....2 Credits

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

1. Graphical construction of scales: Linear scale, Comparative scale, Diagonal scale, Vernier scale.
2. Construction of projections: Polar Zenithal Stereographic, Simple Conical with two standard parallels, Bonne's, Cylindrical Equal Area, and Mercator's.
3. Correlation between physical and cultural features from Survey of India topographical maps using Transect Chart.

2.5 Core T3 – Human Geography (GEOHC-3)

Human Geography.....4 Credits

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.....2 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. Types and patterns of Rural and Urban Settlement.

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.

2.6 Core P3 – Practicals on Human Geography (GEOHC-3)

Cartography.....2 Credits

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

1. Thematic maps: Proportional Squares, Pie Diagrams with Proportional Circles, Cubes.
2. Thematic maps: Dots and Spheres.
3. Thematic maps: Choropleth, Isoline map, Chorochromatic Map.
4. Preparation of Land use Map at Mouza level.

2.7 Core T4 – Cartograms and Thematic Mapping (GEOHC-4).....4 Credits

1. Concepts of Rounding, Scientific notation, Logarithm and Anti-logarithm, Natural and Log scales.
2. Diagrammatic representation of data: Line, Bar, and Circle.
3. Preparation and interpretation of large scale thematic maps: Geomorphological maps.
4. Preparation and interpretation of large scale thematic maps: Climatological maps.
5. Preparation and interpretation of large scale thematic maps: Landuse landcover maps.
6. Preparation and interpretation of large scale thematic maps: Socio-economic maps.
7. To be included
8. To be included

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.

2.7 Core P4 – Practicals on Cartograms and Thematic Mapping (GEOHC-4)

Cartography.....2 Credits

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

1. Plane Table Survey (Inter section Method).
2. Traverse survey using Prismatic Compass.
3. Levelling by Dumpy Level & Measurement of height and distance Theodolite (Base Accessible and Inaccessible).

2.8 Core T5 – Climatology (GEPHC-5)

Climatology.....4 Credits

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.....2 Credits

1. Condensation: Process and forms. Mechanism of precipitation: Bergeron-Findeisen theory, Collision and Coalescence. Forms of precipitation. Air mass: Typology, origin, characteristics and modification.
2. Fronts: Warm and Cold; Frontogenesis and Frontolysis.
3. Circulation in the atmosphere: Planetary winds, Jet stream, Index cycle, Tropical and Mid-latitude cyclones, Monsoon circulation and mechanism with reference to India.
4. 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.

2.9 Core P5 –Practical on Climatology (GEPHC-5)

Weather Map Interpretation and Use of Weather instrument.....2 Credits

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

1. Records of Maximum and Minimum temperature, Fortin's Barometer, Hygrometer and Simon's Rain Gauge.
2. Representation of climatic data by Climograph and Hythergraph.
3. Interpretation of Indian Daily Weather Map.

2.10 Core T6 – Statistical Methods in Geography (GEPHC-6)

Statistical Methods in Geography.....4 Credits

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, 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.

2.11 Core P6 – Practical on Statistical Methods in Geography (GEPHC-6)

Statistical Methods in Geography.....2 Credits

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. Histograms and frequency curve would be prepared on the dataset.
3. Simple bi-variate Co-relation and Regression.

2.12 Core T7 – Geography of India (GEOHC-7)

Geography of India.....4 Credits

Unit I: Geography of India.....2 Credits

1. Physiographic divisions, Climate, Soil and Vegetation (Characteristics and classification).
2. Population: Distribution, growth, structure and policy. Distribution of population by race, caste, religion, language, tribes and their correlates.
3. Mineral and power resources distribution and utilisation of Iron ore, Coal, Petroleum, Gas; Industrial development: Automobile and Information Technology.
4. 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 Intenational 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 Publs., 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.

2.13 Core P7 – Practical on geography of India (GEOHC-7)

Representation of Population, Socio-economic & agricultural data.....2 Credits

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

1. Representation of Population and Socio-economic data
2. Representation of Transport (Flow diagrams) data
3. Representation of Agricultural and industrial data (Production and export).

2.14 Core T8 – Regional Planning and Development (GEOHC-8)

Regional Planning and Development.....4 Credits

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 I: 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. Theories and models for regional development: Cumulative causation (Myrdal) and core periphery (Hirschman, Rostov and Friedman).
3. Changing concept of development, concept of underdevelopment; efficiency-equity debate. Indicators of development: Economic, social and environmental. Human development.
4. Regional development in India, regional inequality, disparity and diversity, Need and measures for balanced development in India.

Reference Books

- Berry, BJ.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.l, 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.
- Haynes J., 2008: Development Studies, Polity Short Introduction Series.
- Johnson E. A. J., 1970: The Organization of Space in Developing Countries, MIT Press, Massachusetts.
- Kulshetra ,S.K,(2012) : Urban and Regional Planning in India : A hand book for Professional Practioners , 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.

2.15 Core P8 – Practical on Regional Planning and Development (GEOHC-8)

Regional Planning and Development.....2 Credits

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

1. Need and measures for Regional Planning and Development for the selected area.
2. Preparation of questionnaire for Pilot survey on Regional Planning and Development.
3. Project on Rural development (Village/Block level).

2.16 Core T9 – Economic Geography (GEOHC-9)

Economic Geography.....4 Credits

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 2 Credits

1. Concept and classification of economic activities. Primary activities: Subsistence and commercial agriculture, forestry, fishing and mining, Secondary activities: Manufacturing (Cotton Textile, Iron and Steel), concept of manufacturing regions, Special Economic Zones and Technology Parks, Tertiary activities: Transport, Trade and Services.
2. Factors affecting location of economic activity with special reference to agriculture (Von Thunen), and Industry (Weber).
3. Agricultural systems: Case studies of tea plantation in India and mixed farming in Europe.
4. 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.

2.17 Core P9 – Practical on Economic Geography (GEOHC-9)

Economic Data Representation & analysis.....2 Credits

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

1. Indices of Economic development & Indices of regional development.
2. Collection of demographic and socio-economic data at household level from primary and / or secondary sources and preparation of an analytical survey report to assess the development of an area (Village/ Ward).
3. Location Quotient, Lorenz Curve, Gini's coefficient.

2.18 Core T10 – Environmental Geography (GEOHC-10)

Environmental Geography.....4 Credits

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.
- Cunninghum W. P. and Cunninghum M. A., 2004: Principals of EnvironmentalScience: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
- Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford.
- Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur.
- 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.
- UNEP, 2007: Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme.
- 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.
- Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub.

2.19 Core P10 – Practical on Environment Geography Lab (GEOHC-10)

Environment Geography.....2 Credits

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
3. Quality assessment of soil using field kit: pH and NPK

Reference Books

- Gilpin.A (1994) Environmental Impact Assessment: Cutting Edge for the 21st Century (Eia : Cutting Edge for the Twenty-First Century, Cambridge University Press,

2.20 Core T11 – Field Work and Research Methodology (GEOHC-11)

Research Methodology and Field Work.....4 Credits

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 reverence 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.

2.21 Core P11 – Practical on Research Methodology and Field Work Lab (GEOHC-11)

Practical Record.....2 Credits

1. Each student will prepare an individual report based on primary data collected form field survey and secondary data collected from different sources for either a rural area or an urban area (Municipal Ward) based on Cadastral or Municipal maps to study specific problems. **(The duration of the field work shall not exceed 10 days).**
2. 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.
3. 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, KolkataNarasinha 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.

2.22 Core T12 – Remote Sensing and GIS (GEOHC-12)

Remote Sensing and GIS..... 4 Credits

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 Satellite System

2 Credits

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.

2.23 Core P12 – Practical on Remote Sensing and GIS (GEOHC-12)

Remote Sensing and GIS.....2 Credits

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

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

2.24 Core T13 – Evolution of Geographical Thought (GEOHC-13).....4 Credits

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 Varenius 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.....2 Credits

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

Reference Books

- Arentsen M., Stam R. and Thuijis 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.
- Hartshone 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.

2.25 Core P13 – practical (Project) Geographical thought (GEOHC-13)

Project Work on Geographical thought.....2 Credits

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

1. Project report regarding Geographical thought
2. Model or Poster preparation
3. Seminar presentation

2.26 Core T14 – Disaster Management (GEOHC-14)

Disaster Management.....4 Credits

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

2.27 Core P14 –Practical on Disaster Management (Project Work) (GEOHC-14)

Disaster Management based Project Work.....2 Credits

An individual Project Report based on any one case study among the following Disasters incorporating 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.
- 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. Publisher-I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

3. GEO Department Specific Electives Subjects Syllabus

3.1 DSE T1 – Cultural and Settlement Geography (GEODSE-1)*

Cultural and Settlement Geography.....6 Credits

Unit I: Cultural Geography.....3 Credits

1. Definition, scope and content of Cultural Geography.
2. Development of cultural geography in relation to allied disciplines.

3. Cultural Hearth and Realm; Cultural diffusion, diffusion of major world religions and languages.
4. Cultural segregation and cultural diversity, Culture, technology and development.
5. Races and racial groups of the world.
6. Cultural regions of India.

Unit I: Settlement Geography.....3 Credits

1. Rural Settlement: Definition, nature and characteristics of rural settlements.
2. Morphology of rural settlements: site and situation, layout-internal and external.
3. Rural house types with reference to India, Social segregation in rural areas; Census categories of rural settlements.
4. Urban Settlements: Census definition (Temporal) and categories in India.
5. Urban morphology: Classical models-Burgess, Homer Hoyt, Harris and Ullman Metropolitan concept.
6. City-region and Conurbation , Functional classification of cities: Harris, Nelson and McKenzie

Reference Books

- Banerjee Guha, S. ed (2004) Space, Society & Geography, Rawat Publication, Delhi.
- Bardhan, P., 2003, Poverty, Age Structure & Political Economy in India, Oxford University Press.
- Biswas, A.K., Jortajada, C., 2006, Appraising Sustainable Development, Oxford University.
- Dhanagare, D.N., 2004, Themes and Perspectives in Indian Sociology, Rawat Publication, Delhi.
- Dohrs, I., Sommers,L., 1967, Cultural Geography. Thomas Crowell Company.
- Fellmann, J.D.,Getis, A., Getis, J., 2000, Human Geography- Landscape of Human Activity, McGraw Hill.
- Fern, R.L., 2002, Nature, God and Humanity, Cambridge University Press.
- Gadhil, M., Guha,R.,2000, The Use and Abuse of Nature, Oxford University Press.
- Gregory, D.,Urry, J.,1985, Social Relation and Spatial Structure, MacMillan.

- Herbert, D.T., Johnston, R.J.,1982, Geography and Urban Environment. John Wiley& Sons.
- 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.
- Mitchell, D. 2000, Cultural Geography-A Critical Introduction, Black Well.

3.2 DSE T2 – Urban Geography (GEODSE-1)*

Urban Geography.....6 Credits

Unit I.....3 Credits

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

Unit II.....3 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. Urban Issues: problems of housing, slums, civic amenities (water and transport)
4. Patterns and trends of urbanization in India.
5. Policies on urbanization. Urban change/landscape in post-liberalized period in India.
6. Case studies of Delhi, Kolkata, and Chandigarh with reference to land use.

Reference Books

- Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
- Graham S. and Marvin S., 2001: Splintering Urbanism: Networked Infrastructures, Technological Mobility and the Urban Condition, Routledge.
- Hall T., 2006: Urban Geography, Taylor and Francis.
- 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.

3.3 DSE T3 – Hydrology and Oceanography (GEODSE-2)*

Hydrology and Oceanography.....6 Credits

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.

3.4 DSE T4 – Population Geography (GEODSE-1)*

Population Geography.....6 Credits

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.

3.5 DSE T5 – Resource Geography (GEODSE-3)*

Resource Geography.....6 Credits

Unit I.....3 Credits

1. Natural Resources: Concept and classification.
2. Approaches to Resource Utilization: Utilitarian, Conservational, Community based adaptive.
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……...3 Credits

1. Distribution, Utilisation, Problems and Management of Metallic Mineral Resources: Iron ore, Bauxite, copper.
2. Distribution, Utilisation, Problems and Management of Non-Metallic Mineral Resources: Limestone, Mica, Gypsum.
3. Distribution, Utilisation, Problems and Management of Energy Resources: Conventional and Non-Conventional.
4. Contemporary Energy Crisis and Future Scenario.
5. Politics of Power resources.
6. Limits to Growth and Sustainable Use of Resources; Concept of Resource sharing.

Reference Books

- Cutter S. N., Renwich H. L. and Renwick W., 1991: Exploitation, Conservation, And Preservation: A Geographical Perspective on Natural Resources Use, John Wiley and Sons, New York.
- Gadgil M. and 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. USA.

- Holechek J. L. C., Richard A., Fisher J. T. and Valdez R., 2003: Natural Resources: Ecology, Economics and Policy, Prentice Hall, New Jersey.
- Jones G. and Hollier G., 1997: Resources, Society and Environmental Management, Paul Chapman, London.
- Klee G., 1991: Conservation of Natural Resources, Prentice Hall, Englewood.
- Mather A. S. and Chapman K., 1995: Environmental Resources, John Wiley and Sons, New York.
- Mitchell B., 1997: Resource and Environmental Management, Longman Harlow, England.
- Owen S. and Owen P. L., 1991: Environment, Resources and Conservation, Cambridge University Press, New York.
- Rees J., 1990: Natural Resources: Allocation, Economics and Policy, Routledge. London.

3.6 DSE T6 – Agricultural Geography (GEODSE-3)*

Agricultural Geography.....6 Credits

Unit I.....2 Credits

1. Progress of Agricultural Geography with reference to allied disciplines. Approaches to study of Agricultural Geography.
2. Origin and dispersal of agriculture; Role of agriculture on human society.
3. Factors affecting agriculture. Classification of world agricultural systems.
4. Location and characteristics of major agricultural types: Intensive subsistence, extensive commercial and plantation agriculture.

Unit II 4 Credits

1. Concept of cropping pattern, crop combination, gross and net cropped area, crop rotation.
2. A critical review and contemporary perspective of Von Thunen' model.
3. Definition and factors affecting yield. Measures of agricultural productivity .
4. Role of irrigation in Indian agriculture.
5. Problems of agriculture with special reference to South Asian countries.
6. World patterns of agricultural production and food security.
7. Land use survey and land classification (USDA).
8. Globalization and agriculture with special reference to India.

Reference Books

- Basu, D.N., and Guha, G.S., 1996: Agro-Climatic Regional Planning in India, Vol.I & II, Concept Publication, New Delhi.
- Bryant, C.R., Johnston, T.R, 1992: Agriculture in the City Countryside, Belhaven Press, London.
- Burger, A., 1994: Agriculture of the World, Aldershot, Avebury.
- Grigg, D.B., 1984: Introduction to Agricultural Geography, Hutchinson, London.
- Ilbery B. W., 1985: Agricultural Geography: A Social and Economic Analysis, Oxford University Press.

- Mohammad, N., 1992: New Dimension in Agriculture Geography, Vol. I to VIII, Concept Pub., New Delhi.
- Roling, N.G., and Wageruters, M.A.E.,(ed.) 1998: Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge.
- Shafi, M., 2006: Agricultural Geography, Doring Kindersley India Pvt. Ltd., New Delhi.
- Singh, J., and Dhillon, S.S., 1984: Agricultural Geography, Tata McGraw Hill, New Delhi.
- Tarrant J. R., 1973: Agricultural Geography, David and Charles, Devon.

3.7 DSE T7 – Political Geography (GEODSE-4)*

Political Geography.....6 Credits

1. Nature and scope Political Geography.
2. Concept State, Nation and Nation State.
3. Attributes of State – Frontiers, Boundaries, Exclave and exclave, Shape, Size, Territory and Sovereignty.
4. Geopolitics and geopolitical theories: Heartland and Rimland.
5. Electoral Geography-Geography of Voting, Geographic Influences on voting pattern.
6. Geography of Representation, Gerrymandering.
7. Political Geography of Conflicts of resource-Oil, water and emission of green house gases.
8. Inter-state dispute on water resources of India.
9. The Indian context of conflicts over forest rights.
10. Geographical basis of Indian federalism; Emergence of new states.
11. Politics of Displacement: Issues of relief, compensation and rehabilitation: with reference to Dams and Special Economic Zones of India.
12. Territorial politics: Case studies of Jammu and Kashmir, Assam and GTA.

Reference Books

- Agnew J., 2002: Making Political Geography, Arnold.
- Agnew J., Mitchell K. and Toal G., 2003: A Companion to Political Geography, Blackwell.
- Cox K. R., Low M. and Robinson J., 2008: The Sage Handbook of Political Geography, Sage Publications.
- Cox K., 2002: Political Geography: Territory, State and Society, Wiley-Blackwell.
- Gallaher C., et al, 2009: Key Concepts in Political Geography, Sage Publications.
- Glassner M., 1993: Political Geography, Wiley.
- Jones M., 2004: An Introduction to Political Geography: Space, Place and Politics, Routledg.
- Mathur H M and M Cernea (eds.) Development, Displacement and Resettlement – Focus on Asian Experience, Vikas, Delhi.
- Painter J. and Jeffrey A., 2009: Political Geography, Sage Publications.

- Taylor P. and Flint C., 2000: Political Geography, Pearson Education.
- Verma M K (2004): Development, Displacement and Resettlement, Rawat Publications, Delhi.
- Hodder Dick, Sarah J Llyod and Keith S McLachlan (1998), Land Locked States of Africa and Asia (vo.2), Frank Cass.

3.8 DSE T8 – Social Geography (GEODSE-4)*

Social Geography.....6 Credits

Unit I

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

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.

3.9 DSE T9 – Geography of Health and Wellbeing (GEODSE-4)*

Geography of Health and Wellbeing.....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 Hristopoles 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.
- Moeller Dade wed., 1993: Environmental Health, Cambridge, Harward Univ. 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.

3.10 DSE T10 – Soil and Biogeography (GEODSE-2)*.....6 Credits

1. Factors or 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: p^H, 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.
7. Concepts of biosphere, ecosystem, biome, ecotone, community 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. Deforestation: Causes, consequences and management.
12. Bio-diversity: Definition, types, threats and conservation measures.

Reference Books

- 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.
- 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.
- Schwab, G.O., Fangmer, D.D. and Elliot, W.J. 1996. Soil and Water Management Systems, 4th edition, John Eiley and sons Inc., New York.
- 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.
- Chairas, D.D. Reganold , J.P. and Owen, O.S. 2002. National Resource Conservation and management for a Sustainable Future, 8th edition, Prentice Hall, Lo—glewood Cliffs.
- 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.

4. GEOH Skill Enhancement Subjects Syllabus

4.1 SEC T1 – Computer Basics and Computer Applications (GEOHSEC-1)*

Computer Basics and Computer Applications.....2 Credits

1. Representation of data; Numbering Systems; Binary Arithmetic; Basic Logic Gates; Boolean Logic and Reduction Techniques.
2. Computation, Storing and Formatting Spreadsheets: Computation of Rank, Mean, Median, Mode, Standard Deviation, Moving Averages, Sample Variation; Derivation of Correlation, Covariance and regression; Selection of technique and interpretation.
3. Preparation of Annoted Diagrams: Scatter diagram and Histogram; selection of technique and interpretation of diagrams.
4. Internet Surfing: generation and extraction of information. Cloud computing and drive sharing.

Reference Books

- Bartee, Thomas C. (1977): Digital Computer Fundamental; McGraw Hill.
- Chauhan, S.; Chauhan, A. and Gupta, K. (2006): Fundamental of Computer; Firewall Media.
- Flake, L.J.; McClintock, C.E. and Turner, S. (1989): Fundamental of Computer Education; Wordsworth Pub. Co.
- Leon, A .and Leon,M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.
- Malvino, A.P. and Leach, D.P. (1981): Digital Principles and Appications; Tata McGraw Hill.
- Mano, Moris M. and Kime, Charles R. (2004): Logic and Computer Design Fundamental; Prentice Hall.
- Rajaraman, V. (2003): Fundamentals of Computer, Prentice Hall Publisher.
- Sarkar, A. and Gupta, S.K (2002) Elements of computer Science, S Chand and Company, New Delhi.
- Blissmer (1996): Working with MS Word; Houghton Mifflin Co.
- Johnson, Steve (2007): Microsoft Power Point 2007; Pearson Paravia Bruno.
- Leon, A .and Leon,M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.
- Leon, A. and Leon, M.(1999): A beginners Guide to Computers, Vikas.
- Rajaraman, V. (2008): Computer Primer; Prentice Hall of India Pvt. Ltd.
- Sarkar, A. and Gupta, S.K (2002) Elements of computer Science, S Chand and Company, New Delhi.

- Shepard, Aaron (2007): Perfect Pages; Shepard Publications.
- Tyson, Herbert L. (2007): Microsoft Word 2007 bible; John Wiley.
- Walkenbach, John (2007): Excel 2007 Bible; John Wiley.

4.2 SEC T1 – Remote Sensing (GEOHSEC-1)

Remote Sensing.....2 Credits

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 landuse land cover features from satellite images.

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

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.

4.3 SEC T2 – Advanced Spatial Statistical Techniques (GEOHSEC-2)

Advanced Spatial Statistical Techniques.....2 Credits

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

Reference Books

- Bart James E and Gerld M.Barber, 1996: Elementary Statistics for Geographers, The Guieford Press, London.
- Eldon, D., 1983: Statistics in Geography: A Practical Approach, Blackwell, London.
- Cressie, N.A.C., 1991: Statistics for Spatial Analysis, Wiley, New York.
- Gregory, S., 1978: Statistical Methods and the Geographer (4th Edition), Longman, London.
- Haining, R.P., 1990: Spatial Data Analysis in the Social and Environmental Science, Cambridge University Press, Cambridge.
- Mc Grew, Jr. and Cahrles, B. M., 1993: An Introduction to Statistical Problem Solving in Geography.
- W.C. Brocan Publishers, New Jersey.
- Mathews, J.A., 1987: Quantitative and Statistical Approaches to Geography: A Practical Manual Pergamon, Oxford.
- S.K., 1998: Statistics for Geoscientists : Techniques and Applications, Concept Publishing Company, New Delhi.
- Wei, W.S.,1990: Time Series Analysis: Variate and Multivariate Methods , Addison Wesley Publishing.
- Yeates, Mauris, 1974: An Introduction to Quantitative Analysis in Human Geography, Mc Grawhill, New York.

4.4 SEC T4 – Research Methods (GEOHSEC-2)

Research Methods.....2 Credits

1. Geographic Enquiry: Definition and Ethics; Literature Review; Framing Research Questions, Objectives and Hypothesis; Preparing Sample Questionnaires and inventories.
2. Data Collection: Type and Sources of Data; Methods of data Collection; Data Input and Editing.
3. Data Analysis: Qualitative and Quantitative Analysis; Techniques Data Representation.
4. Structure of a Research Report: Preliminaries; Text; Citation, Notes, References, Bibliography and Abstract and Key words.

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.
- Misra, R.P. (2002) Research Methodology, Concept Publications, New Delhi.
- Mukherjee, Neela 1993. Participatory Rural Appraisal: Methodology and Application. Concept Publs. Co., New Delhi.
- 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.
- Yadav, H. (2013) Shodh Pravidhi Evam Matratamak Bhugol, Raja Publications, Delhi.

4.5 SEC T5 – Coastal Management (GEOHSEC-2)*

Coastal Management.....2 Credits

1. Components of a coastal zone. Coastal morphodynamic variables and their role in evolution of coastal forms.
2. Environmental impacts and management of mining, oil exploration, salt manufacturing, land reclamation and tourism.
3. Coastal hazards and their management using structural and non-structural measures: Erosion, flood, sand encroachment, dune degeneration, estuarine sedimentation and pollution.
4. Principles of Coastal Zone Management. Exclusive Economic Zone and Coastal Regulation Zones with reference to India.

Reference Books

- Carter, R.W.G (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London.
- Dayer K.R. (1979): Estuary Hydrography, and Sedimentation, Cambridge Univ. Press, Cambridge.
- Devis R.A. (ed) (1978): Coastal Sedimentary Environmental; Springer-Verlag, New York.
- Harikawa , K. (1978): Coastal Engineering, Univ Of Tokyo Press, Tokyo.
- Inman, D.L. (1960): Shore Processes, Encyclopedia of Science & Technology, Mc Graw Hill, New York.
- Knight, B. and Philip, A. (1979): Estuarine and coastal Land reclamation and water storage, Saxon House.
- Laussn, E and Lato, I.(ed): Chemistry and Biochemistry of estuaries, Wiley, New York.
- Pethick, J. (2000): An Introduction to coastal Geomorphology, Arnold, London.
- Stanley, D.J. and Suist D.J.P.(ed)(1976): Marine Sediment Transport and environmental management;Wiley, NewYork.
- Wagret,P. (1968): Polderlands, Methuen, London.

5. Generic Elective Subjects Syllabus (Any three will be offered)

5.1 GE T1 – Disaster Management

Disaster Management.....6 Credits

1. Definition and Concepts of Hazards and Disasters; Risk and Vulnerability; Classification of hazards.
2. Causes and consequences of hazards: Physical, economic and cultural.
3. Role of National and International organizations in disaster management.
4. Causes, Impact, Distribution and Mapping of: Earthquake and Tsunami, Landslides.
5. Causes, Impact, Distribution and Mapping of: Flood and drought.
6. Causes, Impact, Distribution and Mapping: Soil erosion, accidental release of toxic chemicals.
7. Response and Mitigation to Disasters: Institutional set up, NDMA and NIDM.
8. Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During and Post Disasters.
9. Emerging approaches to Disaster management: (a) Pre-disaster stage Preparedness-hazard zonation maps-predictability and forecasting warning, land use zoning, Information, Education & Communication (IEC) Disaster resistance house construction, Population reduction in vulnerable area and awareness. (b) Emergency Stage- Rescue training for search and operation at national and regional level, ground management plan preparation, immediate relief, Assessment surveys. (c) Post disaster stage rehabilitation – Political administrative aspects, social aspect, economic aspect, cultural aspect and environmental aspects.
10. Regional perspectives of hazards in India with reference to dimension, causes, consequences and remedial measures: (a) Hills/ coasts, (b) Terrorism
11. National and international policies for disaster management.
12. Role of geospatial technology (RS, GNSS and GIS) in disaster 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 Oppurtunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

5.2 GE T2 – Geography of Tourism

Geography of Tourism.....6 Credits

1. Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson.
2. Types of Tourism: Ecotourism, Cultural Tourism, Adventure Tourism, Medical Tourism, Pilgrimage, International, National.
3. Factors influencing tourism: historical, natural, socio-cultural and economic; motivating factors for pilgrimages.
4. Spatial pattern of tourism: Spatial affinity; areal and locational dimensions comprising physical, cultural, historical and economic; International travel destinations- cultural and historical.
5. Impact of tourism: physical, economic and social and perceptive positive and negative impacts.
6. Environmental laws and tourism - current trends, spatial patterns and recent changes.
7. Role of foreign capital and impact of globalization on tourism.
8. Recent Trends of Tourism: International and Regional; Domestic (India); Sustainable Tourism, Meeting Incentives Conventions and Exhibitions (MICE).
9. Tourism in India: Tourism Infrastructure; Regional dimensions of tourist attraction; Case Studies of Dal lake, Goa, Garhwal Himalaya, Desert and Coastal Areas.
10. Promotion of Tourism - National Tourism Policy.
11. Infrastructure and support system - accommodation and supplementary accommodation; other facilities and amenities.
12. Tourism circuits-short and longer detraction - Agencies and intermediaries - Indian hotel industry.

Reference Books

- Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
- Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.

- Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
- Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann-USA. Chapter 2.
- Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
- Tourism Recreation and Research Journal, Center for Tourism Research & Development, Lucknow.
- Singh Jagbir (2014) "Eco-Tourism" Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

5.3 GE T3 – Geospatial Technology

Geospatial Technology.....6 Credits

1. Components, scope and historical development of geospatial technology.
2. Concepts of spheroid, ellipsoid and projection systems. Significance of WGS 84 and UTM.
3. Data types and structures in spatial technology.
4. Principles of land-based surveying with reference to auto level and total station
5. Classification of Remote Sensing platforms, sensors and resolution. IRS (Resourcesat and Cartosat) and Landsat systems.
6. Principles of georeferencing of maps and images.
7. Image enhancement, band combination and rationing. Vegetation indices.
8. Image classification and preparation of thematic maps. Raster to vector conversion.
9. Sources, preparation and manipulation of GIS data. Spatial modelling and overlay analysis.
10. GNSS: Principles of satellite positioning and navigation. Collection of waypoints and exporting to GIS.
11. Principles of preparing DEMs from optical and RADAR sensors with reference to CartoDEM and SRTM data.
12. Integration of different components of spatial technology. Development of web-based spatial platforms with reference to Bhuvan and Google Earth / Google Map.

Reference Books

- C. Esperança and H. Samet, An overview of the SAND spatial database system, to appear in Communications of the ACM, 1997. http://www.cs.umd.edu/~hjs/pubs/sandprog.ps.gz
- G. Hjaltason and H. Samet, Ranking in Spatial Databases in Advances in Spatial Databases —4th Symposium, SSD'95, M. J. Egenhofer and J. R. Herring, Eds., Lecture Notes in Computer Science 951, Springer-Verlag, Berlin, 1995, 83-95. http://www.cs.umd.edu/~hjs/pubs/incnear.ps.

- H. Samet, Spatial Data Structures in Modern Database Systems: The Object Model, Interoperability, and Beyond, W. Kim, Ed., Addison-Wesley/ACM Press, 1995, 361-385. http://www.cs.umd.edu/~hjs/pubs/kim.ps.
- H. Samet, Applications of Spatial Data Structures: Computer Graphics, Image Processing, and GIS, Addison-Wesley, Reading, MA, 1990. ISBN 0-201- 50300-0.
- H. Samet, the Design and Analysis of Spatial Data Structures, Addison-Wesley, Reading, MA, 1990. ISBN 0-201-50255-0.
- H. Samet and W. G. Aref, Spatial Data Models and Query Processing in Modern Database Systems: The Object Model, Interoperability, and Beyond, W. Kim, Ed., Addison-Wesley/ACM Press, 1995, 338-360. http://www.cs.umd.edu/~hjs/pubs/kim2.ps
- C. D. Tomlin, Geographic Information Systems and Cartographic Modeling, Prentice-Hall, Englewood Cliffs, NJ, 1990. ISBN 0-13-350927-3.

5.4 GE T4 – Regional Development

Regional Development.....6 Credits

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.
5. Growth Centre Model in Indian Context; Concept of Village Cluster.
6. Problem Regions and Regional Planning; Backward Regions and Regional Plans: Special Area Development Plans in India. DVC- The Success Story and its Failures.
7. Changing concept of development and underdevelopment; Efficiency-equity debate.
8. Indicators of development: Economic, social and environmental. Concept of Human development.
9. Regional development in India, regional inequality, disparity and diversity.
10. Development and Regional Disparities in India since Independence: Disparities in Agricultural Development.
11. Development and Regional Disparities in India since Independence: Disparities in Industrial Development.
12. Development and Regional Disparities in India since Independence : Disparities in Human Resource Development in terms of education and health.

Reference Books

- Adell, Germán (1999) Literature Review: Theories and Models Of The Peri-Urban Interface: A Changing Conceptual Landscape, Peri-urban Research Project Team, Development Planning Unit, University College London at.
- Bhatt, L.S. (1976) Micro Level Planning in India. KB Publication, Delhi.
- Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
- Dreze J. and A. Sen, Indian Development: Select Regional Perspectives (Oxford: Oxford University Press, 1996).
- Ses, Amratya (2000) Development as Freedom. Random House, Toronto.

- Raza, M., Ed. (1988). Regional Development. Contributions to Indian Geography. New Delhi, Heritage Publishers.
- Rapley, John (2007) Understanding Development: Theory and Practice in the 3rd World. Lynne Rienner, London.
- Schmidt-Kallert, Einhard (2005) A Short Introduction to Micro-Regional Planning, Food and Agriculture Organization of the United Nations (FAO) at.
- Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India.

5.5 GE T5 – Climate Change: Vulnerability and Adaptations

Climate Change: Vulnerability and Adaptations.....6 Credits

1. The Science of Climate Change: Origin, scope and trends.
2. Understanding Climate Change with reference to the Geological Time Scale.
3. Evidences and factors of climate change: the nature- man dichotomy.
4. Green House Gases and Global Warming.
5. Electromagnetic spectrum, Atmospheric window, heat balance of the earth.
6. Global climatic assessment: IPCC reports.
7. Climate change and vulnerability: Physical; economic and social.
8. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health and morbidity.
9. Global initiatives to climate change mitigation: Kyoto Protocol, Carbon trading, Clean development mechanism, COP, Climate fund.
10. Climate change vulnerability assessment and adaptive strategies with particular reference to South Asia.
11. National Action Plan (of India) on Climate Change.
12. Role of Urban Local Bodies, Panchayats and educational institutions on climate change mitigation: Awareness and action programmes.

Reference Books

- IPCC. (2007) Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
- IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

- Palutikof, J. P., van der Linden, P. J. and Hanson, C. E. (eds.), Cambridge University Press, Cambridge, UK.
- OECD. (2008) Climate Change Mitigation: What Do we do? Organisation and Economic Co-operation and Development.
- UNEP. (2007) Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.
- 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.
- Sen Roy, S. and Singh, R.B. (2002) Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH Pub., New Delhi.

5.6 GE T6 – Rural Development

Rural Development.....6 Credits

1. Defining Development: Inter-Dependence of Urban and Rural Sectors of the Economy.
2. Paradigms of Rural Development: Lewis Model of Economic Development, 'Big Push' theory of Development, Myrdal's thesis of 'Spread and Backwash Effects'.
3. Need for Rural Development, Gandhian Approach to Rural Development.
4. Rural Economic Base: Agriculture and Allied Sectors, Seasonality and Need for expanding Non-Farm Activities.
5. Rural Co-operatives and agricultural marketing.
6. Area Based Approach to Rural Development: Drought Prone Area Programmes, PMGSY.
7. Target Group Approach to Rural Development: SJSY, MNREGA, Jan DhanYojana.
8. Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care and Micro credit; Concept of PURA.
9. Rural Governance: Panchayati Raj System.
10. Rural Development Policies and Programmes in India.
11. Rural Infrastructural Development programmes relating to: Rural Electrification, Transport, Housing, and Connectivity.
12. Rural Development Programmes for Women and children: Janani SurakshaYojana , National Nutrition Mission, Drinking water and sanitation programmes, NRHM, Sarva Sikha Mission.

Reference Books

- Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
- Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Publs., Jaipur.
- Lee D. A. and Chaudhri D. P. (eds.), 1983: Rural Development and State, Methuen, London.
- Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.

- Misra, R. P. (ed.), 1985: Rural Development: Capitalist and Socialist Paths, Vol. 1, Concept, New Delhi.
- Palione M., 1984: Rural Geography, Harper and Row, London.
- Ramachandran H. and Guimaraes J.P.C., 1991: Integrated Rural Development in Asia – Leaning from Recent Experience, Concept Publishing, New Delhi.
- Robb P. (ed.), 1983: Rural South Asia: Linkages, Change and Development, Curzon Press.
- UNAPDI 1986:Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
- Wanmali S., 1992: Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India, International Food Policy Research Institute, Washington, D.C.
- Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: Studies in Village India: Issues in Rural Development, Concept Publs. Co., New Delhi.

5.7 GE T7 – Sustainable Development

Sustainable Development.....6 Credits

1. Sustainable Development: Historical Background, Definition, Components, Limitations.
2. The Millennium Development Goals: International goals and National Strategies.
3. Sustainable Regional Development: Need and examples from different Ecosystems
4. Inclusive Development: Education and Health.
5. Climate change and sustainable development: Policies and global cooperation.
6. The role of higher education in sustainable development.
7. Poverty and disease; Human right to health; Challenges of Universal Health Coverage.
8. Sustainable Development Policies and Programmes: The proposal for SDGs at Rio+20; Illustrative SDGs; Goal-Based Development.
9. Sustainable Development: Financial issues.
10. Good Governance for sustainable development.
11. National Environmental Policy, Clean development mechanism.
12. Sustainable regional resource development and livelihood security.

Reference Books

- Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
- Ayers, Jessica and David Dodman (2010) "Climate change adaptation and development I: the state of the debate". Progress in Development Studies 10 (2): 161-168.
- Baker, Susan (2006) Sustainable Development. Milton Park, Abingdon, Oxon; New York, N.Y.: Routledge. (Chapter 2, "The concept of sustainable development").
- Brosius, Peter (1997) "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology 25: 47-69.
- Lohman, Larry (2003) "Re-imagining the population debate". Corner House Briefing 28.

- Martínez-Alier, Joan et al (2010) "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69: 1741-1747.
- Merchant, Carolyn (Ed.) (1994) Ecology. Atlantic Highlands, N.J: Humanities Press. (Introduction, pp 1- 25).
- Osorio, Leonardo et al (2005) "Debates on sustainable development: towards a holistic view of reality". Environment, Development and Sustainability 7: 501-518.
- Robbins, Paul (2004) Political Ecology: A Critical Introduction. Blackwell Publishing.
- 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.