

**Department of Geography
Bir Tikendrajit University
Syllabus for M.A. Geography**

Paper Code	Title of paper	Marks		
		Internal assessment	Annual Exam	Total
FIRST YEAR				
GEO-101	Geomorphology	25	75	100
GEO-102	Geographical thought	25	75	100
GEO-103	Natural Resources Management	25	75	100
GEO-104	Regional Geography of North-East India	25	75	100
GEO-105(P)	Quantitative Technique	25	75	100
GEO-106(P)	Geomorphological Mapping and Interpretation	25	75	100
GEO-107	Climatology	25	75	100
GEO-108	Oceanology	25	75	100
GEO-109	Population Geography	25	75	100
GEO-110	Geography and Ecosystem	25	75	100
GEO-111(P)	i) Population Mapping ii) Climatology Practical	25	75	100
GEO-112(P)	i) Research Methodology ii) Field Work Report (Physical)	25	75	100
Total Marks				1200

GEO-101: Geomorphology

Course Objectives:

- 1) The course aims to understand the relationship between landscape form and processes.
- 2) Understanding the basic geomorphological principles and fundamental Concepts.
- 3) Application of geomorphic knowledge couple with models and data in various types of studies.

Course Learning Outcome:

- 1) Explain basic principles for development of landforms through time.
- 2) Make an initial geomorphological fieldwork.
- 3) Learn the techniques of geomorphological analysis.

Course Contents

Unit I: Evolution of geomorphic thought, Fundamental concepts of geomorphology, Concept of climatic geomorphology; Bases of geomorphological processes - physical, chemical, biological and human, Drainage basin as a fundamental geomorphic unit.

Unit II: Normal cycle of erosion and its characteristics landforms, Interception in the cycle, concept of polycyclic; Slope evolution, slope development and processes, slope classification and mapping

Unit III: Soil forming processes, physical and chemical properties of soils. Development of soil profile and genetic classification of soils. Major landforms associated with fluvial, glacial, aeolian and karst region.

Unit-IV: Applied geomorphology - application of Geomorphic mapping for terrain evaluation, digital elevation model (DEM), land capability and land suitability classification, Urban geomorphology; Hydro geomorphology; Regional geomorphology of Appalachians, Chotanagpur and Meghalaya plateau.

Suggested Readings

Bloom, A.L.: Geomorphology - A Systematic Analysis of Late Canezoic Landforms, Prentice Hall Englewood Cliffs N.J. 1978

Chorley, R.J.: Spatial Analysis in Geomorphology, Methuen, London, 1972

Cooke, R.U. and Doornkamp, J.C.: Geomorphology in Environmental Management - An Introduction, Clarendon Press, Oxford, 1974

Dayal, P.: A Text Book of Geomorphology, Patna, 1990

Dury, G.H.: The Face of the Earth, Penguin Harmondsworth, 1959

Fairbridge, R.W.: Encyclopaedia of Geomorphology, Reinholdts, New York, 1968

Garner, H.F.: The Origin of landscape - A Synthesis of Geomorphology, Oxford University Press, London, 1974.

Goudie, A.: The Nature of the Environment, Oxford & Blackwell, London, 1993

Melhorn, W.N. (ed): Theories of Landform Development, George Allen & Unwin, London, 1981

Mitchell, C.W.: Terrain Evaluation, Longman, London, 1973.

Ollier, C.D.: Weathering, Longman, London, 1979.

Pitty, A.F.: Introduction to Geomorphology, Methuen, London, 1971.

- Skinner, B.J. & Porter, S.C.: The Dynamic Earth, John Wiley, New York, 1995.
- Sparks, B.W.: Geomorphology, Longman, London, 1960.
- Sharma, H.S. (ed): Perspectives in Geomorphology, Concept, New Delhi, 1980.
- Singh, S.: Geomorphology, Prayag Publication, Allahabad, 1998.
- Stoddart, D.R. (ed): Process and Form in Geomorphology, Routledge, New York, 1996.
- Thornbury, W.D.: Principles of Geomorphology, John Wiley, New York, 1960.

GEO-102: Geographic Thought

Learning Objectives

1. To provide in-depth knowledge of the nature of geographic thought in important ancient civilizations.
2. Exposing students to the developments in European academia which eventually laid the foundations of modern geography as we know it today.
3. To critically appreciate and understand the emergence of different perspectives in geographic thought in Anglo-American geography after 1945 AD.
4. To theoretically acquaint students with new ideas, theory and tools of modern geography.

Course Learning Outcomes

After the completion of the course, students will be able to

1. Relate ancient geographic thoughts with the nature of modern geography
2. Critically evaluate the socio-economic and academic contexts in which key geographers worked.
3. Understand the origins of the dualities and dichotomies within the field of geography, and whether they truly constitute dichotomies.
4. Realize that the philosophical base of Geography is provided by geographic thoughts.

Course Content

Unit I: Ancient Geographic Thoughts: Contributions of Indian, Greek, Roman and Arab geographers.

Unit II: Emergence of modern geography: Contribution of Varenus, Emmanuel Kant, Carl Ritter and Humboldt; Contributions of German, French, British and American Schools.

Unit III: Dichotomies in Geography: Ideographic and Nomothetic, Positivism and empiricism. Recent trends in geography: quantitative revolution in geography, behavioural, humanistic and radical geography and welfare geography.

Unit IV: Areal differentiation, post - modern geography, applied geography concept of models in geography and their classification.

Suggested Readings

Abler, Ronald; Adams, John S. Gould, Peter: Spatial Organization: The Geographer's View of the World, Prentice Hall, N.J., 1971.

Ali.S.M.: The Geography of Puranas, Peoples Publishing House, Delhi, 1966.

Amedeo, Douglas: An Introduction to Scientific Reasoning in Geography, John Wiley, U.S.A., 1971.

Board, C et al: Progress in Geography, Vols I-VIII, Edward Arnold, London, 1970

Bunge, W: Theoretical Geography, Lund Studies in Geography, The Royal University of Lund, Sweden, 1962

Dishit, R.D. (ed.): The Art & Science of Geography Integrated Readings, Prentice Hall of India, New Delhi, 1994.

Gould, J.R: An Introduction to Behavioural Geography, Oxford, 1980

Gregory, D: Geographical Imaginations, Blackwell, Cambridge, Mass, 1994

Hartshorne, R.: Perspectives on Nature of Geography, Rand McNally & Co., 1959.

Harvey, D: Explanations in Geography, Edward Arnold, London, 1969

Jensen A Holt: Geography: History and Concepts, SAGE Publications, 2018

Husain, M.: Evolution of Geographic Thought, Rawat Publishing, Jaipur, 1984.

James, P.E: All Possible Worlds: A History of Geographical Ideas, New York, 1972

Johnston, R.J.: Philosophy and Human Geography, Edward Arnold, London, 1983.

Johnston, R.J.: The Future of Geography, Methuen, London, 1988.

Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.

Sauer, C.O: Land Life, University of California, Berkley, 1963

Soja, Edward: Post Modern Geographies, Verso, London, 1989

GEO-103: Natural Resources Management

Course Objective:

1. Creating awareness about resource availability, accessibility, problem of resource utilization, sustainable use.
2. Spatial distribution of natural resources.
3. Sustainable resource management and natural hazard management.

Course Learning Outcome:

1. At the end the course student should learn importance of natural resources.
2. Resource appraisal for decision making policy.
3. Integrating resource development and its application

Course Content

Unit I: Concept, models and approaches to natural resource management; Problems of resource utilization; population pressure; development and resource use; natural hazard and risk management.

Unit II: Use and misuse of resources: Global and Indian scenario; prospects of various resources; soil, water, mineral and forests; Conservation and management of resources.

Unit III: Resource appraisal and policy making: land resources, geophysical, geochemical geobotanical; use of GIS and remote sensing in resource appraisal for decision making policy.

Unit IV: Resource development: Sustainable resource management, integrated resource development and its application.

Suggested Readings

Adams, W.M.: Green Development: Environment and sustainability in the third world, Routledge & Chapman Hall, New York, 1990

Granfelt, T.R., Managing the Globalised Environment, J. & L. Composition Ltd. New York, 1999

Holechek, J.L. et al: Natural Resources: Eulogy Economics & Policy, Prentice Hall, New Jersey, 2000

Hooja, R & Joshi, R.,: Desert drought and Development, Studies in Resource management and sustainability; Rawat publication, Jaipur, 1994

Howard, M.C. (ed), Asia's Environment Crisis, Westview Press, Boulder, 1993.

Kates, R.W. & Burton, I (eds): Geography, Resources and Environment, Vol I & II,

- University of Chicago Press, Chicago, 1986
- Newson, M.D. Land, water & development: River Basin System & Management, Routledge London, 1991.
- Owen, S. & Owens, P.L. Environment Resources and Conservation, Cambridge University press, New York, 1991
- Rees, J.: Natural Resources: Allocation, Economics and policy, Methuen, London, 1988
- Redcliff, M.: Sustainable Development: Exploring the Contradiction, Methuen, London, 1987
- Simmons, I.G. : Earth, air and water: Resources and Environment in late 20th century, Edward Arnold, New York, 1991
- Thoman, Alan et al: Environmental Policies & NGO influence, Routledge, London,
- Hamilton, F.E.I.: Spatial Perspectives on Industrial Organization and Decision Making, John Wiley, New York, 1974.
- Hamilton, I. (ed.): Resources and Industry, Oxford University Press, New York, 1992.
- Isard, W.: Location and Space Economy, MIT Press, Cambridge, 1956
- Losch, A: The Economics of Location, New Haven, 1954
- Pachuri, R.K. Energy and Economic Development in India, Praeger, New York, 1977.
- Robertson, D. (ed.): Globalisation and Environment, E. Elgar Co., U.K., 2001.

GEO-104: Regional Geography of North-East India

Course Objectives:

1. To introduce the location and formation of eight NE states in the light of politico - historical perspective.
2. To discuss the physical and cultural aspects of NE region, its natural beauty, magnificent biodiversity and full of natural resources.
3. The dialogue on state specific development predicaments are highlighted among the students.

Course Learning Outcome:

1. It will help to understand the uniqueness of the NE states in terms of physical and cultural aspects compared to the mainland India.

2. This course will focus on the potentiality of the NE States to the future growth of Indian economy, and important in geostrategic perspective.

Course Content

Unit I: Location and politico-administrative units, physical characteristic: relief, climate, drainage, soil and vegetation; Natural resources: coal, natural gases, petroleum, forest and water.

Unit II: Population: population growth and distribution, migration, population characteristics, trends of urbanization, characteristics of urban centres.

Unit III: Agriculture: Types of farming, cropping pattern, agriculture efficiency, agricultural modernization (problems and prospects)

Unit IV: Transport, trade & commerce, industrial development, study of Imphal valley, Cachar valley and Brahmaputra valley.

Suggested Readings

Centre for Science & Environment: State of India's, Environment, New Delhi, 1988

Deshpande C.D.: India: A Regional Interpretation, ICSSR & Northern Book Centre, 1992.

Dreze, Jean & Amartya Sen (ed.): India Economic Development and Social opportunity: Oxford University Press, New Delhi, 1996.

Gopala Krishnan, R.: Geography of India, Jawahar, Delhi, 2001

Kundu A. Raza Moonis: Indian Economy: the Regional Dimension. Spectrum Publishers, New Delhi, 1982.

Robinson, Francis: The Cambridge Encyclopaedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives, Cambridge University Press, London, 1989.

Spate OHK & ATA Learmonth: India & Pakistan, Methuen, London. 1967.

Singh R.L. (ed.): India-A Regional Geography, National Geographical Society, India, Varanasi, 1971.

Taher, M and Ahmed, P: Geography of North East India, Mani-Manil Prakash, Guwahati, 2000.

Tirtha R. & Gopal Krishna: Emerging India, Reprinted by Rawat Publications, Jaipur, 1996.

GEO-105(P): Quantitative Techniques

Course Objectives:

1. To introduce the students with data acquisition methods and techniques.
2. To train the students to the data analysis with the help of different descriptive and inferential statistical techniques.
3. To familiarise the students with statistical packages with different statistical techniques and adopting multivariate models with data sets.

Course Learning Outcome:

1. This practical course helps to understand the use of statistical techniques in daily life.
2. This course will univocally guide the students- when and where, which statistical techniques will be used to explore the pinpoint information or facts.
3. Students trained with quantitative Techniques will help to be absorbed in different project works.

Course Content

Significance of statistical techniques in geographic studies; Frequency distribution; Graphic representation; Central tendencies - mean, median and mode; Measures of dispersion and skewness; Correlation and regression analysis, Multivariate analysis.

Basic principles of probability; Sampling techniques - random and systematic; Tests of significance; Chi-square test, students' T-test, and F-test; Time series analysis : Trend devices; characteristics and components of a computer system.

Suggested Readings

Blackwell, B: Statistics in Geography, Basil Blackwell Ltd., 1988

David Unwin: Introductory Spatial Analysis, Methuen, London, 1981.

Elhance, D.N: Fundamental of Statistics, Kitab Mahal, Allahabad, 1972

Eyles, J. and Smith, D.M. (eds): Quantitative Methods in Human Geography, Polity Press, Oxford, 1988.

Gregory, S. Statistical Methods and the Geographer, Longman, London, 1978.

Hagget, P. and Mc Cullagh, P: Locational Analysis in Human Geography, Arnold, London, 1965.

Hammond R and P.S. McCullagh: Quantitative Techniques in Geography : An Introduction, Clarendon Press, Oxford, 1974.

John P.Cole and Cuchlaine A. M. King: Quantitative Geography, John Wiley, London, 1968.

Johnston R.J: Multivariate Statistical Analysis in Geography, Longman, London, 1973.

King, L.J.: Statistical Analysis in Geography, Prentice Hall, Englewood Cliff, N.J.

Koutsoyiannis: Theory of Econometrics, Mcmillan, London, 1973.

Mahmood, A: Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi, 1999.

Maurice Yeats: An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York, 1974.

Mc Cullagh, P.: Data Use and Interpretation (Science in Geography Series, Part-4), Oxford University Press, Oxford, 1988.

Pal, S.K.: Statistics for Geoscientists: Techniques and Applications, Concept Publication, New Delhi, 1999.

Peter Haggett, Andrew D.Cliff, & Allan Frey: Location Methods, Vol. I and II, Edward Arnold, London, 1977.

Smith, D.M.: Patterns in Human Geography, Penguin Book, 1975.

GEO-106(P) Geomorphological Mapping & Interpretation

Course Objectives:

1. To know diverse methods of analyzing and interpreting geographical and geological data.
2. To develop an understanding of how this knowledge may be applied in practice.

Course Learning Outcome:

1. All these techniques are applicable in decision making policy of any development planning on any form of land surface.

Course Content

Interpretation of geological maps: drawing of profiles, Determination of dip and strike, Measurement of thickness of beds; Interpretation of geological history and correlation of topography with structure.

Drawing and analysis of slope and terrain; Drawing of altimetric histogram and its geomorphological interpretation;

Preparation of long and cross profiles of river valleys, mountainous regions and plateaus; Hypsographic, clinographic and altimetric frequency curves, Slope maps according to Robinson, Raisz & Henry, and Strahler.

Drainage basin analysis; determination of linear, aerial and relief attributes of drainage basins and their relationships.

Preparation of geomorphological map; Russian, French and Polish methods.

Suggested Readings

Birch, T.W: Maps - Topographical & Statistical, Clarendon press, Oxford, 1954

Chow, V.T.: Handbook of Applied Hydrology, Mc Graw Hill Book Company, New York, 1964

Dake, C.L. & Brown: Interpretation of Topographic & Geologic Maps, McGraw Hill, New York, 1974

Garnet, Alice: Geographical Interpretation of Topographical Maps

Gondie, A.: Geomorphological Techniques

King, C.A.M.: Techniques in Geomorphology, Arnold, London, 1960

Miller, A.A.: The Skin of the Earth

Misra, R.P. & Ramesh, A.: Fundamentals of Cartography

Monkhouse, F.J. & Wilkinson, H.R.: Maps and Diagrams, Methuen and Co. Ltd., New York, 2000

Raisz, Erwin: Principles of Cartography, Mc Graw Hill, New York, 1962

Robinson, A.H. & Other: Elements of Cartography, John Wiley & Sons, New York

Singh, R.L.: Elements of Practical Geography, Kalyani Publishers, Delhi, 1979

GEO-107: Climatology

Course Objectives

1. Make students understand the nature and scope of modern study of climate by imparting latest knowledge about the basic thermal and dynamical atmospheric processes operating at different spatial and temporal scales.
2. To explain weather generation systems of the atmosphere and how they influence climate of the world and regions in the long term.

3. To explore the typology of world's climates through critical study of authoritative climate classification schemes.
4. Instilling greater scientific awareness about the causes and consequences of the modern climate change to enable students to formulate informed mitigation and adaptive responses.

Course Learning Outcomes

1. Acquire advanced knowledge about the workings of the atmosphere and the interconnections inherent in the climate system.
2. Develop thorough understanding of weather systems including monsoon and their critical roles in producing global and regional weather and climate patterns.
3. Have skills to accurately classify climate types from any available climate data.
4. Students will learn about the human induced changes to the earth's atmosphere which pose threats to the sustenance of human and biophysical systems requiring urgent policy responses.

Course Content

Unit I: Nature and scope of climatology, Evolution of atmosphere, Composition and structure of atmosphere; Elements of weather and climate; Insolation, heat balance of the earth and distribution of temperature.

Unit II: Atmospheric pressure and winds; Wind system, monsoon winds and local winds; Jet stream; Atmospheric moisture, and precipitation; Air masses and fronts; Cyclones and anti cyclones.

Unit III: Climates of the world- tropical, temperate, frigid, desert and mountain climates; Classification of world climate (Koppen/Thornwaite/Trewarth).

Unit IV: Climate archives; biotic, geological and geochemical climate data and climate models; Tectonic scale climate change; orbital scale climate change; climate change during the last 1000years and since 1850 AD. Impacts and mitigations.

Suggested Readings

Barry, R.G. and Chorley, R.J.: Atmosphere, Weather and Climate, Methuen Co.Ltd., London, 1971.

Barry, R.G. & Chorley P.J.: Atmosphere, Weather and Climate, Routledge, London and New York, 1998.

Blair, T.A.: Climatology General and Regional, Prentice Hall, New York, 1942

Blair, T.A.: Weather Elements, Prentice Hall, 1954

Chorley, R.J.: Earth, Water and Man, Methuen and Co., London

Critchfield, J.H.: General Climatology, Prentice Hall, India, New Delhi, 1993.

Crowe, P.R.: Concept in Climatology, Longmans, London, 1971

Das, P.K.: Monsoons, National Book Trust, New Delhi, 1987.

Fein, J.S. and Stephens, P.N. : Monsoons, Wiley Interscience, 1987.

Griffith, J.F.: Applied Climatology, Oxford University Press, 1966

Hobbs, J.E.: Applied Climatology, Butterworths, 1980

India Met. Deptt.: Climatological Tables of Observatories in India, Govt.of India, 1968.

Lal, D.S.: Climatology, Chattanya Publications, Allahabad, 1986.

Lydolph, P.E.: The Climate of the Earth, Rowman, 1985.

Menon, P.A.: Our Weather, N.B.T., New Delhi, 1989.

Peterson, S.: Introduction to Meteorology, McGraw Hill Book, London, 1969.

Robinson, P.J. & Henderson S.: Contemporary Climatology, Nenlow, 1999.

Robinson P.J. and Petty A. (ed): Applied Climatology - Principles and Practices, Routledge, London, 1997.

Rumney, George, R.: Climatology and World's Climates, McMillan, London, 1968

Ruddiman, W.F.: Earth's Climate Past and Future ,WH Freeman, 2009

Stringer, E.N.: Hoirn, L.A.: An Introduction to Climate, International Series, 1982, 1980

Thompson, R.D. & Perry, A. (ed.): Applied Climatology, Principles and Practice, Routledge, London, 1997.

Trewartha, G.T. & L.H.Horn: An Introduction to climate, McGraw Hill Book Company, 1980.

Gates, E.S.: Meteorology and Climatology, Harrap Ltd., London, 1982.

Oliver, T.K. and Hidare: Climatology and Introduction, Bell and Howell Company, London, 1984.

GEO-108: Oceanography

Learning Objectives:

1. This course seeks will teach students about the historical evolution of oceanography and how its scope continues to expand in the light of ever accumulating scientific knowledge of geophysical aspects of earth's oceans.
2. Students will explore different properties and movements of sea water and how these interact with the atmosphere.
3. Develop a deeper understanding of the relationship between the marine environmental conditions and marine organisms.

Learning Outcomes:

1. Learn the important role played by discoveries in different branches of earth sciences in expanding our knowledge about the ocean and its various characteristics.
2. Have deeper knowledge of coupled ocean and atmosphere systems.
3. Acquire the ability to discern the nature of marine ecology and ecosystems as an integral component of earth's biosphere.

Course Content

Unit I: Nature and scope of oceanography - History of oceanography; distribution of land and water; major features of ocean basins; continental margin and deep-ocean basins; earth structure and Plate tectonics; marine sediments.

Unit II: Physical and chemical properties of sea water; Interlink between atmospheric circulation and circulation patterns in the oceans; Surface currents; thermohaline, waves and tides.

Unit III: Major marine environments: bio-geochemical cycles in the ocean, biozones, types of organisms; food and mineral resources of the sea; Coastal: estuaries, deltas, barrier island, rocky coasts - Open: reefs, continental-shelf, continental - slope and deep, pelagic environment and floor of the ocean basins.

Unit IV: Impact of humans on the marine environment. Law of the sea; exclusive economic zone, marine deposits and formation of coral - reefs.

Suggested Readings

Davis, Richard J.A.: Oceanography - An Introduction to the Marine Environment,

Wm. C. Brown Iowa, 1986

Duxbury, C.A. and Duxbury B.: An Introduction to the world's oceans - C. Frown,

Iowa 2nd ed. 1996.

Garrison, T.: Oceanography - An Introduction to Marine Science, Books/Cole, Pacific Grove, USA, 2001.

Growss, M. Grant: Oceanography, a View of the earth, Prentice Hall Inc. New Jersey, 1987.

King, C.A.M. Oceanography for Geographers, 1962.

Sharma, R.C.: The Oceans, Rajesh Publications, New Delhi, 1985.

Ummerkutty, A.N.P.: Science of the Oceans and Human Life, NBBT, New Delhi, 1985.

GEO-109: Population Geography

Course Objectives:

1. This course introduces basic components of population study, such as fertility, mortality and migration, and their measures, spatial distribution, size, composition and growth.
2. It provides insight into the population growth and development nexus, classical and modern theories and population policies.
3. Contemporary socio-economic issues like gender inequality, ageing, reproductive health, hunger and undernourishment, are also brought in the gamut of discussion.

Course learning Outcomes:

1. This course helps to understand the importance of population dynamics - fertility, mortality and migration, and social implication of their changing size and composition.
2. This course familiarises the students about social institutions, customs, gender, caste, religion, and aware the issues adhere to these within the states as well as national level.
3. Students get an understanding of population growth, workforce supply and demographic dividend; appreciation of family planning programmes and the role of different stakeholders.

Course Content

Unit-I: Nature, Scope and Significance to Study Population Geography. Sources of Population Data: Censuses, Vital Registration, and Sample Surveys. World Population: Growth and Distribution. Population Growth in India and Growth Differential in Indian States/UTs. Theories in Population Growth: Malthusian, Marxist and Socialist View, Neo-Malthusian, and Demographic Transition Model (DTM).

Unit-II: Age-Sex Structure and Its Implications. Nuptiality and Squeeze in India. Socioeconomic Consequences of Aging; Social Security for Elderly in India. Workers and Work Participation Rate in India.

Unit-III: Fertility: Basic Measures; Levels, Trends and Patterns in India. Mortality and Health: Measures of Mortality; Epidemiological Transition; Global Pattern of Causes of Death. Concepts, Measures, and Importance of Migration with Special Reference to Labour Migration in India. Theories of Migration: E.G. Ravenstein, Everett S. Lee, Wilbur Zelinsky, W. Arthur Lewis, and Harris-Todaro.

Unit-IV: Population, Environmental and Development: Concepts of Under Population and Over Population. Environmental Protocols with Special Reference to India. Hunger and Undernourishment. Population Policies in India.

Suggested Readings

Bhende A. and Kanitkar T., Principles of Population Studies, Himalaya Publishing House, 2000

Srinivasan, K., Population Concerns in India: Shifting Trends, Policies and Programs. Sage, India, 2017

Bilasborrow, Richard E and Daniel Hogan: Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belgium, 1999.

Boque, D.J.: Principles in Demography, John Wiley, New York, 1969.

Bose, Ashish et. al.: Population in India's Development (1947-2000); Vikash Publishing House, New Delhi, 1974.

Census of India: India: A State Profile, 1991.

Chandra, R.C.: Geography of Population; Concept, Determinants and Patterns, Kalyani Publishers, New York, 2000.

Clarke, John I.: Population Geography, Pergamon Press, Oxford 1973.

Crook, Nigel: Principles of Population and Development, Pergamon Press, New York, 1997.

Daugherty, Helen Gin, Kenneth C.W. Kammeyir: An Introduction to Population (Second Edition), The Guilford Press, New York, London, 1998.

Garnier, B.J.: Geography of Population, Longman, London, 1970.

Kochhar, Rajesh: The Vedic People: Their History and Geography, Orient Longman Ltd., New Delhi, 2000.

Mamoria, C.B.: India's Population Problem, Kitab Mahal New Delhi, 1981.

Mitra, Ashok, India's Population: Aspects of Quality and Control. Vol.I &II, Abhinav Publications, New Delhi, 1978.

Premi, M.K., India's Population: Heading Towards a Billion, B.R. Publishing Corporation, 1991.

Srinivasan, K. and M. Vlassoff. Population Development Nexus in India: Challenges for the New Millennium. Tata McGraw Hill, New Delhi, 2001.

Srinivasan, K. Basic Demographic Techniques and Applications, Sage Publications, New Delhi, 1998.

Sundaram K.V. and Sudesh Nangia, (ed.), Population Geography, Heritage Publications, Delhi, 1986.

UNDP: Human Development Report, Oxford University Press, Oxford 2000.

United Nations: Methods for Projections of Urban and Rural Populations, No.VIII, New York 1974.

Woods, R. Population Analysis in Geography, Longman, London 1979.

Zelinsky Wilbur, A. Prologue to Population Geography, Prentice Hall, 1966.

GEO-110: Geography and Ecosystem

Course Objectives:

1. Various dimensions of the ecosystems, their spatial distribution.
2. Anthropogenic interventions and resultant impacts on various ecosystems.
3. Understanding of environmental laws

Course Learning Outcome:

1. Detailed exposure to the concept of ecosystem, processes, theories and concepts.
2. In-depth knowledge of anthropogenic interventions and impacts, conservation strategies and planning.
3. Evaluation and achievement of different environmental programs, policies and legislations.

Course Content

Unit I: Concept of ecology and ecosystem; Geography as human Eco-system form and function: trophic level, ecological pyramids, ecological niche, energy and nutrients in the ecosystem, food chains and food webs.

Unit II: Major terrestrial ecosystem of the world: Agriculture, forests, grasslands and deserts, carrying capacity of the earth.

Unit III: Man-environment relationship: Resource use and ecological imbalance with reference to soil, forests, and energy resources; Biodiversity, Preservation and conservation of the ecosystem, ecology of tropical farming system, mountain ecosystem with special reference to hills of North- East India.

Unit IV: Environmental legislation: The Stockholm Conference, the Earth Summit, Environmental laws in India (the Wild Life Act, Water Act, Forest Act, Environment Protection Act and National Environment Tribunal Act).

Suggested Readings

Arbill, R.: Man and Environment : Crisis and Strategy of Choice, Penguin, Harmondsworth, 1967.

Berril, N.J.: Inherit the Earth - The Story of Man and Changing Planet Fawcett, Greenwich, Connecticut, 1967.

Botkin, Daniel B. and Keller., Edward A. : Environmental Studies, Charles E. Merrill Publishing Co., Columbus, Ohio, 1987.

Marsh, C.P.: Man and Nature, Harvard, 1967.

C.S.E. The State of India's Environment - A Citizen's Report, Centre for Science and Environment, New Delhi, 1982.

C.S.E.: The State of India's Environment - The 2nd Citizen's Report, Centre for Science and Environment, New Delhi, 1984.

Dasman, R.F.: Environmental Conservation, John Wiley & Sons, New York, 1972.

Detwyler J.R.: Man's Impact on Environment, John Wiley & Sons, New York, 1975.

Odun, E.P.: Fundamentals of Ecology, Prentice Hall

Duffey, E.: Conservation of Nature, Collins., London, 1970.

Edington, J.M. and Edington, M.A.: Ecology and Environmental Planning, Chapman and Hall, London, 1977.

Harvey, B. and Hallet, J.D.: Environment and Society: An Introductory Analysis, Macmillan, London, 1977.

Hewitt, K & Hare, F.K. : Man and Environment : A Conceptual Frame Work, Commission on College Geography Resource, Paper 20, 1973; (AAG).

Park C.C.: Ecology and Environmental Management, Butterworths, London, 1980.

Sherlock, R.L.: Man as a Geological Agent, Witherby, London, 1922.

Thomas, W.L. (ed.): Man's Role in Changing the Face of the Earth. University of Chicago Press, Chicago, 1956.

Kormondy, E.J.: Concept of Ecology, Prentice Hall, 1989

Smith, R.L.: Man and his Environment: An Ecosystem Approach, Harper & Row, London, 1992

Singh, S.: Environmental Geography, Prayag publication, Allahabad, 1991

GEO-111(P): i) Population Mapping

ii) Climatology Practical

Course objectives:

1. Apply and understand the various forms of representation of population Attributes
2. Equipping students with skills in handling and analytical investigation of climatological data with the use of advance graphs and relevant statistical tools to discern long term patterns in climate.

Learning Outcomes:

- 1 Measurement of basic demographic equation, fertility, migration, etc.
- 2 Apply and measurement of various climatological data in different field of studies

Course Content

i) **Measure of Population Change:** Absolute and Percentage; Linear Growth Rate, Geometric Growth Rate and Exponential Growth Rate. Population Composition: Age-Sex Pyramid, Dependency Ratio, and Median Age.

ii) Basic Demographic Equation. Measures of Fertility: Total Fertility Rate (TFR), Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR). Construction of Abridged Life Table. Measuring Internal Migration: Intercensal Migration, and Indirect Measures of Net Migration. Population Projection.

ii) Climatology practical

Exercises on: Climate normal calculation, Hythergraph, Climograph, Determination of climatic types from climatic data, Temperature anomaly, Trend : parametric (linear) and non-parametric (Mann-Kendall technique,) and dispersion calculations; Variability of rainfall; Rainfall dispersion graph and Rainfall anomaly Index.

Suggested Readings

Srinivasan. K., Training Manual on Demographic Techniques. ORGI&UNFPA. 2014.

Siegel, J.S. & Swanson, D.A., The Methods and Materials of Demography. Elsevier Academic Press, California, 2004.

Preston, S., Heuveline, P. & Guillot, M., Demography: Measuring and Modeling Population Processes, Blackwell, 2000

Srinivasan, K. Basic Demographic Techniques and Applications. SAGE, India, 1997.

Gates, E.S., Meteorology and Climatology, Harrap, London, 1972

Hammond, R. & Mc Cullagh, P., Quantitative Techniques in Geography, Clarendon Press, Oxford, 1965.

Horn, L.H., An Introduction to Climate, Mc Graw Hill Book Company, New Delhi, 1980.

Mishra, R.P., Fundamentals of Cartography, Prasaranga, University of Mysore, 1969.

Monkhouse, F.J. & Wilkinson, H.R., Maps and Diagrams, Methuen and Co., Ltd, 1971.

Singh, R.L., Elements of Practical Geography, Students Friends, Allahabad, 1968.

Singh, R.N. & Kanauja, L.R.S., Mapwork and Practical Geography, Central Book Depot, Allahabad, 1963.

Trewartha, G.T. & Horn, L.H., An Introduction to Climate, Mc Graw Hill Book Company, New Delhi, 1980.

GEO-112(P): Research Methodology and Field Work- Survey Report (Physical)

Course Objectives:

1. The course examines the questions related to data collection, methods and its analysis.
2. The students will be able to do field work through practical experience and get skills of data collection methods and processing and analysis of obtained data.

Course Learning Outcomes:

1. The students will be able to understand basic concepts of field research methods and research design in geography.
2. The students will be able to write dissertation based on field work on given topic.

Course Content

i) Research Methodology

Planning a geographic research project, Types of data, Methods of data collection, Methods of field work.

Preparation of questionnaire; sampling, techniques for primary data collection; data processing, representation, Analysis and interpretation of data, methods of references and bibliography

ii) Field work - survey report

Field Survey Report - In consultation with their guide/teacher, the students will conduct a detailed field work to prepare a field report or project report on the basis of collected data and information for their examination. The survey should base on the observation, measurement and collection of data. The field report should be prepared with quantitative techniques and meaningful analysis.

Suggested Readings

Ackoff, R.L., The Design of Social Research, University of Chicago Press, Chicago, 1961.

Kothari, C.R., Research Methodology: Methods and Techniques, 2nd edition, Wiley Eastern Ltd., New Delhi, 1993.

Miller, D.C., Hand book of Research Design and Social Management, 3rd. Edition, David McKay Company. Inc. New York, 1977.

Mishra, R.P. Research Methodology: A Hand Book, Concept Publishing Company,

New Delhi, 1981.

Mishra, H.N. & Singh, V.P., Research Methodology in Geography, Concept Publishing Company, New Delhi, 1998.

Selltiz, C. et al.: Research Methods in Social Relations, Rinehart and Winston, Inc., New York, 1959

Sharma, B.A.N. et al. Research Methods in Social Sciences, Sterling Publishers, New Delhi, 1983.

N.B. The objective of the field work is to conduct survey of a selected region/area and study micro geomorphic features, weather elements, local environment, pattern of land use, human life, etc.