

UNIVERSITY OF CALCUTTA
DEPARTMENT OF GEOGRAPHY
MA/M.Sc Part-I, 2005-2006

PAPER	MODULE	CONTENTS
1(theory)	1	Geomorphology
	2	Hydrology and Oceanography
2(theory)	3	Climatology
	4	Bio-Geography
3(theory)	5	Social and Cultural Geography
	6	Economic Geography
4(theory)	7	Geographical Thought
	8	Geography of Population and Settlement
5(practical)	9	Mapping and computer applications
	10	Data product interpretation

Paper-1 : Module-1: Geomorphology

Unit-1: Fundamental concept in geomorphology

- 1.1: Modern approach to Geomorphology (Concepts, systems, response and time scale)
- 1.2: Morphogenic evolutionary systems (cycle and alternative models, direct measurement, simulation modeling, equilibrium landforms)
- 1.3: Plate tectonic and its application on earth's surface configuration
- 1.4: Structure, Lithology and Landforms in Indian context.

Unit-2: Rivers and River basins in Indian subcontinent

- 2.1: Stream flow and Stream energy
- 2.2: Channel forms and processes
- 2.3: Erosional and Depositional processes and landforms
- 2.4: River terraces, flood-plains, Delta –origin and characteristics

Unit-3: Slopes

- 3.1: Methods and problems of slope study
- 3.2: Processes and evolution of slopes
- 3.3: Mass-movements and steep and intermediate slopes
- 3.4: Slope characteristics in Glacial, Periglacial and tropical regions

Unit-4: Applied Geomorphology

- 4.1: Nature and Objective
- 4.2: Geomorphic hazards
- 4.3: Fluvial hazard evaluation
- 4.4: Case studies

PAPER-1:Module-2: Hydrology and Oceanography

Unit-1: Application of Hydrology to the Environment

- 1.1: Hydrology, definition and its relation to the environment
- 1.2: Surface and sub-surface water and environment
- 1.3: Basic Management ad environment
- 1.4: Urban water supply and environment

Unit-2: Precipitation, Evaporation, Transpiration, Infiltration and Run-off

- 2.1: Definition and characteristics
- 2.2: Measurement and input
- 2.3: Methods and reduction
- 2.4: Application

Unit-3: Morphology of Oceans

- 3.1: Introduction and history of Oceanography
- 3.2: Continental terraces
- 3.3: Submarine canyons
- 3.4: Coral reefs

Unit-4: Properties of Ocean water

- 4.1: The salinity and temperature of Ocean water
- 4.2: T-S relationship and water masses
- 4.3: Theory of Ocean circulation
- 4.4: Ocean resources

PAPER-2: Module-3: Climatology

Unit-1: The atmosphere

- 1.1: Scope and content of climatology and its relation to climatology and applied climatology
- 1.2: Nature, origin and composition of atmosphere, the role of CO₂ and O₃
- 1.3: Distribution of atmospheric energy by vertical and horizontal mixing; Heat budget of the earth
- 1.4: Atmospheric pressure and general circulation of wind, Jet stream and Monsoons

Unit-2: Precipitation and water budget

- 2.1: The role of water vapour in the atmosphere, theory of rain-drop formation
- 2.2: Monsoon, origin and theories
- 2.3: Monsoon- characteristics, components , numerical modeling
- 2.4: Water balance: global and regional

Unit-3: Weather disturbance and hazards

- 3.1: Fronts, temperate and tropical cyclones
- 3.2: Mechanism of thunderstorms and tornadoes
- 3.3: Climatic hazards; ENSO phenomena
- 3.4: Weather forecasting

Unit-4: Climatic classification and applied issues

- 4.1: Classification of world climate, Koppen's and Thornwaite's schemes
- 4.2: Concept of Macro, Micro climate, agro climatology
- 4.3: Global warming and possible consequences
- 4.4: Climatic cycles and theories of climatic changes

PAPER-2: Module-4: Bio-Geography

Unit-1: Significance of Biogeography and Ecosystem

- 1.1: Major natural ecosystems, Forests, Grasslands and Marine ecosystem; Biological desert
- 1.2: Structure of ecosystems, trophic structure and energy flow, Ecological niche and species structure
- 1.3: Nutrient cycles
- 1.4: Population dynamics and the problem of abundance

Unit-2: Soil Geography

- 2.1: Factors and forms of soil formation
- 2.2: Soil nutrients, Role of physical and chemical properties in soil fertility
- 2.3: Classification and world pattern of soils
- 2.4: Plant-water-soil relationship

Unit-3: Plant Geography

- 3.1: Plant ecology-habitat factors, plant responses to environment, plant adaptation, succession and climax
- 3.2: Forest types, Phyto-geographical regions
- 3.3: Causes and consequences of deforestation, forest conservation, afforestation and social forestry
- 3.4: Biodiversity

Unit-4: Zoo geography

- 4.1: Evolution of species, Critiques of Darwinism
- 4.2: Dispersal of animals, means and barriers, Migration and Aquatic life and marine fauna
- 4.3: Distribution of species in different geological periods, the distant past, Pleistocene changes, post-glacial changes
- 4.4: Conservation of wild life sanctuaries

PAPER-3: Module-5: Social and Cultural Geography

Unit-1: Social and cultural geography

- 1.1: Nature and scope and development of social and cultural geography, social and cultural geography in the realm of social science
- 1.2: Relevance of concept of well being in geographical studies
- 1.3: Social structure and social processes
- 1.4: Concept of region, region as a social unit- city region

Unit-2: Realm of Cultural geography

- 2.1: Cultural hearth and realm
- 2.2: Cultural system and diffusion
- 2.3: Cultural and development
- 2.4: Geography of inequality and gender related issues

Unit-3: Elements of social geography

- 3.1: Ethnicity, Caste and Tribes; theories of tribal groups
- 3.2: Religion: World and India
- 3.3: Language, Historical process, geographical pattern and classification
- 3.4: Indian Tribes; major groups, characteristics and distribution

Unit-4: Social and cultural relations

- 4.1: Socio-cultural transformations
- 4.2: Culture and technology
- 4.3: Development and social change
- 4.4: Problems of cultural segregation

Paper-3: Module-6: Economic Geography

Unit-1: Concepts of Resources and Economics

- 1.1: Classification, conservation and management of resources
- 1.2: Sector of economy: primary, secondary, tertiary and quaternary
- 1.3: Location of economic activities and spatial organization of economics
- 1.4: Ranking of world economies as postulated by World Bank

Unit-2: Agricultural Geography

- 2.1: Measurement of agricultural productivity and efficiency: Role of technology
- 2.2: Crop combination, crop rotation and diversification
- 2.3: Concept of techniques of delineation
- 2.4: Changing pattern of world agriculture

Unit-3: Industrial Geography

- 3.1: Industrial revolution and industrialization
- 3.2: Classification of industries: Theories of industrial location- Weber and Losch
- 3.3: Industries- Iron and Steel, Cotton-textile, paper, Petroleum refining; Industrial complexes
- 3.4: Industrial policy and globalization

Unit-4: Geography of Transport, communication and trade

- 4.1: Models of transportation and transport cost
- 4.2: Accessibility and connectivity; comparative cost advantage
- 4.3: Impact of information technology on trade
- 4.4: WTO and international trade

Paper-4: Module-7: Geography Thought

Unit-1: Evolution Geographical Thought

- 1.1: General characteristics of Geographic knowledge during the ancient and medieval period
- 1.2: Foundation of Modern Geography: colonial expansion and development of geography, the emergence of scientific geography- Humboldt, Ritter
- 1.3: Changing emphasis in Geography- Ratzel, Richtofen; evolution of the study of Man-Blache
- 1.4: Background of the current problems in Geography: conceptual and methodological development during the 20th century; impact of World Wars on the development of Geography; Quantitative revolution

Unit-2: Geography as Social Science

- 2.1: Social space and the domain of Humanistic Geography
- 2.2: Emergence of Welfare Geography
- 2.3: Geography of inequality and Feminist geography
- 2.4: Nature Dichotomies in Geography

Unit-3: Paradigms in Geography

- 3.1: Possibilism of Vidal-de-la-Blache
- 3.2: Environmental determinism of Huntington and Ratzel
- 3.3: Landscape morphology-cultural expression of Karl Sauer and Areal differentiation of Richard Hartshrone
- 3.4: Critique of exceptionalism

Unit-4: Recent trends in Geographical Thought

- 4.1: Revival of ecological studies in Geography
 - 4.2: System approach in Geography
 - 4.3: Post-modernism- Ideological influences
 - 4.4: Advances in Geographical research
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PAPER-4: Module-9: Mapping and Computer Application

Unit-1: Preparation of reference map

1.1: Survey of ground details for their planimetric and altimetric position by Theodolite

1.2: Construction of graticules of projection for representing ground details of different areas of the earth

1.2.1: Projection for India: (a) Simple conic projection with 2 standard parallels

(b) Bonne's projection

1.2.2: Projection for hemisphere: (a) Equatorial Stereographic projection

1.2.3: Projection for world: (a) Mercator's projection

(b) Gall's stereographic

projection

(c) Homolosine projection

1.2.4: Projection for topographical mapping: Modified International projection

Unit-2: Computer Application in Geography

2.1: Drawing of cartograms: Bargraph, Piegraph, Histogram and Scatter diagram

2.2: Scanning and digitization of maps

Paper-5: Module-10: Data Products interpretation

International among: Toposheet, Air Photo and Satellite imagery (preferably of the same area)

**UNIVERSITY OF CALCUTTA
DEPARTMENT OF GEOGRAPHY
SYLLABUS FOR M.A/M.Sc PART- II - 2006-2007**

PAPER	MODULE	CONTENTS
6 th (theory)	11	India- regions and regionalization
	12	Selected adjacent countries of India, Bangladesh, China, Nepal, Pakistan (any2)
7 th (theory)	13	Environmental studies
	14	Historical and Political geography
8 th (theory)	15	Cartography
	16	Cartography
9 th (practical)	17	Cartography Practical
	18	Remote Sensing and GIS
10 th (practical)	19	(a) Field report (b) Disseration
	20	Quantitative techniques

PAPER-6: Module-11: India

Unit-1: Regions and regionalization

- 1.1: Various bases of regionalization in India; Problems of identification and delineation
- 1.2: Physiographic and climatic regions; Interrelations among climate, vegetation and soil; Bio-climatic regions
- 1.3: Agricultural, industrial and planning regions
- 1.4: Evolution of social regions of India, nuclear regions and regions of isolation

Unit-2: Socio-economic Issues

- 2.1: Changing nature of India's economic base with reference to Agriculture, Industry, Trade and commerce
- 2.2: Rural-urban linkage and interaction, Urbanisation in India; Problems, process and hierarchy
- 2.3: Regional disparities in population growth, resource mobilization and human development
- 2.4: Developmental strategies- regional, rural and urban

Unit-3: Micro-level studies of selected regions of India

- 3.1: North-eastern regions
- 3.2: Ganga plain
- 3.3: Chattisgrah region
- 3.4: Malabar Coast

Unit-4: West Bengal

- 4.1: Regionalisation
- 4.2: Identification of regional problems and their impact
- 4.3: Changing rural economy and problems of industrialization
- 4.4: Classification, geographical personality of Ganga delta

PAPER-6: Module-12:

[Selected adjacent countries of India- Regional geography of China, Pakistan, Nepal and Bangladesh {to be rotated (any 2 at a time)}]

CHINA

Unit-1: Physical background

- 1.1: Historical background and geographic personality
- 1.2: Structure, relief and drainage
- 1.3: Climate, Vegetation and soil
- 1.4: Physiographic zones

Unit-2: Economic base

- 2.1: Population characteristics, distribution, structure, population policy and urbanization
- 2.1: Structure, relief and drainage
- 2.3: Climate, vegetation and soil
- 2.4: Physiographic zones

PAKISTAN

Unit-3: Physical background

- 3.1: Location and historical background of Pakistan
- 3.2: Structure, relief and drainage
- 3.3: Vegetation and soil
- 3.4: Physiographic zone

Unit-4: Socio-economic base

- 4.1: Population characteristics: distribution and growth, migration and urbanization
- 4.2: Economic bases influencing economic activities; industrial resource, water power and mineral resource; transport and communication
- 4.3: agricultural development and industrial development
- 4.4: Economic policies, international trade, recent trend in economic development

NEPAL

Unit-1: Introduction and physical set up

- 1.1: Location and historical background of Nepal
- 1.2: Geography, structures and relief characteristics
- 1.3: Drainage and climate
- 1.4: Natural vegetation

Unit-2: Socio-economic base

- 2.1: Population, its characteristics- distribution and growth, urbanization
- 2.2: Economic bases influencing economic activities, water resources, forest resources, power and mineral resource and their utilization
- 2.3: Agriculture and industrial development
- 2.4: Transport, trade and recent trend in economy

BANGLADESH

Unit-3: Introduction and physical set up

- 3.1: Location and historical background
- 3.2: Geology-structure and relief
- 3.3: Drainage pattern, characteristics and climate
- 3.4: Soil and natural vegetation

Unit-4: Socio-economic base

- 4.1: Population, its characteristics- distribution and growth, urbanization
- 4.2: Economic bases influencing economic activities, water resources, forest resources, power and mineral resource and their utilization
- 4.3: Agriculture and industrial development
- 4.4: Transport, trade and recent trend in economy

PAPER-7: Module-13: Environmental studies in geography

Unit-1: Concepts

- 1.1: Concept of holistic environment
- 1.2: Physical component: Lithosphere, hydrosphere, atmosphere and biosphere
- 1.3: Socio-cultural components with special reference to housing and sanitation
 - (a) Lithosphere, hydrosphere
 - (b) Health and nutrition
 - (c) Levels of income and education

Unit-2: Man and ecosystem

- 2.1: Structure of ecosystem
- 2.2: Energy flow and energy balance in the biosphere
- 2.3: Soil-water-plant-animal relationship, material cycles
- 2.4: Anthropogenic impact on terrestrial and marine ecosystems

Unit-3: Environmental degradation and hazards

- 3.1: Perception of degradation, hazards and disaster
- 3.2: Natural hazard
- 3.3: Social hazard
- 3.4: Water and soil pollution

Unit-4: Environmental management

- 4.1: Global resource crisis and management
- 4.2: Waste land and wet land conservation
- 4.3: Forest conservation and significance of social forestry
- 4.4: Global warming and its prevention

PAPER: 7: Module- 14: Historical and Political Geography

Unit-1: Nature and scope of Historical Geography

- 1.1: Scope and content
- 1.2: Its relationship with history and other branches of geography, source materials in India (religious text epics)
- 1.3: Nature of source materials
- 1.4: (I) Literature, travel accounts, archives and chronicles
(II) Old maps and revenue records, folk culture etc

Unit-2: Historical Geography of India

- 2.1: Ancient and Puranic period (geographical materials, territorial organization of the Janapadas, urbanization)
- 2.2: Medieval period (trend accounts of Hiuen Tsang and Ibn-e-Batuta, Regional and economic geography of India)
- 2.3: Mughal period (territorial organisation of the empire, industry, agriculture, trade and urbanisation)
- 2.4: Colonial period with particular reference to eastern India (new trends in agriculture, industrialization and urbanization in colonial period, trade colony's economy development of transport network economy and port orientation), origin and development of gateway cities

Unit-3: Nature, scope and significance of political geography

- 3.1: Scope and content, its relationship with political science and other branches of geography
- 3.2: Geographical perspectives on formation of state, nation and nation-state core areas and peripheral areas, capitals, frontiers and boundaries and borderlands, buffer zones, buffer states and land locked stations
- 3.3: Geostrategic views; heartland and rimland theories
- 3.4: politics of world resources; political and economic blocks, political geography of foreign trade

Unit-4: Political geography of India

- 4.1: Geopolitical setting of India- SAARC
- 4.2: Partition of India and its political implications
- 4.3: Bases of reorganisation of Indian states since independence
- 4.4: International and interstate water disputes

PAPER-8: Module-15: Cartography

Unit-1: Emerging concepts in Cartography

- 1.1: Basic concepts
- 1.2: History and development

Unit-2: Measurement on the earth based on

- 2.1: Spherical Trigonometry- Spherical Triangle, Napier's rule, Spherical excess, Determination of distance, azimuth and area on the earth's surface
- 2.2: Field Astronomy- Celestial sphere, co-ordinates of celestial bodies, Equation of time and its application, Determination of latitude, longitude and azimuth of celestial bodies
- 2.3: Geodesy- The shape and size of the earth, Radius of curvature, Determination of distance on spheroid.

Unit-3: Sources of data

- 3.1: Traverse Surveying
- 3.2: Triangulation survey and Base-line measurement
- 3.3: Reciprocal leveling by Theodolite
- 3.4: Determination of height and distance by Tacheometric Survey

Unit-4: Remote Sensing

- 4.1: Aerial photography- Basic photogrammetry, Measurement from aerial photographs, photo interpretation
- 4.2: Satellite Imagery- Radiation principle, Application of various bands in mapping, Interpretation of imageries.

PAPER-8: Module-16: Cartography

Unit-1: Principle of mapping with accuracy assessment

- 1.1: Processing and Generalization of Data
- 1.2: Graduated Symbols
- 1.3: Choropleth
- 1.4: Accuracy Assessment

Unit-2: Co-Ordinate systems for Zenithal and Conical Projections (Determination of distance, azimuth and scale variations)

- 2.1: Oblique Zenithal Equal-area projection
- 2.2: Oblique Zenithal Stereographic projection
- 2.3: Conical Equal-area projection with two standard parallels
- 2.4: Conical Orthomorphic projection with two standard parallels

Unit-3: Co-ordinate systems for Cylindrical and Conventional projections (Determination of distance, azimuth and scale variations)

- 3.1: Mollweide's projection
- 3.2: Hammer's projection
- 3.3: Oblique Mollweide's projection
- 3.4: Transverse Mercator's projection

Unit-4: Basic concepts in GIS

- 4.1: Components of GIS
- 4.2: User's interface
- 4.3: Data coding and data entry
- 4.4: Manipulation and analysis of data

PAPER-9: Module-17: Cartography Practical

Unit-1: Location of points

- 1.1: Tacheometric surveying
- 1.2: Reciprocal surveying
- 1.3: Determination of Area by planimeter

Unit-2: Map projection

- 2.1: Construction of Oblique Zenithal stereographic
- 2.2: Construction of Conical Equal Area
- 2.3: Construction of Oblique Mollweide's
- 2.4: Construction of Transverse Mercator's

Unit-3: Computer Mapping

- 3.1: Drawing of choropleth map
- 3.2: Drawing of the graticules of Oblique Zenithal Equal Area Projection
- 3.3: Drawing of the graticules of Conical Orthomorphic Projection
- 3.4: Drawing of the graticules of Mollweide's Projection

Unit-4: Image Processing and GIS

- 4.1: Visual interpretation of satellite imagery
- 4.2: Digital Image Processing
- 4.3: Geographical Information System

Unit-5: Laboratory Note Book and Viva-Voce

PAPER-9: Module-18: Remote Sensing and GIS

Unit-1: Principles of Remote sensing

- 1.1: History of Remote sensing
- 1.2: Energy sources and radiation principles
- 1.3: Energy interactions with earth surface features
- 1.4: Data acquisition

Unit-2: Principles of Aerial photographs

- 2.1: Fundamentals of Photogrammetry
- 2.2: Photogrammetry

Unit-3: Digital Image processing

- 3.1: Image rectification
- 3.2: Image enhancement
- 3.3: Spatial Filtering
- 3.4: Image classification- supervised, unsupervised

Unit4: Geographic information system

- 4.1: Principles of Geographic information system, hardware and software
- 4.2: Data coding and entry
- 4.3: Query and analysis
- 4.4: Creating a Map

PAPER-10: Module-19:

- a) Dissertation : Transport Infrastructure and its Development in Kolkata

- b) Field Report : Physico – Cultural study of Rampur sub-division with special emphasis on the study of Rampur Town.

PAPER-10: Module-20: Quantitative Techniques

Unit-1: Mean centre

- 1.1: Mean centre of Population
- 1.2: Mean centre of Settlement
- 1.3: Locational shift of Mean centres
- 1.4: Standard distance from mean centres

Unit-2: Concentration

- 2.1: Location quotient
- 2.2: Lorenz curve to study inequality and Gini-coefficient
- 2.3: Standard score to study distribution
- 2.4: Nearest neighbour analysis and chi-square test

Unit-3: Population analysis

- 3.1: Population potential by gravity model
- 3.2: Mapping of population potential
- 3.3: Rank size rule to study rank and population of urban centres
- 3.4: Mapping of actual and expected urban population

Unit-4: Correlation and regression

- 4.1: Pearsonian and Spearman correlation, Test of Significance
- 4.2: Linear regression and residual mapping
- 4.3: Curvilinear regression

Unit-5: Laboratory note book and viva-voce

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