SIDHO-KANHO-BIRSHA UNIVERSITY

Syllabi of M.A./M.Sc. Course in Geography

1st SEMESTER

:: GEOMOPHOLOGY ::

Module: 101

Time: 2 hrs. **Full Marks: 50**

UNIT – I : CONCEPTS IN GEOMORPHOLOGY **10 Marks**

1.1. Basic levels of Geomorphology
1.2. Spatial scale, temporal scale in Geomorphology
1.3. Related concepts: Systems, feedback,
1.4. Equilibrium and Thresholds

UNIT – II : TECTONICS AS A UNIFIED THEORY **10 Marks**

2.1. Plate tectonics as a unified theory of global tectonics
2.2. Morpho-climatic mechanism and morphogenetic landforms
2.3. Morphogenetic evolution: Models of Davis, Penck
2.4. Concepts of King, Hack, Schuman

UNIT – III : EVOLUTION OF LANDFORMS **10 Marks**

3.1. Coastal morphodynamics variables and their influence on evolution of coastal forms
3.2. Classification and evolution Aeolian landforms
3.3. Classification and evolution of Periglacial landforms
3.4. Processes of slope development

UNIT – IV : HYDROLOGY **10 Marks**

4.1. River hydraulics: flow and energy; Hydraulic geometry of streams
4.2. Catchment processes and fluvial processes; Factors regulating entrainment transportation and deposition of sediments and morphometric analysis
4.3. Fluvial landforms: characteristics and evolution
4.4. Geo-hydrology Movement and storage of ground water, Darcy's law, Karst processes

UNIT – V : INTERNAL ASSESSMENT **10 Marks**

:: CLIMATOLOGY ::

Module: 102

Time: 2 hrs. **Full Marks: 50**

UNIT – I : ATMOSPHERIC PROCESSES **10 Marks**

1.1. Concept, nature and scope of climatology and its relationship with Meteorology
1.2. Climate system, variations of atmospheric composition, temperature, pressure
1.3. Nature of radiation and radiation laws; Energy budget of the Earth atmospheric system
1.4. Controlling forces of wind motion; Pressure gradient force; Coriolis force, Frictional force, Convergent and Divergent forces

UNIT – II : CONDENSATION AND PRECIPITATION **10 Marks**

2.1. The role of water vapour with Atmosphere, evaporation condensation by Adiabatic, isothermal processes
2.2. Water budgets, Global and Regional water balance
2.3. Theories of Rain Drop Formation
2.4. Monsoon: origin, characteristics and relationship with Jet streams, Numerical model of monsoon; MONEX, Walker circulation and ENSO phenomena

UNIT – III : WEATHER DISTURBANCES AND FORECASTING **10 Marks**

3.1. Air mars; Fronts and Tornadoes
3.2. Temperature and tropical cyclones anti cyclones
3.3. Techniques of weather forecasting; short, medium and long range
3.4. Climate Change

UNIT – IV : CLASSIFICATION AND APPLIED ISSUES **10 Marks**

4.1. Classification of world climate – Thornthwaite, Trewartha
4.2. Climatic changes and cycle, recent climate changes and their effects
4.3. Agro-climatic regions, Basis of identification of Agro-climatic regions
4.4. Micro climate: Urban heat islands, hot spots, forest climate, cloud burst

UNIT – V : INTERNAL ASSESSMENT **10 Marks**

:: ECONOMIC GEOGRAPHY ::

Module: 103

Time: 2 hrs. **Full Marks: 50**

UNIT – I : CONCEPT OF RESOURCES **10 Marks**

1.1. Concept and distribution of land, water and biotic resources
1.2. Functional theory of resources
1.3. Concept of Resource analysis in geography – Regional approach, production approach, ecological approach
1.4. Energy Resources – Renewable and Non-renewable development and utilization of resources

UNIT – II : AGRICULTURAL GEOGRAPHY **10 Marks**

2.1. World Economics – Distribution and Pattern
2.2. Agricultural Regions: Concept, technique and delimitation, theory of Vonthunen, Sinclair
2.3. Land and Land reforms in relation to Agriculture in India, Green Revolution
2.4. Food grain production: Indian scenario

UNIT – III : INDUSTRIAL GEOGRAPHY **10 Marks**

3.1. Theories of Industrial location – Weber, Hoover, Palander
3.2. Major Industrial Regions of India
3.3. Industrial policy in the process of Liberalization, Privatization and globalization
3.4. Recent progressive industries – Petrochemical and IT

UNIT – IV : TRANSPORT TRADE AND COMMERCE **10 Marks**

4.1. Concept of distance, connectivity, accessibility – Intra-regional and inter-regional graph theory and development of transport network
4.2. Significance of Trade in National and International Economy – WTO, TRIPS, ASEAN, Concept of EPZs & SEZs
4.3. Modes of transport and transportation cost; comparative cost advantage
4.4. Network analysis, graph theory and development of transport network

UNIT – V : INTERNAL ASSESSMENT **10 Marks**

:: SOCIAL AND CULTURAL GEOGRAPHY ::

Module: 104

Time: 2 hrs. **Full Marks: 50**

UNIT – I : SOCIAL GEOGRAPHY **10 Marks**

1.1. Social Geography: definition, scope, content, Social Geography is the realm of social sciences and its relation with Sociology and Anthropology
1.2. Elements of social geography, Social structure, Social processes and Social space
1.3. Concept of welfare and social well-being, indicators of social well-being, social well-being in India; Social security, Social change, Social justice and Social inequality.
1.4. Region as a social unit; city region

UNIT – II : ELEMENTS OF SOCIAL GEOGRAPHY **10 Marks**

2.1. Major racial groups of the world and their distribution
2.2. Social elements: Ethnicity, Caste and Tribe
2.3. Religion: World and India
2.4. Distinction between dialects and languages and classification and geographical pattern

UNIT – III : CULTURAL GEOGRAPHY **10 Marks**

3.1. Concept and development of cultural geography
3.2. Cultural Hearth and Realm; Cultural system and diffusion
3.3. Culture, technology and development
3.4. Cultural segregation and cultural diversity

UNIT – IV : CULTURAL RELATIONS **10 Marks**

4.1. Three fold divisions of societies
4.2. Socio-cultural transformation: Environment and culture
4.3. Acculturation, metropolitan culture and cultural globalization
4.4. Cultural regions of world and India

UNIT – V : INTERNAL ASSESSMENT **10 Marks**

:: SURVEYING AND PREPARATION OF MAPS ::

Module: 105 (PRACTICAL)

Time: 4 hrs. **Full Marks: 50**

UNIT – I : CARTOGRAMS **10 Marks**

1.1. Ergo graph, crop calendar
1.2. Sex Ratio, Rank Size Rule
1.3. Hypsometric curve, Area Height diagram
1.4. Lorenz curve and Gini co-efficient

UNIT – II : THEMATIC MAP **10 Marks**

2.1. Weber's crop combination, Crop diversification
2.2. Location quotient, Nearest Neighbour Analysis
2.3. Flow map, Detour, Isochrone
2.4. Morphometric analysis

UNIT – III : PROJECTION **10 Marks**

3.1. Concept and properties of map projection
3.2. Gnomonic and Stereographic (Equatorial case)
3.3. Mercator, Gall's, Mollweide, Sinusoidal
3.4. Choice and uses of Map Projections, Problems of scale variation related to projection

UNIT –IV : SURVEYING AND PREPARATION MAPS **10 Marks**

4.1. Plain Table Survey with two point and three point problems
4.2. Theodolite Survey: Traversing and Triangulation Survey, Determination of height of an object by oblique plane
4.3. Tachometric survey for finding difference of level, Reciprocal levelling with level
4.4. Total Station and GPS Survey

UNIT – V : LABORATORY NOTE BOOK AND VIVA-VOCE **10 Marks**

SIDHO-KANHO-BIRSHA UNIVERSITY

Syllabi of M.A./M.Sc. Course in Geography

2nd SEMESTER

:: OCEANOGRAPHY ::

Module: 201

Time: 2 hrs. **Full Marks: 50**

UNIT – I : PHYSIOGRAPHY TO OCEAN BASIN **10 Marks**

1.1 Origin Bottom Relief of Oceans – Continental Self, Slope, Trench
1.2 Origin Bottom Relief – Explanation through Plate tectonics
1.3 Continental Self and Slope: Morphology and Origin
1.4 Submarine Canyons – Morphology and Origin

UNIT – II : OCEAN HYDROLOGY **10 Marks**

2.1 Properties of Ocean Water – Physical and Chemical Properties
2.2 Temperature of Ocean Water – Factors and Distribution
2.3 Salinity – Significance, Source, Factors and Distribution
2.4 Density of Ocean Water – Factors and Distribution

UNIT – III : OCEAN TIDES AND CURRENTS AND DEPOSITS **10 Marks**

3.1 Tides – Generating forces, Theory of Formation
3.2 Ocean Currents –Types Controlling Factors and Flow of Ocean Currents in Atlantic, Pacific and Indian Oceans. Effects
3.3 Oceanic Deposits – Sources, Classification and Characteristics
3.4 Coral Reefs – Ecology, Morphology and Origin

UNIT – IV : OCEAN AS GLOBAL CONCERNS **10 Marks**

4.1 Resource – Organic, Inorganic and Energy Resources, Oceanic Resources as New Resource Horizon for Future
4.2 ENSO Phenomena– Origin and Impacts
4.3 Marine Pollution and its effects
4.4 Geopolitics of Oceanic Resource with special reference to Asia-Pacific Region

UNIT – V : INTERNAL ASSESSMENT **10 Marks**

:: SOIL AND BIO-GEOGRAPHY ::

Module: 202

Time: 2 hrs. **Full Marks: 50**

UNIT – I : SOIL GEOGRAPHY 10 Marks

1.1. Soil as a component of Biosphere; Concept of land and soil; Plant-water soil relationship
1.2. Soil nutrients and organisms; Role of physico-chemical properties in soil fertility and productivity
1.3. Classification and world pattern of soil
1.4. Soil erosion and degradation: causes consequences; Conservation and management

UNIT – II : PLANT GEOGRAPHY 10 Marks

2.1. Plant Ecology: habitat factors; Plant responses to environment; Adaptation, succession and climax; Domestication of plants
2.2. Forest types: Phyto-Geographical regions; Concept of plant species, family and genera.
2.3. Causes and consequences of deforestation; forest conservation; social forestry and participatory management of forest
2.4. Biodiversity – controlling factors, depletion and its significance

UNIT – III : ZOO GEOGRAPHY 10 Marks

3.1. Evolution of species; critique of Darwinism, origin of Neo-species
3.2. Dispersal and migration of animals; means and barriers; aquatic life and marine – fauna
3.3. Distribution of animals in different geological periods: Distant past, Pleistocene and post-glacial changes
3.4. Principles of animal ecology; wild life management; relevance of sanctuaries and National Parks with special reference to India

UNIV – IV : ECO-SYSTEM AND ECOLOGY 10 Marks

4.1. Forms and functions of major National Eco Systems; forest, grassland, mountain and marine eco-system
4.2. Principles of physical and human ecologies
4.3. International Biological Programme; Man and Biosphere Programme
4.4. Eco-system models; population dynamics of organizers and problems of their Abundance and Extinction

UNIT – V : INTERNAL ASSESSMENT 10 Marks

:: POPULATION AND SETTLEMENT GEOGRAPHY ::

Module: 203

Time: 2 hrs. **Full Marks: 50**

Unit – I : POPULATION **10 Marks**

1.1 Trends of population growth of the World and India
1.2 Determinants of population growth – physical, biological and socio-economic, Dynamics of population growth – Birth rate, Death rate, Migration
1.3 Theories of Population Growth – Malthus, Marx, Saddler, Double day, Neo-Malthusian
1.4 Migration – types, pattern, Diaspora

Unit – II : POPULATION POLICY AND DEVELOPMENT **10 Marks**

2.1 Concept of over population, under population, optimum population, equilibrium population
2.2 Population characteristics and policies of Developed and Developing world
2.3 Population growth and Resource Depletion – The Limits to Growth
2.4 Population related issues: Food & Energy crisis in Future, Poverty and Famine and Mal-nutrition

Unit – III : RURAL SETTLEMENT **10 Marks**

3.1 Development of Settlement Geography, Human Settlement as a system
3.2 Evolution and growth of rural settlements and their causes
3.3 Site, location, types and pattern of rural settlement, morphology of rural settlement
3.4. Rural house types: Plans and architectural style in different geographical environment, Monsoon Asia, Arid zone, Frigid zone

Unit – IV : URBAN SETTLEMENT **10 Marks**

4.1 Origin and evolution of urban settlement, characteristics of urban settlement – Pre-industrial and Industrial
4.2 Morphology of urban settlements (characteristics of internal structure and external forms, theories explaining internal morphological structure of cities)
4.3 Settlement hierarchy, factors contributing to hierarchy with special reference to central place theory, Size and spacing of urban settlement – Rank size Rule, Law of primate cities
4.4 Rural urban fringe, structure, characteristics and functions, rural urban interaction, Forms processes of rural-urban interaction: changes and adjustment in the fringe areas

Unit V. INTERNAL ASSESSMENT **10 Marks**

:: INTERPRETATION OF MAPS ::

Module: 204 (PRACTICAL)

Time: 4 hrs. **Full Marks: 50**

UNIT – I : INTERPRETATION OF GEOLOGICAL MAPS **10 Marks**

1.1. Basic concepts of Geological Map and Identification of Geological structures
1.2. Simple horizontal and uniclinal structure
1.3. Geological maps for folded and faulted structure
1.4. Interpretation of Geological Map

UNIT – II: INTERPRETATION OF TOPOGRAPHICAL MAPS **10 Marks**

2.1. Principle of topographical map numbering system
2.2. Interpretation of physical and cultural landscapes based on identification of physical and cultural features
2.3. Drawing of section, Transact Charts
2.4. Different morphometric analysis

UNIT – III : QUANTITATIVE TECHNIQUES IN GEOGRAPHY **10 Marks**

3.1. Determination of Mean, Median and Mode
3.2. Standard Deviation and Co-efficient of variation
3.3. Regression analysis; Linear (including residual mapping), Parabola, exponential and Geometric curves
3.4. Pearson's product moment coefficient of correlation, Population projections

UNIT – IV : INTERPRETATION OF AERIAL PHOTOGRAPHS AND SATELLITE IMAGES (VISUAL) **10 Marks**

4.1. Principles of Aerial photography, concept of stereoscopic view, determination of effective area
4.2. Identification of physio-cultural features, preparation of land use / land cover maps and interpretation
4.3. Principles of Remote Sensing, basic concept, generation of satellite data
4.4. Identification of various spatial features, preparation of land use / land cover maps and interpretation.

UNIT – V : LABORATORY BOOK AND VIVA-VOCE **10 Marks**

:: QUANTATIVE TECHNIQUES AND COMPUTER APPLICATION ::

Module: 205 (PRACTICAL)

Time: 4 hrs. **Full Marks: 50**

UNIT – I : SAMPLING, HYPOTHESIS TESTING AND SPATIAL ANALYSIS **10 Marks**

1.1. Nature and types of geographical data, standardization of data; Rank and Z-scores
1.2. Sampling techniques; purposive, random, systematic, stratified and multistage
1.3. Hypothesis testing; test of significance chi-square test, t-test. F-test; probability statement
1.4. Determination and location of mean centre of population over time; calculation of standard distance from mean centre of population

UNIT – II : MEASUREMENT OF INEQUALITIY; CORRELATION, REGRESSION AND PROJECTION **10 Marks**

2.1. Dominant Distinctive Function, Breaking Point Analysis, Gravity Model
2.2. Pearson's product moment and Spearman's Rank correlation co-efficient, concept of partial and multiple correlation, Index of development by Kendall's method
2.3. Time Series Analysis, Principle Component Analysis
2.4. Determinants, Matrices, Path Analysis

UNIT – III : COMPUTER APPLICATION **10 Marks**

3.1. Fundamentals of computer
3.2. Computer components and operating systems
3.3. Work on Microsoft Excel / SPSS: Data entry, tabulation and analysis (Sum, Average, Median, and Mode)
3.4. Graphical representation of data: scatter diagram with trend line, time series with trend line, bar graph, pie graph and histograms

UNIT – IV : GIS AND ITS APPLICATION **10 Marks**

4.1. Fundamental of GIS
4.2. Component of GIS
4.3. Different types of Data Structure
4.4. Location of places and traversing by coordinates

UNIT – V : LABORATORY NOTE BOOK AND VIVA-VOCE **10 Marks**

SIDHO-KANHO-BIRSHA UNIVERSITY

Syllabi of M.A./M.Sc. Course in Geography

3rd SEMESTER

:: GEOGRAPHICAL THOUGHT ::

Module: 301

Time : 2 hrs **Full Marks : 50**

UNIT – I : EVOLUTION OF GEOGRAPHICAL THOUGHT **10 Marks**

1.1. Place of Geography in the classification of knowledge.
1.2. Pre-Scientific ideas in Ancient and Medieval period; the emergence of Scientific Geography – Humboldt & Ritter.
1.3. Changing emphasis in Geography – Ratzel & Richtofen ; colonial expansion and development of Geography.
1.4. Background of the current problem in Geography. Conceptual and Methodological development during 20th Century ; Impact of World War in the development of Geography; Quantitative Revolution & Geographical Information System.

UNIT – II : GEOGRAPHY AS SOCIAL SCIENCE **10 Marks**

2.1. Spatial Organization and Critique of Geometric Spatial Structure.
2.2. Emergence of Humanistic Geography and Welfare Geography.
2.3. Geography of Inequality & Geography of Gender.
2.4. Quantitative revolution and challenges ; Philosophy & Geography : Contributions of Vidal-de-la-Blache and Carl-O-Sauer ; Humanistic and phenomenological Geography: Contribution of Yi-Fu Tuan ; Indian Geography.

UNIT – III : PARADIGMS IN GEOGRAPHY **10 Marks**

3.1. Dichotomies in Geography: Physical and Human, Systematic and Regional, Determinism and Possibilism.
3.2. Environmental Determinism of Huntington and Ratzel ; Possibilism of Vidal-de-la-Blache.
3.3. Landscape Morphology – Cultural expression of Carl-O-Sauer ; Hartshorne – Schaefer debate.
3.4. Ecological, Nomothetic and Idiographic approaches in Geography.

UNIT – IV : CONTEMPORARY TRENDS **10 Marks**

4.1. Qualitative paradigm, Behavioural Revolution : perception and cognition, mental maps.
4.2. Marxism ; post modernism, post structuralism & post colonialism.

4.3. Radicalism and Development of Critical Geography.
4.4. Evolution of the study of man ; Metaphysics, Empiricism and Positivism.

UNIT – V : INTERNAL ASSESMENT 10 Marks

ENVIRONMENTAL GEOGRAPHY & DISASTER MANAGEMENT

MODULE : 302

Time : 2 hrs **Full Marks : 50**

UNIT – I : CONCEPTS 10

1.1. Concept of Environment, Importance of Environmental studies in Geography.
1.2. Physical Components : Lithosphere, Hydrosphere, Atmosphere and Biosphere.
1.3. Socio- Cultural components with special reference to Health, Education, Income and Nutrition.
1.4. Changing perception of Man-Environmental relationship.

UNIT – II : ENVIRONMENT AND MAN 10

2.1. Concept and Structure of Ecosystem, Ecosystem Principal.
2.2. Ecosystem Functioning, Energy flow and Material Dynamics.
2.3. Soil-water-plant-animal relationship and nutrient cycle.
2.4. Ecosystem models and its significance.

UNIT – III : ENVIRONMENTAL DEGRADATION & HAZARDS 10

3.1. Perception of Degradation, Hazards and Disaster.
3.2. Environmental pollution with special reference to Air and Water.
3.3. Natural and quasi-natural Hazards: Vulnerability and management of cyclones, Flood.
3.4. Social Hazards: poverty, crime & social exclusion

UNIT – IV : ENVIRONMENTAL ISSUES 10

4.1. Environmental Issues at different scale: Local, Regional, Global Issues.
4.2. Climate change and Related Issues.
4.3. Conflict of sharing of water in Regional,. Problem of over use of water & it's management Trans-National Scale.
4.4. Environmental Management.

UNIT – V : INTERNAL ASSESMENT 10

:: HISTORICAL AND POLITICAL GEOGRAPHY ::
MODULE : 303

Time : 2 hrs **Full Marks : 50**

UNIT – I : HISTORICAL GEOGRAPHY 10

1.1. Nature, scope, content and approaches.
1.2. Relationship with History and other branches of Geography.
1.3. Literature, Travel accounts, Archives and chronicles as source materials.
1.4. Evolution of maps in the making of Historical Geography.

UNIT – II : HISTORICAL GEOGRAPHY OF INDIA 10

2.1. Ancient and Puranic period : Geographical materials, Territorial organization of the Janapada,
Urbanization.
2.2. Medieval period : Trade accounts of Huen Tsiang and Ibn-e-Batuta, Regional and Economic
Geography of India.
2.3. Mughal period : Territorial organization of the Empire, Industry, Agriculture, Trade and Urbanization.
2.4. Colonial period with particular reference to Eastern India : Trends in Agriculture,
Industrialization and Urbanization, Trade, Colony's economy, Development of transport network

and its Port orientation; Origin and Development of Gateway Cities.

UNIT – III : POLITICAL GEOGRAPHY 10

3.1. Nature, scope and content ; Relationship with Political Science ; Political Geography in the era of
Globalization; Concept of Geo-Politics and evolution of Geo-Strategic views.
3.2. Geographical perspectives on formation of State, Nation and Nation-State, Core and Peripheral
Areas, Capitals, Frontiers and Boundaries, Border lands, Buffer zones and Buffer states, Land
Locked states.
3.3. Electoral Geography : Regional Stability and Realignments; System model and Revised models.
3.4. Politics of world Resources, Political and Economic blocks, Political Geography of Foreign
Trade.

UNIT – IV : POLITICAL GEOGRAPHY OF INDIA 10

4.1. Boundary dispute and Geo-Political setting of India—SAARC.
4.2. Bases of Re-organization of Indian states since Independence.
4.3. Federalism in India and Center-state relation.
4.4. National and International water Disputes.

UNIT – V : INTERNAL ASSESMENT 10

[P R A C T I C A L]

:: GEOINFORMATICS ::
MODULE : 304

Time : 2 hrs **Full Marks : 50**

UNIT – I : DIGITAL IMAGE PROCESSING 10

1.1. Concept of Digital Images, Digital Data Format and Meta Data.
1.2. Image registration .
1.3. Image enhancement and spatial filtering.
1.4. image classification : Supervised and Unsupervised.

UNIT – II : FUNDAMENTALS OF GEOGRAPHICAL INFORMATION SYSTEM 10

2.1. Definitions, Concepts, Components of G.I.S.
2.2. Data type, Data structure.
2.3. Data Manipulation and Analysis.
2.4. Areas of Application- Environmental studies and Planning.

UNIT – III : GEOGRAPHICAL INFORMATION SYSTEM AND MAPPING 10

3.1. Georeferencing.
3.2. Creation of Layers.
3.3. Integration of Spatial and non-Spatial data.
3.4. Creation of Map.

UNIT – IV : GLOBAL NAVIGATION SATELLITE SYSTEM 10

4.1. Principals of GNSS positioning with special reference to GPS.
4.2. Collection and retrieval of GNSS positions.
4.3. Preparation of map from GNSS data.
4.4. Length and area measurement from GNSS data.

UNIT – V : LABARATORY NOTE BOOK & VIVA-VOCE 10

[P R A C T I C A L]

:: FIELD REPORT EVALUTION ::

MODULE : 305

Time : 2 hrs **Full Marks : 50**

UNIT – I : FIELD REPORT EVALUTION 50

1.1.	Field	Report. **20**
1.2.		Viva-voce. **10**
1.3.	Seminar	Presentation. **10**
1.4.		Interaction. **10**

SYLLABI

4th SEMESTER

MODULE : 401 :: REGIONAL STUDY: WEST BENGAL & RARH ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : INDIA, WEST BENGAL WITH SPECIAL REFERENCE TO RARH 50

4.1. Evolution of Himalaya, it's structure & geology; Physiography of Peninsular India; **10**
Characteristics of the drainage system in the North & the South India; Mechanism of the Monsoon in India; Impact of soil in cropping pattern in India; Inter state river conflict, Flood Control & mitigation.

4.2. Distribution of mineral resources, Factors for uneven distribution of population in India; **10**
Indian industrial policy for the backward region of India; Development of major industries- Automobile, cement, petrochemical. Impact of transport system & development of marketing of various product. Impact of Globalization & Liberalization in Indian Economy.

4.3. Physiographic Division, Climate, Vegetation, Agro Climatic Zone; Mineral Resources, **10**
Factors for location of Industrial zones- Hoogly & Durgapur-Asansol; Agriculture & Irrigation; Distribution of Population.

4.4. Demarcation of Rarh region: Physiography & Relief of the region; Drainage system, floods **10**
and water resource potential, vegetation and soil, drought; Impact on different aspects of development: Demographic and Social characteristics; Prospects of development & resource Utilization of the region.

UNIT – II : INTERNAL ASSESMENT 10

MODULE : 402 **[O P T I O N A L P A P E R – I]**

:: POPULATION GEOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : POPULATION DYNAMICS 10

1.1. Concept and scope of Population Geography
1.2. Difference between population Geography and Demography
1.3. Factors affecting Population distribution
1.4. Population dynamics- Fertility, mortality, Migration, Age-sex structure and gender inequality

UNIT – II : POPULATION THEORIES 10

2.1. Theories of Fertility and Mortality.
2.2. Theories of Migration.
2.3. Economics, Social and Demographic Transition Theories.
2.4. Recent trends on content, techniques in population studies.

UNIT – III : POPULATION & ECONOMICS DEVELOPMENT 10

3.1. Population resource region of the world.
3.2. Concept of over population, under population & optimum population and their effect on Population resources.
3.3. Population problem of third world countries and backwardness and poverty in under Developed countries.
3.4. Trends of urbanization with special reference to population.

UNIT – IV : POPULATION POLICIES 10

4.1. Population policies in developed countries with special reference to Switzerland, America &
Japan.
4.2. Population policies affecting mortality in the developing countries.
4.3. Migration and population policies in major developed countries.
4.5. UNO's world population policies.

UNIT – V : INTERNAL ASSESMENT 10

MODULE : 403 **[O P T I O N A L P A P E R – II]**

:: POPULATION GEOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : ECONOMIC DEVELOPMENT AND INEQUALITIY 10

1.1. Factor responsible for unequal level of development (Human).
1.2. Population characteristics and economic development in developed & developing countries.
1.3. Impact of Migration in urban areas and their effects.
1.4. International & intranational population policies of migration

UNIT – II : SOCIAL INEQUALITY 10

2.1. Basic indicators of Human Development.
2.2. Gender issues and gender empower measures.

2.4. Different Measures of poverty line and poverty alleviation policies and programmes.
2.4. Economic basis and indicator of social wellbeing.

UNIT – III : ECONOMIC AND HUMAN DEVELOPMENT IN INDIA 10

3.1. Factors for population growth and their impact on society
3.2. Intra urban inequality in India.
3.3. Regional differences of gender inequality in India
3.4. Measures of poverty alleviation in India, Participation of labour force in economic activity
In India.

UNIT – IV : POPULATION POLICIES 10

4.1. Population policies during pre-independence & independence period in India.
4.2. Insecurity of child labour, unemployed youth and superannuated person in India.
4.3. Human Development Index, its measures and level of development in the states of India.
4.4. Determination of quality of life in India.

UNIT – V : INTERNAL ASSESMENT 10

MODULE : 404 **[O P T I O N A L P A P E R – III]**
[P R A C T I C A L]
:: POPULATION GEOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : MEASURES OF TEMPORAL & SPATIAL CHANGES 10

1.1. Growth rate of population: Absolute and Compound
1.2. Population projection.
1.3. Spatial distribution of population density by different method

1.4. Rural and urban population (representation), correlation between the area and population.

UNIT – II : MEASURES OF DEVELOPMENTS 10

2.1. Sex Ratio and literacy rate
2.2. Infant child mortality rate & life expectancy at birth.
2.3. Participation of working population.
2.4. GNP, GDP in India.

UNIT – III : MEASURES OF TECHNIQUES OF POVERTY 10

3.1. Location of infrastructure in any region.
3.2. Preparation of questionnaire for population census.
3.3. Method to measure poverty and their gaps.
3.4. Education & dropout of children with enrolment.

UNIT – IV : QUANTITATIVE TECHNIQUES 10

4.1. Population potential.
4.2. Participation of labour force.
4.3. Different measures of migration in rural urban area.
4.4. Application of GIS in population mapping.

UNIT – V : LABARATORY NOTE BOOK & VIVA-VOCE 10

MODULE : 402 **[O P T I O N A L P A P E R – I]**

:: ADVANCED GEOMORPHOLOGY ::

Time : 2 hrs **Full Marks : 50**

UNIT– I: PERSPECTIVES IN GEOMORPHOLOGY 10

1.1. Evolution of Geomorphological thoughts and ideas: A General Review.
1.2. Concept of spatial scale, Temporal scale, Equilibrium and Threshold.
1.3. Approaches to Geomorphology: Structural, Climatic, Applied and Systems approach.
1.4. Principles of Landform classification: Genetic and Hierarchical.

UNIT – II : FLUVIAL PROCESSES AND FORMS 10

2.1. Hydraulic and Hydrological properties of Channels: Regime, Velocity, Discharge and Energy;
Factors controlling Entrainment, Transportation and Deposition by running water.
2.2. Morphological properties of channel: profile, platforms and patterns; effect of floods in channel
Modification and characterisation.
2.3. Formation, System of change and Classification of Fluvial Landform with special reference to
Badlands, Terraces, Alluvial Fans and Accretional Topography.
2.4. Slope Processes in Fluvial Landscape: factors and processes of Bank Erosion and Valley Walls.

UNIT – III : COASTAL PROCESSES AND ANTHOPOGENIC IMPACT 10

3.1. Coastal Morphodynamics: Factors, Characteristics and relative dominants of Wave, Tidal and
Fluvial processes in coasts.
3.2. Processes and effect of Bioturbation, Bio-Tidal accretion, Coral formation and Storm surge/
Tsunamis in coasts.
3.3. Formation, System of change and Classification of Coastal Landforms with special reference to
Rhythmic Beach Topography, Coastal Dunes and Deltas.
3.4. Humans as Geomorphic agent: Effect of River control, Coastal modification and Landuse change
in Mountainous region.

UNIT – IV : TROPICAL GEOMORPHOLOGY 10

4.1. Definition and boundary of Humid and Tropics; Climate and Vegetation characteristics and their
Control on Tropical Landforms.
4.2. Factors and process of Deep Weathering with special reference to formation of Tors, Domed
Inselberges and Laterite Duricrusts.
4.3. Characteristics of Tropical Streams with special reference to of large rivers.
4.4. Urban Geomorphology of Humid Tropics: scope, content and significant in town Planning.

UNIT – V : INTERNAL ASSESMENT 10

MODULE : 403 **[O P T I O N A L P A P E R – II]**

:: ADVANCED GEOMORPHOLOGY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : APPLIED GEOMORPHOLOGY 10

1.1. Methods and uses of Rainwater Harvesting and check dams
1.2. Geomorphic consequences of sea level change in Coast and Estuaries.
1.3. Application of Geomorphology in Terrain Evaluation, EIA and EMP.
1.4. Principles of Integrated Drainage Basin Management and Integrated Coast Zone Management
With reference to Coastal Regulation Zones.

UNIT – II : CASE STUDIES OF LANDFORMS AND LANDUSE 10

2.1. Badlands on laterite Duricasts: Garhbeta and Santiniketan, West Bengal.
2.2. Tors and Inselberges: Chhotonagpur plateau and surrounding, Jharkhand and West Bengal.
2.3. Alluvial fans: sub-Himalayan West Bengal.
2.4. Deltas and Estuaries: Lower Ganga Delta, West Bengal.

UNIT – III : MANAGEMENT OF GEOMORPHIC PROBLEMS 10

3.1. Management of Mining Subsidence with special reference to Coal Belts of Raniganj and Darjiling
Hills.
3.2. Management of River Discharge and its effect with special reference to Damodar Valley Corporation and Farakka Barrage project.
3.3. Management of Urban water supply and Disposal with special reference to Kolkata.
3.4. Management of Reclaimed Coastal areas with special reference to Indian Sundarban.

UNIT –IV : MANAGEMENT OF GEOMORPHIC HAZARDS 10

4.1. Management of Landslides with special reference to Northern West Bengal.

4.2. Management of Floods with special reference to Northern Piedmont areas and Padma-Bhagirathi
Interfluve of west Bengal.
4.3. Management of Riverbank Erosion with special reference to Ganga and Bhagirathi in West
Bengal.
4.4. Management of coastal Erosion with Special reference to Digha township and Sagar island of
West Bengal.

UNIT – V : INTERNAL ASSESMENT 10

MODULE : 404 **[O P T I O N A L P A P E R – III]**
[P R A C T I C A L]
:: ADVANCED GEOMORPHOLOGY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I: ANALYSIS OF CHANNEL PLANFORMS AND SEDIMENTS 10

1.1. Computation of Braiding index, Sinuosity index, Meander wavelength and Radius of curvature.
1.2. Computation of River profile.
1.3. Collection and analysis of Coastal or Riverine Sediment using Ø- graded sieves and chemicals/
Electronic balance.
1.4. Analysis of Pebble-grade Fluvial and Coastal sediment for shape, size and materials.

UNIT – II: GEOMORPHIC MAPPING 10

2.1. Preparation of Geomorphic maps from field data using standard symbols and colour.
2.2. Preparation of overlay from Topographical maps showing Geomorphic features.
2.3. Extraction of geomorphic features from Satellite FCCs in overlay.

2.4. Extraction of relative height of Geomorphic features from Aerial Photopairs using parallax
Bar.

UNIT – III: HAZARD MAPPING AND ZONATION 10

3.1. Landslide: sites and Vulnerability zones.
3.2. Floods: inundation and Risk zone.
3.3. Riverbank erosion: quantification of Eroded area and Vulnerability zonation.
3.4. Coastal erosion: quantification of Eroded area and Vulnerability zonation.

UNIT – IV: LABARATORY NOTE BOOK & VIVA-VOCE 10

MODULE : 402 **[O P T I O N A L P A P E R – I]**

:: ENVIRONMENTAL STUDIES ::

Time : 2 hrs **Full Marks : 50**

UNIT – I: CONCEPTS 10

1.1. Scope and content of Environmental Studies in Geography.
1.2. Fundamental Ideas: Environment, Ecosystem, Ecology, Homeostasis, Cybernatics, Ecological
Equilibrium, Ecological Foot print, Carrying capacity, Ecological stress.

1.3. Symbiosis between Man & Environment; Effect of Environment on Man: Biophysical, Resource
Availability, Perceptional, Behavioural.
1.4. Physical, Ecological and Human Ecological Issues, Organisimic & Holistic Approach to Environment.

UNIT – II: ATMOSPHERIC CHANGE AND BIOSPHERE 10

2.1. Climatic factors shaping the Geographical zonality and Periodicity.
2.2. Changing Climate of the World: Theories of climate change & Human impact.
2.3. Climatic Hazards and Management.
2.4. Social response to climatic Hazard.

UNIT – III: MASS, ENERGY & ENVIRONMENT 10

3.1. Ecosystem Approach in Environmental Studies.
3.2. Energy and Biomass Pyramid, Exchanges among Ecosystems and changes of Ecosystems.
3.3. Population growth Dynamics.
3.4. Ecological Relationship: Principal of Animal & Human Ecology.

UNIT – IV: SPECIFIC ENVIRONMENTAL ISSUES 10

4.1. Industrialization and atmospheric changes.
4.2. Biodiversity Depletion.
4.3. Energy crisis and future concerns of Energy.
4.4. Conservation of wetlands.

UNIT – V: INTERNAL ASSESMENT 10

MODULE : 403 **[O P T I O N A L P A P E R – II]**

:: ENVIRONMENTAL ISSUES ::

Time : 2 hrs **Full Marks : 50**

UNIT – I: ENVIRONMENTAL PHYLOSOPHY 10

1.1. Recent trends of Environmentalism: Shallow Ecology, Deep Ecology, EF (Earth First) .
1.2. Environment & Development with special emphasis on Tragedy of the commons.
1.3. Philosophical perspective of Environment: Spaceship Earth, Gaia Hypothesis.
1.4. Green Development.

UNIT – II: HUMAN ACTIVITY AND ENVIRONMENTAL CONSTRAINTS 10

2.1. World civilization and Environment.
2.2. Production Technology and environmental change with special emphasis on modern technology.
2.3. Human impact on Environment: Modern Agriculture, Industrialization.
2.4. Problem of Solid waste, Nuclear Fall out.

UNIT – III: ENVIRONMENTAL CONCERNS 10

3.1. Big Dams and River valley planning.
3.2. Urban Development and Ecological consequence.
3.3. Pollution and Degradation of coastal Ecosystem.
3.4. Carbon sink, carbon sequestration and Environmental purification.

UNIT – IV: ENVIRONMENTAL POLICY, PLANNING AND MANAGEMENT 10

4.1. Environmental Ethics, Policy, Act, Laws.
4.2. Environment Policy and Laws concerning Forest, Air & Ocean.
4.3. Environmental Impact Management.
4.4. Environmental Audit, Environmental Management Plan.

UNIT – V: INTERNAL ASSESMENT 10

MODULE : 404 **[O P T I O N A L P A P E R – III]**
[P R A C T I C A L]
:: ENVIRONMENTAL GEOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I: QUALITY ASSESMENT OF ENVIRONMENTAL COMPONENT 10

1.1. Method of studies of physical and cultural Environment.
1.2. Dust fall and Measurement of Air pollutants, Noise pollution.
1.3. Acidity and Alkalinity of Soil water; Estimation of organic matter in Soil.
1.4. Soil profile recognition and Microbial change.

UNIT – II: ENVIRONMENTAL MAPS 10

2.1. Preparation of Environmental Maps of Forest and Pond.
2.2. Preparation of Land Use Map.
2.3. Morphometric Analysis of Drainage Basin/ Terrain Analysis.
2.4. Pollution and Hazard Mapping

UNIT – III: ENVIRONMENTAL SURVEY 10

3.1. Cartographic representation of Primary and Secondary Data.
3.2. Collection of Environmental data and Maps.
3.3. Preparation and Interpretation of Environmental maps.
3.4. Preparation of Survey Schedule and Questionnaires.

UNIT – IV: ENVIRONMENTAL STATISTICS 10

4.1. Sampling of Environmental Data.
4.2. Environmental Analysis through Correlation and Regression.
4.3. Time series analysis of Environmental data.
4.4. Residual Mapping of Environmental data.

UNIT-V: LABARATORY NOTE BOOK & VIVA-VOCE 10

MODULE : 402 **[O P T I O N A L P A P E R – I]**

:: ADVANCED CARTOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : CONCEPTS IN CARTOGRAPHY AND FIELD ASTRONOMY 10

1.1. Basic concepts in Cartography; Geomatics-Cartography relationship.
1.2. History and development of cartography.
1.3. Field Astronomy: Celestial Sphere, Co-ordinates of celestial bodies; Equation of time and its application.
1.4. Determination of latitude, longitude and azimuth of celestial bodies.

UNIT – II : GEODESY AND SPHERICAL TRIGNOMETRY 10

2.1. Geodesy- shape and size of the earth, Radius of curvature.
2.2. Concept of datum
2.3. Spherical trigonometry: spherical triangle, Napier's Rule, Spherical excess.
2.4. Determination of distance, azimuth and area of the earth surface.

UNIT – III : GROUND SURVEY AND POSITIONING 10

3.1. Traverse surveying.
3.2. Triangulation survey.
3.3. Tacheometric survey.
3.4. Reciprocal levelling.

UNIT – IV : REMOTE SENSING AND AREAL PHOTOGRAPHY 10

4.1. Principles of Remote sensing, Electro-magnetic Radiation.
4.2. Remote sensing: Platforms, Sensors, Orbiting satellites, Image Resolutions.
4.3. Aerial photographs: Types, Edge information, Elements of Air Photo interpretation

4.4. Photogrammetry : Scale, Relief displacement, Calculation of photographs for aerial coverage;

Parallax and determination of height of photo features.

UNIT – V : INTERNAL ASSESMENT 10

MODULE : 403 **[O P T I O N A L P A P E R – II]**

:: ADVANCED CARTOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I : MAPPING ELEMENTS AND THEMATIC MAPPING 10

1.1. Plane and spherical co-ordinates; UTM and UPS grid system.
1.2. Cartographic generalization: Elements, Controls and Manipulations.
1.3. Cartographic Symbolization: Point, Line, Area, Volume symbols.
1.4. Choropleth Map: Selection of class interval & accuracy assessment

UNIT – II : MAP PROJECTION- DISTANCE, AZIMUTH & SCALE VARIATION 10

2.1. Conical Equal Area Projection with two standard parallels.
2.2. Conical Orthomorphic Projection with two standard parallels.
2.3. Homolosine Projection.
2.4. Transverse Mercators Projection.

UNIT – III : DIGITAL IMAGE PROCESSING 10

3.1. Basic concepts: Image rectification- radiometric & geometric corrections
3.2. Image Enhancement: Magnification, Reduction, Contrast Enhancement & Spatial Filtering.

3.3. Image Transformation: Asiltmetric operation, Image Fusion.
3.4. Image classification: Types and Classifiers.

UNIT – IV : GEOINFORMATICS 10

4.1. G.I.S – Definitions, Components; Recent trends and Applications.
4.2. Data type, Data structure; Meta Data.
4.3. Data Manipulation and Spatial Analysis.
4.4. Geoinformatics: Concept, integration of Remote Sensing with GIS and GPS; Concept of Differential Global Positioning System.

UNIT – V : INTERNAL ASSESMENT 10

MODULE : 404 **[O P T I O N A L P A P E R – III]**
[P R A C T I C A L]
:: ADVANCED CARTOGRAPHY ::

Time : 2 hrs **Full Marks : 50**

UNIT – I: LOCATION OF POINTS AND DETERMITIONS OF AREA 10

1.1. Use of GPS for Planimetric and Altimetric Location of point.
1.2. Theodolite survey for vertical distance.
1.3. Thacheometric survey for determing difference in height.
1.4. Preparation of map using Total Station.

UNIT – I: CONSTRUCTION OF GRATICULES OF SELECTED PROJECTION 10

2.1. Modified International and Interrupted Sinusoidal Projection.
2.2. Conical Equal Area and Conical Orthomorphic Projections with two standard parallels.
2.3. Cylindrical Equal Area Projection with two standard parallels and transverse Mercator Projection.
2.4. Homolosine and Cubic Gnomonic Projection.

UNIT – III: GEOGRAPHIC INFORMATION SYSTEM 10

3.1. Registration, Raster to Vector conversion.
3.2. Integration of Spatial and non-spatial data.
3.3. Preparation of Thematic Maps.
3.4. Spatial Analysis through Vector overlay.

UNIT – IV: DIGITAL IMAGE PROCESSING AND MAPPING 10

4.1. Georeferencing using ortho-images and GNSS data
4.2. Generation of spectral library of land use/land cover features.
4.3. Image classification: Supervised and Unsupervised.
4.4. Change detection from multidated maps and images.

UNIT-V: LABARATORY NOTE BOOK & VIVA-VOCE 10

MODULE : 405 :: RESEARCH METHEDOLOGY & TERM PAPER ::

Time : 2 hrs **Full Marks : 50**

RESEARCH METHODOLOGY

UNIT – I: Basic Research Concepts 10

1.1. Meaning & Concept of Research, Types of Research, Research process, Significance of Research, Research Methods & Methodology
1.2. Defining Research Problem and objective and identification of research problem, Research Design, Hypothesis Testing, Sampling, referencing style.
1.3. Literature review and formulation of research hypothesis.
1.4. Problems related to pursuing research in the area.

UNIT – II: Data Acquisition, Analysis & Interpretation
10

2.1. Preparation of questionnaire, Sample size, methods and data collection.
2.2. Storing of data in computer data base.
2.3. Analysing of data for the purpose of research and application of different research methodology.
2.4. Preparation of maps, diagrams with the help of modern techniques.

TERM PAPER

UNIT-I : Report writing
20

UNIT-II : Seminar Presentation
10