SYLLABUS STRUCTURE IN GEOGRAPHY

Semester	Course	Total Marks	Total Credits
I	CC 1.1 to 1.5	250	15
II	CC 2.1 to 2.5	250	15
III	CC 3.1 to 3.3 CEC 3.1 to 3.2	250	17
IV	CC 4.1 CEC 4.1 to 4.2 OEC 4.1 to 4.2	250	17
Total		1000	64

SYLLABUS

For

M.A. Ist SEMESTER IN GEOGRAPHY

(Choice Based Credit System (CBCS))

STRUCTURE OF SYLLABUS SEMESTER-I

Course	Credit	Marks	Content	Unit	Theoretical/ Practical
CC 1.1	3	50	Geo-tectonics and Geomorphology	I-IV	Theoretical
CC 1.2	3	50	Hydrology and Oceanography	I-IV	Theoretical
CC1.3	3	50	Philosophy of Geography	I-IV	Theoretical
CC 1.4	3	50	Mapping Perception and Field Techniques	I-III	Practical
CC 1.5	3	50	Quantitative Techniques	I-III	Practical

CC 1.1 Geo-tectonics and Geomorphology

Total Marks-50

Unit I-Concepts in Earth Science

1.1. Concept of Spatial and Temporal Scale, Geological Time Scale and Major Events of Earth's History.
1.2. Plate tectonics an Unified Theory of Global Tectonics
1.3.Concept of slope after Davis, Penck and King.

Unit-II Rivers and River Basin

2.1 River Hydraulics: Energy and Flow Dynamics, Hydraulic Geometry of Streams.

2.2 Catchment processes and fluvial processes, factors regulating entrainment, transportation and deposition of sediments.

2.3 Fluvial landforms (Terraces, Alluvial fans and floodplains): Evolution, Genetic Classification and Characteristics.

Unit-III Geomorphic Processes and Landforms

3.1 Coastal Morphodynamic variables and resultant landforms
3.2 Fundamental difference between Glacial and Peri-glacial processes and resultant landforms.
3.3 Aeolian processes and resultant landforms.

Unit-IV Applied Geomorphology

4.1 Geomorphic approach in feasibility assessment of development projects and hazard studies .
4.2 Construction of dams and highways and its impact on geomorphic processes.
4.3 Factors, vulnerability, consequences and management of earthquakes and landslides.

Internal Assessment-10 Marks

CC 1.2 Hydrology and Oceanography

Total Marks-50

Unit-I Pure Hydrology

1.1 Significance of the global hydrological cycle with specific reference to storage, transportation and evaporation.

1.2 Drainage basin as hydrological unit, run-off cycle.

1.3 Ground water hydrology: components, factors and storage.

Unit-II Applied Hydrology

2.1 Water management in Tropical farmlands; technique and approaches

2.2 Water management in Tropical cities: Techniques and Approaches with special reference to Rainwater Harvesting and Artificial Groundwater Recharge.

2.3 Principles of Integrated River Basin Management.

Unit 3: Morphology of Ocean Basin

3.1 Classification, Characteristics and Origin of the Major Structural Features of Ocean floors with particular reference to Plate Tectonics.

3.2 Coral reefs and Atolls: Types and factors, theories of formation, ocean canyons.

3.3 ENSO and its Impact on Global Hydrological Cycle.

Unit 4: Ocean Water and its Uses

4.1 Waves, tides and currents: Theories of formation, genetic classification.

4.2 Sea-level change: Causes and impacts

4.3Ocean as Resource: Importance of EEZ and CRZ

Internal Assessment- 10 Marks

CC 1.3 Philosophy of Geography

Total Marks- 50

Unit-I: Evolution of Geographical Thought

1.1 Geography as a Spatial Science, place of Geography in the realm of social science.

1.2 Pre-scientific ideas in the ancient and medieval period, Emergence of Scientific Geography- Humboldt, Ritter and Ratzel.

1.3 Positivism in Geography, Impact of World War -II on Quantitative Revolution, Development of Geography as a spatial science.

Unit II: Dualism in Geography

2.1 Nomothetic and Ideographic approaches in Geography.

2.2 Determinism and Possibilism in Geography.

2.3 Systematic and Regional Geography: Hartshorne -Schaefer debate.

Unit III: Rise of Critical Geography

3.1 Critique of positivism, rise of radicalism.

3.2 Emergence of Humanistic and Welfare Geography.

3.3 Production of Space: After Lefebvre and Harvey.

Unit-IV Recent Trends in Geography

4.1 Revival of Determinism: Shallow and Deep Ecology

4.2 Post-modernism and Post-Modern Geography

4.3 Revival of Positivism through Geomatics- Space- Time cognition and planning through RS and GIS

Internal Assessment- 10 Marks

CC 1.4 Mapping Perception and Field Techniques (Practical)
Total Marks- 50

Unit-I Basics of Mapping: Geomorphology and Hydrology

1.1 Referencing scheme: Survey of India Topographical maps, Aerial photographs and Satellite imageries.

1.2 Morphometric Analysis: Basin, Slope- thematic maps and diagrams.

1.3 Basin Hydrology: Hydrograph, Rating Curve, Hypsometric curve.

1.4 Soil Profile: Identification of Layers and Horizons, Mapping and Classifications of Water Bodies and Change Detection .

UNIT II- Projection and Computer Application

2.1 Perspectives of suitable projection: Numerical problems on projections, coordinates, distance, azimuth and scale variation.

2.2 Mollweide and UTM projection, Transverse UTM, conversion of latitude and longitude to UTM

2.3 Using Excel/SPSS/ STATA for preparation of histograms scatter diagrams, correlation and regression.

2.4 Chi Square and ANOVA

Unit III: Aerial Photographs and Satellite Image Interpretation

3.1 Aerial Photographs: Geometry, Scale, Ortho-Rectification and Mosaicing.

3.2 Overlapping and effective area delineation. Preparation of thematic overlays and feature identification.

3.3 Stages and Principles of R.S; NRSA Sensors, Preparation of FCC Scale and Resolution.

3.4 Identification of features, preparation and interpretation of Thematic Overlays

Internal Assessment =10 Marks

Practical Note Book and Viva-Voce- 10 Marks

CC 1.5: Quantitative Techniques (Practical)

Total Marks- 50

Unit I: Data, Sampling and Hypothesis Testing

1.1 Measurement of Data: Nominal, Ordinal Ratio, Weighted and Interval.

1.2 Sampling Techniques: Random, Purposive, Systematic Cluster and Stratified, Collection of Samples using Random Numbers.

1.3 Probability Distribution: Normal and Binomial Estimation: Point and Estimate.

1.4 Hypothesis Testing: Z- test, T-test, Chi-square Test.

Unit-II Correlation, Regression and Time Series Analysis

2.1 Correlation: Product Moment and Rank

2.2 Regression Analysis: Linear and Non-linear (Polynomials and Exponential)

2.3 Residual Mapping through Z score

2.4 Time- Series Analysis

Unit-III Mapping and Interpretation of Social Perspective

3.1 Location Quotient and Index of Dissimilarity

3.2 Index of Development by Kendall's Method

3.3 Mean Centre of Population and its Shift Over Time

3.4 Population potential using Gravity Model.

Internal Assessment =10 Marks

Practical Note Book and Viva-Voce- 10 Marks

SYLLABUS

For

M.A. IInd SEMESTER IN GEOGRAPHY

(Choice Based Credit System (CBCS))

STRUCTURE OF SYLLABUS SEMESTER-II

Course	Credit	Marks	Content	Unit	Theoretical/ Practical
CC 2.1	3	50	Climatology	I-IV	Theoretical
CC 2.2	3	50	Soil and Bio-Geography	I-IV	Theoretical
CC2.3	3	50	Population and Settlement Geography	I-IV	Theoretical
CC 2.4	3	50	Climatology, Bio-Geography and Soil Geography	I-III	Practical
CC 2.5	3	50	Population and Settlement	I-III	Practical

C.C 2.1Climatology

Total Marks - 50

UNIT-I Fundamentals of Climatology

1.1 Climatology and its relation to meteorology ,Role of climate in shaping Soil, Biosphere and Human civilization

1.2 Insolation and Heat budget. latitudinal and seasonal variation of Insolation, Adiabatic and isothermal changes in the atmosphere

1.3 Mechanism of Wind flow , Mechanism of upper air circulation

UNIT-II Condensation, Precipitation and Monsoon

2.1 Theories of Condensation, Mixing Ratio and its relation with Condensation

2.2 Theories and Forms of Precipitation, Acid Rain

2.3 Origin and Characteristics of Monsoon with spatial reference to Jet Stream, Occasional Wind with spatial reference to Cyclone.

UNIT-III Weather Disturbances and Climate Change

3.1 Jet Stream and its Impact on Weather

3.2 ENSO Phenomena: Mechanism and Impact.

3.3 Theories of Climate Change, Atmospheric Pollution, Climate Change and its Impact.

UNIT-IV Applied Climatology

4.1 Weather Forecasting, Traditional and Modern Method , Satellite Weatherforecasting , Synoptic weather chart.

4.2 Climate, House types and Architecture of Settlement, Climate and its relation to Food Habit.

4.3 Climate and Disease, Tropical Disease and Role of School of Tropical Medicine

Internal Assessment – 10 Marks

CC 2.2 Soil and Bio-Geography

Total Marks – 50

Unit-I Fundamental Concepts of Soil

1.1 Definition; Soil as a Component of Biosphere, Factors of Soil Formation

1.2 Physical and Chemical Properties of Soil with special reference to Texture, Structure, Organic Matter and pH

1.3 Development and Characteristics of Soil Profiles

Unit –II Regional Perspective and Management of Soil

2.1 Concept of Zonal, A-zonal and Intra-zonal Soil, Formation and Profile Characteristics of Podsol, Laterite and Chernozem

2.2 Scheme of Classification of World Soil: Russian, British and USDA

2.3 Soil Erosion: Causes, Processes and Mitigation; Conservation of Soil: Importance and Methods.

Unit III Fundamentals of Bio Geography and Ecosystem

3.1 Definitions and Scope of Biogeography, Meaning of Biosphere, Ecology, Ecosystem Environment, Ecotone, Communities, Habitats, Niche, Biotopes and Biomes.

3.2 Bio- Geochemical Cycle: Transfer of Material and Flow of Energy through Food Web and Food Chain; Ecosystem Model; Biosphere and Energy: Energy Sources, Laws of Energy Exchange, Food Chains and Flow of Energy

3.3. Biomes of the World: Tropical Rain forest and Temperate Grassland

Unit – IV Biosphere and Biodiversity

4.1 Concept of Biosphere; Forest Type: Phyto- Geographical Regions of the World; Factors Plant Ecology: Habitat Factors , Plants responses to Environment

4.2 Distribution of Animal in different Geological Periods ,Dispersal and Migration of Animals : Means and Barriers

4.3 Biodiversity: Controlling factors and Depletion; Need and Steps for the Conservation of Biodiversity, International Biological Programmers

Internal Assessment – 10 Marks

C.C. 2.3 Population and Settlement Geography
Total Marks - 50

UNIT- I Population Dynamics

1.1 Population growth in Developed & Developing Countries: Fertility, Mortality, Migration and Morbidity.

1.2 Concept of Sex Ratio (Primary, Secondary & Tertiary Sex Ratio) and Associated Problems in Developing Countries, Stationary & Stable Population

1.3 Population Quality: Literacy, Health & Occupation.

UNIT- II Theories of Population Growth & Migration

2.1 Theories of population growth: Malthusian, Marxist (Surplus Population) Neo-Malthusian, Dumont's Hypothesis, Demographic transition theory and Optimum population.

2.2 Theories of Migration: Lee, Raevenstein, Zelinsky, Lewis and Todaro

2.3 Review of population policies: India and China.

UNIT - III RURAL SETTLEMENT

3.1 Nature, Scope and Significance of Settlement Geography; Origin and Evolution of Rural Settlements – Spatio-Temporal Dimensions

3.2 Distribution of Rural Settlements with Special Reference to Size and Spacing; Functional Classification of Rural Settlements

3.3 Nature and Hierarchy of Rural Service Centers

UNIT- IV URBAN SETTLEMENT

4.1 Origin and Growth of Urban Centres; Processes of Urbanization; Factors Associated with Growth of Cities; Concept of Metropolis, Megalopolis, Ecumenopolis and Necropolis.

4.2 Economic Base Theory, Morphology of Towns: Classical and Non-Classical Models; Central Business District and Urban Fringe; Their Characteristics and Development.

4.3 Christaller’s Theory of settlement: Spacing and Hierarchy of Urban Settlements

Internal Assessment – 10 Marks

C.C 2.4-Climatology, Bio-Geography and Soil Geography (Practical)

Total Marks-50

Unit –I Representation and Analysis of Climatic Data

1.1 Preparation of Weather Map

1.2 Preparation of Synoptic Chart

1.3 Climograph and Hythergraph

1.4 Representation of Climatic Data

Unit – II Estimation Soil Components and Water Quality Analysis

2.1 Soil Sediment and Grain Analysis

2.2 Estimation of water pH and DO

2.3 Estimation of Transparency

2.4 Estimation of BOD

Unit – III Preparation of Biotic Map and Biodiversity Register, Land Use Map

3.1 Preparation of Biotic map

3.2 Preparation of Biodiversity registers

3.3 Crop combination (Doi and Rafiullah)

3.4 Analysis of Land use and Land cover map

Internal Assessment =10 Marks

Practical Note Book and Viva-Voce-10 Marks

C.C.2.5 Population and Settlement Geography (Practical)

Total Marks - 50

Unit 1: Population Growth and Characteristics

1.1 Population growth rate- linear, geometric and exponential

1.2 Population projection

1.3 Measures of Fertility and Mortality

1.4 Measures of Population Quality: Age- Sex Ratio, Age Sex Pyramid, Literacy Rate and Dependency ratio

Unit- II Spatial Pattern and Functions of Rural Settlements

2.1 Nearest Neighbor Analysis

2.2 Density functions and pattern analysis of distribution of settlement : Randomness and Spacing Indices

2.3 Rural Service Centers: Indices, Hierarchy, Classification and Ordering Christaller

2.4 Morphology of Rural Settlement

Unit III: Analysis of Urban Settlement

3.1 Rank Size Distribution of Towns: Zipf and Berry - Garrison

3.2 Population Density Gradient in Urban area, Breaking Point Analysis

3.3 Measures of Centrality- Losche

3.4 Classification of Towns: Functional Classification - Harris and Nelson , Census of India Classification

Internal Assessment =10 Marks

Practical Note Book and Viva Voice – 10 Marks

SYLLABUS

For

M.A. IIIrd SEMESTER IN GEOGRAPHY

(Choice Based Credit System (CBCS))

STRUCTURE OF SYLLABUS SEMESTER-III

Course	Credit	Marks	Content	Unit	Theoretical/ Practical
CC 3.1	3	50	Social and Cultural Geography	I-IV	Theoretical
CC 3.2	3	50	Region and Regional Planning	I-IV	Theoretical
CC3.3	3	50	Remote Sensing and GIS	I-III	Practical
CEC 3.1	4	50	Fluvial Geomorphology	I-IV	Theoretical
CEC 3.1	4	50	Environmental Geography	I-IV	Theoretical
CEC 3.1	4	50	Geography of Urban Development	I-IV	Theoretical
CEC 3.1	4	50	Population and Development Geography	I-IV	Theoretical
CEC 3.2	4	50	Fluvial Geomorphology	I-III	Practical
CEC 3.2	4	50	Environmental Geography	I-III	Practical
CEC 3.2	4	50	Geography of Urban Development	I-III	Practical
CEC 3.2	4	50	Population and Development Geography	I-III	Practical

CC3.1 Social and Cultural Geography
(Marks-50)

Unit –I: Concepts in Social Geography

1.1 Social Geography in the realm of Social Sciences, distinction among Social Geography, Sociology and Anthropology

1.2 Theories of Social Formation and Transformation: Functional Theory (T. Parsons) and Critical Theory (T. Adorno)

1.3 Concept of Welfare and Social Well Being; Social Pathology

Unit-II: Social Structure, Process and Behaviour

2.1. Social Systems: Elements and Types, Social Structure: Economic and Ethnic

2.2. Social Process and Social Interaction

2.3. Region as a Social Unit: City Region

Unit-III: Cultural Geography

3.1 Concept of Cultural Geography; Development of Cultural Geography.

3.2. Elements of Cultural: Food Habit, Language, Religion, Beliefs and Customs

3.3. Babbles of Language-World and India; Mosaic of Religion –World

Unit-IV: Cultural Dynamics

4.1. Role of Technology in the Evolution of Culture

4.2. Cultural Innovation and Diffusion, Theory of Cultural Diffusion.

4.3.Socio-Cultural Transformation: Factors and Outcomes, Cultural Globalization.

Internal Assessment-10 Marks

CC 3.2 Region and Regional Planning

Total Marks-50

UNIT –I: Concept & Theories

1.1 Concept and Type of Region, Concept of Regionalism; Regional Planning and Regional Hierarchy.

1.2 Approaches of Regional Planning -Social, Ecocentric and Technocentric.

1.3 Theories of regional development: F. Perroux, G. Myrdal, A.R. Hirschman & J.F riedman.

UNIT-II Region and Regionalization

2.1. Various bases of regionalization in India; Problems of identification and delineation.

2.2. Physiographic and Climatic Regions; Interrelations among Climate, Vegetation and Soil.

2.3. Agricultural, Industrial and Planning regions.

UNIT-III Regional Planning in India

3.1 Centralized and Decentralized Planning; Concept of Multi-level Planning- Macro, Meso and Micro.

3.2 Experience of Regional Planning in India: Inter-State Planning; Inter- State Schemes; Regional Policies in Indian Five Year Plans.

3.3 Regionalization of Planning for Different Regions- Metropolitan Region, Hill Areas, Tribal Area, Drought Prone Areas, Command Areas and Watershed Management.

UNIT -IV Regional Inequality and Disparity

4.1. Regional inequality and disparity in India.

4.2. Environmental issues in regional planning.

4.3. Changing Landuse and Problems of Rural Landuse Planning with special reference to West Bengal.

Internal Assessment-10 Marks

CC3.3 Remote Sensing and GIS (Practical)

Total Marks- 50

Unit I: Remote Sensing

1.1. Common Types of IRS and Landsat Sensors and their suitability for different types of analysis

1.2. Indian referencing scheme of IRS Sensors

1.3. Georeferencing using ortho-images and GPS/GNSS data

1.4. Image Classification using Supervised and Unsupervised methods

Unit II: Geographical Information System

2.1. Raster to Vector conversion

2.2. Generation of vector layers, buffers, vector overlay and spectral analysis

2.3. Attaching and editing attribute tables

2.4. Preparation of annotated thematic maps

Unit III: Global Navigation Satellite System

3.1 Principles of GNSS positioning

3.2 Collection and retrieval of GNSS data

3.3 Generation of measurements from GNSS data

3.4 Preparation of maps from GNSS data

Internal Assessment-10

Practical Note Book and Viva- Voce- 10 Marks

Special Paper (Theoretical)
CEC 3.1 Fluvial Geomorphology
Total Marks -50

UNIT 1-Fundamental of River Hydraulics

1.1 Forces active in a channel

1.2 Channel flow: Factors controlling and mechanism

1.3 Types of stream flow and their characteristics

Unit 2- Transportation of Sediment Load

2.1 Dissolved load, Wash load and Bed material load

2.2 The nature of fluid force and its relation to debris movement

2.3 Competency and capacity of a stream

Unit 3 – Channel Behaviour

3.1 Behaviour of tidal channels and their associated problems in South Bengal

3.2. Flood problems of West Bengal and their remedies with special reference to North Bengal and Central Bengal

3.3. Effect of embankment, dam, and irrigation canal urbanization in channel regime.

Unit 4- Drainage Basin as a Fundamental Geomorphic Unit

4.1. Quantitative analysis of drainage basin -merits, demerits and applicability.

4.2. Linear, Aerial and relief aspects of a basin.

4.3. Integrated River Basin Management.

Internal Assessment-10

Special Paper (Theoretical)

CEC 3.1 Environmental Geography

Total Marks-50

Unit-I-Concept

1.1 Environmental geography: Nature , scope, concept, content; perception of environment through the progress of civilization; geographers approach to environment.

1.2 Effects of environment on man- Bio-physical, behavioural and perception related to availability of resources

1.3 Effect of man on environment with changes in mode of production

Unit-II-Atmospheric Change and Biosphere

2.1 Climatic factor shaping the geographical, zoning and periodicity

2.2 Climate change of the world in recent time

2.3 Biomes and their relationship to climate and hydrological cycle

Unit-III-Environmental Degradation and Hazards

3.1. Perception and typology of environmental degradation, hazards and disasters.

3.2 Prediction, precaution and mitigation- Climatic hazards: Tropical cyclones, Marine/Tectonic hazard: Tsunami , Hydrological hazards: Flash floods in Himalayan Region and floods in southern part of West Bengal,

3.3. Social hazard with special reference to environmental refugee and problem of rehabilitation, social exclusion and marginalization

Unit-IV-Global Environmental Issues

4.1. Climate change and its impact on human health and biota

4.2. Global resource crisis and management with special reference to energy

4.3. Threat to biodiversity: causes and consequences

Internal assessment-10 Marks

Special Paper (Theoretical)
CEC 3.1- Geography of Urban Development

Total Marks-50

Unit –I: Evolution of Urban Regions

1.1 Emergence of urban geography as a discipline, phases of evolution

1.2 Origin of cities: Ancient, Medieval, Modern /industrial

1.3 Third World Urbanisation: characteristics, Impact of Globalisation

Unit-II: Urban Structure and its Transformation

2.1 Reorganisation of urban space: Changing physical land use

2.2 Restructuring of the urban economy: Secondary to tertiary.

2.3 Social justice, role of governance

Unit –III: Urban Contemporary Issues

3.1 Urban ecological crisis, concept of sustainable city

3.2 Metropolisation, Small Cities and Smart Cities

3.3 Creative Cities, Gated communities and Production of Space (Henri, Lefebvre

Unit-IV: Urban Government and Development

4.1 Concept of urban governance, good governance

4.2 Stakeholder in urban governance: elected, bureaucratic

4.3 Role of institution in governance

Internal assessment-10 Marks

Special Paper (Theoretical)
CEC 3.1 Geography of Population and Development
Total Marks - 50

Unit I: Population Characteristics in India

1.1 Population growth differential in Indian States/UTs and influences of Demographic processes (i.e., fertility, mortality and migration).

1.2 Changes in size and structure of population and its consequences: age and sex ratio, demographic dividend and momentum

1.3 Basic concepts and measures: Migration and urbanization; Trend and pattern of urbanization and internal migration in India

Unit II: Contemporary Issues in Population Geography

2.1 Problems of population growth: Social and Ecological impact.

2.2 Epidemiological transition: Changing disease pattern with special reference to India.

2.3 Ageing of population–Nature and magnitude of the problem both in Indian and global perspective; socioeconomic consequences of ageing.

Unit III: Geography of Development

3.1 Concept and definitions: Growth and Development; Sustainable development and issues.

3.2 Theories of development: W. Rostow, A. Frank and A. Sen.

3.3 Social wellbeing: Smith and Drewnowsky

Unit IV: Spatial Dimension of Deprivation in India and Developmental Programmes

4.1 Deprivation and inequality : Multidimensional poverty, development and gender gap.

4.2 Economic development and labour welfare in India.

4.3 Sustainable Development Goals.

Internal Assessment- 10 Marks

Special Paper (Practical)
CEC 3.2 Fluvial Geomorphology
Total Marks-50

Unit-I: Analysis of Channel Forms

1.1 Computation of Braiding Index, Sinuosity Index, Meander Wave length and Radius of curvature.

1.2 Computation of Long and Cross-Profiles of River together with the calculation of Cross- Sectional Area, Wetted perimeter, Hydraulic Radius and their comparison.

1.3 Measurement of velocity and Discharge with the help of (a) Float method and (b) Current metre.

1.4 Measurement Depth of a River Cross-section and drawing of Cross-Profile with the help of eco- sounder.

Unit-II: Geomorphic Mapping

2.1 Preparation of Geomorphic Maps from Field Data.

2.2 Preparation of Overlays from Topographical Map.

2.3 Geomorphological Mapping with the help of R.S. and GIS techniques.

2.4 Extraction of Relative height of geomorphic features from Aerial photo pairs.

Unit-III: Hazard Mapping

3.1 Floods: Inundation and risk zone

3.2 River Bank Erosion: Quantification and Vulnerability Zonation

3.3 Landslides: Zonation by BIS Method.

3.4 Transformation of wetland Quantification and Vulnerability Zonation

Internal Assessment- 10 Marks

Practical Note-Book and Viva-Voce-10 marks

SPECIAL PAPER (PRACTICAL)

CEC 3.2 ENVIRONMENTAL GEOGRAPHY

Total Marks-50

Unit-I Experiment and Measurement

1.1 Megascopic and microscopic identification of rocks and minerals

1.2 Measurement of soil pH(colorometric method), soil organic matter (wet combination method)

1.3 Estimation of turbidity

1.4 Measuring the slope of land by Dumpy/ Theodolite /Abney's Level(Any one)

Unit-II: Environmental Mapping and Analysis

2.1 Demarcation of drainage basin, stream ordering, Bifurcation ratio and Trend surface (slope)

2.2 Preparation of land use map and mouza level and analysis

2.3 Mapping and pollution zones and analysis

2.4 Breaking point analysis

Unit-III: Environmental Survey and Analysis of Data and Action

3.1 Preparation of questionnaire on environmental problems, perception through ethnographic surveys

3.2 Bivariate Analysis of environmental data; Regression and Correlation

3.3 Environmental impact analysis (Leopold matrix)

3.4 Mapping the change of detection of forest cover or Built up area and Buffer Analysis using R.S and GIS.

Internal Assessment- 10 Marks

Practical Note Book and Viva-Voce:10 Marks

Special Paper (Practical)

CEC 3.2 Geography of Urban Development
(Marks-50)

Unit-I: Quantitative Analysis of Urban Analysis

1.1 Urban growth differentials: Absolute growth, Decadal growth rate, Index of growth.

1.2 Correlation of associated variables, Residual mapping.

1.3 Mapping inequalities: Gini's coefficient.

1.4 Urban system of influence.

Unit-II: Application of R.S & GIS

2.1 Landuse -landcover mapping of an urban area.

2.2 Detection of change in LULC.

2.3 Mapping urban expansion.

2.4 Creation of Buffer zones.

Unit-III: Qualitative Method in Urban Research

3.1 Content Analysis (policy/planning document).

3.2 Ethnographic study of urban issues.

3.3 Participant observation, interviews and FGD'S

3.4 Using Above two Methods to Area 'Everyday urban life'

[For Unit III, Topic 3.2, 3.3, 3.4 a specific theme may be selected- Festivals, Trade &Commerce, Environmental Issues]

Internal Assessment- 10 Marks

Practical Note Book &Viva-Voce-10

Special Paper
CEC 3.2 Geography of Population and Development (Practical)
Total Marks - 50

Unit I: Basic Techniques of Population and Development

1.1 Life Table

1.1 Indexes of age preference or heaping: Whipple's Index and Myers' Blended Index.

1.2 Indices to development: HDI, Poverty Index, GDI.

1.3 Inequality indices: Ratio method, Sopher's Index, Gini Index, Theil's index.

Unit II: Demographic Data Sources and Application of Statistical package (SPSS/STATA) and GIS in Population Study

2.1 Basic sources of demographic data, processes of collection, compilation and representation: Census/ SRS/ NFHS/ DLHS/ NSS.

2.2 Explore the demographic data with statistical packages (SPSS/STATA): NFHS/ DLHS/ NSS.

2.3 Use of GIS to represent the geographic distribution and pattern of demographic aspects: Child Sex Ratio, Infant Mortality, Urbanization

2.4 Use of GIS to represent the geographic distribution and pattern of development aspects- Indices of development and inequality.

Unit-III: Field Techniques in Population and Development Research

3.1 Preparation of a synopsis and questionnaire on population and development issues.

3.2 Ethnographic study of population and development issue.

3.3 Participant observation, interview and FGD's

3.4 Analysis of primary data

Internal Assessment- 10 Marks

Practical Note Book and Viva-Voce=10

SYLLABUS

For

M.A.
IVth SEMESTER IN GEOGRAPHY

Choice Based Credit System (CBCS)

STRUCTURE OF SYLLABUS SEMESTER-IV

Course	Credit	Marks	Content	Unit	Theoretical/ Practical
CC 4.1	3	50	Resource and Regional Economic Development	I-IV	Theoretical
CEC 4.1	4	50	Fluvial Geomorphology	I-IV	Theoretical
CEC 4.1	4	50	Environmental Geography	I-IV	Theoretical
CEC 4.1	4	50	Geography of Urban Development	I-IV	Theoretical
CEC 4.1	4	50	Population and Development Geography	I-IV	Theoretical
CEC 4.2 A	2	25	A) Fluvial Geomorphology B) Environmental Geography C) Geography of Urban Development D) Geography of Population and Development		Field Report (Practical)
CEC 4.2 B	2	25	A) Fluvial Geomorphology B) Environmental Geography C) Geography of Urban Development D) Geography of Population and Development		Dissertation (Practical)
OEC 4.1	3	50	Hazard and Disaster Management	I-IV	Theoretical
OEC 4.2	3	50	Contemporary Issues in Human Geography	I-IV	Theoretical

CC 4.1 Resource and Regional Economic Development
Full Marks- 50

Unit 1: Concept of Resource and Economies

1.1 Concept of Resource and its Classification according to bio-genesis, renewability, availability and distribution.
1.2 Conservation and Management of Land- Water Bio-Resource, Human Resource
1.3 Energy Resource: Renewable and Non-Renewable; Conservation and Sustainability

Unit 2: Agriculture

2.1 Agricultural Region: Concept, Techniques and Delineation.
2.2 Role of Technological Change in Agricultural Productivity and Efficiency: Green and White Revolution and Regional Disparities in Agricultural Growth
2.3 World Agricultural System: Model of Von Thunen and Whittlesey.

Unit 3: Industry

3.1 Classification of Industries; Theories of Industrial Location: Weber and Losche
3.2 Regional Imbalance in Industrial Development in the Post-Independence Era.
3.3 Industrial Policy: Role of Liberalization, Privatization and Globalization

Unit 4: Levels of Industrial Development in India

4.1 Regional Analysis of Natural Resource Base of Indian Economy
4.2 Regional Economic Growth in the Post-Independence Period: Disparities and Trends of Per Capita Income, employment pattern and infrastructure facilities
4.3 Process of Urbanization and Regional Development: The Role of Cities in Development Process, Rural- Urban Linkages

Internal Assessment : 10 Marks

SPECIAL PAPER (THEORETICAL)
CEC 4.1 Fluvial Geomorphology
(Total Marks- 50)

Unit 1: Morphometrical Properties of River Basin

1.1 Models of channel initiation, evaluation of drainage pattern, limits of drainage development
1.2 Causes of concavity of channel, equilibrium profile and concept of grade
1.3 Properties, form and processes of drainage basin as a fundamental geomorphic unit

UNIT 2: Hydrological Characteristics of River Basin

2.1 Channel patterns: Causes of development and morphological properties of straight, meandering and braided channels

2.2 Sediment load: Processes of entrainment and transport, types of load

2.3 Channel flow: Types, factors, energy principle in open channel flow

UNIT 3: River Basin Management Issues

3.1 Watershed Management Programmes - its importance, policies and techniques with special reference to India

3.2 Flood Management strategies – impact on the flood plain morphology with special reference to South Bengal

3.3 River bank erosion abatement strategies – effect on geo-hydrological character of the rivers with special reference to river Ganga and rivers of South Bengal

UNIT 4: Anthropogenic Interferences and Emerging Issues

4.1 Geomorphosite and Geotourism based on fluvial morphology

4.2 Decommissioning of Big dams to revive the river regime

4.3 Proposed River link programmes of India and its consequences

Internal Assessment -10 Marks

SPECIAL PAPER (THEORETICAL)
CEC 4.1 Environmental Geography
(Total Marks- 50)

UNIT 1: Human and Environment

1.1 Production technology and environmental change: From hunting gathering society to information age

1.2 Sustainable development: Concept and Models- Techno-centrism and Eco-centrism

1.3 Approaches to environmental studies: Reductionalist, Holistic, Organismic

2 UNIT 2: Environmental Degradation

2.1 Impact of Urbanization And Industrialization: Air pollution, Water Pollution, Land Pollution, Noise Pollution and Solid Waste Generation

2.2 Non-Degradable Waste: E-waste and other Non- Degradable Products

2.3 Urban Heat Island- Causes, Seasonal Behavior And Impacts

UNIT 3: Development and Environment

3.1 Economic development vs. environmental conservation: Concept of Spaceship-Earth

3.2 Use and misuse of forest resource and forest conservation ; Tourism industry and environment - issues and challenges

3.3 Environment and Development: Case study from river valley project- Silent valley and Narmada dispute with special reference to environmental movements

UNIT 4: Environmental Policy and Management

4.1 Politics of resource and development with reference to climate change, Earth summits and Protocols-Montreal and Kyoto

4.2 Environmental Impact Assessment, Environmental Audit and Environment Plan

4.3 Millennium Development Goals (MDG) and Sustainable Development Goals (SDG)

Internal Assessment -10 Marks

SPECIAL PAPER (THEORETICAL)
CEC 4.1 Geography of Urban Development
Full Marks- 50

Unit-1: Role of Cities: characteristics and processes

1.1 Economic base theory; basic and non-basic functions, forces of urbanization

1.2 Primate City, Metropolis and Megalopolis, Conurbation : Nature, Characteristics and Major issues

1.3 Process and Pattern of Urbanization, the Concept of Urbanism

Unit 2: The Urban Region

2.1 City region, core-periphery interactions

2.2 Characteristics of the Peri-urban region, its problems and prospects

2.3 Changing character of land cover – land use from core to periphery

Unit 3: Urban Transformation

3.1 Gentrification and Urban Renewal

3.2 Cities as Centres of Accumulation of Capital, Neoliberal Cities, Concept of the Revanchist City

3.3 Transformation of the Social Environment: Recreation and Leisure, Crime, Social hazards

Unit 4: Indian Urbanization

4.1 Urbanization in India: an overview (spatial and temporal)

4.2 Major issues and challenges of urbanization in India

4.3 Evolution of Urban Local Governance in India

Internal Assessment : 10 Marks

SPECIAL PAPER (THEORETICAL)

CEC 4.1Geography of Population and Development

Full Marks- 50

Unit-1: Human Health, Wellbeing and Social Environment

1.1 Concept and factors affecting human health & wellbeing

1.2 Gender Inequality and Health

1.3 Climate Change and Health

Unit 2: Population and Food Security

2.1 Food and Fertility Nexus- Theories of Castro, Spencer and Doubleday

2.2 Dimension of Food Security: Food Availability, Affordability and Accessibility, Malnutrition and its measures

2.3 Famine and Hunger: Causes and consequences, Amartya Sen's view on famine and Hunger

Unit 3:Population, Environment and Development Linkages

3.1 Development and ecological crisis: A theoretical introduction: Malthus, Neo-Marxist, Limits to Growth.

3.2 Environmental Kuznets Curve: Trade-off between Economic growth and environmental degradation

3.3 Environment and development debate- developed and developing world perspective, issues and trends

Unit 4: Spatial Dimension of Deprivation and Under Development

4.1 Economic deprivation and Poverty: Measures of spatial variation of poverty in India- Causes and Consequences

4.2 Social Deprivation: Education, Health, Gender Bias and Differential Participation in Economic Development in India; Causes and Consequences

4.3 Migration and Economic Development in India; Diaspora, Transnational and Economic Development

Internal Assessment -10 Marks

OEC 4.1 Hazard and Disaster Management
Full Marks- 50

Unit-1: Human Health, Wellbeing and Social Environment

1.1 Concept of Hazard and Disaster
1.2 Classification of Hazard
1.3 Key Terminologies and Ideas: Risk, Vulnerability, Assessment of Risk and Vulnerability, Disaster Management

Unit II: Natural Hazard, Disaster and Management

2.1 Tectonic Hazards: Earthquake- Impact mitigation and livelihood adaptation
2.2 Hydrological Hazards: Flood- Impact mitigation and livelihood adaptation
2.3 Climatic Hazards: Cyclone- Impact mitigation and livelihood adaptation

Unit-III Human Induced Hazards

3.1 Impacts and mitigation measures of Nuclear hazard and Radio-active contamination; CFC and Plastic hazard; Lead, Arsenic and Fluoride contaminations
3.2 Soil Erosion: Causes, Consequences and Management
3.3 Poverty: Causes, Consequences and Eradication

Unit-IV :Hazard and Disaster Management

4.1 Approaches to the Management of Hazard and Disaster; Pre-Event, During Event and Post Event Management
4.2 Hazard Preparedness
4.3 Government initiative for Hazard and Disaster Management, Role of International Agencies.

Internal Assessment-10 Marks

OEC 4.2 Contemporary Issues in Human Geography

Full Marks- 50

Unit I: Human Geography: Dimensions and New Trend

1.1 Human geographic tradition in Geography and its recent changes

1.2 Dimensions of Human Geography: Economic, Social and Political

1.3 Structuralist and Post- Structuralist approaches in Human Geography.

Unit II: Contemporary Economic Issues

2.1 New Economy and New World Order

2.2 Impact of GATT and WTO on Developing Countries with Special Reference to India

2.3 Green Development- Green Technology; Green Economy

Unit-III: Contemporary Social Issues

3.1 Cultural globalization through Cyber Culture

3.2 Tribal cultural change in India through invasion of modernity

3.3 Urban growth and Urban water crisis with special reference to India

Unit-IV: Contemporary Political Issues

4.1 Transnational Migration: Causes and Consequences.

4.2 National and Trans-National Conflict of Sharing of River Water with Special Reference to Kauvery and Ganga Rivers.

4.3 Indian Ocean and its Political Perspective with Special Reference to South East Asia.

Internal Assessment-10 Marks

SEMESTER 1

CC 1.1 GEOTECTONICS AND GEOMORPHOLOGY

References:

Beloussov, V. (2011). *Geotectonics.* Berlin, Germany: Springer.

Garg, S. (2017). *Geotectonics and Geomorphology* (1st ed.). New Delhi, Inida: Random Publications.

Kale, V. S., & Gupta, A. (2001). *Introduction to Geomorphology.* Orient Longman.

Park, G. (2011). *Introducing Tectonics, Rock Structures and Mountain Belts.* Edinburgh, Scotland: Dunedin Academic Press.

Selby, M. J. (1985). *Earth's Changing Surface.* Oxford: Oxford University Press.

Sharma, H. (1989). *Tropical Geomorphology- A Morphogenetic Study of Rajasthan.* New Delhi, India: Concept Publishing Company.

Summerfield, M. A. (Ed.). (2011). *Geomorphology and Global Tectonics.* New Delhi, India: Wiley India Pvt Ltd.

Summerfield, M. A. (1991). *Global Geomorphology* (1st ed.). New Jersey, USA: Prentice Hall.

Thornbury, W. D. (2002). *Principles of Geomorphology* (2nd ed.). New Delhi, India: CBS Publishers.

Wooldridge, S. W., & Morgan, R. S. (1988). *An Outline of Geomorphology.* Orient Longman.

CC 1.2 HYDROLOGY AND OCEANOGRAPHY

Keith todd, D. (1950) *Ground Water Hydrology*, John Wiley and Sons.

Rao, K.L. (1975) *India's Water Wealth*, Orient Longman.

Ramana, M.V.V. (1992) *Interstate River Water Disputes In India*, Orient Longman.

DeWalle, D.R. & Rango, A. (2008) *Principles Of Snow Hydrology,* Cambridge University, Press.

Rakhecha, P.R. & Vijay (2009*) Applied Hydrometeorology*, Capital.

Gupta, K.R. (2008) *Water Crisis In India,* Atlantic.

Knighton, D. (1998) *Fluvial Forms And Processes A New Perspective, Hodder education.*

Singh, Savindra. (2008) *Oceanography*, Prayag Pustak Bhawan.

Trujillo, A.P.& Thurman H.V. (2011*) Essentials Of Oceanography*, P H I Learning Pvt.Ltd .

Todd, D.K. & Mays L.W. (2005) *Ground Water Hydrology*, Wiley India Pvt.Ltd.

Ward, R.C. & Robinson, K.M.(2000*) Priciples Of Hydrology*, TATA McGRAW-Hill.

Davie, T. (2002) *Fundamentals Of Hydrology*, Routledge.

CC 1.3 PHILOSOPHY OF GEOGRAPHY

Hartshorne, R. The Nature of Geography.

Taylor,G.(ed.) (1951) : Geography in the Twentieth century, New York.

Wooldridge, S.W. (1956) : The Geographers as Scientists, London.

Wooldridge, S.W. & East, W.G. : The Spirit and Purpose of Geography, London

Stoddart, R. : Geography, Ideology & Social Man.

Gregory, D (1978) : Ideology, Science & Human Geography, London.

Dickinson, R.E. : The Makers of Modern Geography, London.

Johnston, R.J. (1991) : Geography & Geographers, London.

James, P.E. & Jones, C.F.(1954) : American Geography: Inventory & Prospect.

Stoddart, D.R. 1986 : On Geography and its History, Basil Blackwell, Oxford: 236p.

Adhikary, S.(1999) : Fundamentals of Geographical Thought, Chaitanya Publishing House,

Allahabad. Dikshit, R.D.(1997) : Geographical Thought, a Contextual History of Ideas, New Delhi, Prentice Hall.

CC 1.5 QUANTITATIVE TECHNIQUES

Kendall, M.G.(1945) : *The Advanced Theory of Statistics*, Charles Griffin & Co., London.

Cochram, W.G. (1953) : *Samling Techniques,* Asia Publishing House, New Delhi.

Hammond, R. and Macullagh, P.S. (1974) : *Quantitative Methods in Geography*, Clarendon Press, Oxford.

Mehmood, Aslam (1977) : *Statistical Methods in Geographical Studies*, Rajesh Publication, New Delhi.

Silk, J. 1979 : *Statistical techniques in Geography*, George Allen and Unwin, London: 276p:

Alvi, Z. 1995 : *Statistical Geography: Methods and Applications*, Rawat Pub. New Delhi: 194p.

Pal, S.K. 1999 : *Statistics for Geoscientists,* Concept publishing Company, New Delhi: 423p.

Walford, P.,1995: *Geographical Data Analysis*, John Wiley and Sons Inc., New York: 446p.

SEMESTER-II

CC 2.1 CLIMATOLOGY

Barry R.G., & Charley R.J.(1970) : *Atmosphere, Weather & Climate,* Methuen.

Critchfield H : *General Climatology* (1979) : Prentice Hall of India, New Delhi
Crowe P.R.: *Concepts in Climatology.*

Petterson, S. : *Introduction to Meteorology*.

Trewartha G.T.91968) : *An introduction to climate*, (4th ed.) McGraw Hill, N.Y.

Peterson J.(1969) : *Introduction to Meteorology*, McGraw Hill, N.Y.

CC 2.2 SOIL AND BIOGEOGRAPHY

Biogeography : A Study of Plant in the Ecosphere, J Tivy(1971), Oliver & Boyd.

Introduction to Biogeography : B. seddon(1971), Duckworth, London.

Principles of Biogeography : Watts D (1971), McGraw Hill, London.

Soil Geography : J.G.Cruickshank(1972), David & Charles, Newton Abbor.

Soil : G.V. Jacks(1963), Nelson, London.

Ecology : E P Odum (1966), Holt Reinhart & Winston, New York.

Pleistocene Geology & Biology : R G West(1968), Longmans, London.

CC 2.3 POPULATION AND SETTLEMENT GEOGRAPHY

J. I. Clarke (1973) : *Population Geography*, Pergamon Press, Oxford.

J. Beaujeu Garnier (1966) : *Geography of population*, Longman, London.

F. S.Hudson (1970) : *Geography of Settlements*, Machoneld & Evans Ltd.

A. Mittra : *Report on House types and village settlement patterns in India*.

Hopkinson. D (1983): *Geography of settlement*, Oliver & Boyd

Ghosh, S, Settlement Geography, Orient Longman

SEMESTER III

CC 3.1 SOCIAL & CULTURAL GEOGRAPHY

Smith D M(1977) : Human Geography : A welfare approach, Edward Arnold, London.

Robinson H (1976) : Human Geography, Mac Donald & Evans, London.

Tuan Yi-Fu (1976) : Humanistic Geography, Annals of Association of American Geographers, vol.66.

Morgan L H, : Ancient Society(1877), Mac Millan & Co. London

Ley D & Samuels M (ed.)(1978) : Humanistic Geography : prospects and problems, Croom Helm, Chicago.

CC 3.2 REGION AND REGIONAL PLANNING ISSUES

Bhargava, G. 2001. Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective, Gyan Publishing House.

Chand, M., Puri, V.K. 2000. Regional Planning In India, Allied Publishers Ltd.

Chandana, R.C. 2016. Regional Planning and Development, 6th ed, Kalyani Publishers. Glasson, J. 2017. Contemporary Issues in Regional Planning, Routledge.

Gore, C. 2011. Regions in Question: Space, Development Theory, and Regional Policy, Routledge. Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009.

The Dictionary of Human Geography, 5th ed, Wiley. Hall, P., Tewdwr-Jones, M. 2010. Urban and Regional Planning, Routledge. Higgins, B., Savoie, D.J. 2017. Regional Development: Theories and Their Application, Routledge. Kulshetra, S.K. 2012.

Urban and Regional Planning in India: A Handbook for Professional Practioners, Sage Publication. Kulshetra, S.K. 2012.

Urban and Regional Planning in India: A Handbook for Professional Practioners, Sage Publication. Kumar,

A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.

Kumar, A., Meshram, D.S., Gowda, K. (Eds) 2016. Urban and Regional Planning Education: Learning for India, Springer.

Misra, R.P. 1992. Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept Publishing.

Ray, J. 2001. Introduction to Development & Regional Planning, Orient Blackswan. Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.

Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.

Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.

Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998.

Economic Geography, 3rd ed, Wiley. Willington D. E., 2008: Economic Geography, Husband Press. Wood,

A., Roberts, A. 2010. Economic Geography: Places, Networks and Flows, Routledge.

Govt. of India : The Gazetteer of India.

Mitra A : Levels of Regionals Development of India, Census of India, vol.I part IA.

G Sdasyuk & P Sengupta : Economic Rationalization of India, Census of India Publication.

Spate & Learmonth : India & Pakistan, Land, People & Economy.

Kundu & Moonis Raza : Indian Economy : The Regional Dimension.

R. P. Mishra and others : Regional Development Planning in India – A Strategy.

M.S.A. Rao : Urbanisation : Social Change.

David Sopher : An Exploration of India.

Ghurya, R. S. : Caste and Class in India.

Arther Geddes : Man & Land in South Asia.

K. S. Singh : Tribal Situation in India.

CC 3.3 REMOTE SENSING GIS PRATICAL

Lillesand T.M. and Kiefer R.W.(1979) : Remote Sensing and Image Interpretation, John Wiley & Sons., N. Y.

Reddy, A. : Geoinformatics.

Hallert, B. (1960) : Photogramnetry, McGrawHill Book Company, London.

Sabins, F.F., 1997 : Remote Sensing: Principles and Applications, 3rd edition, W.H. Freeman & Company, New York: 494p.

Campbell, J .B. 1996 : Introduction to Remote Sensing, 2nd edition, Taylor & Francis, London: 622p.

RoBinson, A.H., Sale, R.D., Morrison, J. 1984 : Elements of Cartography, Wiley, New York:

CEC 3.1 FLUVIAL GEOMORPHOLOGY

Dury, G.H., 1967, Essays in Geomorphology, Heinemann Educational Books Ltd, London

Gregory. K.J (Eds.) 1977.River Channel Changes, John Willy and Publications.

Knighton, D. 1998 : Fluvial Processes : A New Perspective, Arnold, London

Leopold, L.B.., et al, 1964, Fluvial Processes in Geomorphology, Eurasia Publishing House, New Delhi

Morisawa, M. 1985. Rivers, Longman, London

Murthy, K.S. 1998. Watershed Management in India, 3rd edition, Wiely Eastern Ltd./ NEW AGE INTERNATIONAL Ltd., New Delhi .

Petts, G. and Foster, I. 1985. Rivers and Landscapes, Edward Arnold, London

Petts, G.E. and Amoros, C. (editors) 1996. Fluvial Hydro systems, Champman and Hall, London

CEC 3.1 ENVIRONMENTAL GEOGRAPHY

Bennet R.J. and Chorley R.J. : *Environmental Systems.*

Budyko M.I. (1980) : *Global Ecology*, Progress Publishers, Moscow.

Koromondy E.J. (1989) : *Concepts of Ecology*, Prentice Hall of India Ltd., N.Y.
New Delhi.

Kolbasov Oleg : *Ecology.*

Stranhler A.M. and Strahler A.N. (1979) : *Geography and Man's Environment*, John Wiley.

E.P. Odum (1971) : *Fundamentals of Ecology* (Philadelphia, Sanders).

Mac. Arthur : *Geographical Ecology.*

Smith Wood T.R.E. : *Ecological Methods*

Van Dyne : *The Ecosystem Concept in Natural Resource Management.*

Stoddard D.E. : *Geography and the Ecological Approach (1965)*, Geography, vol.50.

Dale M.B. : *Systems Analysis in Ecology.*

Mcintosh R.P. : *The Background of Ecology : Concept and Theory.*

Michael : *Evolution and Revolution.*

Goddard : *Man and Earth.*

CEC 3.1 GEOGRAPHY OF URBAN DEVELOPMENT

Carbs H. 1981 : *The study of urban Geography.*

Harvey D. 1973 : *Social justice and the city*, Edward Arnold, London.

Kukhinski A.R. ed. 1972 : *Growth poles and Growth centers in Regional Planning*

Mouton, Paris, The Hague.

Hall Peter, 1974 : *Urban and Regional Planning*, Penguin.

Hall Tim (2012) Urban Geography, Routledge, Oxon

CEC 3.1 POPULATION AND DEVELOPMENT GEOGRAPHY

Bhende, Asha A. and Tara Kanitkar. 1994. Principles of Population Studies, Sixth Edition. Mumbai: Himalaya Publishing House. Chandna, R.C. 2016. Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.

Barrow, C. J. (1995). Sustainable development: Concept, value and practice. *Third World Planning Review*, *17*(4), 369.

Du Pisani, J. A. (2006). Sustainable development – historical roots of the concept. *Environmental Sciences*, *3*(2), 83–96.

Frank, A. G. (1966). The Development of Underdevelopment. *Monthly Review*, *18*(4), 17–31.

Mitcham, C. (1995). The concept of sustainable development: Its origins and ambivalence. *Technology in Society*, *17*(3), 311–326.

Rostow, W. W. (1959). The Stages of Economic Growth. *The Economic History Review*, *12*(1), 1–16. JSTOR.

Sen, A. (1988). The Concept of Development. In H. Chenery & T. N. Srinivasan (Eds.), *Handbook of Development Economics*. North Holland.

Sen, A. (2003). Development as Capability Expansion. In S. Fukuda-Parr & et al (Eds.), *Readings in Human Development*. Oxford University Press.

Shearer, R. A. (1961). The Concept of Economic Growth. *Kyklos*, *14*(4), 497–532. Willis, K. D., & Kumar, M. S. (2009). Development I. In R. Kitchin & N. Thrift (Eds.), *International Encyclopedia of Human Geography* (pp. 111–116). Elsevier.

Fouberg, E.H., Murphy, A.B., de Blij H.J. 2015. Human Geography: People, Place, and Culture, 11th ed, Wiley.

Ghosh, S. 1998. Introduction to Settlement Geography, Sangam Books Ltd.

Gore Charles (1984), Regions in Question, Methuen and Co.

Gould, W.T.S. 2015. Population and Development, Routledge.

Gregory, D., Johnston, R., Pratt, G., Watts, M., Whatmore, S. (Eds) 2009. The Dictionary of Human Geography, 5th ed, Wiley.

Knox, P.L., Marston, S.A. 2014. Human Geography: Places and Regions in Global Context, 6th ed, Pearson Education Limited.

Knox, P.L., McCarthy, L.M. 2011. Urbanization: An Introduction to Urban Geography, 3rd ed, Pearson Educztuion Ltd.

Mandal, R.B. 2001. Introduction to Rural Settlement, 2nd ed, Concept Publishing Company.

Majumdar, P.K. 2013. India's Demography: Changing Demographic Scenario in India, Rawat Publications.

Moseley, W.G., Perramond, E., Hapke, H.M., Laris, P. 2013. An Introduction to Human-Environment Geography: Local Dynamics and Global Processes, Wiley-Blackwell.

Norton, W. 2014. Human Geography, 8th ed, Oxford University Press.

Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.

Ray Chaudhuri ,J. (2009)An Introduction to Development and Regional Planning, Sangam Books

Rubenstein, J.M. 2016. The Cultural Landscape: An Introduction to Human Geography, 12th ed, Pearson Education Limited.

Short, R.J. 2017. Human Geography: A Short Introduction, 2nd ed, Oxford University Press.

Asha A. Bhende & Tara Kanitkar, Principles *of Population Studies*. Himalaya Publising House.

Mahendra K Premi, *India's Changing Population Profile*-; National Book Trust , India

Irudaya Rajan, S., Balagopal, Gayathri (Eds.) Elderly Care in India: Societal and State Responses, Springer

S. Irudaya Rajan (Eds.) Social Security for the Elderly: Experiences from South Asia, Routledge

Debraj Ray (Ed) ; Development Economics Oxford University Press.

Hollis Chenery & T. N. Srinivasan (Eds) Handbook of Development Economics- ; Elsevier Science Publishers.

Knox, P. L. (1975): Social Wellbeing- A Spatial Perspective, Oxford University Press, London

Peet, R. (2005): Theories of Development, Rawat Publications, Jaipur

Desai, V. and Potter, B. R. (Eds.) (2011): The Companion to Development Studies, A Hodder-Viva Edition, London

Goudie, A. S. (2013): The Human Impact on the Natural Environment, Wiley- Blackwell, Oxford

CEC 3.2 Geography o Population and Development (Practical)

Pathak, K. B. and Ram, F. (2013): Techniques of Demographic Analysis, Himalaya Publishing House, Mumbai

K. Srinivasan, *Basic Demographic Techniques and Applications*, Sage Publication, New Delhi

Samuel H. Preston, Patrick Heuveline & Michel Guillot; *Demography: Measuring and Modelling Population Processes*- Blackwell publisher.

Henry S. Shryock, Jacob S. Siegel & Accociates; *The Methods and Materials of Demography*- Vol 1 & Vol 2; Bureau of the Census, U.S. Department of Commerce.

Manuals (online):

Training Manual on Demographic Techniques- by K. Srinivasan; UNFPA & Census of India.

Method of Measuring Internal Migration. Population Studies, No. 47, Department of Economics and Social Affiar, United Nations.

FOURTH SEMESTER

CC 4.1 RESOURCE AND REGIONAL ECONOMIC DEVELOPMENT

Aoyama, Y., Murphy, J.T., Hanson, S. 2010. Key Concepts in Economic Geography, Sage.

Bhat L.S. 1973 : *Regional Planning in India.*

Chand M Puri, V. K. 1988 : *Regional Planning in India.*

Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.

Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.

Durhamand Hill Horst, 1971 : *Issues in Regional Planning*, Rotterdam University.

Economic Geography: Places, Networks and Flows, Routledge.

Glasson Joh, 1985 : *An Introduction to Regional Planning*.

Mitra Ashok : *Levels of Regional Development in India*, Census of India, 1971

Misra R.P. 1969 *: Regional Planning, Concept, Techniques, Policies*, The University of Mysore Press, Mysore.

Misra R.P. Sundaran and Rao, 1974 : *Regional Planning in India*, Viking, Delhi.

Wheeler, J.O., Muller, P.O., Thrall, G.I., Fik, T.J. 1998. Economic Geography, 3rd ed, Wiley.

Willington D. E., 2008: Economic Geography, Husband Press. Wood, A., Roberts, A. 2010.

WEBSITES: BRICS: www.brics2017.org/English & www.brics2016.gov.in World Trade Organisation: www.wto.org

CEC 4.1 FLUVIAL GEOMORPHOLOGY

Bagchi. K. 1944. The Gangas Delta, University of Calcutta.

Baker, V.,Craig-Kochel, R.and Patton, P.C. (1988); Flood Geomorphology,Wiley, Chichester.

Bandyopadhyay, S.(1988): Drainage evolution in a badland terrain at Gangani Medinipur district ,West Bengal, Geographical Review Of India, 50(3);10-20

Bandyopadhyay, S. (1997); Natural environmental hazards and their management : a case study of Sagar Island, India, Singapore Journal of Tropical Geography , 18(1) : 20-45

Basu , S.R. (2004); Man and Environment ,ACB publishers , Kolkata .

Brid Faniran, A and Jeje , L.K. 1983. Humid Tropical Geomorphology , Longman , London

Brooks , K.N Ffolliott ,P.F.Gregersen , H.M. and DeBano ,F.B. (2003) : Hydrology and the Management of Watersheds , 3 rd edition , Wiley-Blackwell, Chichester.

Brown , A.G. (1997) : Alluvial Geoarchaeology : Floodplain Archaelogy and Environment change , Cambridge University Press, Cambridge.

Charlton. R. 2007 Fundamentals of Fluvial Geomorphology, Routledge press, New York

Chorley, R., Schumm, S. and Sugden, D.E. 1994 Geomorphology, Methuen, London

Chow, V.T., Maidment, D.R. and Mays, L.W. 1988 Applied Hydrology, Mcgraw- Hill new, York

Cook and Doorncamp. 1988. Geomorphology in Environment Management, London

Das, K . and Bandyopadhyay, S. (1996) : Badland development in a lateritic terrain at Santiniketan , West Bengal. National Geographer, 31 (1&2) : 87-103

Dplains, Blackwell, London

Gregersen , H ., Ffolliot , P. and Brookes, K. (2008) : Intregrated Watershed Management : Connecting people to their Land and Water , Cabi Publishing , Nosworthy Way (UK)

Mitchell, C.W 1991. Terrain Evaluation, 2nd edition, Longman Scientific & Technical, Harlow

Morisawa , M. (editor) (1994) : Geomorphology and Natural hazards , Elsevier , Amsterdam.

Paul , A.K. (2002) : Coastal Geomorphology and Environment : Sundarban Coastal Plain , Kanthi Coastal Plain , Subarnarekha Delta Plian, ACB Publishers , Kolkata.

Randhir,T.O. (2006) :Watershed Management Issues and Approaches, IWA Publishing London

Rudra, K. (2006) : Shifting of the Ganga and Land Erosion in West Bengal : A Socio Ecological Viewpoint ,Indian Institute of Management , Kolkata.

Starkel, L. and Basu, S. (2000) : Rains Landslides and Floods in the Darjeeling Himalaya, Indian

National Science Academy , New Delhi

Wilson, J.P. and Gallant J.C. (editors) (2000) : Terrain Analysis Principles and Applications, John Wiley and Sons LTD New York

CEC 4.1 ENVIRONMENTAL GEOGRAPHY

Bennet R.J. and Chorley R.J. : Environmental Systems.

Budyko M.I. (1980) : Global Ecology, Progress Publishers, Moscow.

E.P. Odum (1971) : Fundamentals of Ecology (Philadelphia, Sauders).

Koromondy E.J. (1989) : Concepts of Ecology, Prentice Hall of India Ltd., N.Y. New Delhi.

Kolbasov Oleg : Ecology.

Mac. Arthur : Geographical Ecology.

Morgan, R.P.C. 1995 : Soil Erosion and Conservation, 2nd edition, Longman, London: 198p.

Smith Wood T.R.E. : Ecological Methods.

Stranhler A.M. and Strahler A.N. (1979) : Geography and Man's Environment, John Wiley.

CEC 4.1 GEOGRAPHY OF URBAN DEVELOPMENT

Alex Marshall (2001) How Cities Work : Suburbs, Sprawl, and the Roads Not Taken, University of Austin Press, Texas

Annapurna Shaw (2012) Indian Cities: Oxford India Short Introductions (Oxford India Short Introductions Series)

Hall Peter, 1974 : *Urban and Regional Planning*, Penguin.

Hall Tim (2012) Urban Geography, Routledge, Oxon

Harvey D. 1973 : Social justice and the city, Edward Arnold, London.

John J Macionis Vinecnt N. Parilo (2010) Cities and Urban Life , PHI

Knox Paul and Stephen Pinch (2010) Urban Social Geography: An Introduction, Pearson

LN Verma (2011) Urban Geography, Rawat,

Michael Pacione (2009) Urban Geography: A Global Perspective, 3rd Ed Routledge

Potter and Evans (2014) Cities in Developing World, Routledge

Ramachandran R (1989)Urbanisation and Urban Systems in India, Oxford

CEC 4.1 Geography o Population and Development

Anthony C. Gatrell, Susan J. Elliott, Geographies **of Health: An Introduction**, Wiley Blackwell.

Brown, T., McLafferty, S., Moon, G. (2010): **A Companion to Health and Medical Geography**, Wiley Blackwell, UK

Curtis, S. (2004): **Health and Inequality: Geographical Perspectives,** Sage Publications, London

K. Park (2015), Park's Textbook of preventive and social medicine, Bhanot Publishers,Jabalpur.

Peter Anthamatten, Helen Hazen, **An Introduction to the Geography of Health**, Routledge