

SYLLABUS
FOR
M.A. / M. Sc. COURSE IN
GEOGRAPHY
(SEMESTER SYSTEM)
2007



THE UNIVERSITY OF BURDWAN
RAJBATI, BURDWAN – 713104
WEST BENGAL, INDIA

SEMESTER SYSTEM

TERMS & CONDITIONS

1. There shall be full-time M.A. / M. Sc. Course in Geography of two years' duration.
2. There shall be Semester System spreading over four Semesters, each of six months.
3. There shall be 1200 marks in total and each Semester shall carry 300 marks.

BASIC STRUCTURE

1. There shall be 24 Papers (15 theoretical and 9 practical) to cover the whole Syllabus and each Semester shall contain six Papers. Each Paper carries 50 marks.
2. The Students shall be evaluated by all the teachers regularly by conducting Class Tests, the marks of which shall be a part of their examination system. The Class Tests shall be held on the topic(s) of the theoretical papers. Each of the Semesters I, II & III shall carry 20 marks and Semester IV shall carry 15 marks for evaluation by the teachers during the Course.
3. Paper XXIV of 50 marks shall require a Term Paper by each of the students, which shall be evaluated on the basis of Written submitted Report and Viva – Voce (30+20 marks).

THE UNIVERSITY OF BURDWAN

Syllabus for M.A. / M. Sc. Course in GEOGRAPHY

DIVISION OF MARKS

	Full Marks	Theory	Practical
Semester I :	300	200	100
Semester II :	300	200	100
Semester III :	300	200	100
Semester IV :	300	150	150
Total Marks:	1200	750	450

STRUCTURE OF THE SYLLABUS

SEMESTER I

PAPER	SUBJECT	MARKS	EXAM TIME
101	Geomorphology	50	2 HOURS
102	Climatology and Soil Geography	50	2 HOURS
103	Nature of Geography	50	2 HOURS
104	Economic Geography	50	2 HOURS
105	Quantitative Techniques and Digital Data Processing	50	4 HOURS
106	Soil -Water Analysis, Surveying and Field Report	50	4 HOURS

SEMESTER II

PAPER	SUBJECT	MARKS	EXAM TIME
201	Geohydrology and Oceanography	50	2 HOURS
202	Bio-Geography	50	2 HOURS
203	Historical and Political Geography	50	2 HOURS
204	Geographical Thought	50	2 HOURS
205	Cartographic Techniques and Map Projection	50	4 HOURS
206	Thematic Mapping and Geographical Information System	50	4 HOURS

SEMESTER III

PAPER	SUBJECT	MARKS	EXAM TIME
301	Social, Cultural and Settlement Geography	50	2 HOURS
302	Population and Human Development	50	2 HOURS
303	Regions and Regional Entity of India and West Bengal	50	2 HOURS
304	Special Paper (A, B, C, D)*(Theory)	50	2 HOURS
305	Applied Statistical Techniques in Geography	50	4 HOURS
306	Special Paper (A, B, C, D)*(Practical)	50	4 HOURS

***304 A – Advanced Geomorphology, 304 B – Pedology, 304 C – Environmental Issues In Geography, 304 D – Urban Geography**

SEMESTER IV

PAPER	SUBJECT	MARKS	EXAM TIME
401	Resource Planning and Development	50	2 HOURS
402	Regional Planning and Development	50	2 HOURS
403	Land use Planning and Rural Development	50	2 HOURS
404	Special Paper (A, B, C, D)*(Theory)	50	2 HOURS
405	Remote Sensing and Geographical Information System	50	4 HOURS
406	Term Paper (On Respective Special Papers)	50	4 HOURS

SEMESTER I
Paper101
GEOMORPHOLOGY

Full Marks: 50

Time: 2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPTS, APPROACHES AND MODELS IN GEOMORPHOLOGY

- 1.1. Concepts of spatial and temporal scales and threshold value
- 1.2. Approaches to Geomorphology: Static, Dynamic, Environmental and Applied
- 1.3. Models of slope development by Davis, Penck, Wood and Young
- 1.4. Models of landform development by Davis, Penck, Hack and Schumm

UNIT 2.0 GEOMORPHIC PROCESSES AND FORMS

- 2.1. Morpho -Climatic mechanisms
- 2.2. Processes of channel initiation and Network development
- 2.3. Forms of valley development and Profile of equilibrium
- 2.4. Periglacial processes and forms

UNIT 3.0 APPLIED GEOMORPHOLOGY

- 3.1. Flood management
- 3.2. Integrated Coastal Management
- 3.3. Application of Geomorphology to Route alignment and Site Selection
(Highways and Dams)
- 3.4. Application of Remote Sensing and Geographic Information System in
Geomorphology

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER I

Paper 101

CLIMATOLOGY AND SOIL GEOGRAPHY

Full Marks: 50

Time: 2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CLIMATE: NATURE AND CHANGE

- 1.1. Bioclimatic regions with special emphasis on Tropical climate
- 1.2. Identification and characteristics of Bioclimatic and Agro-climatic regions in India
- 1.3. Theories of Climatic change with special reference to Pleistocene period
- 1.4. Climatic change of recent time – Role of Global warming and ENSO

UNIT 2.0 IMPACT OF CLIMATE

- 2.1. Morphogenetic regions and Pedogeomorphic Processes.
- 2.2. Climate, Human comfort and Diseases with special reference to Tropical Regions.
- 2.3. Climate, Settlement and Architecture.
- 2.4. Climate, Human activity and Culture

UNIT 3.0 SOIL

- 3.1. Soil as a natural organic body, Soil mineralogy, Soil nutrients and Fertility
- 3.2. Bio-function of Soil – Soil organic matter, soil organisms & micro organisms and its relation with soil fertility
- 3.3. Soil reaction – Base Exchange, soil pH, Reclamation of saline, alkaline and acidic soil
- 3.4. Soil degradation, Pollution and Management

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER I

Paper103

NATURE OF GEOGRAPHY

Full Marks: 50

Time:2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 APPROACHES TO GEOGRAPHY

- 1.1. Philosophy of Geo-science, Geographic methodology and Explanation in Geography
- 1.2. Approaches to Regional Studies
- 1.3. Ecology and Ecosystem as Geographical principle and method
- 1.4. Holistic and Reductionist approaches to Geography

UNIT 2.0 DUALISM IN GEOGRAPHY

- 2.1. Physical Geography and Human Geography
- 2.2. Idiographic and Nomothetic
- 2.3. Determinism and Possibilism
- 2.4. Areal and Spatial

UNIT 3.0 CONCEPT OF SPACE IN GEOGRAPHY

- 3.1. Concept of space
- 3.2. Geographic perception of space and locality with special emphasis on behavioural space
- 3.3. Social space, Social problems and Processes in spatial analysis
- 3.4. Post-modern views on space

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER I

Paper 104

ECONOMIC GEOGRAPHY

Full Marks: 50

Time: 2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPT OF RESOURCE

- 1.1. Resource analysis in Geography
- 1.2. Factors controlling resource use
- 1.3. Resource appraisal and allocation
- 1.4. Carrying capacity and resource management

UNIT 2.0 BASES OF ECONOMIC GEOGRAPHY

- 2.1. The physical bases of economic geography
- 2.2. Economic bases of economic geography
- 2.3. Institutional bases of economic geography
- 2.4. Urban bases of economic geography

UNIT 3.0 GEOGRAPHY OF TRANSPORT, COMMUNICATION AND TRADE

- 3.1 Concept of distance, accessibility and connectivity: interregional and intra-regional
- 3.2 Transport cost: Factors and comparative cost advantages
- 3.3 Significance of trade in regional and national economy and impact of information technology on trade in India
- 3.4 International trade: Balance of Payment, WTO, GATT and IPR

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER – I

Paper 105

QUANTITATIVE TECHNIQUES AND DIGITAL DATA PROCESSING

Full Marks: 50

Time: 4 Hours

Number of periods to be assigned for each of the Units 1, 2, 3 and 4: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are to be allotted for Unit 5 (Evaluation of Practical Notebook: 5 + Viva- voce: 5 Marks)

UNIT 1.0 REGRESSION AND CORRELATION

- 1.1 Regression: Linear and Curvilinear
- 1.2 Multiple Regression
- 1.3 Residuals, Standard Error Estimate and 't' and 'F' test
- 1.4 Bivariate (Rank and Product Moment), Multiple and Partial Correlation

UNIT 2.0 ADVANCED STATISTICS

- 2.1 Matrix Algebra,
- 2.2 Factor Analysis: Centroid method
- 2.3 Principal Component Analysis
- 2.4 Time Series Analysis

UNIT 3.0 DIGITAL DATA PROCESSING

- 3.1 Data Entry, Editing, Sorting and Retrieval
- 3.2 Derivation of Correlation, Regression
- 3.3 Derivation of Mean, Rank, Standard Deviation
- 3.4 Interpolation and Extrapolation

UNIT 4.0 DATA REPRESENTATION

- 4.1 Line Graph, XY (Scatter), Logarithmic
- 4.2 Bar Graph, Compound bar, Stack Bar
- 4.3 Pie Chart, Doughnut, Bubble Diagram
- 4.4 Histogram

EVALUATION OF PRACTICAL NOTE BOOK AND VIVA-VOCE

SEMESTER – I

Paper 106

SOIL - WATER ANALYSIS

SURVEYING AND FIELD REPORT

Full Marks: 50

Time: 4 Hours

Number of periods to be assigned for each of the Units 1 and 2 :20. Three compulsory questions of 14 marks each are to be set from each of the units 1.0, 2.0 and 3.0 and 8 marks are to be allotted for Unit 4.0 (Evaluation of Practical Note Book: 4 Marks and Viva-voce 4 Marks)

UNIT1.0 SOIL - WATER ANALYSIS

- 1.1 pH, NPK, Organic Carbon using Soil kit and Mapping
- 1.2 Ternary Diagram and Soil Profile
- 1.3 BOD and COD of water
- 1.4 pH and Hardness of water

UNIT 2.0 SURVEYING AND MAPPING

- 2.1 Preparation of Contour Map by Reciprocal Method
- 2.2 Measurement of Height and Distance (Oblique Method)
- 2.3 Triangulation and Traversing using Theodolite
- 2.4 Land use and Land Cover Mapping (Tacheometric Method)

UNIT 3.0 FIELD REPORT

Guidelines on execution

Either a rural or an urban area of about 5 km² is to be selected for study.

The work is to be based mainly on processing of primary data collected from field with the help of appropriate schedules for physical and socio-economic survey, stressing on any local problem or any contemporary issue.

Duration of the field study is not to exceed seven days. The area and supervisor (s) of the Report are to be determined by the Departmental Committee.

The following are to be taken as base maps, subject to availability: (a) cadastral maps, (b) 1:50,000 and/or 1:25,000 toposheets and (c) Satellite imageries and/or data.

Interrelations between different aspects of the study should be the focus of the Report.

Text of the Report should not exceed 6,000 words and should ideally be divided into the following sections: Introduction, Statement of problem(s) and Objectives, Materials and methods, Results Discussions, Conclusion, References / Bibliography and Appendices (if any).

Maps, diagrams and sketches, excluding photographs, should not exceed 15 pages of A4 size paper.

Handwritten Report duly endorsed by the Supervisor(s) is to be produced individually by the students. Photocopying and computer typing are not to be allowed in any form.

EVALUATION OF PRACTICAL NOTE BOOK AND VIVA-VOCE

SEMESTER II

Paper 201

GEOHYDROLOGY AND OCEANOGRAPHY

Full Marks: 50

Time: 2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPT AND APPROACHES

- 1.1. Concept of Water Budget and Hydrological Cycle
- 1.2. Drainage basin as a Hydrological unit: Properties and significance
- 1.3. Stream Rises and Sub-surface flow
- 1.4. Sea-level changes: Causes and implications

UNIT 2.0 PROPERTIES, USE AND MANAGEMENT OF SURFACE AND GROUNDWATER

- 2.1. Movement of Groundwater: Darcy's law and its range of validity
- 2.2. Surface and Sub-surface Geophysical methods of exploration
- 2.3. Physical and chemical characteristics of groundwater
- 2.4. Surface and Sub-surface Water Management

UNIT 3.0 ORIGIN AND CHARACTERISTICS OF OCEANIC FEATURES

- 3.1. Continental shelf and slope
- 3.2. Submarine Canyons
- 3.3. Coral reefs
- 3.4. Oceanic Waves and Tsunamis

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER II
Paper 202
BIOGEOGRAPHY

Full Marks: 50

Time:2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 PLANT GEOGRAPHY

- 1.1. Plant ecology, habitat factors and adaptations
- 1.2. Types of forests and their relationship with hydrological cycles
- 1.3. Deforestation, degradation and Conservation of forests
- 1.4. Recent trends in Regeneration

UNIT 2.0 ZOOGEOGRAPHY

- 2.1. Principles of animal ecology
- 2.2. Theory of evolution; distribution of animals through geological periods
- 2.3. Dispersal of animals: Means and barriers; Zoogeographical regions
- 2.4. Management and conservation of wildlife; Relevance of sanctuaries with special reference to India

UNIT 3.0 APPLIED ECOLOGY

- 3.1. Principles of human ecology
- 3.2. Environmental organisations and agencies: International Biological Programme and Man & Biosphere Programme in the world and in India
- 3.3. Ecosystem models
- 3.4. Biodiversity conservation with special reference to the Third World

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER II

Paper 203

HISTORICAL AND POLITICAL GEOGRAPHY

Full Marks: 50

Time: 2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0: HISTORICAL GEOGRAPHY

- 1.1 Scope, content and nature of source materials.
- 1.2 Ancient period: Development and destruction of ancient civilizations; territorial organisation of *janapadas* in India.
- 1.3 Medieval period: Agriculture, Trade and Urbanization in India.
- 1.4 Colonial period: New trends in agriculture, industrialization and urbanization in India

UNIT 2.0: POLITICAL GEOGRAPHY

- 2.1. Nature, Scope and Content; Geo-political theories (Heartland and Rimland)
- 2.2 Geographical perspectives of State, Nation and Nation-states
- 2.3. Politics of world resources with particular reference to energy resources.
- 2.4 Strategic regional and economic alliances: Commonwealth, SAARC and EU

UNIT 3.0: GEO-POLITICAL ISSUES IN INDIA AND NEIGHBORING COUNTRIES

- 3.1 Geo-political setting and boundary conflicts
- 3.2 Regionalism and geographies of political and social movements.
- 3.3 Electoral geography and political stability in India
- 3.4 Inter-state conflicts on share of river water

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER II
Paper 204
GEOGRAPHICAL THOUGHT

Full Marks: 50

Time:2 Hours

Number of lectures to be delivered for each of the Units 1, 2 & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks only shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question is to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 PARADIGM SHIFT IN GEOGRAPHY

- 1.1. Paradigms in Geography
- 1.2. Positivism and Quantitative Revolution
- 1.3. Structuralism in Geography
- 1.4. Development of Behavioural Geography `

UNIT 2.0 DEVELOPMENT OF CRITICAL GEOGRAPHY

- 2.1. Empiricism: the fundamental assumption of Positivism
- 2.2. Radical Critique of Positivism
- 2.3. Critique of Geometric spatial structure
- 2.4. Geography of Poverty and Inequality

UNIT 3.0 CURRENT IDEAS IN GEOGRAPHY

- 3.1. Marxist Geography
- 3.2. Gender Geography
- 3.3. Humanistic Geography
- 3.4. Welfare Geography

INTERNAL ASSESSMENT

One Mid-semester test of 50 minutes shall be conducted during the Semester period on the topic (s) of this paper. The mark obtained shall be considered for the final award of marks.

SEMESTER II

Paper 205

CARTOGRAPHIC TECHNIQUES AND MAP PROJECTION

Full Marks: 50

Time: 4 Hours

Number of periods to be assigned for each of the Units 1, 2 and 3: 20. Three compulsory questions of 14 marks each are to be set from each of the units 1.0, 2.0 and 3.0 and 8 marks are to be allotted for Unit 4.0 (Evaluation of Practical Note Book: 4 Marks and Viva-voce 4 Marks)

UNIT 1.0 SOURCES AND METHODS OF DATA COLLECTION

- 1.1 Sources and Methods of Data Collection: Quantitative and Qualitative;
Reliability and accuracy of data
- 1.2 Preparation of Questionnaire Schedules
- 1.3 Tabulation and Mapping of Population Data
- 1.4 Tabulation and Mapping of Land use data

UNIT 2.0 MAPPING TECHNIQUES AND ANALYSIS

- 2.1 Analysis of Geological Maps
- 2.2 Nearest Neighbour Analysis and Analysis of Point features: Location of mean centres
- 2.3 Population Potential Surface
- 2.4 Socio-economic Disparity

UNIT 3.0 MAP PROJECTION

- 3.1 Principles of Geodesy and Global Positioning System, Conversion of Latitudes and Longitudes to Meters
- 3.2 Gnomonic, Stereographic and Orthographic Projection (Equatorial Cases)
- 3.3 Mercator's, Gall's and Mollweide's Projection
- 3.4 Problems related to Projection and Scale Variation

EVALUATION OF PRACTICAL NOTE BOOK AND VIVA-VOCE

SEMESTER II

Paper 206

THEMATIC MAPPING AND GEOGRAPHICAL INFORMATION SYSTEM

Full Marks: 50

Time: 4 Hours

Number of periods to be assigned for each of the Units 1, 2, 3 and 4: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are to be allotted for Unit 5 (Evaluation of Practical Notebook: 5 + Viva-voce: 5 Marks)

UNIT 1.0 THEMATIC MAPPING OF PHYSICAL ENVIRONMENT

- 1.1 Computation and Mapping of Morphometric Aspects: Relative Relief, Dissection Index, Drainage Density, Slope, and Bifurcation Ratio from Topographical Sheet
- 1.2 Preparation of Geomorphic Maps, Hypsometric Curve and Percentage Hypsometric Curve
- 1.3 Preparation of Environmental Maps: Flood, Drought and Pollution
- 1.4 Computation, Mapping and Drawing of Pluviometric Coefficient, Equipluves, Aridity and Moisture Index and Coefficient of Variability of Rainfall

UNIT 2.0 THEMATIC MAPPING OF ECONOMIC AND SOCIAL ENVIRONMENT

- 2.1 Presentation of Literacy, Nutrition and Mortality data through maps
- 2.2 Lorenz Curve and Gini's Coefficient,
- 2.3 Location Quotient and Coefficient of Localisation
- 2.4 Christaller's Centrality Index, Isochrone and Isophore

UNIT 3.0 SPATIAL DATA GENERATION IN GEOGRAPHICAL INFORMATION SYSTEM

- 3.1 Scanning, Editing and Conversion in Different file format
- 3.2 Georeferencing of scanned files and Reprojection
- 3.3 Generation of Vector Layers
- 3.4 Editing, Storing and Retrieval of Digitized files

UNIT 4.0 INTEGRATION OF SPATIAL AND ATTRIBUTE DATA

- 4.1 Measurement of Area, Length and Distance in Digitized layers
- 4.2 Representation of Morphometric aspects: Relative Relief, Drainage Density and Bifurcation Ratio
- 4.3 Representation of Land Use and Land Cover data through Cartograms
- 4.4 Preparation of Maps using Demographic data

EVALUATION OF PRACTICAL NOTE BOOK AND VIVA-VOCE

REFERENCES (under preparation)

PAPER 101 GEOMORPHOLOGY AND

PAPER-201 GEOHYDROLOGY AND OCEANOGRAPHY

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PAPER-102 CLIMATOLOGY AND SOIL GEOGRAPHY

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PAPER-103 NATURE OF GEOGRAPHY AND

PAPER -204 GEOGRAPHICAL THOUGHT

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PAPER-105 QUANTITATIVE TECHNIQUES AND DIGITAL DATA PROCESSING

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PAPER- 106: SOIL - WATER ANALYSIS, SURVEYING AND FIELD REPORT

PAPER 205 : CARTOGRAPHIC TECHNIQUES AND MAP PROJECTION

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SEMESTER III

PAPER: 301

SOCIAL, CULTURAL AND SETTLEMENT GEOGRAPHY

FULL MARKS: 50
2 HOURS

TIME:

*Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment **Two** questions of 15 marks each are to be set and **one** question to be answered from each of the three Units. Each question is to have at least two parts.*

UNIT 1.0 SOCIAL GEOGRAPHY

- 1.1 Social Geography in the realm of Social Science, Relation of Social Geography with Sociology and Anthropology
- 1.2 Social Systems: Structure and Processes; Social elements; Ethnicity, Race, Language and Religion
- 1.3 Changing Social Space: Diversity of activity space, production behaviour and division of labour, functional specialisation and association
- 1.4 Social Space: Globalisation, Power and Politics

UNIT 2.0 CULTURAL GEOGRAPHY

- 2.1 Concept of Culture in Geography and Development of Cultural Geography
- 2.2 Role of technology in the evolution of Cultural, Stages of Culture, Cultural Take off, Socio-cultural transformations
- 2.3 Cultural Realms, Cultural Innovation, Cultural hearth, Problems of Cultural Regeneration
- 2.4 Role of Environment in the Development of Folk Culture and its Diversity, Revival of Folk Culture, Patterns of popular Culture and Cultural fusion

UNIT 3.0 SETTLEMENT GEOGRAPHY

- 3.1 Nature, Scope, Content and Development of Settlement Geography
- 3.2 Census categories of Settlements; Size, Function and Morphology of Rural and Urban Settlements
- 3.3 Evolution of Rural Settlement; Rural Service Centres and Markets
- 3.4 Processes of Urban Growth; Urban fringe; City Region, Rural –Urban Continuum

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER III

PAPER: 302

POPULATION AND HUMAN DEVELOPMENT

FULL MARKS: 50

TIME: 2 HOURS

*Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment **Two** questions of 15 marks each are to be set and **one** question to be answered from each of the three Units. Each question is to have at least two parts.*

UNIT1.0 POPULATION DYNAMICS

- 1.1 Trends and determinants of population growth
- 1.2 Theories of population Growth: Malthus, Marx, Saddler, Doubleday, Neo Malthusian approach
- 1.3 Migration: Diaspora and Identity crisis
- 1.4 Mobility Transition Model; Policy Response to Demographic changes

UNIT 2.0 SOCIAL PROBLEMS AND DEVELOPMENT

- 2.1 Concept of welfare; social well-being and its determinants
- 2.2 Geography of inequality (production, consumption and distribution systems) social consequences, social justice
- 2.3 Social Problems: social bonds, kinship relation and social unrest
- 2.4 Development and displacement in developing countries

UNIT 3.0 ISSUES RELATED TO HUMAN DEVELOPMENT

- 3.1 Concepts and Issues in Human Development
- 3.2 Food production systems (regions of deficit and surplus); Food security, Health and Malnutrition
- 3.3 Poverty and Poverty alleviation Schemes in India with special reference to NREGA IRDP and SGSY
- 3.4 Development and Gender; Women Empowerment and Gender Development Index

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER III

PAPER: 303

REGIONS AND REGIONAL ENTITY OF INDIA AND WEST BENGAL

FULL MARKS: 50

TIME:

2 HOURS

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1,2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 REGIONALISATION OF INDIA: BASES AND CHARACTERISTICS

- 1.1 Methods and Techniques of Regionalisation
- 1.2 Physico-Economic regions
- 1.3 Socio-Cultural regions
- 1.4 Planning regions

UNIT 2.0 REGIONAL ENTITY

- 2.1. Malwa plateau: Potentialities, Problems and Prospects of agricultural and industrial development
- 2.2. Karnataka coastal and interior industrial region
- 2.3. Western Himalayas as Tourist Region: Ecotourism and Ecological Protection
- 2.4. North-eastern Region: Ethnic Identity, Backwardness and Regionalism

UNIT 3.0 REGIONAL ENTITY OF WEST BENGAL

- 3.1 Darjeeling Himalaya with special reference to morpho structural characteristics
- 3.2 North Bengal Plain with special reference pedo floral characteristics
- 3.3 Rarh Bengal with special reference to Forestry and Mining
- 3.4 Ganga Delta with special reference urban industrial development

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER - III
PAPER- 304 A

SPECIAL PAPER THEORY: ADVANCED GEOMORPHOLOGY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 PERSPECTIVES IN GEOMORPHOLOGY

- 1.1 New Concepts and Methods in Geomorphology
- 1.2 Geomorphic Thought: Evolution of Pre-Davision Thoughts; Davis and onward
- 1.3 Schools in Geomorphology: British, French, German and American
- 1.4 Development of Geomorphology in India

UNIT 2.0 CONCEPTS AND MODELS IN GEOMORPHOLOGY

- 2.1 Concept of Planation Surfaces; Peneplain, Pediplain, Panplain, Etchplain and Cryoplain
- 2.2 Theories of Pediment and Inselberg Development
- 2.3 Geomorphic Analysis of typical features: Tors and Bornhardts River Terraces and Duricrust
- 2.4 Channel Morphology: Hydraulic geometry, River Discharge, River Gradient and Channel forms

UNIT 3.0 APPLIED GEOMORPHOLOGY

- 3.1 Application of Geomatics in Geomorphology
- 3.2 Terrain Classification and Evaluation
- 3.3 Geomorphic controls on Transport, Communication and Settlement
- 3.4 Watershed Management using Geo-spatial technologies

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER - III
PAPER- 304 B

SPECIAL PAPER THEORY: PEDOLOGY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1,2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 PERSPECTIVES IN PEDOLOGY

- 1.1 New Concepts in Pedology and its relation to other sciences; Pedology vs. edaphology
- 1.2 Pedoecology and Pedogenic transformations
- 1.3 Theories of soil formation: podsolisation, laterisation, calcification; Subtypes of major zonal soils
- 1.4 Methods of soil Classification: Russian, American and West European

UNIT 2.0 SOIL PHYSICS AND CHEMISTRY

- 2.1 Soil Air and Soil Water
- 2.2 Soil Reaction: Soil acidity, alkalinity, salinity and their effects on plant growth.
- 2.3 Soil Colloids: Origin, constitution, properties and types of soil clay, Method of Classification of clay minerals.
- 2.4 Soil nutrients, fertility and productivity: Nutrient transformation and fixation in soil. Controlling factors of soil fertility and productivity

UNIT 3.0 LAND AND SOIL SURVEY IN ENVIRONMENTAL MANAGEMENT

- 3.1 Soil relationship within drainage basins and its impact on biota and agriculture
- 3.2 Soil Survey: Modern tools and techniques in processing soil survey data for agricultural and non agricultural purposes.
- 3.3 Land form, Land use and Soil management: Environmental and Economic perspectives
- 3.4 Fertiliser and Soil Health: Fertilisers, Pesticides and their management

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER – III
PAPER- 304 C

SPECIAL PAPER THEORY: ENVIRONMENTAL ISSUES IN GEOGRAPHY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPT AND HISTORICAL PERSPECTIVES

- 1.1 Recent trends in Environmental Studies; Types and Development of Environmentalism
- 1.2 World Civilizations and Perception of Environment: Study of Ecological History in Geography
- 1.3 Philosophical perspectives of Environment: Gaia Hypothesis, Spaceship Earth, Ecosystem Balance, Population Equilibrium and Stationary State Economy
- 1.4 Approaches to Environmental Studies: Organismic, Environmentalist, Holistic and Deep Ecology

UNIT 2.0 MODES OF ENVIRONMENTAL RESOURCE USE AND ENVIRONMENTAL DEGRADATION

- 2.1 Production Technology, Technological Fix and Environmental Problems; Role of State Control, Privatization and Out-sourcing
- 2.2 Modern Agriculture, Industrialization and Urbanization: their Impact on Air, Water, Land and Forests
- 2.3 Natural and quasi-natural Hazards : Vulnerability and Management of Cyclones, Earthquake, Droughts, Floods and Landslide
- 2.4 Social Hazards: Tropical Diseases, Poverty, Crime and Social Exclusion

UNIT 3.0 ENVIRONMENTAL POLICY AND MANAGEMENT IN INDIA

- 3.1 Environmental Ethics, Policies and Laws
- 3.2 Forest Policies: Social Forestry and Participatory Forest Management; Case Studies of JFM in West Bengal.
- 3.3 Policies and management of Wasteland - Case Studies from West Bengal.
- 3.4 Wetland and Micro Watershed Management- Case Studies from West Bengal.

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER - III
PAPER- 304 D

SPECIAL PAPER THEORY: URBAN GEOGRAPHY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPT AND APPROACHES

- 1.1 Perception of Urban Space and Changing emphasis
- 1.2 Changing Approaches to the Study of Urban Geography
- 1.3 Centripetal and Centrifugal forces and Core-Periphery relation
- 1.4 Classification of Urban Settlements and agglomerations

UNIT 2.0 URBANISATION PROCESSES

- 2.1 History of Urban Development
- 2.2 Processes, Factors and Patterns of Urbanisation
- 2.3 City size distribution and economic development
- 2.4 Urbanisation in Developed and Developing countries and its related problems

UNIT 3.0 MORPHOLOGY AND STRUCTURE

- 3.1 Urban Land use and Land Value
- 3.2 Models of urban structure: Classical Models and their Modifications
- 3.3 CBD, Concept of neighbourhood and community
- 3.4 Social area Analysis and Factorial Ecology

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

**SEMESTER III
PAPER- 305**

APPLIED STATISTICAL TECHNIQUES IN GEOGRAPHY

FULL MARKS 50

TIME: 4 HOURS

Number of periods to be assigned for each of the Units 1.0, 2.0, 3.0 & 4.0: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are allotted for evaluation of Practical Notebook: 5 marks + Viva-voce: 5 marks

UNIT 1.0 SAMPLING

- 1.1 Techniques of sampling
- 1.2 Estimation from sample
- 1.3 Confidence limit
- 1.4 Standard error of mean

UNIT 2.0 PROBABILITY AND TESTING HYPOTHESIS

- 2.1 Concept of probability and set theory(simple problems)
- 2.2 Probability of occurrences
- 2.3 Probability Distribution – Normal, binomial and Poisson
- 2.4 t-test, Chi Square test

UNIT 3.0 APPLIED STATISTICAL ANALYSIS

- 3.1 Interpolation and Extrapolation
- 3.2 Advanced Time series analysis and Techniques of forecasting
- 3.3 Logistic Regression
- 3.4 Clustering and Mapping through PCA

UNIT 4.0 SELECTED QUANTITATIVE TECHNIQUES

- 4.1 Simple Linear Programming(Simple Problems – graphical solution of LPP, Transportation problems and allocation problem)
- 4.2 System Component Growth
- 4.3 Population Packing
- 4.4 Dispersion and concentration of Settlement

PRACTICAL NOTE BOOK AND VIVA VOCE

SEMESTER III

PAPER- 306 A

SPECIAL PRACTICAL- ADVANCED GEOMORPHOLOGY

FULL MARKS 50

TIME: 4 HOURS

Number of periods to be assigned for each of the Units 1.0, 2.0, 3.0 & 4.0: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are allotted for evaluation of Practical Notebook: 5 marks + Viva-voce: 5 marks

UNIT 1.0 DRAINAGE BASIN MORPHOMETRY AND MULTIVARIATE ANALYSIS

- 1.1 Stream Order (Strahler's method), number, length and their bivariate analysis
- 1.2 Relative relief, dissection index, ruggedness index, drainage density and their bivariate and multivariate analysis
- 1.3 Slope, Forest and Settlement & their bivariate analysis
- 1.4 Relative relief, ruggedness index and communication lines and their bivariate analysis

UNIT 2.0 MEASUREMENT COMPUTATION AND ANALYSIS OF GEOMORPHIC VARIABLES & FEATURES

- 2.1 Braiding index, sinuosity index, meander wave length and radius of curvature
- 2.2 Measurement of Velocity, Gauge Height and Discharge of River Water
- 2.3 Measurement of slope with Abney's level and drawing of profiles mentioning slope forms
- 2.4 Hydrograph, rating Curve and constant of channel maintenance

UNIT 3.0 GEOLOGICAL AND GEOMORPHOLOGICAL MAPPING

- 3.1 Interpretation of geological maps of minerally rich faulted zone of India
- 3.2 Preparation of geomorphic maps of flood zones and their interpretation
- 3.3 Extraction of geomorphic features and their relative height from aerial photographs, their mapping and interpretation
- 3.4 Extraction of geomorphic features from satellite images and their mapping and interpretation

UNIT 4.0 ANALYSIS OF SOILS, SEDIMENTS, ROCKS, MINERALS AND THEIR INTERPRETATION

- 4.1 Mechanical analysis of soils and sediments
- 4.2 Determination of specific gravity of insoluble rocks and minerals
- 4.3 Measurement of the shapes of pebbles
- 4.4 Microscopic examination of rocks and minerals

PRACTICAL NOTE BOOK AND VIVA-VOICE

SEMESTER III

PAPER- 306 B SPECIAL PRACTICAL- PEDOLOGY

FULL MARKS 50

TIME : 4 HOURS

Number of periods to be assigned for each of the Units 1.0, 2.0, 3.0 & 4.0: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are allotted for evaluation of Practical Notebook: 5 marks + Viva-voce: 5 marks

UNIT 1.0 ANALYSIS OF SOIL AND LAND USE DATA BY QUANTITATIVE TECHNIQUES

- 1.1 Bivariate estimation of soil and land use data
- 1.2 Multivariate estimate of soil and soil crop relationship
- 1.3 Standard Error of Estimate of land use and productivity
- 1.4 Time series Analysis of crop production and productivity

UNIT 2.0 LABORATORY ANALYSIS OF PHYSICAL PROPERTIES OF SOIL

- 2.1 Hygroscopic moisture
- 2.2 Specific gravity by specific gravity bottle.
- 2.3 Mechanical analysis of soil
- 2.4 Keen box experiment

UNIT 3.0 LABORATORY ANALYSIS OF CHEMICAL PROPERTIES OF SOIL

- 3.1 pH and cat ion exchange capacity
- 3.2 Organic matter
- 3.3 Calcium
- 3.4 Salinity

UNIT 4.0 SOIL AND LAND USE SURVEY AND THEIR MAPPING

- 4.1 Techniques of survey of soil and land use
- 4.2 Land classification and mapping
- 4.3 Mapping and Interpretation of land use maps from cadastral map and satellite images
- 4.4 Soil profile recognition

PRACTICAL NOTE BOOK AND VIVA-VOICE

SEMESTER III

PAPER- 306 C

SPECIAL PRACTICAL- ENVIRONMENTAL ISSUES IN GEOGRAPHY

FULL MARKS 50

TIME : 4 HOURS

Number of periods to be assigned for each of the Units 1.0, 2.0, 3.0 & 4.0: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are allotted evaluation of Practical Notebook: 5 marks + Viva-voce: 5 marks

UNIT 1.0 MODELLING AND QUANTITATIVE TECHNIQUES

- 1.1 Identification and modelling of Environmental Problems
- 1.2 Regression Analysis and Standard Error Estimate with environmental data
- 1.3 Correlation (Bivariate) Analysis of Environmental Data
- 1.4 Time series analysis of climatic data

UNIT 2.0 DETECTION OF ENVIRONMENTAL POLLUTION THROUGH LABORATORY TECHNIQUES

- 2.1 Dust fall and Measurement of air Pollutants, Noise Pollution
- 2.2 Acidity and alkalinity of soil and Water
- 2.3 TSS and TDS in water
- 2.4 BOD and Total Hardness

UNIT 3.0 ENVIRONMENTAL SURVEY AND MAPPING

- 3.1 Sampling Procedures
- 3.2 Perception Survey Techniques, preparation of Survey Schedule and Questionnaires for perception survey of Natural and Social hazards
- 3.3 Cartographic Representation of Primary or Secondary Data and Collation of Environmental Data and Maps
- 3.4 Preparation of Environmental Management Plan

UNIT 4.0 FIELD TECHNIQUES AND PLANNING

- 4.1 Preparation and Interpretation of Environmental Maps: Micro levels (Area and Problem specific)
- 4.2 Environmental Mapping Techniques for enabling Environment and Development
- 4.3 Interpretation of Environmental change from Toposheets and Remote Sensing Data
- 4.4 Pollution and Hazard Mapping

PRACTICAL NOTE BOOK AND VIVA-VOICE

SEMESTER III

PAPER- 306 D SPECIAL PRACTICAL- URBAN GEOGRAPHY

FULL MARKS 50

TIME: 4 HOURS

Number of periods to be assigned for each of the Units 1.0, 2.0, 3.0 & 4.0: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are allotted for evaluation of Practical Notebook: 5 marks + Viva-voce: 5 marks

UNIT 1.0 DEMOGRAPHIC ASPECTS OF URBAN AREAS

- 1.1 Time series analysis of Urban Growth
- 1.2 Applicability of Rank Size Rule with settlement data (Normal and Log)
- 1.3 Urban density Zoning
- 1.4 Analysis of Occupational Diversity and Specialisation

UNIT 2.0 MAPPING OF URBAN LINKAGES

- 2.1 Network Analysis (Konig Number; Shimmel, Alpa, Beta, and Gama Indices)
- 2.2 Flow matrix and Maps
- 2.3 Connectivity Mapping (Detour)
- 2.4 Shortest Path Analysis

UNIT 3.0 MAPPING AND INTERPRETATION OF SPATIAL URBAN PHENOMENA

- 3.1 Correlation between associated variables and Residual Mapping
- 3.2 Index of Urbanisation
- 3.3 Index of Dissimilarity and Similarity
- 3.4 Urban Land use mapping using Satellite Images

UNIT 4.0 PERCEPTION OF URBAN ENVIRONMENT

- 4.1 Preparation of questionnaires related to urban issues
- 4.2 Perception of the City: Neighbourhood intimacy mapping
- 4.3 Quality of Life Index for Urban Residential Areas
- 4.4. Delineation of urban sphere of influence

PRACTICAL NOTE BOOK AND VIVA VOCE

SEMESTER IV

PAPER: 401

RESOURCE PLANNING AND DEVELOPMENT

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPTS

- 1.1 Abiotic, Biotic and Human Resources
- 1.2 Resource Crisis and Its Impact on Economy
- 1.3 Resource Depletion, Renewal and Search for Alternative Resources
- 1.4 Common Property Resources (CPR): Tragedy of Commons and Concept of Anti-Commons

UNIT 2.0 RESOURCE INVENTORY, RESOURCE USE AND ITS IMPLICATIONS

- 2.1. Stock and Flow of Major Resources
- 2.2. Regional Concentration of Resources and Geopolitical Issues
- 2.3. Rights to Resources; IPR and Bio-piracy and Eco-imperialism
- 2.4. Environmental Impact Assessment and Environmental Planning and Management

UNIT 3.0 RESOURCE PLANNING AND MANAGEMENT IN INDIA

- 3.1 Techno-centric and Eco-centric Planning of Resources
- 3.2 Land Crisis for Development and SEZ
- 3.3 Development and Displacement and Rehabilitation
- 3.4 Human Resource Development: Employment Opportunity and Capability Building.

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER IV
Paper 402
REGIONAL PLANNING AND DEVELOPMENT

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPTS

- 1.1 Concept of regions: Types of regions and their delineation.
- 1.2 Types of planning, Principles and Objectives of Regional Planning, Multi- level planning in India
- 1.3 Metropolitan Concept: Metropolitan areas, and Urban Agglomerations
- 1.4 Regional Planning and economic Development

UNIT 2.0 REGIONAL PLANNING AND DEVELOPMENT

- 2.1 Tools and Techniques of Regional Planning, Need for regional planning in India
- 2.2. Characteristics of Backward and Developed regions, Reasons for Backwardness
- 2.3 Decentralised Planning and People's Participation in Planning process
- 2.4 Theories and Models of Regional Development: Growth Pole, Cumulative Causation and Core periphery

UNIT 3.0 STRATEGIES FOR REGIONAL DEVELOPMENT

- 3.1 Regional Inequality, Regional Disparity and Regional Diversity in India
- 3.2 State as a Planning unit; Criteria for dividing a State into Planning Region: West Bengal as a case study.
- 3.3 Regional planning in India: Metropolitan planning (NCR), Tribal Regions (Bastar)
- 3.4 Planning for Natural Resource Region: A Case Study of Damodar Valley Region

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER IV
PAPER 403
LANDUSE PLANNING AND RURAL DEVELOPMENT

FULL MARKS: 50
HOURS

TIME: 2

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment. Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONCEPT OF LAND AND LAND USE

- 1.1 Concepts and attributes of land; Land as Resource, Land as Ecosystem, Landscape Ecology
- 1.2 Determinants and Classification of Land use
- 1.3 Government Control and Laissez faire; Measures of Land reforms.
- 1.4 Government Policies concerning Forest, Wastelands and Wetlands in India.

UNIT 2.0 LAND USE PLANNING

- 2.1 Principles and Methods of Land use Survey: Macro and Micro levels
- 2.2 Land Evaluation: Methods and Techniques
- 2.3 Methods of Land Capability Classification (USDA, FAO, INDIA)
- 2.4 Land use Planning in Great Britain and India.

UNIT 3.0 RURAL DEVELOPMENT IN INDIA

- 3.1 Concept and approaches to Rural Development
- 3.2 Major Programmes of Rural development in the Five Year Plans
- 3.3 Case Studies of Rural Development: Operation Flood (Gujarat) and CADP (West Bengal)
- 3.4 Land Use transformations in Rural Bengal with special to the Sundarbans.

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER - IV
PAPER- 404 A

SPECIAL PAPER THEORY: ADVANCED GEOMORPHOLOGY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 RECENT TRENDS IN GEOMORPHOLOGY

- 1.1 Interdisciplinary approaches to Geomorphology (Physical Science and Social Sciences)
- 1.2 Climatic and Climatogenetic approaches to Geomorphology: Concept and relevance
- 1.3 Quantitative Geomorphology: Methods, Application and relevance
- 1.4 Application of Geomatics to Geomorphic analysis (Terrain identification and classification, change detection and hazard management)

UNIT 2.0 GEOMORPHIC HAZARDS AND MANAGEMENT

- 2.1 Endogenic Hazards and Management: Earthquakes and Vulcanicity
- 2.2 Geo-Climatic Hazards and Management: Climatic Change and Sea-Level Changes
- 2.3 Riverine Hazards and Management: Floods and Channel Shifting
- 2.4 Hazards in Mountains and their Management: Avalanches and Landslides

UNIT 3.0 REGIONAL GEOMORPHOLOGY OF INDIA AND BANGLADESH

- 3.1 Geomorphic Regions of India: Problems of Regionalisation and Identification of Region
- 3.2 Eastern Himalaya (Materials, Processes, Forms and Evolution)
- 3.3 Chotanagpur Plateau (Materials, Processes, Forms and Evolution)
- 3.4 Bengal Basin (Materials, Processes, Forms and Evolution)

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER - IV
PAPER- 404 B

SPECIAL PAPER THEORY: PEDOLOGY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 EVALUTION OF LAND AND SOIL

- 1.1 Evaluation of Land and Soil: Parametric and Nonparametric system, productivity rating index of Storie and G. Aziz
- 1.2 Principles and methods of Land Assessment: Land Capability and Suitability.
- 1.3 Integrated soil and water management.
- 1.4 Soil resource and food supply.

UNIT 2.0 SOILS OF INDIA

- 2.1 Genesis, classification, problems and principles of utilisation of soils of India.
- 2.2 Soils in agro-ecological regions: Soil crop relationship in terms of soil fertility, productivity and choice of crops.
- 2.3 Soil Retrogradation factors, processes and resultant forms in different parts of India.
- 2.4 Amelioration, Conservation and Reclamation of major soils of India.

UNIT 3.0 MODERN TRENDS IN PEDOLOGY

- 3.1 Modern concepts and research trends.
- 3.2 Role of geomorphic processes for the formation of soil, Pedo-geomorphic synthesis.
- 3.3 Soil as a system Dynamic equilibrium, functional and process approaches.
- 3.4 Modelling in the study of soil profiles and landscape.

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

SEMESTER - IV
PAPER- 404 C

SPECIAL PAPER THEORY: ENVIRONMENTAL ISSUES IN GEOGRAPHY

FULL MARKS: 50
2 HOURS

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 CONFLICTING IDEAS IN ENVIRONMENT

- 1.1 Development and Environment
- 1.2 Ecocentrism and Technocentrism
- 1.4 Political Ecology and Social Ecology
- 1.5 Ecologism and Ecofeminism

UNIT 2. ENVIRONMENTAL CONCERNS

- 2.1 River Valley Planning & Ecological Consequences(Narmada and Damodor Valley)
- 2.2 Urban Development and Ecological Consequences (Kolkata Metropolitan Area and Varanasi)
- 2.3 Tourism and Ecological Consequences (Digha and Darjeeling)
- 2.4 Ecological Impact Assessment and Environmental Management Plan (EMP)

UNIT 3.0 EMERGING ISSUES IN ENVIRONMENT

- 3.1 Global Warming and Environment Change
- 3.2 Biodiversity and Biotech Issues.
- 3.3 Global Resource Scarcity and Use of Oceans as International Commons
(Exploitation of aquatic and mineral resources)
- 3.4 Environmental Movements in India (Bisnoi, Chipko and Silent Valley)

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks.

**SEMESTER - IV
PAPER- 404 D**

SPECIAL PAPER THEORY: URBAN GEOGRAPHY

**FULL MARKS: 50
2 HOURS**

TIME:

Number of lectures to be delivered for each of the Units 1, 2, & 3: 16. Each of the Units 1, 2 & 3 carries 15 marks. 5 marks shall be awarded on the basis of Internal Assessment Two questions of 15 marks each are to be set and one question to be answered from each of the three Units. Each question is to have at least two parts.

UNIT 1.0 URBAN ECONOMY

- 1.1 Urban economic base theory.
- 1.2 Urban economic activities – Formal and informal
- 1.3 Urban poverty and its management
- 1.4 Impact of Structural reforms on urban economy in India

UNIT 2.0 URBAN SOCIAL AND ENVIRONMENTAL ISSUES

- 2.1 Social Problems of cities: Slums and Squatter settlements and Crime
- 2.2 Urban Environmental Issues: Different forms of Pollution, Solid Waste Management, Ecological Footprints in cities
- 2.3 Urban housing and Infrastructural problems
- 2.4 Concept of sustainable cities with special reference to India

UNIT 3.0 Urban Planning in India

- 3.1 Historical development of Urban Planning in India
- 3.2 Master Plan approach for urban development (Kolkata and Mumbai)
- 3.3 National Commission on Urbanisation (NCU), Integrated Development of Small and Medium Towns (IDSMT), Jawaharlal Nehru National Urban Renewal Mission (JNNURM).
- 3.4 Urban Governance in India with special reference to 74th Constitutional Amendment

INTERNAL ASSESSMENT

Mid-semester tests shall be conducted during the Semester period on the topics of this paper. The mark obtained will be considered for the final award of marks

**SEMESTER IV
PAPER- 405
REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM**

FULL MARKS 50

TIME: 4 HOURS

Number of periods to be assigned for each of the Units 1.0, 2.0, 3.0 & 4.0: 20. Four compulsory questions are to be set from each of the four Units. 10 marks are allotted for evaluation of Practical Notebook: 5 marks + Viva-voce: 5 marks

UNIT 1.0 VISUAL INTERPRETATION OF AERIAL PHOTOS

- 1.1 Concept and application of Remote Sensing, Comparative assessment of topographical maps, aerial photos and satellite images in representation geographical data
- 1.2 Geometry of aerial photographs; Principles of orthorectification and mosaicing
- 1.3 Determination of Aerial photographic scale
- 1.4 Preparation of LULC Maps from aerial photographs on the basis of feature identification keys

UNIT 2.0 VISUAL INTERPRETATION OF SATELLITE IMAGES

- 2.1 Concept of sensors, bands and resolution: Influence of these factors on satellite imaging
- 2.2 Principles of preparing standard FCCs with special reference to IRS series satellites
- 2.3 Referencing scheme and selection procedure of IRS images
- 2.4 Preparation of thematic overlays from satellite photoproducts on the basis of feature identification keys

UNIT 3.0 DIGITAL IMAGE PROCESSING

- 3.1 Image enhancement techniques: methods and applications.
- 3.2 Georeferencing of scanned maps and images; Applying reference spheroids (WGS-84 & Everest) and projections (Universal Transverse Mercator & Polyclonic); Mosaicing and layering of images, scanned aerial photographs and maps of different dates and scales.
- 3.3 Unsupervised and Supervised image classification and generation of classification report
- 3.4 Hybrid Image Classification, Accuracy assessment using spectral separability; Class editing; generation of classification report;

UNIT 4.0 GIS DATA PROCESSING

- 4.1 Generation of buffers and query in GIS
- 4.2 Generation of Land information of any selected Region
- 4.3 Socio-economic change detection study using Census data

PRACTICAL NOTEBOOK AND VIVA-VOCE

SEMESTER IV

PAPER- 406

TERM PAPER (on Special Paper)

FULL MARKS 50

Written Report: 30 and Viva Voce: 20

The Term Paper on respective special paper will be a comprehensive work based on conceptual aspects, field work analysis of primary and secondary data in the laboratory. It should mention the objectives, sources of information, methods and approaches. Interrelations between different aspects of the study should be the focus of the term paper.

Text of the term paper should not exceed 10,000 words and should ideally be divided into the following sections: • Introduction, • Statement of problem(s) and Objectives • Information and Analysis, • Results • Discussions • Conclusions • References / Bibliography and • Appendices (if any).

Maps, diagrams and sketches, excluding photographs, should not exceed 30 pages of A4 size paper.

Each of the Term Paper is to be produced individually by the students and this must be stated clearly in a certificate from the supervisor(s). Photocopying and/or bulk computer typing are not to be allowed in any form.

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PAPER 302: POPULATION AND HUMAN DEVELOPMENT

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