# University of Gour Banga

**(Established under West Bengal Act XXVI of 2007)**

**N.H.-34(Near Rabindra Bhawan), P.O.:Mokdumpur Dist.: Malda, West Bengal, Pin-732103**

## M.A./M.Sc. in Geography

## Two Years (Four Semesters) Syllabus

# Main Feature of the Syllabus

## M.A./M.Sc. in Geography

| Semester | Module | Module Name | Marks | Time |
|---|---|---|---|---|
| I | MODULE – 1 | Geotectonics and Geomorphology | 45 | 2.00 Hr |
| | MODULE – 2 | Climatology | 45 | 2.00 Hr |
| | MODULE – 3 | Resource Studies and Its Management | 45 | 2.00 Hr |
| | MODULE – 4 | Philosophy of Geography | 45 | 2.00 Hr |
| | MODULE – 5 | Practical | 70 | 4.00 Hr |
| **Total** | | | **250** | |
| II | MODULE – 6 | Hydrology and Oceanography | 45 | 2.00 Hr |
| | MODULE – 7 | Soil and Biogeography | 45 | 2.00 Hr |
| | MODULE – 8 | Social and Cultural Geography | 45 | 2.00 Hr |
| | MODULE – 9 | Settlement Geography | 45 | 2.00 Hr |
| | MODULE – 10 | Practical | 70 | 4.00 Hr |
| **Total** | | | **250** | |
| III | MODULE – 11 | Population and Food Security | 45 | 2.00 Hr |
| | MODULE – 12 | Historical and Political Geography | 45 | 2.00 Hr |
| | MODULE – 13 | Development Studies | 45 | 2.00 Hr |
| | MODULE – 14 | Environmental Issues and Policies | 45 | 2.00 Hr |
| | MODULE – 15 | Practical | 70 | 4.00 Hr |
| **Total** | | | **250** | |
| IV | MODULE – 16 | Regionalization & Regions : India | 50 | 2.00 Hr |
| | MODULE – 17(A)/ MODULE – 17(B) | Special Paper Theory | 50 | 2.00 Hr |
| | MODULE – 18(A)/ MODULE – 18(B) | Special Paper Theory | 50 | 2.00 Hr |
| | MODULE – 19 | General Practical | 40 | 2.00 Hr |
| | MODULE – 20 | Special Paper Practical | 50 | 2.00 Hr |
| **Total** | | | **250** | |
| **Grand Total** | | | **1000** | |

**Special Paper**

17(A) Geoinformatics ;
17 (B) Geography of Social Well-Being with Special Reference to India
18 (A) Fluvial Geomorphology
18 (B) Advanced Geography of Development and Under Development

# Detailed Syllabus

## SEMESTER SYSTEM -TERMS & CONDITIONS

There shall be full-time M.A./MSc. Course in Geography of two years' duration. There shall be Semester System spreading over four Semesters, each of six months. There shall be 1000 marks in total and each Semester shall carry 250 marks.

## BASIC STRUCTURE

There shall be **20 Modules (15 Theoretical, 5 Practical, One Field Report and One Dissertation (Area-Study**) to cover the whole Syllabus and each Semester shall contain five Papers. Each theory Paper carries 45 marks and each practical paper carries 50 marks (including 45 marks external and 5 marks internal) except 3rd and 4th Semester. In 4th Semester one general paper and one special paper practical will individually carry 45 marks. One term paper carries 20 marks should be prepared and presented by each student in each semester in 1st and 2rd Semesters. Total marks of the term paper will be allocated for term paper preparation and presentation. One field report of 25 marks will be prepared and presented by each student individually in 3rd semester.

There will be one dissertation paper (area study) in 4th Semester which will carry 25 marks.

### TERM PAPER PREPARATION AND PRESENTATION

Teachers will provide separate topics for the term papers in 1st and 2rd semester. They individually work on the given topic and will be submitted on the stipulated date set by the department, of course within the one semester tenure. One term paper will carry 20 marks. Marks division will be like 15 + 5 = 20. Out of 20, 15 marks will be allotted for submitted written term paper and 5 marks will be given for presentation of the term paper in front of the fellow students and all the teachers of the Department. Each term paper should have the following parts - Abstract – Keywords –Introduction – About Study Area – Previous Literatures - Objectives – Materials and Methods – Results ad Discussions – Conclusion – References – appendices (if any). Term Paper size should not exceed 16 A4 size pages (font size 12; spacing 1.5) with all maps diagrams and tables. This term paper evaluation process will be internal.

### FIELD REPORT

One field report, which will carry 25 marks, will have to prepare by the students for a particular area. Area will be selected in some of the geographically significant sites within the native state of this University (UGB). Size of the Field Report should not exceed 30 A4 size pages with 12 font size and 1.5 spacing. For preparing Field report, students will be allocated among the concerned faculty members of the department. Decision regarding allocation of student under different faculty members will be taken by Departmental Committee (DC). Evaluation will be done in two phases a) evaluation of the submitted field report and b) presentation of the Field Report in front of the fellow students and all the faculty members. Out of 25 marks, 20 marks will be allotted to the submission of prepared field report and 5 marks will be allocated for presentation of the field report. Evaluation process will be internal within the tenure of 3rd Semester.

### DISSERTATION (AREA-STUDY)

A Dissertation (Master's Thesis) of any branch of Geography will be a comprehensive work based on conceptual aspects, field work and analysis of primary and secondary data in the laboratory. Dissertation should contain the objective, sources of information, web resources, methods and approaches. Interrelations among different aspects of the study should be the focus of the dissertation. Text of the dissertation should not exceed 10,000 words and should ideally be divided into the following sections: Introduction, Statement of problem(s), Review of Literature, Objective,

Methodology, Information and Analysis, Results, Discussions, Conclusions, References/Bibliography and Appendices (if any). Maps, diagrams and sketches, excluding photographs, should not exceed 50 pages of A4 size paper, typed on 1.5 space and 12 font size format. It is to be produced individually by the students and this must be stated clearly in a certificate from the Supervisor(s) and Head of the Department, Geography.

The Dissertation will be will be evaluated on the basis of (a) Written Report submitted and (b) Seminar presentation or viva-voce (20+5 marks).

**PAPER SETTING AND EVALUATION:**

**THEORY PAPERS**

Number of lectures to be delivered for each of the Units 1, 2, 3 & 4 will be 12 (i.e. 12×4 = 48 lectures). Each unit carries 10 marks (10 x 4 =40). Eight questions (each question containing 10 marks) are to be set from four units and each unit contains two questions. Students have to attempt one question from each Unit. Each question should have at least two parts. Five short questions from four units will be selected and each question will carry 1 mark (1 x 5 =5). Paper Setting will have normally 50% External and 50% Internal Examiner System. Moderation of question papers will be performed by a board of Moderators including at least one external member from other Universities. Evaluation of the theory papers will be performed by the concerned internal examiners.

**PRACTICAL PAPERS**

Number of periods to be assigned for each of the Units 1, 2, 3 & 4 will be 20 each. Four compulsory questions are to be set, one from each of the four Units (4×10 = 40 marks). 5 marks are allotted for evaluation of Practical Laboratory Notebook: 2 marks + Viva-voce: 3 marks (total 5 marks). 5 Marks shall be awarded on the basis of internal assessment in 1$^{st}$ and 2$^{nd}$ Semesters. In 3$^{rd}$ and 4$^{th}$ semester there will be no internal assessment marks.

In 4$^{th}$ semester general practical paper there will be 3 units and each will carry equal marks.

**SELECTION OF SPECIAL PAPER**

The Department would offer two specialized branches-

a. Physical Geography with special emphasis on (i) Fluvial Geomorphology and (ii) Geoinformatics

b. Social Geography with special emphasis on (i) Geography of Social Wellbeing (ii) Advance Geography of Development and Under Development

Students can opt any of the above mentioned subject combination during 4$^{th}$ Semester. In special circumstances Head of the Department/In charge along with the faculty members will decide about balance allocation of the students in respective specialization branches.

**PROCEDURE FOR SPECIAL PAPER PRACTICAL EXAMINATION**

One Special paper practical will be offered in the respective branches (Physical or Social Geography). In 4$^{th}$ semester special practical paper there will be 3 or 4 units and each will carry equal marks.

**DIVISION OF MARKS**

**STRUCTURE OF THE SYLLABUS**

| | Full Marks | Theoretical | Practical |
|---|---|---|---|
| Semester I | 250 | 180 | 70 |
| Semester II | 250 | 180 | 70 |
| Semester III | 250 | 180 | 70 |
| Semester IV | 250 | 135 | 115 |
| Total Marks | 1000 | 675 | 325 |

## SEMESTER-I

| Module | Subjects | Marks | Duration of Examination |
|---|---|---|---|
| 1 | Geotectonics and Geomorphology | 45 | 2 Hours |
| 2 | Climatology | 45 | 2 Hours |
| 3 | Resource Studies and Its Management | 45 | 2 Hours |
| 4 | Philosophy of Geography | 45 | 2 Hours |
| 5 | Practical | (45+5+20) = 70 | 4 Hours |
| | (i) Remote Sensing I | External 45 | |
| | (ii) Statistics I | Internal 5 | |
| | (iii) Field Work Techniques and Surveying I | | |
| | (iv) Map Projections | | |
| | (v) Term Paper | 20 | |

## SEMESTER-II

| Module | Subjects | Marks | Duration of Examination |
|---|---|---|---|
| 6 | Hydrology and Oceanography | 45 | 2 Hours |
| 7 | Soil and Biogeography | 45 | 2 Hours |
| 8 | Social and Cultural Geography | 45 | 2 Hours |
| 9 | Settlement Geography | 45 | 2 Hours |
| 10 | Practical | (45+5+20) = 70 | 4 Hours |
| | (i) Remote Sensing II | External 45 | |
| | (ii) Statistics II | Internal 5 | |
| | (iii) Learning of one Statistical Spreadsheet (Microsoft Excel) | | |
| | (iv) GIS I | | |
| | (v) Term Paper | 20 | |

## SEMESTER-III

| Module | Subjects | Marks | Duration of Examination |
|---|---|---|---|
| 11 | Population and Food Security | 45 | 2 Hours |
| 12 | Historical and Political Geography | 45 | 2 Hours |
| 13 | Development Studies | 45 | 2 Hours |
| 14 | Environmental Issues and Policies | 45 | 2 Hours |
| 15 | Practical | (45+25) = 70 | 4 Hours |
| | (i) Remote Sensing III | External 45 | |
| | (ii) Soil testing and Pollution measurement | | |
| | (iii) Field Work Techniques and Surveying II | | |
| | (iv) GIS II | | |
| | (v) Field Report | 25 | |

# SEMESTER-IV

| Module | Subjects | Marks | Duration of Examination |
|---|---|---|---|
| 16 | Regionalization & Regions : India | 45 | 2 Hours |
| 17(A) / 17 (B) | Special Paper Theory | 45 | 2 Hours |
| 18(A) / 18(B) | Special Paper Theory | 45 | 2 Hours |
| 19 | General Practical | (45+25) = 70 | 2 Hours |
| | (i) Remote Sensing IV | External 45 | 4 Hours |
| | (ii) SPSS Package for Quantitative Technique | | |
| | (iii) GIS III | | |
| | (iv) Dissertation | 25 | |
| 20 A/20B | Special Paper Practical | 45 | |

**Special Paper**

17(A) Geoinformatics ;

18 (A) Fluvial Geomorphology

17 (B) Geography of Social Well-Being with Special Reference to India Development and Under Development

18 (B) Advanced Geography of

# SEMESTER – I

**MODULE – 1**

**GEOTECTONIC & GEOMORPHOLOGY**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Geotectonic** |
| | 1.1 | Geological Time Scale (using fossil and nuclear clocks); Concept of Spatial and Temporal Scales |
| | 1.2 | Theories of Origin of the Earth, Earth's Crust and the Interior of the Earth: Seismological Evidences |
| | 1.3 | Earth Movements: Orogenic and Epeirogenic Forces |
| | 1.4 | Sea floor Spreading and Plate Tectonics |
| **UNIT** | **2.0** | **Geomorphological Conditions** |
| | 2.1 | Fundamental Concepts in Geomorphology, Place of Geomorphology in Geography |
| | 2.2 | Concept of Grade, Profile of Equilibrium and Base Level |
| | 2.3 | Evolution of Topography: Cyclic and Non Cyclic Concepts |
| | 2.4 | Environmental and Applied Geomorphology |
| **UNIT** | **3.0** | **Morphometry** |
| | 3.1 | Elements of Slope; Theories of Slope Development and Slope Evolution |
| | 3.2 | Relationship between Longitudinal and Transverse Slope Regression |
| | 3.3 | Channel Forms and Their Adjustment to Morphological Variables |
| | 3.4 | Morphometric Analysis of Drainage Basin: Linear, Areal and Relief Aspects |
| **UNIT** | **4.0** | **Geomorphic Processes and Hazards** |
| | 4.1 | Tropical Geomorphology: Fluvial Process and Land form |
| | 4.2 | Quaternary Geomorphology: Glacial |
| | 4.3 | Quaternary Geomorphology: Periglacial, Paraglacial and Nival Processes and Landform |
| | 4.4 | Geomorphic Hazards: River Bank Erosion, Land Slide, Desertification |

## MODULE 2

## CLIMATOLOGY

**Full Marks: 45** **Exam. Duration: 2 Hour**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **The Atmosphere** |
| | 1.1 | Composition and Internal Structure of the Atmosphere |
| | 1.2 | Prevailing and adiabatic Lapse Rates, Instability of Dry and Moist Air, Geopotential |
| | 1.3 | Classification of Air mass |
| | 1.4 | Cloud and Fog Classification |
| **UNIT** | **2.0** | **PRECIPITATION AND WEATHER DISTURBANCES** |
| | 2.1 | Theories of Rain Drop Formation |
| | 2.2 | Condensation Nuclei and Artificial Rainfall |
| | 2.3 | Monsoon System |
| | 2.4 | Temperate and Tropical Cyclones, Tornadoes, ENSO and Related Hazards |
| **UNIT** | **3.0** | **Classification of Climate and Related Issues** |
| | 3.1 | Concept of Macro and Micro Climate, Numerical Models |
| | 3.2 | Classification of Climate: Trewarta and Strahler |
| | 3.3 | The Classification of Climate: The Case of India-Koppen and Champion |
| | 3.4 | Water Budget; Agro Climatology |
| **UNIT** | **4.0** | **Climate Changes and its Impact** |
| | 4.1 | Climate Changes: Cycles & Theories |
| | 4.2 | Global Warming: Causes and Consequences |
| | 4.3 | Ozone Depletion: Causes and Consequences |
| | 4.4 | Vulnerability of Climate Change & its Impact Assessment- EIA, IPCC reports |

## MODULE 3

## RESOURCE STUDY AND ITS MANAGEMENT

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Concepts** |
| | 1.1 | Concept of Resource: Natural and Human |
| | 1.2 | Classification of Resources |
| | 1.3 | Exploitation and conservation strategies |
| | 1.4 | Top-Down and Bottom-Up approaches to Resource Management with Special Reference to People's Participation |
| **UNIT** | **2.0** | **Natural Resources** |
| | 2.1 | Land Resource: Uses of Land Resource-Agriculture & Non-Agricultural, Land use and Land cover, Soil Fertility, Land Capability & Productivity |
| | 2.2 | Agricultural Productivity and Efficiency: Measurement & Role of Changing Technology, Crop Combination, Crop Rotation & Crop Diversification, Techniques of Delineating Agricultural Regions |
| | 2.3 | Water and Biotic Resources: Uses, Distribution over space & Time, Fishing and catch per unit effort, maximum sustainable yield, forest density, forest coup, and forest regeneration |
| | 2.4 | Value, Demand & Concept of Sustainable Development, Forgone Income and Cost of Sustainability, Carbon Trade |
| **UNIT** | **3.0** | **Manmade Resources** |
| | 3.1 | Definition, Scope & Content of Industrial Geography, Classification of Industries, Agro-Based, Animal Based, Metallic & Non-metallic, Localized and Footloose |
| | 3.2 | Theories of Industrial Location: Losch, Berry |
| | 3.3 | Industrial Policy, Role of Liberalization, Privatization and Globalization |
| | 3.4 | Selected Industries: Food Processing, automobile and pharmaceutical |
| **UNIT** | **4.0** | **Economic Sectors & Spatial Organization** |
| | 4.1 | Sectors of Economy: Primary, Secondary, Tertiary, Quaternary and Quinary |
| | 4.2 | Spatial Organization of Economies: Agricultural & Industrial Regions-global & Indian, Ranking of World Economies by World Bank |
| | 4.3 | International and Interregional Trade, Role of International Agreements & Organizations- GATT, WTO, World Bank |
| | 4.4 | Information Technology, Concept of Export Processing Zone & E-Commerce |

## MODULE 4

## PHILOSOPHY OF GEOGRAPHY

**Full Marks: 45** **Exam. Duration: 2 Hour**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Evolution of Geographical Thought** |
| | 1.1 | Evolution Geography: Ancient, Medieval, Modern Periods with Special Reference to Colonialism, World Wars & Post Colonial Developments |
| | 1.2 | Place of Geography in the classification of Knowledge with Special Reference to Kant |
| | 1.3 | Theory and Paradigm in Geography with Special Reference to Kuhn |
| | 1.4 | Pragmatism, Functionalism, Phenomenology, Existentialism, Realism, Environmentalism, Marxist Interpretation in Geography with reference to Dialectical & Historical Materialism |
| **UNIT** | **2.0** | **Dichotomies in Geography** |
| | 2.1 | Dichotomy & Dualism in Geography: Physical & Human; Regional (idiographic) Vs Systematic (Nomothetic) Approach; Inductive & Deductive Methods, Qualitative Vs Quantitative Approach |
| | 2.2 | Schaefer-Hartshorne Debate; Areal Differentiation & Spatial Organization |
| | 2.3 | Social Darwinism in Geography, Concepts of Geopolitics |
| | 2.4 | Interdisciplinary nature of Geography: in content and approach |
| **UNIT** | **3.0** | **Geography as a Social Science** |
| | 3.1 | Concept of Space, Social Space and the Domain of Humanistic Geography |
| | 3.2 | Geography of Inequality |
| | 3.3 | Social Justice and Welfare Geography |
| | 3.4 | Geography of Gender |
| **UNIT** | **4.0** | **Recent Shifts in Geographical Thought** |
| | 4.1 | Systems Approach in Geography: General Systems Theory; Content of Objects/or Elements in a system, Relationships between Objects; Input, Output and Leakages in a system, Classification of Systems |
| | 4.2 | Ecological Approach in Geography: Ecosystem, Human Social & Urban Ecology |
| | 4.3 | Modernism & Postmodernism in Geography |
| | 4.4 | Critical Geography: Ideas of David Harvey |

**MODULE 5**
**PRACTICAL**

**Full Marks: 50** **Exam. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Remote Sensing I** |
| | 1.1 | Principals of Remote Sensing: Energy Sources & Radiation; Energy Interactions with Earth Surface Features |
| | 1.2 | Data Acquisition techniques; Types of Remote Sensing data and methods of interpretation and analysis with special reference to study of aerial photographs and satellite images |
| | 1.3 | Characteristics of Digital data and Fundamentals of Digital Image Processing; Image Rectification and Restoration: Band Combination, TCC and FCC Creation; Image Sub setting; Moasicking; PCA Analysis. |
| | 1.4 | Land use and Land-Cover Mapping |
| **UNIT** | **2.0** | **Statistics I** |
| | 2.1 | Descriptive and Inferential Statistics, Probability, Scales & Levels of Measurement |
| | 2.2 | Measures of Central Tendency and Dispersion and the moments of distribution: Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode, Range, Standard Deviation, Higher Order Moments |
| | 2.3 | Concept of Non-parametric tests: Chi-Square & Spearman's Rank Correlation, Tests of Hypothesis, level of Significance and Confidence, Two Tailed & One Tailed Tests, Type One and Type Two Error, T-Test |
| | 2.4 | Linear Regression and Correlation, Test of Significance |
| **UNIT** | **3.0** | **Field Work Techniques and Surveying-I** |
| | 3.1 | GPS-Handling of the Equipments, Measurement of Latitude, Longitude and Altitude |
| | 3.2 | Use of Clinometers |
| | 3.3 | Abney's Level |
| | 3.4 | Conceptualization & Framework for formulation of a research project, identification of research problem, literature review, formulation of central questions and hypothesis (if required), collection of secondary and primary data, questionnaire preparation |
| **UNIT** | **4.0** | **Map Projections** |
| | 4.1 | Simple Conical Projection with two Standard Parallel |
| | 4.2 | Bonne's |
| | 4.3 | Mercator |
| | 4.4 | Modified International and UTM |

# SEMESTER – II

**MODULE - 6**

**HYDROLOGY AND OCEANOGRAPHY**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Fundamental Concepts of Hydrological Cycle and Surface Hydrology** |
| | 1.1 | Hydrology: Definition, Hydrological Cycles, Characteristics, Significance and Interpretation |
| | 1.2 | Global Hydrological Cycle : Special Reference to Global Storage and Atmospheric Transportation of Heat |
| | 1.3 | Surface Hydrology: Water and Runoff Characteristics & Distribution; Runoff – Rainfall: Conceptual and Empirical Model Relationship |
| | 1.4 | Drainage Basin Hydrology: River Regime, Stream Flow Measurement, Hydrograph and their Applications, Flood Analysis |
| **UNIT** | **2.0** | **Concept of Subsurface Hydrology & Integrated Basin Management** |
| | 2.1 | Components of Subsurface Hydrology; Aquifer and their Characteristics; Processes and Loss, Controlling Movement & Storage; Watershed Leakage |
| | 2.2 | Definitions and Characteristics of Precipitation, Evaporation, Evapo-Transpiration, Infiltration, Rainfall Recharge Relationship, Estimation of Recharge |
| | 2.3 | Measurement, Input, Method of Reduction and Concept of Applied Hydrology |
| | 2.4 | Watershed and Principles of Integrated Basin Management; Concept of Micro watershed Planning, Water Management in Tropical Cities and Rainwater Harvesting |
| **UNIT** | **3.0** | **Morphology of Ocean** |
| | 3.1 | Origin, Characteristics and Classification of the Major Structural and Morphological Features of the Ocean with particular Reference to Plate Tectonics |
| | 3.2 | Bottom Configuration of Indian, Atlantic and Pacific Oceans |
| | 3.3 | Oceanic Sediments: Origin, Classification and Movement |
| | 3.4 | Coral Reefs and Atolls: Evolution, Factors and Types |
| **UNIT** | **4.0** | **Properties of Ocean Water** |
| | 4.1 | Distribution of Temperature and Salinity in the Ocean: Halocline, Picnocline, Thermocline, T-S Diagram; Surface Circulation; Causes of Ocean Currents and Important Current Systems; Deep Circulation |
| | 4.2 | Water Mass: Origin, Evolution, Physical and Chemical Properties, Convergence and Upwelling, Waves, Tides and Currents: Genetic Classification and Models of Formation, Air Sea Interaction |
| | 4.3 | Sea Level Change: Causes, Types and Implications |
| | 4.4 | Ocean as a Resource: Anthropogenic Utilization of the Oceans, Oceanic Laws: EEZ, CRZ |

**MODULE 7**

**SOIL AND BIO GEOGRAPHY**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | |
|---|---|
| **1.0** | **Soil Geography** |
| 1.1 | Soil as a component of Biosphere, Concept of land and soil; Plant-water-soil relationship |
| 1.2 | Soil nutrients and organisms, Role of Physico-chemical properties in Soil fertility and productivity. |
| 1.3 | Soil taxonomy: USDA and FAO systems of soil classification |
| 1.4 | Soil degradation; Causes and processes, consequences, soil amelioration and conservation. |
| **2.0** | **Plant Geography** |
| 2.1 | Plant ecology: Habitat factors, Plant response to environment; adaptation, succession and climax, domestication of plants |
| 2.2 | Forest types: Phyto-geographical regions |
| 2.3 | Concept of plant species, family & genera |
| 2.4 | Forms and functions of major natural ecosystems; forest, grassland, mountain & marine ecosystems, biological desert. |
| **3.0** | **Zoo Geography** |
| 3.1 | Evolution of species, critics of Darwinism; origin of neo-species |
| 3.2 | Dispersion and migration of Animals: Means and Barriers |
| 3.3 | Aquatic life and Marine Fauna |
| 3.4 | Distribution of animals in Different geological periods; Pre Pleistocene and Post-Pleistocene |
| **4.0** | **Physical Ecosystem and Human Population** |
| 4.1 | Principles of Physical and Human ecosystems and related models |
| 4.2 | Population Dynamics of Organisms and Problems of their abundance and extinction |
| 4.3 | Biodiversity and its importance |
| 4.4 | Conservation strategies |

**MODULE 8**

**SOCIAL AND CULTURAL GEOGRAPHY**

**Full Marks:45** **Exam. Duration: 2 Hours**

| Unit | Subject |
|---|---|
| **1.0** | **Concepts in Social Geography** |
| 1.1 | Social Geography: Definition, Evolution, Nature of Social Geography and Approaches |
| 1.2 | Concepts of Social structure, social processes and social patterns; Significance of models in social geography |
| 1.3 | Concepts of social welfare and social wellbeing: World and India |
| 1.4 | Concept of social inequality, social security, social justice and social planning |
| **2.0** | **Elements in Social Geography** |
| 2.1 | Space in Social Geography: material and social space |
| 2.2 | Ethnicity; race, tribe, caste and class with special reference to India. |
| 2.3 | Geography of Religion: The World and India |
| 2.4 | Geography of language: Classification and spatial distribution of language in world and in India |
| **3.0** | **Concepts in Cultural Geography** |
| 3.1 | Definition, nature and evolution of Cultural Geography: Material and Non- Material culture |
| 3.2 | Origin of culture: Concepts of cultural hearth and cultural realm |
| 3.3 | Cultural system, cultural region and cultural landscape |
| 3.4 | Cultural Diffusion: Theories, processes and patterns |
| **4.0** | **Cultural Process and Transformation** |
| 4.1 | Socio-cultural transformation: Adaptation and integration |
| 4.2 | Culture and technology: Eco-centric and techno-centric views |
| 4.3 | Culture and development: Sanskritization, De-sanskritization, Westernization and modernization; globalization of culture |
| 4.4 | Cultural complexity and change: cultural diversity, cultural segregation and cultural regeneration |

**MODULE 9**

**SETTLEMENT GEOGRAPHY**

**Full Marks:45** **Exam. Duration: 2 Hours**

| Unit | Subject |
|---|---|
| **1.0** | **Rural Settlements** |
| 1.1 | Concept of settlement and ekistics, scope and content of Settlement geography |
| 1.2 | Definition of rural and urban settlements-census categories; site and situation of settlements-factors and examples; evolution and growth of rural settlements with examples from the World and India. |
| 1.3 | Theories of evolution of rural settlements: Bylund, Hudson Green |
| 1.4 | Classification of rural settlements: IG Congress and Champion's classification. |
| **2.0** | **Characteristics of Rural Settlements** |
| 2.1 | Settlement hierarchy and rural service canters |
| 2.2 | Study of rural settlements; types, patterns and segregation in India and the World |
| 2.3 | Rural house types and forms in India |
| 2.4 | Problems of access, stability and infrastructure faced by rural settlements in India |
| **3.0** | **Urban Settlements** |
| 3.1 | Definitions of urban settlements, urbanism and urbanization- the world and India |
| 3.2 | Urbanization and its significance with reference to developed and developing countries; Urban primacy and Rank Size Rule |
| 3.3 | Classification of urban settlements: Taylor and Huston, Mumfords; classifications based on technological characteristics and cultural rise and fall, Chauncy D. Harris and Nelson |
| 3.4 | Concepts of conurbation, Metropolis and Megapolis, Ecumenopolis |
| **4.0** | **Characteristics of Urban Settlements** |
| 4.1 | Morphology of towns: Concentric zone theory, Sector theory, Multiple nuclei theory, Alonso's theory and Peri-urban model of Sinclair |
| 4.2 | Urban hierarchy and spacing of urban settlements: Christaller, Smailes and Philbrick; application in Indian context |
| 4.3 | Urban Ecology; City and region; Urban Fringe |
| 4.4 | Urban problems , policies, Urban regeneration processes and planning with special reference to India |

**MODULE 10**

**PRACTICAL**

**Full Marks: 50** **Exam. Duration: 4 Hours**

| Unit | Subject Name |
|---|---|
| **1.0** | **Remote Sensing II** |
| 1.1 | Comparison of air photos, Satellite Images and topographical maps |
| 1.2 | Image Enhancement: Spatial, Spectral and Radiometric Enhancement; Fourier Analysis |
| 1.3 | Image Georeferencing (GCP base Image Georeferencing) |
| 1.4 | Image Registration (Corrected Image Base Georeferencing ) |
| **2.0** | **Statistics II** |
| 2.1 | Correlation Matrix; Regression Analysis of Curvilinear relationships: multiple, second degree, exponential, logistic |
| 2.2 | Multivariate Analysis: Classification and Procedure, Application |
| 2.3 | Factor Analysis Methods: Principal Component; Centroid and Maximum Likelihood |
| 2.4 | Analysis of Variance: One way and two way analysis |
| **3.0** | **Learning of one Statistical Spreadsheet (Microsoft Excel )** |
| 3.1 | Data Tabulation and Data Manipulation and Restoration |
| 3.2 | Graphical Techniques and Diagrammatic Representation (1, 2 & 3 dimensional) |
| 3.3 | Calculation and Representation of Central Tendency Measures, Variance, Skewness |
| 3.4 | Trend Analysis: Least square, Exponential, Polynomial, Power |
| **4.0** | **GIS I** |
| 4.1 | Fundamentals of Geographic Information System |
| 4.2 | Concept of Spatial and aspatial data in GIS; Types of Spatial Data-Vector and Raster Data Coding, manipulation and analysis |
| 4.3 | Attribute Data and Application of GIS in different types of decision making |
| 4.4 | Scanning, Georeferencing, Digitization; Reading of Latitudinal and Longitudinal Values and measurement of distances.. |

# SEMESTER – III

**MODULE-11**

**POPULATION AND FOOD SECURITY**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| Unit | Subject name |
|---|---|
| **1.0** | **Population Dynamics** |
| 1.1 | Population Geography: Nature, Trends and its relation with Demography |
| 1.2 | Different schools of Thought in Population Studies, Economic and Social Values and their Influence on the evolution of population policies |
| 1.3 | Population growth in Developed & Developing Countries: Fertility, Morbidity, Mortality, Growth Rates, Sex Ratio (Primary, Secondary & Tertiary Sex Ratio) and Associated Problems, Concept of Stationary & Stable Population |
| 1.4 | Population Quality: Literacy, Health & Occupation |
| **2.0** | **Theories of Population Growth & Migration** |
| 2.1 | Marxist Concept of Surplus Population: Dumonts Hypothesis |
| 2.2 | Theories of Migration: Lee, Revenstein, Zelinsky, Lewis and Todaro |
| 2.3 | Theories of Optimum Population: Concepts of Threshold Population |
| 2.4 | Types and Methods of Population Projections |
| **3.0** | **Population Characteristics of India** |
| 3.1 | Population Growth and Differential Growth Rates of Different States of India, Fertility, Mortality, Differentials; Stages of Demographic Transition Reached by Different States |
| 3.2 | Sex Ratio: Temporal and Spatial Trends; Implications & Problems |
| 3.3 | Quality of Population (Literacy, Health and Occupation) of India & Different States; Implications and Problems |
| 3.4 | Population policies: India Compared to China and Sweden, Population-Development Debate: Ehrlich and Amartya Sen's Views |
| **4.0** | **Food Security** |
| 4.1 | Food-Fertility Related Nexus Related Theories of Fertility; Theories of Castro, Spencer and Doubleday |
| 4.2 | Dimensions of Food Security: Food Availability, Access, Food Absorption- Malnutrition and its measurement |
| 4.3 | Famine: Causes and Impact; Natural and Manmade; Amartya Sen’s views on Famines |
| 4.4 | National Policies on Food security with special reference to India |

**MODULE 12**

**HISTORICAL AND POLITICAL GEOGRAPHY**

**Full Marks: 45** **Exm. Duration: 2 Hours**

| | |
|---|---|
| **1.0** | **Nature of Historical Geography** |
| 1.1 | Historical Geography: Definition, Scope, Content and Nature of Historical Geography |
| 1.2 | Evolution of Historical Geography: Concept of History, Historiography and their relation with Historical Geography |
| 1.3 | Approaches in the Study of Historical Geography: Views Derby, Hartshorne, Sauer and Clarke; Alternative Ideas of Phenomenological and Bhevioural Schools – Wright and Guelke |
| 1.4 | Historical Constructs: Maps and its Evolution through Historical periods; Chronicles, Archives, Text, Epics. |
| **2.0** | **Historical Geography of India** |
| 2.1 | Evolution of Regional and Urban pattern in India; Ancient period with reference to Sixteen Mahajanapadas. |
| 2.2 | Medieval period with reference to travel accounts of Huen Tsiang and Ibn-e- Buatuta; Urbanization in Mughul period. Territorial organization of Empire: Agriculture, Industry, Trade and commerce during Mughul period. |
| 2.3 | Impact of colonialism during British period; Introduction to cash crops, Industrialization, Decline of Handloom Industries; Urbanization in the colonial period |
| 2.4 | Introduction to railways; expansion of transport networks, development of ports, suctions mechanisms of ports; origin of development of gateway cities. |
| **3.0** | **Nature of Political Geography** |
| 3.1 | Politics, power and political geography: Theories of distribution of power in society; political authority; high politics versus low politics; nature scope, content of Political geography, relation with other branches of social sciences; nation-state-territory as the central organizing principle of Political Geography |
| 3.2 | Evolution of political geography: Classical- Ratzel , German Geopolitics, Mackinder, modern phase 1930-1970, Post modern- after1970. |
| 3.3 | Dimensions of political geography: Political Geography as the politics of place; Functional approach, Unified field theory Genetic-Functional The rise of quantitative electoral Geography. |
| 3.4 | Geopolitics, Boundaries and capitals: Power and politics in the world economy; definition of geopolitics, geopolitical world orders; geopolitical codes; formation of frontiers and boundaries, border lands, buffer zones, buffer states and land locked station |
| **4.0** | **Political Geography of India** |
| 4.1 | Geopolitical setting of India and Security issues, roles functions and achievements of SAARC and ASEAN as international organization in Asia. |
| 4.2 | Bases of reorganization of Indian states since independence: Federalism, centre state relation; social conflicts and formation of new states-advantages and disadvantages |
| 4.3 | Governance and public administration: Geography of public administration and landscape formation (Local and Regional scales); Area administration and landscape transformation in India with special reference to Evolution of local self government administration; $74^{th}$ amendment of the constitution and local self government, Nagar Palikas |
| 4.4 | Border disputes: Border infiltration, International and interstate disputes. |

**MODULE 13**

**DEVELOPMENT STUDIES**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | |
|---|---|
| **1.0** | **Definition and Theories of Development and Under Development** |
| 1.1 | Definition of Development: Economic, Social, Human; Indices of Human Development (HDI,HPI,GDI<GEM) and their use at global, national and state levels with special reference to India |
| 1.2 | Theories of Underdevelopment: Modernization and Diffusion Theories of Development (Social Differentiation and Social Mobilization, Vicious Circle of Poverty, Critiques & Crisis); Dependency Theory (Structuralism and Dependency), Marxism and its strand in Development Theories, Capitalist Underdevelopment; Social Development Theory; Social Justice and Social Exclusion; Amartya Sen's views on Social Development |
| 1.3 | Polarized Growth at the Global level and Core-Periphery Concept |
| 1.4 | Globalization, Trade and Development |
| **2.0** | **Socio-Economic Transformation and Development** |
| 2.1 | Role of Agriculture in Economic Development; Impact of technological Changes in Agriculture on the Process of Development |
| 2.2 | Role Industry and Trade in Economic Development; impact of Technological Changes in Industry, Trade and Commerce on the process of development |
| 2.3 | Labour Surplus Theory & Sectoral Labour Transfer Mechanisms, Technological Transformation and Mechanization, Labour Intensive versus Capital Intensive Strategies of Development with examples from World and India |
| 2.4 | Linkages between Growth and Economic Development: Commodity, Human and Monetary Linkages |
| **3.0** | **Governance and Development** |
| 3.1 | The State and Development: Centralized and De-Centralized Development |
| 3.2 | Strategy of Participatory Development-World and India |
| 3.3 | Local Self Governance: Rural & Urban with Special Reference to India |
| 3.4 | Concept of Sustainable Development, Cost of Sustainability |
| **4.0** | **Spatial Dimensions of Deprivation and Under Development** |
| 4.1 | Economic Deprivation and poverty: Measurement and Spatial variation of Poverty- World and India, Causes and Consequences |
| 4.2 | Social Deprivation: Education, Health, Gender Bias & Differential Participation in Economic Development- World and India; Causes and Consequences |
| 4.3 | Strategies of Poverty Eradication-The World and India |
| 4.4 | Social Development Programmes-The World and India |

**MODULE – 14**

**ENVIRONMENTAL ISSUES AND POLICIES**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Concept of Environment** |
| | 1.1 | Perception of Environment: Geographer's Approach to Environment, Dualistic and Monistic View, Concept of Space-ship Earth, Gaia Hypothesis, Concept of Holistic Environment. |
| | 1.2 | Ecological Principles in Geographical Studies, a Historical Overviews, Applicability and Limitations of Ecological Models in Geography |
| | 1.3 | Environmentalism in Geography: Post Modern Context- A World Environmentalist Agenda, Environmentalism and New Political and Social Groupings, the contested nature of environmentalism |
| | 1.4 | Development vs. Environment: Contradictions and Complementarities between Demand for Resources and Environmental Sustainability- Impact of Green Revolution in Agriculture, Water Use and Disputes, Industrialization, Urbanization and Environmental Pollution, Short term and Long Term Impact of Modern Technology on the Environment |
| **UNIT** | **2.0** | **Man and Ecosystem** |
| | 2.1 | Structure of Ecosystem and Ecological Services |
| | 2.2 | Energy Flow and Energy Balance in the Biosphere |
| | 2.3 | Soil-Water-Plant-Animal Relationship: Material Cycle |
| | 2.4 | Anthropogenic Impact on Terrestrial and Marine Ecosystems |
| **UNIT** | **3.0** | **Environmental Degradation and Hazards** |
| | 3.1 | Perception of Degradation, Hazards and Disasters –World and India |
| | 3.2 | Natural Hazards: Types, Causes and Consequences - World and India |
| | 3.3 | Social Hazards: Types, Social Responses and Social Impact Assessment - World and India |
| | 3.4 | Vulnerability: Types, Causes and Consequences - World and India |
| **UNIT** | **4.0** | **Environmental Performance Measurement and Management** |
| | 4.1 | Measurement of Environmental Performance: Environmental Sustainability Index, Environmental Impact Assessment and Vulnerability Assessment with special Reference to the formulation of IPCC, Environmental Audit and Concept of Credit Rating |
| | 4.2 | Environmental Protection Laws: Role of UNO and Environmental Policies at the Global Level – Montreal Protocol, Biodiversity and Genetic Monitoring, Conflicts between Environment and Free Trade, Human Rights, Indigenous People and Environmental Poverty Law, North South Tensions. |
| | 4.3 | Environmental Problems of India – Air, Land and Water; Environmental Problems in Rural and Urban Areas (with special reference to metropolises). |
| | 4.4 | Environmental Protection Strategies in India: Mitigation of Water and Air Pollution, Wetland, Wasteland and Forest Conservation Policies, Bio-reserves and Wildlife Conservation, Ecotourism and Eco-feminism; Policies Related to Sustainable Development.<br>Environmental Ethics, Environmental Education, Environmental Justice, Ecological Heritage, Ecological Foot Print Analysis. |

**MODULE 15**

**PRACTICAL**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| Unit | Subject |
|---|---|
| **1.0** | **Remote Sensing III** |
| 1.1 | Unsupervised Image Classification |
| 1.2 | Supervised Image Classification: Signature Collection, Classification, R2V Conversion, Attribute Calculation |
| 1.3 | Thematic Image Preparation |
| 1.4 | Surface Analysis from SRTM Data |
| **2.0** | **Soil Testing and Pollution Measurement** |
| 2.1 | pH, NPK, Organic Carbon using Soil Kit and Mapping |
| 2.2 | Ternary Diagram & Soil Profile |
| 2.3 | BOD & COD of Water |
| 2.4 | Hardness of Water |
| **3.0** | **Field Work Techniques and Surveying II** |
| 3.1 | GPS survey techniques, generation of on-field vectors and their plotting |
| 3.2 | Transfer of GPS data to GIS Environment |
| 3.3 | Creation of point, lines & Polygon using GPS, Editing of GPS & Preparation of Shape File |
| 3.4 | Collection of Primary Data from field & Sampling Techniques (with & without replacement): Random sampling and random number table, systematic &stratified sampling & a Sample, Sample distribution, sample size |
| **4.0** | **GIS II** |
| 4.1 | Poly region creation |
| 4.2 | Editing and Correction of Error |
| 4.3 | Measurement of Area |
| 4.4 | Attachment of attribute data and Tables, Query from different thematic layers |

# SEMESTER – IV

**MODULE 16**

**REGIONALIZATION AND REGIONS: INDIA**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| Unit | Subject |
|---|---|
| 1.0 | **Concept Of Region** |
| 1.1 | Regions: Definition, Evolution, Approaches and nature |
| 1.2 | Regionalization: Definition, Evolution, Approaches and nature |
| 1.3 | Nature and Scope of Regional Methods of Analysis |
| 1.4 | Regional Geography: Evolution, scope, approaches and nature |
| 2.0 | **Regions and Regionalism** |
| 2.1 | Regions and Regionalism |
| 2.2 | Emergence of regions-regionalism and regional identities and the process involved. |
| 2.3 | Regional differentiation: macro, meso and micro regions and the contextualize process behind their emergence. |
| 2.4 | Role of ethnicity, tribal identities and caste identities in region formation in India. |
| 3.0 | **Indian Regions** |
| 3.1 | Review of Major schemes of Indian Regions with special reference to Baker and Stamp, K.S Stamp, K.S Ahmad, Pithawala, Spate and Learmonth, R.L Singh, C.D Deshpande and Ranjit Trtha. |
| 3.2 | Critique of Methods and Techniques used for identifying Regions. |
| 3.3 | Macro Regions of India: a) The Himalayas b) Indo-Ganga Plains c) Indian Peninsula: Their Personality, Physical and Socio-Economic Characteristics. |
| 3.4 | India Meso and Micro Regions. |
| 4.0 | **Profile Study of Some Selected Regions** |
| 4.1 | Tarai and Duars region of North Bengal |
| 4.2 | Sundarban Region |
| 4.3 | Tal, Diara and Barind Region |
| 4.4 | Chhotanagpur Regions and Marusthali |

**MODULE – 17 (A)**

**GEOINFORMATICS**

**(SPECIAL PAPER)**

**Full Marks: 45** **Exm. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Database Management System** |
| | 1.1 | Database Basics: Table Structure, Data Dictionary, Database Language |
| | 1.2 | Database Management System: Simple, Hierarchical and Relational Data Structure; Data formats |
| | 1.3 | Data Models: Component, Categories, Merits and Demerits |
| | 1.4 | E-R Diagram: Type, Attribute and Relationship |
| **UNIT** | **2.0** | **Advance Geographical Data Collection and Processing Techniques** |
| | 2.1 | Remote Sensing and GPS : Types and Methods |
| | 2.2 | RS and GPS based Data Collection and Data Handling: Constraint and Error |
| | 2.3 | Products: Satellite image, Aerial Photo and SRTM data |
| | 2.4 | Techniques of GPS Data Processing and Presentation, Digital image processing, PCA analyzing for Image Processing, Image Sub setting, Contrast enhancement and object detection, NDVI analysis. |
| **UNIT** | **3.0** | **GIS Basics** |
| | 3.1 | Concepts of GIS |
| | 3.2 | Functions and Advantages of GIS |
| | 3.3 | GIS Data Structure: Spatial, Attribute and Meta Data |
| | 3.4 | Process of GIS and Project Management through GIS |
| **UNIT** | **4.0** | **Geospatial Analysis and Terrain Evaluation** |
| | 4.1 | Network Analysis: Network Routing, Tracing, Buffer Analysis |
| | 4.2 | Surface Analysis: SRTM Data, Contour, Slope, Aspects, Hill shade, View shed |
| | 4.3 | Watershed Analysis: Basin Demarcation, Generation of River Links etc. |
| | 4.4 | Suitable Site Selection (SSS): Components, Spatial Data Integration, Presentation |

**MODULE – 18(A)**

**FLUVIAL GEOMORPHOLOGY**

**(SPECIAL PAPER)**

**Full Marks: 45** **Exam Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Hydrological Characteristics of River Basin** |
| | 1.1 | Fluvial Geomorphology: Nature. scope and present trend of study. Concept and components of Fluvial System. |
| | 1.2 | Channel Flow: Types, factors, energy principle in open channel flow. |
| | 1.3 | Erosion and Deposition: Processes of erosion, entrainment and transport, types of load. |
| | 1.4 | Classification of Channel using Different Parameters |
| **UNIT** | **2.0** | **Drainage Pattern and Basin Quantification** |
| | 2.1 | Quantitative Analysis of Drainage Basin- merits, demerits and applicability |
| | 2.2 | Models of channel initiation, evolution of drainage pattern, limits of drainage development |
| | 2.3 | Graded stream; Disturbances and Regraded River; Base Level of Erosion: Types, Causes and Impacts |
| | 2.4 | Entropy Analysis of River Using Cyclic and Non Cyclic Conditions; Hydrograph Analysis |
| **UNIT** | **3.0** | **Channel Morphology** |
| | 3.1 | Channel geometry |
| | 3.2 | Channel fluid dynamics |
| | 3.3 | Hydraulic geometry |
| | 3.4 | Channel types, channel bed topography |
| **UNIT** | **4.0** | **Human Impacts on Channel Hydro-morphology** |
| | 4.1 | Dams, Embankments and Irrigation Canals: Channel Modification |
| | 4.2 | River Flood: Causes, Consequences, Management Strategies |
| | 4.3 | Channel Diversion; River Linking: Merits and Flaws |
| | 4.4 | Present River Management Policies: Merits and difficulties with special reference to India |

**MODULE 17(B)**

**GEOGRAPHY OF SOCIAL WELL-BEING WITH SPECIAL REFERENCE TO INDIA**

**(SPECIAL PAPER)**

**Full Marks:45** **Exam. Duration: 2 Hours**

| Unit | Subject |
|---|---|
| **1.0** | **Introduction to Well-Being Theme in Geography** |
| 1.1 | Well-Being: Definition and scope, nature and approaches |
| 1.2 | Historical evolution of the concept of Well-Being |
| 1.3 | Social well-being: Philosophical and methodological basis |
| 1.4 | Social well-being in geography, Emergence of Welfare Geography |
| **2.0** | **Concept of Well-Being** |
| 2.1 | Economic and geographic basis of Social Wellbeing |
| 2.2 | Defining Needs And Wants: Different explanations |
| 2.3 | The consumption production approach of welfare, quality of life criteria |
| 2.4 | Social indicators of Well-being- the theoretical and methodological issue; distribution in space. |
| **3.0** | **Spatial Distribution of Well-Being** |
| 3.1 | Spatial Distribution Well-Being: Meaning, nature and approaches |
| 3.2 | Approaches to judging distribution; changing distributions |
| 3.3 | Location, allocation problems |
| 3.4 | Case studies in social engineering; India, USA, South America and Latin America. Inequality and conflict in India, South Africa and USA |
| **4.0** | **Geography of Social Well-Being in India** |
| 4.1 | Health and nutrition: Medical geography approaches to understand morbidity and mortality patterns a major disease in India; spatial organization of health care system in India. Ecology of malnutrition in India- the spatial dimension of malnutrition, exploring causes and solutions to ameliorate malnutrition among children and women |
| 4.2 | Housing as an indicator of social well-being; meaning of space in the context of residential problems in rural and urban India; problem of housing in the metropolitan cities and emergence of squatter colonies and slums; financing shelter. |
| 4.3 | Education- regional disparities in the level of educational development in India-its roots in history, socio-economic and infrastructural dimensions of educational development. |
| 4.4 | Crime and public safety: crime as an indicator of social wellbeing, spatial patterns of the incidence of crime in India and in urban areas-its geographical correlates. |

**MODULE 18(B)**

**ADVANCED GEOGRAPHY OF DEVELOPMENT AND UNDER DEVELOPMENT**

**(SPECIAL PAPER)**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| Unit | Subject |
|---|---|
| **1.0** | **Definitions and theories of Development and Under Development** |
| 1.1 | Concepts and Definitions: Growth and Development; Economic and Social Development; From Economic Development to Human Development; Regional Diversity and Regional Disparity; Convergence and Divergence; |
| 1.2 | Phases of Regional Development Theories: Economic Growth Doctrines and their impact on Regional Development (D.C North, F. Perroux) |
| 1.3 | Modernization Paradigm and Development from above (G. Myrdal, A. R. Hirschman and J. Friedman); Paradigm shift and Development from Below (F Troodling etc); Multifaceted Paradigm of Regional Development (Eco-Development and Sustainable Development); |
| 1.4 | Relevance of Regional Development in the Structural Adjustment Programmes |
| **2.0** | **Urbanization and Regional Development** |
| 2.1 | Selected Theories of Urbanization: World System Approach (Wallerstein); Structuralist Theories (Harvey); Post Modernism and Urban Theories (Soja; Harvey) |
| 2.2 | Comparative review of characteristics, Trends and Pattern of Urban Development: Developed Countries, Developing Countries |
| 2.3 | Process of Urbanization and Regional Development: The Role of cities in the Development Process; Rural Urban Linkages |
| 2.4 | Urban Poverty; Urban Social Conflicts and Sustainable Urban Development |
| **3.0** | **Levels of Regional Development in India** |
| 3.1 | Regional analysis of Natural Resource Base of Indian Economy; Regional Dimensions of Economic growth and disparities in the colonial era |
| 3.2 | Regional Economic Growth in the Post Independence Era: Disparities and Trends of Per capita Income; Sectoral Income and Employment; Consumption Pattern and Infrastructural Facilities |
| 3.3 | Regional Disparities in Agricultural Growth, Levels of mechanization; Agriculture Vision 2020 |
| 3.4 | Regional Imbalances in Industrial Development in the Post Independence era |
| **4.0** | **Spatial Dimensions of Deprivation in Socio-Economic Well Being in India** |
| 4.1 | Deprivation and Inequality: Poverty, Multi-Dimensional Poverty, Spatial variation in socio-economic deprivation |
| 4.2 | Regional Dimension of Deprivation of Well Being: Education and Health Poverty, Gender disparity |
| 4.3 | Decentralized Local Governance as tools of empowerment: Panchayates and Case Studies |
| 4.4 | Development Programmes in India: initiates in the Five Year Plan Documents; Bharat Nirman, NREGA, Rural Health Mission JNNURM, Sarva Siksha Abhiyan; Rural Health Mission |

**MODULE – 19**

**GENERAL PRACTICAL**

**Full Marks: 45** **Exam. Duration: 2 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **GIS III** |
| | 1.1 | Thematic Mapping |
| | 1.2 | Point Data base Layout |
| | 1.3 | DEM, TIN, DTW Creation |
| | 1.4 | Virtual GIS Creation |
| **UNIT** | **2.0** | **Remote Sensing IV** |
| | | Remote Sensing based Project |
| **UNIT** | **3.0** | **SPSS Package for Quantitative Techniques** |
| | 3.1 | Introduction to SPSS Soft ware package |
| | 3.2 | Descriptive Statistics , General Linear Model |
| | 3.3 | Data Reduction |
| | 3.4 | Graphical Representation of Data and Model |

**MODULE – 20 A**

## GEOINFORMATICS AND FLUVIAL GEOMORPHOLOGY

**(SPECIAL PAPER PRACTICAL)**

**Full Marks: 45***(For Exam. 45 Marks)***.....Exam. Duration: 4 Hours**

| | | |
|---|---|---|
| **UNIT** | **1.0** | **Data Base Management System (DBMS) and Remote Sensing** |
| | 1.1 | Data entry and Processing of Data |
| | 1.2 | Raster Data Entry, PCA analysis for Image Processing |
| | 1.3 | Image Sub setting and NDVI analysis |
| | 1.4 | Image Classification, R2V Conversion and Thematic Image Preparation |
| **UNIT** | **2.0** | **GIS Preparation and Geospatial Analysis** |
| | 2.1 | Creation of GIS Layers, Data Attachment and Thematic Mapping |
| | 2.2 | Layout Preparation of the Created Thematic Map, Data Export and Data Format Conversion |
| | 2.3 | Network Analysis: Network Routing, Tracing, Buffer Analysis; Surface Analysis: SRTM Data based Contour, Slope, Aspects, Hill shade, View shed etc. Analysis. |
| | 2.4 | Watershed Analysis: Basin Demarcation, Generation of River Links etc., Suitable Site Selection (SSS): Components, Spatial Data Integration, Presentation |
| **UNIT** | **3.0** | **Rainfall & Runoff Analysis** |
| | 3.1 | Computation and Preparation of Rainfall Hyetograph and Annual hydrograph, Techniques of Base Flow Separation |
| | 3.2 | Drainage Basin Analysis with Morphometric Techniques , Computation of Runoff Coefficient |
| | 3.3 | Preparation of Water Budget Graph (Recharge, discharge, surplus and deficit calculation) |
| | 3.4 | Long Profile with Exponential Curve, Morphological Trend Analysis of Channel |
| **UNIT** | **4.0** | **Flood Analysis and Field Data Analysis** |
| | 4.1 | Flood Probability Analysis: Weibull and Gumbel's methods; Flood Trend: Least square method |
| | 4.2 | Spatial Flood Propensity: Power regression; Flood Zoning and Dynamics |
| | 4.3 | Computation of Discharge from Field Data: Velocity area method, Slope area method; People's Participation Analysis in a Watershed; Preparation of Rating curve |
| | 4.4 | Hydro-geomorphic Mapping Using Toposheet and Satellite Image |

Viva-voce & Laboratory Note Book = 5

**MODULE 20 B**

**ADVANCE GEOGRAPHY OF DEVELOPMENT AND UNDER DEVELOPMENT AND GEOGRAPHY OF SOCIAL WELL-BEING WITH SPECIAL REFERENCE TO INDIA**

**(SPECIAL PAPER PRACTICAL)**

**Full Marks: 45** **Exam. Duration: 4 Hours**

*(For Exam. 45 Marks)*

| Unit | Subject |
|---|---|
| **1.0** | **Matrices and Inequality Indices** |
| 1.1 | Matrix Algebra: Basic Concepts of Matrix and Types of Matrix |
| 1.2 | Matrix Addition, Subtraction, Multiplication and inversion |
| 1.3 | Measures of Inequalities: Absolute and Relative Measures |
| 1.4 | Inequality Indices: Ratio Method, Sopher's Index, Gini Index, Theils Index etc. |
| **2.0** | **Compositing indices** |
| 2.1 | Problems of summarizing a large complex of body of data into smaller dimensions, |
| 2.2 | Choice of variables and construction of indicators, methods making indicators scale free and the problems of weight ages |
| 2.3 | Eigen Values and Eigen Vectors symmetrical matrices |
| 2.4 | Introduction to Principal Component and interpretation principal component |
| **3.0** | **Social Indicators** |
| 3.1 | Construction of Social Indicators: Health, Nutrition, Education, Crime etc. |
| 3.2 | Indices of Development: PQLI, HDI, Gender Sensitive HDI etc. |
| 3.3 | Measuring Spatial Wellbeing: Gini's Coefficient, Theiles, Sopher's Index, Diversity Index |

Viva-voce & Laboratory Note Book = 3+2 = 5 Marks

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