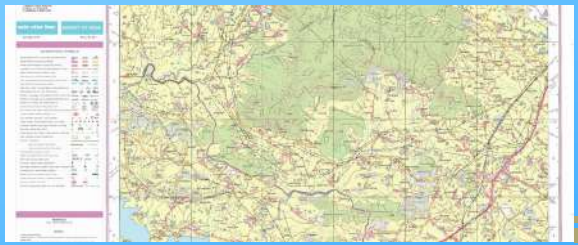
INFORMATION BROCHURE

DEPARTMENT OF GEOGRAPHY

SAGAR MAHAVIDYALAYA



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Principal's Desk

Sagar Mahavidyalaya, the pride of Sagar Island

Since its inception (September 12, 1998) Sagar Mahavidyalaya has been striving to provide quality education to the students and trying to to equip them with practical skills necessary for leading an honest and successful professional life as well as a decent and dedicated personal, even social life. Keeping in mind the demands and needs of the the learners of the the Islands. We are trying to introduce new courses of steady which would be of benefit both to the students and for the development of the Islands. Actually we believe in holistic development of the learners. Now we need the co-operation and encouragement from the parents, guardians and other Islanders so that we can continue our efforts for providing proper academic atmosphere and opportunities to our students, in spite of our natural and other various constraints. Well known 'Where there is a will, there is a way', so let us take inspiration from "Arise, awake and stop not till the goal is reached".

Mr. Prabir Kumar Khatua

1. About the Department:

The Department of Geography, Sagar Mahavidyalaya, established in the year 2001, under the University of Calcutta offers undergraduate course in Geography. The departmental journey was starting a huge demand of the local people as a remote area. The department offers two courses – B.A. Honours in Geography and B.A. General with Geography. The department has developed a well equipped laboratory and departmental library where the students have access to the most updated knowledge of this branch. Faculties are capable of accommodating the addition of new topics when the syllabus is revised. Aside from that, the department actively involved in organizing seminars, workshop, special lecture, group presentation, excursion and extension service.

2. Vision and Mission:

The department is encouraged to the students' new creativity within the framework of academic freedom and diversity of knowledge. Also the department is dedicated to the advancement of knowledge and to serving society. Imparting an integrated understanding of economy, society, politics, gender equity, humanities, ecology and environment holistically is the department's mission.

3. Faculty Profile:

Name of the Faculty	Designation	Qualification	Specialization
Mr. Aminul Haque Mistry	Assistant Professor & HOD	M.Sc, MPhil	Urban Planning
Mrs. Tuli Sen	Assistant Professor	M.A., B.Ed., Diploma in Remote Sensing and GIS	Geomorphology
Mr. Manas Thandar	SACT	M.A., B.Ed	Political Geography
Mr. Biplab Hazra	SACT	M.Sc., Diploma in Remote Sensing and GIS	Remote Sensing and GIS
Mrs. Shova Rani Giri	SACT	M.A.	Remote Sensing and GIS
Mr. Alokesh Dey	SACT	M.A., M.Ed	Cartography
Mr. Subham Majhi	SACT	M.A., B.Ed.	Agricultural Geography

Laboratory Attendant: **Mr. Mrinal Kanti Das (M.A.)**

4. Academic Infrastructure:

Library:

The Central Library of the college has a lot of collections of books and journals. Both Honours and General students may issue books for home as well as day basis. A departmental library with all faculties to access books helps the students for details study.

Laboratory:

Departmental laboratories are well equipped to carry out field work. The department has over 100 topographical maps, a collection of aerial photographs, satellite images, weather maps, atlases and wall maps that are used in teaching.

The Department has a well equipped cartographic laboratory with the equipment required to scan maps digitally. The department has built up a computer laboratory with 10 modern desktops with print out and high speed internet facility. The Department has surveyed instruments, weather instruments, soil kit, GPS instrument, mirror stereoscope, rocks and minerals.

5. Co-curricular and Extension Activities:

- Wall Magazine
- Presentation Competition
- Quiz Competition
- Poster Presentation
- *Swachcha Bharat*, COVID -19 Awareness, Tree Plantation etc. through NSS or NCC
- Various activities in collaboration with other departments within the college premises

6. Field Survey:

The field survey, which is a compulsory paper for all students, they collect the data through a survey that covers physical aspects and socio economic aspects. After field, writing a field survey report based on field data according the university guideline. For practical exposure to conducting the field survey, students are taken to a rural or urban area for a few days and guided by faculties. In the past few years, the students have conducted field survey on the following areas:

- Chandipur, Sagar, West Bengal (2016)
- Gantok, Sikkim (2017)
- Ghatshila, Jharkhand (2018)

- Alipurduar, West Bengal (2019)
- Kalimpong, West Bengal (2020)

7. Mode of Evaluation:

The entire course is divided into six semesters. Total papers allotted for Honours course is 26 and each paper caries 100 marks. Other hand 24 papers allotted for General with Geography and each paper caries 100 marks. Both internal assessment and class attendance carry 10 marks of each paper. In order to appearing the exam a particular semester, the **student must 60% attendance** in each semester (See table 1).

Table 1: Marks Distribution on the Basis of Class Attendance-

Percentage of Attendance	Marks
Above 90%	10
75-90%	8
Above 60%	6

B.A. (Honours) Semester wise Syllabus (Under CBCS)

Semester- I

CC-1-Theory: Geotectonics and Geomorphology 60 Marks / 4 Credits

Unit I: Geotectonics

1. Earth's tectonic and structural evolution with reference to geological time scale [3] (AHM)

2. Earth's interior with special reference to seismology. Isostasy: Models of Airy, Pratt and their applicability [3] (SRG)

3. Plate Tectonics as a unified theory of global tectonics: Processes and landforms at plate margins and hotspots [10] (TS)

4. Folds and Faults—origin and types. [4] (TS)

Unit II: Geomorphology

5. Degradational processes: Weathering, mass wasting and resultant landforms [5] (BH)

6. Processes of entrainment, transportation and deposition by different geomorphic agents. Role of humans in landform development [4] (BH)

7. Development of river network and landforms on uniclinal and folded structures. Surface expression of faults. [6] (MT)

8. Development of river network and landforms on granites, basalts and limestones [5] (MT)

9. Coastal processes and landforms [4] (SM)

10. Glacial and glacio-fluvial processes and landforms [4] (SM)

11. Aeolian and fluvio-aeolian processes and landforms [4] (AD)

12. Role of time and systems approach in geomorphology. Models on landscape evolution: Views of Davis, Penck, King and Hack [8] (AD)

CC-1-Practical: Geotectonics and Geomorphology Lab 30 Marks / 2 Credits

1. Measurement of dip and strike using clinometer [6] (TS)

2. Megascopic identification of (a) *mineral samples*: Bauxite, calcite, chalcopyrite, feldspar, galena, gypsum, hematite, magnetite, mica, quartz, talc, tourmaline; and (b) *rock samples*: Granite, basalt, dolerite, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite, marble [14] (MT)

3. Extraction and interpretation of geomorphic information from Survey of India 1:50k topographical maps of plateau region: Delineation of drainage basins, construction of relief profiles (superimposed, projected and composite), relative relief map, slope map (Wentworth's method), stream ordering (Strahler) and bifurcation ratio on a drainage basin [30] (AD & SM)

4. Construction of hypsometric curve and derivation of hypsometric integer from Survey of India 1:50k topographical maps of plateau region [10] (AHM)

5. Viva-voce based on laboratory notebook (5 Marks)

CC-2-Theory: Cartographic Techniques 60 Marks / 4 Credits

1. Maps: Components and classification [4] (AD)

2. Concept and application of scales: Plain, comparative, diagonal and Vernier [8] (AD)

3. Coordinate systems: Polar and rectangular [6] (TS)

4. Concept of generating globe [2] (TS)

5. Grids: Angular and linear systems of measurement [5] (BH)

6. Bearing: Magnetic and true, whole-circle and reduced [5] (BH)
7. Concept of geoid and spheroid with special reference to Everest and WGS-84 [4] (SM)
8. Map projections: Classification, properties and uses [8] (TS)
9. Concept and significance of UTM projection [2] (AHM)
10. Representation of data using dots and proportional circle [5] (SRG)
11. Representation of data using isopleth and choropleth [5] (SM)
12. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps [6] (AHM)

CC-2-Practical: Cartographic Techniques Lab 30 Marks / 2 Credits

1. Graphical construction of scales: Plain, comparative, diagonal and Vernier [16] (AD & BH)
2. Construction of projections: Polar Zenithal Stereographic, Simple Conic with one standard parallel, Bonne's, Cylindrical Equal Area, and Mercator's [20] (AHM & TS)
3. Thematic maps: Proportional squares, pie diagrams with proportional circles, dots and spheres [12] (SRG)
4. Thematic maps: Choropleth, isopleth, and chorochromatic maps [12] (SM)
5. Viva-voce based on laboratory notebook (5 Marks)

Semester-II

CC-3-Theory: Human Geography 60 Marks / 4 Credits

Unit I: Nature and Principles

1. Nature, scope and recent trends. Elements of human geography [4] **TS**
2. Approaches to Human Geography: Resource, locational, landscape, environment [6] **TS**
3. Concept and classification of race. Ethnicity [5] **SRG**
4. Space, society, and cultural regions (language and religion) [5] **AHM**

Unit II: Society, Demography and Ekistics

5. Evolution of human societies: Hunting and food gathering, pastoral nomadism, subsistence farming, and industrial society [6] **MT**
6. Human adaptation to environment: Case studies of Eskimo, Masai and Maori [4] **SRG**
7. Population growth and distribution, composition; demographic transition [5] **AD**
8. Population–resource regions (Ackerman) [5] **BH**
9. Development–environment conflict [5] **BH**
10. Types and patterns of rural settlements [5] **SM**
11. Rural house types in India [5] **SM**
12. Morphology and hierarchy of urban settlements [5] **AHM**

CC-3-Practical: Human Geography Lab 30 Marks / 2 Credits

1. Spatial variation in continent- or country-level religious composition by divided proportional circles [12] **MT**
2. Measuring arithmetic growth rate of population comparing two decadal datasets [15] **SRG**
3. Types of age-sex pyramids (progressive, regressive, intermediate, and stationary): Graphical representation and analysis [20] **SM**
4. Nearest neighbour analysis from Survey of India 1:50k topographical maps of plain region (c. 5' x 5') [13] **AHM**

5. Viva-voce based on laboratory notebook (5 Marks)

CC-4-Theory: Thematic Mapping and Surveying	**60 Marks / 4 Credits**

1. Concepts of rounding, scientific notation. Logarithm and anti-logarithm. Natural and log scales [4] **TS**
2. Concept of diagrammatic representation of data [2] **MT**
3. Preparation and interpretation of geological maps [5] **TS**
4. Preparation and interpretation of weather maps [5] **SRG**
5. Preparation and interpretation land use land cover maps [5] **MT**
6. Preparation and interpretation of socio-economic maps [5] **SM**
7. Principal national agencies producing thematic maps in India: NATMO, GSI, NBSSLUP, NHO, and NRSC / Bhuvan [5] **SM**
8. Basic concepts of surveying and survey equipment: Prismatic compass [5] **BH**
9. Basic concepts of surveying and survey equipment: Dumpy level [7] **AD**
10. Basic concepts of surveying and survey equipment: Theodolite [7] **AHM**
11. Basic concepts of surveying and survey equipment: Abney level [5] **AD**
12. Basic concepts of surveying and survey equipment: Laser distance measurer [5] **AHM**

CC-4-Practical: Thematic Mapping and Surveying Lab	**30 Marks/ 2 Credits**

1. Traverse survey using prismatic compass [10] **BH & AD**
2. Profile survey using dumpy Level [12] **AD & BH**
3. Height determination of base accessible and inaccessible (same vertical plane method) objects by theodolite [18] **AHM**
4. Interpretation of geological maps with uniclinal structure, folds, unconformity, and intrusions [20] **TS**
5. Viva-voce based on laboratory notebook (5 Marks)

Semester-III

CC-5-Theory: Climatology	**60 Marks /4 Credits**

Unit I: Elements of the Atmosphere
1. Nature, composition and layering of the atmosphere [4] MT
2. Insolation: Controlling factors. Heat budget of the atmosphere [6] MT
3. Temperature: horizontal and vertical distribution. Inversion of temperature: types, causes and consequences [6] SRG
4. Overview of climate change: Greenhouse effect. Formation, depletion and significance of the ozone layer [4] BH

Unit II: Atmospheric Phenomena and Climatic Classification
5. Condensation: Process and forms. Mechanism of precipitation: Bergeron-Findeisen theory, collision and coalescence. Forms of precipitation [6] BH
6. Air mass: Typology, origin, characteristics and modification [4] SM
7. Fronts: Warm and cold, frontogenesis and frontolysis [5] AD

8. Weather: Stability and instability, barotropic and baroclinic conditions [5] AHM

9. Circulation in the atmosphere: Planetary winds, jet streams, index cycle [5] AHM

10. Atmospheric disturbances: Tropical and mid-latitude cyclones, thunderstorms [5] AD

11. Monsoon circulation and mechanism with reference to India [5] TS

12. Climatic classification after Thornthwaite (1955) and Oliver [5] TS

CC-5-Practical: Climatology Lab 30 Marks / 2 Credits

1. Measurement of weather elements using analogue instruments: Mean daily temperature, air pressure, relative humidity, rainfall [15] AHM

2. Interpretation of a daily weather map of India (any two): Pre-Monsoon, Monsoon and Post-Monsoon [20] SRG

3. Construction and interpretation of hythergraph and climograph (G. Taylor) [15]AD

4. Construction and interpretation of wind rose [10] SM

5. Viva-voce based on laboratory notebook (5 Marks)

CC-6-Theory: Hydrology and Oceanography 60 Marks / 4 Credits

Unit-I: Hydrology

1. Systems approach in hydrology. Global hydrological cycle: Its physical and biological role [5] BH

2. Run off: controlling factors. Infiltration and evapotranspiration. Run off cycle [5] BH

3. Drainage basin as a hydrological unit. Principles of water harvesting and watershed management [5] SRG

4. Groundwater: Occurrence and storage. Factors controlling recharge, discharge and movement [5]SRG

Unit-II: Oceanography

5. Major relief features of the ocean floor: Characteristics and origin according to plate tectonics [6] MT

6. Physical and chemical properties of ocean water [4] TS

7. Water mass, T–S diagram [4] TS

8. Air-Sea interactions, ocean circulation, wave and tide [8] SM

9. Ocean temperature and salinity: Distribution and determinants [4] SM

10. Coral reefs: Formation, classification and threats [5] AHM

11. Marine resources: Classification and sustainable utilisation [4] AD

12. Sea level change: Types and causes [5] AHM

CC-6-Practical: Hydrology and Oceanography Lab 30 Marks / 2 Credits

1. Construction and interpretation of rating curves [10] TS

2. Construction and interpretation hydrographs and unit hydrographs [15] AD

3. Monthly rainfall dispersion diagram (Quartile method), Climatic water budget, and Ergograph [25] SM

4. Construction of Theissen polygon from precipitation data [10] AHM

5. Viva-voce based on laboratory notebook (5 Marks)

CC-7-Theory: Statistical Methods in Geography 60 Marks / 4 Credits

Unit I: Frequency Distribution and Sampling

1. Importance and significance of statistics in Geography [4] BH

2. Discrete and continuous data, population and samples, scales of measurement (nominal, ordinal, interval and ratio) [5] TS

3. Sources of geographical data for statistical analysis [4] SRG

4. Collection of data and formation of statistical tables [5] SRG

5. Sampling: Need, types, and significance and methods of random sampling [4] AHM

6. Theoretical distribution: Frequency, cumulative frequency, normal and probability [6] AD

Unit II: Numerical Data Analysis

7. Central tendency: Mean, median, mode, partition values [6] SM

8. Measures of dispersion range, mean deviation, standard deviation, coefficient of variation [6] BH

9. Association and correlation: Rank correlation, product moment correlation [5] AHM

10. Regression: Linear and non-linear [5] AD

11. Time series analysis: Moving average [5] MT

12. Hypothesis testing: Chi-squared test and T-test [5] TS

CC-7-Practical: Statistical Methods in Geography Lab 30 Marks / 2 Credits

1. Construction of data matrix with each row representing an areal unit (districts / blocks / *mouzas* / towns) and corresponding columns of relevant attributes [15] AHM

2. Based on the above, a frequency table, measures of central tendency and dispersion would be computed and interpreted using histogram and frequency curve [15] AHM

3. From the data matrix, a sample set (20%) would be drawn using random, systematic and stratified methods of sampling and the samples would be located on a map with an explanation of the methods used [15] TS

4. Based on of the sample set and using two relevant attributes, a scatter diagram and linear regression line would be plotted and residual from regression would be mapped with a short interpretation [15]AD

5. Viva-voce based on laboratory notebook (5 Marks)

Skill Enhancement Course

SEC-A-1-Theory: Coastal Management 90 Marks / 2 Credits

1. Components of a coastal zone. Coastal morphodynamic variables and their role in evolution of coastal forms [7] BH

2. Environmental impacts and management of mining, oil exploration, salt manufacturing, land reclamation and tourism [8] **AD**

3. Coastal hazards and their management using structural and non-structural measures: Erosion, flood, sand encroachment, dune degeneration, estuarine sedimentation and pollution [8] **TS**

4. Principles of Coastal Zone Management, Exclusive Economic Zone and Coastal Regulation Zones with reference to India. [7] AHM

Semester: IV

CC-8-Theory: Economic Geography 60 Marks / 4 Credits

Unit I: Concepts

1. Meaning and approaches to economic geography [4] [BH]

2. Concepts in economic geography: Goods and services, production, exchange and consumption [6] [BH]

3. Concept of economic man, theories of choices [6] [MT]

4. Economic distance and transport costs [4] [AD]

Unit II: Economic Activities

5. Concept and classification of economic activities [4] [MT]

6. Factors affecting location of economic activity with special reference to agriculture (von Thünen), and industry (Weber) [6] [SRG]

7. Primary activities: Agriculture, forestry, fishing and mining [6] [SM]

8. Secondary activities: Classification of manufacturing, concept of manufacturing regions, special economic zones and technology parks [6] [TS]

9. Tertiary activities: Transport, trade and services [6] [AD]

10. Transnational sea-routes, railways and highways with reference to India [4] [AHM]

11. International trade and economic blocs [4] [TS]

12. WTO and BRICS: Evolution, structure and functions [4] [AHM]

CC-8-Practical: Economic Geography Lab 30 Marks / 2 Credits

1. Choropleth mapping of state-wise variation in GDP [10] [MT]

2. State-wise variation in occupational structure by proportional divided circles [15] [SRG]

3. Time series analysis of industrial production (India and West Bengal) [20] [SM]

4. Transport network analysis by detour index and shortest path analysis [15] [BH]

5. Viva-voce based on laboratory notebook (5 Marks)

CC-9-Theory: Regional Planning and Development 60 Marks / 4 Credits

Unit I: Regional Planning

1. Concept of regions: Types of regions and their delineation [4] [MT]

2. Regional Planning: Types, principles, objectives, tools and techniques [6] [TS]

3. Regional planning and multi-level planning in India [6] [TS]

4. Metropolitan concept and urban agglomerations [4] [AHM]

Unit II: Regional Development

5. Concepts of growth and development, growth versus development [6] [BH]

6. Indicators of development: Economic, social and environmental [6] [BH]

7. Human development: Concept and measurement [4] [SRG]

8. Theories and models for regional development: Cumulative causation (Myrdal) [4] [MT]

9. Theories and models for regional development: Stages of development (Rostow), growth pole model (Perroux) [6] [AHM]

10. Concept and causes of underdevelopment [4] [SM]

11. Regional development in India: Disparity and diversity [5] [SM]

12. Need and measures for balanced development in India [5] [AD]

CC-9-Practical: Regional Planning and Development Lab 30 Marks / 2 Credits

1. Delineation of formal regions by weighted index method [15] [SRG]

2. Delineation of functional regions by breaking point analysis [15] [AHM]

3. Measurement of inequality by location quotient [15] [AD]

4. Measuring regional disparity by Sopher index [15] [TS]

5. Viva-voce based on laboratory notebook (5 Marks)

CC-10-Theory: Soil and Biogeography 60 Marks / 4 Credits

Unit I: Soil Geography

1. Factors or soil formation. Man as an active agent of soil transformation [4] [TS]

2. Soil profile. Origin and profile characteristics of lateritic, podzol and chernozem soils [6] [SRG]

3. Definition and significance of soil properties: Texture, structure and moisture [5] [BH]

4. Definition and significance of soil properties: pH, organic matter and NPK [5] [AD]

5. Soil erosion and degradation: Factors, processes and mitigation measures [4] [SM]

6. Principles of soil classification: Genetic and USDA. Concept of land capability and its classification [6] [TS]

Unit II: Biogeography

7. Concepts of biosphere, ecosystem, biome, ecotone, community and ecology [5] [MT]

8. Concepts of trophic structure, food chain and food web. Energy flow in ecosystems [5] [MT]

9. Classification of world biomes (Whittaker). Geographical extent and characteristics of tropical rain forest, savanna, hot desert, taiga and coral reef biomes [8] [BH]

10. Bio-geochemical cycles with special reference to carbon dioxide and nitrogen [4] [AD]

11. Deforestation: Causes, consequences and management [4] [AHM]

12. Biodiversity: Definition, types, threats and conservation measures [4] [BH]

CC-10-Practical: Soil and Biogeography Lab 30 Marks / 2 Credits

1. Determination of soil reaction (pH) and salinity using field kit [15] [TS]

2. Determination of soil type by ternary diagram textural plotting [15] [SRG]

3. Plant species diversity determination by matrix method [10] [AHM]

4. Time series analysis of biogeography data [20] [SM]

5. Viva-voce based on laboratory notebook (5 Marks)

Skill Enhancement Course

SEC-B-03-Theory: Rural Development 90 Marks / 2 Credits

1. Rural Development: Concept, basic elements, measures of level of rural development [5] [AD]

2. Paradigms of rural development: Gandhian approach to rural development Lewis model of economic development, 'big push' theory of development, Myrdal's model of 'spread and backwash effects' [10] [TS & SRG]

3. Area based approach to rural development: Drought prone area programmes, PMGSY, SJSY, MNREGA, Jan Dhan Yojana [10] [AHM]

4. Rural Governance: Panchayati Raj System and rural development policies and Programmes in India [5] [SM]

Semester-V

CC-11-Theory: Research Methodology and Fieldwork 60 Marks / 4 Credits

Unit I: Research Methodology

1. Research in Geography: Meaning, types and significance [5] **(AD)**

2. Literature review and formulation of research design [5] **(TS)**

3. Defining research problem, objectives and hypothesis [6] **(AHM)**

4. Research materials and methods [4] **(AHM)**

5. Techniques of writing scientific reports: Preparing notes, references, bibliography, abstract and keywords [6] **(MT)**

6. Plagiarism: Classification and prevention [4] **(BH)**

Unit II: Fieldwork

7. Fieldwork in Geographical studies: Role and significance. Selection of study area and objectives. Pre-field academic preparations. Ethics of fieldwork [6] **(AHM)**

8. Field techniques and tools: Observation (participant, non-participant), questionnaires (Open, closed, structured, non-structured). Interview [5] **(AHM)**

9. Field techniques and tools: Landscape survey using transects and quadrants, constructing a sketch, photo and video recording [5] **(SRG)**

10. Positioning and collection of samples. Preparation of inventory from field data [4] **(SM)**

11. Post-field tabulation, processing and analysis of quantitative and qualitative data [5] **(TS)**

12. Fieldwork: logistics and handling of emergencies [5] **(TS)**

CC-11-Practical: Research Methodology and Fieldwork Lab 30 Marks / 2 Credits

Every student needs to participate in fieldwork and prepare a field report according to the following guideline, failing which he/she will not be evaluated for GEO-A-CC-5-11-P.

1. Each student will prepare a report based on primary data collected from field survey and secondary data collected from different sources.

2. Students will select either one rural area (*mouza*) or an urban area (municipal ward) for the study, with the primary objective of evaluating the relation between physical and cultural landscape.

3. A specific problem or a special feature should be identified based on which, the study area will be selected.

4. The report should be handwritten in English on A4 size paper in candidate's own words within 5,000 words (Introductory Chapter: 1000 words; Physical Aspects: 1500 words; Socio-economic Aspects: 1500 words; Concluding Chapter: 500 words, approximately) excluding tables, photographs, maps, diagrams, references and appendices.

5. Photographs, maps and diagrams should not exceed 15 pages.

6. A copy of the bound report, duly signed by the concerned teacher, will be submitted during examination.

7. The field work and post-field work will include:

a. Collection of primary data on physical aspects (relief and soil) of the study area.

Students should use survey instruments like prismatic compass, dumpy level, Abney level or clinometer wherever necessary.

b. Collection of soil samples from different land cover land use regions of the study area for determining pH and NPK values with help of a soil kit.

c. Collection of socio economic data, at the household level (with the help of a questionnaire) in the selected study area.

d. Plot to plot land use survey for preparation of a land use map, covering whole or part of the selected area.

e. Visit to different organisations and departments for collection of secondary data.

f. Any other survey relevant to the objective of the study.

8. The Field Report should contain the following sections (a–e).

a. Introduction: Study area extent and space relations, reasons for selection of the study area on the basis of a specific problem or special feature, objectives, methods of data collection, analyses and presentation, sources of information, etc.

b. Physical aspects: Lithology and geological structure, relief, slope, drainage, climate, soil, vegetation, environmental issues, proneness to natural hazards, etc.

c. Socio-economic aspects:

i. Population attributes: number, sex ratio, literacy, occupational structure, ethnic and religious composition, language, per capita income, etc.

ii. Settlement characteristics: Number of houses, building materials, number and size of rooms, amenities, etc.

iii. Agriculture: General land use, crop-combination, use of fertiliser and irrigational facilities, production and marketing etc.

iv. Other economic activities: Fishing, horticulture, brick-making, household and other industries, etc.

d. Conclusions: Relation between physical and cultural landscape. Evaluation of problems and prospects. General recommendations.

e. Bibliography.

9. The students will prepare (i) a chorochromatic land use land cover map on the basis of plot to plot survey; (ii) a profile of 250–1000 m, surveyed and plotted, with different land use land cover superimposed on it.

10. All sections of the report should contain relevant maps, diagrams and photographs using primary and secondary data, clearly citing sources.

11. All surveys should pertain to the objective of the study. Surveys not relevant for establishing the relation between physical and cultural landscape should be avoided.

12. Marks division: 20 on report + 10 on viva-voce = 30

CC-12-Theory: Remote Sensing, GIS and GNSS 30 Marks / 2 Credits

Unit I: Remote Sensing

1. Principles of Remote Sensing (RS): Types of RS satellites and sensors [5] **(BH)**

2. Sensor resolutions and their applications with reference to IRS and Landsat missions [5] **(BH)**

3. Image referencing schemes and acquisition procedure of free geospatial data from NRSC / Bhuvan and USGS [5] **(TS)**

4. Preparation of False Colour Composites from IRS LISS-3 and Landsat TM / OLI data. [5] **(TS)**

5. Principles of image interpretation. Preparation of inventories of landuse land cover (LULC) features from satellite images [5] **(AD)**

6. Acquisition and utilisation of free Digital Elevation Model data: Carto DEM, SRTM and ALOS [5] **(AD)**

Unit II: Geographical Information Systems and Global Navigation Satellite System

7. GIS data structures: types: spatial and non-spatial, raster and vector [5] **(SRG)**

8. Principles of preparing attribute tables and data manipulation and overlay analysis [6] **(MT)**

9. Principles and significance of buffer preparation [4] **(SM)**

10. Principles and significance overlay analysis [5] **(SM)**

Unit III: Global Navigation Satellite System (GNSS)

11. Principles of GNSS positioning and waypoint collection [5] **(AHM)**

12. Principles of transferring of GNSS waypoints to GIS. Area and length calculations from GNSS data [5] **(AHM)**

CC-12-Practical: Remote Sensing, GIS and GNSS Lab 30 Marks / 2 Credits

1. Image georeferencing and enhancement. Preparation of reflectance libraries of LULC features across different image bands of IRS L3 or Landsat OLI data [15] **(TS)**

2. Supervised image classification, class editing and post-classification analysis [15] **(TS)**

3. Digitisation of features and administrative boundaries. Data attachment, overlay and preparation of annotated thematic maps [20] **(AHM)**

4. Waypoint collection from GNSS receivers and exporting to GIS database [10] **(AHM)**

5. Viva-voce based on laboratory notebook (5 Marks)

Discipline Specific Elective

DSE-A-2-Theory: Climate Change: Vulnerability and Adaptations 60 Marks

1. The science of climate change: Origin, scope and trends [5] [AHM]

2. Climate change with reference to the geological time scale [6] [AHM]

3. Evidences and factors of climate change: The nature–man dichotomy [4] [SRG]

4. Greenhouse gases and global warming [5] [SRG]

5. Electromagnetic spectrum, atmospheric window, heat balance of the earth [5] [MT]

6. Global climatic assessment: IPCC reports [5] [MT]

7. Climate change and vulnerability: Physical; economic and social [5] [SM]

8. Impact of climate change: Agriculture and water; flora and fauna; human health and morbidity [5] [AD]

9. Global initiatives to climate change mitigation: Kyoto Protocol, carbon trading, clean development mechanism, COP, climate fund [5] [TS]

10. Climate change vulnerability assessment and adaptive strategies with particular reference to South Asia [5] [AD]

11. National Action Plan on climate change [5] [TS]

12. Role of urban local bodies, panchayats and educational institutions on climate change mitigation: Awareness and action programmes [5] [BH]

DSE-A-02-Practical: Climate Change: Vulnerability and Adaptations Lab 30 Marks

1. Analysis of trends of temperatures (maximum and minimum of about three decades) of any India Meteorological Department (IMD) station [10] [SM]

2. Comparative analysis of seasonal variability of rainfall on the basis of monthly data of any two IMD stations [15] [BH]

3. Annual rainfall variability of about three decades for any two representative climatic regions of India [15] [AHM]

4. Preparation of an inventory of extreme climatic events and mitigation measure of any climatic region / country of South Asia for a period of one decade on the basis of secondary information [20] [TS]

5. Viva-voce based on laboratory notebook (5 Marks)

DSE-B-5-Theory: Cultural and Settlement Geography 60 Marks / 4 Credits

Unit I: Cultural Geography

1. Definition, scope and content of cultural geography [5] [BH]

2. Development of cultural geography in relation to allied disciplines [5] [BH]

3. Cultural hearth and realm, cultural diffusion, diffusion of major world religions and languages [6] [TS]

4. Cultural segregation and cultural diversity, culture, technology and development. [5] [AD]

5. Races and racial groups of the world [5] [AD]

6. Cultural regions of India [4] [TS]

Unit II: Settlement Geography

7. Rural Settlement: Definition, nature and characteristics [3] [SRG]

8. Morphology of rural settlements: site and situation, layout-internal and external [5] [SM]

9. Rural house types with reference to India, Social segregation in rural areas; Census categories of rural settlements [7] [SM]

10. Urban Settlements: Census definition (Temporal) and categories in India [3] [AHM]

11. Urban morphology: Models of Burgess, Hoyt, Harris and Ullman. [7] [MT]

12. City-region and conurbation. Functional classification of cities: Schemes of Harris, Nelson, and McKenzie [5] [AHM]

DSE-B-5-Practical: Cultural and Settlement Geography □ 30 Marks /2 Credits

1. Mapping language distribution of India [10] [AHM]

2. CD block-wise housing distribution in any district of West Bengal using proportional square [20] [SRG]

3. Identification of rural settlement types from toposheet [15] [MT]

4. Social area analysis of a city (Shevky & Bell) [15] [TS]

5. Viva-voce based on laboratory notebook (5 Marks)

Semester-VI

CC-13-Theory: Evolution of Geographical Thought □60 Marks / 4 Credits

Unit I: Nature of Pre-Modern Geography

1. Development of pre-modern Geography: Contributions of Greek, Chinese, and Indian geographers [5] **(SRG)**

2. Impact of 'Dark Age' in Geography and Arab contributions [5] **(BH)**

3. Geography during the age of 'Discovery' and 'Exploration' (contributions of Portuguese voyages, Columbus, Vasco da Gama, Magellan, Thomas Cook) [5] **(MT)**

4. Transition from cosmography to scientific Geography (contributions of Bernard Varenius and Immanuel Kant). Dualism and Dichotomies (General vs. Particular, Physical vs. Human, Regional vs. Systematic, Determinism vs. Possibilism, Ideographic vs. Nomothetic) [7] **(AD)**

Unit II: Foundations of Modern Geography and Recent Trends

5. Evolution of Geographical thoughts in Germany, France, Britain, and United States of America [5] **(SM)**

6. Contributions of Humboldt and Ritter [3] **(TS)**

7. Contributions of Richthofen, Hartshorne–Schaeffer, Ratzel, La Blaché[6] **(MT)**

8. Trends of geography in the post-World War-II period: Quantitative revolution, systems approach [7] **(SRG)**

9. Structuralism and historical materialism [3] **(BH)**

10. Changing concept of space with special reference to Harvey [5]**(SM)**

11. Evolution of Critical Geography: Behavioural, humanistic, and radical [5]**(TS)**

12. Towards post modernism: Geography in the 21st Century [5] **(AHM)**

CC-13-Practical: Evolution of Geographical Thought Lab 30 Marks / 2 Credits

1. Changing perception of maps of the world (Ptolemy, Ibn Batuta, Mercator) **(AHM)**

2. Mapping voyages; Columbus, Vasco da Gama, Magellan, Thomas Cook **(TS)**

3. Group Presentation of five to ten students on any selected school of geographical thought (20 marks) **(AHM & TS)**

4. Viva-voce based on laboratory notebook on topics 1 and 2 (10 Marks)

CC-14-Theory: Hazard Management 60 Marks / 4 Credits

Unit I: Concepts

1. Classification of hazards and disasters. Hazard continuum [4] **(BH)**

2. Approaches to hazard study: Risk perception and vulnerability assessment. Hazard paradigms [6] **(BH)**

3. Responses to hazards: Preparedness, trauma, and aftermath. Resilience, capacity building [5] **(MT)**

4. Hazards mapping: Data and geospatial techniques (for hazards enlisted in Unit II and GEO-A-CC-6-14-P) [5] **(AD)**

Unit II: Hazard-specific Study with Focus on West Bengal and India

5. Earthquake: Factors, vulnerability, consequences, and management [5] **(AD)**

6. Landslide: Factors, vulnerability, consequences, and management [5] **(SRG)**

7. Land subsidence: Factors, vulnerability, consequences, and management [5] **(SM)**

8. Tropical cyclone: Factors, vulnerability, consequences, and management [5] **(SM)**

9. Flood: Factors, vulnerability, consequences, and management [5] **(MT)**

10. Riverbank erosion: Factors, vulnerability, consequences, and management [5]**(TS)**

11. Fire: Factors, vulnerability, consequences, and management [5] **(AHM)**

12. Biohazard: Classification, vulnerability, consequences, and management [5] **(AHM)**

CC-14-Practical: Hazard Management Lab 30 Marks / 2 Credits **(AHM & TS)**

1. Earthquake
2. Landslide
3. Land subsidence
4. Thunderstorm
5. Flood
6. Riverbank / Coastal erosion
7. Fire
8. Industrial accident
9. Road / Railway accident
10. Structural collapse
11. Environmental pollution
12. Biohazard

Discipline Specific Elective

DSE-A-04-Theory: Resource Geography 60 Marks / 4 Credits

Unit I: Resource and Development

1. Natural resources: Concept and classification [4] **MT**
2. Approaches to resource utilization: Utilitarian, conservational, community based adaptive [6] **MT**
3. Significance of resources: Backbone of economic growth and development [5] **SRG**
4. Pressure on resources. Appraisal and conservation of natural resources [5] **SRG**
5. Problems of resource depletion: global scenario (forest, water, fossil fuels) [7] **BH**
6. Sustainable resource development [3] **BH**

Unit II: Resource Conflict and Management

7. Distribution, utilisation, problems and management of metallic mineral resources: Iron ore, bauxite, copper [6] **SM**
8. Distribution, utilisation, problems and management of non-metallic mineral resources: Limestone, mica, gypsum [6] **AD**
9. Distribution, utilisation, problems and management of energy resources: Conventional and non-conventional [6] **AHM**
10. Contemporary energy crisis and future scenario [4] **TS**
11. Politics of power resources [3] **AHM**
12. Limits to growth and sustainable use of resources. Concept of resource sharing [5] **TS**

DSE-A-04-Practical: Resource Geography Lab 30 Marks / 2 Credits

1. Mapping and area estimate of changes in forest or vegetation cover from maps and/or satellite images [15] **TS**
2. Mapping and number estimate of changes in water bodies from maps and/or satellite images [15]**TS**
3. Decadal changes in state-wise production of coal and iron ore [15] **AHM**
4. Computing Human Development Index: Comparative decadal change of top five Indian states [15] **AD**

DSE-B-08-Theory: Geography of India 60 Marks / 4 Credits

Unit I: Geography of India

1. Physiographic divisions with reference to tectonic provinces [5] **SRG**
2. Climate, soil and vegetation: Classification and interrelation [6] **MT**
3. Population: Distribution, growth, structure, and policy [4] **MT**
4. Tribes of India with special reference to Gaddi, Toda, Santal, and Jarwa [5] **SM**
5. Agricultural regions. Green revolution and its consequences [4] **SM**
6. Mineral and power resources: Distribution and utilisation of iron ore, coal, petroleum, and natural gas [6] **AD**
7. Industrial development: Automobile and information technology [3] **AD**
8. Regionalisation of India: Physiographic (R.L. Singh) and economic (P. Sengupta) [7] **BH**

Unit II: Geography of West Bengal

9. Physical perspectives: Physiographic divisions, forest and water resources [6] **AHM**
10. Resources: Agriculture, mining, and industry [6] **TS**

11. Population: Growth, distribution, and human development [4] **AHM**
12. Regional issues: Darjeeling Hills and Sundarban [4] **TS**

DSE-B-8-Practical: Geography of India Lab 30 Marks / 2 Credits

1. Monthly temperature and rainfall graphs of five select stations from different physiographic regions of India [15] TS
2. Crop combination: Comparison of any two contrasting districts from West Bengal [15] SM
3. Annual trends of production: Mineral resources and manufacturing goods over two decades [20] MT
4. Composite Index: Comparison of developed and backward states of India [10] AHM

B.A. (General) Semester wise Syllabus (Under CBCS)

Semester-I

CC-1-Theory: Physical Geography 60 Marks / 4 Credits

Unit I: Geotectonic

1. Earth's interior with special reference to seismology [3] **AD**
2. Plate Tectonics as a unified theory of global tectonics. Formation of major relief features of the ocean floor and continents according to Plate Tectonics [7] **SM**
3. Folds and faults: Classification and surface expression [6] **BH**

Unit II: Geomorphology

4. Degradational processes: Weathering, mass wasting and resultant landforms [4] SRG
5. Principal geomorphic agents. Classification and evolution of fluvial, coastal, aeolian and glacial landforms [12] **MT**
6. Ideas of Davis, Penck and King on slope evolution. Systems approach and its significance in geomorphology [7]. **TS**

Unit III: Hydrology

7. Global hydrological cycle: Its physical and biological role [2] **AHM**
8. Run off: controlling factors. Concept of ecological flow [4] **AD**
9. Drainage basin as a hydrological unit. Principles of watershed management [3] **TS**

Unit IV: Oceanography

10. Physical and chemical properties of ocean water. Distribution and determinants of temperature and salinity [5] **BH**
11. Overview of air-sea interactions. Ocean circulation, wave and tide [7] **SRG**
12. Marine resources: Classification and sustainable utilisation [3] **AHM**

CC-1-Practical: Physical Geography Lab 30 Marks / 2 Credits

1. Megascopic identification of *mineral samples*: Bauxite, calcite, chalcopyrite, feldspar, galena, hematite, mica, quartz, talc, tourmaline [8] MT
2. Megascopic identification of *rock samples*: Granite, basalt, laterite, limestone, shale, sandstone, conglomerate, slate, phyllite, schist, gneiss, quartzite [12] MT
3. Extraction of physiographic information from Survey of India 1:50k topographical maps of plateau region: Delineation of drainage basins, construction and interpretation of relief profiles

(superimposed, projected and composite), Construction and interpretation of relative relief map [20] AD

4. Extraction of drainage information from Survey of India topographical maps: Construction and interpretation of drainage density maps, extraction and interpretation of channel features and drainage patterns [20] BH

5. Viva-voce based on laboratory notebook (5 Marks)

Semester-II

CC-2-Theory: Environmental Geography □ 60 Marks / 4 Credits

Unit I: Climatology

1. Insolation and Heat Budget. Horizontal and vertical distribution of atmospheric temperature and pressure [5] SRG

2. Overview of planetary wind systems. Indian Monsoons: Mechanisms and controls [6] MT

3. Atmospheric disturbances: Tropical and temperate cyclones. Thunderstorms [7] BH

4. Overview of global climatic change: Greenhouse effect. Ozone depletion [5] AD

5. Scheme of world climatic classification by Köppen [2] SM

Unit II: Soil Geography

6. Factors of soil formation [4] AHM

7. Soil profile development under different climatic conditions: Laterite, Podsol and Chernozem [6] TS

8. Physical and chemical properties of soils: Texture, structure, pH, salinity and NPK status [6] AD

9. USDA classification of soils. Soil erosion and its management [4] SRG

Unit III: Biogeography

10. Ecosystem and Biomes. Distribution and characteristics of tropical rainforest; Savannah and hot desert biomes [6] MT

11. Plant types, occurrence and ecological adaptations: Halophytes, xerophytes, hydrophytes and mesophytes [5] BH

12. Biodiversity: Types, threats and management with special reference to India [4] SM

CC-2-Practial: Environmental Geography Lab □ 30 Marks / 2 Credits

1. Interpretation of a daily weather map of India (any one): Pre-Monsoon, Monsoon or Post-Monsoon [20] SRG

2. Construction and interpretation of hythergraph, climograph (G. Taylor) and wind rose (seasonal) [20] SM

3. Determination of soil type by ternary diagram textural plotting [10] AHM

4. Preparation of peoples' biodiversity register [10] TS

5. Viva-voce based on laboratory notebook (5 Marks)

Semester-III

CC-3-TH – Human Geography □ 60 Marks / 4 Credits

Unit I: Economic Geography

1. Sectors of the economy: Primary, Secondary, Tertiary and Quaternary. Factors affecting location of economic activities [5] MT

2. Location of economic activities: Theories of von-Thunen, Lösch and Weber [5] SRG
3. Location of industries with special reference to India: Cotton, Iron and Steel [5] BH
4. Globalisation and integration of world economies [5] TS

Unit II: Social Geography

5. Human Society: Structure, functions, social systems. Population and migration: overview, causes and effects [5] AD
6. Types and characteristics of social organisations: Primitive, hunting–gathering, agrarian, industrial [5] SM
7. Race, Language and Religion: Origin, characteristics and spatial variations [6] MT
8. Social Issues: Diversity, conflict and transformation [5] TS

Unit III: Cultural Geography

1. Carl Sauer: cultural landscape and its elements [6] TS
2. Rural and urban settlements: Differentiation in cultural landscapes [5] BH
3. Cultural regions and cultural realms [5] SM
4. Diffusion of culture and innovations [4] AHM

CC-3-Practical: Human Geography Lab □ 30 Marks / 2 Credits

1. State-wise variation in occupational structure by proportional divided circles [15] SRG
2. Time series analysis of industrial production using any two manufactured goods from India [20] AD
3. Measuring arithmetic growth rate of population comparing two datasets [15] MT
4. Nearest neighbour analysis: Rural example from Survey of India 1:50k topographical maps [10] AHM
5. Viva-voce based on laboratory notebook (5 Marks)

Skill Enhancement Course

SEC-A-1-Theory: Coastal Management □ 90 Marks / 2 Credits

1. Components of a coastal zone. Coastal morphodynamic variables and their role in evolution of coastal forms [7] BH
2. Environmental impacts and management of mining, oil exploration, salt manufacturing, land reclamation and tourism [8] **AD**
3. Coastal hazards and their management using structural and non-structural measures:
Erosion, flood, sand encroachment, dune degeneration, estuarine sedimentation and pollution [8] **TS**
4. Principles of Coastal Zone Management, Exclusive Economic Zone and Coastal Regulation Zones with reference to India. [7] AHM

Semester-IV

CC-4-Theory: Cartography □ 60 Marks / 4 Credits

Unit I: Scale and Projections

1. Maps: Classification and types. Scales: Types, significance and applications [3] AHM
2. Coordinate systems: Polar and rectangular. Bearing: Magnetic and true, whole-circle and reduced [3] TS
3. Map projections: Classification, properties and uses. Concept and significance of UTM projection [8] MT

Unit II: Topographic and Thematic Maps

4. Survey of India topographical maps: Reference scheme of old and open series. Information on the margin of maps [4] BH

5. Representation of data by dots and proportional circles [4] SRG

6. Representation of data by isopleth and choropleth [4] AD

7. Principal national agencies producing thematic maps in India: GSI, NATMO, NBSSLUP, NHO, NRSC etc. Acquaintance with Bhuvan platform [5] AD

Unit III: Remote Sensing and Geographical Information System

8. Basics of Remote Sensing: Types of satellites, sensors, bands and resolutions with special reference to the ISRO missions [10] SM

9. Principles of preparing standard FCCs and classified raster images [5] TS

10. Principles of Geographical Information System: Concepts of vector types, attribute tables, buffers and overlay analysis [6] TS

Unit IV: Surveying

11. Basic concepts of surveying and survey equipment: Prismatic compass [6] BH

12. Basic concepts of surveying and survey equipment: Dumpy level [6] BH

CC-4-Practical: Cartography Lab □ 30 Marks / 2 Credits

1. Graphical construction of scales: Plain and comparative [10] AD

2. Construction of projections: Simple Conic with one standard parallel, Cylindrical Equal Area, and Polar Zenithal Stereographic [20] SM

3. Construction of thematic maps: Proportional squares, proportional circles, choropleths and isopleths [20] SRG

4. Preparation of annotated thematic overlays from satellite standard FCCs of 1:50k [10] AHM

5. Viva-voce based on laboratory notebook (5 Marks)

Skill Enhancement Course

SEC-B-03-Theory: Rural Development □ 90 Marks / 2 Credits

1. Rural Development: Concept, basic elements, measures of level of rural development [5] [AD]

2. Paradigms of rural development: Gandhian approach to rural development Lewis model of economic development, 'big push' theory of development, Myrdal's model of 'spread and backwash effects' [10] [TS & SRG]

3. Area based approach to rural development: Drought prone area programmes, PMGSY, SJSY, MNREGA, Jan Dhan Yojana [10] [AHM]

4. Rural Governance: Panchayati Raj System and rural development policies and Programmes in India [5] [SM]

Semester-V (Discipline Specific Elective)

DSE-A-1-Theory: Regional Development □ 60 Marks / 4 Credits

1. Definition of region. Types and need of regional planning [3] SRG

2. Choice of a region for planning; characteristics of an ideal planning region; delineation of planning region [7] AD

3. Regionalization of India for planning (agro-ecological zones) [5] MT

4. Strategies/models for regional planning: growth pole model of Perroux [6] BH

5. Growth centre model in Indian context; concept of village cluster [4] TS

6. Problem regions and regional planning; backward regions and regional plans: special area development plans in India. DVC: success and failures [5] SM
7. Changing concept of development and underdevelopment; Efficiency-equity debate [5] AHM
8. Indicators of development: Economic, social and environmental. Concept of human development [5] BH
9. Regional development in India, regional inequality, disparity and diversity [5] SRG
10. Development and regional disparities in India since Independence: Disparities in agricultural development [5] AD
11. Development and regional disparities in India since Independence: Disparities in industrial development [5] SM
12. Development and regional disparities in India since independence: Disparities in human resource development in terms of education and health [5] AHM

DSE-A-01-Practical: Regional Development Lab □ 30 Marks / 2 Credits

1. Delineation of regions according to given criteria using Weavers method [15] TS
2. Determination of sphere of influence by gravity model [15] AHM
3. Measurement of inequality by Lorenz curve and location quotient [15] SM
4. Preparation of Z score and composite Index from suitable data [15] AD
5. Viva-voce based on laboratory notebook (5 Marks)

Semester-VI (Discipline Specific Elective)

DSE-B-04-Theory: Population Geography □ 60 Marks / 4 Credits

Unit I: Population Dynamics
1. Development of Population Geography as a field of specialization. Relation between population geography and demography. Sources of population data, their level of reliability and problems of mapping [6] MT
2. Population distribution: density and growth. Classical and modern theories in population distribution and growth, Demographic transition model [6] SRG
3. World patterns determinants of population distribution and growth. Concept of optimum population [4] BH
4. Population distribution, density and growth profile in India [4] AD
Unit II: Population and Development
5. Concepts of age-sex composition; Rural and urban composition; Literacy and education [5] SM
6. Measurements of fertility and mortality. Concept of cohort and life table [5] TS
7. Population composition of India: Urbanisation and occupational structure [7] AHM
8. Migration: Causes and types [3] SRG
9. National and international patterns of migration with reference to India [5] MT
10. Population and development: Population-resource regions. Concept of human development index and its components [5] BH
11. Population policies in developed and less development countries. India's population policies. Population and environment, implication for the future [5] AHM
12. Contemporary issues: Ageing of population, declining sex ratio, population and environment dichotomy, impact of HIV/AIDS [5] SM

DSE-B-4-Practical: Population Geography Lab 30 Marks / 2 Credits

1. Population projection by arithmetic method [15] SRG
2. Population density mapping: State-wise for India [15] MT
3. Analysis of work participation rate: Total and gender-wise for India [15] TS
4. Analysis occupation structure by dominant and distinctive functions: Districts of West Bengal [15] AD
5. Viva-voce based on laboratory notebook (5 Marks)

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ADMISSION CONTACT DETAILS

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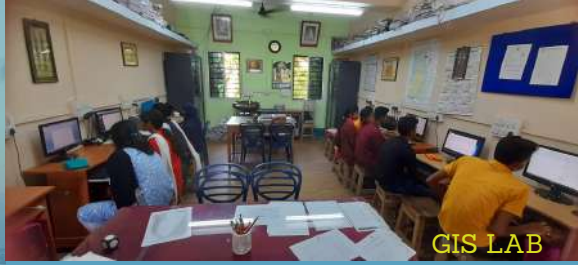
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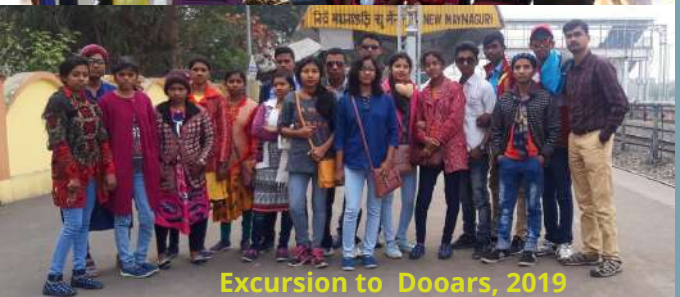

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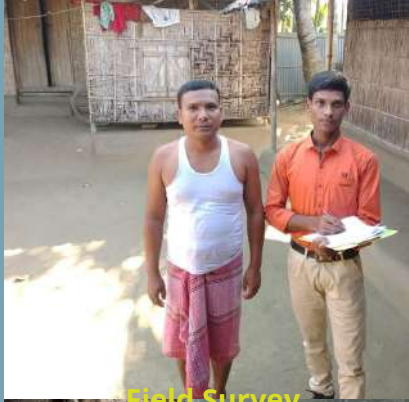

Field Survey