CENTRE FOR STUDIES IN GEOGRAPHY

DIBRUGARHUNIVERSITY

SYLLABUS FOR MASTER DEGREE IN GEOGRAPHY

UNDER SEMESTER SYSTEM

SEMESTER – I

Paper - I: GEOMORPHOLOGY

Course Objectives:

To enhance the learner in the field of fundamental geomorphic concepts,diverse geomorphic processes acting on the earth and their role on the development different landform under different geo-climatic conditions.

Credits: 6 (4+2+0) (42 lectures)

Unit-I :**Development of Geomorphic Ideas (8 lectures)**

a) FundamentalGeomorphicConcepts.
b) Concepts of Uniformitarianism and Catastrophism.
c) Recent trends in Geomorphology

Unit –II **: Fundamental Concepts in Geomorphology (8 lectures)**

a) Concept of Steady state and Dynamic Equilibrium
b) System concept in geomorphology
c) Geomorphic Thresholds

Unit –III: **Geomorphic Process (12 lectures)**

a) Endogenetic and Exogenetic processes
b) Dynamics of Fluvial, Glacial, Aeolian and Karst processes and resulting landforms.
c) Study of slopes, slopes forming processes and different forms of slope

Unit –IV: **Morphometric analysis (6 lectures)**

a) Methods and techniques of geomorphic process study
b) Concepts of morphogenetic regions.

Unit –V: **Applied Geomorphology**(8 lectures)

a) Concepts and techniques in applied geomorphology
b) Paleogeomorphology, Environmental Geomorphology
c) Quantitative applications in Geomorphology

Books Recommended for Paper I: Geomorphology

1. *Ahmed, E., 1985: Geomorphology, KalyaniPubliser, New Delhi.*
2. *Bloom, Arthur L., 1978: Geomorphology-A Systematic Analysis of Late Cenozoic Land-Forms, Prentice Hall, Engelwood Cliffs, N.J.*
3. *Chorley, R.J., 1972: Spatial Analysis in Geomorphology, Harper&RowPublisher, London*
4. *Chorley,Water, Earth and Man, Methun and Co., London.*
5. *Chorley, R.J.,(ed),1968: Models in Geography, Methun and Co., London.*
6. *Dayal, P.(2nd edition),1996: A Textbook of Geomorphology, Shukla Book Depot, Patna.*
7. *Dixit,K.R.(ed),1983: Contribution to Indian Geography/Geomorphology, Heritage, New Delhi.*
8. *Gregory, K.J. 1985: The Nature of Physical Geography, Edward Arnold, London.*
9. *Gregory, K.J. & Walling, D.E.1973: Drainage Basin-Form and Process, Ed.Arnold, Lond.*
8. *Leopold, L.B., Wolman, M.G., Milier, J.P., 1964: Fluvial Processes in Geomorphology, Freeman, Sanfransisco.*
9. *Penck,W.,1924: Morphological Analysis of Landforms, McMillan, London.*
10. *Schumm, S.A.,(ed)1977: Drainage Basin Morphology, Dowden Hutchinson & Ross Inc.*
11. *Sharma, H.S.(ed)1982: Perspectives in Geomorphology, Vol. I to IV, Concept, New Delhi.*
12. *Sharma, H.S.(ed) 1986: Geomorphology-Earth Surface Processes and Forms, Tata McGraw Hill, New Delhi.*
13. *Smart, M.W.1951: The Origin of the Earth .*
13. *Steers, A.J.,1937:The Unstable Earth.*
14. *Strahler, A.N.1968: The Earth Science, Harper International Edition.*
15. *Strahler, A.N.1969: Physical Geography, 3rd Edition, Wiley International.*
16. *Thornbury, W.D.1969: Principles of Geomorphology, Wiley International.*
17. *Young, A.,1972: Slope, Longman, New York.*

Paper – II :CLIMATOLOGY AND OCEANOGRAPHY

Course Objectives:

To conceptualize the fundamentals of climate and weather and different climatic types. It also focuses on the nature and development of different atmospheric processes and whether phenomena over the surface of the earth

Credits: 6(4+2+0) (48 lectures)

Unit-I: Basic concepts in Climatology& Hydrological Cycle (8 lectures)

(a) Insolation, Heat balance and distribution of temperature.

(b) Concept of hydrological cycle-Humidity, evaporation,

TranspirationCondensationandPrecipitation.

(c) Concept of atmosphericequilibriumstability& instability.

Unit-II: Atmospheric Circulation (12 lectures)

(a) Atmosphere pressure, global pressure systems and general

atmospheric circulation.

(b) The Monsoon-its origin, mechanism and development:

Indian monsoon, concepts of El-ninoand LA- NINA and its impact on India

(c) Changes in climates, causes & consequences and society's response; Paleoclimate.

Unit-III: Climatic processes (10 lectures)

(a) Atmospheric disturbances-Tropical and Temperate Cyclones.

(b) Air mass and fronts-types and characteristics and their

influence on weather andClimate.

(c) Weather forecasting techniques.

Unit IV: Physical and Chemical properties of Sea Water (10 lecture)

a. Temperature and density of the sea water.
b. Salinity of the oceans: controls and distribution.
c. Marine Deposits, formation of coral reefs.

UnitV: Dynamics of the Marine environment (8 lectures)

a. Nature and formation of waves and tides.
b. Sea level changes: causes and consequences.
c. Impact of humans on the Marine environment.

Books Recommended for Paper II : Climatology

1. Barry,R.G.& Chorley, R.J.1971: Atmosphere, Weather & Climate, MethuemCo.,London.
2. Critsfield,H.J.,1975:General Climatology, Prentice Hall,New Delhi.
3. Das,P.K.,1968: The Monsoon, National Book Trust,New Delhi.
4. Hobbs,J.E.,1980: Applied Climatology, Butterworth.
5. Lockwood,J.G.,1976: World Climatology-Environmental Approach, Ed. Arnold Ltd..
6. Lal,D.S.,1998: Climatology, ShardaPustakBhawan, Allahabad.
7. Miller,A.A.,1953: Climatology, Dutton.
8. Menon,P.A.,: Our Weather, National Book Trust.
9. Stringer,E.N.,1982: An Introduction to Climate, International Studies.
10. Trewarha,G.T. & Horn,L.A.,1980: An Introduction to Climate, International Studies.
Bio-geography:
11. Bradshaw,M.J.,1979: Earth and Living Planet, ELBS,London.
12. Bunting,B.T.,1967: The Geography of Soil, Hutchinson,London.
13. Goudie,A.1981: The Human Impact, Basil Blackwell,Oxford.
14. Hussain,H(ed),1994: Bio-geography (part I & II), AnmolPublications,New Delhi.
15. Newbiggin,: Plant and Animal Geography.
16. Odum,E.P.,1977: Ecology
17. Robinsom,H.,1982: Bio-geography, ELBS, Mc Donald &Evans,London.
18. Russell,E.W.,1973: Soil Condition and Planet Growth, Long man,London.
19. Smith,R.L.,1977: Ecology of Man-An Ecosystem Approach.
20. Simmons,I.G.,1974: Bio-geography :Natural and Cultural,London
21. Tiby,1982: Bio-geography , Longman

PAPER – III: ENVIRONMENTAL GEOGRAPHY

Course Objectives:

To develop conceptual and theoretical ideas of environment as well as relationship between man and environment in different geo climatic regions. The learners will also understand the nature and intensity of some burning environmental issues at local, regional and global along with mitigation programs and policies.

Credits: 6 (4+2+0) (40 lectures)

Unit-I: Conceptual Basis (8 lectures)

(a) Defining the field of Environmental Geography:Emergence of EnvironmentalGeography as a branch ofGeography and its scope and significance.

(b) Man Environment Relationship: Historical perspective on man's interaction with environment; population growth and environment.

(c) Approaches to the study of man-environment relationship.

Unit-II: Ecosystem in the context of Development (8 lectures)

(a) Concept and type of ecosystem; functioning of and energyflow in eco-System.

(b) Bio-geochemical cycles and biosphere as an ecosystem.

(c) Environment and Development: Concept of environment and development.

Unit-III: Environmental Hazards (8 lectures)

(a) Environmental hazards: Meaning and types.

(b) Tectonic disaster and climatic hazards of the world and NE India.

(c) Flood hazards with special reference to the floods of the Brahmaputra River.

Unit-IV: Concept of Sustainable Development (8 lectures)

a) Genesis and evolution of the concept of Sustainable development

b) Sustainable development goals: Meaning, concepts and objectives.

c) Carbon footprint and sustainable development.

Unit-V: Environmental Management (8 lectures)

a) Concept of environmental management and its necessity.

b) Approaches to environment management and Environment impact assessment.

c) Global and regional environmental programs and policies

Books Recommended for Paper III : Geography of Environment

1. *Cantledge, B (ed), 1992 : Monitoring the Environment, Oxford University Press, Oxford*
2. *Lodha, M.R.,(ed) 1996 : Academic's Dictionary of Environment.*
3. *Park, C.,1997 : The Environment, Routledge, London.*
4. *Santra, S.C.,2011 : Environmental Science .*
5. *Seshagiri, N.,2014 : Pollution.*
6. *Singh, S.,1991 : Environment Geography, PrayagPustakBhawan, Allahabad.*
7. *Strahler, A.N.& A.H. Strahler, 1976 : Geography and Man's Environment, John Willey, New York.*
8. *Simon, I.G.,1982 : Biogeographical Process, Allen &Unwin, London.*
9. *Singh, B.R.& Mishra, S.,1996 : Environmental Law in India Issues and Responses .*
10. *Thomas, S.,& Siddhartha, K.,(ed)2013 : Biospere A Geography of Life.*
11. *Varma, P.S.&V.K.Agarwal, 1989, : Principles of Ecology, S.Chand&Co.,New Delhi.*
12. *Ress,J.,1985: Natural Resources, Routledge, London.*

Paper –IV: PRACTICALS ON MORPHOMETRIC TECHNIQUES AND THEMATIC MAPPING

Credits: 5(1+0+4)

Unit-I: Representation of Relief and Analysis.

(a) Profile Drawing and Interpretation.

(b) Preparation and analysis of relative relief maps based on Smith's method.

(c) Preparation and analysis of slope maps using Wentworth's method

Unit-II: Analysis of Basin Morphometry

(a) Drainage ordering, calculation of bifurcation ratio, length ratio, basin circularity ratio,analysis of laws of stream's number, stream length and drainage basin area.

(b) Calculation, preparation and analysis of drainage density, drainage frequency and drainage texture map.

(c) Preparation and analysis of altimetric frequency curve and histogram.

Unit-III: Thematic Mapping and Preparation of Graphs.

(a) Distribution, Density and Growth of Population-Assam and India

(b) Spatial variations of literacy ratio-Assam and India

(c) Preparation of Graphs and Maps based on Climatic data.

1. Drawing and analysis of climograph, hythergraph and ergograph.
2. Preparation of rainfall dispersion graph, rainfall variability and equifluves maps.
3. Construction of water deficiency and surplus graphs.

Unit-IV: Internal Evaluation

(a) Assignment

(b) Practical note book

(c) Viva voce

Books Recommended for Paper IV: Practical

1. Davis, P: Data Description and Presentation .
2. Khullar, R.D. : Practical Geography .
3. Mishra, R.P: Fundamentals of Cartography.
4. Monkhouse,F.J: Maps and Diagrams.
5. Steers,J.A: Introduction to the Study of Map Projection.

6.Singh,R.L: Fundamentals of Practical Geography.

7. Singh, M.R.N: Map Work and Practical Geography.

SEMESTER II

Paper - V:HUMAN GEOGRAPHY

Course Objectives:

To develop conceptual and theoretical ideas on the different branches of human geography. It will also enhance the learner with the basic ideas of population, settlement and cultural geography.

Credits: 6 (4+2+0) (46 lectures)

Unit I: Conceptual Basis(10 lectures)

a.Introduction to the field of Human Geography, Nature and Scope of Human Geography.

b. Approaches to Human Geography: Environmental Determination, Possibilism, Neo-environmentalism and Ecological Approaches.

c. Modern Approaches-Locational, behaviour, humanistic, Marxist and PostmodernApproaches.

Unit II: Patterns in Human Geography(8 lectures)

a. Concept of Geographical Patterns and its Measurement.

b. Spatial interaction model in geography

c. Spatial Diffusion and Decision Process Systems in Geography.

Unit III: Population Geography (10 lectures)

a. Population geography and its development.

b. Population growth: components and determinants, populationdistribution in the world;migration: internal and international and associated problems.

c. Population Theory: Thomas Robert Malthus, and David Ricardo; Demographic transition.

d. Population resource relationship-optimum population, under population andoverpopulation. Population resource regions

Unit IV: Settlement Geography(10 lectures)

a. Settlement: Concept, classification, distribution and thechanging relationship with theenvironment.

b. Rural settlement: evolution, site and situational factors and patterns and types.

c. Urban settlement: growth, processes and problems of urbanization,functionalclassification of towns, rural-urban dichotomy and continuum and hierarchy ofsettlement.

Unit V: Cultural Geography(8 lectures)

a. Definition, scope and development of Cultural Geography.

b. Themes and concepts in cultural geography: Cultural regions, cultural ecology, culturalintegration and cultural landscape.

c. Man, society and culture: Region as a cultural entity.

Books recommended for paper V:Human Geography

1. *Cain ,R.H.,1986 : Human and Economic Geography .*
2. *Chorley , R.J. and Haggett, P.,1967: Models in Geography , Methuen, London.*
2. *Gregory , D.,1978: Ideology ,Science and Human Geography ,Hutchin, Londan*
3. *Huntington,E,1951 Principles in Human Geography ,John Wiley & Sons, Lnc, New York*
4. *Johnstone,R.J.et.(eds)1981,Dictionary of Human Geography ,Basil Blackwell Oxford.*
5. *Johnston,R.J. 1983 : Philosophy and Human Geography ,Edward Arnold ,London.*
6. *Wagner,P.L. & Mikesell,M.W.9ed)1962:Readings in Cultural Geography ,Chicago*
7. *Thomas W.L.1956,Man's Role in Changing the Face of Earth, Chicago.*
8. *Chandana,R.C. 1986,A Geography of Population,KalyaniPublishers,New Delhi*

9. Ahmed,A,et,al(eds) 1997,Demographic Transition, The Third world Scenario,Rawat Publications,Jaipur and New Delhi

10. Clarke J.I. 1972 Population Geography ,PergamonPress,Oxford

11. Carter.H.1972,The Story of Urban Geography ,Edward Arnold, London

12. Haggett, P., 1965: Locational Analysis in Human Geography, Edward Arnold, London

Paper – VI: SOCIAL, POLITICAL AND REGIONAL CONCEPT IN GEOGRAPHY

Course Objectives:

Tounderstand the theoretical basis of social and political geography. A comprehensive idea about the signifance of political geography and important geopolitical issues is also intended to provide to the student. It will also enhance the learner with the basic concept of region and its application in geography.

Credits: 6(4+2+0) (48 lectures)

Unit I: Theoretical Basis of Social Geography (10 lectures)

a. Introduction to the field of Social Geography-Problems ofDefinition; the InternationalPerspective.

b. Theories of Social formation: International and national perspective.

c. Society and Environment, Concept of Social space, modernization and socio-cultural changes, Processes of social change and transformation with special reference to caste and tribal groups

Unit II: Social development(8 lectures)

a. Social well-being: Concepts of social well-being and Physical quality of life.

b. Human development, world patterns , measurement of human development

Unit III: Theoretical basis of political Geography (10 lectures)

a. Nature, scope and significance of Political Geography; A Historical Review ofDevelopment of Political Geography; approaches to the study of Political Geography.

b. Geographical perspective on the formation of state and nation; core and periphery;frontiers and boundaries.

c. Boundary issues of India with Pakistan, China and Bangladesh

Unit IV: Geostrategic ideas in Political Geography(10lectures)

a. Geo-strategic theory of Ratzel,Kjellen, Mahan,Mackinder, Spykman andCohen.

b. Concept of geo-politics and its application, Geopolitical problems of South Asia.

c. Federalism and other form of government, federalism in India.

Unit V: Concept of Region(8 lectures)

a. Regional concept in Geography and its application.

b. Types and methods of regionalization.

c. Growth centers and growth poles, regional disparities and environmental issues in regional development.

Books recommended for Paper VI

1. *Jones,Emrys and John Eyles,1977 :A Introduction to Social Geography ,London*
2. *Jones,Emyrs,1975 Readings in Social Geography .London*
3. *Srinivas.M.N. Social Change in Modern India,OrientLongman,Delhi*
4. *Singh Yogendra,Modernisation and Social change : Orient Longman*
5. *Census of India ,Economic and Social-Cultural Dimensions of Regionalisation, Census Centenary Monograph No.7 New Delhi1974*
6. *Talor,Peter1985: Political Geography,London.1985*
7. *Cohen ,S.B,1986 Geography and Politics in Divided World ,Methuen .London,1968*
8. *De,Bliji.H.J 1980 Systematic Political Geography,JohnWiley,New York*
9. *Kasperson and Minghi9ed) ,The Structure of Political Geigraphy.1969 Methuen London*
10. *Muir,R 1975 Modern Political Geography,Macmillan,London*
11. *Paccione,M 1968 Progress in Political Geography,CroonHelm,Beckenham*
12. *Alden,J and R Morgan 1974,Regional Planning, A comprehensive View,London Hill Book,Bath,U.K*

Paper – VII: GEOGRAPHY OF RESOURCES AND ECONOMIC DEVELOPMENT

Course Objectives:

To acquaint the students with the conceptual parameters and utilization pattern of different types of resources. The objective of this course is also to understand the geography of economic development and different types of economic activity. The students will also acquire knowledge about the various aspects of industrial, agricultural and transport geography.

Credits: 6 (4+2+0) (48 lectures)

Unit-I: Conceptual parameters of Resources (8 lectures)

a. Concept and Classification of Resources.

b.Dynamics of Resource base as related to Cultural, economic and technologicalDevelopment.

c.Methods of conservation and Management of resources.

Unit II: Utilization of Resources (10 lectures)

a. Global distribution of mineral and power Resources.

b. Utilization pattern of mineral and power Resources.

c. Role of Technology in Resource utilization.

Unit III: Geography of Economic Development (8 lectures)

a. Characteristics of Economic Development,economy of Developed and Developing countries.
b. Regional Disparities in terms of Development-causes and Remedies.
c. Globalization and Indian economy

Unit IV: Geography of Economic Activity(10 lectures)

a. Agriculture- Place of agriculture in global economy,agriculture systems of the world.

b. Classification of industries: Resource base and footloose industries

c.Industrial location theories-Weber, Hoover and Losch.

Unit V: Geography of Transport(10 lectures)

a. Role of transport in resource utilization.

b. Co-ordination of transport.

c. Indian transport system-rail, road, air and inland water transport.

Books recommended for paper VII

1. *Guha,J.L&Chattarj,P.R 1999, new edition): A new Approach to Economic Geography.*
2. *Alexander .1986 Economic Geography,Prentic Hall*
3. *Das Gupta,A Economic Commercial Geography*
4. *Isard,W, 1975 Introduction to Regional Sciences,Engle Wood pub*
5. *Roy &Mukherjee,S, 1993 Economic Geography,Theory and Models,Progress Pub, Moscow*

Symons,L,1979,AgriculturalGeography.WV Press

6. *Thomes R.S. & Corbin,P.B.1974 Geography of Economic Activity,McGraw Hill*
7. *Wheeler,J.O& Muller P.O. 1981 Economic Geography, Wiley & Sons*
8. *Eliot,H.M.(ed)1974 Transportation Geography Comments and Readings*
9. *Hay,A,1973 Transport Geography for the Space Economy*
10. *Isard ,W, 1956,Location and Space EconomyMIT Press*
11. *Losch.A.1954,The Economics of Location,New Haven*
12. *Choudhuri,M.R. 1970 Indian Industries, Development and Location,Oxford*

Paper – VIII :PRACTICAL ON SURVEYING AND SPATIAL PATTERNS

The objective of this course is to develop skills among the students regarding the use of different surveying techniques. The students will also acquire knowledge about different field survey methods.

Credits: 4 (1+0+3)

Unit I: 1. Surveying by Dumpy's level/ Auto level.

a. Profile leveling by Dumpy's level (1 exercise)

b. Contouring by Dumpy's level (1 exercise)

2. Surveying by Theodolite.

a. Measurement of vertical and horizontal angles. (1 exercise)

b. Triangulation and mapping of a micro region. (1 exercise).

Unit II: Measures of Spatial pattern

a.Rank size relationship. (1 exercise)

b. Density gradient analysis. (1exercise)

c. Methods of regionalization:Ranking method, mean method and z-score standardization.

Unit III: Field survey method.

a. Basic properties of a schedule and questionnaire.

b. Preparation of household schedule for socio-economic survey.

c. Methods of tabulation and organization of data.

d. Methods of interpretation of data.

Unit IV: Internal Evaluation.

a. Assignments

b. Practical note book

c. Viva voce

Books Recomended for Paper VIII

1. Mahmood A,: Statistical Methods in Geography
2. Alvi,J.: Statistical Geography

SEMESTER III

Paper – IX: GEOGRAPHIC THOUGHT

Course Objectives:

To enhance thelearner with the basic philosophical concepts and approaches of Geography. It will also incorporate laws, theories and models associated with the field of Geography. The learners will also acquire the knowledge about historical development in Geography during the periods of ancient, medieval and modern.

Credits: 6 (4+2+0) (42 lectures)

Unit-I: Geography as a Field of learning (8 lectures)

a. The place of Geography in the classification of sciences;geography as a social andnatural science.

b. Selected concepts in the philosophy of Geography: distributions, relationships, interactions, areal differentiation and spatial organization.

c. Need of Geography in the present day context.

Unit-II: Dualism in Geography (8 lectures)

a. Systematic and Regional Geography.

b. Physical and Human Geography.

c. German and American school of thought.

Unit-III: Explanations in Geography (8 lectures)

a. Routes to scientific explanation-inductive and deductive.

b. Types of explanations: cognitive description, cause-effect analysis and temporalanalysis.

c. System Approaches in Geography.

Unit-IV: Laws, Theories and Models in Geography (8 lectures)

a. Concepts of laws, theories and models and its application in Geography.

b**.** The quantitative revolution and its relevance in Geography

c. Responses to positivism and behaviorism.

Unit-V: Historical Development in Geography (10 lectures)

a. Classical period in Geography: Greek and Roman's Contribution.

b.Medieval Geography: Muslim's contribution, exploration by Prince Henry, ColumbusandVasco Da Gamma and their contribution to Geography.

c. Modern Geography: Contribution of A.V. Humboldt and Carl Ritter.

Suggested Readings (Paper IX)

1. *Abler,R, Adams,J.S. Gould,P.(1971) Spatial Organization: The Geographers View of the World Prentice Hall,N.J*
2. *Ali.S.M(1966) The Geography of Puranas , Peoples' Publishing House,New Delhi*
3. *Amedeo,D(1971) An Introduction of Scientific Reasoning in Geography,JWilly,USA*
4. *Dikshit,R.D. (1994) The Art and Science of Geography ,IntegratedReadings, Prentice Hall of India,New Delhi*
5. *Hartshorne ,R,(1959) Perspectives on Nature of Geography,R.McNally& Co.*
6. *Hussain,M(1984) Evaluation of Geography,EdwardArnold,London*
7. *Hohnstone R.J. (1988) The Future of Geography,Merhen,London*
8. *Minshul,R (1970) The Changing Nature of Geography,Hutchinson University Library London.*

Paper – X:METHODS IN GEOGRAPHY

Course Objectives:

To enhance the learner with different statistical techniques and methods applied in the field of Geography.

The course will also attain the fundamentals of remote sensing and GIS and their historical development in Geography.

Credits: 6 (4+2+0) (48 lectures)

Unit-I: Quantitative Methods: Bi-variate analysis (12 lectures)

a. Correlation and regression analysis-concepts and techniques.

b. Construction of regression line; interpolation, prediction and extrapolation.

c. Application of computer technology in Geography: Excel, SPSS etc.

Unit-II: Thematic Cartography (8 lectures)

a. Trends in the development of Cartographic techniques.

b. Concept of thematic mapping and its applicability in Geography.

c. Data source and techniques of analysis of thematic mapping.

Unit-III: Fundamentals of Remote Sensing (10 lectures)

a. Historical Development of remote sensing as atechnology-Relevance of remotesensingin Geography.

b. Concept and basics: Electromagnetic radiation, Energy source, energy and radiation principles, energyinteractions in the atmosphere and earth surface features.

c. Remote sensing systems: platforms, sensors

Unit-IV: Fundamentals of Geography Information Systems (10 lectures)

a. Definition and development of Geographic Information System

b.Components of Geographic Information System

c. Data in GIS: Spatial and Non Spatial Data, Raster and Vector Data structure, Data format and DBMS

Unit-V: Fundamentals of Global Positioning System (8 lectures)

a. Definition and development of Global Positioning System

b.Operational mechanism

i) Space Segment

ii) Ground Control Segment

c. Application of GPS.

Suggested Readings (Paper X)

1. *Gregory,S(1978) Statistical Methods in Geography,Longman,London*
2. *Hammond,R, McCullagh,P.S.(1974):Quantitative Techniques in Geography: An Introduction,ClarendanPress,Oxford*
3. *Maurce,Y (1974) An Introduction to Quantitative Analysis in Human Geography, McGraw Hill ,New York*
4. *Lawrence G.R.P.(1968) Cartographic Methods,Methuen,London*
5. *Monkhouse,F.J. &Wilkinsion,H.R.(1994) :Maps and Diagrams,Methuen,London*
6. *Sarkar, A.K. (1997) Practical Geography-A Systematic Approach,Orient Longman Calcutta*
7. *Singh R.L. Elements of Practical Geography,KalyaniPublisher,New Delhi*
8. *Khan Z.A.(1998) Text Book of Political Geography,ConceptPublisher,New Delhi*
9. *Arnoff S.(1989) Geographic Information System: A Management Perspective ,*

DDL Publication,Ottawa,

10. Star J and Estes (1994) Geographic Information System,An Introduction,

PrenticeHall,EnglewoodCliff,New Jersey

11. Barrett E.C. and L.F. Curtis (1992) Fundamentals of Remote Sensing and Air Photo

Interpretation, Macmillan,New York

Paper – XI: SPECIAL PAPER-REGIONAL PLANNING (PART -I)

Course Objectives

To improve the conceptual parameter of the learners in the field of Region,methods of regionalization, Regional planning and development. It broadly focuses the role of regional planning in the removal of regional disparities in terms of development.

Credits: 6 (4+2+0) (46 lectures)

Unit-I: Regional Concept in Geography (8 lectures)

a. Conceptual and theoretical framework of Region; merits and limitations for application to regional planning and development.

b. Types of region and methods of regionalization.

c. **Hierarchy of region.**

Unit-II: Concept of Regional Planning (8 lectures)

a. Meaning and scope of Planning.

b. Geography and Regional Planning.

c. Historical Development of Regional Planning.

Unit-III: Regional Planning Approaches (10 Lectures)

a. Synoptic, functional and operational approaches.

b. Analysis of region: inter and intra-regional analysis.

c. Application of input-output analysis for prediction of short-range change in regional development

Unit IV: Methods and Techniques of Regional Planning(10 lectures)

a. Methodology of Regional Planning.

b. Analytical Techniques of Regional Planning.

c. Procedural Techniques of Regional Planning.

Unit –V: Regions for Planning (10 lectures)

a. Region and its evolution; Planning regions and its characteristics

b. Planning regions of India proposed by TCPO

c. Evolution, nature and scope of town planning with special reference to India, and Fundamentals of Town and Country planning.

d. Application of GIS in Urban studies; land use, urban sprawl.

Suggested Readings (Paper -XI): Regional Planning

1. *Bhat,L.S(1973) Regional Planning in India,Statistical Publishing Society ,Calcutta*
2. *Bhat,L.S. et al (1976) Micro-Level Planning,A Case Study of Karana l Area,Haryana*

K.B.Publcation,New Delhi

3. *Chorley,H.andHagget P. (1976) Models in Geography,Metun.London*
4. *Misra,R.P. et al (1974)Regional Development in India-A Strategy,Mysore.*
5. *Mitra.A. (1965)Levels of Regional Development,Census of India,VolI,pt I &II*

New Delhi

6. *Raza,M (1988)Regionaldevelopment,Heritage Publisher ,Delhi*
7. *Misra R.P. et al (1980) Multi Level Planning ,Heritage.*

Paper XI: SPECIAL PAPER-FLUVIAL GEOMORPHOLOGY (PART-I)

Course Objectives:

To understand the basic concept of fluvial geomorphology .The focus is also to make the student aware about the various modern techniques applied in fluvio geomorphological study. The student will as well learn about the different process acting in a channel and about channel dynamics.

Credits: 6 (4+2+0) (46 lectures)

Unit-I:Introduction to Fluvial Geomorphology: (8 lectures)

a. Meaning and evolution of fluvial geomorphology; relation between fluvial geomorphology and hydrology,major fluvial regimes of India.

b. Modern methods and techniques in fluvial geomorphologicalstudies: sedimentological techniques, remote sensing, GISand computer applications.

Unit-II:Drainage basin as a fluvial system (8 lectures)

a. Inputs and outputs in thebasin, drainage basin as a fundamental geomorphic unit.

b. Runoff estimation in the basin, factors controlling runoff.

Unit-III:Channel processes (10 lectures)

a. Concept of grade, attainment of grade,channel equilibrium.

b. Forces acting in channel, velocity distribution, flow types and water and sediment discharge in channel.

Unit-IV:Channel form and Hydraulic Geometry (10 lectures)

a. Cross-section geometry and long profile

b. Hydraulic geometry analysis: at-a-station case and downstreamcase, relationship of water discharge with velocity, depth widthand sediment discharge.

Unit-V:Channel patterns(10 lectures)

a. Straight, meandering, and braided; development and causes of meandering; mechanics and causes of braiding.

b. Channel changes in time and space.

Suggested Readings (Paper XI & Paper XV) (Fluvial Geomorphology)

1. Bhagabati, A.K., Bora, A.K. and Kar, B.K. (ed), 2001: Geography of Assam, Rajesh Publications, New Delhi.

2. Chorley, Wolman and Millerm, 1969: Fluvial Processes in Geomorphology, W.H. Freeman AndCompany, San Francisco.

3. Chorley, R.J. (ed), 1969: Water, Earth and Man, Methuen, London.

4. Chouhan, T.S., 1995: Remote Sensing: Principles and Interpretation, H.W. Freeman and Company, San Francisco.

5. Chow, V.T., 1964: Handbook of Applied Hydrology, McGraw Hill Book company, New York.

6. Folk, R.L., 1980: Petrology of Sedimentary Rocks, Hemphill Publishing Co. Austin, Tx.

Garde, R.J. and RangaRaju, K.G.: Mechanism of Sediment Transportation.

7. Gregory, K.J. and Walling, D.E., 1973: Drainage basin Form and Processes, Arnold, London.

Kanidhton, D., 1984: Fluvial Forms and Processes, Edward Arnold, London.

8. Leopold, Wolman and Miller, 1964: Fluvial Processes in Geomorphology, W. H. Freeman and Company, San Francisco.

9. Morisawa, M., 1968: Streams: Their Dynamics and Morphology, McGraw Hill Book Company,New York.

10. Mutreja, K.N., 1986: Applied Hydrology, McGraw Hill Book Company, New York.

11. Pettijohn, F. J., 1975: Sedimentary Rocks, Harper and Raw Publishers, New York.

12. Petts, G.E., and Foster, I., 1985: Rivers and Landscape, Edward Arnold, London.

13. Rao, K.L., 1975: India's Water Wealth, Orient Longman, New Delhi.

14. Sabnis, Floyd. F., 1978: Remote Sensing: Principles and Interpretation, H.W. Freeman and Company, San Francisco.

15. Schumm, S.A., 1977: The Fluvial System, Wiley Interscience, New York

16. Schumm, S.A. (ed), 1977: Drainage Basin Morphology.

17. Smith, D.I. and Stopp, P., 1978: The River Basin:An Introduction to the Study of Hydrology, Cambridge.

Paper XI:SPECIAL PAPER –REMOTE SENSING &GIS(PART – I)

Course Objectives:

To understand the principles, applications and pertinent issues of geoinformatics, leading to modelling of earth resources management using the GIS and RS technology.To acquire, store and management of spatial data for Digital Image Processing and Classification.

Credits: 6 (4+2+0) (48 lectures)

UNIT-I: Remote sensing fundamentals (10 Lectures)

a. History and scope of remote sensing,
b. Concepts of remote sensing, Principles of remote sensing,
c. Elements of the visual image interpretation, verification and validation of the remote sensing data (Ground truth Collection).

UNIT-II: Remote sensing platforms and Sensor Characteristics (10 Lectures)

a. Platforms
b. Active and Passive remote sensing
c. Sensor Resolutions
d. Data Formats of Digital image

UNIT-III: Digital Image Processing: Preprocessing and enhancement (8 lectures)

a. Radiometric correction
b. Geometric correction,
c. Image enhancement
d. Filtering

UNIT-IV: Image Classification (8 Lectures)

a. Supervised classification
b. Unsupervised classification
c. Accuracy assessment

UNIT-V: Data Integration, analysis and presentation (12 Lectures)

a. Multi sensor and multisource data
b. Integration of optical, radar and Geospatial data,
c. Intergration with GIS

Suggested Readings (Paper XI & XV) (Remote Sensing & GIS)

1. Sabnis, Floyd. F., 1978: Remote Sensing: Principles and Interpretation, H.W. Freeman and Company, San Francisco.

2. Goswami,S.C., 1997, Remote Sensing Applications in North East India,PurbanchalPrakash, G.N.B.Road, Ambari, Guwahati-781001.

3. Henderson, Floyd M. and Lewis Anthony, J. Principles & Application of Imaging Radar, Manualof Remote Sensing, Third Edition, Vol-2.

4. QuattrochiDale.A, and Goodchild, Michael F (Eds.) (1997) Scale in Remote Sensing and GIS, USA.

5. Rodda, J.C (Eds.) (1985) Facets of Hydrology Vol-II, John Wiley & Sons Ltd.

6. Schultz,A.Gret&Engman,Edwin.T (Eds.), (2000) Remote Sensing in Hydrology and water Management, Germany.

7. Thomas M. Lillesand, Ralph W. Keifer and Jonathon W. Chipman" Remote Sensing and Image Interpretation, Fifth Edition.

8. Kumar, BirAbhimanyu, "Remote Sensing and GIS for Natural Resource Management, (1st Edition).

9. Nag, Prithvish, (Eds.) "Thematic cartography and Remote Sensing".

10. Sharma, V.K. (Eds.) " Remote Sensing for Land Resource Planning".

Paper –XII:MAP PROJECTION AND FIELD WORK

Credits: 4 (2+1+1)

(The main objective of the field works is to conduct an extensive survey of a contiguous wider region and identify salient landforms; their genesis and their impact on human life, flora and fauna)

Unit -I : Trace the prominent features of the area to be surveyed,identify salient landform features of the selected area of a topographical sheet.

Unit-II : Identify the landforms of the surface, while in the field.Also note the agents of erosion, transportation and deposition associated with the landforms.

Unit-III : Identify and classify the biodiversity in the area (Flora & Fauna).

Unit-IV: Observe of the relationship of various landforms, flora and fauna with land-use settlement structure and life style of people.

Unit-V: Based on observations of the above characteristics, prepare a field survey report. The report need to be supplemented with maps, sketches, photographs, etc.

50 marks to be included with the field study practical

Concept of Map Projection

1. Meaning and types: Characteristics of map projection
2. Concept of latitudes, longitudes and Datum
3. Digital cartography

Projections

1. Zenithal Polar Gnomonic Projection and stereographic projection.
2. Conical Projection with one and two standard parallel
3. Mercator's Projection, Sinusoidal Projection

SEMESTER IV

Paper XIII - REGIONAL GEOGRAPHY OF INDIA

Course Objectives**:**

To make the students familiar with the spatial distribution and spatio-temporal variations of land and resources in India

To have a comprehensive knowledge of north eastern part of India as a distinct regional unit

Credits : 6(4+2+0) (48 lectures)

Unit-I Physical Basis of the Country (10 lectures)

a. Physiographic framework and drainage system.

b. Indian monsoons, cyclones, western disturbances, flood and draughts.

c. Soil and vegetation.

Unit-II Resource Basic of the Country (8 lectures)

a. Mineral and power resources.

b. Agricultural resources-problems and prospects.

c. Transport and Communication.

Unit-IIICultural Basis of the Country (10 lectures)

a. Cultural setting: racial and ethnic diversities, tribal areasand their problems, population: problems and policies.

b. Settlements: types, pattern and morphology of rural settlements.

c. Urban development, morphology of India cities, urban sprawls, slums and associated problems.

Unit-IV: North East India (10 lectures)

a. Physiographic background of North East India-relief, soil, climate and vegetation.

b. Socio-cultural background of North East India-language and religion, cultural diversities in the northeast.

d. Population growth, immigration problems in the northeast India.

Unit-V: Economic Development in North East India (10 lectures)

a. Resources of the northeast India-mineral and powerresources and their Distribution.

b. Agricultural-shifting cultivation in the northeast India.

c. Levels of economic development in the northeast –India and inter-state display.

Suggestion Readings (Paper -XIII)

1. *Singh,R.L(rd) A Regional Geography of India,1967*
2. *Spate O.H.K&Learmonth,A.T.A.(1967) India and Pakistan: Land people and economy.*
3. *Sutta,A.K. India; Resources,Potentialities and Planning ,1973*
4. *Bhagawati,A.K et al: Geography of Assam,2000 Publication of NEIGS,GU and Others*

PAPER-XIV: RESEARCH METHODOLOGY IN GEOGRAPHY

Course Objectives:

General understanding of the concept of research and identification of overall process of designing a research work.To have a deeper understanding of complete designing of research from statement of research problem to final thesis writing. Critical assessment of research methods pertinent to technology innovation research in the field of earth science

Credits: 6(4+2+0) (46 lectures)

Unit-I: Introduction (10 lectures)

a. Meaning and objectives of research.
b. Type of Research, qualitative and quantitative, descriptive and analytical, applied and fundamental research
c. Defining research problem and Research design; true experimental and quasi experimental

Unit-II: Collection of Data (8 lectures)

a. Sources and type of data.
b. Methods of collecting primary and secondary data.
c. Construction of questionnaire and schedule.

Unit-III: Processing and Analysis of data (10 lectures)

a. Editing and coding.
b. Classification and tabulation.
c. Analysis and type of analysis.

Unit-IV: Sampling Design (8 lectures)

a. Census and Sample Survey.
b. Steps in Sample Design.
c. Types of Sample Design.

Unit-V: Hypothesis testing (10 lectures)

a. Concept and characteristics of Hypothesis
b. Procedure for Hypothesis Testing.
c. Testing of Hypothesis with Example.

Suggested Readings (Paper XIV)

1. *Gosal, G.S.(1999) Survey of Research in Geography,ManakPublication,New Delhi.*
2. *Kothari,C.R.(199) Research methodology .Wishaw Publisher ,New Delhi*
3. *Kumar, Ranjit (2011) Research Methodology: A step by step guide, Sage Publication*
4. *Misra.H.N. & Singh, V.P.(1988) Research Methodology in Geography, Rawat Publication*
5. *Murthy.K.N.L. (1999) Geographical Research, Concept Publisher*
6. *Pal, S.K. (1995): Computing Mathematical Techniques in Geography, B.R. Publisher*

Paper –XV: SPECIAL PAPER-REMOTE SENSING & GIS (PART – II)

Course Objectives:

Meaningful application of GIS and Remote Sensing technology in areas like environment, urban planning and flood risk assessment etc.
Skill development in handling the instruments, tools and techniques while using geo-spatial technology
To prepare the student for national and global employability

Credits : 6(4+2+0) (48 lectures)

UNIT-I: Remote sensing applications to the geosciences (8 Lectures)

a. Geological Mapping
b. Mineral Exploration
c. Morphometric studies

UNIT-II: Remote sensing applications to the environmental science(10 Lectures)

a. Land use and land cover analysis: mapping and change detection
b. Urban and regional planning
c. Water resources
d. Flood disaster (FLEWS,DRR)

UNIT-III: Geoinformatics and its applications (12 Lectures)

a. Overview of the GIS, GIS software packages
b. Integration of spatial and non-spatial data. Topology in GIS.
c. Geospatial analysis in Disaster management with the case studies on the landslides and floods.

UNIT-IV: Data representation and integration techniques (8 Lectures)

a. Database management systems.
b. Interpolation methods.
c. Geostatistics and surface mapping.
d. Virtual GIS.

UNIT-V: Application of Remote Sensing & GIS (10 Lectures)

a. Use of the remote sensing and GIS in the selection of the dams, tunnels, roads and bridges,
b. GIS for flood risk assessment and landslide vulnerability zonation,
c. GIS in urban planning.

Suggested Readings (Paper XI & XV) (Remote Sensing & GIS)

1. Sabnis, Floyd. F., 1978: Remote Sensing: Principles and Interpretation, H.W. Freeman and Company, San Francisco.

2. Goswami,S.C., 1997: Remote Sensing Applications in North East India,PurbanchalPrakash, G.N.B.Road,Ambari, Guwahati-781001.

3. Henderson, Floyd M. and Lewis Anthony, J. Principles & Application of Imaging Radar, Manualof Remote Sensing, Third Edition, Vol-2.

4. QuattrochiDale.A, and Goodchild, Michael F (Eds.) (1997) Scale in Remote Sensing and GIS, USA.

5. Rodda, J.C (Eds.) (1985) Facets of Hydrology Vol-II, John Wiley & Sons Ltd.

6. Schultz,A.Gret&Engman,Edwin.T (Eds.), (2000) Remote Sensing in Hydrology and water Management, Germany.

7. Thomas M. Lillesand, Ralph W. Keifer and Jonathon W. Chipman" Remote Sensing andImageInterpretation, Fifth Edition.

8. Kumar, BirAbhimanyu, "Remote Sensing and GIS for Natural Resource Management, (Ist Edition).

9. Nag, Prithvish, (Eds.) "Thematic cartography and Remote Sensing".

10. Sharma, V.K. (Eds.) " Remote Sensing for Land Resource Planning

PAPER –XVI: PRACTICAL ON SPECIAL PAPER - REMOTE SENSING & GIS

Credits : 5 (1+0+4)

Unit – I:

a. An exercise towards Familiarization and Exploratory Inference of Satellite Images.

b. Visual Interpretation (post field visit study)

c. Satellite Data Formats and importing of data In ERDAS Imagine Software.

d. Pre-processing of data (Geometric corrections)

e. Image Enhancement Techniques (Contrast Enhancement)

Unit – II:

a. Using ERDAS on screen digitization of various Land use classes from IRS/LISS-3 FCC

b. Image Enhancement Techniques (Filtering)

c. Image pattern recognition – Unsupervised & supervised classification

d. Remote Sensing Application: Land use& urban studies, forestry & Environ Related Aspects, Flood damage assessment, soil & crop studies, Drought assessment, Geology & Geomorphology, Groundwater prospecting (minimum four of the above)

Unit- III: Project Report

(Each candidate shall have to prepare a project report on a topic assigned by the teacher)

a. Report Writing

b. Viva Voce

Unit- IV: <u>In-semester evaluation</u>

a. Assignments

b. Practical Notebook Assessment.

c. Viva-voce.

Paper XV: SPECIAL PAPER-FLUVIAL GEOMORPHOLOGY (PART-II)

Course objective:

To know about the anthropogenic impact on river basin and also about the various fluvio geomorphic hazards. The aim is also to make the students acquire knowledge about the fluvial geomorphology of the Brahmaputra valley and about river basin planning and development.

Credits : 6(4+2+0) (46 lectures)

Unit-I:Flood Geomorphology(8 lectures)

a. Flood as a geomorphic agent, floodfrequency analysis.

b. Analysis of paleoflood& its relationshipwith paleo-climate

Unit-II:Human impact on river basins and fluvial systems (10 lectures)

a. Effects of basin changes and dam construction on catchment ecosystem.

b. Channel straightening, bank stabilization, sand and gravel extraction and its impact on river basin.

Unit-III:Fluvio-geomorphic hazards (8 lectures)

a. Flood and bank erosion, landslides and soil erosion with specialreference to North-East India.

Unit-IV: Fluvial Geomorphology of the Brahmaputra Valley (10 lectures)

a. Hydrology, sediment type, channel pattern changes & bank linemigration of the river Brahmaputra.

Unit-V: River basin planning(10 lectures)

a. River basin planning, development and management;

b. Human adjustment to flood prone areas and deltaic environment.

Suggested Readings (Paper XI & Paper XV) (Fluvial Geomorphology)

1. Bhagabati, A.K., Bora, A.K. and Kar, B.K. (ed), 2001: Geography of Assam, Rajesh Publications, New Delhi.

2. Chorley, Wolman and Millerm, 1969: Fluvial Processes in Geomorphology, W.H. Freeman AndCompany, San Francisco.

3. Chorley, R.J. (ed), 1969: Water, Earth and Man, Methuen, London.

4. Chouhan, T.S., 1995: Remote Sensing: Principles and Interpretation, H.W. Freeman and Company, San Francisco.

5. Chow, V.T., 1964: Handbook of Applied Hydrology, McGraw Hill Book company, New York.

6. Folk, R.L., 1980: Petrology of Sedimentary Rocks, Hemphill Publishing Co. Austin, Tx.

Garde, R.J. and RangaRaju, K.G.: Mechanism of Sediment Transportation.

7. Gregory, K.J. and Walling, D.E., 1973: Drainage basin Form and Processes, Arnold, London.

Kanidhton, D., 1984: Fluvial Forms and Processes, Edward Arnold, London.

8. Leopold, Wolman and Miller, 1964: Fluvial Processes in Geomorphology, W. H. Freeman and Company, San Francisco.

9. Morisawa, M., 1968: Streams: Their Dynamics and Morphology, McGraw Hill Book Company,New York.

10. Mutreja, K.N., 1986: Applied Hydrology, McGraw Hill Book Company, New York.

11. Pettijohn, F. J., 1975: Sedimentary Rocks, Harper and Raw Publishers, New York.

12. Petts, G.E., and Foster, I., 1985: Rivers and Landscape, Edward Arnold, London.

13. Rao, K.L., 1975: India's Water Wealth, Orient Longman, New Delhi.

14. Sabnis, Floyd. F., 1978: Remote Sensing: Principles and Interpretation, H.W. Freeman and Company, San Francisco.

15. Schumm, S.A., 1977: The Fluvial System, Wiley Interscience, New York

16. Schumm, S.A. (ed), 1977: Drainage Basin Morphology.

17. Smith, D.I. and Stopp, P., 1978: The River Basin:An Introduction to the Study of Hydrology, Cambridge.

Paper –XVI: PRACTICAL ON SPECIAL PAPER- FLUVIAL GEOMORPHOLOGY

CREDITS: 5(1+0+4)

Unit – I

a. Preparation and interpretation of stage, discharge, hydrographs and unit hydrograph.

b. Analysis of the relationship between

(i) Basin area and stream discharge and

(ii) Water discharge and sediment load (sediment ratingcurves) taking examples from the Brahmaputra and its Tributaries

Unit – II

a. Flood frequency analysis using

(i) Plotting position method

(ii) Log Pearson Type III distribution and

(iii) Gumble's Extreme value distribution Method

d. Grain-size analysis of alluvial sediments and fluvio-geomorphicinterpretation of the results.

Unit – III: Project Report

(Each candidate shall have to prepare a project report on a topic based on field study assigned by the teacher)

a. Report Writing

b. Viva voice

Unit IV

Internal evaluation

a. Assignments

b. Practical Notebook Assessment.

c. Viva-voce.

PaperXV: SPECIAL PAPER- REGIONAL PLANNING(PART-II)

Course Objectives:

To enhance the learner in the field of different planning process for the development of problem and special purpose region. It also incorporates the hierarchical order of different planning activity and its role of regional development.

Credits: 6 (4+2+0)(46 lectures)

Unit-I: Basicof Regionalization(10 lectures)

a. Physical, Social and economic regions of India.

b. Special purpose region: river valley and metropolitan region need of Planning for special purpose region.

Unit-II: Problem regions(10 lectures)

a. Identification of Problem regions-basic approaches.

b. Problem regions-hilly region, tribal region and regions of drought and floods;

c.Strategy for Development.

Unit-III: Planning Processes (8 lectures)

a. Sectoral, temporal and spatial dimensions of planning.

b. Urban policy and urban planning in India**.**

c. Indicators of development and their data sources, measuringlevels of development and disparities-India context

Unit –IV: Regional Development Strategies (8 lectures)

1. Concentration vs. dispersal

2. Plans of developed and developing countries

3. Regional development in India -problems and prospects

Unit-V: Multilevel Planning(10 lectures)

1. Concept and utility in the national context-stages in the evolution of multi-level planning process.

2. Features and Pattern of decentralization planning in India-Panchayatirajinstitution and administrative structure (village, block and district);

3. Regional planning strategy under Five Year Plans;Policies and programme for Village level Planning.

PAPER –XVI: PRACTICAL ON SPECIAL PAPER- REGIONAL PLANNING

CREDITS: 5(1+0+4)

Unit-I: Methods of Regionalization

a. Economic Regionalization by- Ranking and Mean Methods, Z-score Standardization,

b. Measurement of spatial concentration: Location Quotient; Measurement of inequality: Lorenz Curve

c. Application of aggregate connectivity for regional (6 exercises) Development usingalpha, beta, gamma and cyclometric number.

Unit-II: Preparation of Field Study Report

1. Preparation of a Land -use Map of the Area being Surveyedin GIS environment**.**

2. Preparation of Blue -print for Development of any area.

3. Preparation of a Survey schedule for land - use.

Unit-III: Project Report

(Each candidate shall have to prepare a project report on a topic assigned by the teacher)

1. Report Writing

2. Viva voce

Unit-IV: Internal Evaluation

a. Assignments

b. Practical note book

c. Viva voce