Department of Geography

Programme Specific Outcome (MA/M.Sc. in Geography)

The programme specific outcome of the syllabus prescribed for the major students of Geography is mentioned below:

- PSO1: The programme assert the significance of Geography as an academic discipline and emphasize its role in reinforcing and confirming the connection between humans and their surroundings.
- PSO2: The programme will enhance the students comprehension of the socio-economic and cultural aspects of populations, with particular emphasis on marginalized segments of society.
- PSO3: The programme will provide engaging in physical field surveys empower students to develop a comprehensive understanding of landforms, geomorphic processes, and the related risks and dangers.
- PSO4: The programme deals with project work and preparation of dissertation which will promote research work and research profession among the students.
- PSO5: The programme will offer instruction to students on the utilization of contemporary tools and techniques, such as aerial photographs, satellite imagery, total stations, and meteorological instruments, to enhance their proficiency in handling these advanced instruments and methods.
- PSO6: The programme deals extensively on environment and man-nature relationship. This will create a sense of awareness and social responsibility among the students towards the environment.

  Most importantly, the programme will help students to become better and responsible citizens of the nation.

COURSE OUTCOME

MA in Geography (Honours) syllabus (CBCS)

1st Semester

Paper Name: Nature of Geography
Paper Code: GGY 1016

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level

After the completion of this course, the students will be able to: • Through understanding of the basics of the subject: • Understanding of sophisticated models and techniques; • Interdisciplinary field – a field that crosses traditional boundaries between academic disciplines or schools of thought.	Unit I: Defining the field of Geography; Planet earth as the home of man.	Remember and Understand
	Unit II: Place of Geography in the classification of knowledge; relation of geography with natural and social sciences; multi-disciplinary nature of Geography.	Remember and Understand
	Unit III: Geography as a spatial science; Spatial Concepts in Geography: Concept of space and place; Geographic space (Absolute Space and Relative Space); Spatial Process and Pattern; Spatial Organization; Spatial Relationship; Spatial Interaction; Spatial Integration; Spatial Diffusion; Spatial Modelling; Space-Time Dimension in Geography	Remember, Understand and Applied.
	Unit IV: Basic Branches and Approaches in Geography: Physical and Human; Systematic and Regional; Ideographic and Nomothetic.	Remember and Understand
	Unit V: Place/Region/Territory and scale factor (macro, meso, micro and space content)	Remember and Understand
	Unit VI: Geography: Pure and Applied; Society-	Remember ,Understan

	Environment Interface and Applied Geography	d and Apply
	Unit VII: Scientific Methods in Geography: Routes to scientific Explanation: Induction and Deduction; Key elements in scientific practice.	Remember ,Understan d and Apply
	Unit VIII: Modes of explanations in Geography: Cognitive explanation, Morphometric explanation, Cause and effect explanation, temporal modes of explanation, Functional explanation, System analysis.	Remember, Understand , Apply and Analysis.
	Unit IX: Hagget's Integrated Approaches in Geography: Spatial Analysis, Ecological Analysis and Regional Complex Analysis.	Remember, Understand , Apply and Analysis.
	Unit X: Pattern-Process Model for geographic enquiry.	Understand , Analysis and Apply.

Paper Name: Principles and Concepts in Geomorphology
Paper Code: GGY 1026

Course Outcome	**Unit/ Topic**	**Bloom's Taxonomy Level**
After the completion of this course, the students will be able to:	**Unit I: Principles and Concepts in Geomorphology**	Remember and Understand

• Understanding of Principles and Concepts in Geomorphology; • Application of geomorphic concepts and techniques in the field; • Knowledge enrichment of glacial, fluvial and Aeolian processes.	1. History of development of geomorphic ideas; recent trends in Geomorphology	
	2. Theoretical bases of Geomorphology: Fundamental concepts in geomorphology: uniformitarianism and catastrophism; system concepts in geomorphology; steady state; and dynamic equilibrium.	Remember and Understand
	3. Concepts and techniques in applied geomorphology: Fluvial geomorphology, Palaeo-geomorphology, Environmental geomorphology.	Understand, Analysis and Apply
	4. Threshold concepts and applications in geomorphology.	Understand, Analysis and Apply
	5. Quantitative methods and techniques in geomorphology	Understand, Analysis and Apply
	Unit II: Processes in Geomorphology 1. Geomorphic processes: endogenetic and exogenetic; Glacial, Fluvial and Aeolian processes.	Remember and Understand
	2. Relationship of climate, vegetation and soil with geomorphic processes.	Understand, Analysis and Apply
	3. Morphogenetic regions: concept and genesis, differential intensity and rate of operation of geomorphic processes in various morphometric regions.	Understand, Analysis and Apply

	4. Development of slopes: slope forming processes and slope forms.	Understand, and Analysis
	5. Methods and techniques of geomorphic process study	Understand, Analysis and Apply

Paper Name: Climatology and Biogeography
Paper Code: GGY 1036

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Knowledge about different phenomena of weather and climate specially vagaries of Indian monsoon and techniques of weather forecasting; • Deeper understanding of plant-animal association in varying habitats and environments; • Practical utility in the field while carrying out research on issues of climate and biogeography.	**Unit I: Climatology** 1. Defining the field of Climatology; Importance of Climatology in geographical studies.	Remember and Understand
	2. Climate and Weather; Elements of Weather; factors influencing climate.	Remember and Understand
	3. Insolation; atmospheric temperature; horizontal and vertical distribution of temperature.	Understand, Analysis and Apply
	4. Atmospheric Pressure and Global Wind System: Vertical pressure gradient and horizontal pressure system; Surface winds, stratospheric winds, seasonal and local winds.	Understand, Analysis and Apply
	5. Air masses and Fronts: Characteristics, Origin and modification of air masses, stability and instability and their influence on weather and climate.	Understand, Analysis and Apply

	6. Climatic disturbances: cyclones, anticyclones, cloud bursts, drought.	Understand, Analysis and Apply
	7. Classification of World Climate: Schemes of Koppen and Thornthwaite.	Understand and Analysis
	8. Monsoons: Mechanism of development, Distribution of monsoons, Trajectories and Irregularities, Effects of El-Nino, Walker oscillation, etc.	Understand, Analysis and Apply
	9. Techniques of weather forecasting: conventional and modern.	Understand, Analysis and Apply
	10. Global warming and climate change and associated impacts and challenges.	Understand, Analysis and Apply
	Unit II: Unit-II Biogeography 1. Defining the field of Biogeography; Its significance, development and approaches.	Remember and Understand
	2. Bio-energy cycles and food-chain.	Understand and Analysis
	3. Soil characteristics and their significance.	Understand and Analysis
	4. Habitat, Environment and Ecosystem;	Understand, Analysis and Apply
	Plant-Animal Association in varying habitats and environments.	Understand, Analysis and Apply
	5. Concept of Bio-diversity; Conservation of forest and wild life.	Understand, Analysis and Apply

	6. National forest and environment policies.	Understand and Apply

Paper Name: Economic Geography
Paper Code: GGY 1046

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
• Understanding of location, distribution and spatial organization of economic activities across the world; • Knowledge of geographical and other factors which influence man's productivity; • Knowledge of different farming techniques and modernization of agriculture; • Practical utility in the field while carrying out research on agriculture and economic geography.	Unit I: Field of Economic Geography: Meaning, significance and theoretical development	Remember and understand
	Unit II: Approaches to Economic Geography: Theoretical, Institutional and Problem solving	Remember and understand
	Unit III: Concepts and Models in Economic Geography: Von Thunen's theory of geographic rent, Spatial Demand Cone, Weberian industrial location model, Suiclair's model, Raw Strong's model, Growth Pole model	Understand, Analysis and Apply
	Unit IV: Technology and Economic Development: Relation between technology and development, regional disparities in technology applications, levels of economic development-global perspective.	Understand, Analysis and Apply
	Unit V: Economic Geography of Primary activity: Geography of pastoral farming,	Understand, Analysis and Apply

	Geography of agriculture, place of agriculture in global economy, critical study of large-scale & small-scale agriculture, Regional pattern of agriculture in the world with special reference to USA, Israel and China	
	Unit VI: Modernization of Agriculture: Intensification, Crop diversification, Mixed farming.	Understand, Analysis and Apply
	Unit VII: Economic geography of power resources: Global pattern of energy production; Conventional sources of energy - water, coal and petroleum; and non-conventional sources of energy - solar, wind and nuclear	Understand, Analysis and Apply
	Unit VIII: Economic Geography of manufacturing: Patterns and problems of manufacturing (mainly iron and steel and textiles) in the world with special reference to USA, UK and Japan.	Understand and Analysis
	Unit IX: Economic geography of International trade in selected commodities: Food grain (Rice and Wheat), Tea, Iron and Steel, Petroleum.	Understand and Analysis

Paper Name: Practical on Geomorphology, Climatology and Economic Geography
Paper Code: GGY 1054

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Practical utility in the field while carrying out research on geomorphology, climatology and economic geography.	**Unit I: Geomorphology** 1. Morphometric Analysis: (i) Profile drawing (ii) Relative relief maps based on Smith's method (iii) Slope maps using Wentworth's method	Analysis and Apply
	2. Slope maps using Wentworth's method (i) Drainage ordering, calculation of bifurcation ratio, length ratio, basin circularity ratio, Analysis of laws of stream number, stream length and drainage basin area (ii) Preparation of drainage density, drainage frequency and drainage texture maps	Analysis and Apply
	3. Area-Height Relationship: (i) Hypsometric curve and hypsometric integral (ii) Altimetric frequency curve and histogram	Analysis and Apply
	Unit II: Climatology 1. Climograph, Hythergraph and Ergograph 2. Rainfall dispersion graph, rainfall variability and equipluve maps 3. Water deficiency and surplus graphs	Analysis and Apply

	Unit III: Economic Geography 1.Spatial variation in landuse and cropping pattern of North-East India using pie graph	Analysis and Apply
	2. Trend analysis of production of different commodities with the help of band graph and using moving average and least squares methods.	Analysis and Apply
	3. Analysis of landholding and income pattern	Analysis and Apply
	4. Choropleth mapping of cropping intensity of N.E. India	Analysis and Apply
	5. Determination of the levels of economic development using simple composite index	Analysis and Apply
	6. Spatial analysis of crop concentration in N.E. India and Assam.	Analysis and Apply

IInd Semester

Paper Name: Geographic Thought
Paper Code: GGY 2066

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to:	Unit I: Geography through the ages; general character of geographic knowledge during the ancient and mediaeval period; impact of explorations and discoveries	Remember and Understand

• Develop a comprehensive understanding of the discipline. • Apply the historic and contemporary perspective to explain and approach the real world geographic problems.	and European renaissance on the emergence of modern geography.	
	Unit II: Foundations of modern geography: contribution of German (Humboldt, Ritter, Ratzel), French (Paul Vidal de la Blache), British and American geographers.	Remember and Understand
	Unit III: Evolution of geographic thought (Determinism, Possibilism, Human Ecology, Morphology of Landscape, Areal differentiation) and their impact in the development of the field.	Remember and Understand
	Unit IV: Emergence of New Geography: quantitative revolution, school of locational analysis, reactions to nomothetic geography; behavioural, radical and humanistic approaches, existentialism and phenomenology, welfare approach, modernism.	Remember and Understand
	Unit V: Postmodern geography: socio-spatial dialectic and gender perspective, new environmentalism, applied geography.	Remember and Understand
	Unit VI: Models in Geography and their applications	Understand, Analysis and Apply
	Unit VII: Present trend in Indian Geography	Remember and Understand

	Unit VIII: Postmodern perspective in Indian Society.	Remember and Understand

Paper Name: Geography of Environment and Development
Paper Code: GGY 2076

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • It provides the scope to develop a better understanding of environment from local to global perspectives. • Increasing awareness towards environment and to equip with the methodologies of need based sustainable developmental plan.	Unit I: Meaning of environment; Components of environment and their interrelationship and functioning; Natural and Human environment.	Remember and Understand
	Unit II: Defining Environmental Geography: emergence of environmental geography as a branch of geography; scope and significance of environmental geography.	Remember and Understand
	Unit III: Man-Environment Relationship: historical perspectives on man's interaction with environment; population growth and environment; approaches to the study of man environment relationship.	Remember and Understand
	Unit IV: Ecosystem: concept and types of ecosystem; functioning of ecosystem; Energy flow in ecosystem; bio-geochemical cycles; biosphere as an ecosystem.	Understand, Analysis and Apply

		Unit V: Man and Atmosphere: man as a factor of climate change; industrialization-urbanization and climate; greenhouse effect and global warming.	Understand, Analysis and Apply
		Unit VI: Development processes: Nature and trend of development-global and national perspective	Understand
		Unit VII: Environment and Development: concept of environment and development; sustainable development.	Understand and Apply
		Unit VIII: Global Environmental Problems: types and extent of environmental problems, areaspecific major environmental issues and problems	Understand and Apply
		Unit IX: Environmental Pollution: factors of environmental pollution; types of pollution; major areas of environmental pollution; effects of environmental pollution	Understand and Apply
		Unit X: Environmental Hazards and Disaster: meaning and types; tectonic disasters; climatic hazards; flood hazards with special reference to floods of Brahmaputra and Barak valleys, Assam.	Understand and Apply
		Unit XI: Environmental Management: concept of environmental management;	Understand and Apply

	environmental Impact assessment; approaches of environmental management; global and regional Environmental programs and policies.	

Paper Name: Population and Settlement Geography
Paper Code: GGY 2086

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • The course enables the students to understand population issue in spatial dimension to diagnose the problem issue arise out of population growth. • Understanding the settlement, both in urban and rural context equip students to prepare need based sustainable settlement plans and policies.	**Unit I: Population Geography** 1. Defining the field of Population Geography; its emergence, trend of development and Significance.	Remember and Understand
	2. Population theories: Malthus theory of population growth; Demographic transition theory.	Understand, Analysis and Apply
	3 Population Data: Nature, Sources and associated problems.	Remember and Understand
	4. Components of population growth: fertility, mortality and migration; trend of population growth in the world and its different parts; patterns, processes and consequences of migration.	Understand, Analysis and Apply
	5. Demographic and socio-economic characteristics of population and associated issues: Global perspective and comparison between	Understand and Analysis

	developed and developing countries	
	6. Population- resource relationship, conceptual bases of under population, optimum population, over population and population explosion, population-resource regions.	Understand, Analysis and Apply
	Unit II: Settlement Geography	
	1. Defining the field of settlement of geography; its development trend, significance and approaches	Remember and Understand
	2. Origin and growth of rural and urban settlements; Characteristics of rural and urban settlements; Spatial patterns of settlements.	Understand and Analysis
	3. Morphology of rural and urban settlements; theories related to internal structure of urban settlements; distance-decay rule in urban context	Understand, Analysis and Apply
	4. Rural-urban relationship: dichotomy and continuum; settlement hierarchy with reference to central place theory; concept of centrality; primate city concept; rank-size rule; concept of urban fringe.	Understand, Analysis and Apply

Paper Name: Geography of Regional Development of India with Special Reference to North-East India
Paper Code: GGY 2096

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Development of a better spatial perspective of a country like India with greater physical and social disparity. Such issues have both utilitarian and applied aspects in a broader context.	**Unit I: Geography of Regional Development of India** 1.India as a geographical entity; unity in diversity; locational significance.	Remember and Understand
	2. Physical background of regional development: relief, drainage, climate, soil and vegetation.	Understand and Analysis
	3. Mineral and power resources and development: iron ore, coal, petroleum and water power potential, and development scenario.	Understand and Analysis
	4. Population and development issues: population growth and its socio-economic implications, literacy, urbanization, occupation and social structure and development inequalities.	Understand, Analysis and Apply
	5. Regional disparities in economic development: agriculture, industry and transport and Communication.	Understand, Analysis and Apply
	6. India's geo-economic position in Asia and the world; Resource potentials; its economic development policies and international relations.	Understand, Analysis and Apply

	Unit II: Geography of Regional Development of North-East India 1. North-East India: location and strategic significance; the land of seven sisters.	Understand
	2. Physical characteristics and their relation to development: relief, drainage, climate, soil and vegetation.	Understand and Analysis
	3. Natural resources, their utilization and development: forests, coal, petroleum, natural gas and water, and development scenario.	Understand, Analysis and Apply
	4. Population and development: population growth and distribution, Migration, population characteristics and their socio-economic implications.	Understand, Analysis and Apply
	5. Agriculture and development: problems of agriculture; agricultural modernization (problems and prospects) and economic development.	Understand, Analysis and Apply
	6. Spatial pattern of socio-economic development (state level) and strategies for future development.	Understand, Analysis and Apply

Paper Name: Practical on Population and Settlement Geography and Regional Development of India and N.E. India
Paper Code: GGY 2104

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Practical on these issues help the students to portray problems as well as resource based in spatial perspectives and encourage the students to accommodate the significance of dimension in planning and policy making.	**Unit I : Population and Settlement Geography** 1. Population concentration and density pattern in North East India and Assam.	Analysis and Apply
	2. Trend of population growth (Exponential and Non-Linear methods) and population projection of India, N.E. India/Assam/India.	Analysis and Apply
	3. Determination of spatial mean center of population, spatial mean center of urban population and settlements of selected areas.	Analysis and Apply
	4. Distribution pattern of services/economic activities/settlements using Nearest Neighbour Analysis Statistic.	Analysis and Apply
	5. Determination of settlement hierarchy using centrality index.	Analysis and Apply
	6. Population Density Gradient Analysis.	Analysis and Apply
	7. Mapping volume and direction of	Analysis and Apply
	population migration in North East India.	
	Unit II: Regional Development of India and North East India 1. Analysis of trend of population growth and food production in India.	Analysis and Apply

	2. Spatial pattern of population density in Assam (district level) and dispersion of population density in India.	Analysis and Apply
	3. Mapping of population distribution of North-East India and analysis of its relationship with relief.	Analysis and Apply
	4. Analysis of connectivity and centrality of transport networks in North East India.	Analysis and Apply

IIIrd Semester

Paper Name: Quantitative and Cartographic Methods in Geography
Paper Code: GGY 3116

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Understand what methods to use for geographical data analysis. • Understand the principles of surveying and mapping.	**Unit I: Quantitative Methods in Geography** 1. Methodological developments in geography: quantitative and qualitative; significance of quantification in geographical analysis; limitations of quantitative techniques	Understand, Analysis and Apply
	2. Geographic data matrix; nature and types of geographic data, levels of measurement, data source and acquisition techniques.	Understand, Analysis and Apply

	3. Sampling and its need in geographical data collection; Sampling techniques (Probability and Non-Probability sampling); application of probability in sample selection and sample data analysis.	Understand, Analysis and Apply
	4. Application of inferential statistics in hypothesis testing; parametric and nonparametric tests, selection of significance level.	Understand, Analysis and Apply
	5. Conceptual basis of quantitative techniques in spatial distribution and concentration, spatial relationship, spatial interaction, spatial diffusion and regional patterns analysis.	Understand, Analysis and Apply
	Unit II: Cartographic Methods in Geography 1. Significance of cartography in geography; traditional and digital cartography.	Understand, Analysis and Apply
	2. Principles of surveying; field survey techniques (triangulation, traversing and leveling) and mapping.	Understand, Analysis and Apply
	3. Principles of mapping; base map preparation; concept of point, line and area; concept of generalization; scale factor; choice of map projection (Zenithal, Conical, Cylindrical and	Understand, Analysis and Apply

	Conventional); map design and layout.	
	4. Thematic mapping: meaning and type; principles of thematic mapping; basic ideas of isopleth, choropleth and choro-chromatic mapping; concept of three-dimensional representation of geographical data.	Understand, Analysis and Apply
	5. Techniques of physical and socio-economic data representation and mapping.	Understand, Analysis and Apply

Paper Name: Fundamentals of Remote Sensing, GIS and GPS
Paper Code: GGY 3123

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Understand the rationale behind use of remotely sensed data its advantages and disadvantages. • Understand how GIS/GPS methodologies can be	**Unit I: Remote Sensing** 1. Basic Concepts and Principles of Remote Sensing.	Understand, Analysis and Apply
	2. Significance of remote sensing in geography as spatial data acquisition tool.	Understand, Analysis and Apply
	3. Airborne and Satellite Remote Sensing: Data products and characteristics.	Understand, Analysis and Apply
	4. Remote Sensing Data Interpretation: Visual and digital techniques; digital image processing.	Understand, Analysis and Apply

used to address spatial analysis from the theoretical perspective.	5. Application of Remote Sensing in geomorphology, land use/ land cover, forestry, rural and urban landscape study.	Understand, Analysis and Apply
	Unit II: GIS 1. Field of GIS: Basic concepts, principles, components and functions.	Understand, Analysis and Apply
	2. Data type and structure of GIS; Raster and Vector data structure.	Understand, Analysis and Apply
	3. Spatial analysis techniques and thematic representation of data in GIS.	Understand, Analysis and Apply
	4. GIS Softwares; Licensed and Open Source.	Understand, Analysis and Apply
	5. Application areas of GIS in geographical study.	Understand, Analysis and Apply
	Unit III: GPS 1. Introduction to GPS technology and its working principles.	Understand, Analysis and Apply
	2. GPS elements and types of signals and receivers and data acquisition techniques; Accuracy of GPS data; Concept and principle of DGPS.	Understand, Analysis and Apply
	3. Application areas of GPS in geographical study.	Understand, Analysis and Apply

Paper Name: Research Methodology in Geography
Paper Code: GGY 3133

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
• This course will help students how to proceed with tackling a research problem and the steps one should adopt and the tools and craft a geographer usually employs.	Unit I: Meaning of research and geographic research; types of research; Introduction to research methodology in geography.	Remember and Understand
	Unit II: Formulation of a research problem.	Understand and Apply
	Unit III: Research design: statement of the problem, objectives, and hypothesis/ research questions, methodology, significance, review of research works and referencing.	Understand and Apply
	Unit IV: Inductive and deductive approaches in geographic research, concept development, model building and hypothesis testing.	Understand, Analysis and Apply
	Unit V: Questionnaire design, data collection, data processing and analysis.	Understand, Analysis and Apply
	Unit VI: Research write-up.	Understand, Analysis and Apply

Paper Name: Social, Cultural and Political Geography
Paper Code: GGY 3146

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level

After the completion of this course, the students will be able to: • To appreciate socio-cultural and political dimensions of geographic phenomena. • To understand how language, religion, ethnicity tangent with lebensraum, frontiers and boundaries and influence the geography of a region.	**Unit I: Social and Cultural Geography** 1. Defining the field of social geography; development of social geography in Anglo American countries and India.	Remember and Understand
	2. Concept of social space, social group, social structure, social differentiation, social diversity, plurality, socio-spatial inequalities, social well-being.	Remember and Understand
	3. Defining the field of cultural geography; its trend of development and significance.	Remember and Understand
	4. Sauer's Morphology of Landscape School.	Remember and Understand
	5. Themes and concepts in cultural geography: cultural hearth, cultural area, cultural region, cultural landscape, cultural history, cultural ecology, cultural diffusion and cultural integration.	Remember and Understand
	6. Patterns of world cultural regions with reference to (a) language,(b) religion and (c) ethnicity.	Understand, Analysis and Apply
	Unit II: Political Geography 1. Defining the field of political geography and its significance.	Remember and Understand
	2. Historical development of political geography; schools of thought: landscape school,	Remember and Understand

	ecology school and organismic school.	
	3. Approaches to the study of political geography: historical, morphological and functional.	Remember and Understand
	4. Concepts in political geography: lebensraum, state and nation, core- periphery and capital, frontier and boundary, buffer zone, rim-land geopolitics, heartland and its theory and political economy.	Understand, Analysis and Apply
	5. International relations; India's relations with neighbours; Act East Policy. 6. Geopolitical problems in global and Indian context.	Understand, Analysis and Apply

Paper Name: Geoinformatics
Paper Code: GGY 3156(5)

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Derive a comprehensive understanding of the use of RS/GIS/GPS techniques and their integration.	**Unit I: Remote Sensing** 1. Remote Sensing System/technology: Definition, principles and field of study; Types of Remote Sensing (Aerial and Satellite Remote Sensing).	Understand, Analysis and Apply
	2. Electromagnetic spectrum, energy radiation principles, energy interactions in atmosphere and with earth surface features.	Understand, Analysis and Apply

	3. Fundamentals of aerial photography: aerial cameras, spectral and radiometric characteristics.	Understand, Analysis and Apply
	4. Geometric characteristics of aerial photographs; scale and ground coverage; classification of aerial photographs; tilt and relief displacement.	Understand, Analysis and Apply
	5. Remote Sensing Systems - Sensors, Platforms, CCDs and resolution.	Understand, Analysis and Apply
	6. Earth models, datum, coordinate systems, UTM zones.	Understand, Analysis and Apply
	7. Satellite data products from USA, ESA and India.	Understand, Analysis and Apply
	Unit II: Geographic Information System 1. Defining the field of GIS; development trend; components of GIS.	Understand and Analysis
	2. Data input, storage and maintenance; manipulation, analysis and output.	Understand, Analysis and Apply
	3. GIS data models and spatial data structure.	Understand, Analysis and Apply
	4. Raster and vector data formats and raster to vector and vector to raster conversion.	Understand, Analysis and Apply

	5. GIS databases, RDBMS and queries 6. Integration of remote sensing data and GIS.	Understand, Analysis and Apply
	Unit III: Global Positioning System 1. GPS concepts, navigation principles, GPS receivers, DGPS, errors and accuracy.	Remember and Understand
	2. Real world GPS applications: Spatial data updating, Urban planning, forestry, disaster management and infrastructure planning.	Understand, Analysis and Apply
	3. Drones, UAVs and microsatellites: Applications in smart agriculture, environmental conservation, urban planning and climate studies.	Understand, Analysis and Apply

Paper Name: Population Geography
Paper Code: GGY 3156 (6)

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Develop an understanding of the theories and "laws" in population geography.	Unit I: The field of population geography: nature, development and approaches; its relation with demography.	Understand, Analysis and Apply
	Unit II: Sources of population data; problems associated with reliability and comparability of data; problems of mapping population data; and techniques of population projection.	Understand, Analysis and Apply

• Interpret the problems and prospects of population growth, distribution, composition and rural-urban differences in diverse areal contexts.	Unit III: Population theories: ideas of Malthus, Ricardo and Marx.	Understand, Analysis and Apply
	Unit IV: Models and theories: vital rates, migration and population growth; demographic transition; laws of migration –Raveinstein and Lee; and theories of migration – Reilly, Zipf, Staufer, Hagerstrand and Wolpert.	Understand, Analysis and Apply
	Unit V: Population and resource relationship: concept of under population, optimum population, over population, population explosion and population pressure; Population – Resource regions.	Understand, Analysis and Apply
	Unit VI: Growth and distribution of population in the world and in its different parts.	Understand and Analysis
	Unit VII: International migration –push and pull factors and consequences of migration.	Understand and Analysis
	Unit VIII: Comparative study of population characteristics of the developed and less developed countries: vital rates, infant mortality rates, age and sex composition, life expectancy and 51 demographic transition; literacy and education, rural and urban composition, and occupational structure.	Understand, Analysis and Apply
	Unit IX: Contemporary population problems in the developed and developing	Understand,

	countries; population policies and programmes in the pro-natalist countries (France, U.S.A. and Japan) and anti-natalist countries (China, India and Egypt)	Analysis and Apply

Paper Name: Practical on Quantitative and Cartographic Methods
Paper Code: GGY 3164

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • Students will be able to learn the different quantitative, cartographic and surveying techniques and its applications in geographical studies.	**Unit I: Practical Works on Quantitative Methods** 1. Application of elementary matrix algebra in multivariate data analysis.	Understand and Analysis
	2. Application of probability distributions (normal, poisson and binomial) in geographical analysis.	Understand and Analysis
	3. Application of relevant hypothesis testing techniques (parametric and nonparametric) in geographical data analysis; use of z, t, f and x2 (Chi-square) statistics.	Understand and Analysis
	4. Simple and multiple correlation and regression analysis; non-linear relationship (ranksize relationship and distance decay) analysis.	Understand and Analysis
	5. Spatial interaction, population potential surface, spatial diffusion, shape index and transport network analysis.	Understand and Analysis

	6. Techniques of multivariate analysis in areal classification and regionalisation: (a) Triangular graph and combination analysis (b) Composite scores - composite z score and principal component analysis.	Understand and Analysis
	7. Data Grouping Techniques for Choropleth mapping and Accuracy Assessment: Equal step, parameters of normal distribution, nested means, quartiles and equal-area.	Understand and Analysis
	gases) and natural radioactive forcing (Solar cycles-Milankovich cycle).	
	Unit II: Practical Works on Cartographic Methods 1. Traversing and topographic surveying with the help of prismatic compass and theodolite.	Analysis and Apply
	2. Contouring and profile levelling with the help of dumpy level.	Analysis and Apply
	3. Construction of map projections (5 Exercises) (i) Zenithal gnomonic (Equatorial case) (ii) Lambert's conical equal-area projection (iii) Gall's cylindrical stereographic projection (iv) Mercator's projection (v) Mollweide's projection.	Analysis and Apply
	4. Map reading and analysis, preparation of base map.	Analysis and Apply
	5. Representation of physical and socio-economic data using band graph, pie graph, sphere	Analysis and Apply

	diagram, flow chart, isolines and transect chart.	
	6. Representation of land and population by topological space diagram (grid cells) for comparative study.	Analysis and Apply

IVth Semester

Paper Name: Environment and Climate Change
Paper Code: GGY 4176

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • The course will sensitize the student about the mechanism of climate and its drivers. Learners will explore the impacts on various sectors viz. hydrosphere, cryosphere, and biosphere. Students further learn different organizational setup and policies related to climate change.	**Unit I: Ecology, Environment and Society** **1.** Introduction to ecology and the scientific methods: using observation, experiments and models to understand ecological patterns and processes.	Understand and Analysis
	2. Ecology and society: livelihood environment and development, environmental valuation and accounting.	Understand, Analysis and Apply
	3. Ideologies of environmentalism, Issues of environment and equity.	Understand, Analysis and Apply
	4. Environment of land, water and forest in North east India.	Understand and Analysis
	5. Traditional Ecological Knowledge and belief system.	Understand and Analysis

	Unit II: Environment and Climate Change **1.** Anthropogenic (Green house-Kyoto Gas)	Understand, Analysis and Apply
	2. Atmospheric circulation, El Niño Southern Oscillation (ENSO), Walker Circulation, Indian Ocean dipole clouds, aerosols.	Understand, Analysis and Apply
	3. Evaluation of climate models, climate projection and prediction.	Understand, Analysis and Apply
	4. Climate change: Impacts, vulnerabilities, adaptation and mitigations strategies: global, sectorial, regional).	Understand, Analysis and Apply
	5. Organization and policies: IPCC, UNCOP, ISA, NAPCC, INCCA.	Understand, Analysis and Apply

Paper Name: Geography of Bhutan, Bangladesh and Myanmar
Paper Code: GGY 4186

Course Outcome	**Unit/ Topic**	**Bloom's Taxonomy Level**
After the completion of this course, the students will be able to: • Students will learn the scope of south-east Asian countries in regional collaboration,	**Unit I: Geography of Bhutan** 1. Location and situation of Bhutan; locational significance in relation to India; geo-political history.	Remember and Understand
	2. Physical Framework: Physiography, climate, vegetation, forest policy and biodiversity.	Remember and Understand

cooperation, in sustainable environmental and resource management.	3. Socio-Cultural Background: Population, ethno-religious and linguistic composition, literacy and educational pattern, urbanization level.	Understand, Analysis and Apply
	4. Economic Geography: Resource potential, agriculture, industry, transport system, tourism development, trade relations with India, patterns of economic development.	Understand, Analysis and Apply
	Unit II: Geography of Bangladesh 1. Location and situation of Bangladesh; locational significance in relation to India; geo-political history.	Remember and Understand
	2. Physical Framework: Physiography, climate, soil, vegetation and environmental problems.	Remember and Understand
	3. Socio-Cultural Background: Population, ethno-religious and linguistic composition, literacy and educational pattern, urbanization level.	Understand and Analysis
	4. Economic Geography: Resource potential, agriculture, industry, transport system, nature of tourism development, trade relations with India, problems and prospects of economic development.	Understand and Analysis

	Unit III: Geography of Myanmar 1**.** Location and situation of Myanmar; locational significance in relation to India; geopolitical history.	Understand and Analysis

	2. Physical Framework: Physiography, climate, vegetation, biodiversity and environmental policies	Understand and Analysis
	3. Socio-Cultural Background: Population, ethno-religious and linguistic composition, literacy and educational pattern, urbanization level	Understand, Analysis and Apply
	4. Economic Geography: Resource potential, agriculture, industry, transport system, nature of tourism development, trade relations with India, problems and prospects of economic development.	Understand, Analysis and Apply

Paper Name: Remote Sensing and GIS (Practical)
Paper Code: GGY 4193

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • The students will learn and acquire the skills in applying the advanced techniques of Remote Sensing, GIS and GPS in their study and research, which will lead them to quality research.	**Unit I: Practical Works** 1. Fundamentals of Photogrammetry: determination of photo scale, object height, slope between two points and relief displacement.	Analysis and Apply
	2. Interpretation of aerial photographs and preparation of land use map, settlement map and road map.	Analysis and Apply
	3. of satellite imagery and preparation of land use/ land cover and fluvial geomorphic maps.	Analysis and Apply

	4. Digitization of different layers of spatial information (Point, line and polygon) and their thematic representation.	Analysis and Apply
	5. Study of changing land use and river course using remote sensing and GIS techniques.	Analysis and Apply
	6. GPS data collection (Point, Line and Polygon) and plotting.	Analysis and Apply

Paper Name: Geo informatics
Paper Code: GGY 4206 (5)

Course Outcome	**Unit/ Topic**	**Bloom's Taxonomy Level**
After the completion of this course, the students will be able to: • The students will enrich themselves with the techniques and skills of Remote Sensing, GIS and GPS and be able to apply these in quality study and research in geography.	**Unit I: Spatial Analysis in GIS** 1. Spatial Data and their geometric attributes including topology.	Understand, Analysis and Apply
	2. Attribute Data in GIS and their management principles and techniques.	Understand, Analysis and Apply
	3. Thematic representation of attributes in GIS.	Understand, Analysis and Apply
	4. Integration of spatial and non- spatial data in GIS.	Understand, Analysis and Apply
	5. Geo processing and spatial analysis tools in GIS.	Understand, Analysis and Apply

	6. Vector based and raster based spatial analysis tools.	Understand, Analysis and Apply
	7. Network and spatial analysis tools.	Understand, Analysis and Apply
	8. DEM/ DTM preparation.	Understand, Analysis and Apply
	9. Spatial Decision Support Systems, Environmental Impact Analysis and Spatial Data Infrastructure, Clearinghouse Networks and Geoportals.	Understand, Analysis and Apply
	Unit II: Image Analysis, Interpretation and Processing. 1. Introduction to image interpretation.	Understand and Analysis
	2. Basic Principles of image interpretation.	Understand and Analysis
	3. Elements of image interpretation.	Understand and Analysis
	4. Image rectification and registration.	Understand and Analysis
	5. Image enhancement techniques.	Understand and Analysis
	Unit III: Digital Image Classification	
	1. Principles of Image classification: Image space, feature space, image classification.	Understand, Analysis and Apply

	2. Image classification process, preparation, unsupervised and supervised classification.	Understand, Analysis and Apply
	3. Classification of algorithms.	Understand and Analysis
	4. Post classification analysis, ground truthing and accuracy assessment and validating the result.	Understand, Analysis and Apply
	Unit IV: Application of GIS and Remote Sensing in Modelling the Environment.	Understand, Analysis and Apply
	1. Applications of remote sensing with special reference to land, water, forests, settlements and urban areas and climate change.	Understand, Analysis and Apply
	2. Land governance and GIS.	Understand, Analysis and Apply

Paper Name: Geo informatics (Practical)
Paper Code: GGY4214 (5)

Course Outcome	**Unit/ Topic**	**Bloom's Taxonomy Level**
After the completion of this course, the students will be able to: • The students will be able to know the methods associated with the analysis of different	**Unit I: Practical works** 1. Design of work-plan /schematic chart / flow-chart (geo informatics components and functions, geo referencing procedure, Geo referencing a part or whole topographical map and satellite Imagery Creation of a relational data	Analysis and Apply

geoinformatics techniques and its applications.	model. Spatial data types – comparison of different satellite imageries.	
	2. Digitization of maps using standard GIS package – point, line and polygon features from small and large scale maps Revenue Circle / Block / District level map of the state /region or from topographical sheets on 1: 250,000 or 1: 50,000 or 1: 63,360 scales).	Analysis and Apply
	3. Adding attributes by joining and relating data, display of attribute data through cartographic methods.	Analysis and Apply
	4. Decision support mapping for point and line features.	Analysis and Apply
	5. Extraction of polyline and polygon features of specific themes from a georeferenced imagery.	Analysis and Apply
	6. Preparation of thematic maps from various attributes (demographic, climatic, socio-economic) of point, line and polygon features.	Analysis and Apply
	7. Preparation of thematic maps from nominal data – such as soils, geology, vegetation types / administrative units.	Analysis and Apply
	8. Digital Image Processing – Enhancement principles and techniques.	Analysis and Apply

	9. Image Classification techniques – Unsupervised and Supervised.	Analysis and Apply
	10. Integration of remote sensing data in GIS environment – Land Use/Land Cover (LULC).	Analysis and Apply
	11. Integration of GPS data in GIS environment for point features, line features and Polygon features.	Analysis and Apply
	12. Land Governance and GIS.	Analysis and Apply
	13. Usage of established models such as USLE and RUSLE.	Analysis and Apply
	Unit II: Practical Notebook and Viva-voce 1. Practical Notebook Assessment. 2. Viva-voce	

Paper Name: Geo informatics (Dissertation)
Paper Code: GGY 4223 (5)

Course Outcome	**Unit/ Topic**	**Bloom's Taxonomy Level**
After the completion of this course, the students will be able to: • Students will write a dissertation on suitable	Unit I: Each student will have to prepare a dissertation under the guidance of respective teacher as per specialization following appropriate methodology, data base and literature review.	Understand, Analysis and Apply

topic related to special paper applying all required methodology and dissertation writing procedure.	2. The dissertation duly signed by the guide concerned has to be submitted to the department at least one week before the scheduled date of examination.	Understand, Analysis and Apply
	3. The marks distribution of dissertation in the final semester examination is as follows: (i) Total marks: 40 (ii) Evaluation of Content: 25 (average between external and internal examiners) (iii) Viva-voce: 15 (exclusively by the external examiner)	Understand, Analysis and Apply

Paper Name: Population Geography
Paper Code: GGY 4206 (6)

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • The students will show the problems and prospects associated with population and also know how population problem can be managed using the Apply knowledge of geography.	Unit I: Demographic and socio-economic characteristics of India's population: vital rates, population growth, population projections, age-sex composition, literacy and education, social composition and occupational structure; socio-economic well-being of population and population regions.	Understand, Analysis and Apply
	Unit II: Rural-Urban composition of population, differential characteristics of rural-urban population in India.	Understand, Analysis and Apply
	Unit III: International and internal migration; consequences of migration; migration problems in North	Understand, Analysis and Apply

	East India, changing population composition in the region	
	Unit IV: Population growth and associated problems in demographic, social and economic fronts, population growth and food problems with special reference to North East India.	Understand, Analysis and Apply
	Unit V: Population pressure and growing environmental, housing and unemployment problems.	Understand, Analysis and Apply

Paper Name: Population Geography
Paper Code: GGY 4214(6)

Course Outcome	Unit/ Topic	Bloom's Taxonomy Level
After the completion of this course, the students will be able to: • The students will be able to know the methods associated with the analysis of different demographic characteristics. • The students will also learn the problems and prospects of demographic characteristics in a	**Unit I: Practical Works** 1. Mapping of population distribution, density and concentration in World and India.	Analysis and Apply
	2. Population growth trend analysis and population projections in World and India.	Analysis and Apply
	3. Mapping of Rural-Urban population and population potential surfaces in India.	Analysis and Apply
	4. Representation of demographic, social and economic characteristics of population.	Analysis and Apply
	5. Population- Resource Regions in the World.	Analysis and Apply

region with some practical exposure trips.	6. Levels of socio-economic well-being and demographic zones in India.	Analysis and Apply
	7. Application of field survey methods in population studies.	Analysis and Apply
	Unit II: Practical Notebook and Viva-voce 1. Practical Notebook Assessment.	
	2. Viva-voce	

Paper Name: Population Geography (Dissertation)
Paper Code: GGY 4223 (6)

Course Outcome	**Unit/ Topic**	**Bloom's Taxonomy Level**
After the completion of this course, the students will be able to: • Students will write a dissertation on suitable topic related to special paper applying all required methodology and dissertation writing procedure.	Unit I: Each student will have to prepare a dissertation under the guidance of respective teacher as per specialization following appropriate methodology, data base and literature review.	Understand, Analysis and Apply
	Unit II: The dissertation duly signed by the guide concerned has to be submitted to the department at least one week before the scheduled date of examination.	Understand, Analysis and Apply
	Unit III: The marks distribution of dissertation in the final semester examination is as follows: (i) Total marks: 40 (ii) Evaluation of Content: 25 (average between external and internal examiners) (iii) Viva-	Understand, Analysis and Apply

	voce: 15 (exclusively by the external examiner)	