Course Outcomes, Programme Outcomes and Programme Specific Outcomes for Four Years Under Graduate Programme (FYUGP) in Geography

Programme Name: Four Years Under Graduate Programme (FYUGP) B.A in Geography

W.E.F: ACADEMIC SESSION 2023-24

Department of Geography

Rajganj College

Rajganj, Jalpaiguri

735134

Rajganj College

Department of Geography

COURSE OUTCOMES

PAPER: MAJOR
Paper Description: GEOTECTONIC
Paper Code: UGEOMAJ11001
Paper Type: Theory & Practical Lab Based

After completion, the learning outcomes of this particular paper are the followings:

- Explain the geological time scale and its significance in Earth's history.
- Describe the internal structure of the Earth, including the core, mantle, and crust.
- Differentiate between igneous, sedimentary, and metamorphic rocks based on their formation and characteristics.
- Analyze the views of Airy and Pratt on isostasy and its role in maintaining the Earth's equilibrium.
- Explain the processes and topographic effects of folding and faulting.
- Classify mountains based on their origin and characteristics.
- Evaluate the Geosynclinal Theory (Kober), Thermal Contraction Theory (Jeffreys), and Thermal Convection Current Theory (Holmes) in explaining mountain formation.
- Describe Wegener's Continental Drift Theory and its supporting evidence.
- Explain the concept of sea-floor spreading and its role in plate tectonics.
- Identify different types of plate boundaries and their associated geological processes, including subduction zones.
- Define volcanicity and classify volcanoes based on their activity and structure.
- Describe different volcanic landforms and their formation processes.
- Analyze the global distribution of volcanoes and their impact on Earth's surface.
- Define scale and explain its importance in geographical representation.
- Differentiate between various types of scales (e.g., linear and comparative).
- Demonstrate the construction of linear and comparative scales.
- Illustrate different methods of data presentation using diagrams.

- Construct and interpret line graphs for trend analysis.
- Create bar diagrams (simple, compound, and composite) to represent categorical data.
- Develop and analyze circle diagrams, including pie charts, proportional circles, and proportional divided circles.
- Develop skills in questioning, reasoning, and drawing logical conclusions based on evidence and scientific principles of various theories and concepts related to geotectonic.

PAPER: SEC
Paper Description: DISASTER MANAGEMENT
Paper Code: UGEOSEC11001
Paper Type: Theory & Practical Lab Based

The following learning outcomes of this paper are:

- Define and explain the concepts of hazards and disasters.
- Differentiate between vulnerability and risk, and understand their roles in disaster scenarios.
- Classify various hazards and disasters, distinguishing between natural and human-induced events.
- Analyze the economic, social, and environmental impacts of disasters.
- Evaluate case studies of disasters such as floods, droughts, landslides, earthquakes, cyclones, industrial hazards, and pandemics to understand their multifaceted consequences.
- Explain the concept of disaster management and its importance in mitigating disaster impacts.
- Understand and apply the disaster management cycle, including identification and risk assessment, risk reduction and preparedness, disaster response, and recovery strategies.
- Develop the skills to identify potential hazards and assess risks in various environments.
- Formulate and evaluate strategies for risk reduction and preparedness.
- Understand the coordination of disaster response and the processes involved in recovery to restore normalcy after a disaster.
- Learn how to effectively organize and write a project report incorporating appropriate maps, diagrams, charts and tables.

- Develop skills required for teamwork, including collaboration, coordination, and task allocation, by working in groups under faculty members' supervision.
- Develop a comprehensive understanding of hazards and disasters, enabling them to recognize and assess potential risks and vulnerabilities in different contexts.
- Equip with the knowledge and skills necessary to contribute to the development of effective disaster management plans and strategies.
- Enhance critical thinking abilities by examining the causes, impacts and management strategies associated with hazards and disasters.

PAPER: MAJOR
Paper Description: SETTLEMENT GEOGRAPHY
Paper Code: UGEOMAJ12002
Paper Type: Theory & Practical Lab Based

After completion, the learning outcomes of this particular paper are the followings:

- Define settlement geography and explain its nature, scope, and content.
- Distinguish between the concepts of site and situation and discuss their significance in settlement analysis.
- Explain the origins and growth patterns of both rural and urban settlements.
- Classify and describe the types, patterns, and distribution of rural settlements.
- Analyze the morphology of rural settlements and assess various theories regarding the origin of towns as proposed by scholars like Childe and Mumford.
- Evaluate the functional classification of urban settlements, incorporating perspectives such as those presented by A. Mitra.
- Explain urban land use and morphology through the application of models like the Concentric Zone Theory, Sector Theory, and Multiple Nuclei Theory.
- Understand and analyze settlement hierarchies and the concept of a primate city.
- Apply the rank-size rule to interpret the organization of urban systems.
- Critically evaluate the Central Place Theory as developed by W. Christaller and A. Losch, and discuss its relevance to modern urban geography.
- Develop a clear understanding of the concept of scale and gain practical skills in constructing both diagonal and vernier scales for accurate cartographic measurement.

- Master the fundamental principles of map projections—including their definitions, properties, classifications, and uses—and acquire the ability to mathematically and graphically construct key projections such as the Polar Zenithal (Gnomonic, Stereographic, Orthographic), Cylindrical Equal Area, and Mercator projections.
- Students will develop competency in constructing diagonal and vernier scales and equip with practical skills in map reading, interpretation, and cartographic analysis.

Paper: SEC
Paper Description: SUSTAINABLE DEVELOPMENT
Paper Code: UGEOSEC12002
Paper Type: Theory & Practical Lab Based

The following learning outcomes of this paper are:

- Define sustainable development and explain its overall concept, emphasizing the need for balancing economic, social, and environmental priorities.
- Examine and differentiate between social, economic, and environmental sustainability, and discuss how each contributes to the broader framework of sustainable development.
- Assess critical global challenges such as deforestation and soil erosion, and understand their implications for achieving sustainable development.
- Analyze international efforts such as the Ramsar Convention, Stockholm Conference, Earth Summit (Rio 1992), and the Millennium Development Goals, including India's progress, while exploring future trends and challenges in sustainable development.
- Critically assess the impact and effectiveness of international efforts—such as the Ramsar Convention, Stockholm Conference, Earth Summit (Rio 1992), and the Millennium Development Goals—in promoting sustainable development practices worldwide.
- Analyze India's progress with respect to the Millennium Development Goals, identifying successes and challenges, and discuss how national policies can influence sustainable development outcomes.
- Identify emerging trends and challenges in sustainable development, and formulate strategic recommendations that integrate social, economic, and environmental perspectives to address future sustainability issues.

- Students will learn how to effectively organize and write a project report incorporating appropriate maps, diagrams, charts and tables.
- By working in groups under the supervision of faculty members, students will develop skills required for teamwork; including collaboration, coordination, and task allocation.

PAPER: MINOR
Paper Description: PHYSICAL GEOGRAPHY
Paper Code: UGEOMIN10001
Paper Type: Theory & Practical Lab Based

The following learning outcomes of this paper are:

- Understand the internal structure of the Earth and evaluate theories such as Wegener's Continental Drift and Plate Tectonics that explain the movement and interaction of Earth's plates.
- Analyze the development of geological features through folds and faults, and examine how weathering and mass movements contribute to landscape evolution.
- Assess the formation of various erosional and depositional landforms, with a focus on fluvial, glacial, and aeolian processes that shape the Earth's surface.
- Comprehend the composition and structure of the atmosphere while exploring the roles of insolation and the Earth's heat budget in establishing temperature distributions and pressure belts.
- Describe the dynamics of wind systems, precipitation types, and the formation of cyclones and anticyclones, and evaluate their contributions to broader climate change trends.
- Investigate the distribution of temperature and salinity in ocean waters, analyze the causes and types of ocean currents (with an emphasis on the Indian Ocean), and explore marine phenomena such as coral reef formation and sea level changes.
- Students will develop critical thinking skills by analyzing and evaluating complex geological and atmospheric processes.
- Students will develop an understanding of the earth's natural systems and the impact of human activities on the environment.
- They will learn to interpret and analyze scientific data, including maps, charts and graphs, to draw conclusions and make informed decisions.

- Students will develop the ability to adapt to changes in the earth's systems and understand the dynamic nature of the planet.
- Students will develop the ability to analyse geological processes, atmospheric phenomena and oceanic systems.
- They will learn to interpret maps, diagrams and data related to earth science.
- Students will acquire skills in constructing different types of map projections, including polar zenithal gnomonic, simple conical and cylindrical equal area projection.
- They will develop the ability to observe and identify geological and climatic features.

PAPER: MAJOR
Paper Description: GEOMORPHOLOGY
Paper Code: UGEOMAJ23003
Paper Type: Theory & Practical Lab Based

The following learning outcomes of this paper are:

- Nature and scope of geomorphology, including fundamental concepts in this field. This knowledge will allow the students to comprehend the processes and features shaping the Earth's surface.
- Landforms evolved through erosional and depositional processes in various environments, such as fluvial, karst, aeolian, glacial, and coastal. This knowledge will equip them to recognize and explain the formation of different landforms.
- Weathering processes, their controlling factors, types, and the resulting landforms. Additionally, the students will understand mass wasting, its definitions, the factors influencing it, and the different types. This knowledge will enable them to identify and analyze landforms resulting from weathering and mass wasting.
- Develop the skill to interpret physical and cultural features on topographical maps, particularly in plateau/mountain areas. This skill helps them analyze landscapes and recognize the spatial distribution of landforms.
- Master skills related to geospatial analysis by learning methods such as slope analysis (Wentworth), relative relief (Smith), and dissection index (Dov Nir). These skills will allow them to quantify and assess the terrain's characteristics and relief.

- Gain competency to recognize and differentiate various landforms in different geomorphic settings. This skill is essential for geographers, and environmental professionals who need to understand and assess landscapes.
- Develop competency to analyze landscapes using tools like drainage density, drainage frequency, watershed delineation, Stream frequency and stream ordering. This analytical ability is crucial for studying natural processes and landform evolution.
- Acquire the competency to apply theories and concepts such as Davis', Penck's, and King's slope development theories to understand the morphogenetic processes that shape landscapes. This competency enhances their ability to explain the formation and evolution of landforms.
- Develop the ability to interpret both physical and cultural features on topographical maps, with a focus on understanding regions such as plateaus and mountain areas.
- Gain skills in creating various profile types (serial, superimposed, projected, and composite) and accurately draw long and cross profiles of a river to analyze terrain features.:
- Learn to calculate and interpret key topographical indices such as average slope (Wentworth), relative relief (Smith), dissection index (Dov Nir), and ruggedness index (Schumann).
- Understand and compute drainage density and stream frequency to assess the effectiveness and characteristics of the drainage network within a region.
- Master the techniques for delineating watersheds using graph paper, calculating watershed areas, and applying stream ordering methods (Strahler) for hydrological analysis.
- Develop the ability to integrate various spatial data—including settlement frequency and transect charts—to create comprehensive analyses of landforms and their interrelationships.

PAPER: MAJOR
Paper Description: GEOGRAPHY OF RESOURCES
Paper Code: UGEOMAJ23004
Paper Type: Theory & Practical Lab Based

After completion, the students would develop the following knowledge:

- Concept of resources, their creation, and the factors influencing them. They will learn to classify resources based on various criteria, enabling them to appreciate the diverse nature of resources.
- Distribution of various resources in India, including forest, coal, iron ore, petroleum, atomic minerals, solar, wind and hydel power. They gain insights into the country's geographic and socio-economic factors influencing resource distribution.
- Resource conservation strategies, including those related to forests, soil, water, minerals, and energy resources. They will develop an understanding of ecological, economic, and ethnological approaches to resource management, recognizing the importance of sustainable practices.
- Develop practical skills in identifying a wide range of rocks and minerals, including Granite, Gneiss, Basalt, Limestone, Marble, Shale, Sandstone and more. This skill is essential for geology, environmental science, and resource management professionals.
- Enhance their data presentation and visualisation skills by using various diagrammatic techniques such as choropleth maps, chorochromatic maps, dot and sphere plots, and proportional cubes. These skills are crucial for effectively communicating resource-related information.
- Competent in assessing the availability and distribution of resources, particularly in the context of India. They can analyze the factors influencing resource availability and propose strategies for resource management.
- Advocate for resource conservation, capable of applying ecological, economic, and ethnological approaches to real-world resource management challenges. They are well-equipped to contribute to sustainable resource use and environmental protection.
- Develop proficiency in data analysis and communication through diagrammatic representations. They can effectively present resource-related data to diverse audiences, aiding informed decision-making and policy development.
- Develop the ability to identify and differentiate a variety of rocks and minerals (e.g., Granite, Gneiss, Basalt, Limestone, Marble, Shale, Sandstone, Conglomerate, and others) using visible, macroscopic characteristics.

- Learn to classify rocks and minerals based on observable properties such as color, texture, grain size, and structure, and comprehend their formation processes and geological significance.
- Gain practical skills in using field and laboratory techniques to accurately diagnose and record the characteristics of rocks and minerals, enhancing geological interpretation and analysis.
- Understand the principles behind various mapping techniques including chorochromatic maps, dot and sphere maps, choropleth maps, and diagrammatic maps (using proportional squares and cubes).
- Develop proficiency in interpreting and analyzing spatial data presented through different diagrammatic formats, allowing for effective visualization of geospatial patterns and trends.
- Synthesize the skills of megascopic rock and mineral identification with diagrammatic mapping techniques to produce comprehensive geological maps and reports that enhance the understanding of earth surface processes.

PAPER: MAJOR
Paper Description: POPULATION GEOGRAPHY
Paper Code: UGEOMAJ23005
Paper Type: Theory & Practical Lab Based

After completion, the students would develop the following knowledge:

- Fundamental concepts of population geography, including the nature and scope of the field, sources of population data, and the various types of population density. They will also learn about the factors contributing to population growth and distribution globally and in India's context.
- Pivotal theories of population growth – the Malthusian theory and the demographic transition Model. Students will understand deeply how these theories have shaped our understanding of population dynamics and their implications for society.
- Composition of the Indian population, with a focus on rural-urban divides, age, gender, and literacy. They will also gain insights into the concepts of ageing populations and demographic dividends. They will also gain knowledge about the concept, types, causes

and consequences of Migration. Furthermore, they will learn about important policies like the National Population Policy of 2000 in India.

- Develop essential data analysis skills using Microsoft Excel. They will also learn to navigate the Excel interface, perform data entry, editing, and formatting, work with various data types and gain proficiency in sorting, filtering, and creating tables for efficient data organization.
- Equip students with the ability to create a wide range of charts, including column, bar, line, pie, and scatter plots. They will learn to customize chart elements like titles, legends, and labels, making data visualization a powerful tool for conveying demographic trends and insights.
- Acquire the competency to project population figures using various methods such as arithmetical increase, geometrical progression, and incremental increase. This skill is crucial for making informed demographic predictions.
- Through constructing and interpreting age-sex pyramids, students will become proficient in analyzing demographic data visually, enabling them to draw meaningful conclusions about population structures.
- Enhance students' data analysis and interpretation competency, a valuable skill applicable across various disciplines. They can also apply these skills to real-world situations, including assessing migration trends and understanding the implications of fertility and mortality measures.
- Develop the ability to apply various population projection methods—including arithmetical increase, geometrical progression, and incremental increase—to predict future population trends.
- Gain proficiency in calculating and interpreting key demographic indicators such as crude birth rate, general fertility rate, age-specific fertility rate, total fertility rate, crude death rate, age-specific death rate, and infant mortality rate.
- Acquire skills in constructing and analyzing age-sex pyramids and migration flow diagrams to visually represent and understand population structure and movement.
- Understand the Excel interface and its functionalities, including working with workbooks, worksheets, cells, and ranges to efficiently manage data.

- Develop competence in data entry, editing, formatting, sorting, filtering, and utilizing formulas and functions for effective data manipulation and organization.
- Learn to create and customize various types of charts (such as column, bar, line, pie, and scatter charts) and pivot tables to analyze, interpret, and present demographic and other related data.

Paper: SEC
Paper Description: ENVIRONMENTAL GEOGRAPHY
Paper Code: UGEOSEC23003
Paper Type: Theory & Practical Lab Based

Under this Skill Enhancement Course, the outcomes are the followings:

- Agricultural development, industrial development, and urbanization contribute to environmental degradation. They will analyze the impact of these factors on the environment.
- Environmental laws and policies in India, such as the Wildlife Protection Act, Water (Prevention and Control of Pollution) Act, Forest Conservation Act, and Environmental Protection Act. They will understand the importance of these legal frameworks in environmental conservation.
- Through the practical project, students will develop research skills as they gather and analyze secondary data on environmental topics. They will also enhance their report-writing skills, which are crucial for effective communication in the field of environmental studies.
- The study of environmental ethics and the analysis of environmental movements will encourage critical thinking and ethical reflection among students. They will learn to evaluate the ethical dimensions of environmental issues and movements.
- Acquire a heightened awareness of environmental issues and their consequences. They will be able to identify sources of pollution and propose potential remedies.
- Understanding the significance of Environmental Impact Assessment and the management of solid wastes will equip students with the knowledge and skills required for effective environmental planning and management.

- Familiarity with environmental laws and policies will enable students to appreciate the importance of legal compliance in environmental protection. They will understand how these regulations contribute to sustainable development and conservation.
- Define the environment and understand its components, including the interactions among biotic and abiotic factors.
- Identify various types of pollution (air, water, noise), examine their sources, assess their effects on health and ecosystems, and explore possible remedies.
- Analyze the impact of agricultural, industrial, and urban development on environmental degradation, and evaluate the types, sources, and management strategies of solid wastes.
- Grasp the concepts of environmental planning and management, with a particular emphasis on the importance and methodology of Environmental Impact Assessments (EIA).
- Explore environmental ethics and critically assess the role and impact of environmental movements in India, such as the Chipko and Narmada Bachao Andolan.
- Understand the framework of environmental legislation in India, including key acts and policies like the Water (Prevention and Control of Pollution) Act (1974), Forest Conservation Act (1980), Air (Prevention and Control of Pollution) Act (1981), Environmental Protection Act (1986), Noise Pollution Rules (2000), and Municipal Solid Waste Rules (2000).

PAPER: MAJOR
Paper Description: CLIMATOLOGY
Paper Code: UGEOMAJ24006
Paper Type: Theory & Practical Lab Based

Under this Skill Enhancement Course, the outcomes are the followings:

- Define weather and climate and describe the composition and structure of the atmosphere, including concepts such as insolation, heat budget, and latitudinal heat balance.
- Explain the mechanisms of energy and heat transfer in the atmosphere and analyze how temperature is distributed both horizontally and vertically, including the phenomenon of temperature inversion.

- Understand the vertical and horizontal distribution of atmospheric pressure and pressure belts; assess the factors that influence wind direction and speed; and describe global wind belts, local winds, geostrophic winds, jet streams, as well as phenomena like El Niño and La Niña.
- Identify different types of humidity and their measurement techniques, and evaluate atmospheric stability and instability, along with processes such as condensation and nucleation.
- Examine the mechanisms of precipitation through the Bergeron-Findeisen and Collision-Coalescence theories, differentiate various precipitation types, and understand the roles of air masses, fronts, thunderstorms, cyclones, and anticyclones.
- Apply climate classification systems (e.g., Köppen & Thornthwaite) to analyze global climate patterns, and evaluate evidence and causes of climate change, including issues like ozone depletion and acid rain.
- Acquiring knowledge of climate patterns, wind circulation, and atmospheric processes will equip the students with the competency to adapt to different climate conditions and make informed decisions in various contexts, from agriculture to urban planning.
- Understanding climate change, ozone depletion, and acid precipitation fosters a sense of responsibility for the environment. They become better equipped to engage in discussions and actions that promote environmental sustainability and conservation.
- The paper's insights into atmospheric stability, precipitation, and cyclones shall enable the students to better understand and predict weather events, which is crucial for disaster preparedness and mitigation efforts in regions vulnerable to extreme weather conditions.
- Develop the ability to effectively use instruments such as the Maximum and Minimum Thermometer, Hygrometer, and Fortin’s Barometer for weather observations.
- Gain skills in analyzing and interpreting Indian daily weather reports across different seasons (hot, southwest monsoon, northeast monsoon, and winter).
- Learn to represent weather and climate information using graphical tools like the Climograph (Taylor) and Hythergraph (Taylor) for clear and effective data visualization.

PAPER: MAJOR
Paper Description: GEOGRAPHY OF INDIA
Paper Code: UGEOMAJ24007
Paper Type: Theory & Practical Lab Based

Under this Skill Enhancement Course, the outcomes are the followings:

- Understand India's geographical location, physiographic divisions, and the distribution of drainage systems, soils, and natural vegetation.
- Analyze the seasonal variations of the Indian climate, including the distinctive features of each season.
- Examine the origin, characteristics, and mechanisms of the Indian monsoon, including the influences of El Niño and La Niña**.**
- Learn about climatic classification systems such as those proposed by Stamp and Trewartha and their relevance to India's climate.
- Investigate the growth of India's population and its distribution based on factors like density, religion, language, and tribal affiliations.
- Evaluate the composition of India's population in terms of rural-urban distribution, gender, and literacy rates.
- Explore the key features of Indian agriculture, focusing on the production and distribution of major crops (rice, wheat, cotton, and tea) and the concept of agro-climatic regions as defined by the Planning Commission.
- Analyze the spatial patterns of industrial development in sectors such as iron and steel, cotton textiles, petro-chemicals, automobiles, and information technology, along with the development of transport networks (railways, roadways, and waterways).
- The study of the spatial pattern of industrial development and transport networks will equip students with the competency to understand and contribute to regional development and planning initiatives.
- The practical unit involving field reports will enhance students' ability to conduct field research, collect data, and communicate their findings effectively, which is a valuable skill for geography professionals.

PAPER: MAJOR
Paper Description: GEOGRAPHICAL INFORMATION SYSTEM
Paper Code: UGEOMAJ24008
Paper Type: Theory & Practical Lab Based

Under this Skill Enhancement Course, the outcomes are the followings:

- Understand the nature, definition, and evolution of GIS along with its core components and functional requirements.
- Analyze the benefits and constraints of GIS technology, including an understanding of coordinate systems and map projections.
- Distinguish between spatial data (location-based) and attribute data (descriptive information).
- Comprehend raster and vector database models, recognize common file formats for spatial data, and understand the role of DBMS in GIS.
- Learn about the elements that determine data quality in GIS and identify common sources of error.
- Grasp the fundamentals of Web-GIS and its importance in facilitating online access and sharing of spatial data.
- Explore the wide-ranging applications of GIS in urban planning, environmental management, agriculture, disaster management, health care, transport, defense, decentralized planning, tourism, and natural resource management.
- Acquire practical skills in geo-referencing scanned topographical maps and digitizing features (point, line, polygon) using QGIS 3.22.
- Master operations related to raster data, including adding layers, styling, analysis, mosaicking, and clipping in a GIS environment.
- Develop the ability to work with attribute data by importing spreadsheets/CSV files, and create thematic maps using tools and plug-ins in QGIS 3.22.
- Proficiency in managing and analyzing spatial and attribute data, ensuring data quality, and minimizing errors in GIS projects.
- Cultivate the ability to think spatially and make informed decisions using GIS tools, which is invaluable for a wide range of professional and research applications.

PAPER: MINOR
Paper Description: HUMAN GEOGRAPHY
Paper Code: UGEOMIN20002
Paper Type: Theory + Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Theories such as environmental determinism, possibilism, neo-determinism, and the quantitative revolution. They understand how these theories have contributed to the study of human geography.
- In-depth knowledge of population growth theories, including the Malthusian and demographic transition theories. They also understand the intricacies of population composition, fertility, mortality, and migration patterns in the Indian context.
- Urban settlement classifications, theories like the Central Place Theory, and the evolving patterns of urbanization in India. They develop a nuanced understanding of the dynamics shaping urban areas.
- Develop the ability to interpret topographical maps, identify physical and cultural features, and analyze landforms, slopes, and drainage patterns. This skill enhances their spatial analysis capabilities.
- Acquire proficiency in effectively conveying geographic information Through diagrammatic data presentation techniques, such as line, bar, circle, dot, and choropleth maps. They learn how to choose appropriate visualizations for different types of data.
- Become adept at critically analyzing geographic phenomena and understanding the underlying factors driving population growth, settlement patterns, and urbanization. They can evaluate the strengths and limitations of various theories.
- The practical exercises equip students with the competence to collect, interpret, and present geographical data, enhancing their ability to conduct research and contribute to the field.
- By focusing on India, students gain a contextual understanding of human geography, enabling them to apply their knowledge and skills to real-world issues related to population, settlement, and urban development within the country.

- Develop the ability to interpret physical and cultural features on topographical maps (e.g., plateau/mountain areas) using various profile techniques (serial, superimposed, projected, composite) along with tools like Smith's relative relief map and transect charts.
- Master the creation and interpretation of diverse diagrammatic representations such as line graphs, various types of bar graphs (simple, compound, multiple), proportional circle maps, and choropleth maps for effective spatial data visualization.
- Synthesize skills in map interpretation and diagrammatic presentation to analyze, visualize, and communicate complex geographical patterns and landform characteristics effectively.

PAPER: MAJOR
Paper Description: SOIL GEOGRAPHY
Paper Code: UGEOMAJ35009
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Understand the nature and scope of soil geography and its role in analyzing soil distribution and properties.
- Define soil and explain the key factors and processes involved in its formation.
- Grasp the concept of a pedon and understand the processes of eluviation and illuviation in soil development.
- Describe the characteristics of an ideal soil profile and the stages of its development.
- Analyze the profile development of specific soil types, including laterite, podzol, and chernozem soils.
- Evaluate soil's physical properties such as texture, structure, moisture content, colour, and temperature.
- Assess chemical attributes like pH, organic matter content, cation exchange capacity, and the presence of essential plant nutrients.
- Understand the types and characteristics of soil colloids and their influence on soil fertility.
- Learn various soil classification systems (Dokuchaev's genetic, Marbut's morphogenetic, USDA taxonomy, and ICAR for Indian soils) and master identification techniques using

textural plotting (Ternary Diagram) and Ergograph. Making students efficient in determining soil type to construct Ergograph.

- Develop skills to interpret geological maps by drawing geological sections on uniclinal and folded structures, incorporating both simple and multiple series formations.
- Develop the ability to question, reason, and draw logical conclusions based on concepts, various theories, and classifications related to soil.
- Enable students to interpret the Geological Map effectively.

PAPER: MAJOR
Paper Description: RURAL DEVELOPMENT
Paper Code: UGEOMAJ35010
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Understand the basic concept of rural development, its essential elements, and why it is critical for balanced national progress.
- Explore the principles and practices of the Gandhian model and its emphasis on self-reliance and community empowerment in rural areas.
- Analyze the structure and functions of the Panchayati Raj System and its role in promoting grassroots governance and participatory decision-making.
- Evaluate key development theories, including the Big Push Theory, Lewis Model of Economic Development, and Myrdal's theory of Spread and Backwash Effects, to understand rural growth dynamics.
- Investigate the causes and consequences of rural poverty and recognize the importance of diversifying income sources through non-farm activities.
- Review various approaches and significant government initiatives such as SGSY, MGNREGA, PMJDY, PMJAY, PMGSY, PURA, PMAY, and SBM that aim to improve rural livelihoods.
- Learn to organize data using frequency distribution tables, histograms, frequency polygons, frequency curves, and cumulative frequency distributions.
- Master the calculation and interpretation of central tendency measures (mean, median, mode) to summarize rural demographic and socioeconomic data.

- Understand and compute partition values (quartiles, deciles, percentiles) along with measures of dispersion (range, mean deviation, variance, standard deviation, quartile deviation, and coefficient of variation) to assess data variability.
- Use the Lorenz curve and Gini's coefficient to analyze and interpret income or resource distribution inequalities within rural populations.
- Make student aware of major Indian rural development programmes.
- Enable students to interpret and visually communicate data using statistics

PAPER: MAJOR
Paper Description: AGRICULTURAL GEOGRAPHY
Paper Code: UGEOMAJ35011
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Examine environmental, economic, and technological factors that influence agriculture and differentiate among farming types such as intensive subsistence, extensive commercial, plantation, and dairy farming.
- Analyze the growth conditions, worldwide distribution, and production trends of major crops like wheat, paddy, maize, tobacco, cotton, jute, and oil seeds.
- Evaluate classic models such as Von-Thunen's land use theory, Olof Jonasson's perspectives, and Sinclair's ideas on peri-urban agriculture to understand spatial patterns in farming.
- Compare global agricultural regions as defined by Whittlesey and understand the agricultural regionalisation in India through frameworks developed by Randhawa, Sengupta, and ICAR.
- Identify the causes of low productivity in Indian agriculture and explore viable solutions to enhance yield and efficiency.
- Review the transformative impacts of the Green, White, and Blue revolutions on Indian agricultural practices and output.
- Examine major government schemes such as the National Food Security Mission (NFSM), Pradhan Mantri Krishi Sinchai Yojana (PMKSY), and Pradhan Mantri Fasal Bima Yojana (PMFBY), and their roles in rural development.

- Assess how climate change affects agricultural systems and evaluate the principles of climate smart agriculture as a strategy for sustainable farming.
- Learn methodologies for identifying crop combination regions based on the approaches of Weaver and Rafiullah.
- Master techniques for assessing agricultural performance, including the use of Bhatia's measures for efficiency and crop concentration, as well as the Gibbs-Martin Index for crop diversification.
- Enabling learning power to interpret and analyse methods of delineating crop combination regions, measuring agricultural efficiency, crop concentration index, and crop diversification.

PAPER: MAJOR
Paper Description: GEOGRAPHICAL THOUGHT
Paper Code: UGEOMAJ35012
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Contributions of Greek, Roman, and Indian philosophers in laying the early foundations of geographic thought.
- The impact of the Dark Age, the role of Arab geographers, and advancements during the age of voyages and exploration.
- Influences of German, French, American, and British schools of thought, highlighting the evolution of geographic methods and ideas.
- Key theoretical developments including positivism, the quantitative revolution, and evolving concepts of space and time, along with behaviouralism, radical geography, and welfare geography.
- Introduction to the concept of levelling and surveying as essential tools for geographical measurements.
- Application of the closed traverse method using a prismatic compass for precise field measurements
- Use of Dumpy Level for levelling along a defined line, including computation of reduced levels using rise and fall and collimation methods.

- Determining the height of an object with both accessible and inaccessible bases in the same vertical plane using a theodolite (transit).
- Employing radiation and intersection methods to construct accurate plane table surveys.
- Visualization of data through box plots, scatter plots, and band graphs for effective interpretation and analysis.
- Enrich students with knowledge of dualism in geography.
- Enable students to be aware of the concept of levelling and surveying, making them efficient by graphical representation of data.

PAPER: MAJOR
Paper Description: BIOGEOGRAPHY
Paper Code: UGEOMAJ36013
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Explain the nature and scope of biogeography, including the interactions between physical and biological components of the environment.
- Describe the nature and components of the biosphere and fundamental ecological concepts such as species, population, community, habitat, and ecological niche.
- Analyze trophic structures, food chains, food webs, and the energy flow within ecosystems.
- Understand the processes and stages of ecological succession and their role in ecosystem stability.
- Explain the oxygen, carbon, nitrogen, and phosphorus cycles and their significance in sustaining life.
- Differentiate between Holdridge and Whittaker biome classification systems and describe the geographical extent and features of major biomes.
- Identify the world's floristic realms and zoogeographical regions, along with their key species and ecological significance.
- Define biodiversity, its types, threats, and the importance of conservation strategies.
- Explain concepts related to the Red Data Book, Green Data Book, endangered and extinct species, and assess conservation initiatives.

- Evaluate major wildlife conservation projects in India, including those for tigers, elephants, one-horned rhinos, crocodiles, and Gangetic dolphins.
- Apply the matrix method using Shannon-Weiner and Simpson indices to determine plant species diversity.
- Identify xeric periods using Ombrothermic graphs from five weather stations and interpret hyetographs for rainfall distribution.
- Gain knowledge of various map projection techniques and their mathematical/graphical construction.
- Construct and analyze Simple Conical (One and Two Standard Parallel), Bonne's, Sinusoidal, Polyconic, and Mollweide's projections for geographical representation.

PAPER: MAJOR
Paper Description: URBAN GEOGRAPHY
Paper Code: UGEOMAJ36014
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Define the scope and content of urban geography and classify cities based on Harris and Taylor's model.
- Explain urban morphology, the structure of the Central Business District (CBD), and factors influencing city layout.
- Differentiate between urban growth, urbanization, suburbanization, counter-urbanization, re-urbanization, urbanism, and urban renewal.
- Analyze urbanization trends in developed and developing countries and examine patterns of urbanization in India.
- Understand concepts such as conurbation, megacity, million city, global city, rural-urban fringe, urban corridor, satellite towns, and new towns.
- Explain the concept of master plans through case studies of Chandigarh, Delhi NCR, and Salt Lake (Kolkata).
- Evaluate the contributions of Ebenezer Howard, Patrick Geddes, and Le Corbusier to urban planning theories and practices.

- Identify major urbanization problems in India, including urban poverty, transportation issues, and slum proliferation.
- Assess the objectives and impact of key urban development schemes in India, such as JNNURM, AMRUT, and the Smart Cities Mission.
- Develop insights into sustainable urban growth strategies and their implications for future city planning.
- Understand the hierarchy of urban settlements using Rank-Size Rule (Zipf) and Ternary Diagram (Mitra).
- Apply Nearest Neighbour Analysis to assess clustering and regularity in urban settlement patterns.
- Utilize Pearson's product-moment and Spearman's rank correlation to measure relationships between geographic variables.
- Conduct simple bi-variate linear regression to analyze and interpret spatial and urban development trends.
- Enriching skills among students in doing and interpreting rank-size rule, ternary diagram, nearest neighbour analysis and correlation and regression.

PAPER: MAJOR
Paper Description: INDUSTRIAL GEOGRAPHY
Paper Code: UGEOMAJ36015
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Understanding Industrial Geography: Define the nature, scope, and significance of industrial geography in economic development. Differentiate between types of manufacturing industries based on classification criteria.
- Analyze the factors influencing industrial location and assess their impact on industrial development.
- Evaluate the theories of industrial location proposed by Weber, Losch, Hoover, Palander, Smith, and Isard.
- Examine the location, production, and distribution of major industries, including iron-steel and cotton textiles.

- Assess the production and global distribution patterns of the automobile and shipbuilding industries.
- Investigate the distribution, problems, and future prospects of the paper and heavy chemical industries.
- Analyze the industrial regions of India, the USA, Russia, Germany, Japan, and China.
- Understand the impact of India's Industrial Policy of 1991 on economic liberalization and growth.
- Evaluate the objectives, strategies, and implications of the Make in India scheme (2014) for industrial development.
- Develop skills in understanding types of manufacturing industries and theories of industrial location.
- Develop competency in exploration regarding location, production, and world distribution of iron-steel and cotton textile industry; production and world distribution of automobile and ship-building industry; World distribution, problems, and prospects of paper and heavy chemical industry.
- Strengthened the knowledge of industrial regions, the industrial policy of India, 1991 and the Make in India scheme, 2014.
- Cultivating research qualities among students with a scientific field report on a specific project.

PAPER: MAJOR
Paper Description: FUNDAMENTALS OF REMOTE SENSING
Paper Code: UGEOMAJ36016
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Understanding Remote Sensing: Explain the definition, scope, and historical evolution of remote sensing technology. Describe the process of remote sensing, energy sources, and the interaction of electromagnetic radiation (EMR) with the atmosphere and Earth's surface.
- Building understanding among learners regarding differentiate between types of remote sensing and assess various satellite sensors and their resolutions.

- Understand the concept, classification, and process of photogrammetry, along with LiDAR and Radargrammetry techniques.
- Apply pre-processing, image enhancement, and classification techniques (supervised and unsupervised) to digital images.
- Identify key elements of visual interpretation for aerial photographs and satellite images.
- Analyze the role of remote sensing in atmospheric monitoring, disaster management, land use change detection, agriculture, forestry, hydrology, and urban planning.
- Evaluate India's space programs, including DOS, ISRO, IIRS, NRSC, and major satellite launch initiatives.
- Conduct image classification (supervised and unsupervised) and thematic mapping using Landsat imagery and remote sensing indices such as NDVI, NDWI, NDBI, and SAVI.
- Perform aerial photograph interpretation using pocket stereoscopes and analyze satellite images for real-world applications.
- Construct skills in the interpretation of aerial photographs using pocket stereoscopes and satellite images.
- Develop efficiency in image processing and classifying and preparation of thematic maps using QGIS 3.22 software.
- Competency Developed:
- Building understanding among learners regarding remote sensing, remote sensing satellites and sensor resolutions, photogrammetry, supervised and unsupervised digital images, applications of remote sensing and Indian space programmes.
- Enable students to interpret Aerial Photographs using a pocket stereoscope and Satellite Images.
- Effectively make students better understand different remote sensing indices using Landsat imagery using QGIS 3.22 software.

PAPER: MINOR
Paper Description: ECONOMIC GEOGRAPHY
Paper Code: UGEOMIN30003
Paper Type: Theory & Practical Lab Based

After completion this Generic Elective paper, the learning outcomes are the followings:

- Acquire a solid grasp of the nature and scope of economic geography, the Concept and classification of economic activities, the definition and classification of resources, and Economic theories, including Von Thunen's agriculture theory and the Industry theory of Weber & Losch.
- Learner in-depth knowledge of conditions of growth and world distribution of various crops, including wheat, rice, cotton, tea and coffee, major fishing grounds of the world, and characteristics of lumbering in tropical and temperate forests.
- Explore the production and world distribution of Iron-steel, cotton textile and paper industry, modes of transport, Geographical factors of transport development, and factors affecting international trade.
- Gain the ability to organize data, which includes frequency distribution tables, histograms, frequency polygons, frequency curves and cumulative frequency distribution; measure mean, median and mode; measure range, mean deviation, variance, standard deviation and coefficient of variation.
- Develop proficiency in measures of inequality and traffic flow diagram.
- Become adept at critically analyzing economic geography and understanding the economic theories.
- Make students more competent by enriching their knowledge regarding conditions of growth and world distribution of crops, major fishing grounds of the world, production and world distribution of Iron-steel, cotton textile and paper industry.
- Develop understanding about modes of transport, geographical factors of transport development, factors affecting international trade.
- The practical exercises equip students with the competence to organize data effectively.

PROGRAM OUTCOMES

- To understand the basic concepts in geography. Develop a comprehensive knowledge of physical, human, and environmental geography to analyze spatial patterns and processes.
- Develop of knowledge, skills and holistic understanding of the discipline among students.
- Develop the ability to critically assess and interpret geographic information, theories, and research findings.
- Demonstrate skills in cartography, remote sensing, GIS, and GPS for spatial analysis, data visualization, and decision-making.
- Utilize statistical and computational techniques, including correlation, regression, and spatial modeling, for geographic data analysis.
- Evaluate environmental challenges such as climate change, land degradation, and biodiversity loss while promoting sustainable solutions.
- Analyze urbanization trends, industrial development, and rural-urban interactions to contribute to effective spatial and regional planning.
- Conduct field surveys, collect and interpret primary and secondary data, and apply research methodologies to geographical studies.
- Use advanced geospatial technologies, including remote sensing and GIS, for land use planning, disaster management, and resource assessment.
- Develop analytical skills to assess complex geographical issues, formulate hypotheses, and propose data-driven solutions.
- Understand population dynamics, settlement patterns, economic geography, and cultural landscapes to assess socio-economic development.
- Apply geographical knowledge to policy-making in environmental management, disaster risk reduction, sustainable development, and urban planning.
- Gain proficiency in conducting independent research, including data collection, analysis, and interpretation within the context of geographical issues.
- Effectively communicate geographical concepts, findings, and arguments through written and oral presentations.

- Develop an appreciation for cultural diversity and environmental sustainability, understanding the impact of human activities on the environment.
- Ability to understand and analyze the different maps/sheets/Images to look at the various aspects on the earth.
- Develop critical knowledge and skills among the students to identify the problems and validate the solutions.
- Students become mentally prepared with the ability to respond to various disasters and hazards and acquire management skills.
- Gain an understanding of global issues and the ability to analyze how geographical factors contribute to global challenges.
- Develop the ability to critically assess and interpret geographic information, theories, and research findings.
- Understand the interconnectedness of geography with other disciplines, fostering a holistic approach to problem-solving. The curriculum encompasses the study and analyses of concepts of sub-disciplines and related disciplines such as Environmental Studies, Disaster Management, Geology, Tourism Management, Sustainable Development, Resource management and conservation, Regional Planning and Development Studies etc.
- Adhere to ethical standards in geographical research and practice, recognizing the responsibility of geographers in societal and environmental issues.

PROGRAMME SPECIFIC OUTCOMES

- Explore the relationship between geography and culture, society, and human behavior, understanding how these factors shape and are shaped by spatial patterns.
- Develop a strong foundation in physical, human, and environmental geography, enabling a comprehensive understanding of spatial patterns and processes.
- Acquire proficiency in map reading, cartographic techniques, remote sensing, GIS, and GPS for spatial analysis and decision-making. Gain practical experience in applying GIS for solving real-world problems, such as urban planning, transportation, and environmental management.
- Apply statistical and computational techniques, including correlation, regression, and spatial modeling, to analyze geographical data effectively.
- Assess environmental issues such as climate change, biodiversity loss, land degradation, and natural hazards, promoting sustainable solutions.
- Understand concepts related to urbanization, rural-urban interactions, industrial geography, and regional development for informed spatial planning.
- Conduct geographical field surveys, interpret land use patterns, and analyze socio-economic and environmental variables using primary and secondary data.
- Utilize geospatial technologies for land use mapping, disaster management, resource planning, and urban studies.
- Develop research aptitude through problem identification, hypothesis formulation, data collection, and analytical reasoning to address geographical challenges. Develop fieldwork and practical skills through hands-on experiences, including field surveys, data collection, and analysis.
- Analyze population dynamics, settlement patterns, cultural landscapes, and socio-economic development trends across different regions.
- Contribute to policy-making in environmental management, sustainable development, urban planning, and disaster risk reduction using geographical insights.

- Understand the principles of climate change and develop skills in assessing its impacts, as well as proposing and implementing adaptation strategies.
- Acquire knowledge and skills related to natural and human-induced disasters, including risk assessment, mitigation strategies, and disaster response planning.
- Understand the spatial distribution of natural hazards, assess risks, and formulate strategies for effective hazard management and response.
- Collaborate with professionals from other disciplines to address complex geographical issues, fostering interdisciplinary perspectives.
- Acquire skills in sustainable resource management, including water resources, forestry, and land use planning.
- Understand the geographical aspects of tourism and recreation, including destination planning and sustainable tourism practices.
- Explore advanced applications of remote sensing technologies in environmental monitoring, agriculture, and natural resource management.
- Develop advanced communication skills to present research findings, data analyses, and geographical concepts both orally and in writing.