

Deccan Education Society's

**Kirti M. Doongursee College of
Arts, Science and Commerce
(AUTONOMOUS)**



Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for
Program: Bachelor of Arts
Course: S.Y.B.A
Subject: **GEOGRAPHY**

Choice Based Credit System (CBCS)
with effect from
Academic Year 2024-2025

PROGRAM OUTCOMES

PO	Description
	A student completing Bachelor's Degree in Arts Program will be able to
PO1	Disciplinary Knowledge: Demonstrate a blend of conventional discipline knowledge and its applications to the modern world. Execute strong theoretical and practical understanding generated from the chosen program.
PO2	Critical Thinking and Problem solving: Exhibit the skill of critical thinking and use higher order cognitive skills to approach problems situated in their social environment, propose feasible solutions, and help in its implementation.
PO3	Social competence: Express oneself clearly and precisely to build good interpersonal relationships in personal and professional life. Make effective use of linguistic competencies to express themselves effectively in real and virtual media. Demonstrate multicultural sensitivity in group settings.
PO4	Research-Related Skills: Seeks opportunity for research and higher academic achievements in the chosen field and allied subjects and is aware about research ethics, intellectual property rights and issues of plagiarism. Demonstrate a sense of inquiry and capability for asking relevant/appropriate questions; ability to plan, execute and report the results of a research project be it in field or otherwise under supervision.
PO5	Personal and professional competence: Equip with strong work attitudes and professional skills that will enable them to work independently as well as collaboratively in a team environment.
PO6	Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centered national development; ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
PO7	Environment and Sustainability: Understand the impact of scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
PO8	Self-directed and Life-long learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

Deccan Education Society's
Kirti M. Doongursee College (autonomous)
Proposed Curriculum as per NEP 2020 Year of
implementation- 2024-25.
Name of the Department: Geography

Semester	Course Code	Course Title	Vertical	Credit
III	24GEOMJ311	Introduction to Climatology	Major	4
	24GEOMJ312	Regional Planning and Sustainable Development	Major	4
	24GEOMR321	Geography of India	Minor	4
	24GEOOE331	Sustainable Resource Development	OE	2
	24GEOVC341	Modern Surveying Techniques	VSC	2
IV	24GEOMJ411	Introduction to Oceanography	Major	4
	24GEOMJ412	Economic Geography	Major	4
	24GEOMR421	Regional Geography of South Asia	Minor	4
	24GEOOE431	Climate Change Vulnerability and Adaptation	OE	2
	24GEOSE451	Digital Cartography	SEC	2



Course Code	MAJOR SEM – III	Credits	Lectures /Week
24GEOMJ311	Paper I: Introduction to Climatology	4	4
Course Outcomes: After successful completion of this course, students would be able to <ul style="list-style-type: none">• Describe the components of the Earth's climate system.• Explain the processes that drive climate patterns and weather phenomena.• Analyze methods used for climate data collection and interpretation.• Apply climate classification systems to different regions of the world.• Evaluate historical trends and variations in Earth's climate.• Assess the impacts of human activities on the Earth's climate.• Discuss the societal and environmental implications of changing climates.• Demonstrate proficiency in analyzing and interpreting climatological data.• Communicate effectively about climatological concepts through oral and written means.• Apply critical thinking skills to assess current issues and debates in climatology.			
Unit	Topics	No of Lectures	
I	Foundations of Climatology <ul style="list-style-type: none">• Overview of Climatology• Components of Earth's Climate System• Factors Influencing Climate• Climate vs. Weather• Methods of Climate Data Collection	15	
II	Climate Patterns and Processes <ul style="list-style-type: none">• Atmospheric Circulation Patterns• Ocean Currents and Climate• Solar Radiation and Climate• Greenhouse Effect and Climate Change• El Niño-Southern Oscillation (ENSO) Phenomenon	15	
III	Climate Classification <ul style="list-style-type: none">• Koppen Climate Classification System• Thornthwaite Climate Classification	15	

	<ul style="list-style-type: none"> • Regional Climate Variability • Application of Climate Classification to Different Regions 	
IV	<p>Practical</p> <ul style="list-style-type: none"> • IMD: Weather signs and symbols, • Interpretation of IMD weather maps • Construction of: wind rose, Climograph and hythergraph 	15

References:

1. "Climatology" by Robert V. Rohli and Anthony J. Vega
2. "Introduction to Modern Climate Change" by Andrew Dessler and Edward Parson
3. "The Atmosphere: An Introduction to Meteorology" by Frederick K. Lutgens, Edward J. Tarbuck, and Dennis G. Tasa
4. "Climatology" by John E. Oliver
5. "Global Physical Climatology" by Dennis L. Hartmann
6. "Understanding Weather and Climate" by Edward Aguado and James E. Burt
7. "Climate Change: What Everyone Needs to Know" by Joseph Romm
8. "Practical Meteorology: An Algebra-based Survey of Atmospheric Science" by Roland Stull
9. "Climate Dynamics" by John C. Marshall and R. Alan Plumb
10. "The Climate Crisis: An Introductory Guide to Climate Change" by David Archer

Course Code	MAJOR SEM – III	Credits	Lectures /Week
24GEOMJ312	Paper II: Regional Planning and Sustainable Development	4	4
<p>Course Outcomes:</p> <p>After successful completion of this course, students would be able to</p> <ul style="list-style-type: none"> • Explain the principles of regional planning and sustainable development. • Analyze the factors influencing regional growth and development. • Evaluate methods of land use planning and zoning. • Assess infrastructure needs and sustainable transportation options. • Examine strategies for resource management and environmental conservation. • Discuss the role of stakeholders in regional planning processes. • Apply GIS and other tools for spatial analysis in regional planning. • Critically evaluate case studies of successful sustainable development projects. • Develop sustainable regional plans integrating economic, social, and environmental factors. • Communicate effectively about regional planning concepts and proposals. 			
Unit	Topics	No of Lectures	
I	<p>Understanding Regional Planning</p> <ul style="list-style-type: none"> • Planning: Concept, types and need • Regional planning: Concept, nature, relation with Geography • Role of surveys and geospatial technology in regional planning • Problems associated with regional planning 	15	
II	<p>Concept of Region in Planning</p> <ul style="list-style-type: none"> • Region: Concept, types, and delineation • Planning Regions: Need, characteristics and hierarchy. • Demarcation of planning regions: Principles, criteria, and methods • Perroux’s Growth Pole Theory and regional planning. 	15	
III	<p>Understanding Regional Development Infrastructure Needs Assessment</p> <ul style="list-style-type: none"> • Development: Concept and indicators • Regional disparities in development: Concept and measurements 	15	

	<ul style="list-style-type: none"> • Spatial and Non-Spatial Models of Development with Special Reference to Rostow's Model and Myrdal's Model • Strategies for regional development 	
IV	<ul style="list-style-type: none"> • Regional Planning in India • Five-Year Plans: Features, achievements, and failure • Multi-level planning in India • Planning regions of India • Changing planning mechanism of India: NITI Ayog • Micro level planning in rural area • Backward area development programmes 	15

References:

- "Planning Sustainable Cities: An Infrastructure-based Approach" by Karen C. Seto and Meredith Reba
- "Introduction to Urban Planning: Cities and Regions in a Changing World" by Jonathan Barnett and Larry Beasley
- "Sustainable Urban Development Reader" edited by Stephen M. Wheeler and Timothy Beatley
- "Urban and Regional Planning" by Peter Hall and Mark Tewdwr-Jones
- "Cities for People" by Jan Gehl
- "Sustainable Communities: Planning for the 21st Century" by Daniel R. Mandelker and Christopher Duerksen
- "Land Use Planning and Development Regulation Law" by Julian Conrad Juergen Meyer, Thomas E. Roberts, and Patricia E. Salkin
- "Urban Planning and Real Estate Development" by John Ratcliffe and Michael Stubbs
- "Infrastructure Planning and Finance: A Smart and Sustainable Guide" by Vicki Elmer and Kevin C. Desouza
- "Transportation for Livable Cities" by Vukan R. Vuchic

Course Code	MINOR SEM – III	Credits	Lectures /Week
24GEOMR321	Paper I: Geography of India	4	4
<p>Course Outcomes:</p> <p>After successful completion of this course, students would be able to</p> <ul style="list-style-type: none"> • Describe the physical geography of India, including its major landforms and geological features. • Explain the climatic diversity of India and its impact on regional ecosystems. • Analyze the distribution and characteristics of India's major biomes and ecosystems. • Examine the cultural diversity of India, including languages, religions, and traditions. • Evaluate the demographic patterns and population distribution across different states and regions of India. • Discuss the historical and political geography of India, including the formation of states and union territories. • Analyze the economic geography of India, focusing on major industries, agriculture, and natural resources. • Examine the challenges and opportunities of sustainable development in India. • Interpret maps and spatial data to understand the geographical patterns of India. 			
Unit	Topics	No of Lectures	
I	<p>Physical Geography of India</p> <ul style="list-style-type: none"> • Overview of India's Major Landforms • Geological Features: Mountains, Plateaus, and Plains • River Systems: Ganges, Brahmaputra, Indus, and Others • Coastal Regions: Western Ghats, Eastern Ghats, and Coastal Plains • Impact of Physical Geography on Climate and Biomes 	15	
II	<p>Cultural and Demographic Landscape</p> <ul style="list-style-type: none"> • Linguistic Diversity: Major Languages and Language Families • Religious Diversity: Hinduism, Islam, Christianity, Sikhism, Buddhism, Jainism • Cultural Traditions and Festivals • Demographic Patterns: Population Distribution and Density 	15	

	<ul style="list-style-type: none"> • Urbanization Trends and Rural-Urban Migration 	
III	<p>Political and Economic Geography</p> <ul style="list-style-type: none"> • Historical Development of States and Union Territories • Federal Structure of India: States and Union Territories • Economic Diversity: Major Industries and Economic Regions • Agriculture in India: Crops, Farming Practices, and Agricultural Regions • Natural Resources: Mineral Wealth, Energy Resources, and Their Distribution 	15
IV	<p>Environmental Challenges and Sustainable Development</p> <ul style="list-style-type: none"> • Biodiversity Hotspots and Conservation Efforts • Sustainable Development Initiatives: Renewable Energy, Green Practices • Case Studies of Sustainable Development Projects in India • Prospects and Challenges for Sustainable Development 	15

References:

- "India: A Comprehensive Geography" by D. R. Khullar
- "Geography of India" by Majid Husain
- "Physical Geography of India" by K. Bharatdwaj
- "Indian Geography" by Rupa Made Simple Editorial Board
- "Geography of India" by R.C. Tiwari
- "India: Environment and Development" by Khullar D.R. and Goh Cheng Leong
- "Economic and Commercial Geography of India" by C.B. Mamoria, S. Mohan, and V.S. Vyas
- "India After Gandhi: The History of the World's Largest Democracy" by Ramachandra Guha
- "India's Struggle for Independence" by Bipan Chandra
- "Indian Economy" by Ramesh Singh

Course Code	OE SEM – III	Credits	Lectures /Week
24GEOOE331	Sustainable Resource Development	2	2
Course Outcomes:			
<p>After successful completion of this course, students would be able to</p> <ul style="list-style-type: none"> • Define sustainable resource development and its importance for environmental stewardship. • Identify different types of natural resources and their significance for society and the economy. • Analyze the environmental impacts of resource extraction and utilization. • Evaluate sustainable management practices for water resources, including conservation and efficient use. • Examine methods for sustainable mining practices, including reclamation and minimizing ecological impacts. • Discuss renewable and non-renewable energy sources, their advantages, and challenges for sustainable development. • Assess strategies for sustainable forestry and agriculture, balancing production with conservation. • Explore the importance of biodiversity conservation and strategies for sustainable biodiversity management. • Apply principles of sustainable resource development to real-world case studies and scenarios. 			
Unit	Topics	No of Lectures	
I	Principles of Sustainable Resource Development <ul style="list-style-type: none"> • Introduction to Sustainable Resource Development • Importance of Environmental Stewardship • Types of Natural Resources (Renewable and Non-renewable) • Environmental Impacts of Resource Extraction • Sustainable Management Practices • Water Resources: Conservation and Efficiency • Energy Resources: Renewable and Non-renewable • Mining Practices: Reclamation and Ecological Impact Mitigation 	15	
II	Sustainable Management of Specific Resources	15	

	<ul style="list-style-type: none"> • Sustainable Forestry Practices Forest Conservation and Management • Agroforestry: Integrating Trees into Agriculture • Sustainable Agriculture • Organic Farming and Agroecology • Soil Conservation and Crop Rotation • Biodiversity Conservation • Importance of Biodiversity • Strategies for Biodiversity Management and Conservation 	
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References:

- "Sustainable Development of Natural Resources and its Impact on the Environment" by Zekâi Şen
- "Sustainable Resource Development" by N. Selvakumar
- "Natural Resource Development and Environmental Sustainability in India" by P. Sudhakar Reddy and Ch. Pradeep Kumar Reddy
- "Sustainable Resource Development" by T. V. Ramachandra and D. K. Subramanian
- "Sustainable Resource Development: An Approach to Management" by K. R. Aneja and Gargi Aneja
- "Sustainable Development of Natural Resources" by Berhanu Abegaz
- "Renewable and Sustainable Energy" by K. S. Kasiviswanathan and K. R. Jothi
- "Sustainable Energy Systems and Applications" edited by Ahmad Vassel-Be-Hagh, Ebrahim Zarei, and M. H. Saidi
- "Sustainable Agriculture and Agroecology" by Peter F. Sale
- "Sustainable Forestry: From Monitoring and Modelling to Knowledge Management and Policy Science" edited by Jeffrey G. Benjamin, Volker Radeloff, and Susan M. R. Leckie

Course Code	VSC SEM – III	Credits	Lectures /Week
24GEOVC341	Modern Surveying Techniques	2	2
Course Outcomes:			
After successful completion of this course, students would be able to			
<ul style="list-style-type: none"> • Demonstrate the survey techniques for calculation of area and finding height. • Describe the process of aerial photography and drone as well as extract the information. • Explain the process of remote sensing and operate GPS as well as extract the information. • Compare different techniques of field data collection and utilize for information exploration. 			
Unit	Topics	No of Lectures	
I	Field Survey, GPS, and Drone Survey <ul style="list-style-type: none"> • Geographical Survey: Concept and Types • Field Surveying of Height and Area • Use of Websites and Mobile apps for surveying • GPS, DGPS and GNSS- Concept, Process and Applications • GPS Survey and Mapping- Point, Track and Area • Drone Survey and Mapping 	15	
II	Aerial Photography and Remote Sensing Technology <ul style="list-style-type: none"> • Aerial Photography: Concept, Types and Applications • Geometry and Scale of Aerial Photographs • Visual Interpretation and Thematic Mapping from Aerial Photographs • Remote Sensing: Concept, Process and Applications • Earth Observation System- Sensors & Platforms • Visual Interpretation, Thematic Mapping and Digital Image Processing 	15	
References:			
<ol style="list-style-type: none"> 1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman, Harlow. 2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow. 3. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York. 4. Keates J.S. (1973): Cartographic Design and Production, Longman Group Ltd. 5. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and 			

Sons

Ltd.

6. Monkhouse, F.J. and Wilkinson, H. R (1962): Maps and Diagrams, Methuen and Company

Ltd. and Company Ltd., London.

7. Nag, P. (ed.) (1984): Census Mapping Survey, Concept Publishing Company, New Delhi.

8. Nair, N. B. (1996): Encyclopaedia of Surveying, Mapping and Remote Sensing. Rawat Publications. Jaipur and New Delhi.

9. Raisz, E. (1962): Principles of Cartography. McGraw Hill Books Company, Inc., New York.

10. Misra, R.P. and Ramesh, A. (1999): Fundamentals of Cartography. Concept Publishing

Company, New Delhi.

11. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic

Society, London.

12. Rice Oxley, M.K. and Shearer, W.V. (1929): Astronomy for Surveyors. Methuen and Company Ltd. and Company, London.

13. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984): Elements of

14. Cartography. 6th edition John Wiley and Sons, New York.

15. <https://dst-iget.in/>

Course Code	MAJOR SEM – IV	Credits	Lectures /Week
24GEOMJ411	Paper I: Introduction to Oceanography	4	4
<p>Course Outcomes:</p> <p>After successful completion of this course, students would be able to</p> <ul style="list-style-type: none"> • Describe the major features and characteristics of Earth's oceans. • Explain the principles of ocean circulation and its role in global climate. • Analyze the physical properties of seawater, including temperature, salinity, and density. • Identify and classify major marine ecosystems and their biodiversity. • Examine the structure and functions of marine food webs and trophic interactions. • Discuss the processes and impacts of coastal erosion, sedimentation, and beach formation. • Evaluate human impacts on marine environments, including pollution and overfishing. • Explain the geological processes shaping the ocean floor, including plate tectonics and seafloor spreading. 			
Unit	Topics	No of Lectures	
I	Introduction to Oceanography <ul style="list-style-type: none"> • Overview of Earth's Oceans • Ocean Basins and Features • Ocean Circulation: Thermohaline and Surface Currents • Physical Properties of Seawater: Temperature, Salinity, Density • Methods of Oceanographic Exploration 	15	
II	Marine Ecosystems and Biodiversity <ul style="list-style-type: none"> • Classification of Marine Ecosystems • Coral Reefs: Structure and Importance • Kelp Forests and Seagrass Meadows • Pelagic and Benthic Zones • Marine Biodiversity: Species Interactions and Adaptations 	15	
III	Coastal Processes and Human Impacts <ul style="list-style-type: none"> • Coastal Erosion and Sedimentation • Beach Formation and Dynamics • Estuaries and Coastal Wetlands 	15	

	<ul style="list-style-type: none"> • Human Impacts on Marine Environments: Pollution and Overfishing • Conservation of Coastal Habitats and Species 	
IV	<p>Practical</p> <ul style="list-style-type: none"> • Map filling: Related to Oceanography • Reading and Interpretation of navigation charts and bathymetric maps 	15
<p>References:</p> <ul style="list-style-type: none"> • "Oceanography: An Invitation to Marine Science" by Tom S. Garrison • "Essentials of Oceanography" by Alan P. Trujillo and Harold V. Thurman • "Introduction to Physical Oceanography" by Robert H. Stewart • "Marine Biology: Function, Biodiversity, Ecology" by Jeffrey S. Levinton • "Marine Ecology: Processes, Systems, and Impacts" by Michel J. Kaiser, Martin J. Attrill, Simon Jennings, and David N. Thomas • "Coastal and Estuarine Processes" by Richard A. Davis Jr. • "Coral Reefs: Biology, Threats, and Restoration" edited by T. P. Hughes, J. H. C. Ogden, and J. S. Jackson 		

Course Code	MAJOR SEM – IV	Credits	Lectures /Week
24GEOMJ412	Paper II: Economic Geography	4	4
Course Outcomes:			
<ul style="list-style-type: none"> • After successful completion of this course, students would be able to • Describe the spatial organization of economic activities at various scales. • Explain the theories of industrial location and their application in economic geography. • Analyze the impacts of globalization on local and regional economies. • Examine the role of transportation and infrastructure in economic development. • Discuss urbanization trends and the geography of cities in relation to economic activities. • Evaluate the factors influencing regional disparities in income, employment, and development. • Analyze patterns of international trade and their impact on economies and regions. • Examine the concept of economic sustainability and its role in economic geography. 			
Unit			
Unit	Topics	No of Lectures	
I	Foundations of Economic Geography <ul style="list-style-type: none"> • Introduction to Economic Geography • Spatial Organization of Economic Activities • Theories of Industrial Location • Weber's Least Cost Theory • Von Thünen's Agricultural Land Use Model • Christaller's Central Place Theory 	15	
II	Urbanization and Cities in Economic Geography <ul style="list-style-type: none"> • Urbanization Trends and Patterns • Functions and Hierarchies of Cities • Urban Economic Base and Industry Clusters • Urban Sprawl and Suburbanization • Case Studies: Global Cities and Megacities 	15	
III	Economic Development and Regional Disparities <ul style="list-style-type: none"> • Regional Disparities in Income and Employment • Factors Influencing Regional Development • Core-Periphery Model and Spatial Inequality • Role of Infrastructure in Regional Development • Policies for Reducing Regional Disparities 	15	
IV	International Trade and Economic Geography <ul style="list-style-type: none"> • Patterns of Global Trade Flows • Trade Agreements and Regional Integration • Impacts of International Trade on Economies and Regions 	15	

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| | <ul style="list-style-type: none">• Trade Balances and Trade Deficits• Economic Geography of Free Trade Zones and Special Economic Zones | |
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References:

- "Economic Geography: A Contemporary Introduction" by Neil Coe, Philip Kelly, and Henry W. C. Yeung
- "The New Oxford Handbook of Economic Geography" edited by Gordon L. Clark, Maryann P. Feldman, Meric S. Gertler, and Dariusz Wójcik
- "Global Economic Geography: A Geographic Perspective" by Joseph P. Stoltman, Roger F. Riefler, and Barney Warf
- "Economic Geography: Places, Networks and Flows" by Elizabeth Jane Holden and Richard Shearmur
- "The Geography of International Economic Systems" by Mark W. Zacher
- "International Business: The Challenge of Global Competition" by Donald Ball, Michael Geringer, Michael Minor, and Jeanne McNett

Course Code	MINOR SEM – IV	Credits	Lectures /Week
24GEOMR421	Regional Geography of South Asia	4	4
<p>Course Outcomes: After successful completion of this course, students would be able to</p> <ul style="list-style-type: none"> • Describe the varied physical geography of South Asia, including its mountain ranges, river systems, plains, and coastlines. • Explain the rich cultural diversity of South Asian countries, encompassing languages, religions, traditions, and historical landmarks. • Analyze the political divisions and administrative structures within South Asia's nations. • Examine the economic landscape of South Asian countries, focusing on agriculture, manufacturing, services, trade, and their economic development. • Discuss the environmental issues prevalent in South Asia, such as pollution, deforestation, water scarcity, and efforts towards biodiversity conservation. • Explore the urban geography of South Asia, studying the growth and development of its cities, including trends in urbanization and the presence of informal settlements. • Evaluate the impacts of globalization on South Asian economies and societies, considering trade, investments, cultural exchanges, and the diaspora. 			
Unit	Topics	No of Lectures	
I	Physical Geography of South Asia <ul style="list-style-type: none"> • Overview of South Asia's Physical Features • Mountain Ranges: Himalayas, Western Ghats, Eastern Ghats • River Systems: Ganges, Brahmaputra, Indus • Coastal Plains and Coastlines • Climate Zones: Tropical, Subtropical, Arid, and Highland • Impact of Physical Geography on Agriculture and Biodiversity 	15	
II	Cultural Diversity and Historical Legacies <ul style="list-style-type: none"> • Languages and Linguistic Diversity • Religions: Hinduism, Islam, Buddhism, Sikhism • Cultural Traditions and Festivals • Historical Landmarks and Dynasties • Colonial Legacy and Independence Movements • Cultural Heritage Sites: Temples, Mosques, 	15	

	Monuments	
III	Economic Landscapes and Urbanization <ul style="list-style-type: none"> • Agriculture in South Asia: Crops, Farming Practices, and Challenges • Manufacturing Industries: Textiles, Information Technology, Automotive • Services Sector: IT Services, Tourism, Banking • Urbanization Trends: Growth of Megacities and Urban Sprawl • Informal Settlements and Slums • Role of Infrastructure in Economic Development 	15
IV	Globalization, Regional Conflicts, and Environmental Challenges <ul style="list-style-type: none"> • Geopolitical Dynamics: Borders and Strategic Interests • Environmental Challenges: Pollution, Deforestation, Water Scarcity • Conservation Efforts and Biodiversity Hotspots 	15

References:

- "South Asia: An Environmental History" by David Arnold
- "South Asia: A Systematic Regional Geography" by R. L. Singh
- "South Asia: The Spectre of Terrorism" by Bruce Vaughn
- "South Asia: An Introduction" by Milton Israel
- "South Asia: An Interpretive Geography" by Lallanji Gopal
- "South Asia: Geopolitical Challenges and Opportunities" by Shahid Javed Burki
- "South Asia: Politics and Economics" by Craig Baxter

Course Code	OPEN ELECTIVE SEM – II	Credits	Lectures /Week
24GEOOE431	Climate Change Vulnerability and Adaptation	2	2
<p>Course Outcomes:</p> <p>After successful completion of this course, students would be able to</p> <ul style="list-style-type: none"> • Describe the concepts and drivers of climate change vulnerability. • Identify and analyze the impacts of climate change on ecosystems, societies, and economies. • Examine the social, economic, and environmental factors contributing to vulnerability. • Evaluate the effectiveness of different adaptation strategies and measures. • Apply vulnerability assessment tools and methodologies to real-world scenarios. • Discuss the role of technology in climate change adaptation and mitigation. • Analyze case studies of successful climate change adaptation initiatives. • Explore the linkages between climate change adaptation and sustainable development. • Critically assess policies and frameworks for climate change adaptation at local and global 			
Unit	Topics	No of Lectures	
I	<p>Understanding Climate Change Vulnerability</p> <ul style="list-style-type: none"> • Introduction to Climate Change and its Impacts • Drivers of Climate Change Vulnerability • Social, Economic, and Environmental Factors Contributing to Vulnerability • Vulnerability Assessment Tools and Methodologies • Case Studies of Climate Change Impacts on Ecosystems, Societies, and Economies 	15	
II	<p>Climate change Adaptation Strategies and Policies</p> <ul style="list-style-type: none"> • Community-Based Adaptation Approaches • Technological Solutions for Climate Change Adaptation • Policy and Planning for Climate Change Adaptation • Linkages Between Climate Change Adaptation and Sustainable Development 	15	
References:			

- **"Climate Change 2014: Impacts, Adaptation, and Vulnerability" edited by Intergovernmental Panel on Climate Change (IPCC)**
- **"Climate Change Adaptation Manual: Lessons Learned from European and Other Industrialised Countries" by Philipp Schmidt-Thome and Johannes Klein**
- **"Climate Change and Adaptation Planning for Ports" by Jens Hesselbjerg Christensen, Kirk Bryan, and Haakon Lein**
- **"Climate Change Adaptation and Disaster Risk Reduction: Issues and Challenges" edited by Rajib Shaw, Fuad Mallick, and Aminul Islam**
- **"Climate Change Adaptation in Africa: Fostering Resilience and Capacity to Adapt" edited by Walter Leal Filho, Samuel Fankhauser, and Celine McInerney**
- **"Adapting to Climate Change: An International Perspective" edited by James A. Adejuwon and Victor O. Sadras**

Course Code	SEC Skill Enhancement Course SEM – IV	Credits	Lectures /Week
24GEOSE451	Digital Cartography	2	2

Course Outcomes:

After successful completion of this course, students would be able to

- Describe the principles and concepts of digital cartography.
- Create and design maps using Geographic Information Systems (GIS) software.
- Applying: Use GIS tools to create maps with appropriate symbols, colors, and labels.
- Analyze and manipulate spatial data for cartographic purposes.
- Analyzing: Use geospatial analysis techniques to extract information and derive new data layers.
- Understand map projections and coordinate systems in digital cartography.
- Understanding: Explain different map projections and their applications.
- Apply cartographic design principles to create effective and visually appealing maps.
- Creating: Design maps with proper layout, legend, scale, and thematic representation.
- Visualize and represent spatial data in various formats, such as choropleth maps, dot density maps, and thematic maps.

Unit	Topics	No of Lectures
I	Concept and Processes of Cartography & Digital Cartography <ul style="list-style-type: none"> • Cartography and Digital Cartography: Concept and Applications • Maps: Concept, components and types • Reading of Thematic, Weather and Topographical maps • Georeferencing, Digitization, Raster and Vector Data Processes – QGIS software • Preparing and composition of thematic maps- QGIS software. • Web GIS- Bhuvan (NRSC-ISRO), Google Earth Pro, Open Street Maps etc. 	15
II	Digital Data Processing <ul style="list-style-type: none"> • Use of computer in statistical data analysis and representation (SPSS software) • Hydro Geomorphological Mapping (SAGA software) • Climate and Vegetation Mapping- SAGA and DIVA GIS software 	15

References:

- **"Thematic Cartography and Geographic Visualization" by Terry A. Slocum,**

Robert B. McMaster, Fritz C. Kessler, and Hugh H. Howard

- **"Designing Better Maps: A Guide for GIS Users" by Cynthia Brewer**
- **"Map Use: Reading and Analysis" by A. Jon Kimerling, Aileen R. Buckley, and Phillip C. Muehrcke**
- **"Geographic Information Science and Systems" by Paul A. Longley, Michael F. Goodchild, David J. Maguire, and David W. Rhind**
- **"GIS Fundamentals: A First Text on Geographic Information Systems" by Paul Bolstad**
- **"Getting to Know ArcGIS Pro" by Michael Law and Amy Collins**
- **"Mastering ArcGIS" by Maribeth H. Price**
- **"Remote Sensing and Image Interpretation" by Thomas Lillesand, Ralph W. Kiefer, and Jonathan Chipman**

Evaluation Scheme for Second Year (UG) under NEP (4 credits)

I. Internal Evaluation for Theory Courses – 40 Marks

1) Continuous Internal Assessment (CIA) Assignment –

Tutorial/ Case Study/ Project /Presentations/ Group Discussion / Ind. Visit. – 20 marks

2) Continuous Internal Assessment (CIA) ONLINE Unit Test – 20 marks

II. External Examination for Theory Courses – 60 Marks

Duration: 2 Hours

Theory question paper pattern:

Question	Based on	Marks
Q.1	Unit I	15
Q.2	Unit II	15
Q.3	Unit III	15
Q.4	Unit IV	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be subdivided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

NOTE: To pass the examination, attendance is compulsory in both Internal & External (Theory + Practical) Examinations.

Evaluation Scheme for Second Year (UG) under NEP (2 credits)

I. Internal Evaluation for Theory Courses – 20 Marks

1) Continuous Internal Assessment (CIA) Assignment - Tutorial/ Case Study/ Project /Presentations/ Group Discussion / Ind. Visit. – 10 marks

2) Continuous Internal Assessment (CIA) ONLINE Unit Test – 10 marks

II. External Examination for Theory Courses – 30 Marks

Duration: 1 Hours

Theory question paper pattern: All questions are compulsory.

Question	Based on	Marks
Q.1	Unit I	15
Q.2	Unit II	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be subdivided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

NOTE: To pass the examination, attendance is compulsory in both Internal & External (Theory + Practical) Examinations