Annexure - A

Chaudhary Bansi Lal University

Hansi Road, Prem Nagar, Bhiwani

(A State University Established under Govt. of Haryana Act No 25 of 2014)

वासुधैव कुटुम्बकम्

(The world is one family.)

Scheme & Syllabus
of
M.Sc. Geography

(In accordance with NEP-2020)

DEPARTMENT OF GEOGRAPHY

Approved

PGBOS&R: 15 July 2025 & 31 Dec 2025 Faculty Board: 02 Aug 2025

IKS : ≥ 5 %

Programme Learning Outcomes (PLO) of M.Sc. Geography

PLO 1	Demonstrate advanced knowledge about Geography with a critical understanding of the emerging developments and issues relating to the learners domain area.
PLO 2	Demonstrate advanced knowledge and understanding of principles, methods, and techniques applicable to the chosen field of study.
PLO 3	Demonstrate the capacity to extrapolate the acquired knowledge and skills to real-life situations and apply acquired competencies in new/unfamiliar contexts.
PLO 4	Demonstrate the ability to apply the acquired conceptual, operational or technical knowledge and a range of cognitive and practical skills to identify and address problems related to the chosen field of learning.
PLO 5	Demonstrate the apply advanced knowledge relating to research methods to carryout research and investigations to formulate evidence-based solutions to complex and unpredictable problems in the field of Geography.
PLO 6	Demonstrate the ability to communicate, in a well-structured manner the findings/ results of the research studies undertaken in the field of Geography.
PLO 7	Pursue self-paced and self- directed learning to upgrade knowledge and skills, including research-related skills avoiding unethical practices.

Table 1. Course mapping with PLO for M.Sc. Geography Programs

Course Code	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CC-1	✓	✓	✓	✓	✓	✓	✓
CC-2	✓	✓	✓	✓	✓	✓	✓
CC-3	✓	✓	✓	✓	✓	✓	✓
CC-4	✓	✓	✓	✓	✓	✓	✓
PC-1		✓	✓	✓	✓	✓	✓
DEC-1	✓	✓	✓	✓	✓	✓	✓
CC-5	✓	✓	✓	✓	✓		
CC-6	✓	✓	✓	✓	✓	✓	✓
CC-7	✓	✓	✓	✓	✓	✓	✓
CC-8	✓	✓	✓	✓	✓	✓	✓
PC-2		✓	✓	✓	✓	✓	✓
DEC-2	✓	✓	✓	✓	✓	✓	✓
VAC	✓	✓	✓	✓	✓		
CC-9							
CC-10							
CC-11							
PC-3							
DEC-3							
DEC-4							
EEC							
CC-12							
CC-13							
PC-4							
DEC-5							
DEC-6							
DEC-7							
DEC-7							
PR							

Scheme of Examination and Syllabus for M.Sc. Geography (w.e.f. 2025-26)

Semester	Course Type	Course Code	Nomenclature of the Paper	Credits	Hours/Week	External Assessment Marks	Internal Assessment Marks	Total Marks	Duration of Exam.
I	CC 1	25 PG GEO 101	Principles of Geomorphology (Theory)	3	3	50	20	70	3 Hours
			Principles of Geomorphology (Practical)	1	2	20	10	30	1.5 Hours
	CC 2	25 PG GEO 102	Advanced Climatology (Theory)	3	3	50	20	70	3 Hours
			Advanced Climatology (Practical)	1	2	20	10	30	1.5 Hours
	CC 3	25 PG GEO 103	Population and Development (Theory)	3	3	50	20	70	3 Hours
			Population and Development (Practical)	1	2	20	10	30	1.5 Hours
	CC 4	25 PG GEO 104	Statistical Methods in Geography (Theory)	3	3	50	20	70	3 Hours
			Statistical Methods in Geography (Practical)	1	2	20	10	30	1.5 Hours
	PC 1	25 PG GEO 105	Digital Cartography & Morphometric Analysis (Practical)	4	8	70	30	100	3 Hours
	DEC 1	25 PG GEO 106	Fluvial Geomorphology (Theory)	3	3	50	20	70	3 Hours
			Fluvial Geomorphology (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 107	Social and Spatial Inequalities (Theory)	3	3	50	20	70	3 Hours
			Social and Spatial Inequalities (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 108	Principles and Practices of Disaster Risk Reduction (Theory)	3	3	50	20	70	3 Hours
			Principles and Practices of Disaster Risk Reduction (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 109	Theories and Models of Regional Development (Theory)	3	3	50	20	70	3 Hours
			Theories and Models of Regional Development (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 110	Foundations of Geospatial Technology (Theory)	3	3	50	20	70	3 Hours
			Foundations of Geospatial Technology (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 111	MOOC/SWAYAM						

II	CC 5	25 PG GEO 201	Oceanography (Theory)	3	3	50	20	70	3 Hours
			Oceanography (Practical)	1	2	20	10	30	1.5 Hours
	CC 6	25 PG GEO 202	Theories and Models in Human Geography (Theory)	3	3	50	20	70	3 Hours
			Theories and Models in Human Geography (Practical)	1	2	20	10	30	1.5 Hours
	CC 7	25 PG GEO 203	Regional Geography of India (Theory)	3	3	50	20	70	3 Hours
			Regional Geography of India (Practical)	1	2	20	10	30	1.5 Hours
	CC 8	25 PG GEO 204	Remote Sensing & GIS (Theory)	4	4	70	30	100	3 Hours
	PC -2	25 PG GEO 205	Remote Sensing & GIS (Practical)	4	8	70	30	100	3 Hours
	DEC 2	25 PG GEO 206	Hydrology and Water Resource Management (Theory)	3	3	50	20	70	3 Hours
			Hydrology and Water Resource Management (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 207	Political Geography and Geopolitics (Theory)	3	3	50	20	70	3 Hours
			Political Geography and Geopolitics (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 208	Disasterscapes of India: Typologies and Regional Patterns (Theory)	3	3	50	20	70	3 Hours
			Disasterscapes of India: Typologies and Regional Patterns (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 209	Regional Planning and Policy in India (Theory)	3	3	50	20	70	3 Hours
			Regional Planning and Policy in India (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 210	Remote Sensing: Principles and Applications (Theory)	3	3	50	20	70	3 Hours
			Remote Sensing: Principles and Applications (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 211	MOOC/SWAYAM						
	VAC 1	25 PG GEO 212	Sacred Geography	2	2	35	15	50	2 Hours

Option –1 PG- I									
III	CC 9	25 PG GEO 301	Biogeography (Theory)	3	3	50	20	70	3 Hours
			Biogeography (Practical)	1	2	20	10	30	1.5 Hours
	CC 10	25 PG GEO 302	Philosophy of Geography (Theory)	3	3	50	20	70	3 Hours
			Philosophy of Geography (Practical)	1	2	20	10	30	1.5 Hours
	CC 11	25 PG GEO 303	Research Methodology (Theory)	3	3	50	20	70	3 Hours
			Research Methodology (Practical)	1	2	20	10	30	1.5 Hours
	PC- 3	25 PG GEO 304	Field Survey in Physical Geography (Practical)	4	8	70	30	100	3 Hours
		25 PG GEO 305	Field Survey in Human Geography (Practical)	4	8	70	30	100	3 Hours
	DEC 3	25 PG GEO 306	Glacial and Periglacial Geomorphology (Theory)	3	3	50	20	70	3 Hours
			Glacial and Periglacial Geomorphology (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 307	Cultural Landscapes and Identity (Theory)	3	3	50	20	70	3 Hours
			Cultural Landscapes and Identity (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 308	Governance and Institutional Frameworks for Disaster Management in India (Theory)	3	3	50	20	70	3 Hours
			Governance and Institutional Frameworks for Disaster Management in India (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 309	Urban and Regional Development Strategies (Theory)	3	3	50	20	70	3 Hours
			Urban and Regional Development Strategies (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 310	Geographic Information Systems (GIS) and Applications (Theory)	3	3	50	20	70	3 Hours
			Geographic Information Systems (GIS) and Applications (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 311	MOOC/SWAYAM						

III	DEC 4	25 PG GEO 312	Application of Geospatial Technology in Earth Sciences (Theory)	3	3	50	20	70	3 Hours
			Application of Geospatial Technology in Earth Sciences (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 313	Rural Development and Transformation (Theory)	3	3	50	20	70	3 Hours
			Rural Development and Transformation (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 314	Geospatial Technologies in Disaster Risk Assessment and Response (Theory)	3	3	50	20	70	3 Hours
			Geospatial Technologies in Disaster Risk Assessment and Response (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 315	Techniques and Methods of Regional Analysis (Theory)	3	3	50	20	70	3 Hours
			Techniques and Methods of Regional Analysis (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 316	Global Navigation Satellite Systems (GNSS) and Positioning Technologies (Theory)	3	3	50	20	70	3 Hours
			Global Navigation Satellite Systems (GNSS) and Positioning Technologies (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 317	MOOC/SWAYAM						
	EEC 1	25 PG GEO 318	Modern Survey Methods and Techniques	2	2	35	15	50	2 Hours
		25 PG GEO 319	Introduction to Python and R	2	2	35	15	50	2 Hours
IV	CC 12	25 PG GEO 401	Urban Development and Planning with reference to India (Theory)	3	3	50	20	70	3 Hours
			Urban Development and Planning with reference to India (Practical)	1	2	20	10	30	1.5 Hours
	CC 13	25 PG GEO 402	Regional Development and Planning (Theory)	3	3	50	20	70	3 Hours
			Regional Development and Planning (Practical)	1	2	20	10	30	1.5 Hours
	PC- 4	25 PG GEO 403	Geospatial Analysis (Practical)	4	8	70	30	100	3 Hours

IV	DEC 5	25 PG GEO 404	Earth's Climate History (Theory)	3	3	50	20	70	3 Hours
			Earth's Climate History (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 405	Geographies of Agriculture and Food Security (Theory)	3	3	50	20	70	3 Hours
			Agriculture Geography and Food Security (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 406	Climate Change and Hydro-Meteorological Hazards (Theory)	3	3	50	20	70	3 Hours
			Climate Change and Hydro-Meteorological Hazards (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 407	Regional Inequalities and Inclusive Growth (Theory)	3	3	50	20	70	3 Hours
			Regional Inequalities and Inclusive Growth (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 408	Modern Field Survey Techniques and Geospatial Data Acquisition (Theory)	3	3	50	20	70	3 Hours
			Modern Field Survey Techniques and Geospatial Data Acquisition (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 409	MOOC/SWAYAM						
	DEC 6	25 PG GEO 410	Quaternary Dating Methods and Techniques (Theory)	3	3	50	20	70	3 Hours
			Quaternary Dating Methods and Techniques (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 411	Health Geography and Spatial Epidemiology (Theory)	3	3	50	20	70	3 Hours
			Health Geography and Spatial Epidemiology (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 412	Health Emergencies, Pandemics, and Disaster Resilience (Theory)	3	3	50	20	70	3 Hours
			Health Emergencies, Pandemics, and Disaster Resilience (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 413	Environmental Sustainability and Regional Development (Theory)	3	3	50	20	70	3 Hours

IV			Environmental Sustainability and Regional Development (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 414	Spatial Data Analytics and Geospatial Modelling (Theory)	3	3	50	20	70	3 Hours
			Spatial Data Analytics and Geospatial Modelling (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 415	MOOC/SWAYAM						
	DEC 7	25 PG GEO 416	Glaciers and Glaciation in the Himalaya (Theory)	3	3	50	20	70	3 Hours
			Glaciers and Glaciation in the Himalaya (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 417	Geography of Tourism and Sustainable Development (Theory)	3	3	50	20	70	3 Hours
			Geography of Tourism and Sustainable Development (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 418	Community-Based Disaster Risk Management and Resilience Building (Theory)	3	3	50	20	70	3 Hours
			Community-Based Disaster Risk Management and Resilience Building (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 419	Development Perspectives: Poverty, Equity, and Governance (Theory)	3	3	50	20	70	3 Hours
			Development Perspectives: Poverty, Equity, and Governance (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 420	Web-Based GIS and Geospatial Application Development (Theory)	3	3	50	20	70	3 Hours
			Web-Based GIS and Geospatial Application Development (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 421	MOOC/SWAYAM						

Option – II when a student opt for Dissertation/ Project Report/Internship/ Research Work/ Apprenticeship etc.									
III	CC 9	25 PG GEO 301	Biogeography (Theory)	3	3	50	20	70	3 Hours
			Biogeography (Practical)	1	2	20	10	30	1.5 Hours
	CC 10	25 PG GEO 302	Philosophy of Geography (Theory)	3	3	50	20	70	3 Hours
			Philosophy of Geography (Practical)	1	2	20	10	30	1.5 Hours
	CC 11	25 PG GEO 303	Research Methodology (Theory)	3	3	50	20	70	3 Hours
			Research Methodology (Practical)	1	2	20	10	30	1.5 Hours
	PC- 3	25 PG GEO 304	Field Survey in Physical Geography (Practical)	4	8	70	30	100	3 Hours
		25 PG GEO 305	Field Survey in Human Geography (Practical)	4	8	70	30	100	3 Hours
	DEC 3	25 PG GEO 306	Glacial and Periglacial Geomorphology (Theory)	3	3	50	20	70	3 Hours
			Glacial and Periglacial Geomorphology (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 307	Cultural Landscapes and Identity (Theory)	3	3	50	20	70	3 Hours
			Cultural Landscapes and Identity (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 308	Governance and Institutional Frameworks for Disaster Management in India (Theory)	3	3	50	20	70	3 Hours
			Governance and Institutional Frameworks for Disaster Management in India (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 309	Urban and Regional Development Strategies (Theory)	3	3	50	20	70	3 Hours
			Urban and Regional Development Strategies (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 310	Geographic Information Systems (GIS) and Applications (Theory)	3	3	50	20	70	3 Hours
			Geographic Information Systems (GIS) and Applications (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 311	MOOC/SWAYAM						

III	DEC 4	25 PG GEO 312	Application of Geospatial Technology in Earth Sciences (Theory)	3	3	50	20	70	3 Hours
			Application of Geospatial Technology in Earth Sciences (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 313	Rural Development and Transformation (Theory)	3	3	50	20	70	3 Hours
			Rural Development and Transformation (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 314	Geospatial Technologies in Disaster Risk Assessment and Response (Theory)	3	3	50	20	70	3 Hours
			Geospatial Technologies in Disaster Risk Assessment and Response (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 315	Methods of Regional Analysis (Theory)	3	3	50	20	70	3 Hours
			Methods of Regional Analysis (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 316	Global Navigation Satellite Systems (GNSS) and Positioning Technologies (Theory)	3	3	50	20	70	3 Hours
			Global Navigation Satellite Systems (GNSS) and Positioning Technologies (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 317	MOOC/SWAYAM						
	EEC 1	25 PG GEO 318	Modern Survey Methods and Techniques	2	2	35	15	50	2 Hours
		25 PG GEO 319	Introduction to Python and R	2	2	35	15	50	2 Hours
IV	PC - 4	25 PG GEO 403	Geospatial Analysis (Practical)	4	8	70	30	100	3 Hours
	DEC 5	25 PG GEO 404	Earth's Climate History (Theory)	3	3	50	20	70	3 Hours
			Earth's Climate History (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 405	Agriculture Geography and Food Security (Theory)	3	3	50	20	70	3 Hours
			Agriculture Geography and Food Security (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 406	Climate Change and Hydro-Meteorological Hazards (Theory)	3	3	50	20	70	3 Hours

			Climate Change and Hydro-Meteorological Hazards (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 407	Regional Inequalities and Inclusive Growth (Theory)	3	3	50	20	70	3 Hours
			Regional Inequalities and Inclusive Growth (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 408	Modern Field Survey Techniques and Geospatial Data Acquisition (Theory)	3	3	50	20	70	3 Hours
			Modern Field Survey Techniques and Geospatial Data Acquisition (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 409	MOOC/SWAYAM						
	DEC 6	25 PG GEO 410	Quaternary Dating Methods and Techniques (Theory)	3	3	50	20	70	3 Hours
			Quaternary Dating Methods and Techniques (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 411	Health Geography and Spatial Epidemiology (Theory)	3	3	50	20	70	3 Hours
			Health Geography and Spatial Epidemiology (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 412	Health Emergencies, Pandemics, and Disaster Resilience (Theory)	3	3	50	20	70	3 Hours
			Health Emergencies, Pandemics, and Disaster Resilience (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 413	Environmental Sustainability and Regional Development (Theory)	3	3	50	20	70	3 Hours
			Environmental Sustainability and Regional Development (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 414	Spatial Data Analytics and Geospatial Modelling (Theory)	3	3	50	20	70	3 Hours
			Spatial Data Analytics and Geospatial Modelling (Practical)	1	2	20	10	30	1.5 Hours
		25 PG GEO 415	MOOC/SWAYAM						
	Project Report	25PG-GEO-400	Dissertation/ Project Report/Internship/ Research Work/ Apprenticeship	12	12	--	--	300	--

Important Details and Instructions:

Total Credit and Semester wise Distribution of Credits of M.Sc. Geography

Semester	*Credits*
I	*24*
II	*26*
III	*26*
IV	*24*
Total Credit	*100*

Instructions regarding the Selection of DEC Courses:

For each DEC course (Courses 1–6) listed in the syllabus, five options are provided. Students are required to select one option for each course. Alternatively, students may choose a MOOC/SWAYAM course in place of a DEC course, if they are interested.

Note: For **PC–4 (Course Type)**, students shall opt for either *25 PG GEO 304: Field Survey in Physical Geography (Practical)* or *25 PG GEO 305: Field Survey in Human Geography (Practical)*, depending on their area of specialisation.

Instructions for Course Coordinator / Students for Exercises / Practicum:
All practical exercises should preferably be carried out in a computer-based GIS and remote sensing environment using standard software and available primary or secondary datasets. Manual methods may be adopted wherever necessary, especially for conceptual clarity or when adequate digital resources are not available. Students are expected to maintain a well-organized practical record containing maps, outputs, and brief interpretations of each exercise.

CC-1			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Principles of Geomorphology		
Course Code	25PG-GEO-101		
Course Type	CC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand and explain the fundamental concepts and processes in geomorphology. 2. Analyze the evolution of landforms in relation to structure, process, and time. 3. Evaluate different geomorphic theories and apply them in interpreting landscapes. 4. Use topographic maps, field techniques, and GIS tools to identify and map landforms.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Foundations and Approaches in Geomorphology:** Nature, scope, and significance of geomorphology in Earth system science, Historical development of geomorphic thought: Davisian, Penckian, and Dynamic Equilibrium, Systems approach and process-response models, Contemporary trends: Process geomorphology, tectonic geomorphology, and environmental geomorphology	15

II	**Earth Surface Processes and Landform Development:** Endogenic processes: volcanism, earthquakes, folding and faulting, mountain building. Exogenic processes: weathering, mass movement, erosion, transportation, and deposition, Geomorphic agents and associated landforms: fluvial, glacial, aeolian, coastal, and karst systems. Slope development theories: Davis, King, Wood, and contemporary views	15
III	**Tectonic and Climatic Geomorphology:** Plate tectonics and landform evolution, Neo-tectonics and active tectonics in landscape modification. Climatic geomorphology: landforms in arid, humid, periglacial, and tropical regions, Quaternary landscape evolution: glacial-interglacial cycles and sea-level changes..Anthropogenic impacts on geomorphic systems (urbanization, mining, damming)	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Lab Exercises/ Practicum:** 1. Interpretation of topographic maps & Aerial Photographs for geomorphic features (2) 2. Slope analysis: clinographic, hypsometric, and gradient analysis (2) 3. Drainage basin and network analysis (stream order, bifurcation ratio, density) (2) 4. Landforms Interpretation and Analysis with Digital Elevation Models (DEMs) (2) 5. Field identification and interpretation of landforms and geomorphic processes (local/nearby region) (1) 6. Prepare a geomorphic map using GIS tools. (01)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Huggett, R. J. (2011). *Fundamentals of geomorphology* (3rd ed.). Routledge.
2. Summerfield, M. A. (1991). *Global geomorphology*. Prentice Hall.
3. Ritter, D. F., Kochel, R. C., & Miller, J. R. (2011). *Process geomorphology* (5th ed.). Waveland Press.
4. Kale, V. S., & Gupta, A. (2001). *Introduction to geomorphology*. Orient Blackswan.Burbank,
5. D. W., & Anderson, R. S. (2011). *Tectonic geomorphology* (2nd ed.). Wiley-Blackwell.
6. Anderson, R. S., & Anderson, S. P. (2010). *Geomorphology: The mechanics and chemistry of landscapes*. Cambridge University Press.
7. Huggett, R. J. (2011). *Fundamentals of geomorphology (3rd ed.)*. Routledge.
8. Summerfield, M. A. (1991). *Global geomorphology*. Prentice Hall.
9. Kale, V. S. (2014). *Landscape processes and landforms of India*. Springer.
10. Sharma, V. K. (2010). *Coastal geomorphology*. Concept Publishing Company.
11. Gregory, K. J. (2010). *The Earth's land surface: Landforms and processes in geomorphology*. SAGE Publications.
12. Selby, M. J. (1993). *Hillslope materials and processes (2nd ed.)*. Oxford University Press.
13. Twidale, C. R. (2004). *River patterns and their meaning*. Nova Science Publishers.
14. Fairbridge, R. W. (Ed.). (1968). *Encyclopedia of geomorphology*. Reinhold Book Corporation.
15. Goudie, A. S. (2004). *The human impact on the natural environment: Past, present, and future* (6th ed.). Blackwell Publisghin.

CC-2			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Advanced Climatology		
Course Code	25PG-GEO-102		
Course Type	CC-2		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Explain advanced atmospheric processes and global climate systems using theoretical and empirical perspectives. 2. Analyze spatial and temporal patterns of climate variability using climatological datasets. 3. Evaluate the science and evidence of climate change and its regional and global impacts. 4. Apply remote sensing, GIS, and statistical tools for climatic data analysis and visualization.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Advanced Atmospheric Processes and Global Climate System:** Structure and thermodynamics of the atmosphere, Global energy balance, radiation laws, and heat transfer mechanisms, General circulation of the atmosphere, Walker circulation, jet streams, ENSO, and monsoon systems, Atmospheric stability, cloud microphysics, and precipitation processes, Contemporary approaches: numerical modeling, climate system feedbacks, Earth system science perspective.	15

II	**Climate Classification, Variability, and Dynamics:** Classical and modern climate classifications (Köppen, Thornthwaite, Trewartha, and empirical/statistical systems). Inter-annual, decadal, and centennial climate variability (ENSO, NAO, PDO). Paleoclimatology: proxies, methods, and climatic reconstructions. Regional climatology with special reference to India: monsoon dynamics, droughts, and extreme weather events. Synoptic and mesoscale meteorology: role of teleconnections.	15
III	**Climate Change Science and Applications:** IPCC framework, greenhouse gases, radiative forcing, and anthropogenic emissions. Climate models and scenarios (GCMs, RCMs, downscaling techniques). Observed and projected climate trends (temperature, precipitation, sea-level rise). Impacts on ecosystems, agriculture, water resources, and human health. Climate change mitigation, adaptation, and policy (UNFCCC, Paris Agreement). Role of geospatial technologies in climate research. Anthropogenic impacts on geomorphic systems (urbanization, mining, damming).	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Interpretation of synoptic weather maps and weather symbols (2) 2. Preparation of isopleth maps (isotherms, isohyets) using GIS (2) 3. Time series analysis of temperature and rainfall data (trend detection) (2) 4. Correlation and regression analysis of climatic variables (2) 5. Field visit to a weather observatory and recording of the observations from various instruments (01) 6. Introduction to climate model outputs and scenario mapping (01)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Barry, R. G., & Chorley, R. J. (2010). *Atmosphere, weather and climate* (9th ed.). Routledge. 2. Lutgens, F. K., & Tarbuck, E. J. (2013). *The atmosphere: An introduction to meteorology* (12th ed.). Pearson. 3. Critchfield, H. J. (2013). *General climatology* (4th ed.). Prentice Hall. 4. Aguado, E., & Burt, J. E. (2018). *Understanding weather and climate* (7th ed.). Pearson. 5. Lal, D. S. (2012). *Climatology* (4th ed.). Sharda Pustak Bhawan. 6. IPCC. (2021). *Climate change 2021: The physical science basis*. Cambridge University Press. 7. Trenberth, K. E. (Ed.). (2005). *Climate system modeling*. Cambridge University Press. 8. Peixoto, J. P., & Oort, A. H. (1992). *Physics of climate*. Springer. 9. Singh, M. B. (2015). *Applied climatology*. Rawat Publications. 10. Dash, S. K. (2006). *Climate change: An Indian perspective*. Cambridge University Press India. 11. Tyndall Centre for Climate Change Research. (Various Reports). 12. Indian Meteorological Department (IMD) reports and bulletins.

CC-3			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Population and Development		
Course Code	25PG-GEO-103		
Course Type	CC-3		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Explain demographic theories, transitions, and spatial population structures in developed and developing regions. 2. Analyze the relationships between population growth, human development, resources, and environmental sustainability. 3. Evaluate contemporary population issues such as migration, ageing, urbanization, and gender disparities. 4. Apply demographic data, GIS tools, and statistical techniques to population mapping and regional analysis.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Population Theories, Patterns, and Transitions:** Nature, scope, and significance of population geography, Classical and modern demographic theories: Malthus, Marx, Neo-Malthusianism, Demographic Transition, Spatial distribution and density of population: global and regional patterns, Population structure: age-sex pyramid, dependency ratio, literacy, and workforce participation, Population data sources and reliability: census, surveys, civil registration.	15

II	**Population and Development Interface:** Population growth and its relationship with economic and human development, Population-resource-environment nexus. Sustainable development goals (SDGs) and demographic indicators, Urbanization, internal migration, and development corridors, Population policies: comparative review (India, China, Sweden, Kenya).	15
III	**Contemporary Issues in Population and Spatial Analysis:** Population ageing and implications for health and economy, Gender and population: sex ratio, female literacy, reproductive health, and empowerment, Climate change and population vulnerability (environmental migration, climate refugees), Role of geospatial technologies in population mapping and demographic change, Contemporary tools: Population dashboards, UN DESA, IPUMS, WorldPop	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Construction and interpretation of age-sex pyramids (static and progressive)(2) 2. Analysis of population growth rates and doubling time using census data (2) 3. Calculation of population density, dependency ratio, literacy rate (2) 4. Spatial mapping of population indicators using GIS (e.g., district-level census data) (2) 5. Analysis of Human Development Index (HDI) and other demographic indicators (01) 6. Case study report on a contemporary population issue (e.g., migration, ageing, gender) (01)	30
Total Contact Hours		**75**

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Chandna, R. C. (2020). *Geography of population: Concepts, determinants and patterns* (12th ed.). Kalyani Publishers.
2. Clarke, J. I. (1972). *Population geography*. Pergamon Press.
3. Weeks, J. R. (2021). *Population: An introduction to concepts and issues* (13th ed.). Cengage Learning.
4. Trewartha, G. T. (1969). *A geography of population: World patterns*. John Wiley & Sons.
5. Bhende, A. A., & Kanitkar, T. (2019). *Principles of population studies* (8th ed.). Himalaya Publishing House.
6. Dyson, T. (2010). *Population and development: The demographic transition*. Zed Books.
7. UNFPA. (2023). *State of world population report*. United Nations.
8. Desai, S. et al. (2021). *India Human Development Survey*. National Council of Applied Economic Research.
9. UNDP. (2022). *Human development report*. https://hdr.undp.org/
10. Poston, D. L., & Bouvier, L. F. (2010). *Population and society: An introduction to demography* (2nd ed.). Cambridge University Press.
11. Mitchell, R. (2009). *Environmental geography*. Oxford University Press.
12. IPUMS. (n.d.). *Integrated Public Use Microdata Series*. https://ipums.org/

CC-4			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Statistical Methods in Geography		
Course Code	25PG-GEO-104		
Course Type	CC-4		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Explain demographic theories, transitions, and spatial population structures in developed and developing regions. 2. Analyze the relationships between population growth, human development, resources, and environmental sustainability. 3. Evaluate contemporary population issues such as migration, ageing, urbanization, and gender disparities. 4. Apply demographic data, GIS tools, and statistical techniques to population mapping and regional analysis.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Fundamentals of Statistical Analysis in Geography**: Nature and significance of statistical methods in geography, Types and sources of data: primary, secondary, spatial, and temporal data, Measures of central tendency and dispersion (mean, median, mode, standard deviation, coefficient of variation), Probability distributions: normal, binomial, and Poisson, Data visualization: histograms, box plots, scatter diagrams, cartograms.	15

II	**Correlation, Regression, and Hypothesis Testing:** Bivariate and multiple correlation analysis, Linear regression: applications in spatial and environmental studies. Hypothesis formulation, significance testing, levels of confidence, Parametric and non-parametric tests: t-test, chi-square, ANOVA, Mann-Whitney U-test.	15
III	**Multivariate and Spatial Statistical Techniques:** Principal Component Analysis (PCA) and Factor Analysis, Cluster analysis and spatial classification, Discriminant analysis and canonical correlation, Time series analysis and trend forecasting in climatology and demography, Introduction to geostatistics: kriging, interpolation, and spatial modelling, Use of R, SPSS, and GIS for spatial statistical computation.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Descriptive statistics and data visualization using Excel and SPSS (02) 2. Correlation and regression analysis of geographical data (02) 3. Principal Component and Factor Analysis using SPSS or R (02) 4. Spatial autocorrelation and mapping using Moran's I in GIS (02) 5. Trend and time series analysis in climate or population datasets (01) 6. Application of kriging/interpolation using GIS (QGIS/ArcGIS) (01)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Mahmood, A. (1977). *Statistical methods in geographical studies*. Rajesh Publications.
2. Gregory, S. (1978). *Statistical methods and the geographer*. Longman.
3. Ebdon, D. (1985). *Statistics in geography: A practical approach* (2nd ed.). Blackwell.
4. Hammond, R., & McCullagh, P. S. (1980). *Quantitative techniques in geography: An introduction* (2nd ed.). Oxford University Press.
5. Rogerson, P. A. (2015). *Statistical methods for geography: A student's guide* (4th ed.). Sage.
6. Wong, D. W. S., & Lee, J. (2005). *Statistical analysis with ArcGIS*. Wiley.
7. Johnston, R. J., & Semple, R. K. (2010). *A quantitative revolution in geography*. Routledge.
8. de Smith, M. J., Goodchild, M. F., & Longley, P. A. (2018). *Geospatial analysis: A comprehensive guide* (6th ed.). Winchelsea Press.
9. Brunsdon, C., & Comber, L. (2015). *An introduction to R for spatial analysis and mapping*. Sage.
10. Yeates, M., & Garner, B. (1976). *Quantitative methods in geography: An introduction*. McGraw-Hill.
11. Sarkar, A. (2013). *Practical geography: A systematic approach*. Orient BlackSwan.
12. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of geographical information systems* (2nd ed.). Oxford University Press.

PC-1			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Digital Cartography & Morphometric Analysis (Practical)		
Course Code	25PG-GEO-105		
Course Type	PC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Develop proficiency in digital mapping using GIS tools and cartographic principles. 2. Analyze terrain features using morphometric techniques with spatial datasets. . 3. Apply GIS-based tools and DEMs to interpret surface processes and watershed dynamics. 4. Design high-quality cartographic outputs and quantitative morphometric reports.		
Credits	Theory	Practical	Total
	0	4	4
Teaching Hours per week	0	8	8
Internal Assessment Marks	0	30	30
End Term Exam Marks	0	70	70
Max. Marks	0	100	100
Examination Time	**3 hours**		
Part B- Contents of the Course			

Instructions for Lab Exercises & Practical Record: Students are required to complete all practical exercises outlined in the syllabus, ensuring that at least 7–8 exercises are prepared and documented from each unit. Proper pagination and organization of the record are mandatory for appearing in the final examination.

Instructions for Paper- Setter: The examiner shall set eight exercises based on the syllabus, with two exercises from each unit. Students are required to attempt four exercises, selecting one from each unit. All exercises carry equal marks.

Distribution of Marks for Evaluation

Exercise = 10x4=40 **File Record = 15** **Viva-voce : 15**

Unit	Topics	Contact Hours
I	**Introduction to GIS Interface and Data Management:** Exploring the GIS environment: QGIS, ArcGIS, Global Mapper, Working with vector and raster datasets. Understanding file formats: shapefiles, GeoTIFFs, CSVs. Managing layers, attributes, metadata, Coordinate systems and layer properties. **Understanding Map Scale and Projections:** Types of map scales: representative fraction, verbal, and graphical, Understanding coordinate reference systems (CRS) and UTM/Zones, Transformation and reprojection of spatial data, Using EPSG codes and custom projections in GIS.	30
II	**Cartographic Design and Thematic Mapping:** Principles of map design: visual hierarchy, color, symbology, typography, Preparation of thematic maps: land use, rainfall, soil, drainage. **Use of classification methods:** natural breaks, quantiles, equal interval, Creating legends, north arrows, scale bars, inset maps, Map layout preparation and export for publication.	30
III	**Terrain Analysis Using Digital Elevation Models (DEMs):** Sources of DEMs: SRTM, ASTER, LiDAR, Generating slope, aspect, hillshade, and contour maps, Elevation profiling and 3D surface visualization, Applications in hazard mapping, urban planning, and watershed studies. **Linear and Areal Morphometric Analysis:** Stream ordering (Strahler and Horton), stream length, bifurcation ratio, Drainage density, stream frequency, texture ratio, Basin shape indices: form factor, circularity ratio, elongation ratio, Relief aspects: basin relief, ruggedness number, relief ratio.	30
IV	**GIS-Based Watershed Delineation and Analysis:** Watershed boundary delineation from DEMs, Flow direction, accumulation, stream network extraction, Sink filling and hydrologic correction, Sub-watershed analysis and prioritization using morphometric parameters. **Small group project:** Digital mapping and morphometric assessment of a selected basin and Interpretation of morphometric outputs in relation to geology and land use etc.	30
Total Contact Hours		**120**

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ Practicum	30	➢ Practicum	70
○ Class Participation:	05	Examination (Lab Exercises, Practical Record & Viva) : 70	
○ Seminar/presentation/assignment/quiz/Practical Record etc.:	10		
○ Field/Lab Performances:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of geographical information systems* (2nd ed.). Oxford University Press.
2. Chorley, R. J., Schumm, S. A., & Sugden, D. E. (1984). *Geomorphology*. Methuen.
3. Clarke, K. C. (2018). *Getting started with geographic information systems* (6th ed.). Pearson.
4. de Smith, M. J., Goodchild, M. F., & Longley, P. A. (2022). *Geospatial analysis: A comprehensive guide* (7th ed.). Winchelsea Press.
5. Dent, B. D., Torguson, J. S., & Hodler, T. W. (2008). *Cartography: Thematic map design* (6th ed.). McGraw-Hill.
6. Field, K. (2018). *Cartography*. Esri Press.
7. Gorr, W. L., & Kurland, K. S. (2016). *GIS tutorial for ArcGIS Pro 2.6*. Esri Press.
8. Jenson, S. K., & Domingue, J. O. (1988). Extracting topographic structure from digital elevation data. *Photogrammetric Engineering & Remote Sensing, 54*(11), 1593–1600.
9. Kale, V. S. (2014). *Landscape processes and landforms of India*. Springer.
10. Keates, J. S. (1996). *Understanding maps* (2nd ed.). Routledge.
11. Kraak, M. J., & Ormeling, F. J. (2020). *Cartography: Visualization of geospatial data* (4th ed.). Routledge.
12. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems* (4th ed.). Wiley.
13. MacEachren, A. M. (2004). *How maps work: Representation, visualization, and design*. Guilford Press.
14. Monmonier, M. (1996). *How to lie with maps* (2nd ed.). University of Chicago Press.
15. Pearson,Tate, N. J., & Tate, D. M. (2022). *Principles of geospatial data handling*. Wiley-Blackwell.
16. Peterson, M. P. (2014). *Mapping in the cloud*. Guilford Press.
17. Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., & Guptill, S. C. (1995). *Elements of cartography* (6th ed.). Wiley.
18. Sarkar, A. (2015). *Practical geography: A systematic approach* (3rd ed.). Orient BlackSwan.
19. Shukla, S., & Mishra, A. (2016). Morphometric analysis of a watershed using GIS. *Applied Water Science, 6*(1), 11–20.
20. Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2009). *Thematic cartography and geovisualization* (3rd ed.).

DEC-01			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Fluvial Geomorphology		
Course Code	25PG-GEO-106		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Explain the processes, dynamics, and evolution of fluvial systems. 2. Interpret fluvial landforms using geomorphological models and concepts. 3. Analyze river basin morphology and channel dynamics using GIS and remote sensing. 4. Apply morphometric and spatial techniques to assess fluvial processes and hazards.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Introduction to Fluvial Geomorphology:** Nature, scope, and development of fluvial geomorphology. Drainage basins: structure, function, and hydrological significance, Stream flow mechanics: discharge, velocity, and energy gradients. Sediment transport: competence, capacity, load types.	15

II	**River Morphology and Landforms:** Channel patterns: straight, meandering, braided, anabranching, Channel geometry and classification (e.g., Rosgen method), Erosional and depositional landforms: floodplains, levees, terraces, alluvial fans, deltas, Channel response to tectonics, climate, and anthropogenic change	15
III	**Contemporary Issues and Applied Fluvial Geomorphology:** River regulation: dams, embankments, channelization and their geomorphic impacts, River hazards: bank erosion, floods, sedimentation, Tools and techniques: use of remote sensing, GIS, DEMs, and hydrological modelling, Case studies from Indian and global river systems (e.g., Ganga, Brahmaputra, Amazon).	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Delineation of a Drainage Basin (01) 2. Estimation of Stream Discharge (02) 3. Understanding and Analyze the Hydrograph and interpret the Catchment Response (02) 4. Mapping and Interpretation of Fluvial Landforms (02) 5. Channel Migration and Floodplain Change Detection (02) 6. Calculate the Hydraulic Power of different Streams (02)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Knighton, D. (2014). *Fluvial forms and processes: A new perspective* (2nd ed.). Routledge. 2. Schumm, S. A. (2005). *River variability and complexity*. Cambridge University Press. 3. Bridge, J. S. (2003). *Rivers and floodplains: Forms, processes, and sedimentary record*. Blackwell. 4. Kondolf, G. M., & Piégay, H. (Eds.). (2003). *Tools in fluvial geomorphology*. Wiley. 5. Brierley, G. J., & Fryirs, K. A. (2005). *Geomorphology and river management*. Blackwell Publishing. 6. Kale, V. S. (2014). *Landscape processes and landforms of India*. Springer. 7. Wohl, E. (2014). *Rivers in the landscape: Science and management*. Wiley-Blackwell. 8. Chorley, R. J., Schumm, S. A., & Sugden, D. E. (1984). *Geomorphology*. Methuen. 9. Thorne, C. R., Hey, R. D., & Newson, M. D. (Eds.). (1997). *Applied fluvial geomorphology for river engineering and management*. Wiley. 10. Richards, K. S. (1982). *Rivers: Form and process in alluvial channels*. Methuen.

DEC-01			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Social and Spatial Inequalities		
Course Code	25PG GEO 107		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Critically analyze the dimensions and drivers of social and spatial inequalities at multiple scales. 2. Examine the role of geography in shaping disparities related to income, health, education, caste, gender, ethnicity, and space. 3. Apply spatial and statistical tools to identify and map inequalities using secondary datasets and GIS techniques. 4. Interpret policies and development strategies in addressing socio-spatial disparities.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Theoretical Foundations and Dimensions of Inequality:** Concepts: inequality, marginality, exclusion, deprivation, and justice. Theories of social inequality: Marxist, liberal, structuralist, postcolonial and feminist perspectives. Types of inequalities: economic, social, political, and spatial. Historical and contemporary processes producing uneven development.	15

II	**Patterns and Determinants of Social and Spatial Inequalities:** Rural-urban divides and intra-urban inequalities, Caste, ethnicity, religion, gender, and class as spatial categories, Regional disparities in income, education, health, and infrastructure, Migration, gentrification, and displacement.	15
III	**Mapping and Addressing Inequalities:** Quantifying inequalities: Lorenz Curve, Gini Coefficient, Theil Index, GIS and Remote Sensing in inequality mapping, Development indicators and Human Development Index (HDI), Public policy, welfare state, inclusive planning, and social justice, Case studies: India (e.g., Aspirational Districts), global South, and global North.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise – 10 marks File record – 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Mapping socio-economic indicators: Use Census/NSSO data to create thematic maps of literacy, poverty, and employment in GIS. (02) 2. Regional disparities analysis: Visualize inter-regional inequalities using choropleth and graduated symbol maps (02) 3. Gini Coefficient and Lorenz Curve: Calculate and interpret income inequality using statistical tools. (02) 4. Caste/gender segregation mapping: Use GIS to identify spatial segregation based on caste or gender. (01) 5. HDI calculation and mapping: Compute Human Development Index and visualize disparities across districts. (01) 6. Case study with secondary data: Conduct spatial inequality analysis using datasets from NITI Aayog, NFHS, or Census (02)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS:

1. Dorling, D. (2015). *Inequality and the 1%*. Verso Books.
2. Harvey, D. (2006). *Spaces of global capitalism: Towards a theory of uneven geographical development*. Verso.
3. Sen, A. (1999). *Development as freedom*. Oxford University Press.
4. Massey, D. (1994). *Space, place, and gender*. Polity Press.
5. Smith, N. (2010). *Uneven development: Nature, capital, and the production of space* (3rd ed.). University of Georgia Press.
6. Tilly, C. (1998). *Durable inequality*. University of California Press.
7. NITI Aayog. (2021). *SDG India Index and Dashboard 2020–21*. Government of India.
8. UNDP. (2020). *Human development report 2020: The next frontier—Human development and the Anthropocene*. UNDP.
9. Reardon, S. F., & Bischoff, K. (2011). *Income inequality and population density in US metropolitan areas: 1970–2000*. Demography, 48(1), 143–168.
10. Sen, A., & Drèze, J. (2013). *An uncertain glory: India and its contradictions*. Penguin Books.

DEC-01			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Principles and Practices of Disaster Risk Reduction		
Course Code	25PG GEO 108		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand theoretical foundations, terminologies, and paradigms in disaster risk reduction (DRR). 2. Critically examine natural and anthropogenic disasters and their spatial dimensions. 3. Apply geographic methods and geospatial technologies for hazard mapping and vulnerability assessment. 4. Evaluate disaster mitigation, preparedness, and policy frameworks with a focus on the Sendai Framework and SDGs.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Foundations of Disaster Risk Reduction:** Concepts: hazard, risk, vulnerability, resilience, and capacity. Types of disasters: natural, anthropogenic, and hybrid. Paradigm shift from response to risk reduction, UNDRR and the Sendai Framework for Disaster Risk Reduction (2015–2030).	15

II	**Spatial Dimensions of Disasters:** Physical and human-induced disaster-prone regions of India and the world. Geographic factors influencing vulnerability and exposure, Disaster mapping, zonation, and risk modelling. Urban risk, climate change, and cascading disasters.	15
III	**DRR Strategies, Policy, and Institutional Frameworks:** Structural and non-structural mitigation measures, Community-Based Disaster Risk Reduction (CBDRR), Role of NDMA, SDMA, UNDRR, Red Cross, and NGOs. Integration of DRR into development planning and climate resilience. Case studies: Cyclone Fani, Kerala Floods, Bhuj Earthquake, Bhopal Gas Tragedy etc.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Hazard zonation mapping using GIS (e.g., earthquake or flood-prone areas). (02) 2. Preparation of disaster vulnerability maps using socio-economic and physical indicators. (02) 3. Temporal analysis of disaster events using historical data and trends (02) 4. Risk matrix and disaster severity indexing for selected case studies. (01) 5. Mapping critical infrastructure and service accessibility in disaster-prone zones. (01) 6. Case study analysis using NDMA/SDMA and UNDRR reports (Sendai indicators, resilience metrics)/ Report on Local Disasters (01)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Coppola, D. P. (2015). *Introduction to international disaster management* (3rd ed.). Butterworth-Heinemann. 2. Wisner, B., Gaillard, J. C., & Kelman, I. (Eds.). (2012). *Handbook of hazards and disaster risk reduction and management*. Routledge. 3. Alexander, D. (2000). *Confronting catastrophe: New perspectives on natural disasters*. Oxford University Press. 4. Smith, K., & Petley, D. N. (2009). *Environmental hazards: Assessing risk and reducing disaster* (5th ed.). Routledge. 5. UNDRR. (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. United Nations. 6. NDMA. (2020). *National Disaster Management Plan*. Government of India. 7. Shaw, R. (2014). *Disaster risk reduction: Methods, approaches and practices*. Springer. 8. Cutter, S. L. (2006). *Hazards, vulnerability and environmental justice*. Earthscan. 9. Kelman, I., Mercer, J., & Gaillard, J. C. (2017). *The Routledge handbook of disaster risk reduction including climate change adaptation*. Routledge. 10. Blaikie, P., Cannon, T., Davis, I., & Wisner, B. (2004). *At risk: Natural hazards, people's vulnerability and disasters* (2nd ed.). Routledge.

DEC-01			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Theories and Models of Regional Development		
Course Code	25PG GEO 109		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Critically evaluate classical and contemporary theories of regional development and planning. 2. Analyze spatial inequalities and regional disparities through quantitative and qualitative lenses. 3. Apply regional development models to real-world geographic contexts. 4. Utilize geospatial tools and regional indicators for planning and policy assessment.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Conceptual and Theoretical Foundations:** Concepts of region, regionalism, development, underdevelopment, and planning. Types of regions: formal, functional, planning, and perceptual. Classical theories: Growth Pole Theory (Perroux), Core-Periphery Model (Friedmann), Cumulative Causation (Myrdal), Rostow's Stages of Growth, Harrod-Domar and Lewis models.	15

II	**Contemporary Models and Approaches:** Dependency and World Systems Theory (Frank, Wallerstein), Sustainable Regional Development: Indicators, SDGs, and resilience, Human Development and Capability Approach (Sen), Spatial Inequality and Territorial Cohesion in a globalized context, Case studies from Global South and India.	15
III	**Regional Planning and Policy Framework:** Types of regional planning: sectoral, spatial, and integrated, Regional development strategies in India: Backward Region Grant Fund (BRGF), NITI Aayog's Aspirational Districts, Decentralized planning and participatory models, Role of institutions, infrastructure, and governance Critique of regional imbalances and policy performance in India.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Mapping spatial disparities using HDI and per capita income at state levels (2) 2. Preparation of regional typologies using socio-economic indicators (2) 3. Application of Location Quotient (LQ) (01) 4. Calculation and interpretation of regional inequality using Coefficient of Variation and Gini Index (2) 5. Trend analysis of development indicators using Census/NFHS data (02) 6. Overlay of development programs (e.g., Aspirational Districts) with poverty/education/health maps. (01)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Friedmann, J. (1966). *Regional development policy: A case study of Venezuela*. MIT Press.
2. Myrdal, G. (1957). *Economic theory and underdeveloped regions*. Harper and Row.
3. Sen, A. (1999). *Development as freedom*. Oxford University Press.
4. Wallerstein, I. (2004). *World-systems analysis: An introduction*. Duke University Press.
5. Richardson, H. W. (1973). *Regional growth theory*. Macmillan.
6. Todaro, M. P., & Smith, S. C. (2020). *Economic development* (13th ed.). Pearson.
7. Glasson, J., & Marshall, T. (2007). *Regional planning* (5th ed.). Routledge.
8. NITI Aayog. (2021). *SDG India Index & Dashboard*. Government of India.
9. UNDP. (2020). *Human Development Report: The next frontier – Human development and the Anthropocene*.
10. Scott, A. J., & Storper, M. (2015). *The nature of cities: The scope and limits of urban theory*. International Journal of Urban and Regional Research, 39(1), 1–15.

DEC-01			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	I		
Name of the Course	Foundations of Geospatial Technology		
Course Code	25PG GEO 110		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the fundamental principles of geospatial technologies including GIS, GPS, and remote sensing. 2. Apply spatial data models and tools for real-world geographic problem-solving. 3. Use open-source and commercial GIS software for mapping, analysis, and decision support. 4. Critically evaluate geospatial applications in environment, disaster management, urban planning, and development.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Fundamentals of Geospatial Technology:** Introduction to geospatial technologies: GIS, Remote Sensing, GPS, Web GIS, Spatial data types: raster vs. vector, attributes and metadata. Coordinate systems: Geographic vs. projected; UTM, WGS84, transformations. Open-source and proprietary geospatial software: QGIS, ArcGIS, Google Earth Engine.	15

II	**Spatial Data Models and Processing:** Spatial databases and data formats (Shapefile, GeoTIFF, KML, GPKG), Topology and spatial relationships. Geospatial data collection: digitization, GPS field data, crowdsourced platforms (OSM), Data quality, accuracy, and standards (FGDC, ISO).	15
III	**Applications and Contemporary Trends:** Applications: urban planning, environmental monitoring, disaster risk reduction, agriculture, and public health. Introduction to spatial analysis: overlay, buffer, proximity, raster operations. Emerging trends: AI in GIS, drone mapping, cloud-based platforms (GEE, ArcGIS Online). Ethical and legal considerations: geoprivacy, data sharing, licensing	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Familiarization with GIS interface (QGIS/ArcGIS): Loading and visualizing raster and vector data (02) 2. Working with coordinate systems and projections: CRS assignment, transformation, and reprojection (02) 3. Digitization and editing of spatial features from toposheets or satellite imagery (02) 4. Attribute data handling and table joins: Querying and data management in GIS (02) 5. Georeferencing scanned maps using control points (02) 6. Buffering, overlay, and spatial query tools for spatial analysis (03)	30
	Total Contact Hours	75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of geographical information systems* (2nd ed.). Oxford University Press. 2. Chang, K. T. (2020). *Introduction to geographic information systems* (9th ed.). McGraw-Hill Education. 3. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information systems and science* (4th ed.). Wiley. 4. Schowengerdt, R. A. (2007). *Remote sensing: Models and methods for image processing* (3rd ed.). Elsevier. 5. Bolstad, P. (2019). *GIS fundamentals: A first text on geographic information systems* (6th ed.). Eider Press. 6. Tomlinson, R. (2007). *Thinking about GIS: Geographic information system planning for managers* (4th ed.). Esri Press. 7. Jensen, J. R., & Jensen, R. R. (2013). *Introductory geographic information systems*. Pearson. 8. Open Geospatial Consortium (OGC). (2021). *OGC Standards and Best Practices*. https://www.ogc.org 9. U.S. Geological Survey (USGS). (2020). *EarthExplorer and Landsat User Guide*. https://earthexplorer.usgs.gov

CC 5			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Oceanography		
Course Code	25 PG GEO 201		
Course Type	CC -5		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Describe the origin, structure, and relief features of ocean basins and explain the physical and chemical properties of seawater. 2. Analyze oceanic processes such as waves, tides, currents, and ocean–atmosphere interactions influencing climate and monsoon systems. 3. Evaluate marine ecosystems, resources, and environmental challenges with special reference to the Indian Ocean and Indian coastal regions. 4. Interpret oceanographic data, charts, and geospatial outputs to analyze marine processes, resources, and coastal hazards in India.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	3 hours		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Fundamentals of Oceanography and Ocean Basins:** Nature, scope, and significance of oceanography in Geography and Earth System Science, Branches of oceanography, Origin, evolution and Distribution of oceans, Morphology of ocean basins: continental shelf, slope, rise, abyssal plains, mid-ocean ridges, seamounts, trenches, Physical and chemical properties of seawater: temperature, salinity, density, pressure, and heat budget, Latitudinal and vertical distribution of temperature and salinity	15

II	**Ocean Dynamics and Climate Interaction:** Waves: types and characteristics, Tides: theories, spring and neap tides, tidal patterns of the Indian coast, Ocean currents: causes, types, and global circulation, Indian Ocean circulation and monsoon-driven currents. Ocean–atmosphere interaction and heat transfer, ENSO and Indian Ocean Dipole (IOD) and their climatic influence, Sea-level changes and coastal implications.	15
III	**Marine Ecosystems, Resources, and Environmental Issues:** Marine ecosystems: pelagic and benthic systems, Coral reefs, mangroves, and estuaries. Marine productivity and food chains, Living and non-living marine resources, India's Exclusive Economic Zone (EEZ) and Blue Economy, Marine pollution and environmental degradation, Coastal hazards: cyclones, storm surges, tsunamis, Climate change and ocean warming.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Lab Exercises/ Practicum:** 1. Interpretation of SST and salinity charts of the Indian Ocean (2) 2. Inventory and analysis of ISRO oceanographic missions, satellites, and data products related to ocean studies (e.g., OCEANSAT series, SARAL–Altika, SCATSAT, INSAT data) (3) 3. Analysis of wave characteristics along the Indian coast (1) 4. Tidal analysis of selected Indian ports (Mumbai, Chennai, Kolkata, Kochi) (1) 5. Mapping of major surface currents of the Indian Ocean using atlases/GIS (2) 6. Identification and mapping of major fishing grounds of India (1) 7. Mapping coral reefs and mangrove ecosystems of India using satellite images (1) 8. Analysis of coastal hazards (cyclones/tsunami-prone zones) of India (2) 9. Preparation of a thematic map on marine resources/coastal vulnerability using GIS (1)	30
Total Contact Hours		**75**

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class.test etc.:	05	Seminar/Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Thurman, H. V., & Trujillo, A. P. (2017). *Essentials of Oceanography*. Pearson.
2. Garrison, T. (2016). *Oceanography: An Invitation to Marine Science*. Cengage Learning.
3. Pickard, G. L., & Emery, W. J. (1990). *Descriptive Physical Oceanography*. Pergamon Press.
4. Pinet, P. R. (2018). *Invitation to Oceanography*. Jones & Bartlett.
5. Sharma, R. C., & Vatal, M. (1985). *Oceanography for Geographers*. Chaitanya Publishing House.
6. Rao, A. D., & Sivakumar, R. (2010). *Indian Oceanography*. Oxford & IBH.
7. Talley, L. D., Pickard, G. L., Emery, W. J., & Swift, J. H. (2011). *Descriptive Physical Oceanography*. Academic Press.
8. Tomczak, M., & Godfrey, J. S. (2003). *Regional Oceanography: An Introduction*. Pergamon.
9. Ministry of Earth Sciences (MoES), Government of India – Reports and Publications.
10. INCOIS & NIOT (India) – Oceanographic data portals and technical documents.

CC 6			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Theories and Models in Human Geography		
Course Code	25 PG GEO 202		
Course Type	CC-6		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the philosophical foundations, evolution, and major theoretical perspectives in Human Geography. 2. Critically evaluate key spatial, economic, social, and behavioural models used in human geographical analysis. 3. Apply theories and models to interpret patterns of population, settlements, economic activities, and regional development. 4. Use quantitative, cartographic, and geospatial techniques to apply and test human geography models with Indian examples.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Philosophical Foundations and Evolution of Human Geography:** Nature, scope, and significance of Human Geography. Philosophical foundations of human geographical thought: environmental determinism, possibilism, and neo-determinism, Areal differentiation and regional approach, Quantitative revolution and spatial science. Behavioural and humanistic geography, Radical, welfare, and Marxist geography, Post-modernism, feminist geography, and critical approaches. Relevance of theories in contemporary human geographical research.	15

II	**Spatial Organization, Population, and Settlement Models:** Concept of spatial organization and spatial interaction. Models of spatial interaction: gravity model and intervening opportunity model, Population theories and models: Malthusian theory and Demographic Transition Model, Migration theories and models. Rural settlement patterns and agricultural land-use models, Urban structure models: concentric zone, sector, and multiple nuclei models, Central Place Theory: assumptions, hierarchy, spacing, applications, and limitations. Applicability of classical models in the Indian context.	15
III	**Economic, Regional, and Development Models:** Location Theories: Von Thünen's agricultural location model, Weber's industrial location theory, Lösch's market area theory, Industrial location and regional development models, Growth pole theory and cumulative causation, Core–periphery and dependency models, World-systems theory, Models of regional inequality and development planning, Application of models to Indian regional development, Critical evaluation and contemporary relevance of human geographical models.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Lab Exercises/ Practicum:** 1. Application of gravity model using population and distance data (Indian cities) (02) 2. Central Place Theory: hierarchy and spacing analysis using selected Indian towns (2) 3. Testing Von Thünen's agricultural land-use model with Indian examples (01) 4. Urban land-use analysis using concentric zone or multiple nuclei model (2) 5. Population growth analysis using Demographic Transition Model (India/States) (1) 6. Migration analysis using census-based data (push–pull factors) (1) 7. Regional development analysis using core–periphery framework (1) 8. Mapping spatial interaction and accessibility using GIS tools (2)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/ Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (2009). *The Dictionary of Human Geography* (5th ed.). Wiley-Blackwell. 2. Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (2011). *The Sage Handbook of Human Geography*. Sage Publications. 3. Haggett, P. (2001). *Geography: A Global Synthesis*. Pearson Education. 4. Haggett, P., Cliff, A. D., & Frey, A. (1977). *Locational Analysis in Human Geography*. Edward Arnold. 5. Chorley, R. J., & Haggett, P. (1967). *Models in Geography*. Methuen. 6. Knox, P. L., & Marston, S. A. (2016). *Human Geography: Places and Regions in Global Context*. Pearson. 7. Pacione, M. (2009). *Urban Geography: A Global Perspective*. Routledge. 8. Mandal, R. B. (2011). *Introduction to Human Geography*. Concept Publishing Company (India). 9. Singh, R. L. (Ed.) (2005). *Environmental Geography*. Rawat Publications (Indian perspective on human–environment interaction). 10. Census of India (Latest Edition). Registrar General of India – for population and migration analysis.

CC 7			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Regional Geography of India		
Course Code	25 PG GEO 203		
Course Type	CC - 7		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the physical, cultural, and economic diversity of India using a regional framework. 2. Analyze the interrelationships between physical environment, resources, population, and economic activities across Indian regions. 3. Critically evaluate regional disparities, development issues, and planning regions in India. 4. Apply regional analysis techniques using maps, statistical data, and geospatial tools to interpret Indian regions.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Conceptual Framework and Physical Regionalization of India:** Concept, scope, and significance of regional geography, Approaches to regionalization: physical, economic, cultural, and planning regions, India as a geographical unity and diversity, Physiographic divisions of India, Climate regions of India: monsoon mechanism, climatic types, Natural vegetation and soil regions of India, Influence of physical environment on regional development.	15

II	**Population, Cultural, and Economic Regions of India:** Population distribution, density, growth, and regional patterns, Population composition: linguistic, religious, and tribal regions, Settlement patterns: rural and urban regions of India, Agricultural regions of India: cropping patterns and agricultural regionalization, Industrial regions: major industrial belts and clusters, Transport and communication regions, Resource regions: water, mineral, and energy resources, Regional patterns of economic development and disparities.	15
III	**Planning Regions and Regional Development Issues:** Concept of planning regions and regional planning in India, Regionalization by Planning Commission and NITI Aayog, Specific Regions of India: drought-prone, flood-prone, tribal, desert, hill, and coastal regions, Regional inequalities and development challenges, Special economic regions and corridors, Border regions and strategic regions, Sustainable regional development and environmental issues, Case studies of selected Indian regions.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Lab Exercises/ Practicum:** 1. Delineation of physiographic regions of India using outline maps (1) 2. Climatic regionalization of India based on rainfall and temperature data (2) 3. Mapping population density and growth patterns of Indian states (2) 4. Identification and mapping of agricultural regions of India (2) 5. Mapping major industrial regions and transport corridors (2) 6. Regional analysis of resource distribution (minerals, power) (2) 7. Preparation of a regional development profile of a selected Indian state/region using GIS or secondary data (2)	30
Total Contact Hours		**75**

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/Demonstration/ Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Singh, R. L. (Ed.). (2009). *India: A Regional Geography*. National Geographical Society of India. 2. Husain, M. (2014). *Geography of India*. McGraw-Hill Education. 3. Khullar, D. R. (2018). *India: A Comprehensive Geography*. Kalyani Publishers. 4. Spate, O. H. K., & Learmonth, A. T. A. (1967). *India and Pakistan: A General and Regional Geography*. Methuen. 5. Sharma, T. C., & Coutinho, J. (2006). *Economic Geography of India*. Macmillan India. 6. Singh, G. (2010). *Geography of India*. Atma Ram & Sons. 7. Planning Commission of India. (2014). *Report on Regional Development*. Government of India. 8. NITI Aayog. (2020). *Strategy for New India @75*. Government of India. 9. Census of India. (2011). *Primary Census Abstract*. Registrar General of India.

CC 8			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Remote Sensing & GIS (Theory)		
Course Code	25 PG GEO 204		
Course Type	CC – 8		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the principles, platforms, sensors, and data characteristics of remote sensing systems. 2. Understand the concepts, data structures, and analytical techniques of Geographic Information Systems. 3. Analyze spatial data using digital image processing and GIS-based analytical methods. 4. Apply Remote Sensing and GIS techniques for resource assessment, environmental analysis, and regional planning.		
Credits	Theory	Practical	Total
	4	-	4
Teaching Hours per week	4	-	4
Internal Assessment Marks	30	-	30
End Term Exam Marks	70	-	70
Max. Marks	100	-	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare nine questions, selecting two questions from each of the four units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising seven sub-parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt five questions: the compulsory Question No. 1 and one question from each of the four units.

Unit	Topics	Contact Hours
I	**Fundamentals of Remote Sensing:** Nature, scope, and development of remote sensing, Radiation principles and laws of black body radiation: Planck's Law, Stefan–Boltzmann Law, Wien's Displacement Law, and Kirchhoff's Law, Electromagnetic radiation and the electromagnetic spectrum, Energy–matter interaction, Atmospheric effects on electromagnetic radiation, Spectral reflectance characteristics of Earth surface features, Platforms and sensors: ground, airborne, and satellite platforms, Types of sensors: passive and active sensors, Spatial, spectral, radiometric, and temporal resolutions.	15

II	**Remote Sensing Data and Image Interpretation:** Satellite systems and sensors: Landsat, IRS, Sentinel, MODIS, Cartosat, Data products and formats, Visual image interpretation elements: tone, texture, shape, size, pattern, association. Digital image processing concepts: image enhancement, filtering, classification (supervised and unsupervised), Accuracy assessment, Applications of remote sensing in land use/land cover mapping, agriculture, water resources, forestry, and disaster management (Indian examples).	15
III	**Fundamentals of Geographic Information Systems (GIS):** Concept, components, and functions of GIS, Spatial data models: vector and raster data structures, Attribute data and database management systems, Data input, editing, and topology, Coordinate systems, map projections, and georeferencing, Spatial data quality and errors. GIS software overview (Open Source Softwares)	15
IV	**Spatial Analysis, Modeling, and Applications of GIS:** Spatial analysis techniques: overlay, buffering, network analysis, surface analysis, Digital Elevation Models (DEMs) and terrain analysis. Spatial interpolation techniques, GIS modeling and decision support systems, Integration of Remote Sensing and GIS. Applications of GIS in urban planning, environmental management, resource planning, climate studies, and regional development, Emerging trends: Web GIS, GPS integration, and geospatial governance.	15
Total Contact Hours		60

Suggested Evaluation Methods		
Internal Assessment: 30		**End Term Examination: 70**
Class Participation	05	**Theory: 70**
Seminar/presentation/assignment/quiz/class test etc.:	10	
Mid-Term Exam	15	
Part C-Learning Resources		

Recommended Books/e-resources/LMS:

1. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote Sensing and Image Interpretation*. Wiley.
2. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective*. Pearson.
3. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to Remote Sensing*. Guilford Press.
4. Burrough, P. A., McDonnell, R. A., & Lloyd, C. D. (2015). *Principles of Geographical Information Systems*. Oxford University Press.
5. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic Information Systems and Science*. Wiley.
6. Aronoff, S. (1995). *Geographic Information Systems: A Management Perspective*. WDL Publications.
7. DeMers, M. N. (2008). *Fundamentals of Geographic Information Systems*. Wiley.
8. NRSC. (2019). *Remote Sensing Applications in India*. National Remote Sensing Centre, ISRO.
9. Chang, K. T. (2018). *Introduction to Geographic Information Systems*. McGraw-Hill Education.
10. ISRO. (Latest Edition). *Indian Remote Sensing Satellite Systems and Applications*. Government of India.

PC-2			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Remote Sensing & GIS (Practical)		
Course Code	25PG-GEO-205		
Course Type	PC-2		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Handle and preprocess satellite data using standard remote sensing software. 2. Perform visual and digital image interpretation for thematic mapping. 3. Create, manage, and analyze spatial databases using GIS tools. 4. Integrate Remote Sensing and GIS techniques for applied geographical problem-solving.		
Credits	Theory	Practical	Total
	0	4	4
Teaching Hours per week	0	8	8
Internal Assessment Marks	0	30	30
End Term Exam Marks	0	70	70
Max. Marks	0	100	100
Examination Time	**3 hours**		
Part B- Contents of the Course			

Instructions for Lab Exercises & Practical Record: Students are required to complete all practical exercises outlined in the syllabus, ensuring that at least 7–8 exercises are prepared and documented from each unit. Proper pagination and organization of the record are mandatory for appearing in the final examination.

Instructions for Paper- Setter: The examiner shall set eight exercises based on the syllabus, with two exercises from each unit. Students are required to attempt four exercises, selecting one from each unit. All exercises carry equal marks.

Distribution of Marks for Evaluation

Exercise = 10x4=40 **File Record = 15** **Viva-voce : 15**

Unit	Topics	Contact Hours
I	**Satellite Data Handling and Image Pre-Processing:** Introduction to remote sensing software (ERDAS Imagine / ENVI / QGIS), Importing and managing satellite data (Landsat, Sentinel, IRS), Image sub-setting and layer stacking, Radiometric and geometric corrections, Image enhancement techniques: contrast stretching, filtering, band combinations, Preparation of false colour composites (FCCs).	30
II	**Image Interpretation and Digital Classification:** Visual image interpretation using elements such as tone, texture, shape, size, pattern, and association. Preparation of interpretation keys. Digital image classification techniques: supervised and unsupervised classification, Accuracy assessment and error matrix. Land use / land cover (LULC) mapping using satellite imagery. Change detection analysis using multi-temporal data.	30
III	**GIS Database Creation and Spatial Analysis:** Creation of vector and raster databases, Digitization of spatial features and attribute data entry, Georeferencing of maps and images, Topology creation and error correction. Spatial analysis techniques: buffering, overlay analysis, proximity analysis, Network and surface analysis, Preparation of thematic maps using GIS.	30
IV	**Integration of Remote Sensing & GIS and Applications:** Integration of satellite data with GIS layers, Digital Elevation Model (DEM) generation and terrain analysis (slope, aspect, relief), Watershed and drainage analysis, Site suitability analysis using multi-criteria evaluation, Application-oriented projects in urban planning, agriculture, water resources, environmental management, and disaster studies (Indian case studies). Preparation of a mini-project and map layout for presentation.	30
Total Contact Hours		120

Suggested Evaluation Methods

Internal Assessment: 30		End Term Examination: 70	
➢ Practicum	30	➢ Practicum	70
o Lab Participation:	05	Examination (Lab Exercises, Practical Record & Viva) : 70	
o Seminar/presentation/assignment/quiz/Practical Record etc.:	10		
o Field/Lab Performances:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote Sensing and Image Interpretation: Laboratory Manual*. Wiley.
2. Jensen, J. R. (2016). *Remote Sensing of the Environment: An Earth Resource Perspective – Exercises and Applications*. Pearson.
3. Sabins, F. F. (2007). *Remote Sensing: Principles and Interpretation with Practical Applications*. Waveland Press.
4. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to Remote Sensing: Laboratory Exercises*. Guilford Press.
5. Chang, K. T. (2018). *Introduction to Geographic Information Systems: Practical Workbook*. McGraw-Hill Education.
6. DeMers, M. N. (2008). *Fundamentals of Geographic Information Systems: Laboratory Manual*. Wiley.
7. NRSC. (2020). *Remote Sensing and GIS Training Manual*. National Remote Sensing Centre, ISRO, Hyderabad.
8. ISRO. (2019). *Manual on Satellite Data Products and Applications*. Government of India.
9. QGIS Development Team. (Latest Edition). *QGIS Training Manual*. QGIS.org.
10. ESRI. (Latest Edition). *ArcGIS Desktop: Step-by-Step Exercise Manual*. ESRI Press.

DEC-02			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Hydrology and Water Resource Management		
Course Code	25PG GEO 206		
Course Type	DEC		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the hydrological cycle, processes, and components governing surface and groundwater systems. 2. Analyze hydrological data and basin characteristics for understanding runoff, floods, and droughts. 3. Evaluate water resources, management strategies, and water-related issues in India. 4. Apply hydrological methods, data analysis, and GIS techniques for water resource assessment and management.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Fundamentals of Hydrology:** Hydrology: nature, scope, and significance in Geography and Earth system science, Hydrological cycle and water balance, Precipitation: forms, measurement, and spatial distribution, Evaporation, evapotranspiration, and infiltration, Surface runoff: factors affecting runoff and runoff estimation, Stream flow and river regimes, Groundwater: occurrence, aquifers, porosity, permeability, and groundwater movement.	15

II	**Drainage Basin Hydrology and Hydrological Hazards:** Drainage basin as a hydrological unit, Morphometric analysis of drainage basins, Hydrographs: components, unit hydrograph concept. Floods: causes, frequency analysis, and flood control measures. Droughts: types, causes, and indices. Soil erosion and sediment yield, Watershed management approach, Case studies of Indian river basins.	15
III	**Water Resource Management and Policy Issues:** Surface and groundwater resources of India, Water demand and availability, Irrigation systems and command area development, Multipurpose river valley projects, Inter-basin water transfer, Groundwater development and problems, Water quality issues and pollution, Integrated Water Resource Management (IWRM), Rainwater harvesting and watershed development, Water governance, policies, and transboundary water issues in India.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Analysis of rainfall data and calculation of mean rainfall using arithmetic mean method (2) 2. Estimation of average rainfall using Thiessen polygon method (2) 3. Computation of mean rainfall using isohyetal method (2) 4. Preparation and interpretation of hydrographs from discharge data (2) 5. Estimation of runoff using simple empirical & digital methods (2) 6. Morphometric analysis of a drainage basin using Survey of India toposheets or DEMs (2) 7. Watershed delineation and drainage analysis using GIS techniques (2) 8. Analysis of groundwater level data and preparation of water table contour maps (2)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		**Theory: 50** **Practicum: 20**
Class Participation	05	Class Participation	Nil	
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Chow, V. T., Maidment, D. R., & Mays, L. W. (2014). *Applied Hydrology*. McGraw-Hill Education. 2. Ward, R. C., & Robinson, M. (2000). *Principles of Hydrology*. McGraw-Hill. 3. Subramanya, K. (2013). *Engineering Hydrology*. Tata McGraw-Hill. 4. Singh, V. P. (1992). *Elementary Hydrology*. Prentice Hall. 5. Maidment, D. R. (2002). *Handbook of Hydrology*. McGraw-Hill. 6. Sharma, K. D., & Singh, V. P. (2016). *Hydrology and Water Resources of India*. Springer. 7. Central Water Commission. (Latest Edition). *Water Resources of India*. Government of India. 8. National Institute of Hydrology. (Latest Edition). *Hydrological Data and Training Manuals*. Roorkee. 9. FAO. (2011). *Guide to Integrated Water Resources Management*. Food and Agriculture Organization. 10. Central Ground Water Board. (Latest Edition). *Groundwater Year Book of India*. Government of India.

DEC-02			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Political Geography and Geopolitics		
Course Code	25PG GEO 207		
Course Type	DEC		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the concepts, scope, and evolution of Political Geography and Geopolitics. 2. Analyze the spatial dimensions of state, territory, boundaries, power, and political processes. 3. Critically evaluate classical and contemporary geopolitical theories in a global and Indian context. 4. Apply cartographic, spatial, and analytical techniques to interpret geopolitical patterns, conflicts, and strategic regions.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Foundations of Political Geography:** Nature, scope, and significance of Political Geography, Relationship between geography, politics, and power, Evolution of political geographical thought, State: concept, origin, elements, and functions, Nation, nationalism, and nation-state, Territory and territoriality, Frontiers and boundaries: types, functions, and boundary disputes, Electoral geography: spatial patterns of voting behaviour, voting patterns, political regions, constituency delimitation, and gerrymandering.	15

II	**Classical and Modern Geopolitical Theories:** Meaning and scope of geopolitics, Classical geopolitical theories: Ratzel's organic theory of the state, Mackinder's Heartland theory, Mahan's Sea Power theory, Spykman's Rimland theory, Cold War geopolitics and balance of power, Modern and critical geopolitics, Post-Cold War geopolitical order, Geopolitics of globalization and regional blocs.	15
III	**Contemporary Geopolitical Issues and Indian Perspective**: Geopolitics of natural resources: water, energy, and minerals, Geopolitics of oceans, cyberspace, and climate change, Political geography of borders, conflicts, and terrorism, Geopolitics of South Asia, India's geopolitical position in the Indian Ocean region, India-China-Pakistan-Bangladesh relations, Regional organizations and global power structures, Emerging geopolitical challenges in the 21st century.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise – 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Preparation of maps of major geopolitical regions of Asia/World (2) 2. Mapping and analysis of international and disputed boundaries (India-specific examples) (2) 3. Delineation and analysis of geopolitical regions of the world (2) 4. Mapping major global and regional power blocs and strategic alliances (2) 5. Spatial analysis of resource-based conflicts (water, oil, minerals) (2) 6. Mapping conflict zones, buffer states, and strategic chokepoints (2) 7. Electoral mapping and analysis using constituency-level data (India) (2) 8. Preparation of a geopolitical case study map using GIS or secondary data (2)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Glassner, M. I., & Fahrer, J. (2004). *Political Geography*. Wiley. 2. Cox, K. R., Low, M., & Robinson, J. (2008). *The SAGE Handbook of Political Geography*. Sage Publications. 3. Taylor, P. J., Flint, C., & Pain, K. (2014). *Political Geography: World-Economy, Nation-State and Locality*. Pearson. 4. Agnew, J. (2016). *Globalization and Sovereignty*. Rowman & Littlefield. 5. Dodds, K. (2010). *Geopolitics: A Very Short Introduction*. Oxford University Press. 6. Parker, G. (1998). *Geopolitics: Past, Present and Future*. Pinter. 7. Cohen, S. B. (2015). *Geopolitics: The Geography of International Relations*. Rowman & Littlefield. 8. Dikshit, R. D. (2011). *Geopolitical Studies: A Geography of Conflict and Cooperation*. Prentice Hall of India. 9. Flint, C. (2017). *Introduction to Geopolitics*. Routledge. 10. Ministry of External Affairs, Government of India. (Latest Edition). *Annual Report and Policy Documents*.

DEC-02			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Disasterscapes of India: Typologies and Regional Patterns		
Course Code	25PG GEO 208		
Course Type	DEC		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the concepts, classification, and spatial patterns of disasters in India. 2. Analyze the physical and socio-economic factors shaping India's disaster-prone regions. 3. Evaluate disaster risk reduction, mitigation, and governance frameworks with regional perspectives. 4. Apply spatial, statistical, and geospatial techniques to map and analyze disaster typologies and regional vulnerability in India.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Conceptual Framework and Disaster Typologies:** Concept of disaster, hazard, vulnerability, and risk, Disaster geography and disasterscapes approach, Classification of disasters: natural, anthropogenic, and biological, Geological disasters: earthquakes, volcanoes, landslides, Hydrometeorological disasters: floods, cyclones, droughts, heat waves, Coastal and marine disasters: storm surges and tsunamis. Technological and industrial disasters, Epidemics and biological hazards, Disaster cycle: preparedness, response, recovery, and mitigation	15

II	**Regional Patterns of Disasters in India:** Seismic zones of India and earthquake-prone regions, Landslide-prone regions of Himalayas, Western Ghats, and North-East India, Flood-prone river basins of India, Drought-prone regions and arid–semi-arid zones, Cyclone-prone coastal regions of Bay of Bengal and Arabian Sea, Tsunami-affected regions of India, Heat wave and cold wave regions, Urban disasters and industrial hazard zones, Spatial clustering and regional contrasts of disasterscapes in India.	15
III	**Disaster Risk Reduction, Governance, and Climate Change:** Disaster Risk Reduction (DRR) concepts and frameworks, Disaster management institutions in India (NDMA, SDMA, DDMA), National Disaster Management Plan and policies, Community-based disaster risk management, Early warning systems and disaster preparedness, Climate change and increasing disaster risks, Resilience, adaptation, and sustainable development, Case studies of major Indian disasters and lessons learned.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Preparation of hazard maps showing earthquake, flood, cyclone, and drought-prone regions of India (3) 2. Delineation and analysis of seismic zones using BIS or NDMA data (1) 3. Mapping flood-prone river basins using historical flood data (2) 4. Spatial analysis of cyclone tracks and coastal vulnerability of India (1) 5. Identification and mapping of landslide-prone regions using Geospatial Data (1) 6. Preparation of drought vulnerability maps using rainfall variability indices (2) 7. GIS-based multi-hazard vulnerability analysis for a selected region (1) 8. Preparation of a disaster risk profile and mitigation plan for a selected Indian state or district of your choice (1)	30
	Total Contact Hours	75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Cutter, S. L. (2006). *Hazards, Vulnerability and Environmental Justice*. Earthscan. 2. Smith, K. (2013). *Environmental Hazards: Assessing Risk and Reducing Disaster*. Routledge. 3. Alexander, D. (2013). *Natural Disasters*. Springer. 4. Dikshit, A. (Ed.). (2019). *Disaster Risk Reduction in India*. Springer. 5. NDMA. (2019). *National Disaster Management Plan*. Government of India. 6. Sharma, E., & Choudhury, D. (2017). *Disaster Management in India*. Oxford University Press. 7. UNDRR. (2015). *Sendai Framework for Disaster Risk Reduction*. United Nations. 8. ISRO. (2018). *Disaster Management Support Programme*. Government of India. 9. Ministry of Home Affairs. (Latest Edition). *Annual Report on Disaster Management*. Government of India. 10. Census of India. (2011). *Primary Census Abstract*. Registrar General of India.

DEC-02			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Regional Planning and Policy in India		
Course Code	25PG GEO 209		
Course Type	DEC		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the concepts, approaches, and evolution of regional planning in India. 2. Analyze regional disparities, planning regions, and development strategies using spatial perspectives. 3. Evaluate regional development policies, institutions, and planning frameworks in India. 4. Apply regional planning tools, data analysis, and GIS techniques to assess regional development and policy outcomes.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Conceptual Foundations of Regional Planning:** Concept, scope, and objectives of regional planning, Region and regionalization. Approaches to regional planning: comprehensive, sectoral, and integrated planning, Growth pole theory and cumulative causation in planning context, Regional imbalance and spatial inequality, Indicators of regional development, Role of infrastructure and resource base in regional planning, Relevance of regional planning in India.	15

II	**Regional Planning Framework and Policies in India:** Evolution of regional planning in India, Planning regions and regionalization by Planning Commission and NITI Aayog, Five-Year Plans and regional development strategies, Backward region development programmes, Area-based planning: tribal, hill, desert, coastal, and border area planning, Special Economic Zones (SEZs) and industrial corridors, Urban and rural regional planning linkages, Role of decentralization and local governance.	15
III	**Contemporary Regional Policy Issues and Sustainable Development:** Regional disparities and inter-state inequalities, Regional policy reforms in post-liberalization India, Infrastructure-led development and regional connectivity, Environmental considerations in regional planning, Climate change and regional resilience planning, Inclusive and participatory planning, Sustainable Development Goals (SDGs) and regional planning, Case studies of selected regional development programmes in India.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Delineation of planning regions using physical and socio-economic indicators (2) 2. Mapping regional disparities using development indicators (income, literacy, infrastructure) (2) 3. Analysis of agricultural, industrial, or infrastructure-based planning regions (3) 4. Identification and mapping of backward and problem regions of India (2) 5. Evaluation of area-based development programmes using secondary data (2) 6. GIS-based analysis of regional connectivity and transport corridors (1) 7. Preparation of a regional development profile of a selected Indian state or region (1) 8. Policy evaluation exercise of a regional development programme (case study based) (1)	30
Total Contact Hours		75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS: 1. Friedman, J. (2005). *Regional Development Policy: A Case Study of Venezuela*. MIT Press. 2. Glasson, J., Chadwick, A., & Kincaid, D. (2005). *Urban and Regional Planning*. Routledge. 3. Misra, R. P., Sundaram, K. V., & Rao, V. L. S. P. (1978). *Regional Development Planning in India*. Vikas Publishing House. 4. Sundaram, K. V. (1987). *Regional Planning in India*. Concept Publishing Company. 5. NITI Aayog. (2020). *Strategy for New India @75*. Government of India. 6. Planning Commission of India. (2014). *Twelfth Five Year Plan*. Government of India. 7. Singh, R. L. (Ed.). (2009). *Regional Development Planning in India*. National Geographical Society of India. 8. Datta, A. (2006). *Regional Planning in India*. Serials Publications. 9. Government of India. (Latest Edition). *Economic Survey*. Ministry of Finance. 10. Census of India. (2011). *Primary Census Abstract*. Registrar General of India.

DEC-02			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Remote Sensing: Principles and Applications		
Course Code	25PG GEO 210		
Course Type	DEC		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Understand the physical principles, platforms, and sensors used in remote sensing. 2. Interpret satellite data and imagery characteristics for geographical analysis. 3. Evaluate applications of remote sensing in natural resource management and environmental studies. 4. Apply digital image processing and interpretation techniques to solve real-world geographical problems.		
Credits	Theory	Practical	Total
	3	1	4
Teaching Hours per week	3	2	5
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Max. Marks	70	30	100
Examination Time	**3 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare seven questions, selecting two questions from each of the three units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising four short parts, each carrying two marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt four questions: the compulsory Question No. 1 and one question from each of the three units.

Unit	Topics	Contact Hours
I	**Fundamentals of Remote Sensing:** Nature, scope, and significance of remote sensing in Geography and Earth System Science, Electromagnetic radiation and its interaction with atmosphere and Earth surface, Spectral characteristics of vegetation, soil, and water, Remote sensing platforms: ground-based, airborne, and space-borne systems, Types of sensors: passive and active sensors, Spatial, spectral, radiometric, and temporal resolution, Data products and image characteristics.	15

II	**Satellite Systems and Data Interpretation:** Earth observation satellite systems: polar orbiting and geostationary satellites, Indian Remote Sensing (IRS) satellite programme and sensors, International satellite systems (Landsat, Sentinel, MODIS). Image interpretation elements: tone, texture, shape, pattern, size, association. Visual and digital image interpretation, Pre-processing of satellite data: geometric and radiometric corrections, Introduction to image classification techniques.	15
III	**Applications of Remote Sensing:** Applications in land use and land cover mapping, Agricultural resource monitoring and crop assessment, Forest and biodiversity studies, Water resource assessment and watershed management, Urban and regional planning, Disaster monitoring and management, Climate and environmental change studies, Integration of remote sensing with GIS for spatial decision-making.	15
IV	**Instructions for external practical examiner:** There will be three questions in all and candidate has to attempt two exercises. Distribution of marks for evaluation *Exercise = 10 marks File record = 5 marks Viva-Voce = 5 marks* **Exercises:** 1. Identification of satellite platforms, sensors, and data products (2) 2. Visual interpretation of satellite images using standard interpretation keys (2) 3. Digital image enhancement techniques (contrast stretching, filtering) (2) 4. Calculation of vegetation indices (e.g., NDVI, NDWI) (2) 5. Supervised and unsupervised image classification (2) 6. Preparation of land use / land cover maps using satellite imagery (2) 7. Change detection analysis using multi-temporal satellite data (1) 8. Preparation of an application-based remote sensing project using Indian datasets (1)	30
	Total Contact Hours	75

Suggested Evaluation Methods

Internal Assessment: 30				**End Term Examination: 70**
Theory: 20		**Practicum: 10**		
Class Participation	05	Class Participation	Nil	**Theory: 50** **Practicum: 20**
Seminar/presentation/assignment/quiz/class test etc.:	05	Seminar/ Demonstration/Viva-voce/Lab records etc.:	10	
Mid-Term Exam	10	Mid-Term Exam	Nil	

Part C-Learning Resources
Recommended Books/e-resources/LMS:

1. Lillesand, T. M., Kiefer, R. W., & Chipman, J. (2015). *Remote Sensing and Image Interpretation*. Wiley.
2. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective*. Pearson.
3. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to Remote Sensing*. Guilford Press.
4. Sabins, F. F. (2007). *Remote Sensing: Principles and Interpretation*. Waveland Press.
5. Chuvieco, E. (2016). *Fundamentals of Satellite Remote Sensing*. CRC Press.
6. Joseph, G. (2018). *Fundamentals of Remote Sensing*. Universities Press.
7. Narayan, L. R. A. (2015). *Remote Sensing and Its Applications*. Universities Press.
8. ISRO. (2019). *Remote Sensing Applications*. Indian Space Research Organisation.
9. Mather, P. M., & Koch, M. (2011). *Computer Processing of Remotely-Sensed Images*. Wiley.
10. Congalton, R. G., & Green, K. (2019). *Assessing the Accuracy of Remotely Sensed Data*. CRC

VAC-1			
Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Geography		
Semester	II		
Name of the Course	Sacred Geography		
Course Code	25 PG GEO 212		
Course Type	CC		
Level of the course	500-599		
Pre-requisite for the course (if any)	N.A.		
Course Learning Outcomes (CLO)	1. Explain the concept, philosophy, and significance of sacred geography in Indian Knowledge Systems. 2. Interpret sacred landscapes, rivers, mountains, and pilgrimage networks as cultural-spiritual spaces. 3. Analyze the role of sacred geography in environmental ethics, sustainability, and cultural continuity. 4. Understand India's sacred spatial traditions as living heritage contributing to national identity and well-being.		
Credits	Theory	Practical	Total
	2	-	2
Teaching Hours per week	2	-	2
Internal Assessment Marks	15	-	15
End Term Exam Marks	35	-	35
Max. Marks	50	-	50
Examination Time	**2 hours**		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner shall prepare five questions, selecting two questions from each of the two units, with consideration given to the Course Learning Outcomes (CLOs). Among these, Question No. 1 will be a compulsory question comprising seven sub-parts, each carrying one marks, and collectively covering the entire syllabus. The remaining questions will be descriptive in nature, each carrying 14 marks. Examinees will be required to attempt three questions: the compulsory Question No. 1 and one question from each of the two units.

Unit	Topics	Contact Hours
I	**Conceptual Foundations of Sacred Geography:** Meaning and scope of sacred geography, Geography in Indian philosophical traditions, Cosmological understanding of space (Desha), time (Kala), and direction (Dik), Concept of sacred space in Vedic, Puranic, and Itihasic literature, Panchabhuta and landscape symbolism, Sacred cosmograms: Mandala and Yantra, Tirtha concept and spatial sanctity, Relationship between nature, divinity, and human settlements in Indian thought, Interface between religion and science in sacred spaces: temple architecture aligned with solar and lunar movements (e.g., Sun temples), geomantic principles, ritual practices, and cultural customs.	15

II	**Sacred Landscapes; Pilgrimage and Cultural Ecology of India:** Sacred rivers of India:. Sacred mountains, forests and groves, Pilgrimage geography: Char Dham, Jyotirlingas, Shakti Peethas, and Pancha Bhoota temples, Sacred cities and cultural landscapes: Kashi, Ayodhya, Mathura, Ujjain, Puri, and Madurai, Festivals and ritual landscapes. Sacred geography and environmental conservation, Contemporary relevance of sacred geography in culture and sustainability.	15
Total Contact Hours		**30**

Suggested Evaluation Methods

Internal Assessment: 15		**End Term Examination: 35**
Class Participation	04	**Theory: 35**
Seminar/presentation/assignment/quiz/class test etc.:	04	
Mid-Term Exam	07	

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Eck, D. L. (2012). *India: A Sacred Geography*. Harmony Books.
2. Kramrisch, S. (1976). *The Hindu Temple*. Motilal Banarsidass.
3. Goswami, B. N.. & Bajpai, S. (2011). *Sacred Geography of India*. National Book Trust.
4. Singh, R. P. B. (2013). *Sacred Geography of India*. Cambridge Scholars Publishing.
5. Michell, G. (1994). *The Hindu Temple: An Introduction to Its Meaning and Forms*. University of Chicago Press.
6. Nair, C. K. G. (2011). *Environmental Ethics in Indian Tradition*. Indira Gandhi National Centre for the Arts.
7. IGNCA. (2010). *Sacred Landscapes of India*. Indira Gandhi National Centre for the Arts.
8. Kinsley, D. (1998). *Hinduism and Ecology*. Motilal Banarsidass.
9. Bhattacharyya, N. N. (1997). *Indian Religious Historiography*. Munshiram Manoharlal.
10. Ministry of Education, Government of India. (2022). *Indian Knowledge Systems Framework*. Government of India.
11. Ali, S. M. (1966). *Geography of the Puranas*. People's Publishing House.