Post Graduate Curriculum Framework

With effect from the Academic Session 2026–27, the M.A (Geography) programme in the Universities of Bihar shall be offered in accordance with the UGC Curriculum and Credit Framework for Postgraduate Programmes (PGCF) and the provisions of the National Education Policy (NEP), 2020.

The programme provides flexibility to students to pursue either a Two-Year Master's Degree Programme or a One-Year Master's Degree Programme for candidates who have completed a four-year undergraduate degree with the requisite credits and qualifications as prescribed by UGC.

The curriculum is designed under the Choice Based Credit System (CBCS) and comprises a combination of Core Courses (CCs), Discipline Specific Electives (DSEs), Generic Electives (GEs), Skill Enhancement Courses (SECs), Ability Enhancement Courses (AECs), and Value Added Courses (VACs). The programme seeks to impart advanced theoretical knowledge, computational proficiency, research aptitude, and practical skills in Statistics and its applications.

Each academic year shall consist of two semesters. Students shall be required to successfully complete the prescribed combination of Core, Elective (Discipline/Generic/Open), Skill Enhancement, Ability Enhancement, and Value Added Courses in each semester to fulfil the credit requirements of the programme.

The curriculum incorporates contemporary developments in Geography, including Physical Geography, Human Geography, Economic Geography, Remote sensing and GIS, Quantitative techniques, Agricultural Geography, Geography of India & Bihar. The syllabus and reading materials shall be reviewed periodically to ensure alignment with emerging developments in academia, research, industry, and public policy.

Teaching-learning methodologies may include lectures, tutorials, seminars, laboratory sessions, statistical computing exercises, case studies, project work, field-based applications, and research assignments. Practical training shall provide hands-on experience in the use of statistical software packages, data analysis techniques, computational tools, and real-world problem-solving.

Assessment shall be conducted through a combination of continuous evaluation and end-semester examinations, including assignments, presentations, practical examinations, projects, viva-voce examinations, and written tests, as prescribed by the authorities concerned from time to time.

Students shall have the opportunity to choose elective and generic courses in accordance with their academic interests, subject to the availability of courses and institutional regulations, thereby promoting interdisciplinary learning and specialization within the broad domain of Geography.

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COURSE OF STUDIES [M.A. GEOGRAPHY]	
Programme Level	Master of Arts (M.A.)
Subject / Discipline	Geography
Faculty	Faculty of Social Sciences
University	Universities of Bihar under the BSU Act 1976/PU Act 1976 (and amended up-to-date).
Duration	Two Years / Four Semesters
NHEQF Level	Level 6.5
Effective from	2026-27 onwards

A PART A — PROGRAMME OVERVIEW & OBJECTIVES

A.1 Graduate Attributes (GAs)

The programme nurtures the following Graduate Attributes in alignment with the National Higher Education Qualifications Framework (NHEQF) Level 6.5:

Graduate Attributes (GAs)

Upon completion of the programme, graduates will possess:

- GA1: Advanced Geographical Knowledge

  Comprehensive understanding of physical, human, environmental, regional, economic, political, social, cultural, urban, agricultural, population, and geospatial dimensions of geography.

- GA2: Technical and Professional Competence

  Skills in cartography, quantitative techniques, GIS, remote sensing, GPS, field survey, spatial modelling, environmental assessment, and geospatial data analysis.

- GA3: Research and Analytical Skills

  Ability to formulate research problems, collect and analyze data, apply geographical methods, and conduct independent research.

- GA4: Problem-Solving and Decision-Making

  Capability to address contemporary issues such as climate change, disasters, urbanization, resource depletion, environmental degradation, food security, migration, and regional inequalities.

- GA5: Communication and Leadership

  Ability to communicate geographical knowledge effectively through reports, maps, and presentations.

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- GA6: Environmental and Social Responsibility

  Commitment to environmental sustainability, social justice, cultural diversity, and ethical professional practices.

- GA7: Employability and Entrepreneurship

  Preparedness for careers in teaching, research, planning, GIS and Remote Sensing industries, disaster management, environmental consultancy, urban and rural planning, and policy analysis.

- GA8: Lifelong Learning

  Capacity for innovation, interdisciplinary engagement, and adaptation to emerging technologies and societal needs.

A.2 Programme Outcomes (POs)

The Programme Educational Objectives describe the career and professional accomplishments that graduates are expected to attain within three to five years of graduation.

- PO1: Demonstrate advanced knowledge of physical, human, environmental, regional, economic, social, cultural, political, urban, agricultural, and population geography.
- PO2: Explain geomorphological, climatological, oceanographic, ecological, environmental, and biogeographical processes and their interactions.
- PO3: Analyze population dynamics, migration, urbanization, social structures, cultural landscapes, and political processes from geographical perspectives.
- PO4: Evaluate agricultural systems, resource utilization, economic development, regional planning, and sustainable development strategies.
- PO5: Apply quantitative and qualitative research methods in geographical investigations.
- PO6: Use cartography, GIS, remote sensing, GPS, geospatial technologies, and statistical tools for spatial analysis and decision-making.
- PO7: Conduct fieldwork, surveys, environmental assessments, and socio-economic investigations using scientific methodologies.
- PO8: Assess natural hazards, disaster risks, environmental impacts, and climate vulnerabilities and propose mitigation and adaptation strategies.
- PO9: Prepare and interpret thematic maps, statistical diagrams, geospatial databases, policy reports, and research publications.
- PO10: Design and execute dissertations using appropriate theoretical and methodological frameworks.

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- PO11: Demonstrate professional ethics, environmental responsibility, and commitment to sustainable development.
- PO12: Apply geographical knowledge and skills in academic, governmental, corporate, and development sectors.

A.3 Programme Specific Outcomes (PSOs)

Upon successful completion of this programme, a student shall demonstrate the following learning outcomes:

- PSO1: Interpret physical geographical processes including geomorphology, climatology, oceanography, biogeography, environmental geography, and natural hazards.
- PSO2: Analyze human geographical phenomena including population growth, migration, urbanization, cultural landscapes, political processes, social structures, and regional disparities.
- PSO3: Evaluate agricultural systems, resource utilization, economic development patterns, industrial location, and sustainable resource management.
- PSO4: Apply geospatial technologies, including GIS, remote sensing, GPS, digital cartography, and spatial statistics, to problem-solving and planning.
- PSO5: Conduct scientific field investigations and research using quantitative, qualitative, and mixed-method approaches.
- PSO6: Assess environmental impacts, climate change, disaster risks, and sustainability challenges at local, regional, and global scales.
- PSO7: Develop planning strategies for urban development, rural development, regional planning, water resource management, and environmental conservation.

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B PART B — COURSE STRUCTURE (CBCS/NHEQF FRAMEWORK)

B.1 Semester-wise Course Structure

The following table presents the full four-semester course structure. Column headings: L = **Lectures per week**; T = Tutorials per week; P = Practicals per week; CC = Core Course; PC = Practical Course; DSE = Discipline Specific Elective; GE/OE = Generic/Open Elective; SEC = Skill Enhancement Course; PROJ = Project/Dissertation.

S.No.	Paper Code	Title of the Course/Paper	L	T	P	Credits	Max. Marks	Type
SEMESTER I								
1	MA GEO CC101	Geomorphology	3	1	0	4	100	CC
2	MA GEO CC102	Climatology and Oceanography	3	1	0	4	100	CC
3	MA GEO CC103	Geographical Thought	3	1	0	4	100	CC
4	MA GEO PC104	Data Representation and Statistical Analysis (Practical)	0	0	4	4	100	PC
5	MA GEO GE105/ GE106	Geography of India/ Natural Hazards and Disaster Risk Reduction	3	1	0	4	100	GE
6		VAC/AEC/SEC	2	0	0	2	100	VAC/AEC/SEC
		Total- Semester I	14	4	4	**22**	**600**	

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S.No.	Paper Code	Title of the Course/Paper	L	T	P	Credits	Max. Marks	Type
		SEMESTER II						
1	MA GEO CC201	Regional Planning and Sustainable Rural Development	3	1	0	4	100	CC
2	MA GEO CC202	Environment and Biogeography	3	1	0	4	100	CC
3	MA GEO CC203	Resource and Economic Geography	3	1	0	4	100	CC
4	MA GEO PC204	Cartographic Techniques (Practical)	0	0	4	4	100	PC
5	MA GEO GE205/ GE206	Water Resource Management / Environmental Impact Assessment	3	1	0	4	100	GE
6		VAC/AEC/SEC	2	0	0	2	100	VAC/AEC/SEC
		Total- Semester II	**14**	**4**	**4**	**22**	**600**	

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO CC101**
Title of the Paper	Core Course I: [**GEOMORPHOLOGY**]
Programme / Subject	[MA] — [Geography]
Semester	Semester I
Nature of Course	Core Course (CC)
L – T – P	3 – 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted on the basis of attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Understand the fundamental concepts, scope, and theories of geomorphology and the evolution of the Earth's surface.
COB 2	Examine tectonic processes, plate movements, and mountain-building mechanisms responsible for major landforms.
COB 3	Analyze geomorphic processes such as weathering, mass wasting, erosion, and landscape evolution.
COB 4	Interpret the formation and characteristics of fluvial, glacial, arid, karst, and coastal landforms.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the basic and applied concepts, geological structure, and evolutionary history of the Earth.
CLO 2	Evaluate major theories of tectonics, continental drift, plate tectonics, and landscape development.
CLO 3	Analyze geomorphic processes and their role in shaping different landforms and topography.
CLO 4	Identify and interpret the origin, evolution, and spatial distribution of major geomorphic features and landscapes.

C.5 Syllabus — Unit-wise Breakdown

Course Name: GEOMORPHOLOGY (MA GEO CC101)		
Unit	**Content**	**Suggested Lectures hours**
I	Fundamentals of Geomorphology: Nature, scope, and fundamental concepts; Geological Time Scale and Indian Stratigraphy; Internal structure and chemical composition of the Earth, Applied Geomorphology.	12–15
II	Tectonics and Earth Movements: Theories of Continental Drift and Plate Tectonics; Sea Floor Spreading and Palaeomagnetism; Theories of mountain building.	12–15
III	Geomorphic Processes & Slope Evolution: Weathering (Physical, Chemical, Biological); Mass wasting and its types; Theories of slope evolution (Davis, Penck, and King).	12–15
IV	Fluvial, Glacial and Periglacial Systems; Channel topography; Concept of Cycle of Erosion (W.M. Davis and Walther Penck)	12–15
V	Evolution of Arid, Karst, and Coastal Landscapes: Wind as a geomorphic agent and desert landforms; Karst topography and underground drainage; Wave action and coastal shoreline evolution.	10–12
	Total Suggested Lectures	**60 (For 4 Credit Course)**

C.6 Reference Books & Readings

1. Ahmad, E. (1985). *Geomorphology*. Kalyani Publishers, New Delhi.
2. Bierman, P. R., & Montgomery, D. R. (2020). *Key Concepts in Geomorphology* (2nd

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ed.). W.H. Freeman, New York.
3. Bloom, A. L. (2003). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms* (3rd ed.). Pearson Education, New Delhi.
4. Chorley, R. J., Schumm, S. A., & Sugden, D. E. (2013). *Geomorphology*. Routledge, London.
5. Dayal, P. (1996). *A Textbook of Geomorphology*. Shukla Book Depot, Patna.
6. Goudie, A. (2013). *The Nature of the Environment: An Advanced Physical Geography* (5th ed.). Wiley-Blackwell.
7. Huggett, R. J. (2017). *Fundamentals of Geomorphology* (4th ed.). Routledge, London.
8. Kale, V. S., & Gupta, A. (2015). *Introduction to Geomorphology*. Orient BlackSwan, Hyderabad.
9. Knighton, D. (2014). *Fluvial Forms and Processes: A New Perspective*. Routledge, London.
10. Singh, S. (2023). *Geomorphology* (Latest Revised Edition). Prayag Pustak Bhawan, Allahabad.
11. Summerfield, M. A. (2014). *Global Geomorphology*. Routledge, London.
12. Thornbury, W. D. (2004). *Principles of Geomorphology* (2nd ed.). John Wiley & Sons, New York.
13. Verstappen, H. T. (2011). *Applied Geomorphology: Geomorphological Surveys for Environmental Development*. Elsevier.
14. खुल्लर, डी. आर. (Khullar, D. R.). भौतिक भूगोल एवं भू-आकृति विज्ञान (Physical Geography and Geomorphology). नई दिल्ली: सरस्वती हाउस प्रा. लि
15. सिंह, सविन्द्र. (2024). भू-आकृति विज्ञान (Geomorphology). प्रयागराज: प्रवालिका पब्लिकेशन।
16. प्रसाद, गायत्री. (2004). भू-आकृति विज्ञान. इलाहाबाद: शारदा पुस्तक भवन।
17. दयाल, पी. (2018). भौतिक भूगोल। प्रयागराज: किताब महल प्रकाशन।
18. लाल, डी. एस. (2023). भौतिक भूगोल. प्रयागराज: शारदा पुस्तक भवन.

C.7 Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Geomorphology, Physical Geography, Earth Surface Processes, Remote Sensing and GIS courses available through SWAYAM and NPTEL platforms.
2. e-PG Pathshala: Geography → Physical Geography → Geomorphology modules.
3. SHODHGANGA / Shodhgangotri — For doctoral theses and research references in Geomorphology, Physical Geography, Environmental Geography, and Earth Surface Processes.
4. NDL India (National Digital Library): https://ndl.iitkgp.ac.in
5. Geological Survey of India (GSI): Geological and geomorphological reports, maps, and publications.
6. Indian Space Research Organisation (ISRO) – Bhuvan Portal: Satellite data and terrain

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information for geomorphological studies.

7. United States Geological Survey (USGS): Earth surface processes, topographic maps, DEMs, and geomorphology resources.
8. NASA Earth Observatory: Global landform processes, remote sensing datasets, and educational resources.
9. British Society for Geomorphology (BSG): Learning materials, research publications, and geomorphological resources.
10. Directory of Open Access Books (DOAB) and Google Scholar: Open-access books, articles, and research literature on Geomorphology.

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO CC102**
Title of the Paper	Core Course I: [**CLIMATOLOGY AND OCEANOGRAPHY**]
Programme / Subject	[MA] — [Geography]
Semester	Semester I
Nature of Course	Core Course (CC)
L – T – P	3 – 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted on the basis of attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Understand the composition, structure, and energy balance of the atmosphere and their influence on weather and climate.
COB 2	Examine atmospheric circulation, air masses, fronts, cyclones, anticyclones, and weather forecasting techniques.
COB 3	Analyze climate change processes, global warming, major ocean–atmosphere

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	interactions, and their applications in applied climatology.
COB 4	Interpret the physical characteristics, processes, and geopolitical significance of oceans and marine resources.

C.4 Course Outcomes (Cos)

CLO No.	Course Learning Outcome
CLO 1	Explain the structure and dynamics of the atmosphere and the Earth's heat budget system.
CLO 2	Analyze weather phenomena and vulnerability associated with air masses, fronts, cyclones, and anticyclones and understand forecasting methods.
CLO 3	Evaluate theories of climate change and assess the impacts of global warming, Urban Heat Island and ENSO on environmental systems, and applications of climatic science.
CLO 4	Describe major oceanic features, marine processes, coral reefs, ocean deposits, and the strategic importance of ocean resources and routes.

C.5 Syllabus -Unit-wise Breakdown

Course Name: CLIMATOLOGY AND OCEANOGRAPHY (MA GEO CC102)		
Unit	**Content**	**Suggested Lectures hours**
I	Composition and structure (physical and chemical) of the atmosphere, Heat budget, and Heat balance of the Earth.	12–15
II	Air masses: Characteristics, classification, distribution; Fronts: Types and associated weather; Cyclones and anticyclones; Weather vulnerability and techniques of weather forecasting.	12–15
III	Theories of climate change; Global warming: Causes and consequences; ENSO (El Niño, La Niña and Southern Oscillation (Indian context), Urban Heat Island; Applied Climatology and Climate Applications.	12–15
IV	Relief features of the ocean floor; Bottom relief of the Pacific, Indian and Atlantic Oceans; Submarine canyon	12–15
V	Ocean Processes and Marine Features; Theories of the origin of tides; Types and formation of coral reefs; Ocean deposits; Geopolitics of oceanic routes and resources.	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

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C.6 Prescribed Textbooks

1. Barry, R. G., & Chorley, R. J. (2019). Atmosphere, Weather and Climate (10th ed.). Routledge.
2. Critchfield, H. J. (2008). General Climatology. Pearson Education India.
3. Garrison, T. (2022). Oceanography: An Invitation to Marine Science (10th ed.). Cengage Learning.
4. Hartmann, D. L. (2016). Global Physical Climatology. Elsevier.
5. IPCC. (2021). Climate Change 2021: The Physical Science Basis (Sixth Assessment Report – AR6). Intergovernmental Panel on Climate Change.
6. Lal, D. S. (1998). Climatology. Chaitanya Publishing House.
7. Lutgens, F. K., Tarbuck, E. J., & Tasa, D. (2021). The Atmosphere: An Introduction to Meteorology (14th ed.). Pearson.
8. Sharma, R. C., & Vatal, M. (2010). Oceanography for Geographers. Chaitanya Publishing.
9. Siddhartha, K. (2013). Oceanography: A Brief Introduction. Kisalaya Publications.
10. Singh, S. (2023). Climatology (Latest Edition). Prayag Pustak Bhavan, Allahabad.
11. Singh, S. (2023). Physical Geography (Latest Edition). Prayag Pustak Bhavan, Allahabad.
12. Strahler, A. N., & Strahler, A. H. (2020). Physical Geography: Science and Systems of the Human Environment (5th ed.). Wiley.
13. Trewartha, G. T. An Introduction to Climate. McGraw-Hill.
14. सिंह, सविन्द्र. (2025). जलवायु विज्ञान (Climatology). प्रयागराज: प्रवालिका पब्लिकेशन।
15. सिंह, सविन्द्र. (2025). समुद्र विज्ञान (Oceanography). प्रयागराज: प्रवालिका पब्लिकेशन।
16. तिवारी, अनिल कुमार. (संस्करणानुसार). जलवायु विज्ञान. जयपुर: राजस्थान हिन्दी ग्रंथ अकादमी।
17. लाल, डी. एस. (2023).जलवायु एवं समुद्र विज्ञान, इलाहाबाद: शारदा पुस्तक भवन।
18. नेगी, बी. एस. *जलवायु तथा समुद्र विज्ञान.* आगरा: साहित्य भवन पब्लिकेशन्स।
19. खुल्लर, डी. आर.,भौतिक भूगोल एवं भू-आकृति विज्ञान . नई दिल्ली: सरस्वती हाउस प्रा. लि.

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C.7 Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Climatology, Meteorology, Atmospheric Science, Oceanography, Climate Change and Earth System Science courses.
2. e-PG Pathshala: Geography → Climatology, Meteorology, Oceanography and Physical Geography modules.
3. SHODHGANGA / Shodhgangotri — Research theses on Climatology, Atmospheric Sciences, Oceanography, Climate Change, and Environmental Studies.
4. NDL India (National Digital Library): ndl.iitkgp.ac.in
5. Intergovernmental Panel on Climate Change (IPCC): Assessment Reports, climate datasets, and policy documents.
6. India Meteorological Department (IMD): Weather observations, climate data, monsoon reports, and meteorological resources.

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO CC103**
Title of the Paper	Core Course I: [**GEOGRAPHICAL THOUGHT**]
Programme / Subject	[MA] — [Geography]
Semester	Semester I
Nature of Course	Core Course (CC)
L – T – P	3 – 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted on the basis of attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Understand the nature, scope, evolution, and interdisciplinary character of Geography as a scientific discipline.
COB 2	Examine the contributions of ancient Greek, Roman, and Indian scholars to the development of geographical thought.
COB 3	Analyze major philosophical and methodological approaches, paradigms, and quantitative developments in Geography.
COB 4	Evaluate the application of geographical models and contemporary trends in geographical thought and research.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the evolution, nature, and position of Geography within the natural and social sciences.
CLO 2	Assess the contributions of classical and Indian scholars to the development of geographical knowledge.
CLO 3	Critically evaluate major geographical paradigms, quantitative approaches, and models used in geographical analysis.
CLO 4	Interpret contemporary perspectives such as behavioural, radical, feminist, structuralist, and post-modern approaches and their relevance to modern geographical studies.

C.5 Syllabus -Unit-wise Breakdown

Course Name: GEOGRAPHICAL THOUGHT (MA GEO CC103)		
Unit	**Content**	**Suggested Lectures hours**
I	Nature of Geography: As an interdisciplinary, chorological, and ecological science; its changing nature and development during the 19th century; Place of Geography in Sciences and Social Sciences.	12–15
II	Contribution by Greek and Roman Scholars with special reference to Eratosthenes, Herodotus, Aristotle, Plato, Strabo, Ptolemy; Development of Geographical Ideas in Ancient India	12–15
III	Positivism and Pragmatism in Human Geography; Paradigms in Geography; Quantitative Geography: Revolution, Merits and Demerits. Models – Definition and Types.	12–15
IV	Meaning and classification of Models; Use of Models in Geography; Models in Agriculture Geography and Models in Industrial Geography in India; Applied Geography, Behavioural Geography, Radical Geography	12–15
V	Structuralism, Functionalism, Feminism, Post-Modernism, Trend of Geography in Modern India.	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

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C.6 Prescribed Textbooks

1. Adhikari, S. (2018). *Fundamentals of Geographical Thought*. Chaitanya Publishing House, Allahabad.
2. Cloke, P., Crang, P., & Goodwin, M. (2014). *Introducing Human Geographies* (3rd ed.). Routledge, London.
3. Cresswell, T. (2013). *Geographic Thought: A Critical Introduction*. Wiley-Blackwell, Oxford.
4. Dikshit, R. D. (Ed.). (1997). *The Art and Science of Geography: Integrated Readings*. Prentice Hall of India, New Delhi.
5. Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (Eds.). (2009). *The Dictionary of Human Geography* (5th ed.). Wiley-Blackwell, Oxford.
6. Haggett, P. (2001). *Geography: A Global Synthesis*. Prentice Hall, London.
7. Hartshorne, R. (1959). *Perspective on the Nature of Geography*. Rand McNally, Chicago.
8. Husain, M. (2021). *Evolution of Geographical Thought* (7th ed.). Rawat Publications, Jaipur.
9. Kaushik, S. D. (2020). *Geographical Thought and Methodology* (Hindi). Rastogi Publications, Meerut.
10. Livingstone, D. N. (1992). *The Geographical Tradition: Episodes in the History of a Contested Enterprise*. Blackwell, Oxford.
11. Peet, R. (1998). *Modern Geographical Thought*. Blackwell Publishers, Oxford.
12. Taylor, P. J. (2013). *Extraordinary Cities: Millennia of Moral Syndromes, World-Systems and City/State Relations*. Edward Elgar.
13. श्रीवास्तव, वी. के. (2015). भौगोलिक चिंतन के आधार. वसुंधरा प्रकाशन गोरखपुर ।
14. सिंह, जगदीश. (2018). भौगोलिक चिंतन के मूल आधार. प्रवालिका पब्लिकेशन्स इलाहाबाद (प्रयागराज)।
15. मौर्य, एस. डी. (2023). भौगोलिक चिंतन का इतिहास. प्रवालिका पब्लिकेशन्स इलाहाबाद (प्रयागराज)।
16. हुसैन, माजिद. (संस्करणानुसार). भौगोलिक विचारधारा का इतिहास: रावत पब्लिकेशन्स जयपुर।
17. कौशिक, एस. डी. (संस्करणानुसार). भौगोलिक विचारधाराएँ एवं विधि तंत्ररस्तोगी पब्लिकेशन्स . मेरठ:
18. दीक्षित, आर. डी. भौगोलिक विचारधारा: प्रेंटिस हॉल ऑफ इंडिया . नई दिल्ली।

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C.7 Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Human Geography, Geographical Thought, Social Geography, Cultural Geography, and Research Methodology in Geography courses.
2. e-PG Pathshala: Geography → Geographical Thought, Human Geography, Social and Cultural Geography modules.
3. SHODHGANGA / Shodhgangotri — Research theses on Geographical Thought, Human Geography, Regional Development, and Contemporary Geographical Perspectives.
4. NDL India (National Digital Library): ndl.iitkgp.ac.in
5. Association of American Geographers (AAG): Resources on geographical theory, contemporary debates, and disciplinary developments.
6. Royal Geographical Society (RGS-IBG): Educational materials, publications, and resources on the evolution of geographical thought.
7. International Geographical Union (IGU): Research reports, commissions, and global perspectives on geography.

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO PC104**
Title of the Paper	Practical Course I: [**DATA REPRESENTATION AND STATISTICAL ANALYSIS**]
Programme / Subject	[MA] — [Geography]
Semester	Semester I
Nature of Course	Practical Course (PC)
L – T – P	0– 0 – 4
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	—	—	—	—
Practical / Lab Work	—	70	—	70
Internal Assessment	—	—	30	30
Maximum Marks	—	**70**	**30**	**100**
Passing Marks	—	32	13	45 (45%)

Note: Internal Assessment shall be conducted on the basis of attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop skills in the graphical and cartographic representation of geographical data using appropriate techniques.
COB 2	Understand the principles and applications of thematic mapping and diagrammatic presentation of population, climatic, and economic data.
COB 3	Apply statistical methods and spatial analytical techniques for geographical interpretation and decision-making.
COB 4	Acquire practical knowledge of data handling, analysis, and visualization using MS Excel.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Prepare and interpret thematic maps and diagrams for representing population, climatic, and economic data.
CLO 2	Apply cartographic and graphical techniques for effective visualization of geographical information.
CLO 3	Perform basic statistical and spatial analyses using correlation, regression, and nearest neighbour techniques.
CLO 4	Use MS Excel for data management, graphical representation, and preliminary geographical data analysis.

C.5 Syllabus -Unit-wise Breakdown

Course Name: DATA REPRESENTATION AND STATISTICAL ANALYSIS (MA GEO PC104)		
Unit	**Content**	**Suggested Lectures hours**
I	Representation of Population Data: Dot Map, Proportionate Circle, Spherical Diagrams	15-20
II	Representation of Climate Data: Wind Rose, Climograph, Isopleth and Choropleth, Weather Maps.	15-20
III	Representation of Economic Data: Band Graph, Ergograph, Lorenz curve	15-20
IV	Statistical Analysis: Correlation, Regression and Nearest Neighbourhood Analysis, MS Excel: Data Entry, Data Import and Scatter Plot.	20-40
V	Practical Record and Viva Voce	10-20
	Total Suggested Contact Hours for Practical/Field Work Courses	**120 Hours/Semester**

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C.6 Prescribed Textbooks

1. Archer, J. E., & Dalton, T. H. (1968). Fieldwork in Geography. Batsford, London.
2. Campbell, J. (1984). Introductory Cartography. Prentice-Hall Inc., Englewood Cliffs, New Jersey.
3. Cuff, D. J., & Mattson, M. T. (1982). Thematic Maps: Their Design and Production. Methuen, New York.
4. Mahmood, A. (1977). Statistical Methods for Geographical Studies. Rajesh Publications, New Delhi.
5. Ministry of Finance, Government of India. (2026). Economic Survey of India 2025–26. Department of Economic Affairs, Government of India.
6. Monkhouse, F. J., & Wilkinson, H. R. (1967). Maps and Diagrams: Their Compilation and Construction. Methuen & Co., London.
7. National Atlas and Thematic Mapping Organisation (NATMO). National Atlas of India. Department of Science and Technology, Government of India.
8. Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., & Guptill, S. C. Elements of Cartography. John Wiley & Sons, New York.
9. Sarkar, A. (2015). Practical Geography: A Systematic Approach (3rd ed.). Orient Blackswan Private Ltd.
10. Singh, R. L., & Singh, R. P. B. (2008). Elements of Practical Geography. Kalyani Publishers, New Delhi.
11. मामोरिया, चतुर्भुज एवं जैन, शेषमल. मानचित्रांकन एवं प्रायोगिक भूगोल. आगरा: साहित्य भवन पब्लिकेशन्स।
12. शर्मा, जे. पी. (2023). प्रयोगात्मक भूगोल की रूपरेखा. मेरठ: रस्तोगी पब्लिकेशन्स।
13. सिंह, सविन्द्र. (संस्करणानुसार). भौगोलिक आँकड़ों का सांख्यिकीय विश्लेषण. प्रयागराज: प्रवालिका पब्लिकेशन।
14. श्रीवास्तव, वी. के. (संस्करणानुसार). मात्रात्मक भूगोल एवं सांख्यिकीय विधियाँ. गोरखपुर: वसुंधरा प्रकाशन।

Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Cartography, Remote Sensing, GIS, Quantitative Techniques, Surveying and Field Methods in Geography courses.
2. 2. e-PG Pathshala: Geography → Cartography, Practical Geography, Quantitative Techniques, Surveying and Fieldwork modules.
3. SHODHGANGA / Shodhgangotri — Research theses on Cartography, Geospatial Techniques, Spatial Analysis, and Field-Based Geographical Studies.
4. NDL India (National Digital Library): ndl.iitkgp.ac.in
5. Survey of India (SOI): Topographical maps, geodetic data, and mapping resources.
6. National Atlas and Thematic Mapping Organisation (NATMO): National Atlas, thematic maps, and cartographic resources.

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7. ISRO Bhuvan Portal: Satellite imagery, thematic layers, GIS datasets, and geospatial tools.
8. National Remote Sensing Centre (NRSC): Geospatial datasets and remote sensing applications.
9. Census of India: Primary demographic and socio-economic data for thematic mapping and spatial analysis.

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- There will be four questions, one question from each unit I - IV
- Each question carries 20 marks.
- Out of the four given questions, any three must be attempted.
- Question no. Five-Practical Record and Viva voce are compulsory, carrying 10 marks.
- Total Marks = 60+10 = 70 Marks.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO GE105**
Title of the Paper	Generic Course I: [**GEOGRAPHY OF INDIA**]
Programme / Subject	[MA] — [Geography]
Semester	Semester I
Nature of Course	Generic Elective (GE)
L – T – P	3– 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted on the basis of attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop an understanding of the physical, climatic, and environmental characteristics of India and their regional variations.
COB 2	Examine the distribution, utilization, and management of natural resources and their role in national development.
COB 3	Analyze agricultural development, industrialization, transport networks, and their contribution to the Indian economy.
COB 4	Understand the spatial patterns, composition, and policy dimensions of India's population, including tribal communities.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the physiographic divisions, drainage systems, climatic characteristics, and monsoon mechanisms of India.
CLO 2	Assess the distribution and significance of natural resources and emerging approaches to sustainable resource management.
CLO 3	Evaluate the role of technological and institutional factors in agricultural and industrial development in India.
CLO 4	Analyze population distribution, demographic characteristics, population policies, and issues related to tribal and vulnerable communities in India.

C.5 Syllabus -Unit-wise Breakdown

Course Name: GEOGRAPHY OF INDIA (MA GEO GE105)		
Unit	**Content**	**Suggested Lectures hours**
I	Major Physiographic Regions and their Characteristics: Drainage System (Himalayan and Peninsular), Climate: Seasonal Weather Characteristics, Climatic Divisions, Indian Monsoon (mechanism and characteristics), Jet Streams and Himalayan Cryosphere.	12–15
II	Major Resources of India: Types and Distribution of Natural Resources: Soil, Vegetation, Water, Mineral and Marine Resources, Green Technology.	12–15
III	Technological and Institutional Factors affecting Indian Agriculture: Agro-Climatic Zones, Green, Blue, Yellow, and white Revolution, Food Security and Right to Food.	12–15
IV	Industrial Regions and their characteristics, Industrial Policies in India. Development and Patterns of Transport Networks (railways, roadways, waterways, airways and pipelines).	12–15
V	Population Characteristics (spatial patterns of distribution), Growth and Composition (rural-urban, age, sex, occupational, educational, ethnic and religious), Determinants of Population, Population Policies in India, and Particularly Vulnerable tribal Groups of India. (PVTG'S).	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

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C.6 Prescribed Textbooks

1. Spate, O. H. K., & Learmonth, A. T. A. (1967). *India and Pakistan: A General and Regional Geography*. Methuen & Co. Ltd., London.
2. Ramamurthy, K., & Gopalakrishnan, R. (Eds.). (2003). *Geography of India*. National Book Trust, New Delhi.
3. Singh, G. (2017). *Geography of India* (Latest Revised Edition). Atma Ram & Sons, New Delhi.
4. Singh, J. (2003). *India: A Comprehensive Systematic Geography*. Gyanodaya Prakashan, New Delhi.
5. Raychaudhuri, S. P. (1963). *Land and Soils of India*. Indian Council of Agricultural Research (ICAR), New Delhi.
6. Krishnan, M. S. (1982). *Geology of India and Burma* (6th ed.). CBS Publishers & Distributors, New Delhi.
7. Das, P. K. (1968). *The Monsoons*. National Book Trust, New Delhi.
8. Wadia, D. N. (1975). *Geology of India* (4th ed.). Tata McGraw-Hill, New Delhi.
9. Mamoria, C. B., & Jain, J. P. (2020). *Bharat ka Bhugol* (Hindi). Sahitya Bhavan Publications, Agra.
10. Singh, G. (1979). *Bharat ka Bhugol* (Hindi Edition). Atma Ram & Sons, New Delhi.
11. Hussain, M. (2023). *Geography of India*. McGraw Hill Education, New Delhi.
12. Khullar, D. R. (2024). *India: A Comprehensive Geography*. Kalyani Publishers, New Delhi.
13. Sharma, T. C., & Coutinho, O. (2022). *Economic and Commercial Geography of India*. Vikas Publishing House, New Delhi.
14. सिंह, आर. एल. (2008). भारत का प्रादेशिक भूगोल। वाराणसी: काशी हिंदू विश्वविद्यालय प्रकाशन।
15. मामोरिया, सी. बी., एवं जैन, जे. पी. (2017). भारत का भूगोल। आगरा: साहित्य भवन पब्लिकेशन्स।
16. खुल्लर, डी. आर. (2017). भारत का भूगोल (Bharat Ka Bhugol). लुधियाना: कल्याणी पब्लिशर्स.
17. बंसल,सुरेश चंद्र, (2023). भारत का वृहद भूगोल,पारीक पब्लिकेशन.
18. हुसैन, एम., एवं सक्सेना, पी. (2021). भारत का भूगोल (11वां संस्करण). मैकग्रॉ हिल एजुकेशन (इंडिया) प्राइवेट लिमिटेड.

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C.7 Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Geography of India, Indian Physical Environment, Economic Geography of India, Regional Development, and Natural Resource Management courses.
2. e-PG Pathshala: Geography → Geography of India, Physical Geography of India, Economic Geography, Population Geography, and Regional Planning modules.
3. Shodhganga / Shodhgangotri - Research theses on Indian Geography, Regional Development, Agriculture, Population, Environment, and Resource Studies.
4. NDL India (National Digital Library): ndl.iitkgp.ac.in
5. Census of India: Population, housing, socio-economic, and demographic datasets for India.
6. Ministry of Statistics and Programme Implementation (MOSPI): National statistical databases and reports.
7. India Year Book (Government of India): Comprehensive information on India's geography and economy.

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO GE106**
Title of the Paper	Generic Course I: [**NATURAL HAZARDS AND DISASTER RISK REDUCTION**]
Programme / Subject	[MA] — [Geography]
Semester	Semester I
Nature of Course	Generic Elective (GE)
L – T – P	3– 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted on the basis of attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop an understanding of the concepts, types, and dimensions of hazards, disasters, vulnerability, risk, and resilience.
COB 2	Examine international and national frameworks, policies, and agreements related to climate change and disaster risk reduction.
COB 3	Analyze the causes, impacts, and spatial patterns of natural and anthropogenic disasters, particularly in India.
COB 4	Assess disaster vulnerability, risk management strategies, and regional disaster challenges with special reference to Bihar.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the fundamental concepts, classification, and characteristics of hazards, disasters, vulnerability, risk, and resilience.
CLO 2	Evaluate major international environmental agreements and national initiatives related to climate change adaptation and disaster management.
CLO 3	Analyze the occurrence, distribution, and impacts of natural and human-induced disasters using disaster mapping and assessment techniques.
CLO 4	Assess vulnerability, disaster risk, and mitigation strategies, and examine hydrometeorological and environmental disasters in India with special reference to Bihar.

C.5 Syllabus -Unit-wise Breakdown

Course Name: NATURAL HAZARDS AND DISASTER RISK REDUCTION (MA GEO GE106)		
Unit	**Content**	**Suggested Lectures hours**
I	Basic Concepts: Hazard, Vulnerability, Disaster Risk, Resilience; Classification and Types of Hazards/Disasters	12–15
II	International Environmental Treaties (Paris Agreement, Montreal Protocol & Kigali Amendment, Conference of the Parties, Ramsar Convention); National Action Plan on Climate Change (NAPCC)	12–15
III	Disaster- Natural and Anthropogenic (with special reference to India), Mapping the Disasters.	12–15
IV	Vulnerability and Risk Assessment, Sendai Framework for Disaster Risk Reduction.	12–15
V	Regional Dimension of Hazards/Disasters in India; Hydrometeorological and Environmental Disasters in India (with special reference to Bihar)	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

C.6 Prescribed Textbooks

1. Birkmann, J. (2006). *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies*. United Nations University Press, New York.
2. Coppola, D. P. (2015). *Introduction to International Disaster Management* (3rd ed.). Elsevier, London.

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3. Government of India. (2009). *National Policy on Disaster Management*. National Disaster Management Authority, Ministry of Home Affairs, New Delhi.
4. Gupta, M. C., Gupta, L. C., Tamini, B. K., & Sharma, V. K. (2000). *Manual on Natural Disaster Management in India*. National Disaster Management Centre, New Delhi.
5. Hyndman, D., & Hyndman, D. (2016). *Natural Hazards and Disasters* (5th ed.). Cengage Learning, Boston.
6. Madu, C. N., & Kuei, C. H. (2018). *Handbook of Disaster Risk Reduction and Management*. World Scientific Publishing Co. Pte. Ltd., Singapore.
7. Singh, R. B. (Ed.). (2019). *Environmental Geography*. Heritage Publishers, New Delhi.
8. Singh, R. B., & Prokop, P. (Eds.). (2023). *Climate Change, Disaster Risk and Sustainable Development*. Springer, Singapore.
9. Smith, K. (2020). *Environmental Hazards: Assessing Risk and Reducing Disaster* (7th ed.). Routledge, London.
10. Sharma, M. R., & Priya, S. (2025). Climate Dynamics of Bihar: Variability, Extremes and Adaptive Policy Pathways. Darbhanga: L.N. Mithila University Press. ISBN-978-93-344-0220-9.
11. United Nations Office for Disaster Risk Reduction (UNDRR). (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. UNDRR, Geneva.
12. Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2014). *At Risk: Natural Hazards, People's Vulnerability, and Disasters* (2nd ed.). Routledge, London.
13. खुल्लर, डी. आर., एवं राव, जे. ए. सी. एस. (2022). पर्यावरण एवं आपदा प्रबंधन. मैकग्रॉ हिल एजुकेशन (इंडिया) प्राइवेट लिमिटेड.
14. सिंह, एस., सिंह, ए., एवं सिंह, के. (2019). आपदा प्रबंधन (2रा संस्करण). रावत पब्लिकेशन्स.
15. सिंह, स. (2021). आपदा प्रबंधन (Disaster Management). प्रवालिका पब्लिकेशन्स.
16. सिन्हा, विश्वनाथ प्रसाद, मो. नाजिम, चंद्रशेखर पाठक एवं प्रिन्स फिरोज अहमद. (2016). बिहार का भूगोल. नई दिल्ली: संजय गुप्ता, राजेश प्रकाशन. ISBN: 978-81-85891-96-5.
17. कुमार, संजय. (2022). आपदा प्रबंधन एवं मानव कल्याण. नई दिल्ली: एम्पायर बुक्स इंटरनेशनल. ISBN: 978-93-91996-08-6.
18. कुमार, बांके पंडित एवं गुप्ता, अनिल कुमार. (2005). बिहार का भौगोलिक अध्ययन (Bihar: A Geographical Study). आगरा: साहित्य भवन पब्लिकेशन्स।

C.7 Suggested E-Resources / Digital Repositories

1. National Disaster Management Authority (NDMA): https://ndma.gov.in
2. National Institute of Disaster Management (NIDM): https://nidm.gov.in
3. United Nations Office for Disaster Risk Reduction (UNDRR): https://www.undrr.org
4. Sendai Framework Monitoring Platform: https://sendaimonitor.undrr.org
5. India Disaster Resource Network (IDRN): https://idrn.nidm.gov.in
6. India-WRIS (Water Resources Information System): https://indiawris.gov.in

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7. India Meteorological Department (IMD): https://mausam.imd.gov.in
8. Central Water Commission (Flood Forecasting): https://cwc.gov.in
9. National Remote Sensing Centre (NRSC): https://www.nrsc.gov.in
10. ISRO Bhuvan Disaster Services: https://bhuvan.nrsc.gov.in
11. ReliefWeb (Global Disaster Information Portal): https://reliefweb.int
12. PreventionWeb (DRR Knowledge Platform): https://www.preventionweb.net
13. e-PG Pathshala (Disaster Management & Geography Modules): https://epgp.inflibnet.ac.in
14. SWAYAM / NPTEL: Courses on Disaster Management, Climate Change and Environmental Risk Assessment
15. SHODHGANGA / Shodhgangotri: https://shodhganga.inflibnet.ac.in
16. National Digital Library of India (NDLI): https://ndl.iitkgp.ac.in
17. Open Government Data (OGD) Platform India: https://data.gov.in

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO CC 201**
Title of the Paper	Core Course- **[REGIONAL PLANNING AND SUSTAINABLE RURAL DEVELOPMENT]**
Programme / Subject	[MA] — [Geography]
Semester	Semester II
Nature of Course	Core Course (CC)
L – T – P	3 – 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted based on attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	COURSE OBJECTIVES
COB 1	Develop an understanding of the evolution, concepts, approaches, and significance of regional planning and regional development
COB 2	Examine regional disparities, development indicators, and planning strategies in the Indian context
COB 3	Analyze the concepts, theories, and approaches of rural development and their role in sustainable development
COB 4	Evaluate rural development programmes, decentralised planning, and contemporary policy initiatives for rural transformation in India.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the evolution, concepts, methods, and applications of regional planning and regional development.
CLO 2	Assess regional disparities, development indicators, and planning challenges in India.
CLO 3	Analyze major theories, approaches, and models of rural development and their relevance to contemporary rural issues.
CLO 4	Evaluate the effectiveness of rural development programmes, Panchayati Raj institutions, and government initiatives in promoting inclusive and sustainable rural development.

C.5 Syllabus — Unit-wise Breakdown

Course Name: REGIONAL PLANNING AND SUSTAINABLE RURAL DEVELOPMENT [MA GEO CC 201]		
Unit	**Content**	**Suggested Lectures hours**
I	Evolution and Conceptual Foundations of Regional Planning- merits and limitations, Methods for Delineations of Regions, Special Purpose planning regions in India (River valley, Metropolitan regions, Problem regions- Hilly and Tribal regions.	12–15
II	Indicators of development. Regional Disparities in India, Need for Regional Planning, Regional Development in India: From Five-Year Plans to NITI Aayog-Challenges and Prospects.	12–15
III	Rural development: meaning, concept definitions, Indicators of rural development, Theories of rural development (economic theory, sustainable development theory, LPG theory), Gandhian concept of Rural Development.	12–15
IV	Rural development programme in India; History of Rural development programme, Concept of Multi-level planning, Panchayat Raj institutions in rural development, Area-based approach in rural development- Drought-prone area, and PMGSY, MMGSY.	12–15

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	Target group approach: SJSY, MGNREGA, Jal Jeevan-Hariyali.	
V	Changing Model and approaches of Rural Development programmes- AB PM Jan Arogya Yojana, PM Aawas yojna Gramin, PM Kisan yojna, UJJWALA Yojna, JEEViKA Yojna, Deen Dayal Upadhaya Gramin Kaushalya Yojna; Rural Ecology and Development Challenges.	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

C.6 Prescribed Textbooks

1. Bhatt, L.S. 1973, Regional Planning in India, Statistical Publishing Society Kolkata.
2. Chandana, R. C. 2000, Regional Planning, Kalyani Publishers, Ludhiana.
3. Friedman.j.& Alonso.W, 1967, Regional Development and Planning- A Reder, MIT Press Cambridge, Hars.
4. Srivastava, Sharma & Chauhan, Prdesheik Niyojan avam Santulit Vikas,
5. Anand, Subhash. (2013). *Dynamics of Rural Development*. New Delhi: Research India Press.
6. मिश्रा, आर. पी. (1992). क्षेत्रीय नियोजन: अवधारणाएं, तकनीकें, नीतियां और केस स्टडीज. कॉन्सेप्ट पब्लिशिंग कंपनी.
7. चंद, म., एवं पुरी, वी. के. (2012). भारत में प्रादेशिक नियोजन. अलाइड पब्लिशर्स प्राइवेट लिमिटेड.
8. द्विवेदी, न. (2023) प्रादेशिक नियोजन : विकास में 'प्रदेश' और 'नियोजन' की भूमिका, वाइट फालकॉन पब्लिकेशन, चण्डीगढ़, भारत
9. चांदना, आर. सी. (2022). प्रादेशिक नियोजन तथा विकास. कल्याणी पब्लिकेशन्स.
10. मौर्य, एस. डी. (2023). प्रादेशिक नियोजन और विकास. अनुभव पब्लिशिंग हाउस.
11. मामोरिया, च. (2023). प्रादेशिक भूगोल:. एसबीपीडी पब्लिशिंग हाउस.

C.7 Reference Books & Readings

1. Mishra, R.P. (1969). Regional planning Concepts, Techniques and Policies, University of Mysore.
2. Rao, V.L.B, (1916). Regional Planning, Asia Publishing House, New Delhi
3. Gilg, A. W. (1985). An Introduction to Rural Geography. London: Edward Arnold.
4. Krishnamurthy, J. (2000). Rural Development: Problems and Prospects. Jaipur: Rawat Publications.
5. Lee, D. A. & Chaudhri, D. P. (Eds.). (1983). Rural Development and the State. London: Methuen.
6. Misra, R. P. & Sundaram, K. V. (Eds.). (1979). Rural Area Development: Perspectives and Approaches. New Delhi: Sterling Publishers.

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C.7 Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Regional geography, Regional Development, Planning in India. courses available through SWAYAM and NPTEL platforms.
2. e-PG Pathshala: Geography → Regional Geography →regional planning and development modules.
3. SHODHGANGA / Shodhgangotri — For doctoral theses and research references in Regional geography and Rural development.
4. NDL India (National Digital Library): https://ndl.iitkgp.ac.in

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO CC 202**
Title of the Paper	Core Course- **[ENVIRONMENT AND BIOGEOGRAPHY]**
Programme / Subject	[MA] — [Geography]
Semester	Semester II
Nature of Course	Core Course (CC)
L – T – P	3 – 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted based on attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	COURSE OBJECTIVES.
COB 1	Develop an understanding of ecological principles, ecosystem dynamics, and the interactions between organisms and their environment
COB 2	Examine environmental degradation, pollution, climate change, and their impacts on ecosystems and biodiversity.
COB	Analyze biogeographical patterns, biodiversity distribution, ecological succession, and

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3	factors influencing the distribution of life.
COB 4	Evaluate contemporary issues in biogeography, including wetland ecology, urban ecosystems, habitat fragmentation, conservation, and global environmental change.

C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the structure, functioning, and dynamics of ecosystems and the principles of ecology and biogeography
CLO 2	Assess the causes and consequences of environmental degradation, pollution, climate change, and biodiversity loss.
CLO 3	Analyze patterns of species distribution, biomes, ecological succession, and biogeographical regions using ecological concepts.
CLO 4	Evaluate conservation strategies and the biogeographical implications of global environmental change, urbanization, and habitat fragmentation.

C.5 Syllabus — Unit-wise Breakdown

Course Name: ENVIRONMENT AND BIOGEOGRAPHY (MA GEO CC 202)		
Unit	**Content**	**Suggested Lectures hours**
I	Ecology and Dynamics of Ecosystems; Types of Ecosystems- Terrestrial and Marine; Environmentalism.	12–15
II	Environmental Degradation: Causes and Effects; Pollution and its types; Climatic changes and Global warming; Sea-level changes; Environmental refugees; Ozone depletion	12–15
III	Trophic levels; Ecological Pyramid; Biomes; Biodiversity and its levels; Ecological Succession.	12–15
IV	Factors Influencing the Distribution of Life: Endemic and Exotic Species; Biogeographical Regions; Habitat Fragmentation.	12–15
V	Ecohydrology and Wetland Biogeography, Urban Biogeography and Spatial Informatics; Conservation Biogeography; Biogeographical Consequences of Global Change	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

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C.6 Prescribed Textbooks

1. Chandna, R. C. (2022). *Environmental Geography* (3rd ed.). New Delhi: Kalyani Publishers.
2. Cox, C. B., Moore, P. D., & Ladle, R. J. (2016). *Biogeography: An Ecological and Evolutionary Approach* (9th ed.). Hoboken: Wiley-Blackwell.
3. Cunningham, W. P., & Cunningham, M. A. (2021). *Principles of Environmental Science: Inquiry and Applications* (10th ed.). New York: McGraw-Hill Education.
4. Forman, R. T. T. (2014). *Land Mosaics: The Ecology of Landscapes and Regions*. Cambridge: Cambridge University Press.
5. सिंह, स. (2021). पर्यावरण भूगोल (संशोधित संस्करण). प्रवालिका पब्लिकेशन्स।
6. गर्ग, एच. एस. (2021). पर्यावरणीय भूगोल. एसबीपीडी पब्लिकेशन्स।
7. सक्सेना, एच. एम. (2020). पर्यावरण भूगोल (Paryavaran Bhoogol). रावत पब्लिकेशन्स।
8. शर्मा, एच. एस., एवं शर्मा, एन. के. (2021). पर्यावरण अध्ययन और आपदा प्रबंधन. पंचशील प्रकाशन।

C.7 Reference Books & Readings

1. MacDonald, G. M. (2019). *Biogeography: Introduction to Space, Time and Life* (2nd ed.). Hoboken: Wiley.
2. Ricklefs, R. E., & Relyea, R. (2024). *The Economy of Nature* (9th ed.). New York: W.H. Freeman.
3. Molles, M. C., & Sher, A. A. (2024). *Ecology: Concepts and Applications* (9th ed.). New York: McGraw-Hill.
4. Odum, E. P., & Barrett, G. W. (2005). *Fundamentals of Ecology* (5th ed.). Belmont: Thomson Brooks/Cole.
5. Singh, R. B. (2005). Risk, Assessment and Vulnerability, Analysis, IGNOU, New Delhi.

C.7 Suggested E-Resources / Digital Repositories

1) SWAYAM / NPTEL: Environment Geography SWAYAM and NPTEL platforms.
2) e-PG Pathshala: Geography → Environment Geography → Environment Geography modules.
3) SHODHGANGA / Shodhgangotri — For doctoral theses and research references in Geomorphology, Physical Geography, Environmental Geography, and Earth Surface Processes.
4) NDL India (National Digital Library): https://ndl.iitkgp.ac.in

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C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO CC 203**
Title of the Paper	Core Course- **[RESOURCE AND ECONOMIC GEOGRAPHY]**
Programme / Subject	[MA] — [Geography]
Semester	Semester II
Nature of Course	Core Course (CC)
L – T – P	3 – 1 – 0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted based on attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop an understanding of the distribution, utilization, conservation, and management of natural resources and energy resources at global and regional scales.
COB 2	Examine theories and models related to agricultural and industrial location and their applications in economic geography.

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COB 3	Analyse contemporary patterns of industrial development, digital economy, tourism, trade, connectivity, and economic transformation
COB 4	Evaluate global issues related to resource security, energy crises, food security, international trade, and sustainable development.

C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the distribution, production, conservation, and management of major natural resources, energy resources, and strategic minerals.
CLO 2	Analyse agricultural and industrial location patterns using major geographical models and theories.
CLO 3	Assess the role of industrialization, infrastructure, ICT, tourism, and digital economies in regional and global development.
CLO 4	Evaluate global trade patterns, connectivity, energy and food security issues, and the impacts of international policies, conflicts, and treaties on economic systems.

C.5 Syllabus — Unit-wise Breakdown

Course Name: RESOURCE AND ECONOMIC GEOGRAPHY [MA GEO CC 203]		
Unit	**Content**	**Suggested Lectures hours**
I	Conservation and management of resources with special reference to: Water and Biotic resources, Conventional energy resources- coal and petroleum- their distribution, production and conservation. Non-conventional energy resources and their management.	12–15
II	Distribution and production of strategic minerals in the world: lithium, cobalt, uranium, tin, and tungsten. Agricultural regions of the world: Von Thunen's model of Agricultural location.	12–15
III	Weber's Model and Smith's Model of Industrial Location: Iron and Steel, with special reference to China and India. Petrochemical complexes with reference to India. World distribution and growth of Information and Communication Technology (ICT) and Knowledge Production: tourism industry- India.	12–15

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IV	Industrial transformation, infrastructure and digital economy, agrarian reforms, rural transformation and food production, problems and security. World Energy Crises in Developed and Developing Countries.	12–15
V	World trade theories and patterns, Measures and Indices of connectivity and accessibility, the Gravity Model and its variants, and the role of the World Trade Organization in world trade. Effects of conflicts and treaties on international trade.	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

C.6 Prescribed Textbooks

1. Hussain, Majid. (2023). *Economic Geography*. New Delhi: McGraw Hill Education.
2. Guha, J. L. & Chattoraj, P. R. (1998). *A New Approach to Economic Geography*. Kolkata: The World Press.
3. Alexander, J. W. & Hartshorne, T. A. (1995). Economic Geography. New Delhi: Prentice Hall of India.
4. Boyle, Godfrey (Ed.). (2021). Renewable Energy: Power for a Sustainable Future (5th ed.). Oxford: Oxford University Press.
5. गौतम, अ. (2023). आर्थिक भूगोल के मूल तत्व (प्रथम संस्करण). शारदा पुस्तक भवन.
6. मामोरिया, च. (2023). आर्थिक भूगोल ,. साहित्य भवन पब्लिकेशन्स.
7. मौर्य, एस. डी. (2023). मानव एवं आर्थिक भूगोल ,शारदा पुस्तक भवन.
8. सक्सेना, एच. एम. (2018). आर्थिक भूगोल, (द्वितीय संस्करण). रावत पब्लिकेशन्स.
9. सिंह, जसबीर. (2021). कृषि भूगोल (हिन्दी संस्करण). रावत पब्लिकेशन्स, जयपुर.
10. तिवारी, आर. सी. (2022). भारत का आर्थिक एवं संसाधन भूगोल. प्रयाग पुस्तक भवन, प्रयागराज

C.7 Reference Books & Readings

1. Krugman, Paul. (1991). *Geography and Trade*. Cambridge, MA: MIT Press.
2. Lloyd, P. E. & Dicken, P. (1977). *Location in Space: A Theoretical Approach to Economic Geography*. New York: Harper & Row.

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3. Rodrigue, J. P. (2024). *The Geography of Transport Systems* (6th ed.). New York: Routledge.
4. Singh, J. & Dhillon, S. S. (2020). *Agricultural Geography* (5th ed.). New Delhi: McGraw Hill Education.
5. Smil, Vaclav. (2017). *Energy and Civilization: A History*. Cambridge, MA: MIT Press.
6. Weber, Alfred. (1929). *Theory of the Location of Industries*. Chicago: University of Chicago Press.

C.7 Suggested E-Resources / Digital Repositories

1. SWAYAM / NPTEL: Economic and Resource, Geography, through SWAYAM and NPTEL platforms.
2. e-PG Pathshala: Geography → Economic Geography → Economic Geography modules.
3. SHODHGANGA / Shodhgangotri — For doctoral theses and research references in Economic Geography, Recourse Geography.
4. NDL India (National Digital Library): https://ndl.iitkgp.ac.in
5. ICSSR E-Library & Digital Research Resources: https://icssr.org/nassdoc/e-resources-portal

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO PC 204**
Title of the Paper	Practical Course- **[CARTOGRAPHIC TECHNIQUES]**
Programme / Subject	[MA] — [Geography]
Semester	Semester II
Nature of Course	Practical Course (PC)
L – T – P	0-0- 4
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	—	—	—	—
Practical / Lab Work	—	70	—	70
Internal Assessment	—	—	30	30
Maximum Marks	—	**70**	**30**	**100**
Passing Marks	—	32	13	45 (45%)

Note: Internal Assessment shall be conducted based on attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop practical skills in terrain representation, relief analysis, and interpretation of topographical characteristics using cartographic techniques.
COB 2	Understand the principles, properties, and applications of different map projections used in geographical studies.
COB 3	Acquire knowledge of aerial photographs and satellite image interpretation for geographical and geological analysis.
COB 4	Apply geospatial techniques such as Georeferencing, map digitization, and spatial data preparation for mapping and analysis.

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C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Prepare and interpret cartograms, relief profiles, and slope analyses using standard cartographic methods.
CLO 2	Select and apply appropriate map projections for representing geographical information.
CLO 3	Interpret aerial photographs, satellite imagery, and geological maps for terrain and resource analysis.
CLO 4	Perform Georeferencing, map digitization, and basic geospatial data processing for spatial analysis and mapping.

C.5 Syllabus — Unit-wise Breakdown

Course Name: CARTOGRAPHIC TECHNIQUES [MA GEO PC 204]		
Unit	**Content**	**Suggested Lectures hours**
I	Cartograms- Hypsographic and Altimetric Frequency curve.	15-20
II	Relief profiles: serial, superimposed. Composite and projected. Slope analysis: Smith, Henry, and Wentworth methods.	15-20
III	Map projections: Mercator's, Sinusoidal, Gall's, and International Projections	15-20
IV	Elements of interpretations of Aerial photographs and Satellite imagery; Geologic sections and interpretations of Geological maps. Techniques of Georeferencing and Map Digitization.	20-40
V	.Practical Record and Viva-Voce.	10-20
	Total Suggested Contact Hours For Practical/Field Work Courses	**120 Hours/Semester**

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C.6 Prescribed Textbooks

1. Singh, R. L. & Singh, Rana P. B. (2014). *Elements of Practical Geography*. New Delhi: Kalyani Publishers.
2. Mishra, R. P. & Ramesh, A. (2019). *Fundamentals of Cartography*. New Delhi: Concept Publishing Company.
3. Monkhouse, F. J. & Wilkinson, H. R. (1971). *Maps and Diagrams* (3rd ed.). London: Methuen.
4. Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J. & Guptill, S. C. (1995). *Elements of Cartography* (6th ed.). New York: John Wiley & Sons.
5. मिश्रा, आर. पी. (2014). फंडामेंटल्स ऑफ कार्टोग्राफी (दूसरा संस्करण). कॉन्सेप्ट पब्लिशिंग कंपनी.
6. सिंह, एल. आर. (2022). फंडामेंटल्स ऑफ प्रैक्टिकल ज्योग्राफी. शारदा पुस्तक भवन.
7. सिंह, एम. एम. पी., एवं बाला, एस. (2021). एडवांस्ड कार्टोग्राफी एंड प्रैक्टिकल ज्योग्राफी. राजेश पब्लिकेशंस.
8. मल्टियार, के. के., एवं मल्टियार, एस. आर. (2019). कॉन्सेप्ट्स ऑफ कार्टोग्राफी, रिमोट सेंसिंग एंड जीआईएस. राजेश पब्लिकेशंस.
9. मदान, पी. एल. (2001). इंडियन कार्टोग्राफी: ए हिस्टोरिकल परस्पेक्टिव. मनोहर पब्लिशर्स.

C.7 Reference Books & Readings

1. Slocum, T. A., McMaster, R. B., Kessler, F. C. & Howard, H. H. (2023). *Thematic Cartography and Geovisualization* (4th ed.). Boca Raton: CRC Press. Covers modern thematic mapping, geovisualization, web mapping, and big spatial data.
2. Gregory, S. (2010). *Statistical Methods and the Geographer* (4th ed.). London: Longman.
3. Campbell, J. B. & Shin, M. (2011). *Introduction to Remote Sensing* (5th ed.). New York: Guilford Press.
4. Lillesand, T. M., Kiefer, R. W. & Chipman, J. W. (2015). *Remote Sensing and Image Interpretation* (7th ed.). Hoboken: Wiley.
5. Jensen, J. R. (2016). *Introductory Digital Image Processing: A Remote Sensing Perspective* (4th ed.). New Delhi: Pearson.

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C.7 Suggested E-Resources / Digital Repositories

1) SWAYAM / NPTEL: Practical Geography though SWAYAM and NPTEL platforms.
2) e-PG Pathshala: Geography → Economic Geography → Economic Geography modules.
3) SHODHGANGA / Shodhgangotri
4) NDL India (National Digital Library): https://ndl.iitkgp.ac.in

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- There will be four questions, one question from each unit I - IV
- Each question carries 20 marks.
- Out of the four given questions, any three must be attempted.
- Question no. Five Practical Records and Viva voce are compulsory, carrying 10 marks.
- Total Marks = 60+10 = 70 Marks

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

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C.1 Paper Identification

PAPER PROFILE	
Paper Code	**MA GEO GE 205**
Title of the Paper	Generic Course- **[WATER RESOURCE MANAGEMENT]**
Programme / Subject	[MA] — [Geography]
Semester	Semester II
Nature of Course	Generic Elective (GE)
L – T – P	3-1-0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted based on attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop an understanding of hydrological processes, water resources, and contemporary issues related to water security and hydro-politics.
COB 2	Examine surface water and groundwater systems, stream flow characteristics, and methods of water quality assessment.

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COB 3	Analyze the principles and practices of integrated water resource management, watershed development, and water conservation.
COB 4	Evaluate sustainable water management strategies, policies, and community-based approaches for effective water governance.

C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the hydrological cycle, precipitation processes, stream flow systems, and issues related to global water security.
CLO 2	Assess water quality, sources of water pollution, and the characteristics and dynamics of groundwater and surface water resources
CLO 3	Apply concepts of integrated water resource management, watershed management, rainwater harvesting, and water conservation in resource planning
CLO 4	Evaluate water policies, sustainable water management practices, and the role of community participation in ensuring water security and environmental sustainability

C.5 Syllabus — Unit-wise Breakdown

Course Name: WATER RESOURCE MANAGEMENT [MA GEO GE 205]		
Unit	**Content**	**Suggested Lectures hours**
I	Hydrological cycle: components and processes; Precipitation: formation, types, characteristics; Global water security and Transboundary Hydro-Politics.	12–15
II	Sources of stream flow, Stream ordering; Sources of water pollution; Methods of water quality assessment.	12–15
III	Types of aquifers and their characteristics; Aquifer properties: porosity, permeability, transmissivity; Groundwater monitoring and surface water resources of India	12–15
IV	Integrated Water resource management; Watershed management, Rainwater harvesting, Water conservation techniques; National Water Policy (India)	12–15
V	Water conservation techniques, sustainable water management practices, and the role of community participation in water management.	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

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C.6 Prescribed Textbooks

1. Andrew, D. W. & Trimble, S. (2004) – Environmental Hydrology, CRC Press.
2. Beek, E. & Loucks, D. P. (2005) – Water Resource Systems Planning and Management, UNESCO.
3. Chow, V. T., Maidment, D. R. & Mays, L. W. (1988) – Applied Hydrology, McGraw-Hill.
4. Eslamian, S. & Eslamian, F. (2024) – Handbook of Irrigation Hydrology and Management, CRC Press.
5. Gámiz-Fortis, S. R. et al. (2024) – Impacts of Climate Change on Hydrology and Water Resources, MDPI Publications.
6. सिंह, जी. (2018). जल संभरण, सफाई एवं पर्यावरण इंजीनियरिंग (Water Supply, Sanitary and Environmental Engineering Hindi). स्टैंडर्ड पब्लिशर्स डिस्ट्रीब्यूटर्स.
7. शर्मा, एस. के. (2020). जल विज्ञान एवं जल संसाधन अभियांत्रिकी. खन्ना पब्लिशर्स.
8. चौहान, बी. एस. (2019). सिंचाई एवं जल विज्ञान इंजीनियरिंग (Irrigation and Hydrology Engineering). लक्ष्मी पब्लिकेशन्स.
9. सक्सेना, पी. बी. (2016). जल संसाधन भूगोल. रावत बुक्स
10. राष्ट्रीय जलविज्ञान संस्थान. (2022). प्राचीन भारत में जलविज्ञानीय ज्ञान (तीसरा संस्करण). राष्ट्रीय जलविज्ञान संस्थान, रुड़की.

C.7 Reference Books & Readings

1. Guo, J. C. Y. et al. (2024) – Urban Drainage and Storage Practices, CRC Press.
2. Jain, S. K., Aggarwal, P. K. & Singh, V. P. (2007) – Hydrology and Water Resources of India, Springer.
3. Janardhan, P. et al. (2025) – Water and Environment (ICWROEE Proceedings), Springer.
4. Phan, C. M. (2026) – Where Water Meets Air: The Science of Surface Phenomena, CRC Press.
5. Raghunath, H. M. (2006) – Hydrology, New Age International.
6.

C.7 Suggested E-Resources / Digital Repositories

5) SWAYAM / NPTEL: Hydrology, Water resources.,
6) e-PG Pathshala: Geography → Hydrology → Water resource modules.
7) SHODHGANGA / Shodhgangotri
8) NDL India (National Digital Library): https://ndl.iitkgp.ac.in
9) Water Resources Management and Policy- https://www.coursera.org

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C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

C.1 Paper Identification

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PAPER PROFILE	
Paper Code	**MA GEO GE 206**
Title of the Paper	Generic Course- **[ENVIRONMENT IMPACT ASSESSMENT]**
Programme / Subject	[MA] — [Geography]
Semester	Semester II
Nature of Course	Generic Elective (GE)
L – T – P	3-1-0
Credits	4
Maximum Marks	100 (ESE: 70 + Internal Assessment: 30)
Duration of Examination	3 Hours

C.2 Marks Distribution

Component	Paper I	Practical	IA	Total (ESE+IA/ESE+PRAC)
End Semester Examination	70	—	—	70
Practical / Lab Work	—	—	—	—
Internal Assessment	—	—	30	30
Maximum Marks	**70**	—	**30**	**100**
Passing Marks	32	—	13	45 (45%)

Note: Internal Assessment shall be conducted based on attendance, class tests, seminars, assignments, and viva voce as provided in the regulation.

C.3 Course Objectives (COBs)

COB No.	Course Objectives
COB 1	Develop an understanding of the concepts, principles, and significance of Environmental Impact Assessment (EIA) in environmental planning and sustainable development.
COB 2	Examine the procedures, methodologies, and tools used in environmental impact assessment and risk evaluation.

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COB 3	Analyze the environmental impacts of developmental activities on land, water, and air resources.
COB 4	Evaluate environmental management strategies, public participation mechanisms, and the policy framework governing EIA in India.

C.4 Course Outcomes (COs)

CLO No.	Course Learning Outcome
CLO 1	Explain the concepts, processes, indicators, and importance of Environmental Impact Assessment in sustainable development
CLO 2	Apply EIA methodologies, screening, scoping, baseline studies, and risk assessment techniques in environmental evaluation.
CLO 3	Assess the environmental impacts of development projects and recommend appropriate mitigation and management measures.
CLO 4	Evaluate EIA policies, legislation, stakeholder participation, and the role of EIA in addressing climate change and environmental sustainability.

C.5 Syllabus — Unit-wise Breakdown

Course Name: ENVIRONMENT IMPACT ASSESSMENT [MA GEO GE 206]		
Unit	**Content**	**Suggested Lectures hours**
I	Concept and Evolution of Environmental Impact Assessment (EIA); Environmental Components and Indicators; Sustainable Development and Environmental Management.	12–15
II	EIA Process and Methodologies; Screening, Scoping and Baseline Environmental Studies; Environmental Risk Assessment.	12–15
III	Environmental Impacts of Development Projects; Assessment of Impacts on Land, Water, Air.	12–15
IV	Environmental Management Plan (EMP): Mitigation Measures and Monitoring; Public Participation and Stakeholder Consultation.	12–15
V	EIA Legislation and Policies in India; Environmental Impact Assessment in the Context of Climate Change and Sustainable Development.	8–10
	Total Suggested Lectures	**60 (For 4 Credit Course)**

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C.6 Prescribed Textbooks

1. Canter, L. W. (1996). *Environmental Impact Assessment* (2nd ed.). McGraw-Hill, New York.
2. Glasson, J., Therivel, R., & Chadwick, A. (2013). *Introduction to Environmental Impact Assessment* (4th ed.). Routledge, London.
3. Jay, S., Jones, C., Slinn, P., & Wood, C. (2007). *Environmental Impact Assessment: Retrospect and Prospect*. Routledge, London.
4. Lawrence, D. P. (2003). *Environmental Impact Assessment: Practical Solutions to Recurrent Problems*. John Wiley & Sons, New Jersey.
5. Ministry of Environment, Forest and Climate Change, Government of India. (2020). *Environmental Impact Assessment Notification, 2020 (Draft)*. MoEFCC, New Delhi.
6. वैज्ञानिक पब्लिशर्स. (2024). पर्यावरणीय प्रभाव आकलन की विवरण पुस्तिका: अवधारणा एवं प्रक्रिया. साइंटिफिक पब्लिशर्स.
7. सक्सेना, एम., एवं श्रीवास्तव, पी. (2021). पर्यावरणीय प्रभाव मूल्यांकन और सतत विकास. रावत बुक्स.
8. सिंह, वाई. के. (2018). पर्यावरण विज्ञान: अनुसंधान और प्रभाव आकलन विधियां. डिस्कवरी पब्लिशिंग हाउस.
9. काले, वी. एस. (2023). भारत में पर्यावरणीय प्रभाव आकलन: नियम और केस स्टडीज. राजकमल प्रकाशन.
10. हुसैन, एम. (2026). पर्यावरण एवं पारिस्थितिकी (6ठा संस्करण). जी. के. पब्लिकेशंस.

C.7 Reference Books & Readings

1. Ministry of Environment, Forest and Climate Change, Government of India. (2006). *Environmental Impact Assessment Notification, 2006*. MoEFCC, New Delhi.
2. Morris, P., & Therivel, R. (Eds.). (2009). *Methods of Environmental Impact Assessment* (3rd ed.). Routledge, London.
3. Noble, B. F. (2020). *Introduction to Environmental Impact Assessment: A Guide to Principles and Practice* (4th ed.). Oxford University Press, Canada.
4. Petts, J. (Ed.). (1999). *Handbook of Environmental Impact Assessment* (Vols. 1 & 2). Blackwell Science, Oxford.
5. Singh, R. B. (Ed.). (2018). *Environmental Geography*. Heritage Publishers, New Delhi.

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C.7 Suggested E-Resources / Digital Repositories

1) SWAYAM / NPTEL: Environmental Impact Assessment
2) e-PG Pathshala: Geography → Enviornment → Environmental Impact Assessment
3) SHODHGANGA / Shodhgangotri
4) NDL India (National Digital Library): https://ndl.iitkgp.ac.in
5) IISD EIA Learning Platform- https://www.iisd.org/learning/eia/
6) Mastering Environmental Impact Assessment -https://uniathena.com/lms/short-course-sign-in

C.8 Assessment Pattern & Question Paper Design

The End-Semester shall be conducted as per the following question paper design:

- Section A: Short Answer Questions (10 × 2 marks = 20 marks) — Covering all units (mandatory)
- Section B: Medium Answer Questions (4 × 5 marks = 20 marks) — Attempt any 4 out of 6
- Section C: Long Answer / Essay Questions (3 × 10 marks = 30 marks) — Attempt 3 out of 5.

Internal Assessment (30 marks) breakdown:

- Written Test(s): 20 marks
- Seminar / Assignment / Project: 05 marks
- Attendance & Class Participation: 05 marks

Note: Generic/Open Elective–I (Course Code) and II (Course Code) courses in Semester- I and Generic/Open Elective–III (Course Code) and IV (Course Code) courses in Semester- II of 2 Year Postgraduate Programme may be offered by an institution based on student demand, academic interest, and the availability of qualified faculty members. These courses shall be open to students of the concerned discipline as well as students from other disciplines, with the objective of promoting multidisciplinary and interdisciplinary learning in accordance with the principles of the National Education Policy (NEP), 2020.

For fulfilment of the programme requirements, a student shall be required to successfully complete any one of the Generic Elective courses offered during the semester. The institution may decide to offer either or both of the Generic Elective courses, subject to academic feasibility, availability of faculty expertise, and student enrolment.

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