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Office of the
Director (Curriculum)
Academics Division

No. HEC/NCRC/GEOGRAPHY/2026/8601

January 15, 2026

SUBJECT: REVISED CURRICULUM FOR DEGREE PROGRAMS IN GEOGRAPHY

Dear Madam/Sir,

The Higher Education Commission (HEC) of Pakistan, as mandated by its law, provides guidance to Higher Education Institutions (HEIs) on curricula for tertiary education levels in alignment with the National Qualifications Framework (NQF). To address evolving academic trends and market demands, HEC has revised the curricular standards for Geography degree programs at NQF levels 5, 6 and 7. These updated standards are intricately aligned with HEC's Undergraduate Education Policy V 1.1 (2023) and Graduate Education Policy (2023), ensuring coherence with national priorities and adherence to international benchmarks.

02. The revised curricula for Geography degree programs (attached), incorporating the option of various specializations with advanced electives, are hereby notified. Universities offering these programs are advised to align their Geography curricula with these updated standards at the earliest. The finalized course content should be developed according to the curriculum framework provided and be submitted electronically to this office. An electronic copy of this document can be found on HEC's official website.

03. Through effective implementation of these standards, HEC aims to equip Geography graduates with a deep understanding of spatial patterns, environmental systems, and human-environment interactions, enabling them to excel in fields such as urban planning, environmental management, and geospatial analysis. This will empower them to drive sustainable development, informed decision-making, and foster positive change, contributing to a more resilient and equitable future locally and globally.

SALEEMULLAH SOHOO

Vice Chancellors/Rectors/Heads

All Public/Private Sector Universities/DAIs

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CURRICULUM
OF
GEOGRAPHY DEGREE PROGRAMS

Associate Degree

Bachelor of Science

Master of Science / Master of Philosophy

2026

Academics Division
Higher Education Commission, Islamabad
Government of Pakistan

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| Cartography and Geo-visualization | 20 |
| Introduction to GIS | 20 |
| Human Geography | 20 |
| Geographical Thought & Modern Concepts | 20 |
| Principles of Remote Sensing | 20 |
| Geography of Pakistan | 21 |
| Land Surveying | 21 |
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PREFACE

The curriculum serves as a comprehensive blueprint for the teaching-learning process that students must navigate to achieve specific academic objectives. This encompasses clearly defined prior learning requirements, program objectives, scheme of studies, and course learning outcomes. As knowledge rapidly evolves and new fields emerge, it is crucial to continually develop and revise curricula to ensure they remain current, relevant, and impactful.

As mandated by its law through Clause 10-1 (a), (l), (s), and (v), the Higher Education Commission (HEC) of Pakistan has been developing and periodically updating curricula through its National Curriculum Revision Committees (NCRCs). These committees are generally composed of subject experts, researchers, and representatives from accreditation bodies, professional councils, and industry. In response to the evolving needs, HEC has undertaken the task to develop robust standards for the curricula of degree programs in Geography at levels 5-7 of the National Qualifications Framework. These standards are meticulously structured in accordance with the HEC's Undergraduate Education Policy V 1.1 (2023) and Graduate Education Policy (2023), ensuring alignment with both national priorities and international educational standards.

The degree programs in Geography are designed to develop students' critical understanding of Earth's physical and human environments, spatial relationships, and interactions between people and the environment. These programs offer a comprehensive foundation in geographical concepts, theories, and techniques, equipping graduates with analytical, interpretive, and research skills essential for academic inquiry, spatial analysis, and informed decision-making. The curricular standards, developed by academic experts and practitioners from across the country, aim to elevate the quality and relevance of Geography education by promoting scholarly excellence, critical thinking, and ethical academic practice. Through these programs, graduates will be prepared for diverse career pathways in environmental management, urban planning, GIS and remote sensing, research, education, and other sectors where knowledge of geographical concepts and techniques is essential.

With the support of universities in implementing these standards, HEC envisions a future where Geography graduates contribute meaningfully to national development, informed citizenship, and global understanding through critical engagement with geographical concepts, spatial analysis, and environmental awareness, and its relevance to contemporary challenges like climate change, urbanization, and sustainable development.

Dr. Amjad Hussain

Director General

Academics Division

Higher Education Commission

GUIDING PRINCIPLES

Minimum Standards

The curricular standards and guidelines prescribed under this policy are mandatory at minimum level. Universities or the concerned departments may however set higher standards provided that the standards prescribed herein are not reduced or compromised.

Course Sequence, Titles and Credits

For Bachelor of Science in Geography (BS Geography) and Master of Science / Master of Philosophy in Geography (MS/MPhil Geography), the sequence of courses prescribed under this policy document is logically arranged and is suggestive only. The offering department may rearrange the sequence and alter the course titles and credits provided that the essence of the courses prescribed in policy remains intact. The department may add more courses as and when required subject to approval of university's relevant statutory body.

Course Syllabus

This document serves as a comprehensive guideline delineating the course learning outcomes (CLOs) for each course offered in the BS Geography and MS/MPhil Geography as minimum standards. The offering department is mandated to meticulously prepare, modify, and tailor the syllabus of each course, ensuring alignment with the stipulated learning outcomes. It is in this regard imperative that the department utilizes instructional, reference, and reading materials that it deems appropriate to effectively meet the CLOs.

General Education

For BS Geography, the courses prescribed for General Education component must mandatorily be offered with the same titles and credits as prescribed under HEC Undergraduate Education Policy V 1.1. The concerned departments may adopt and follow the learning outcomes and study contents developed by HEC for these courses as available on its website.

Requirement of Internship

It is a mandatory degree award requirement of three (03) credit hours for BS Geography. Internship of six (06) to eight (08) weeks (preferably undertaken during semester or summer break) must be graded by a faculty member in collaboration with the supervisor in the field. This requirement cannot be substituted with additional course work, capstone or project work.

Requirement of Capstone Project

It is a mandatory degree award requirement of three (03) credit hours for BS Geography. A capstone project is multifaceted body of work that serves as a culminating academic and intellectual experience for students. The capstone project must be supervised and graded by a faculty member as per the protocols prescribed by the concerned department. This requirement cannot be substituted with additional course work or internship.

Associate Degree

The eligibility criteria and the first-four semesters of the BS Geography as prescribed in this policy document guide the admission requirement and the structure of Associate Degree in Geography. Field experience / internship is not a mandatory requirement for the Associate Degree in Geography.

Electives

- a) In accordance with the National Qualifications Framework, the department is required to offer at least 7 electives comprised of 21 credit hours i.e., minimum of 25% of the major i.e., BS Geography comprised of 84 credit hours, to meet the criteria of nomenclature with specialization. Where the department increases the range of major beyond 84, the number of electives will accordingly be adjusted.
- b) Where the electives are opted from the general pool, the degree will be awarded as BS Geography in its generic form and without any specialization. Example: Bachelor of Science in Geography.
- c) Where the electives are opted from within a single specialization domain, the degree will be offered as Bachelor of Science in Geography (with name of specialization) in accordance with the National Qualifications Framework (2015). Example: Bachelor of Science in Geography (Physical Geography), Bachelor of Science in Geography (Remote Sensing and GIS) etc.

- d) Subject to approval of the relevant statutory body, the department may develop additional specializations other than those prescribed in this document. It should however be noted that offering of the degree program with specialization is prescribed in this document as an option only and not as a mandatory requirement or a binding on the offering department. In view of this, the department concerned may consider offering the degree program with specialization or not, in accordance with its available academic, human and infrastructural resources

Entry and Exit Provisions at Undergraduate Level

Pathway for Graduates with Associate Degree

- a) Students having completed Associate Degree in Geography are allowed admission in the fifth semester of the BS Geography with or without any deficiency course up-to a maximum of 6 credit hours as determined by the admitting university / department.
- b) Students having completed Associate Degree in any discipline related to the field of Geography shall be required to complete deficiency courses up-to a maximum of 18 credit hours as determined by the admitting university / department.
- c) In case where the deficiency courses are more than 18 credit hours, the concerned university may decide not to offer admission in accordance with its screening, admission and merit calculation criteria approved by its statutory bodies.
- d) The minimum eligibility for admission in the fifth semester in above cases is 2.00/4.00 CGPA in the prior qualification i.e., Associate Degree. The admitting university may, however, set higher eligibility criteria for admission in the fifth semester of BS Geography.

Pathway for Graduates with Conventional BSc/Equivalent Degree Programs

- a) Students having completed two-year conventional BSc/equivalent degree programs are allowed admission in the fifth semester of BS Geography in which case, such students shall be required to complete deficiency courses up-to a maximum of 21 credit hours as determined by the admitting university.
- b) In case where the deficiency courses are more than 21 credit hours, the concerned university may decide to not offer admission, in accordance with its screening, admission and merit calculation criteria approved by its statutory bodies.
- c) The minimum eligibility for admission in the fifth semester in this case is 45% cumulative score in the prior qualification i.e., two-year conventional BSc/equivalent degree programs. The admitting university may however set higher eligibility criteria for admission in the fifth semester of BS Geography.

Exiting from Bachelor of Science in Geography with the Associate Degree

Students enrolled in BS Geography are allowed to exit the program with the Associate Degree provided that the requirements specified in this policy document for the Associate Degree in Geography are met.

BACHELOR OF SCIENCE IN GEOGRAPHY

PROGRAM DESCRIPTION

The Bachelor of Science in Geography program is designed in accordance with the Higher Education Commission's (HEC) Undergraduate Education Policy V 1.1 (2023), to provide students with a comprehensive understanding of geographic concepts, theories, principles and their applications in analyzing spatial patterns and human-environment interactions. This program also aims to promote the student's success which is envisioned as the ability to comprehend and apply conceptual knowledge, acquire professional skills and competencies, and act as an individual having strong civic and ethical values of tolerance and inclusiveness. The program covers a wide range of topics, including Physical and Human Geography, Geographic Information Systems, Remote Sensing, Spatial Analysis, Urban and Regional Planning, Climate Change and Disaster Management etc., with an emphasis on contemporary developments in the discipline of Geography. Students will explore complex relationships between people, places, and environments across spatial and temporal scales. Through coursework, field survey, research and critical analysis, students will develop analytical and applied geographic skills, preparing them for careers in fields like geospatial sciences, climate change, urban ecology, urban and rural planning, resource management, disaster resilience and risk management, environmental management, sustainable development, and related emerging fields.

STANDARD NOMENCLATURE

To ensure uniformity, the standard nomenclature of four-year undergraduate degree programs in Geography must be **“Bachelor of Science in Geography”** with its short form as **“BS Geography”**.

Note: The scheme of study prescribed for the four-year undergraduate degree in Geography is based on a total of 7 electives. Where these courses are opted from the general pool of electives, the degree will be titled “Bachelor of Science in Geography” with its short form as “BS Geography” in its generic form and without any specialization. Whereas, if all the electives are opted from a single specialization domain, the degree will be titled Bachelor of Science in Geography with the name of specialization in parenthesis in accordance with the National Qualifications Framework (2015).

PROGRAM LEARNING OUTCOMES

By the completion of BS Geography, the graduates will be able to:

- a) Critically demonstrate and analyze geographical phenomena, climate change, geo-hazards, urbanization, resource management, and socio-spatial inequalities using geographic concepts, empirical evidence, and spatial data handling.
- b) Apply geographical tools and techniques, including GIS, remote sensing, cartography, and field-based data to acquire, analyze, model, and visualize spatial data for addressing real-world issues.
- c) Formulate research questions, evaluate geographic literature and data sources, integrate qualitative and quantitative methods, and interpret results with scientific rigor and geographic perspective.
- d) Demonstrate professional skills, interdisciplinary awareness, and adaptability to emerging technologies including GeoAI and Earth observation, enabling engagement with academia, industry, government, and community needs in Pakistan.

ELIGIBILITY CRITERIA

Higher Secondary School Certificate (12 years of schooling) or an IBCC equivalent qualification is the basic eligibility requirement for admission in the BS Geography. The admitting university may set minimum eligibility scores and may conduct entry / admission test through its own testing body or an external testing services provider of repute as per the screening, admission and merit calculation criteria approved by its statutory bodies.

PROGRAM STRUCTURE

The BS Geography is structured in accordance with the provisions of the HEC Undergraduate Education Policy V 1.1. and comprises of minimum 136 credit hours spread over eight (08) regular semesters. Universities may offer courses up-to maximum of 148 credit hours provided that the total number of credit hours are reasonably set to achieve the Program Learning Objectives (PLOs) without putting undue burden on students.

| | | |
|------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Minimum Credit Hours | | 136 |
| General Education Courses | | 34 credit hours (15 courses) |
| Discipline Related Courses / Major | a. Compulsory | 63 credit hours (21 courses) Mandatory courses as reflected in the scheme of study, irrespective of the area of specialization (where applicable). |
| | b. Mandatory Electives | 21 credit hours (7 courses) (to be opted from either general pool of electives or from a particular specialization) |
| | Total Major Requirement | 84 credit hours (28 courses) |
| Interdisciplinary / Allied Courses | | 12 credit hours (4 courses) |
| Internship | | 3 credit hours |
| Capstone Project | | 3 credit hours |
| Program Duration | | Minimum: 4 Years Maximum: 6 Years (further extendable to another year subject to approval of university's statutory body) |
| Semester Duration | | 16-18 weeks for regular semesters (1-2 weeks for examination) 8-9 weeks for summer semesters (1 week for examination) |
| Course Load (per semester) | | 15-18 credit hours for regular semesters. The upper range may be extended up-to 21 credit hours where required and subject to approval of the offering department. Up-to 8 credit hours for summer semesters (for remedial/deficiency/failure/repetition courses only) |
| 3 Credit Hours (Theory) | | 3 classes (1 hour each) OR 2 classes (1.5 hour each) OR 1 class (3 hours) per week throughout the semester |
| 1 Credit Hour (Lab / Field Work) | | 1 credit hour in laboratory or practical work would require lab / field contact of three hours per week throughout the semester. |

SCHEME OF STUDIES

The standard scheme of studies for BS Geography is given below:

| SEMESTER I | | | |
|---------------------------|------------------------------------------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Social Sciences *** | 2 (2-0) | General Education |
| 2. | Applications of Information & Communication Technologies (ICT) * | 3 (2-1) | General Education |
| 3. | Fundamentals of Geography | 3 (3-0) | Major |
| 4. | Islamic Studies * (Ethics for non-Muslim students) | 2 (2-0) | General Education |
| 5. | Functional English * | 3 (3-0) | General Education |
| 6. | Quantitative Reasoning – I * | 3 (3-0) | General Education |
| 7. | Understanding of Holy Quran – I * | 1 (0-1) | General Education |
| Total Credits (17) | | | |

| SEMESTER II | | | |
|-------------|---------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Civics & Community Engagement * | 2 (2-0) | General Education |
| 2. | Expository Writing * | 3 (3-0) | General Education |
| 3. | Physical Geography | 3 (3-0) | Major |
| 4. | Quantitative Reasoning – II * | 3 (3-0) | General Education |

| | | | |
|---------------------------|---------------------------------------|---------|-------------------|
| 5. | Mapping Techniques and Projections | 3 (2-1) | Major |
| 6. | Ideology & Constitution of Pakistan * | 2 (2-0) | General Education |
| 7. | Understanding of Holy Quran – II * | 1 (0-1) | General Education |
| Total Credits (17) | | | |

| SEMESTER III | | | |
|---------------------------|------------------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Arts & Humanities ** | 2 (2-0) | General Education |
| 2. | Interdisciplinary / IDS Course – I ***** | 3 (3-0) | Interdisciplinary |
| 3. | Cartography and Geo-visualization | 3 (2-1) | Major |
| 4. | Introduction to GIS | 3 (2-1) | Major |
| 5. | Human Geography | 3 (3-0) | Major |
| 6. | Natural Science **** | 3 (2-1) | General Education |
| 7. | Pakistan Studies * | 2 (2-0) | General Education |
| Total Credits (19) | | | |

| SEMESTER IV | | | |
|---------------------------|-------------------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Entrepreneurship * | 2 (2-0) | General Education |
| 2. | Interdisciplinary / IDS Course – II ***** | 3 (3-0) | Interdisciplinary |
| 3. | Geographical Thought & Modern Concepts | 3 (3-0) | Major |
| 4. | Principles of Remote Sensing | 3 (2-1) | Major |
| 5. | Geography of Pakistan | 3 (3-0) | Major |
| 6. | Land Surveying | 3 (1-2) | Major |
| Total Credits (17) | | | |

| SEMESTER V | | | |
|---------------------------|--------------------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Digital Cartography | 3 (1-2) | Major |
| 2. | Geomorphology | 3 (3-0) | Major |
| 3. | Climatology | 3 (3-0) | Major |
| 4. | Oceanography | 3 (3-0) | Major |
| 5. | Economic Geography | 3 (3-0) | Major |
| 6. | Interdisciplinary / IDS Course – III ***** | 3 (3-0) | Interdisciplinary |
| Total Credits (18) | | | |

| SEMESTER VI | | | |
|---------------------------|-------------------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Elective-I ***** | 3 (3-0) | Major |
| 2. | Elective-II ***** | 3 (3-0) | Major |
| 3. | Quantitative Geography | 3 (3-0) | Major |
| 4. | Research Methods | 3 (3-0) | Major |
| 5. | Interdisciplinary / IDS Course – IV ***** | 3 (3-0) | Interdisciplinary |
| Total Credits (15) | | | |

| SEMESTER VII | | | |
|---------------------|----------------------|--------------|----------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Elective – III ***** | 3 (3-0) | Major |

| | | | |
|---------------------------|---------------------|---------|-------|
| 2. | Elective – IV ***** | 3 (3-0) | Major |
| 3. | Elective – V ***** | 3 (3-0) | Major |
| 4. | Political Geography | 3 (3-0) | Major |
| 5. | Photogrammetry | 3 (2-1) | Major |
| Total Credits (15) | | | |

| SEMESTER VIII | | | |
|---------------------------|------------------------------------|--------------|----------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Elective – VI ***** | 3 (3-0) | Major |
| 2. | Elective – VII ***** | 3 (3-0) | Major |
| 3. | Global Navigation Satellite System | 3 (3-0) | Major |
| 4. | Environmental Geography | 3 (3-0) | Major |
| 5. | Capstone Project | 3 | Capstone |
| Total Credits (15) | | | |

- * HEC designed model courses for general education may be used by the university.
- ** HEC designed model course may be used by the university, OR the university / offering department may offer any course in the broader category of **“Arts & Humanities”** including but not limited to a course of regional or international language such as Chinese, Arabic, French, Spanish etc. or any other course such as Philosophy, History etc.
- *** HEC designed model course may be used by the university, OR the university / offering department may offer any course in the broader category of **“Social Sciences”** including but not limited to a course of Psychology, Sociology, Anthropology etc.
- **** HEC designed model course may be used by the university, OR the university / offering department may offer any course in the broader category of **“Natural Sciences”** which should have relevance to the purpose of the degree program.
- ***** The university / concerned department must offer at least 4 interdisciplinary courses from the recommended list provided in this document, or any other such course to enhance the interdisciplinary understanding of the students, keeping in view the available academic, human and infrastructural resources of the department.
- ***** Read in conjunction with guidance given on “Standard Nomenclature” in this document, the university / concerned department may offer any 7 advanced courses from either the general pool or from any one of the specializations as electives keeping in view its available academic, human and infrastructural resources.

RECOMMENDED LIST OF INTERDISCIPLINARY COURSES

Student may opt interdisciplinary courses from the following list where required in the scheme of studies for BS Geography or may opt from other departments to complement their holistic understanding of the major, provided that the same is allowed by the admitting department. The list provided here is a recommended one only, and the offering department may add more courses as and when needed, provided that the same is approved by the university’s relevant statutory body.

1. Environmental Sciences
2. Earth Sciences
3. Disaster Management
4. Geology
5. Hydrology
6. Natural Resources Management
7. Water Resources Management
8. Urban & Regional Planning
9. Environmental Policy & Governance
10. Heritage & Cultural Landscape
11. Environmental Security
12. Marine Sciences

13. Zoology
14. Botany
15. International Relations
16. Remote Sensing and GIS
17. Economics
18. Physics
19. Mathematics
20. Chemistry
21. Statistics
22. Computer Science
23. Political Science
24. Archeology
25. Mountain Conservation and Watershed Management
26. Ecology and Environmental Management
27. Regional Development Studies
28. Rural Development
29. Smart Cities & Urban Sustainability
30. Migration & Refugee Studies
31. Natural Resource Management
32. Media and Communication Studies
33. Data Science
34. Meteorology
35. Space Sciences

RECOMMENDED GENERAL POOL OF ELECTIVES

Students may opt for any 7 courses as electives from the following recommended general pool where required in the scheme of studies for Geography, provided that the same is offered and allowed by the department concerned. Where all 7 courses are opted from this pool, the degree will be titled “Bachelor of Science in Geography” in its generic form and without any specialization. The list provided here is a recommended one only and the department concerned may add more courses as and when needed.

1. Applied Geomorphology
2. Techniques in Geomorphology
3. Applied Climatology
4. Hydrology
5. Hydro-Geography
6. Biogeography
7. Soil Geography
8. Coastal Geomorphology
9. Glaciology
10. Natural Hazards
11. Environmental Science
12. Quaternary Geology
13. Geophysical Processes
14. Landscape Ecology
15. Water Resources
16. Meteorology
17. Population Geography
18. Economic Geography
19. Urban Geography
20. Social Geography

21. Cultural Geography
22. Political Geography
23. Development Geography
24. Historical Geography
25. Tourism Geography
26. Transport Geography
27. Geography of Crimes
28. Urban Planning
29. Regional Development
30. Human Migration
31. Geography of War and Peace
32. Gender Geography
33. Behavioural Geography
34. Environmental Management
35. Climate Change
36. Sustainable Development
37. Natural Resources
38. Environmental Impact Assessment
39. Conservation Geography
40. Environmental Degradation and Sustainability
41. Environmental Policy
42. Ecology and Environment
43. Waste Water Management
44. Soil Conservation
45. Biodiversity Conservation
46. Environmental Health
47. Community-based Conservation
48. Conservation Genetics
49. Conservation Policy
50. Ecosystem Services Valuation
51. Natural Resource Management
52. Endangered Species Recovery
53. Forest Ecosystem Dynamics
54. Habitat Connectivity Planning
55. Invasive Species Ecology
56. Plant Diversity Conservation
57. Restoration Ecology
58. Tropical Ecology
59. Wetland Ecology
60. Wildlife Forensics
61. Wildlife Habitat Management
62. Regional Planning
63. Regional Economics
64. Regional Policy
65. Spatial Planning
66. Infrastructure Planning
67. Environmental Planning
68. Land Use Planning
69. Transportation Planning

70. Urban Design
71. Regional Cooperation
72. Planning Theory
73. Sustainable Development and Cities
74. Applications of GIS in Urban Planning
75. Urban Ecology
76. Urban Demography
77. Urban Economy
78. Urban Transportation
79. Urban Housing
80. Urban Policy and Governance
81. Housing and Community Development
82. GIS for Urban Planning
83. City Planning
84. Smart Cities
85. Urban Morphology
86. Urban Development
87. Land Use Planning Strategies
88. Dimensions of Urban Sprawl
89. Master Plan and EIA
90. Climate Systems
91. Climate Dynamics
92. Introduction to Climate Change and Disasters
93. Hydro-meteorological Hazard
94. Multi-hazard Vulnerabilities
95. Techniques of Hazard Mapping
96. Natural Hazards of Pakistan
97. Natural Hazards and Extreme Events
98. Climate Change Science
99. Disaster Risk Management
100. Disaster Risk Reduction
101. Hazards and Disasters
102. Vulnerability and Resilience
103. Disaster Risk Assessment and Modelling
104. Climate Change Adaptation and Mitigation
105. Disaster Planning and Preparedness
106. Emergency Response and Recovery Management
107. Environmental and Technological Disasters
108. Disaster Governance, Policy, and Ethics
109. Applied GIS and Remote Sensing for Disaster Management
110. Flood Risk Reduction
111. Climate Change Policies
112. Natural Hazards and Disaster Management
113. Spatial Analysis
114. GIS Applications
115. Advanced Remote Sensing
116. Database Management Systems
117. Spatial Database Management Systems
118. WebGIS

119. Server GIS
120. Mobile GIS
121. GIS Programming
122. Spatial Modeling
123. Digital Mapping and Image Processing
124. Spatial Statistics
125. Remote Sensing Fundamentals
126. Radar Remote Sensing
127. Hyperspectral Remote Sensing
128. Satellite Meteorology
129. Marine Navigation and Meteorology
130. Spatial Data Science
131. Applied SAR
132. Hydrology and Watershed Modelling with RS
133. Spatial Decision Support System
134. Geospatial Big Data and Artificial Intelligence
135. Geomatics
136. Applications of GIS in Agriculture and Food Security
137. Health and Epidemiological GIS
138. GIS and Public Health
139. Coastal Zone and Marine GIS
140. Geospatial Policy and Governance
141. Cloud GIS and Big Spatial Data
142. Python and R for Spatial Analytics
143. Mathematical Foundations of Image Classification
144. Computational Methods for Geospatial Image Analysis
145. Linear Reference System
146. Precision Agriculture
147. Artificial Intelligence for Geospatial Data Analysis
148. Essentials of GeoAI
149. Geospatial Analysis using AI & ML
150. Geospatial Artificial Intelligence
151. Programming Fundamentals for Geospatial Applications
152. Spatial Databases Management
153. Big Geospatial Data and Cloud Platforms
154. Datawarehouse and Data Mining
155. Deep Learning for Earth and Spatial Data
156. Integrated/ Multimodal Earth Observation Analysis
157. Applications of GeoAI

DEGREE AWARD REQUIREMENTS

The following minimum requirements are prescribed for the award of BS Geography:

- a) All courses in the General Education category with titles and credit hours as prescribed in HEC Undergraduate Education Policy V 1.1. must be completed.
- b) Minimum of 136 credit hours (including internship / field experience and capstone project) as prescribed in this policy document must be completed.
- c) Capstone / research project of 3 credit hours must be completed in accordance with HEC Undergraduate Education Policy V 1.1. This requirement cannot be substituted with additional coursework or internship.
- d) Internship / Field Experience of 3 credit hours must be completed in accordance with HEC Undergraduate Education Policy V 1.1. This requirement cannot be substituted with additional coursework, capstone, research or project work.

- e) CGPA must not be below 2.00/4.00 at the time of completion of the degree program. The university may, however, set higher standard in this regard.
- f) The minimum duration to complete the degree is 8 regular semesters (4 Years) and the maximum duration is 12 regular semesters (6 Years). The maximum duration may be extended to 2 more semesters (1 Year) in extra-ordinary circumstances subject to approval of the university's relevant statutory body. Summer semester is not considered as a regular semester.

MAJOR SPECIALIZATIONS FOR GEOGRAPHY

The following are a few example specialization streams in case the BS Geography is offered with specialization (7 courses from any stream). Subject to approval of the relevant statutory body, the department may develop additional specializations other than those prescribed below or add more courses or edit the list in the given specializations. The department concerned may consider offering the degree program with specialization or otherwise, keeping in view availability of its academic, human and infrastructural resources.

1. Physical Geography

- a) Applied Geomorphology
- b) Techniques in Geomorphology
- c) Applied Climatology
- d) Hydrology
- e) Hydro-Geography
- f) Biogeography
- g) Soil Geography
- h) Coastal Geomorphology
- i) Glaciology
- j) Natural Hazards
- k) Environmental Science
- l) Quaternary Geology
- m) Geophysical Processes
- n) Landscape Ecology
- o) Water Resources
- p) Meteorology

2. Human Geography

- a) Population Geography
- b) Economic Geography
- c) Urban Geography
- d) Social Geography
- e) Cultural Geography
- f) Political Geography
- g) Development Geography
- h) Historical Geography
- i) Tourism Geography
- j) Transport Geography
- k) Geography of Crimes
- l) Urban Planning
- m) Regional Development
- n) Human Migration
- o) Geography of War and Peace
- p) Gender Geography
- q) Behavioural Geography

3. Environmental Sciences

- a) Environmental Management
- b) Climate Change
- c) Sustainable Development
- d) Natural Resources
- e) Environmental Impact Assessment
- f) Conservation Geography
- g) Environmental Degradation and Sustainability
- h) Environmental Policy
- i) Ecology and Environment
- j) Waste Water Management

- k) Soil Conservation
- l) Biodiversity Conservation
- m) Environmental Health
- n) Community-based Conservation
- o) Conservation Genetics
- p) Conservation Policy
- q) Ecosystem Services Valuation
- r) Natural Resource Management
- s) Endangered Species Recovery
- t) Forest Ecosystem Dynamics
- u) Habitat Connectivity Planning
- v) Invasive Species Ecology
- w) Landscape Ecology
- x) Plant Diversity Conservation
- y) Restoration Ecology
- z) Tropical Ecology
- aa) Wetland Ecology
- bb) Wildlife Forensics
- cc) Wildlife Habitat Management

4. Urban and Regional Planning

- a) Regional Development
- b) Regional Planning
- c) Regional Economics
- d) Urban Planning
- e) Regional Policy
- f) Spatial Planning
- g) Infrastructure Planning
- h) Environmental Planning
- i) Land Use Planning
- j) Transportation Planning
- k) Urban Design
- ↳ Regional Cooperation
- m) Planning Theory
- n) Sustainable Development and Cities
- o) Applications of GIS in Urban Planning
- p) Urban Ecology
- q) Urban Demography
- r) Urban Economy
- s) Urban Transportation
- t) Urban Housing
- u) Urban Policy and Governance
- v) Housing and Community Development
- w) GIS for Urban Planning
- x) City Planning
- y) Urban Ecology
- z) Urban Environment
- aa) Smart Cities
- bb) Urban Morphology
- cc) Urban Development
- dd) Land Use Planning Strategies
- ee) Dimensions of Urban Sprawl
- ff) Master Plan and EIA

- gg) Land Use Planning Strategies
- hh) Dimensions of Urban Sprawl
- ii) Master Plan and EIA

5. Climate Change and Disaster Management

- a) Climate Systems
- b) Climate Dynamics
- c) Introduction to Climate Change and Disasters
- d) Hydro-meteorological Hazard,
- e) Multi-hazard Vulnerabilities
- f) Techniques of Hazard Mapping
- g) Natural Hazards of Pakistan
- h) Natural Hazards and Extreme Events
- i) Climate Change Science
- j) Disaster Risk Management
- k) Disaster Risk Reduction
- l) Hazards and Disasters
- m) Vulnerability and Resilience
- n) Disaster Risk Assessment and Modelling
- o) Climate Change Adaptation and Mitigation
- p) Disaster Planning and Preparedness
- q) Emergency Response and Recovery Management
- r) Environmental and Technological Disasters
- s) Disaster Governance, Policy, and Ethics
- t) Applied GIS and Remote Sensing for Disaster Management
- u) Flood Risk Reduction
- v) Climate Change Policies
- w) Natural Hazards and Disaster Management

6. Remote Sensing and GIS

- a) Spatial Analysis
- b) GIS Applications
- c) Advanced Remote Sensing
- d) Database Management Systems
- e) Spatial Database Management Systems
- f) WebGIS
- g) Server GIS
- h) Mobile GIS
- i) GIS Programming
- j) Spatial Modelling
- k) Digital Mapping and Image Processing
- l) Spatial Statistics
- m) Remote Sensing Fundamentals
- a) Radar Remote Sensing
- b) Hyperspectral Remote Sensing
- c) Satellite Meteorology
- d) Marine Navigation and Meteorology
- e) Spatial Data Science
- f) Applied SAR
- g) Hydrology and Watershed Modelling with RS
- h) Spatial Decision Support System
- i) Applications of GIS in Urban Planning
- j) Geospatial Big Data and Artificial Intelligence

- k) Geomatics
- l) Applications of GIS in Agriculture and Food Security
- m) Health and Epidemiological GIS
- n) GIS and Public Health
- o) Coastal Zone and Marine GIS
- p) Geospatial Policy and Governance
- q) Cloud GIS and Big Spatial Data
- r) Python and R for Spatial Analytics
- s) Spatial Analysis
- t) Mathematical Foundations of Image Classification
- u) Computational Methods for Geospatial Image Analysis
- v) Linear Reference System
- w) Precision Agriculture
- x) Artificial Intelligence for Geospatial Data Analysis
- y) Essentials of GeoAI
- z) Geospatial Analysis using AI & ML

7. GeoAI

- a) Geospatial Artificial Intelligence
- b) Programming Fundamentals for Geospatial Applications
- c) Spatial Databases Management
- d) Spatial decision support systems
- e) Big Geospatial Data and Cloud Platforms
- f) Datawarehouse and Data Mining
- g) Deep Learning for Earth and Spatial Data
- h) Integrated/ Multimodal Earth Observation Analysis
- i) Applications of GeoAI
- j) Essentials of GeoAI
- k) Spatial Analysis using AI & ML

MASTER OF SCIENCE IN GEOGRAPHY / MASTER OF PHILOSOPHY IN GEOGRAPHY

PROGRAM DESCRIPTION

The Master of Science / Master of Philosophy in Geography program is designed in accordance with the HEC Graduate Education Policy 2023 to equip scholars with advanced, research-oriented understanding and applications of geographic techniques. The curriculum promotes critical inquiry, intellectual independence, and scholarly engagement with regional and comparative perspectives. Through a blend of applied and advanced courses, the scholars acquire in-depth knowledge of physical and human geography, developing skills in research design, data analysis, and academic writing. Core modules in advanced research methods, spatial statistics and GIS lay the foundation for rigorous inquiry, while the specialized courses enable research scholars to focus on specific themes. Graduates are well-prepared for careers in academia, research, policy, planning and practice, or for further doctoral studies in Geography or related disciplines.

STANDARD NOMENCLATURE

To ensure uniformity, the standard nomenclature for all NQF level 7 qualifications in the field of Geography will be either “**Master of Science in Geography**” or “**Master of Philosophy in Geography**” (with its short form as **MS Geography** or **MPhil Geography**), subject to approval by relevant statutory bodies of the university.

PROGRAM LEARNING OUTCOMES

By the completion of MS/MPhil Geography, the graduates will be able to:

- a) Demonstrate an advanced understanding of geographic concepts, theories, and methodologies, and apply critical thinking skills to analyze complex geographical phenomena.
- b) Design and conduct original research in Geography, demonstrating expertise in research methods, data analysis, and academic writing.
- c) Apply geographic techniques and spatial analysis to address real-world phenomena, evaluate the interactions between human and physical systems, and propose evidence-based solutions.
- d) Demonstrate professional and academic competence in Geography, preparing them for careers in academia and industry, or for further doctoral studies in Geography or related disciplines.

ELIGIBILITY CRITERIA

- a) An undergraduate degree or an equivalent qualification involving 16 years of education in Geography is the basic eligibility requirement for admission in the MS/MPhil Geography.
- b) Candidates having undergraduate degree or an equivalent qualification involving 16 years of education in any discipline relevant to Geography are also eligible for admission in MS/MPhil Geography subject to completion of deficiency courses up-to 12 credit hours to be determined by the admitting university / department. Relevance of the prior qualification in this regard will also be determined by the admitting university / department.
- c) In addition to the basic eligibility, the admitting university is further required to conduct a rigorous admission test as an eligibility condition for admission to the program, with a passing score of 50% (OR) accept the GRE/HAT General/equivalent tests, with a passing score of 50%. The admitting university may also set minimum eligibility scores (above 50%) as per the screening, admission and merit calculation criteria approved by its statutory bodies.

PROGRAM STRUCTURE

The MS/MPhil Geography is structured in accordance with the provisions of the HEC Graduate Education Policy (GEP) 2023. Standard structure of the program is as under:

| | |
|-------------------------------|------------------------------------------------------------------------------------|
| Credit Hours | Minimum 32 |
| Course Work | Minimum 26 credit hours (10 courses) |
| Research Work / Thesis | Minimum 6 credit hours |
| Program Duration | Minimum: 1.5 Years (3 regular semesters) Maximum: 4 Years (8 regular semesters) |

| | |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Note: In case a student is unable to secure an MS/MPhil within the prescribed timeframe and claims for extension in duration, the university may constitute appropriate authority and determine the causes of delay. In the event of force majeure (i.e., delay on account of circumstance beyond the control of student), the university may grant an extension in the period of award of MS/MPhil degree in accordance with the duration limiting factor(s) and shall also take corrective measures in case the delay is caused by process or administrative reasons. |
| Semester Duration | 16-18 weeks for regular semesters (1-2 weeks for examination) 8-9 weeks for summer semesters (1 week for examination) |
| Course Load (per semester) | 09-12 credit hours for regular semesters Up-to 8 credit hours for summer semesters (for remedial/deficiency/failure/repetition courses only) |
| 3 Credit Hours (Theory) | 3 classes (1 hour each) OR 2 classes (1.5 hour each) OR 1 class (3 hours) |

SCHEME OF STUDIES

The standard scheme of studies for MS/MPhil Geography is given below:

| SEMESTER I | | | |
|---------------------------|-----------------------------|--------------|----------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Advanced Research Methods * | 3 (3-0) | Core |
| 2. | Spatial Statistics * | 3 (3-0) | Core |
| 3. | Elective – I ** | 3 (3-0) | Elective |
| 4. | Elective – II ** | 3 (3-0) | Elective |
| Total Credits (12) | | | |

| SEMESTER II | | | |
|--------------------------------|------------------|--------------|----------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Elective –III ** | 3 (3-0) | Elective |
| 2. | Elective –IV** | 3 (3-0) | Elective |
| 3. | Elective –V ** | 3 (3-0) | Elective |
| 4. | Elective – VI ** | 3 (3-0) | Elective |
| Total Credit Hours (12) | | | |

| SEMESTER III | | | |
|--------------------------------|--------------------------------------|--------------|-------------------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| 1. | Understanding of Holy Quran – I *** | 1 (0-1) | General Education |
| 2. | Understanding of Holy Quran – II *** | 1 (0-1) | General Education |
| 3. | Thesis *** | 6 **** | Research |
| Total Credit Hours (08) | | | |

| SEMESTER IV | | | |
|-------------|-------------|--------------|----------|
| S.N. | COURSE | CREDIT HOURS | CATEGORY |
| | Thesis **** | Continued | Research |

- * These are the mandatory courses for the program, irrespective of the area of specialization.
- ** The university / concerned department may offer any advanced course in the field of Geography as an elective, as per its available academic, human and infrastructural resources (a recommended list of electives is available below).
- *** These are prescribed for all NQF level 5-8 qualifications as mandated vide HEC letter No.10-01/2022/Coord(Acad)/HEC/235 dated March 28, 2025.
- **** Research work for thesis must be conducted by students individually in accordance with the university's policy as approved through its statutory bodies provided that the same is in accordance with the HEC Graduate Education Policy (2023).

RECOMMENDED LIST OF ELECTIVES

The list provided here is a recommended one only and the department concerned may add more courses as and when needed.

1. Advance Physical Geography and Earth System
2. Advance Human Geography and Spatial Theory
3. Principles and Interpretation of Aerial Photos
4. Approaches in GIS
5. Advance Remote Sensing
6. Geography of Resources
7. Rural Geography, Planning & Development
8. Agricultural Geography
9. Transportation Geography
10. Morphometry and Fluvial Geomorphology
11. Topography, Mapping and Modeling
12. Applications of GIS in Agriculture
13. Digital Earth and Data Science
14. Applied Physical Geography
15. Applied Human Geography
16. Techniques in Geography
17. Research Design & Methods in Data Collection
18. Meteorology
19. Computer Cartography
20. Geography of Natural Hazard and Disaster
21. Urban Planning
22. Climate Change Studies
23. Geography of Transport
24. Disaster Risk Management
25. Regional Planning
26. Urban Resilience
27. Understanding Earthquake Disaster
28. Research Methods in Geography
29. Environmental Cognition and Geography
30. Foundations of Hazards and Disaster Studies
31. Environmental Impact and Analysis
32. Landscape Ecology
33. Global Positioning System
34. Advanced Geographical Information Systems
35. Advanced Remote Sensing and Image Processing
36. Introduction to Geographical Information Systems and Spatial Analysis

37. Climate Research
38. Climate Policy
39. Desert Morphology

DEGREE AWARD REQUIREMENTS

The following minimum requirements are prescribed for the award of MS/MPhil Geography:

- a) A minimum of 26 credit hours of course work including 06 credit hours for core courses, 18 credit hours for general or specialization-oriented electives and 2 credit hours for Quranic courses as prescribed in this document must be completed.
- b) In addition, research thesis of 6 credit hours or course work of 2 courses of 6 credit hours must also be completed individually as partial fulfilment of the degree program.
- c) CGPA must not be below 2.50 / 4.00 at the time of completion of the degree program. The university may, however, set a higher standard in this regard.
- d) The minimum duration required to complete the degree is 3 regular semesters (1.5 Years) and maximum duration is 8 regular semesters (4 Years) . Summer semester is not considered as a regular semester.

Save exceptions: In case a student is unable to secure an MS/MPhil within the prescribed timeframe and claims for extension in duration, the university may constitute appropriate authority and determine the causes of delay. In the event of force majeure (i.e., delay on account of circumstance beyond the control of student), the university may grant an extension in the period of award of MS/MPhil degree in accordance with the duration limiting factor(s) and shall also take corrective measures in case the delay is caused by process or administrative reasons.

COURSE LEARNING OUTCOMES

(Bachelor of Science)

a) Fundamentals of Geography

By the end of this course, the students will be able to:

- a) Explain the scope, branches, and key concepts of Geography.
- b) Describe relationships between Physical and Human Systems.
- c) Explain the geographic concepts to real-world phenomena.

b) Physical Geography

By the end of this course, the students will be able to:

- a) Understand the fundamentals and scope of physical Geography.
- b) Grasp key concepts, processes, and principles shaping the Earth's physical landscape.
- c) Familiarize themselves with terminology used to describe physical features.
- d) Recognize and identify local landforms.

c) Mapping Techniques and Projections

By the end of this course, the students will be able to:

- a) Understand and construct various map scales and map projections using mathematical calculations and geometric principles.
- b) Recognize and interpret physical and cultural landscapes from Survey of Pakistan topographic sheets and interpret atmospheric conditions from Pakistan weather maps.
- c) Understand and apply grid referencing and coordinate systems for precise location-finding and execute the manual enlargement and reduction of maps.

d) Cartography and Geo-Visualization

By the end of this course, the students will be able to:

- a) Explain cartographic principles including map projections, scale, and symbolization.
- b) Design effective maps and geo-visualizations for spatial data communication.
- c) Evaluate map quality and visual effectiveness for different readers and purposes.

e) Introduction to GIS

By the end of this course, the students will be able to:

- a) Describe the fundamental concepts, components, and functions of Geographic Information Systems.
- b) Perform basic spatial data input, management, analysis, and visualization using GIS software.
- c) Apply GIS techniques to solve real-world geographic and environmental issues.

f) Human Geography

By the end of this course, the students will be able to:

- a) Understand the relationships between people, places, and cultures.
- b) Analyse the spatial patterns of human activities, such as population, migration, and urbanization.
- c) Evaluate the impact of human activities on the environment and vice versa.

g) Geographical Thoughts and Modern Concepts

By the end of this course, the students will be able to:

- a) Evaluate the historical development of geographical thought from the Classical and Medieval periods to the emergence of modern geography, focusing on the philosophical shifts between environmental determinism and possibilism.
- b) Appraise the mid-20th-century Quantitative Revolution and the subsequent rise of critical perspectives.
- c) Synthesize contemporary geographical themes such as globalization, postmodernism, and sustainable development to explain the changing relationship between humans and the environment in a modern global context.

h) Principles of Remote Sensing

By the end of this course, the students will be able to:

- a) Explain the physical principles of electromagnetic spectrum and radiations, sensor characteristics, and image acquisition.
 - b) Interpret and analyse remotely sensed data from different sensors and platforms.
- i) Geography of Pakistan**
By the end of this course, the students will be able to:
- a) Understand Pakistan's physical and human geography, including its location, climate, and resources.
 - b) Analyse the relationships between Pakistan's geography and its economy, culture, and security.
 - c) Evaluate the challenges and opportunities facing Pakistan's geographic development.
- j) Land Surveying**
By the end of this course, the students will be able to:
- a) Understand the principles of land surveying and measurement techniques.
 - b) Apply surveying skills to collect and analyse spatial data.
 - c) Evaluate the importance of land surveying in geographic research.
- k) Digital Cartography**
By the end of this course, the students will be able to:
- a) Create effective thematic maps.
 - b) Develop visual strategies for contrast, hierarchy, and colour balance.
 - c) Implement cartographic design principles.
- l) Geomorphology**
By the end of this course, the students will be able to:
- a) Explain fundamental concepts of geomorphology, including the origin, evolution, and classification of landforms.
 - b) Interpret landforms using maps, satellite images, and aerial photographs, applying basic geomorphological mapping techniques.
 - c) Apply geomorphological concepts to real-world issues, such as natural hazards, land degradation, river management, and environmental planning.
- m) Climatology**
By the end of this course, the students will be able to:
- a) Explain the fundamental principles of climatology, including atmospheric composition, structure, and energy balance of the Earth–atmosphere system.
 - b) Interpret climatological data using graphs, maps, and basic statistical techniques.
 - c) Evaluate the role of climate variability and climate change, including natural and anthropogenic drivers.
- n) Oceanography**
By the end of this course, the students will be able to:
- a) Understand the physical, chemical, geological, and biological processes that shape the world's oceans.
 - b) Analyse the importance of oceans in the global ecosystem, economics and climate regulation due to Coastal Dynamics.
 - c) Evaluate the impact of human activities on ocean resources, ecosystems and suggest sustainable solutions.
- o) Economic Geography**
By the end of this course, the students will be able to:
- a) Explain the spatial distribution of economic activities and the role of natural, social, and technological factors in shaping regional and global economies.
 - b) Analyse patterns of industrial location, agriculture, trade, and services using economic geography theories and spatial data.
 - c) Apply economic geography concepts to evaluate regional development issues, economic disparities, and policy implications at local, national, and global scales.

p) Quantitative Geography

By the end of this course, the students will be able to:

- a) Understand and apply quantitative techniques, statistical methods, and mathematical models in geographic analysis.
- b) Analyse and interpret spatial data to identify patterns, relationships, and trends in physical and human geography.
- c) Students will be able to develop problem-solving and research skills by using quantitative approaches for evidence-based geographic decision-making.

q) Research Methodology

By the end of this course, the students will be able to:

- a) Apply fundamental research methodologies (quantitative, qualitative, and mixed methods) to design and conduct basic geographical research.
- b) Collect, analyse, and interpret geographical data using appropriate research tools, statistical techniques, and ethical research practices.
- c) Develop a structured research proposal and report, demonstrating proper problem formulation, literature review, data presentation, and academic writing skills.

r) Political Geography

By the end of this course, the students will be able to:

- a) Understand the relationships between politics, power, and territory.
- b) Analyse the impact of geopolitics on international relations and global issues.
- c) Evaluate the role of geography in shaping political decisions and conflicts.

s) Photogrammetry

By the end of this course, the students will be able to:

- a) Explain the fundamental concepts and geometry of aerial and terrestrial photogrammetry.
- b) Generate spatial data products such as orthophotos, DEMs, and 3D models from image data.
- c) Evaluate the accuracy and limitations of photogrammetric techniques in mapping applications.

t) Global Navigation Satellite System

By the end of this course, the students will be able to:

- a) Describe the principles, components, and working mechanisms of GNSS technologies.
- b) Perform basic GNSS data collection and processing for positioning and navigation applications.
- c) Assess the accuracy, errors, and applications of GNSS in surveying, mapping, and environmental studies.

u) Environmental Geography

By the end of this course, the students will be able to:

- a) Explain the fundamental concepts, processes, and interactions between human activities and natural environmental systems at local, regional, and global scales.
- b) Analyse spatial patterns and causes of major environmental issues such as climate change, land degradation, water scarcity, and biodiversity loss using geographic perspectives.
- c) Evaluate environmental management strategies and apply geographic tools to propose sustainable solutions for environmental problems.

(Master of Science / Master of Philosophy)**a) Advanced Research Methods**

By the end of this course, scholars will be able to:

- a) Design and conduct advanced research studies using quantitative, qualitative, and mixed methods to address complex research questions.
- b) Apply advanced statistical and analytical techniques, such as multivariate analysis, regression, and structural equation modeling, to analyze and interpret complex data sets.
- c) Critically evaluate research designs, methods, and results, and communicate research findings and implications, effectively.

b) Spatial Statistics

By the end of this course, the scholars will be able to:

- a) Apply spatial statistical concepts and methods to analyze and interpret spatial data.
- b) Use and apply spatial statistical approaches to perform exploratory spatial data analysis, model spatial relationships, and make predictions.
- c) Evaluate the appropriateness of different spatial statistical models and techniques for a given problem and communicate results and insights effectively.