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University of Delhi

[illegible]

CHC-I/DSS/1/EC-1380/2025
Dated: 23.01.2026

NOTIFICATION

Sub: Amendment to Ordinance X

(ECR 57-1/3/ dated 12.12.2025)

It is hereby notified for information to Affiliated Colleges that the Ordinance V (D-V) of the Ordinances of the University

Add the following:

The syllabi of M.A. Geography for Semester-III/IV under Faculty of Social Sciences based on Postgraduate Curriculum Framework 2024 are notified herewith for the information of all concerned as per Annexure-I.

REGISTRAR

13-1-2024

UGC 2020 (Post Graduate Curriculum Framework) (CBCS) 2024

UNIVERSITY OF DELHI

POST GRADUATE PROGRAMS IN GEOGRAPHY

MASTER OF ARTS
(GEOGRAPHY)

TWO YEARS PG PROGRAM AFTER COMPLETION OF THREE YEAR UG PROGRAM (3+2)
ONE YEAR PG PROGRAM AFTER COMPLETION OF FOUR YEAR UG PROGRAM (1+1)

PROGRAMME STRUCTURE, COURSES AND SYLLABI
(Effective from Academic Year 2023-24)

Revised Syllabus is updated as approved by the Faculty of Social Sciences and approved by Academic Council on (date) 2025 and Executive Council on (date) 2025

DEPARTMENT OF GEOGRAPHY
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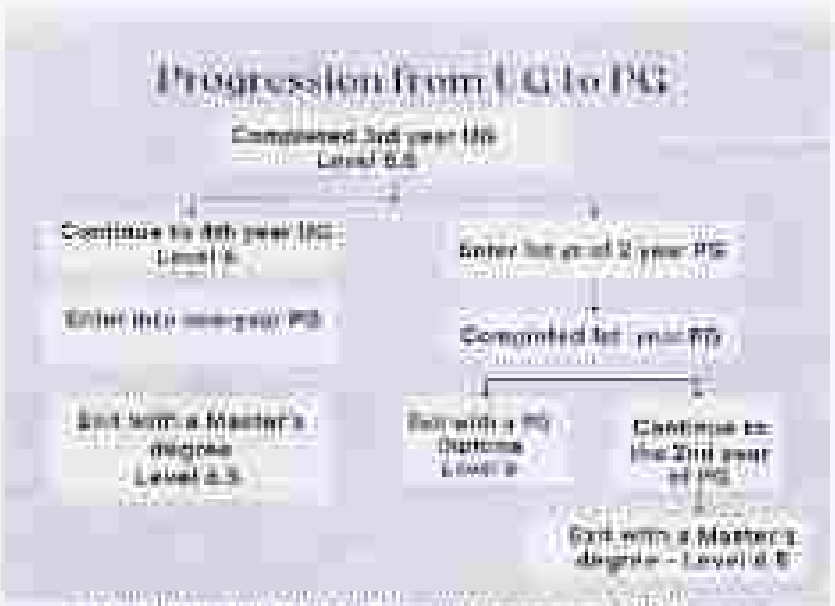
UNIVERSITY OF DELHI
POST GRADUATE CURRICULUM FRAMEWORK (PGCF) 2024
(based on New Education Policy (NEP) 2020)
POST GRADUATE (PG) PROGRAMMES FRAMEWORK:
An Introduction

PROGRESSION FROM UNDER GRADUATE (UG) TO POST GRADUATE (PG) PROGRAMS



PROGRAMMES OF STUDY WITH MULTIPLE ENTRY AND EXIT OPTIONS

First Year of Four Years UG Programme – Level 4.5
Second Year of Four Years UG Programme – Level 5.0
Third Year of Four Years UG Programme – Level 5.5
Fourth Year of Four Years UG Programme – Level 6.0

First year of Two Years PG Programme (after 3 Year UG) – Level 6.0
Second Year of Two Years PG Programme (after 3 Year UG) – Level 6.5
First year of One Year PG Programme (after 4 Year UG) – Level 6.5

First year of Two Years PG Programme (after 4 Year UG) – Level 6.5
Second year of Two Years PG Programme (after 4 Year UG) – Level 7.0

POST GRADUATE (PG) PROGRAMMES FRAMEWORK 2024

- Two years PG Programme after completion of Three Year UG Programme (3+2)
- One year PG Programme after completion of Four Year UG Programme (4+1)
  - Structure 1 (Level 6.5): PG Curricular Structure with only "Course Work"
  - Structure 2 (Level 6.5): PG Curricular Structure with "Course work and Research"
    - A. "Dissertation Writing" track
    - B. "Academic Project" track
    - C. "Entrepreneurship" track
  - Structure 3 (Level 6.5): PG Curricular Structure with only "Research"

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TWO YEARS PG PROGRAMME AFTER COMPLETION OF THREE YEAR UG PROGRAMME (3+2)

(2nd Year of PG curriculum structure for Two-year PG Programmes (Level 6.5))

Semester	DSC	DSE	2 Credit course	Dissertation/ Academic Project/ Entrepreneurship	Total Credits
Semester III	DSC 5 DSC 6 DSC 7 (12 credits)	DSE 1 DSE 2 OR DSE 3 OR 4 (8 credits)	Skill Based course / Internship / Consultancy / Industry Training / Lab Learning / Fieldwork (2 credits)	6	26
Semester IV	DSC 8 DSC 9 DSC 10 (12 credits)	DSE 5 DSE 6 OR DSE 7 OR 8 (8 credits)	Skill Based course / Internship / Consultancy / Industry Training / Lab Learning / Fieldwork (2 credits)	6	28

(3rd Year of PG curriculum structure for Two-year PG Programmes (Level 6.5))

Semester	DSC	DSE	2 Credit course	Dissertation/ Academic Project/ Entrepreneurship	Total Credits
Semester V	DSC 7 DSC 8 (8 credits)	DSE 9 DSE 10 DSE 11 OR DSE 12 OR 13 (12 credits)	Skill Based course / Internship / Consultancy / Industry Training / Lab Learning / Fieldwork (2 credits)	6	28
Semester VI	DSC 9 DSC 10 (8 credits)	DSE 14 DSE 15 DSE 16 OR DSE 17 OR 18 (12 credits)	Skill Based course / Internship / Consultancy / Industry Training / Lab Learning / Fieldwork (2 credits)	6	28

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An Introduction

ONE YEAR PG PROGRAMME AFTER COMPLETION OF FOUR-YEAR UG PROGRAMME (4+1)

Structure 3 (Level 6.5): PG Curricular Structure with only "Course Work"

Semester	DSC	DSE	4 Credit Course	[illegible]	Total Credits
Semester III	DSC-5 DSC-6 (8 credits)	DSE-1 DSE-2 DSE-3 DSE-4 DSE-5 DSE-6 GC-3 (12 credits)	Skill based course / workshop / Survey based project / laboratory / internship / apprenticeship / dissertation / (4 credits)	[illegible]	24
Semester IV	DSC-7 DSC-8 (8 credits)	DSE-7 DSE-8 DSE-9 DSE-10 DSE-11 DSE-12 GC-4 (12 credits)	Skill based course / Workshop / Survey based project / laboratory / internship / apprenticeship / Dissertation (4 credits)	[illegible]	24

The Structure 3 (Level 6.5) under PG Curricular Structure with only "Course Work" is identical to the 2nd Year of PG curricular structure for Exit option PG Programme (Level 6.5).

ONE YEAR PG PROGRAMME AFTER COMPLETION OF FOUR YEAR UG PROGRAMME [4+1]

Structure 2 [Level 6.5]: PG Certificate Structure with "Course work and Research"

Semester	DSC	DSE	GE	Other Options (Vocational Project / Internship / Field Work)	Total Credits
Semester III	DSC-7 DSC-8 (4 credits)	DSE-5 DSE-6 OR DSE-7, GE-3* (6 credits)	NIL	[illegible] (4 credits)	20
Semester IV	DSC-9 DSC-10 (4 credits)	DSE-7 DSE-8 OR DSE-8 GE-3* (6 credits)	NIL	[illegible] (4 credits)	20

The Structure 2 [Level 6.5] of the PG Certificate Structure with "Course work and Research" has following options:

a. "Dissertation/Writing" Track
b. "Academic Project" Track
c. "Internship/Fieldwork" Track

[illegible] opt for "Dissertation/Writing" or "Academic Project" track, can study only DSE-7 or DSE-8 any one of their choice, while those opting for "Internship/Fieldwork" track will have to study DSE-7 and DSE-8 both of the semesters III and IV.

The Dissertation / Project Report / Fieldwork [which] be an original piece of work and a candidate is required to submit [illegible] of work done earlier in the 3rd / 4th semesters of the programme, though it may be an extension of that work.

The expected activities of each of the three tracks are enumerated below:

A. 'Dissertation/ Writing' – the outcomes expected are as follows:

Semester III

The following four outcomes must be achieved by the end of semester III:

1) Research Problem Identification
2) Review of literature
3) Research design formulation
4) Commencement of data investigation, fieldwork, or archival tasks

Semester IV

The following three outcomes must be achieved by the end of Semester IV:

1) Completion of data investigation / fieldwork
2) Submission of dissertation
3) Research output in the form of any one of the following –
   - Publication in subject development / policy
   - Any other scholarly work as recommended by the HoD and approved by the Research Council
   - Publication in a reputed journal such as Scopus indexed journals or peer reviewed / quality journals
   - Book or book chapter in a publication as a council publisher

B. "Academic Projects" – Six semesters (spread over 4 academic years)

All academic projects should be exploratory, based on research, and can be descriptive, analytical, or experimental. Each dissertation or project work is a research component and is equivalent to 4 credits of the PGCF.

Semester III

The following four outcomes must be achieved by the end of Semester III:

1) Research Problem Identification
2) Review of literature
3) Research design formulation
4) Commencement of data collection, fieldwork, or experiments

Semester IV

The following three outcomes must be achieved by the end of Semester IV:

1) Completion of the experimentation, fieldwork or analysis work
2) Submission of project report
3) Research output in the form of any one of the following:
   - Prototype or product development or patent
   - Any other extension work as recommended by the GEC and approved by the Research Council
   - Publication in a research journal such as Science, Nature, Geoscience or other similar quality journals
   - Draft policy formulation and submission to the concerned ministry
   - Book or book chapter in a publication by a reputed publisher
   - Book translation (for Language specialization)

c. "Entrepreneurship" – the outcomes expected are as follows:

Semester III

Week	Topic	Deliverable	Activities	Learning Environment
1-2	Idea Generation and Validation	Refined list of at least three potential start-up ideas	Conduct market research to validate the viability of each idea	Peer review and feedback on the initial ideas
3-4	Choosing the Business Idea	Selection of the final business idea based on research and market potential	Develop a preliminary business model canvas	Approval of the final business idea
5-6	Market Research and Customer Discovery	Detailed market research report and customer discovery interviews	Identify target market, customer segments, and key competitors	Presentation of market research findings
7-8	Prototype Development / Minimum Viable Product (MVP) and Initial Value Proposition	Development of a prototype or MVP, initial business model canvas including value proposition, customer segments, and revenue streams	Design and build a basic version of the product or service. Test and refine the business model based on user feedback	Prototype/MVP demonstration and feedback
9-10	Financial and Legal Planning	Initial financial plan including cost structure, pricing strategy, and funding requirements	Prepare a basic financial plan, including a budget and revenue forecast. Review IPR protection	Financial plan and IPR review
11-12	Pitch Preparation	Development of a pitch deck presenting the business idea, market opportunity, strategies, and financials	Create and refine a presentation for potential investors or stakeholders	Practice pitch sessions with feedback
13-15	Final Presentation and Review	Final pitch presentation to a panel of investors, faculty, and possibly industry experts	Deliver a polished pitch, receive feedback, and make final adjustments	Final assessment and grading based on the pitch and overall progress throughout the semester

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An Introduction

Semester IV

Week	Topic	Deliverable	Activities	Mentor Checkpoint
1–3	Review and refinement of prototype / MVP	Version 3.0 of the prototype, including feedback from the beta pilot	Collect user feedback; prioritise bugs and improvements; implement changes	Review and approval of the refined prototype
9–12	Legal and Regulatory Compliance	Documentation of all legal requirements, including business registration, intellectual property rights, and compliance with industry-specific regulations	Consult with legal experts; draft and review necessary documents; address any compliance issues	Legal compliance review and feedback
5–8	Operational Planning	Detailed operational plan, including supply chain management, production schedules, and quality assurance processes	Finalize partnerships with suppliers, set up production or service delivery processes, and establish quality control measures	Review and approval of the operational plan
9–12	Marketing and Sales Strategy	Comprehensive marketing and sales plan, including market entry strategy, branding, and pricing	Develop and test marketing campaigns, refine branding and messaging, and establish sales channels	Approval and initial strategy review and feedback
9–12	Financial Planning and Fundraising	Finalized financial plan, including cash flow projections, break-even analysis, and funding requirements	Prepare for fundraising by identifying potential investors, preparing financial documents, and pursuing leads	Financial plan review and practice pitch session
9–12	Risk Management and Contingency Planning	Risk management plan, including potential risks and contingency mitigation strategies	Identify key risks (e.g., market, operational, financial) and develop	Risk management plan review and feedback

Week	Topic	Deliverable	Activities	Mentor Checkpoint
			contingency plans	
[illegible]	Final Preparations for Launch	Final preparations for product launch, including any final adjustments to the product/service, operational processes, and marketing efforts.	Conduct a soft launch or beta testing phase to gather final feedback, finalize logistics, and ensure readiness for full-scale launch.	Review and approval of launch readiness
[illegible]	Final Presentation and Review	Comprehensive final presentation summarizing the entire project, including business model, operations, financials, marketing, and launch plan.	Deliver the final pitch to a panel of mentors, faculty, and industry experts. Followed by the official market launch.	Final evaluation and feedback, with an emphasis on the launch (go/ no-go) decision and overall project success.

Note: Additional outcomes or competencies may be added / revised by the concerned faculty / Department Committee as per the Master's level Programme.

DEPARTMENT OF GEOGRAPHY
[NAME OF SCHOOL OF ECONOMICS]
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[BASED ON NEW ZAMBIA POLICY [NFP] 2020]
POST GRADUATE [PG] PROGRAMMES FRAMEWORK
AN INTRODUCTION

ONE YEAR PG PROGRAMME AFTER COMPLETION OF FOUR YEAR UG PROGRAMME [4+1]

Structure 1 (Level 4.5) PG Certificate Structure with only "Research"

Semester	Unit	Unit Related to identified research [HRS]	Research Methods/ Writing [Courses]	Other Elective [Courses]	Total Credits
Semester III	3 Units [Units related to the area identified for research] [9 Credits]	1 Unit [Units related or allied to the area identified for research] [3 Credits]	(a) Advanced Research Methodology of the Core Discipline + (b) Data for Research [2+2 = 4 credits]	(1) ... (2) ... (3) ... [3 credits]	22
Semester IV	–	1 Unit [Units related or allied to the area identified for research] [3 Credits]	Techniques of research writing [3 credits]	[Courses related to research writing] [3 credits]	22

The outcomes expected are as follows:

Semester III

The following key outcomes must be achieved by the end of semester III:

1) Research problem identification
2) Review of literature
3) Research design formulated
4) Report on initial phase of research examination by completion of 6th month etc.

Semester IV

The following three parameters must be achieved by the end of Semester IV:

1) Report on final phase of examination (7th Month)
2) Dissertation / project report submission
3) Research output in the form of any one of the following –
   a) Developed a patent or prototype of a product which meets the Technology Readiness Level [TRL] 6 or TRL 9 as defined by CSIR

(ii) Publication in Scopus Indexed Journals.[4]
(c) Publication of a book by a reputed publisher[5] (National/International) as recommended by the BOS and approved by the Research Council.

[4] Authors have to be the student and his/her supervisor(s). Additional author has to be approved by the Departmental Research Council. This provision is mandatory only for submission of Phase II of the research.

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NEP 2020: POST GRADUATE CURRICULAR FRAMEWORK (PGCF) 2024
POST GRADUATE PROGRAMME IN GEOGRAPHY

TABLE 3: TWO YEARS PG PROGRAM AFTER COMPLETION OF THREE YEAR UG PROGRAM (3+2) / ONE YEAR PG PROGRAM AFTER COMPLETION OF FOUR YEAR UG PROGRAM (4+1)

MA in GEOGRAPHY – PART 2 (LEVEL 6.5) – SEMESTER III – LIST OF COURSES

MPC	COURSE CODE	COURSE NAME	CREDITS			
			L	T	P	TOTAL
		Discipline Specific Core (DSC) Courses				
		Plan Tools for Contemporary Geographers	3	1	0	4
		Land, Water and Ecological Interactions	3	1	0	4
		Discipline Elective Courses (DEC) Courses				
		Cities in Global Space	3	1	0	4
		Climate Change and Ecosystems	3	1	0	4
		Geomorphology of India's Environment	3	1	0	4
		Cultural Geography: Issues and Practices	3	1	0	4
		Development Issues and Regional Policy	3	1	0	4
		Digital Geographies	3	1	0	4
		Urban Geographies in Global South	3	1	0	4
		Geographies of the Home and Everyday	3	1	0	4
		Geographies of Sexualities	3	1	0	4
		Urban Design, Planning and Governance	3	1	0	4
		Landscape and Culture	3	1	0	4
		Remote Sensing and GIS	3	1	0	4
		Applied Climatology and Urban Climates	3	1	0	4
		Water Resources Management	3	1	0	4
		Research Methods and Techniques	3	1	0	4
		Regional Development – [illegible]	3	1	0	4
		Research Project / Dissertation*				
		Research Project / Dissertation	0	0	8	8
		Total Credits (DSC Courses)				
		Research Project / Dissertation	0	0	8	8
		Total Credits (DEC Courses)				
		Research Methodology	3	1	0	4
		Research Project	0	0	8	8
		Total Credits (Research Project / Dissertation)				
		Dissertation / Academic Project / Entrepreneurship	0	0	12	12
		Dissertation / Academic Project / Entrepreneurship	0	0	12	12

2 Year PG Program in Liberal Arts and 2 Year PG Program in Media Communication, with minimum 80 Credits (including 8 Credits [1 DSC, 4 DEC and 3 GEC] and 72 Credits [36 DSC and 36 DEC] in Geography)

1 Year PG Program in Liberal Arts with Research and Research, with minimum 40 Credits, comprising 8 Credits [4 DSC, 4 DEC] in the Core Discipline and 32 Credits [16 DSC and 16 DEC] in Geography

1 Year PG Program (Honors) in Liberal Research, with minimum 40 Credits, comprising 8 Credits [4 DSC, 4 DEC] in the Core Discipline and 32 Credits [16 DSC and 16 DEC] in Geography

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POST GRADUATE PROGRAMS IN GEOGRAPHY

TABLE 4 AFTER COMPLETION OF THREE-YEAR UG PROGRAM [3+2] / AFTER COMPLETION OF FOUR-YEAR UG PROGRAM [4+1]

MA IN GEOGRAPHY – PART 2 (LEVEL 6.5) – SEMESTER IV – LIST OF COURSES

UPC	COURSE CODE	COURSE NAME	CREDITS L	T	P	Total
		Discipline Specific Core (DSC) Courses				
	[illegible]	[illegible]	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
		Discipline Specific Elective (DSE) Courses				
	[illegible]	Applied Climatology (Practical)	2	0	2	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	Energy Geographies	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	Geography of [illegible]	3	1	0	4
	[illegible]	Geography of Health	3	1	0	4
	[illegible]	Geography of [illegible]	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	Regional Geography of India	3	1	0	4
	[illegible]	[illegible] India	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	[illegible]	3	1	0	4
	[illegible]	Urban and Regional Planning	3	1	0	4
		[illegible]				
	[illegible]	[illegible]	3	0	1	4
		[illegible]				
	[illegible]	[illegible]	1	0	1	2
		[illegible]				
	[illegible]	[illegible]	1	0	1	2
		Dissertation / Academic Project / Entrepreneurship				
	[illegible]	Dissertation / Academic Project / Entrepreneurship	0	0	4	4
	[illegible]	Dissertation / Academic Project / Entrepreneurship	0	0	[illegible]	[illegible]

[illegible]

DISCIPLINE SPECIFIC CORE [DSC] COURSE — GEOGRAPHY PAPER [DSC] [X] [XX] [XXX] [XXXX]

Course title & Code	Credits	Distribution (hours per week)			Eligibility (if any)	Prerequisite
		Lecture	Tutorial	Practical / Practice		
GEOGRAPHY PAPER [XXX] [XXXX]	4	3	2	0	BA/Bsc in Geography	Nil

Learning Objectives

The learning objectives of this course are:
1) To provide knowledge of the historical development of Geographic thought.
2) To enable students to comprehend the conceptual evolution of the principles along with the major philosophical influences.
3) To promote an understanding of the history, approaches and relevance of Modern Geographical Thought in current regional and environmental issues.

Learning Outcomes

Having completed this course, students will have:
1) Knowledge and thorough knowledge of the growth, development, principal schools and approaches of geography from 1930 to the present time, this includes.
2) Knowledge of emerging areas and new dimensions within the discipline.
3) An appreciation of the dynamic, complex and evolutionary nature.

Course Outline:

THEORY (45 hours)

Unit I (12 hours)

Brief Discipline History: Early origins, regional differences and shift paradigm; origin, the evolution, modern geography, and the concept of space, a contested discipline.

Readings for Unit I:

- Nayak, A. & Jeffrey, A.N. (2011) Geographical Thought: An Introduction to Ideas in Human Geography. Pearson Prentice Hall. Unit I (Chapter 1 Geographical Legacies: the Imperial Traditions)

- [illegible] R. J. "Paradigm and Revolution in Evolution?: Observations on Human Geography since the [illegible] World War." Progress in Human Geography 2, no. 2 (June 1978): 169-206. https://doi.org/10.1177/030913257800200201.
- Gregory, D., Johnston, R., Pratt, G., Watts, M. and Whatmore, S. (eds. The Dictionary of Human Geography. John Wiley & Sons, 2011.

Unit 2: (11 hours)

Philosophical Influences and subfields of Modern Geography: Influence of Environmental geographies, Relativism, Marxism and development of critical geographies and feminist geographies, Structuralism, Post-structuralism and Post-colonialism, development of new modern geographies

Readings for Unit 2

- Daly, A., Tight, M., Johnson, L., Clegg, S. and Shin, J.M. eds. (2013). Routledge Handbook of Tertiary and Technical Geographies. Routledge. (Introductory Chapter: Establishing, placing, regulating and living Colonial geographies).
- Cooper, P. (2014). A student's introduction to Geographical Thought. Sage, UK (Chapter 1: Pages [illegible])
- Hubbard, P., et al. (2002). Thinking [illegible] Routledge. (Chapter 2: Pages 1), (Unit 3: Section 2.3, Pages 4), (Unit 4: Section 1.3, Pages 88-9).

Unit 3: (21 hours)

Ontological turns, Philosophy and New Theories in Geography: New ontologies of space and place, critical turn, continued turn, narrative turn, fictionals and politics of representation, decolonizing geographical research, Grounded Theory, Mixed Theory

Readings for Unit 3

- Anderson, Kay, and Susan J. Smith. "Emotional geographies." Transactions of the Institute of British geographers 26, no. 1 (2001): 7-10.
- Davidson, Joyce F., and Roberta M. Hill. "The narrative turn in social research." Counterpoints 389 (2011): 37-53.
- Hancock, Amanda. "Rethinking the narrative turn: What does storytelling mean in research." In Political ecologies of knowledge. Canadian Geographies/Geographies Canadiennes, vol. 1, p. 2012.

Unit 4: (11 hours)

Future of Geography: Drivers of global interaction, emerging subfields, difference, diversity and greater inclusivity in a globalizing world.
Readings for Unit 4

- [illegible], D. "The future as an emergent [illegible] in geographical [illegible]." [illegible] and Planning D: Society and Space [illegible] [illegible]
- Rose-Redwood, Reuben, Cindy Ann Rose-Redwood, [illegible], [illegible], [illegible] Cheng, [illegible], [illegible] et al. "Re-imagining the futures of geography [illegible]." *Dialogues in Human Geography* 14, no. 2 (2024): 177–191.
- [illegible], S. "The future of geography." [illegible] 22, no. 2 (2012): 290-291.

Tutorial Exercise **(15 hours)**

1. Locating oneself in a [illegible] [illegible]: [illegible] [illegible] [illegible] school of privilege
2. Having geographies from the historically [illegible] perspectives, [illegible] contributions of [illegible] Dalit, Decolonialisation of Geography, Urban Geography
3. "Whose Geography?" On the History of Geography [illegible]

Suggested Readings

- Agnew, N. "Behavioural Geography." In International Encyclopedia of Geography: People, the Earth, Environment and Technology: People, the Earth, Environment and Technology. John Wiley & Sons (2017): 1-13.
- [illegible], K., "Postcolonial Geographies: Edward Said" in Hubbard, P., Kitchin R. & Valentine G. (Eds.) "Key Texts in Human Geography", Sage, 2008, pp. [illegible]
- Murphy, A. B. "Geography's crosscutting themes: Golden anniversary reflections on 'the four traditions of geography'".
- Pattison, W. D. (1964) *The Four Traditions of Geography*. Journal of Geography 63 (5), pp 211-216.
- [illegible], L. W. 2015. Feminist geography. International Encyclopedia of the Social & Behavioral Sciences, [illegible]
- Women and Geography Study Group. *Feminist geographies: explorations in diversity and difference*. Routledge 2014.

DISCIPLINE SPECIFIC CORE (DSC) COURSE
GEOGRAPHY: LAND, OCEAN AND ATMOSPHERE INTERACTION

Course title & Code	Credits	Distribution (Hrs per week)			Eligibility Criteria	Pre-requisite
		Lecture	Tutorial	Practical / Practice		
GEOG-C202: LAND, OCEAN AND ATMOSPHERE INTERACTION	6	5	1	0	B.A. (Hons.) in Geography	Basic Knowledge of Geography

Learning Objectives

The learning objectives of this course are as follows:

- To understand the fundamental concepts and interdisciplinary issues of Earth system science and the interactions between the major spheres.
- To study relations between physical and biogeochemical linkages in the land–ocean–atmosphere system and their role in global processes.
- To examine ocean–atmosphere coupling phenomena and broad-scale climate dynamics.
- To examine patterns and mechanisms of climate variability, including sea surface warming, teleconnections, and emerging modes of variability.

Learning Outcomes

On successful completion of the course, students will be able to:

- Analyse interactions between Earth's spheres using systems and geographical perspectives.
- Evaluate coupling processes at land–ocean and ocean–atmosphere interfaces, including boundary layer dynamics and biogeochemical cycles.
- Explain mechanisms of interannual to multi-decadal climate variability and their teleconnections with far-field impacts.
- Assess the natural and coupled climate variability patterns, including emerging phenomena like Pacific Warm Pool and subseasonal signals.

Course Outline:

THEORY (60 hours)

Unit I: (12 hours)

Introduction to Earth System Science (Theory): Definition and scope of Earth System Science, Geographic perspective in Earth System Science, connection between the spheres

Readings:

- Yadav, U.S., 2018. Essentials of Atmospheric and Oceanic Dynamics. Cambridge University Press. doi:10.1017/9781108443425
- Kump, L. R., Kasting, J. F., & Crane, R. G. 2010. The Earth System (3rd Edition). Prentice Hall.

Unit 3: (11 hours)

Land-Ocean Interaction (Theory): Human dimensions: Drivers, Coupling, Processes, Land ocean interface, Problems and issues.

Readings:

- Mitra, A. K., 2015. Introduction of Land, Ocean and Humans: A Unified Perspective, 1st ed. CRC Press. https://doi.org/10.1201/b18128
- Arnold Strahler, Pearson Prentice (ed.) 2014. The Science Around Us, Wiley Press.

Unit 5: (11 hours)

Ocean-Atmosphere Interaction (Theory): Significance of ocean-atmosphere interface, coupling phenomena, concept of boundary layer, ocean-atmosphere derivatives and its models.

Readings:

- Holton, J., 2020. Dynamics of The Tropical Atmosphere and Ocean, Dynamics of The Tropical Atmosphere and Ocean, Wiley. doi: 10.1002/9781118818688.ch00
- Orr, J. Rayes 2018. Anthropogenic Ocean Acidification, Oxford University Press.

Unit 6: (11 hours)

Sea surface warming and Climate variability (Theory): Interannual variability and decadal variability, teleconnection of India summer monsoon with various oscillations in Indian Ocean, Effects and ENSO Models, Global impact of ENSO, IOD and ENSO Modoki, New facets of climate variability, Negative Skew, Coefficient Nino, Sub tropical cyclone.

Readings

- Nakano, Y., Morita, S., 2023. Causal Analysis for Climate Study: Theory and Application. Causal Analysis for Climate Study: Theory and Application. CRC Press. doi:10.1201/9781003264668
- Sahoo, S.K., 2020. Tropical and Extratropical Air-Sea Interaction. Modes of Climate Variations. Tropical and Extratropical Air-Sea Interaction. Modes of Climate Variations. Elsevier. doi:10.1016/b978-0-12-818156-0.00010-2

Tutorial Exercises (10 hours)

- Discussion on the interactions between Earth's four spheres using a systems approach and geographic perspective with case-study examples.
- Identification and analysis of land-water coupling processes in the drylands using schematic diagrams and case studies.
- Discussion on ocean-atmosphere teleconnection dynamics in tropical regions with emphasis on coupling phenomena.
- Analysis of teleconnection patterns between Indian summer monsoon and ENSO, Indian Ocean Dipole and ENSO events.
- Review and discussion of emerging climate variability studies with additional attention, focusing on their global impacts and mechanisms.

Possible Research Topics (Optional)

Suggested Readings

- Hall, B.K., 2004. Homeostasis and Climate Correlation. Springer Nature.
- Saha, K., Dakua, S.R., Yamakuchi, Y., Tajima, K. and Yamagata, T., 2002. ENSO and ENSO Linkages to the summer monsoon flows of Chinese river in Indonesia. Climate Dynamics. DOI: 10.1007/s00382-002-0261-2. Volume 20, issue 3-4, pp. 327-339.
- Saha, K., Dakua, S.R., Rizvan, F., Silva, R.V., Pathak, D., Saha, K., Singh, B.B. and Yamagata, T., 2014. ENSO teleconnections extremely-low streamflow of the Barnadi River in Assam, China. Dynamics. March, 42(3-4):1-16. DOI: 10.1007/s00382-013-1800-3
- Swadhin K. Behera and Toshio Yamagata, 2018. Indo-Pacific Climate variability and Predictability. World Scientific Publishing.
- Nakamura, J., Lehr, U., Sage, T., 2016. "Elements" in the Climate System: How Developments in the Extraterrestrial Cross-Atmosphere Interaction Research. Springer Nature. doi:10.1007/978-4-431-54027-1
- Global Environmental Change in South Asia, 2018. Global Environmental Change in South Asia. Springer Netherlands. https://doi.org/10.1007/978-3-319-99715-7
- S. Dyer, J. Talbot, R. Pennifold, J.-P. Rampaney, C.D. Beardsley, and J.-P. 2014. The Land/Ocean Interaction in the Coastal Zone of West and Central Africa. Estuaries of the World. Springer International Publishing Switzerland.
- Glantz, J.R. 1992. The Atmospheric Sciences. Cambridge University Press.

- [illegible] and Tobias Vanagas. 2013. Overview of the Indian and Pacific Oceans. Chapter 6. [edit.] Moffatt, [illegible] and Strandberg, E. Environmental Hazards: The Tidal Dynamics and Oscillations of Complex Systems. [illegible] Eastern, [illegible] pp. [illegible]. [illegible].

[illegible] [illegible] Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-E301: CITIES OF GLOBAL SOUTH

[illegible]	[illegible]	[illegible] Lecture	Tutorial	Practical/ Practice	[illegible] Criteria	[illegible]
GEOG-E301 CITIES OF GLOBAL SOUTH	4	3	1	0	BA/BSc (Programme)	

Learning Objectives

- To critically examine the diverse and complex processes shaping urbanization in the Global South.
- To engage with comparative and grounded analysis of urban issues beyond Eurocentric frameworks.
- To develop comparative, historically informed, and place-specific understandings of contemporary urbanisms.

Learning Outcomes

[illegible] competent [illegible], students will [illegible]:

- To develop an understanding of how colonial legacies, postcolonial state building, global economic shifts, and local socio-spatial dynamics [illegible] cities of Global South.
- Explore urban issues using specific analytical and conceptual tools in the Global South to assess their effects, impacts, and sustainable [illegible] policy interventions.
- Apply theoretical frameworks and empirical knowledge to assess urban development, planning initiatives, and policy interventions, particularly within the context of cities in the Global South.

Course Outline:

[illegible]	(45 hours)
Unit 1:	(12 hours)

Conceptualising Global Cities of the South: Defining the City: Theoretical Approaches and Key Debates; global and local urbanisms, tactical urbanisms and [illegible] principles of urban theory

Readings:

- Robinson, J. (2016). Comparative Urbanism: New Geographies and Cultures of Theorizing the Urban. *International Journal of Urban and Regional Research*, 40(1), 187–199.
- Roy, A. (2009). The 21st-Century Metropolis: New Geographies of Theory. *Regional Studies*, 43(6), 819–830.
- Faranak Miraftab, & Neema Kudva. (2015). *Cities of the Global South Reader*. Routledge. (Chapter 1)

Unit 2: (12 Hours)

Cities in the Global Economy: Urban restructuring under neoliberal globalization; Emerging Urban Economies – Informality and urban economy; Cities in roles of global economic hubs; Insecurity, inequality and new forms of urban marginalization

Readings for Unit 2

- Sassen, S. (2002). *Global Networks, Linked Cities*. Routledge. (Chapters 1 & 3)
- McFarlane, C. (2012). Rethinking Informality: Politics, Crisis, and the City. *Planning Theory & Practice*, 13(1), 89–108.

Unit 3: (12 Hours)

Politics and Governance in Cities of the South: Urban Governance and Local Politics; Community Development and Empowerment – right to the city and social justice

Readings:

- Parnell, S., & Oldfield, S. (Eds.). (2014). *The Routledge handbook on cities of the global south* (Vol. 2014). London: Routledge. (Part 4) Chapters 22, 23, 27
- Watson, V. (2014). Co-production and collaboration in planning – The difference. *Planning Theory & Practice*, 15(1), 62–76.

Unit 4: (11 Hours)

Futures of Urbanism in the Global South: Sustainable Urban Futures – Climate resilience, adaptation and planning; Smart Cities and Technological Futures

Readings:

- Datta, A. (2018). Postcolonial urban futures: Imagining and governing India's smart urban age. *Environment and Planning D: Society and Space*, 37(3), 393–410.
- Aurigi, A., & Odendaal, N. (2021). From "Smart in the Box" to "Smart in the City"

Rethinking the Socially Sustainable Smart City in Context. Journal of Urban Technology, 1–21.

Tutorial Exercises **(10 Hours)**

- Group discussion on the conceptual evolution of terms "Smart Urban Cities" to "Global South Cities."
- Based on a case study, the students will reflect on key role (e.g., Public and how does it challenge classical urban theory?
- Based on news stories, students will present on "Sustainability as Survival Strategy" at particular cases — eg. Dharavi (Mumbai), Kibera (Nairobi), or Khayelitsha (Cape
- Group discussion on — How do "everyday armies" shape governance in your city?
- Class debate on Corporate Smart City Missions (e.g., Delhi, Nairobi) through initiatives and equity lens.

Practical Related to Assessment

Suggested Readings:

- Castells, Manuel (2009) The Information Age: Economy, Society and Culture (v. 1, 2). The Rise of Network Society, The Power of Identity, End of Millennium. (Second edition) Oxford: Blackwell Publishing.
- Forrest, Meryl, Glaeser, Edward (2008) The Reinvent Society? Have Knowledge to Today. Washington, DC, Center for Transatlantic Relations.
- Gupta, A. And Sheller, A. (eds) (2017) Mega-Urbanized ex in Global South: Peri-Urban and New Urban Studies of the Post-ordinal Metro. Routledge, London and New York.
- Hall, P. (2002) Cities in Civilization. Culture, Innovation and Urban Order. Pearson.
- Hall, P. (2003) Cities in Time and Space: An Historical History of Urban Planning and Design in the Twentieth Century. 3rd Edition, Oxford: Blackwell.
- Healey, P. (2010) Making Better Places: The Planning Project in the Twenty-first Century. 2nd Edition, London: Palgrave.
- Sassen, Saskia (2001) Global Networks, Linked Cities, New York: Routledge.
- Scott, A.J. (2002) Global City-Regions: Trends, Theory, Policy, Oxford: OUP.
- Southworth, M. (1989) The Sonic City in Time and Space, Cambridge: Cambridge University Press.
- Parnell, S. and Oldfield, S. (2014) The Routledge Handbook on Cities of the Global South. Routledge: London and New York.
- Chattopadhyay, S. 2012. Unpacking the City: Urbanities in a New Millennium. Delhi: Oxford University Press.
- Farmaff, J. Farmaff, L. (2011) Theory from the South: Or, How Euro-America is Evolving Toward Africa. London: Routledge.
- De Boeck, F. Baloji, S. (2016) Suturing the City: Living Together in Congo's Urban Worlds. London: Autograph.

- [redacted]

[redacted]

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
(DSE-E302: CLIMATE CHANGE AND ADAPTATIONS)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Lecture	Tutorial	Practical/ Practice		
GEOG-E302: CLIMATE CHANGE AND ADAPTATIONS	4	4	0	0	BA/Bsc or Geography	NIL

Learning Objectives:

The learning objectives of this course are as follows:

- [illegible]
- [illegible]
- [illegible]

Learning Outcomes:

After completion of this course, students will be able:

- [illegible]
- [illegible]
- [illegible]

Course Outline:

THEORY	60 hours
Unit 1	12 hours

Drivers of Climate Change: [illegible]

Readings for Unit 1:

1. Adger, W. N., (2006). Vulnerability. Global Environmental Change 16 (3A 268-281)
2. Agrawala, S. and Fankhauser, S. (Eds.), (2008). Economic Aspects of Adaptation to Climate Change: Costs, Benefits and Policy Instruments. OECD, Paris.

Unit 2:	12 hours

Measuring Climate Change: [illegible]

Readings for Unit 3

1. [illegible]
2. [illegible]

Unit 3: [illegible]

Empirical Assessment of Climate Change Adaptation: Assessment of Early adaptation Measures Benefit and Costs[illegible]

Readings for Unit 3

1. [illegible]
2. [illegible]

Unit 4: [illegible]

Policy Framework for Climate Change Adaptation: Role of Indigenous Traditional Knowledge (ITK), International Climate Change Agreements and Local Governance

Readings for Unit 4

1. [illegible]
2. [illegible]

Practical Exercises [illegible]

- Prepare a short GIS compiling different scientific agencies recommending climate change
- Identify and use new datasets related to adaptation to climate change [illegible]
- Write a brief assessment of climate change impacts on a chosen natural, human or social ecosystem
- Review a recent IPCC report section and summarize its key findings on adaptation
- Examine selected examples of Indigenous Traditional Knowledge (ITK) used in climate resilience
- Prepare a checklist explaining the link between SDGs and climate change adaptation
- Compare two case studies of climate governance highlight [illegible]

Practical Record [illegible]

Suggested Readings

- Bowers, L. N. (2011) Climate change adaptation: Rules for a vulnerable planet. New York: Nova Science.
- IPCC (2007). Climate Change 2007: The Physical Science Basis. In: Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S.D., D. Qin, G. K., Pitaluga, M., Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.
- Mahajan, Shrestha (2004), Fragile environment, Manak Publications Pvt. Ltd.
- NIDM/A (2008). National Disaster Management Guidelines—Management of Landslides and Snow Avalanches. Publication of National Disaster Management Authority, Government of India, New Delhi.
- Pandey, R., Jha, S., (2011). Climate vulnerability index - measure of climate change vulnerability to communities: a case of rural Lower Himalayan India. Mitigation and Adaptation Strategies Global Change. Published online December 2011.
- Singh, Saroj (2015). Environment Bhugol. Pratap Pustak Bhawan Allahabad (Hindi).

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG. CED: CONTEMPORARY CONFLICTS AND GEOGRAPHIES OF PEACE

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GEOG-DSE: CONTEMPORARY CONFLICTS AND GEOGRAPHIES OF PEACE	6	5	1	0	RADAR in Geography	Basic Knowledge of Political Geography and Contemporary Issues

Learning Objectives

The learning objectives of this course are as follows:

- Understand the spatial dimensions of conflict and peace by engaging with critical theoretical and empirical frameworks within political and social geography.
- Analyse contemporary geographies of violence, such as [illegible] key actors, institutions, weapons systems, and the socio-environmental impacts of conflict in India and the global context.
- Examine peacebuilding strategies and other innovative initiatives for [illegible] conflict-affected societies, and critically assess their effectiveness and limitations.

Learning Outcomes:

On the completion of the course, students will be able:

- [illegible] the causes and dynamics of [illegible] conflicts in India and globally.
- To analyse the geographic drivers and multi-level responses—institutional, grassroots, and policy-based—to conflict and peace.
- To apply spatial concepts and geospatial tools to map conflict areas and assess peacebuilding strategies.

Course Outline:

[illegible]	[illegible] hours
Unit-I	[illegible] hours

Geographies of Conflict and Peace – Concepts and Frameworks: Typologies of conflict (territorial, identity-based, resource, civil, environmental); Peace(s): negative, positive, cultural, political ecology, peace geography; spatial dimensions of violence and recovery; Role of maps and mapping in conflict zones.

Readings for Unit 1:

- Pain, E. (2011). Introduction to Geopolitics. Oxford: Routledge.
- Kaldor, K. (2004). Human Security: An Introduction to the Concept, Scope, and Theory. South-west Forum for Human Rights.
- Gregory, D. & Pred, A. (2007). Violent Geographies: Fear, Terror, and Political Violence. Routledge.

Unit 2: [11 hours]

Conflict and Peace in Africa – Regions, Resources, and Institutions: Regional patterns of conflict: Northern Uganda, Somalia, Great Lakes, Sahel, Horn of Africa; resource conflicts: oil, minerals, water, land; migration, displacement, refugees, and internally displaced persons (IDPs); role of African Union (AU), Regional Economic Communities (RECs), UN, NGOs, and peacebuilding mechanisms.

Readings for Unit 2:

- Abdi, A. O. (2011). Conflicts in South Sudan: Causes, Consequences, and Solutions. South Sudan Publishers.
- Le Billon, P. (2005). Fuelling War: Natural Resources and Armed Conflicts. Routledge.
- Galtung, J. (1996). Peace by Peaceful Means: Peace and Conflict, Development and Civilization. Sage.

Unit 3: [11 hours]

Global Conflicts – Cases, Spaces, and Responses: Geographical analysis of major conflicts: Israel–Palestine, Ukraine, Rohingya, East China Sea, Horn of Africa, Refugee flows, displacement corridors, and global responses; spatial logics of war economies; roles of global institutions – UN, ICJ, ICC, NATO, SAARC and peacekeeping missions.

Readings for Unit 3:

- Sorensen, S. (2021). The Oxford Handbook of Peace: An Interdisciplinary Guide to Changing the World. Oxford University Press.

- Wallensteen, P. (2019). Understanding Conflict Resolution. Sage.
- Kaldor, M. (2018). Global Security Cultures. Polity Press.

Unit 6 **(11 hours)**

Peacebuilding, Spatial Justice, and Emerging Threats: Post-conflict reconstruction, spatial justice, and territorial reconciliation. Peace parks, urban safe zones, memorial landscapes, and place-based healing. Grassroots diplomacy, indigenous, gender and [illegible] dimensions of peacebuilding. Emerging conflict zones: climate-induced regions, cyber and [illegible] warfare spaces, contested borders, [illegible], Indo-Pacific, Sahel, [illegible]. Digital surveillance, misinformation, AI-driven insecurity; early warning systems and GIS mapping.

Readings for Unit 6:

- Megoran, N., McConnell, F., & Williams, P. (Eds.) (2014). Geographies of Peace. I.B. Tauris.
- [illegible] (2011). Peace Studies: An Introduction to the Concept, Scope, and Themes. South Asian Forum for Human Rights.
- Kaldor, M. (2013). New and Old Wars: Organised Violence in a Global Era.

Tutorial Exercises (30 hours)

- Select a conflict-prone region in India (Kashmir, Manipur, [illegible]) or an urban hotspot and discuss its different identity dynamics and spatial patterns.
- Evaluate the role of key Indian institutions (Election Commission, NHRC, NIA, or Peace Committees) in managing conflict and promoting peace.
- Compare any two global conflicts (Israel-Palestine, Ukraine-Russia, [illegible], South China Sea) based on their geopolitical causes and territorial claims.
- Map or describe refugee and displacement patterns from a region of conflict and examine how borders and humanitarian geographies shape movements.
- Choose a case of post-conflict reconstruction (e.g., Nepal, Sri Lanka, Rwanda) and examine how spatial justice and place-based healing are applied.
- Identify an emerging conflict zone (climate-induced regions, cyber warfare, misinformation, [illegible]). Evaluate its spatial implications and propose security planning approach.

Practical Research for Applicants

Suggested Readings:

- Agnew, J., 2009. Geopolitics: re-visioning world politics. 2nd ed. Routledge, New York.
- Baruah, S., 2020. In the Name of the Branch: India and its Northeast. Stanford University Press.
- Finn, C. and Darrason, K.E. eds., 2021. Making geographies of peace and conflict. Taylor & Francis.
- Gilbert, J.L., 2014. The Israeli-Palestinian conflict: One hundred years of war. Cambridge university press.
- Khilnani, S. ed., 2013. Routledge Handbook on Security and Governance in Northeastern India: Boundary Conflicts, Militarization and Development Challenges. Taylor & Francis.
- Lowenthal, J.F., 1995. Mediation with rebels: A review of third party efforts. Washington, DC: USIP.
- Taylor, P.J., 1996. Critical geopolitics: The politics of writing global space. University of Minnesota Press.

Digital materials: Web Application

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOGRAPHY STUDIO (PRACTICAL)

[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
		Lecture	Tutorial	Practical / Practice		
GEOG-504: CULTURAL GEOGRAPHY STUDIO (PRACTICAL)	4	0	0	8	NIL/Basic Geography	NA

Learning Objectives

The learning objectives of this course are as follows:

- To familiarize students with the practical techniques for analysing urban spatial patterns and cultural landscapes.
- To develop methodological skills for conducting socio-cultural interviews and field experiments in urban spaces.
- To foster interdisciplinary approaches to urban cultural research through multimodal presentation techniques.

Learning Outcomes

After completing this course, students will be able to:

- Apply advanced theoretical concepts and methodological models to analyze urban spaces using maps and geo-visualizations.
- Critically evaluate the relationship between urban interventions, socio-economic and political processes.
- Produce [illegible] research projects that effectively communicate urban complexities.

Course Outline

THEORY (20 hours)

Unit 1: (7.5 hours)

Theoretical Foundations and Methodological Approaches: Frameworks for urban cultural research, methods in urban research, Ethics in Fieldwork, Ethnography and Participant Observation, principles, ethics and [illegible] knowledge

Readings for Unit 1:

- Robinson, J. (2016). Thinking cities through elsewhere: Comparative tactics for a more global urban studies. *Progress in Human Geography, 40*(1), 3–29.
- Soja, E. (2008). Urban geographies: New urban geography and the ethnography of space. *Progress in Human Geography, 32*(1), 227–233.
- Ward, K. (2010). The world in 1 city: Globalization and the future of "doing" urban geography. *Urban Geography*, 1–12.

Unit 2: (7.5 hours)

Infrastructures and Materialities: Forms and networks; material politics; urban resources and services; digital infrastructures; platform urbanism. Participatory mapping and information cartography.

Readings for Unit 2:

- Simone, A. M. (2004). People as infrastructure: Intersecting fragments in Johannesburg. *Public Culture, 16*(3), 407–429.
- Kitchin, R. (2016). The ethics of smart cities and urban science. *Philosophical Transactions of the Royal Society A, 374*(2083), 1–15.
- Arvidsson, A. (2017). Notes on the three overlapping infrastructures of classroom 2. *Media Theory in Focus*.

Unit 3: (7.5 hours)

Urban Socialities and Spatial Practices: Social interactions and public space dynamics; sociability, solidarity, and cultural practices; embodied experiences; urban rhythms; temporal patterns; relational and everyday spatial practices; everyday citizenship and rhythmanalysis.

Readings for Unit 3:

- Iacovone, M. (2021). The politics of embedded urban ownership: Roma people and the right to housing in Bucharest, Romania. *Ethnicities, 21*(1), 162–181.
- Latham, A., & Layton, J. (2019). Social infrastructure and the public life of cities: Studying urban sociability and public spaces. *Geography Compass, 13*(7), e12444.
- Middleton, J. (2018). The socialities of everyday urban walking and the 'right to the city'. *Urban Studies, 55*(1), 296–315.

Unit 4: (7.5 hours)

Urban Politics and Transformative Practices: right to the city and social justice; governance; power; digital activism; technological assemblages; urban imaginaries; alternative spatial practices; spatial ethnography; social mobilization; tactical urbanism.

Readings for Unit 4:

- Iveson, K. (2013). The politics of inscribing. Civic protest, mass power and the contesting of urban space in the Occupy movement. *Antipode, 45*(5), 1346–1364.
- Brenner, N., & Katsikis, N. (2020). Urban theories beyond planetary thinking: Lefebvre and the 'completely urban'. *Environment and Planning D: Society and Space, 38*(3), 542–557.

- [illegible] (2025). [illegible]

Tutorial Exercises: Not Applicable

Practical Section:

(45 Hours)

Any Five to be completed:

- **Positionality Mapping and Reflexive Practice**
  [illegible]
- **Participatory Infrastructure Mapping**
  [illegible]
- **Urban Space Walks and Dérives**
  [illegible]
- **Sensory Ethnography and Rhythmanalysis**
  [illegible]
- **Everyday Spatial Tactics Documentation**
  [illegible]
- **Digital Activism and Platform Urbanism Analysis**
  [illegible]
- **Right to the City and Tactical Intervention Proposal**
  [illegible]

Suggested Readings:

- Lefebvre, H. ([illegible]). The Production of Space. [illegible]
- De Certeau, M. ([illegible]). The Practice of Everyday Life. University of California Press. [illegible]
- Roy, A. ([illegible]). "The 21st-Century Metropolis: New Geographies of Theory." Regional Studies, [illegible]
- Harvey, D. ([illegible]). Rebel Cities: [illegible] (Chapters [illegible])
- McFarlane, C. ([illegible]). Learning the City: [illegible] (Chapter [illegible])
- Pink, S. ([illegible]). Doing Sensory Ethnography [illegible] Sage. (Chapters [illegible])

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOGRAPHY DEVELOPMENT THEORY AND REGIONAL POLICY

[illegible]	[illegible]	Lecture	Tutorial	Practical / Project	[illegible]	[illegible]
GEOGRAPHY DEVELOPMENT THEORY AND REGIONAL POLICY	6	5	1	0	Subject to Categories	Basic knowledge of Economics

Learning Objectives:
The learning objectives of this course are as follows:

- This course studies the conception of space in Anglo American traditions of regional development theory.
- It says the theoretical foundation for the various development concepts and models, which originated and [illegible].
- It also critically evaluates the numerous regional policies originating from the above theories.

Learning Outcomes:
Following completion of this course, students will be able:

- The student will be aware of Anglo American economic theories and concepts [illegible] of the regional development theories.
- The student will know how the development theories evolved over four main time periods, with successive variations in emphasis and characters:
  a) Urban-industrial Growth Pole Strategies (1950-70)
  b) New Regional Development Strategies (1970-90)
  c) Liberalization, Privatization and Globalization (1990-2010)
  d) Sustainable Human Development (2010 onwards)
- The students will learn about the regional policies emerging out of these development theories.

Course Outline:

THEORY (36 lectures)

Unit 1 (5 lectures)
Introduction: Origin and Context, Concept of Space and Region, Delimitation of Region, Planning and Space Policy

Readings

- Gore C. 1984. Regions in Question: Space, Development Theory and Regional Policy. London: Methuen.

Unit 2: (10 Hours)

Common Regional Policy Objectives: Regional Imbalances as a Policy Problem; Growth, Income Redistribution and Spatial Inequality

Readings

- Friedmann J. 1966. Regional Development Policy: A Case Study of Venezuela. Cambridge: MIT.
- Hirschman A. O. 1958. The Strategy of Economic Development. New Haven: Yale University Press.
- Myrdal G. 1957. Economic Theory and Underdeveloped Regions. London: Duckworth.

Unit 3: (10 Hours)

Rural Regional Planning Strategies: Urban-Industrial Growth Pole Strategies; Polarization and the Development of Underdevelopment; New Rural-Regional Development Strategies; Territorial Regional Planning; Rural Development and Regional Planning

Readings

- Friedmann J. 1979. Urbanization, Planning and National Development. Sage Pub., London.
- Stohr W. B. and Taylor D. R. F. 1981. Development from Above or Below? The Dialectics of Regional Planning in Developing Countries. John Wiley, Chichester.
- Lo Fu-chen and Salih K. 1978. Growth Pole Strategy and Regional Development Policy: Asian Experience and Alternative Approaches. Pergamon: Oxford.

Unit 4: (10 Hours)

Globalization of Development Policy: Liberalization, Privatization and Globalization; Sustainable Human Development

Readings

- Gore C., Kohler G., Reich U.P., and Ziesemer T. 1996. Questioning Development: Essays on the Theory, Policies and Practice of Development Intervention. Metropolis-Verlag, Marburg.
- Hunt D. 1989. Theories of Development. Guilford Press, New York.
- Gore C. 2000. "The Rise and Fall of the Washington Consensus as a Paradigm for Developing Countries." World Development. 28 (5): 789-804. Elsevier Science Ltd.

TUTORIALS (15 hours)

Tutorial Exercises

- How is the neo-classical view of space in regional development different from other theories?
- Debate on efficiency and equity.
- Describe problems of urban slums.
- Explain Problems in large cities and Problems of large city.
- How the concept of growth pole transformed into a regional theory?
- What are the reasons for failure of growth pole strategies?
- What are the essential ingredients of a regional development strategy?
- How did the development policy globalize?

- [illegible]
- [illegible]

Practical Record: [illegible]
Digital materials: [illegible]

Suggested Readings:

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

DISCIPLINE-SPECIFIC ELECTIVE (DSE) COURSE
GEOG-5.06: DIGITAL GEOGRAPHIES

[illegible]	[illegible]	Credit distribution of the course			Eligibility criteria	[illegible]
		Lecture	Tutorial	Practical / Practice		
GEOG-DSE: DIGITAL GEOGRAPHIES	6	4	1	2	XII/Class XII Geography	

Learning Objectives

- To critically examine the intersections between geography, digital media, and communication technologies.
- To analyse the role of digital media in constructing and mediating geographical knowledge and how these events with more spatial connections, experiences, and practices.
- To evaluate the impacts of digital media on social relations, activities, and economic geographies.

Learning Outcomes

[illegible]

- Critically assess the roles digital media play in creating and disrupting geographical knowledge.
- Examine how digital media platforms, initiatives, and technologies mediate geographical spatial relationships and geographical imaginations.
- Apply insights from digital geography to assess real-world concerns, addressing critical issues such as spatial justice, digital divides, place-making, and mediated experiences.

Course Outline

[illegible] [illegible] hours)

Unit 1 [illegible] hours)

Introduction to Digital Geographies: Conceptualising Digital Media, Space and Place; Theories and Technological Approaches to Digital Geography

Readings

- Agnew, P. C. (2008). Geographies of work and consumption. John Wiley & Sons. [Chapter 3]
- Castronova, A. (2014). Spatial media/form. Progress in Human Geography, 39(6), 725–741.
- Gill, J., Bhatti, Y., & Shrimankar, A. (2018). Digital twin, digital geography?. Progress in Human Geography, 42(1), 29–49.

Unit 2: (11 hours)

Digital Infrastructures: Forms of digital media and practices. Geographies of data centers and cloud computing. Urban informatics and city information models. Infrastructure determinism and Policy

Readings:

- Nafus, D. C., Leshed, G., Edwards, P. N., & Sandvig, C. (2010). Infrastructure matters more (platform studies) in the age of Google and Facebook. New Media & Society, 20(1), 199–219.
- Graham, M., & Dutton, W. H. (Eds.). (2019). Society and the Internet: How networks of information and communication are changing our lives. Oxford University Press. [Chapters 10, 19]
- Batty, C., & Van Ulzen, A. (Eds.). (2018). The digital and built urban environment: Intelligent cities and the data integrations and applications. Springer. [Chapter 11]

Unit 3: (11 hours)

Digital lives: Recommendations of accessing and purchase economy, digital and spatial constituent of everyday lives, digital activism and social mobilizations.

Readings

- Graham, M., & Dutton, W. H. (Eds.). (2019). Society and the Internet: How networks of information and communication are changing our lives. Oxford University Press. [Part 1 Chapters 5,8, 11, 18]
- Trere, E., & Van Lamen, A. (eds.). (2018). The digital arts and humanities: Neoteric ideas, social media and big data investigations and sustainability. Springer. [Chapter 4, 9.]
- Mowatt, R. (2017). The changing society, changing culture through data. Information, Communication & Society, 20(11), 1674–1675.

Unit 4: (11 hours)

Emerging issues and future directions: Some of the digital geographies and their potential societal impacts. Critical challenges and developments between digital divides, spatial justice, and inclusive digital practices.

Readings

- Mayer-Schönberger, V. (2013). The limits of big data: Challenges for governing in future

dimensions of memory, data and algorithms. New Media & Society, 27(1), 145[illegible]

- Couldry, N., & Mejias, U. A. (2019). The costs of connection: How data is colonizing human life and appropriating it for capitalism. In The costs of connection. Stanford University Press.

Tutorial Exercises (15 hours)

- Students individually create a digital concept map linking space, place, and media using Miro or Google Jamboard.
- Class Debate: "Are digital spaces real spaces?" — using readings from Adams (2009) and Ash et al. (2018).
- Students will conduct a case study analysis: Identify and map India's major data centre clusters (e.g., Hyderabad, Mumbai, Noida) — include locational factors, governance, and energy use.
- Students will conduct digital ethnography and document their daily digital connections for 48 hours and spatialize them on a map using Google My Maps or ArcGIS StoryMaps.
- Group discussion on "Futures of Digital Cities 2030" — emphasizing inclusivity and ecological sustainability.

Practical Record: Not Applicable

Suggested Readings:

- Ash, J., Kitchin, R., & Leszczynski, A. (2018). Digital Geographies. SAGE.
- Ash, J., Kitchin, R., & Leszczynski, A. (2024). Researching Digital Life. SAGE Publications Limited.
- Chun, W.H.K. and Keenan, T. (eds) (2006) New Media, Old Media: a History and Theory Reader. Routledge, London and New York.
- Graham, M. (2024, June 18). Digital Economies at Global Margins. MIT Press. https://mitpress.mit.edu/[illegible]digital-economies-at-global-margins/
- Graham, M., & Dutton, W. H. (2019). Society and the Internet: How networks of information and communication are changing our lives. Oxford University Press.
- Jenkins, H. Convergence Culture: Where Old and New Media Collide. New York: New York University Press. 2006.
- Kitchin, R. (2021). Data Lives. Policy Press.
- [illegible] (2022). Critical Data Studies. John Wiley & Sons.
- [illegible] and von Lünen, A. (eds) (2016) The Digital Arts and Humanities: Neogeography, Social Media, Big Data Integrations and Applications. Springer, Switzerland.
- [illegible], M. (2024). Geographies of [illegible] Platform Cultures. Springer Nature.

Digital materials: Not Applicable

DESCRIPTIVE SPECIFIC ELECTIVE (DSE) COURSE
(UNDERGRADUATE) DIGITAL IMAGE PROCESSING (PRACTICAL)

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GEOG-DSE7: DIGITAL IMAGE PROCESSING (PRACTICAL)	4	2	0	2	BA/BSc in Geography	Foundation in remote sensing

Learning Objectives:

- To make students acquainted with standard digital image processing techniques through hands-on practical exercises.
- To enable students to extract land-use/land-cover and other valuable information from the digital remote sensing images for different geographical applications.

Learning Outcomes:

Having completed this course, students will learn:

- Overview of Digital image processing and image enhancement techniques for better interpretation
- Understanding of multi-resolution data types and classification
- Understanding of Image Classification and Change detection techniques

Course Outline:

[illegible]	[illegible]
Unit I	[illegible]

Pre-processing: Digital image models for display and storage of digital data, radiometric and geometric corrections, image registration

Readings for Unit I:

- Jensen, J.R. 2016. Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition, Pearson.
- Gupta, R.P. 2018. Remote Sensing Geology, 3rd Edition, Springer.

Unit 3 (7 Hours)

Image enhancement: Colour Composites, contrast stretching, filtering, multi-temporal indices, image fusion

Readings for Unit 3

- Jensen, J.R. 2015, Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition, Pearson.
- Gupta, R.P. 2018, Remote Sensing Geology, 3rd Edition, Springer.

Unit 4 (7.5 Hours)

Classification: Supervised and unsupervised classification, accuracy assessment

Readings for Unit 4

- Jensen, J.R. 2015, Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition, Pearson.
- Mather, P. M., and Koch, M. 2011, Computer Processing of Remotely-Sensed Images, 4th Edition, Wiley-Blackwell.

Unit 5 (7.5 Hours)

Change Detection: Image and post-classification change detection, change detection matrix

Readings for Unit 5

- Jensen, J.R. 2015, Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition, Pearson.
- Mather, P. M., and Koch, M. 2011, Computer Processing of Remotely-Sensed Images, 4th Edition, Wiley-Blackwell.

Practical Hours (60 Hours)

- Georeferencing of spatial data in GIS platform
- Image radiometric correction
- Image spectral enhancements
- Digital thresholding and masking operations
- Image transformations: PCA and indices
- Image fusion exercise
- Unsupervised and supervised classification
- Accuracy assessment of classification
- Digital change detection

Suggested Readings

- Chen, M.L. 2014, Image Analysis, Classification and Change Detection in Remote Sensing, 3rd Edition, CRC Press.

- Gonzalez, R.C. and Woods, R.E. 2007. Digital Image Processing, 3rd Edition, Pearson.
- Gupta, R.P. 2018. Remote Sensing Geology, 3rd Edition, Springer.
- Jensen, J.R. 2005. Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Edition, Pearson Education.
- Joseph, G. 2005. Fundamentals of Remote Sensing, Orient Blackswan.
- Lakshmi, S. and Lakshmi, A. 2003. Practical Handbook of Remote Sensing, CRC Press.
- Liang, S. 2004. Quantitative Remote Sensing of Land Surfaces, Wiley.
- Mather, P. M. and Koch, M. 2011. Computer Processing of Remotely-Sensed Images: An Introduction, 4th Edition, Wiley-Blackwell.
- Richards, A. 2022. Multispectral Image Analysis using the Object-Oriented Paradigm, CRC Press.
- Sabins, F.F. 2007. Remote Sensing: Principles and Interpretation, 3rd Edition, Waveland Press.

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-E208: GEOGRAPHIES OF LIFE-FORCE AND ENVIRONMENT

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GEOG-E208: GEOGRAPHIES OF LIFE-FORCE AND ENVIRONMENT	4	3	1	0	BA(Hons.) Geography	No

Learning Objectives:

The learning objectives of this course are as follows:

- To understand the complexities of [illegible] systems in relation to [illegible]
- Students will learn how the [illegible] and [illegible] is [illegible]
- The students will be [illegible] in which knowledge systems, technologies and [illegible] developing and interacts the self and environment.

Learning Outcomes:

[illegible] this course, students will [illegible]

- The students will acquire in-depth [illegible] knowledge [illegible]
- The students will develop [illegible] knowledge on well-being, environment and healthy life
- Use geographical concepts to understand [illegible]

Course Outline:

THEORY (75 hours)

Unit I (12 hours)

Introduction: Circle of Plants, Open Vitality, Environment, The Energy Body & the universe, the Grounded Spirit principle

Readings for Unit I:

1. Gilson, R (2006) The Path of the Servant: Kundalini as Subtle Energy, from Tantra to New

Series, Yoga Book Series.

3. Samuel, G. and Johnston, C. 2013. Religion and the Subtle Body in Asia and the West. New York and London: Routledge.

Unit 2: (11 hours)

Urban Identities & Virality: Social Space, Public Space, Cyberspace and their effects on Life-style Energy

Readings for Unit 2

1. Rai, S., 2013. The body and the city: psychoanalysis, space and subjectivity. Routledge.
2. Zhang, P., 2020. The energetic economy of cyberchondriacs. Explorations in Media Ecology, 20(4), pp.475-496.

Unit 3: (11 hours)

Systems of Vitality: Yoga, Tantra, Tai Chi, Spatial Systems, Dance, Feng Shui

Readings for Unit 3

1. Abrahams, C., 2021. Exploring the therapeutic effects of yoga and its ability to increase quality of life. International Journal of Yoga, 4(2), pp.49-58.
2. Subramanya, A. and Sasidhara, S. 2004. Patanjali Philosophy and It's Yoga Approach for Self – Transformation : A Perceptual Study. http://dx.doi.org/10.2139/ssrn.4124199
3. Vasey, C., 1992. Design of settlements in the Swedish Sami. Journal of Cultural Geography, 12(2), pp.27-41.

Unit 4: (11 hours)

Spaces of Vitality: The Body, Breathe and Associated Practices (Physical Environments, Cultural Environments, Stimulation and the Vitality Economy)

Readings for Unit 4

1. Larsen, H. G., 2011. Subtle Bodies: Cartographies of the Soul, from Hatha to "the Heart". Body, Space & Technology, 10(1).
2. Sharma, S.R., Singhal, S., Kavita, J.P. and Tripathi, S.K., 2014. Emerging Trends and Psychological Influences on Yoga: A Study of Yoga Practices. SMC Journal, 1(1), pp.53-64.
3. Tiwari, T. and Jena, R. K., 2024. Interrelation of landscape typologies and urban planning in India: Cultivating Well-being and harmony in City Landscapes. In Intersections of Space and Memory (pp.199-215). Routledge.

Tutorial Exercises (15 hours)

- Effects of Different Physical Body & Energy Sets

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

[illegible]

[illegible]

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

[illegible]

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-E 301: GEOGRAPHIES OF SEXUALITIES

Course title & No.	Credits	Credit distribution of the course			Eligibility criteria	Prerequisite
		Lecture	Tutorial	Practical/ Practice		
(DSE-C301) GEOGRAPHIES OF SEXUALITIES	4	3	1	0	BA/BSc in Geography	NIL

Learning Objectives

The learning objectives of this course are as follows:

- To understand geographers' contributions to sexuality studies
- To know the ways in which sexuality mediates the production of space and place
- To introduce the relationship between body, sexuality and the environment towards self ownership

Learning Outcomes

On successful completion of the course, students will learn:

- Understand concepts and terminologies in geographies of sexualities and its intersections
- Reflect on sexuality as a key player in the production of space
- Become aware of contributions of Indian knowledge systems to global sexualities

Course Outline:

THEORY	**(45 hours)**
Unit 1	**(12 hours)**

Introduction: (1) Key debates of geographies of sexualities; Sexuality in/and geography and sexuality, Key Concepts & Terminologies.

Readings for Unit 1

1. Browne, K., 2006. Challenging queer geographies. Antipode, 38(5), 885-893.
2. Oswin, N., 2008. Critical geographies and the uses of sexuality: Deconstructing queer space. Progress in Human Geography, 32(1), 89-103.
3. Valentine, G., 2003. Boundaries: Sage. New Delhi.

Unit 2: (15 Hours)

Heteronormativity and its Spatiality: Production of Spaces, Practices and Identities

Readings for Unit 2

1. Dhanda, Y. & [illegible] 2024. Heteronormative [illegible] geographies and [illegible] in rural Haryana, India. *Culture, Health & Sexuality*, [illegible], pp. [illegible]
2. [illegible] 2018. Autoethnographic [illegible] of [illegible] experiences of [illegible] women in Bangalore. *Emotion, Space and Society*, [illegible], pp. [illegible]
3. Srivastava, S. 2004. *Sexual Sites and Seminal Attitudes: Sexualities, Masculinities and Culture in South Asia*, Sage, New Delhi.

Unit 3: (15 Hours)

Geographies of Socio-Sexual Space: [illegible]

Readings for Unit 3

1. Banerjee, [illegible], Bose, [illegible] & Dasgupta, R. [illegible]. *Queer [illegible] Ethnographies from South Asia*, Taylor & Francis.
2. Bhattacharya, K. 2024. [illegible]: Exploring Male Same-Sex Sexualities in the [illegible]. In: Chakraborty, K. & Chakraborty, [illegible]. *The Queer and the [illegible]*, Routledge, pp. [illegible]
3. Srivastava, S. [illegible]. *Passionate Modernity: Sexuality, Class, and Consumption in India*. Routledge India.

Unit 4: (8 Hours)

Indian Frameworks on Sexuality: [illegible], Tantra, Yoga and Energy Chakra System

Readings for Unit 4

1. Lal, V. 2000. Nakedness, nonviolence, and brahmacharya: Gandhi's experiments in celibate sexuality. *Journal of the History of Sexuality*, 9(1/2), pp.105-136.
2. [illegible], M.R., Acharya, P. and [illegible] 2015. The Issues of Goddess Worship and System of Sex: Significance of Tantric [illegible] in [illegible] of Kathmandu Valley. [illegible], pp. [illegible]
3. [illegible], C. 2013. Exploring the [illegible] effects of yoga and its [illegible] [illegible] of life. *International Journal of Yoga*, [illegible], pp. [illegible]

Tutorial Exercises (15 hours)

- Relationship between Space and Sexuality: discussion based on Readings
- [illegible] to understand [illegible], space and sexuality [illegible]

- [illegible] of Hijab for Global perceptions of virtual space
- [illegible] with its Coverage: How to understand production of [illegible]
- [illegible] on Violence Against Women and Children against Sexual Harassment, Molestation and Trafficking.
- [illegible] on Anti-Harassment, Rights Protection and Online Crimes.

Practical Record: [illegible]

Suggested Readings:

- Bell, D., & Valentine, G. (Eds.). (1995). *Mapping desire: Geographies of sexualities*. Psychology Press.
- Binnie, J., & Valentine, G. (1999). Geographies of sexuality: a review of progress. *Progress in human geography*, *23*(2), 175-187.
- Gills, S. K. 2007. Globalising queer? AIDS, homophobia and the politics of sexual identity in India. *Globalisation and Health*, *3*(1), 8-8.
- Holland, P. 2021. *Close and sexuality*. Routledge.
- Rubin, G., 1975. The traffic in women: Notes on the "political economy" of sex. In Rapp R.R. (Ed) *Toward an anthropology of women* (pp. 157-210). Monthly Review Press, New York & London.
- Sahar, S., 2021. *Essays: The Sahrish Path to Awakening*. New Traditions Press, Vermont.
- Puar, J. K. M., 2002. Queerality and the other lat. *Scarecrow Culture*, *1*(1), 225-233.

Digital material: [illegible]

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE) - [illegible] COVERAGE, SIGHTSEEING AND [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Lecture	Tutorial	Practical / Practice		
[illegible] COVERAGE, SIGHTSEEING AND OTHERS	4	3	1	0	[illegible]	

Learning Objectives:

The learning objectives of this course are as follows:

- [illegible]
- [illegible]
- [illegible]

Learning Outcomes:

[illegible]

- [illegible]
- [illegible]
- [illegible]

Course Outline:

[illegible]	[illegible]
[illegible]	[illegible]

Understanding Geodiversity, Geoheritage, Geoconservation and Ecosystems:

Concept, Components, Scope and Significance of Geoheritage, Geodiversity and Geographic Relationship between Geodiversity, Biodiversity, Cultural Geodiversity, Principles of Geoconservation.

Readings:

- Gray, M. (2013). Geodiversity: Valuing and Conserving Abiotic Nature (2nd Ed.). Wiley Blackwell, United Kingdom.
- Reddy, G. S. (2020). The Geoscientific Legacies in the 21st Century. The Origin, Variability and Futuristic Approach. CRC Press, Taylor & Francis Group, USA.
- Singh, S. P., Wei, H., & Anand, S. (Eds.). (2019). Global Geographical Heritage, Concepts and Conservation. Geoscience Model and Geodynamics. Springer, Singapore.

Unit 2: (11 hours)

Geoheritage Assessment and Practices:

Geoheritage and Geodiversity: Conceptualization, Characteristics, Types and Assessment Methods of Geological Heritage. UNESCO Geoheritage Sites, Geoheritage sites in India: Geomorphic Case Studies.

Readings:

- Brilha, J. B., Gray, M. S., Casadó, S. R., Murray, J. W., & Pumphrey, S. (2017). The Emerging Field of Geoheritage in Switzerland. L'Or (11), 31. Scientific Integrity and Ethics in the Geosciences (pp. 175–222). John Wiley & Sons.
- Brilha, J. (2016). Inventory and Quantitative Assessment of Geosites and Geodiversity Sites: A Review. Geoheritage, 8, 119–134.
- Reynard, E., & Brilha, J. (Eds.). (2018). Geoheritage: Assessment, Protection, and Management (1st Ed.). Elsevier.

Unit 3: (11 hours)

Geotourism Promotion and Development:

Geotourism: Concept, Role, Stakeholders, Trends, Environment & Sustainability, Geotourism based local Community and Economic Development; Sustainable Geotourism in India.

Readings:

- Newsome, D., & Dowling, R. K. (Eds.). (2018). Geotourism: The Tourism of Geology and Landscape. Goodfellow Publishers, Oxford.
- Rodrigues, J., Carvalho, A. R. G., Santos, M., Pereira, P., Viveiros, H., & Borges, M. (2020). Geoparks: tourism development strategies. In UNESCO Geoparks: Concept, Implementation Methodology, and Case Studies from Mountain Global Geoparks (pp. 1–19).

[illegible]

- [illegible]

[illegible] [illegible]

[illegible]

[illegible]

Readings:

- [illegible]
- [illegible]
- [illegible]

Tutorial Exercises: [illegible]

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

[illegible]

Suggested Readings:

- [illegible]

- Errami, E., Brocx, M., & Semeniuk, V. (Eds.). (2015). *From geoheritage to geoparks: Case studies from Africa and beyond*. Springer Nature, Switzerland.
- Reddy, D. R. (Ed.). (2021). *A monograph on Potential geoparks of India*. Indian National Trust for Art and Cultural Heritage (INTACH).
- Shekhar, S., Kumar, P., Chauhan, G., & Thakkar, M. G. (2019). Conservation and Sustainable Development of Geoheritage, Geopark, and Geotourism: A Case Study of Cenozoic Successions of Western Kutch, India. Geoheritage, 11, 1475–1488.
- Tripathi, S. C., Pant, N. C., & Rajan, S. (Eds.). (2025). Geoconservation and Geotourism Potential of India. Springer Nature, Switzerland.
- Tripathi, S. C., Pant, N. C., & Rajan, S. (Eds.). (2025). Geoconservation and Geotourism Potential of India. Springer Nature, Switzerland.
- United Nations Educational, Scientific and Cultural Organization. (2024). UNESCO Global Geoparks.

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG-DSE: LANDSLIDE RISK ANALYSIS

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
GEOG-DSE: LANDSLIDE RISK ANALYSIS	4	3	1	0	BA/BSc in Geography	

Learning Objectives

- To provide a holistic understanding of landslides and [illegible].
- To enable students to efficiently address the issues [illegible] in landslide management.

Learning Outcomes

Having completed this course, students will learn:

- Understanding of landslide hazard and risk assessment methods.
- Understanding and usage of geospatial technologies in landslide studies.
- Overview of landslide risk reduction programs and policies.

Course Outline

THEORY **(45 hours)**

Unit 1 **(12 hours)**

Landslide: definitions, types, causes, factors and [illegible]; Geospatial technologies for landslide hazard and risk assessments.

Readings for Unit 1

- Dikau R., Brunsden, D., Schrott, L. and Ibsen, M-L. (eds.) 1996: Landslide Recognition: Identification, Movement and Causes, Wiley.
- Glade, T., Anderson, M. and Crozier, M.J. (eds.) 2005: *Landslide Hazard and Risk*, John Wiley.

Unit 2: (11 hours)

Landslide hazard assessment, types and techniques, geomorphological, statistical, risk parameters and advanced technologies

Readings for Unit 2:

- Wieczorek, G., Canuti, P. and Sassa, K. (eds.), 2014, Landslide science and practice, volume 1 to 3, Springer.
- van Westen, C.J. et al., 2012, Landslide inventory, hazard and risk assessment in India, in: B. Pradhan and M. Buchroithner (eds.), Terrigenous Mass Movements, Springer.

Unit 3: (11 hours)

Landslide risk assessment, multi and transboundary vulnerability, risk, geomorphological analysis, preparedness and coping capacity

Readings for Unit 3:

- Lee, E.M. and Jones, D.K.C., 2004, Landslide Risk Assessment, Thomas Telford.
- Leroi, E., and El Bedoui, F. (eds.), 2005, Landslides: Disaster Risk Reduction, Springer.

Unit 4: (11 hours)

National and international programs on landslide risk reduction, role of NGOs and local communities, awareness and operation, construction and early warning.

Readings for Unit 4:

- van Westen, C.J. et al., 2012, Landslide Inventory, Hazard and Risk Assessment in India, in: B. Pradhan and M. Buchroithner (eds.), Terrigenous Mass Movements, Springer.
- Rajaguru, M.M. and Mahapatra, R. 2013, Community-based Landslide Risk Reduction: Managing Disasters in Small Steps, The World Bank.

Tutorial: (15 hours)

- Historical landslide events in India
- Tools and techniques for landslide hazard assessment
- Geo-spatial technologies for landslide hazard assessment
- Tools and techniques for landslide risk assessment
- Landslide preparedness
- Assessment of National and International landslide programs
- Community-based landslide risk reduction

Practical Based on above units

Suggested Readings:

- Anderson, M.G. and Holcombe, E. 2013. Community-based Landslide Risk Reduction: Managing Disasters in Small Steps. The World Bank.
- Dikau, R., Brunsden, D., Schrott, L. and Ibsen, M.L. (eds.) 1996. Landslide Recognition: Identification, Movement and Causes. Wiley.
- Lee, E.M. and Jones, D.K.C. 2004. Landslide Risk Assessment. Thomas Telford.
- Margottini, C., Canuti, P. and Sassa, K. (eds.), 2013. Landslide Science and Practice, Volume 1 to 7. Springer.
- [illegible], S.M. and Singh, R. (eds.), 2017. Landslide Research: The [illegible]. New India Publishing Agency.
- Sassa, K., Fukuoka, H., Wang, F. and Wang, G. (eds.), 2005. Landslides: Risk Analysis and Sustainable Disaster Management. Proceedings of the First General Assembly of the International Consortium on Landslides. Springer.
- van Westen, C.J. et al., 2012. Landslide inventory, hazard and risk assessment in India. In: B. Pradhan and M. Buchroithner (eds.), Terrigenous Mass Movements. Springer.
- Yamagishi, H. and Bhandary, N.P. (eds.) 2017. GIS Landslide. Springer.

Digital resources: See Appendix

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG-E(S): MOUNTAIN METEOROLOGY

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	Lectures	Tutorial	Practical / Practice	[illegible]	[illegible]
GEOG-EE: MOUNTAIN METEOROLOGY	4	3	1	0	NIL/Basic in Geography	Basic knowledge of Physical Geography

Learning Objectives:

The learning objectives of this course are as follows:

- To provide an advanced understanding of the fundamentals of mountain meteorology, including topographic influences on atmospheric processes.
- To develop theoretical and analytical skills in understanding local and regional circulations, diagnose airflow over complex terrain, observational techniques, and forecasting challenges.
- To emphasize the unique meteorological characteristics of mountain regions, including mountain dynamics, weather interpretation, extreme weather phenomena, and elevation-dependent climate processes.
- To enable students to assess meteorological hazards in mountain environments, their socio-economic impacts, and the role of climate variability.

Learning Outcomes:

On completion of the course, students will be able to:

- Explain the definition, scope, and historical development of mountain meteorology, describe key processes such as orographic lifting, mountain/valley winds, foehn winds, gradients, and rain shadow effects.
- Analyze local and regional circulation patterns, including diurnally driven winds, and the role of terrain, elevation, exposure, and surface boundary characteristics.
- Describe techniques for meteorological observation and forecasting in complex terrain, while critically assessing challenges like data scarcity and the application of numerical models.
- Identify and evaluate meteorological hazards such as extreme precipitation and thunderstorms, and analyze climate variability impacts.

Course Outline:

THEORY: (45 hours)

Unit I: (15 hours)

Introduction to mountain meteorology: Definition, scope, historical progress and significance of mountain meteorology, instruments for measuring meteorological data. Pressure, temperature and precipitation gradients. Orographic lifting, lapse rates, cloud formation, precipitation patterns, rain shadow and valley winds.

Readings for Unit 1:

- Barry, R. G. (2008). Mountain Weather and Climate (3rd ed.). Cambridge University Press.
- Whiteman, C. D. (2000). Mountain meteorology: Fundamentals and applications. Oxford University Press.

Unit II: (15 hours)

Local and regional circulation systems in mountains: Mountain-valley wind system as well as mountain and valley winds. Slope winds, katabatic (downslope) winds, anabatic (upslope) winds and associated local effects in valleys.

Readings for Unit 2:

- Defant, F. (1951). Local winds. In T. F. Malone (Ed.), Compendium of meteorology (pp. 655–672). American Meteorological Society.
- Barry, R. G., & Chorley, R. J. (2009). Atmosphere, weather and climate (9th ed.). Routledge.
- Egger, J., & Whiteman, C. D. (1991). Thermally driven flows. In Atmospheric Boundary Layers (pp. 1–20). Springer.

Unit 3: (15 hours)

Meteorological observation and forecasting: High-altitude geographical observational networks, mountain radars, satellite based observations, the challenges of data scarcity in mountains, Precipitation and flow strength estimation over mountainous terrain. Meteorological Measurement practices for mountain hill stations.

Readings for Unit 3

- Orlove, B. S., De Walden, D. F., & Snyder, K. J. (Eds.). (2022). Mountain weather research and forecasting: recent progress and current challenges. Springer.
- Orlov, A. P., Severinsen, M., Snyder, M., & Yasunari, T. (Eds.). (2018). Mountain weather and climate and their impact on the environment. Springer Nature.
- Whiteman, C. D. (2000). Mountain meteorology: fundamentals and applications. Oxford University Press.

Unit 4: [illegible] (11 hours)

Meteorological hazards and impacts: [illegible] avalanches, landslides, rock falls, landslides, and convective meteorology, Alpine mountain systems, drifting, mountain lake hazards, elevation-dependent warming, and aerosol influences, socio-economic impacts on livelihoods, hydropower, tourism, and agriculture.

Reading for Unit 4

- Orlov, A. P., Severinsen, M., Snyder, M., & Yasunari, T. (Eds.). (2018). Mountain weather and Climate and their impact on the Environment. Springer Nature.
- Barry, R. G. (2008). Mountain Weather and Climate (3rd ed.). Cambridge: Cambridge University Press.
- Whiteman, C. D. (2000). Mountain meteorology: fundamentals and applications. Oxford University Press.

Tutorial activities (12 hours)

- [illegible] the historical evolution of mountain meteorology as a research discipline
- Describe the processes of orographic lifting, barrier effects, and cap clouds [illegible]
- Describe the diurnal mountain-valley wind system and associated slope flows [illegible]
- Explain and contrast the microscale optical flow of the Rocky Mountains and other [illegible]
- Discuss the major meteorological observational challenges in the Himalayan region.
- Evaluate the contributions of [illegible] numerical weather prediction, [illegible] models, and remote sensing platforms.
- Highlight [illegible] meteorological [illegible] for forecasting [illegible]
- Analyze the meteorological triggers and socio-economic consequences of extreme [illegible]
- [illegible] for disaster prevention, warning and mitigation [illegible]
- Evaluate [illegible] based [illegible] and mitigation [illegible]

Practical Activity (10 hours)

Suggested Readings

- [illegible] (2013). Weather and climate in high altitudes with special reference to the Himalayas. [illegible] Climate Change and its Ecological Implications for the Western Himalaya, [illegible]
- [illegible] Mountain weather: Observations and modeling. Advances in Geophysics, [illegible]
- [illegible] Need for mountain weather stations in India. Science, [illegible]
- [illegible]
- [illegible]
- [illegible] Elevation-dependent warming in mountain regions of the world. Nature Climate Change [illegible]
- [illegible] Climate Change in the Himalayas [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Digital materials: RCS Application

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG-B(VI): NATURAL RESOURCE MANAGEMENT

Course Title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite
		Lecture	Tutorial	Practical / Practice		
GEOG-B(VI): NATURAL RESOURCE MANAGEMENT	4	3	1	0	BA/BSc in Geography	-

Learning Objectives:

The learning objectives of this course are as follows:

- Awareness about resource availability, accessibility, conservation issues and issues.
- Spatial distribution of natural resources.
- Resource management and governance.

Learning Outcomes:

On completion of the course, students will learn:

- At the end of the course student should learn the importance of natural resources.
- Conservation methods and awareness about community participation.
- Assessment of role of national and international efforts to mitigate resource problems.

Course Outline:

INTRODUCTION	(45 hours)
Unit 1:	(12 hours)

Introduction: Introduction- Concept, approaches and scope of natural resource management.

Readings for Unit 1:

- Pandey, R. W. [et.] (2002). Natural Resource Management, Mittal Publication, New Delhi.
- Rees, J. 1990. Natural Resources: Allocation, Economics and Policy, Routledge, London.

Unit 2: (11 hours)

Natural Resources: Land, Water, Forest

Readings for Unit 2

- Singh, Jagdish. 2006. Resource Geography. [illegible] Publications, New Delhi (Hindi).
- Tiwari, Suresh K. and Emmanuel, [illegible] (Eds.) 2021. Natural Resource Management and Local Development. Springer, Netherlands.

Unit 3: (11 Hours)

Problems in Resource Management: Issues and constraints in resource management, Environmental, Political and Socio-Economic challenges.

Readings for Unit 3

- Thakur, B. 2003-2005. Perspectives in Resource Management in Developing Countries. Vol. 1-3. Concept Publishing Company, New Delhi.
- Lockwood, M., Davidson, J., Curtis, A., Stratford, E., & Griffith, R. (2010). Governance principles for natural resource management. Society and natural resources, 23(10), 986-1001.

Unit 4: (11 Hours)

Governance: Policy, Planning and Institutional and Technical advancements in natural resource management, Integrated Resource Management; Case Studies.

Readings for Unit 4

- Berkes, F. (ed.). 1989. Common Property Resources: Ecology and Community-Based Sustainable Development. Belhaven Press London.
- Mitchell, B. 1989. Geography and Resource Analysis, 2nd edition, Longman, London.

Tutorial Exercises (15 Hours)

- **Resource Mapping using RS-GIS:** [illegible] and [illegible] resources using satellite imagery.
- **Integrated Resource Case Study:** Analyze a [illegible] of a given region for resource management challenges and strategies.
- **Policy Review Exercise:** Critically review a national policy related to land, water or forest management.
- **Community Participation Survey:** Document local initiatives in participatory natural resource management.
- **Debate on Resource Conflicts:** Discuss ethical and socio-economic dilemmas in resource utilization and conservation.

Practical Hours: Not applicable

Suggested Readings:

- Mather, A.S. and Chapman, K. 1995. Environmental Resources. Longman, Harlow, England.
- McKay, K.N. 1997. Resource Management Information Systems: Process & Practice. Taylor Francis, London.
- Mitchell, B. 1998. Geography and Resource Analysis, 2nd edition, Longman, London.
- Mitchell, B. 1991. Resource and Environmental Management. Longman, Harlow, England.
- Newson, M.D. 1994. Land, Water and Development: River Basin Systems and their Management. Routledge, London.
- Owen, S. and Owens, P.L. 2013. Environment, Resources and Conservation. Cambridge University Press, New York.

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE: ISSUES, CONCEPTS AND APPROACHES IN CLIMATIC CHANGES AND METHODS OF RECONSTRUCTION

[illegible]	[illegible]	[illegible]				
		Lectures	Tutorial	Practical / Practice	[illegible]	[illegible]
ISSUES, CONCEPTS AND APPROACHES IN CLIMATIC CHANGES AND METHODS OF RECONSTRUCTION	4	3	1	0	Basic knowledge of Geography	Basic knowledge of Geomorphology and Palaeoclimatology

Learning Objectives:

The learning objectives of this course are as follows:

- [illegible]
- [illegible]
- [illegible]
- [illegible]

Learning Outcomes:

[illegible]

- [illegible]
- [illegible]
- [illegible]

Course Outline:

THEORY (60 hours)

Unit I (12 hours)

Introduction: [illegible]

[illegible]

Readings for Unit 1

Hastie and Dietz Jolet (2011) [illegible] Dental tissues in the Early Jurassic mammal *Morganucodon*, Journal of Vertebrate Paleontology, 31:1, 1-10, DOI: 10.1080/02724634.2011.539329

Kent, J. John and Wilson, Michael J. (2012) [illegible] Chapter 1 Introduction, Analysis of Geological Data, John Wiley and Sons, Sussex.

Unit 2: [illegible]

Geomorphological Evidence: Geomorphological evidence and the study and extent of Pleistocene glaciations, Recognition of former ice masses, reconstruction methods of paleo hypsometry and Milankovitch cycles. Palaeoenvironmental evidence from glacial geomorphology: erosional landforms and assemblages of landforms Fluvial sites and Lacustrine environments.

Readings for Unit 2

Bryan, Douglas and Edwards, Mark (1997) Wave forces and soil scour: the attitudes of global sea ice in high-current environments, Continental Shelf Research, Vol. 17 No. 3, 2000, pages 313-335, [illegible]

Hood, J. John and Walker, Michael (2013) Tectonic Geomorphology, Quaternary Environments, Routledge, second revised, Taylor and Francis, Tim [illegible] Earth Environments Past, Present and Future, Wiley Oxford

Fang, Xi., Wang, Xiaoke, A.R., Kravchinsky, Vadim A., et al., (2015) Astronomical chronology of gradual and abrupt Cretaceous–Paleogene rifting in Songliao sedimentary basin (Northeast China): Earth and Planetary Science Letters, Volume 426, 15 September 2015, Pages 177-189, [illegible]

Kent, J. John and Wilson, Michael J. (2012) [illegible] Chapter 1 Introduction, Analysis of Geological Data, John Wiley and Sons, Sussex.

Unit 3: [illegible]

Environmental Evidence: Glacial sediments and landforms, Sediment systems, classification of till, Analysis of glaciogenic sediments, Glacial lake sediment sequences, Lake level changes and fluctuations, environmental proxies, Ice sheet modelling for past climate change.

Readings for Unit 3

Douglas Nash, Tom [illegible] Tuers (2010) [illegible] Chapter 1 Introduction, Routledge, London

Lisa, Wolf, and Small, J.P. (Eds) (2002) Tracking Environmental Change using lake sediments volume 1: Physical and Geochemical Techniques, Kluwer Academic Publishing, New York

Kidding, M. J., (Ed), (1996) Southern Hemisphere Environments: Holocene Climate and Environmental Change, Harwood Publishing, Wiley and Sons Pvt Ltd, New Delhi

Hood, Tim and Walker, David (2000) Earth Environments Past, Present and Future, Wiley, Blackwell, Oxford.

Unit 4: [illegible]

Dating methods: Principles and accuracy in Quaternary dating, Absolute dating: Radiocarbon dating, cosmogenic exposure dating, Thermoluminescence dating, [illegible] Dating, Sampling techniques in field and laboratory situations, Relative dating: Stratigraphic principles, Tephrochronology, dendrochronology, annual layers in glacial ice and lacustrine sediments.

Readings for Unit 4

[illegible]

Tutorial Exercises (15 hours)

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Practical Assessment exercises

Suggested Readings:

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG-5315: REGIONAL DEVELOPMENT IN INDIA

Course title & Code	Credit	Credit distribution			Eligibility criteria	Pre-requisite
		Lecture	Tutorial	Practical / Practice		
GEOG-5315: REGIONAL DEVELOPMENT IN INDIA	6	5	1	0	BA/BSc in Geography	Basic knowledge of Geography

Learning Objectives

The learning objectives of this course are as follows:

- To introduce students to the fundamental concepts of regional development and key factors underpinning regional development.
- To enable students to critically examine the spatial patterns and temporal trends of regional disparities in India.
- To familiarize students with various regional development policies and programmes.
- To understand India's future regional development issues and challenges.

Learning Outcomes

On the completion of the course, students will be able:

- Students will be able to explain the concepts and factors of regional development and how it contributes to the process of regional planning.
- Students will be able to critically assess the evolution of regional development planning in India, including the roles of key institutions like the Planning Commission and NITI Aayog.
- Students will be able to understand the regional disparities, trends, and challenges of regional development in India.

Course Outline:

THEORY (45 hours)

Unit 1: (15 hours)

Introduction: Concept and Theories of regional development, Sustainable Development and Regional planning

Readings:

- Sharma, L.D. (1987) Area & Centres and Regional Development, Mittal Pub. Co. [Ch. 2 & 4]
- Misra, R.P. (ed.) (1995) Regional Planning Concepts, Techniques, Policies and Case Studies, Concept Publishing Pvt. Ltd. Delhi
- Myrdal, G. (1957) Economic Theory and Underdeveloped Regions, Gerald Duckworth & Co.

Unit 2: **(12 hours)**

Regional Planning and Disparities in India: Inequalities and Imbalances in India (Planning Commission), and HDI, Poverty, Regional Disparities, special problems and issues of backwardness in India

Readings:

- Bhattacharya, B. B., and S. Sakthivel. "Regional Growth and Disparity in India." Economic and Political Weekly 39 (10) (2004): 1071–77.
- Ghosh, Ashish. 1965. Levels of Regional Development in India. Census of India 1, no. 10 (Pt. 1-A).
- Dholakia, R. and Sen, A. (1998) Inter-Regional Variations in Levels of Development and Policy Issues.

Unit 3: **(12 hours)**

Regional Development Policies and Programmes: Planning strategies (inter temporalities, HDI, Aspiring and Contemporary India), Features of Decentralized Planning, Area Development Approach, Integrated Watershed Development, Panchayati Raj Institutions, Integrated Tribal Development Programme, Industrial corridor policies (DMIC, CHEC, BIPC etc.)

Readings:

- NITI Policy Paper, 2017, Planning Model in Transition Development, https://www.niti.gov.in/sites/default/files/2019-08/NITI_policy_paper_2017_Model.pdf
- Strategy for New India @ 75, 2018, https://niti.gov.in/sites/default/files/2019-01/Strategy_for_New_India_0.pdf
- NITI Report on Industrial Corridor Programme, https://niti.gov.in/content/report-industrial-corridor-programme

Unit 4: **(12 hours)**

Future Regional Development in India: Emerging trends and challenges, Green growth and Sustainable Regional Development, Role of GIS and big data in regional planning and development, Climate change and regional vulnerability, Challenges Ahead, Way

Readings:

- [illegible], R.S. et al (eds.) (1995). Regional Economic Concept, Growth and Future Prospects. Routledge London and New York.
- World Bank. Institute Course Catalog: The Pathway to Sustainable Development. (n.d.). [illegible].
- Rao, C. H. H. (2000). "Agriculture, Food Security, Poverty and Environment: Essays on Post-Reform India." Oxford University Press.

Term of Exercise (15 hours)

- Dimensions about Growth Pole and Growth Centre approach
- Discussion on role of NCR Region in Regional Development
- Human Development Indicators (HDI) and regional development
- Policies and Programmes of Regional Development in India
- Role of Science and Technology in Regional Development

Practical Related: Not Applicable

Suggested Readings:

- Singh, R.L. (ed.) 1971. India: A Regional Geography. National Geographical Society, India, Varanasi.
- Dubey, G.D. 1992. India: A Regional Interpretation. ICSSR, Northern Book Centre, New Delhi.
- Seth, V. 1995. Regional Development and Planning in India: Concept, Performance Critique.
- Chandana, R.C. [illegible] Profiles and Trends. Kalyani Publishers.
- Gareth, M.K. 1956. Pilot Survey.
- Kar, S., and S. Sakthivel. 2007. "Reforms and Regional Inequality in India." Economic and Political Weekly 42 (197): 168-77.
- UNDP's Human Development Reports, NITI Aayog Reports.
- Dasgupta, D., P. Maiti, R. Mukherjee, C. Saxena, and S. Chandrasekhar. 2010. "Growth and Interstate Disparities in India." Economic and Political Weekly 35 (27): 2413-22.
- Khanna, S.D. [illegible] Economic Theory. Pioneer Publications.

Digital Materials: Not Applicable

GENERAL ELECTIVE (GE) COURSE
GEOG: 8316 NATURAL HAZARDS AND DISASTER MANAGEMENT

[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
		Lectures	Tutorial	Practical/ Projects		
Geog: 8316 NATURAL HAZARDS AND DISASTER MANAGEMENT	4	3	1	0	BA/BSc in Geography	Basic Knowledge of Geography

Learning Objectives:

The learning objectives of this course are as follows:

- To develop conceptual clarity regarding hazards, disasters, vulnerability, risk and impacts
- To understand patterns and controls of natural and anthropogenic disasters
- To examine disaster risk reduction strategies, governance frameworks and policies
- To enable learners to develop analytical and spatial skills in disaster assessment, risk evaluation, and disaster management planning

Learning Outcomes:

On successful completion of this course, students will be able to:

- Demonstrate a clear conceptual understanding of hazards, disasters, vulnerability, risk and resilience within a geographical framework
- Analyse the spatial patterns, causes and impacts of natural and anthropogenic disasters using geographical perspectives and relevant tools
- Apply disaster risk reduction principles by evaluating preparedness, response and recovery strategies in different environments and socio-economic contexts
- Interpret disaster management policies and institutional frameworks at national and international levels, and critically assess their effectiveness
- Critically examine emerging disaster risks, particularly those related to climate change, urbanization and environmental change, and suggest sustainable building strategies

Course Outline

THEORY (45 hours)

Unit I (12 hours)

Introduction (Theory): Concepts of Hazards, Risk, Vulnerability and Disaster, Types of Hazards: Natural (Earthquakes, volcanoes, landslides, drought, Floods, cyclones, tsunamis, forest fire, etc.), man-made). Disaster risk equation and theoretical models

Readings

- Coppola, D.P. (2011). Introduction to International Disaster Management (Second Edition). https://doi.org/10.1016/C2009-0-64237-5
- Wisner, B., P. Blaikie, T. Cannon and I. Davis (2003). At Risk: Natural Hazards, Peoples Vulnerability and Disasters. Routledge (Second Edition)
- Smith, K., Hamilton, C.A., Dixon, D., Bell, D.R., & Kirkwood, T. (2012). Environmental Hazards: Assessing Risk and Reducing Disaster (7th ed.). Routledge. https://doi.org/10.4324/9781315226101

Unit 2: (11 hours)

Dimensions of Disasters (Theory): Regional Overview of Natural Disasters and basic methods of Disaster Risk Analysis. Disaster Response in India and the world: Case studies

Readings

- Keller, E.A., & Blodgett, D.E. (2019). Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes (5th ed.). Routledge. https://doi.org/10.4324/9781315164298
- UNISDR publications on issues and risk assessment

Unit 3: (12 hours)

Disaster Impact and Loss Assessment (Theory): Disaster Losses and Impact - Direct losses, Livelihood, economy and infrastructure, health, social vulnerability and climate change implications of disasters.

Readings

- Coppola, D.P. (2011). Introduction to International Disaster Management (Second Edition). https://doi.org/10.1016/C2009-0-64237-5
- Alexander, D. (2018). Natural Disasters. Routledge. https://doi.org/10.4324/9781315130569
- World Health Organization (WHO). Disaster Health Impact Reports

Unit 4: (11 hours)

Disaster Risk Reduction and Governance Frameworks (Theory): Disaster management cycle: preparedness, mitigation, response, recovery. Role of GIS, Remote Sensing and related technologies

International frameworks: Sendai Framework, Disaster Management Act (India), NDMA, SDMA, DDMA, NIDM, NDRF and international agencies; community-based disaster risk management; Mitigation and Management Plans and policies: engineering, economic, social, political and policy solutions.

Readings:

- Haddow, G.D., Bullock, J.A. & Coppola, D. (2014). Introduction to Emergency Management 5th Edition.
- Carter, W.N. (2008) Disaster Management: A Disaster Manager's Handbook.

Tutorial Exercises **(15 hours)**

- Guided discussions on key concepts and theoretical issues in disaster management
- Case study analysis of recent disasters at regional, national and global scales
- Review and critical discussion of assigned readings and policy documents
- Data interpretation and problem-based analytical exercises
- Student presentations and guided classroom discussions
- Debates on disaster risk reduction strategies, governance and resilience-building approaches.

Practical Record: Not applicable

Suggested Readings

- Allan, S., Adam B. and Carter C. (eds.) (2000). Environmental Risks and the Media. Routledge, London.
- Albala-Bertrand, J.M. (1993). Political Economy of Large Natural Disasters: With Special Reference to Developing Countries. Clarendon Press, Oxford.
- Government of India. 2005. Disaster Management Act 2005, The Gazette of India, New Delhi.
- Bankoff, G., G. Frerks and D. Hilhorst (eds.) 2004. Mapping Vulnerability: Disasters, Development and People. Earthscan.
- Drabek, Thomas. 2013. The Human Side of Disaster. Taylor and Francis.
- Kapur, Anu et al. 2005. Disasters in India: Studies of Grim Reality. Rawat Publications, Jaipur and Delhi.
- Kapur, Anu. 2010. Vulnerable India: A Geographical Study of Disasters. Sage.
- Parasuraman, S. 2004. India Disasters Report: Towards a Policy Initiative. Oxford University Press.
- Tripathi, [illegible] 2018. Vulnerable [illegible] and [illegible]: A Study of Disasters and Response. Routledge.
- United Nations. 2004. Living with Risk: A Global Review of Disaster Reduction Initiatives.
- Alexander, D. (1993). Natural Disasters (1st ed.). Routledge. https://doi.org/10.4324/9780203[illegible]
- National Centre for Disaster Management. 2001. Report of the High Powered Committee

SKILL ENHANCEMENT COURSE
(SEMESTER-III/ EVEN SEMESTER)

Course Code	Credits	Contact Hours			Course Title	Course Type
		Lecture	Tutorial	Practical / Practice		
SEC-GEO-SPATIAL DATA MANAGEMENT	3	1	0	2	Skill in Geography	

Learning Objectives:

The learning objectives of this course are as follows:

- The learners will be exposed to the methodology and procedure in the origin of Spatial Data for map visualization, data creation, creation and its application.

Learning Outcomes:

Having completed this course, learners will be able:

- The learners will be able to differentiate between spatial and non-spatial data, perform basic level of analysis, create and design information maps using spatial and non-spatial data sets.

Course Outline:

Unit I : Theory (15 hours)

Understanding Spatial Association: Formulation of Research Problem, Review of Literature and Identification of Research Design

Readings for Unit I:

- Clark, G. (2018). Introducing Research and Geography: A beginner's guide to doing a research project (Second ed.). SAGE Publications New Delhi.
- Dantzig, R., & Saaty, T. L. P. (Eds.). (2020). Basics of Mathematical Geography: A Critical Introduction. John Wiley & Sons Ltd. Publication, Wiley-Blackwell.
- Tripathi, N. K., & Sengupta, S. K. (Eds.). (2023). Advances in Geographical Research. Sarthaks Publication, Pune.

Unit 2 : Practical (30 hours)

Methods of Data Collection: Ethical Approval and Informed Consent, Sources of Data, Techniques of Spatial Data Collection, Processing Data: Editing, coding, and tabulation, Problems and Constraints in Data Collection

Readings for Unit 2:

- Brunton, R. (2014). Social Research Methods. (5th ed.). Oxford University Press, United Kingdom.
- Creswell, J. W. (2009). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (3rd ed.). SAGE publications, USA.
- Lovell, R. R., Davis, S. E., & Rosenberg, M. W. (Eds.). (2020). The Routledge Handbook of Methodologies in Human Geography. Routledge, Taylor & Francis Group, United Kingdom.

Practical Exercises:

Students will be trained in various data handling techniques during class sessions. Activities will be assigned and assessed through presentations related to individual term papers.

Practical Records: Not Applicable

Suggested Readings:

- Adams, R. A., Hines, M. J., & Hines, J. (2020). Research Methods in Geography: A Critical Introduction. John Wiley & Sons Ltd. Publication, Print-Electronic.
- Gall, M. M. (2015). Social Psychology [Research Methodology] (2nd ed.). S. K. Publishers, New Delhi. (India)
- Kothari, C. R. (2004). Research Methodology: Methods and Techniques. New Age International (P) Ltd., Publishers, New Delhi.
- Mishra, S., & Singh, R. (2006). Researching Geography. The Indian Context (2nd ed.). Routledge, India.
- Lovell, R. R., Davis, S. E., & Rosenberg, M. W. (Eds.). (2020). The Routledge Handbook of Methodologies in Human Geography. Routledge, Taylor & Francis Group, United Kingdom.
- Putney, M. S. (2007). Qualitative Research and Evaluation Methods (3rd ed.). SAGE Publications, London.
- Tatoni, T. V., & Bandyopadhyay, S. K. (Eds.). (2022). Advances in Geographical Research. Aavishkar Publication, Pune.

Digital resources: Not Applicable

RESEARCH METHODS COURSE: GEOG 5003: ADVANCED BIOLOGICAL METHODOLOGY

Course Title	Credit	Contact Hours			Prerequisites	Course Description
		Lecture	Tutorials	Practical/ Studio		
GEOG 5003: ADVANCED RESEARCH METHODOLOGY	3	1	1	2	BSC 551 in Geography	Basic knowledge of Research Methods and Techniques

Learning Objectives

The learning objectives of this course are as follows:

- To develop a comprehensive in-depth understanding of the conceptual foundations, historical norms, methodological approaches and ethical principles essential for geographical research.
- To equip students with the ability to design and construct a robust geographical research framework through problem identification and appropriate formulation of questions, aims, and objectives.
- To foster academic writing proficiency by mastering literature synthesis and report writing with proper citation and referencing.

Learning Outcomes

Upon completion this course unit, students will be able to:

- To critically conceptualize research problems and formulate methodologically aligned research objectives supported by relevant literature.
- To demonstrate ethical accountability in research conduct by identifying and preventing plagiarism, misconduct, and academic misconduct.
- To effectively gather, analyze, and visually present data using field survey techniques and statistical interpretation for dissertation and report writing.

Course Outline

Unit 1 - Theory (10 hours)

Research Design:

Steps; Identification and conceptualization of research problem; Framing research questions, Aims and Objectives; Significance of data collection.

Readings:

- Bryman, A. (2008). Social Research Methods (3rd ed.). Oxford University Press, United Kingdom.
- Creswell, J. W. (2009). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (3rd ed.). SAGE publications, USA.
- Lovett, A. A., Poon, S. E., & Rowlingson, M. W. (Eds.). (2023). The Routledge Handbook of Methodologies in Human Geography. Routledge, Taylor & Francis Group, United Kingdom.

Unit 2 - Practical (30 hours)

Geographical Structure of Dissertation and Report Writing:

Preliminary section, their body of text, conclusion, referencing and Bibliography, Appendix; Relevance, Indexing and Citation. Preparation of report writing on any case studies

Readings:

- Gaillard, G. A. (2013). Fundamentals of Research Methodology & Statistics: guide for research, calculation, management, validation and more. Nova Science Publishers, New York.
- Kothari, C. (2008). Writing Your Thesis (2nd ed.). SAGE Publications Pvt. Limited.
- Parsons, T., & Knight, P. G. (2015). How to do your dissertation in geography and related disciplines (3rd ed.). Routledge, Taylor & Francis Group, United Kingdom.

Practical Record: NA

Suggested Readings:

- Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2022). Key Methods in Geography (4th ed.). SAGE Publications Ltd., London.
- Kirk, R. (2009). Introducing Research Methodology: A beginner's guide to doing a research project (3rd ed.). SAGE Publications, New Delhi.
- Gomez, B., & Jones III, J. P. (Eds.). (2022). Research Methods in Geography: A Critical Introduction. John Wiley & Sons Ltd. Publication, Wiley Blackwell.
- Kothari, C. R. (2004). Research Methodology (2nd ed.). V. K. Publishers, New

Delhi: [illegible]

- [illegible] C. R. (2004). Research Methodology: Methods and Techniques. New Age International (P) Ltd., Publishers, New Delhi.
- Kothari, C. R., & Singh, N. (2003). Researching Geography: The Indian Context (3rd ed.). Routledge: India.
- Patton, M. Q. (2002). Qualitative Research and Evaluation Methods (4th ed.). SAGE Publications, London.
- Tellis, W. J., & Sandelin, R. A. (Eds.). (2015). Advances in Geographical Research. Explorations Publication, Pune.

Digital materials (Kit Technician)

RESEARCH METHODS COURSE:
GEOG-8702: TOOLS FOR RESEARCH

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	Lectures	Tutorials	Practicals	[illegible]	[illegible]
GEOG-8702: TOOLS FOR RESEARCH	2	1	0	2	[illegible]	Basic Knowledge of Research Methods and Techniques

Learning Objectives:

The learning objectives of this course are as follows:

- To introduce students to research tools, techniques, databases, and digital resources used in geographical research.
- To equip students with practical skills in data collection, data processing, referencing, citation management, standards of ethical practices, and special considerations.
- To develop the ability to apply appropriate research tools for preparing academic reports, dissertations, maps, charts, tables, and research based presentations.

Learning Outcomes:

[illegible]

- To identify and use suitable research tools for literature search, data collection, data organization, analysis, referencing, and presentation of the research.
- To handle primary and secondary data using appropriate digital, statistical, graphical, and spatial tools for geographical research.
- To prepare research outputs such as tables, graphs, maps, references, bibliographies, and short analytical reports with academic integrity and ethical considerations.

Course Outline:

Unit I – Theory [15 hours]

Research Tools, Databases and Techniques

Conceptual importance of tools in geographical research. Tools for literature review and evaluation: use of journals, books, theses, reports, conference and online databases. Tools for referencing and bibliography management. Maps, satellite images and aerial photographs: their use for data collection, communication, evaluation, graphical representation, statistical analysis. Ethical and environmental issues in the use of secondary data and sources.

Readings:

- Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2016). *Key methods in Geography* (3rd ed.). SAGE Publications Ltd.
- Gomez, B., & Jones, J. P. (Eds.). (2010). *Research methods in Geography: A critical introduction*. John Wiley & Sons Ltd. Publication, Wiley-Blackwell.
- Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information science and systems* (4th ed.). Wiley. United Kingdom.

Unit 2 - Practical **(36 hours)**

Application of Tools for Geographical Research

Practical Exercises:

- Search and compile academic literature on any selected geographical research topics.
- Produce an annotated bibliography using both journal articles and online resource sources.
- Collect secondary data from census, government agency or survey publications.
- Develop a questionnaire or interview schedule for a selected field-based research problem.
- Process, tabulate, graph and map your collected data.
- Calculate simple statistical measures such as percentages, means, proportions and correlations.
- Produce a research report using MS Word or any suitable reading tool.
- Generate a literature and bibliography in different referencing styles.

Readings:

- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press. United Kingdom.
- Fink, L. (2018). *Introduction to Research Methodology: A Beginner's guide to doing a research project* (1st ed.). SAGE Publications, New Delhi.
- Taylor, T., & Wright, P. G. (2017). *How to write your dissertation in geography and related disciplines* (3rd ed.). Routledge Taylor & Francis Group, United Kingdom.

Practical Record: NA

Suggested Readings

- Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Delhi: New Age International (P) Ltd., Publishers.
- Sadhu, A. N., & Singh, A. (2007). Research Methodology in Social Sciences. Himalaya Publishing House.
- Singh, Y. K. (2006). Fundamental of Research Methodology and Statistics. New Delhi: New Age International (P) Ltd., Publishers.
- Kothari, C. R., & Singh, G. (2012). Research Methodology: Methods and Techniques (3rd ed.). New Delhi: New Age International (P) Ltd., Publishers.
- Kothari, C. R., & Singh, G. (2012). Research Methodology: Methods and Techniques (3rd ed.). Bhartiya Bhawan.
- Patton, M. Q. (2002). Qualitative Research and Evaluation Methods (4th ed.). SAGE Publications, London.

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-C-DSE-NEW ECONOMIC GEOGRAPHIES

Course Name & Code	Credits	Distribution (hours per week)			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical / Practice		
GEOG-C-DSE-NEW ECONOMIC GEOGRAPHIES	6	5	1	0	BA/BSc in Geography	

Learning Objectives:

The learning objectives of this course are as follows:

- Students will appreciate the significance of social, cultural, political forces as central to the functioning of economies, and that the economic processes need to be analysed in social, cultural and political contexts.
- The students will be exposed to contemporary themes in economic geography, which emerged in post 1970s, and be conscious of the numerous economic issues confronting the world economic system.
- The students will realize the relevance of economic geography in analysing contemporary societies and economies.

Learning Outcomes:

On completion of this course, students will be able:

- To identify and describe the key concepts in the geography of economic activities.
- To explain why the nature of economic activities have changed, and how economic geographers engage with these changes.
- To develop a critical understanding of the processes that underpin the economic landscapes, and the role of various actors in shaping these landscapes.
  a) Are we all becoming 'knowledge workers' and 'creative' workers?
  b) How to solve the 'problem' of economic growth?
  c) Has the role of 'distance' and 'proximity' declined?
  d) Has the World become 'flat'?

Course Outline:

THEORY (45 Hours)

Unit 1: (09 Hours)
Introduction: The Re-Discovery and Core Issues, Economic Geography since, Nature of Economic

Growth, Evolution of Economic Systems: Three-Sector Hypothesis and Post-industrial Society, Informal Economy and Social Accounting.

Readings

- Dicken P. 2010. *Global Shift: Mapping the Changing Contours of the World Economy*, Harper Collins Publishers, New York.
- [illegible] 2004. *Economic Systems*, Prentice Hall, New Jersey.
- Prager Jean-Claude and Thisse Jacques-François, 2012. *Economic Geography and the Unequal Development of Regions*, Routledge, London.

Unit 2: **(10 Hours)**

Information and Knowledge Economies in Spatial Systems: Information Revolution and Age, Economics of Human Attention; Knowledge Economies and Imagination Age; Creative Industries and Cultural Economics.

Readings

- [illegible] P. 2012. *Economic Geography*, Routledge, London.
- Coe N. M., Kelly P. F. and Yeung H. W. C. 2007. *Economic Geography: A Contemporary Introduction*, Blackwell, Oxford.
- [illegible] M. 2011. *Principles and Applications of Economic Geography*, [illegible], New York.

Unit 3: **(11 Hours)**

Economics of Urban Systems: FIRE and CE Economics, and Global Cities, Place Making, Place-based and Place-led Development; Place Marketing and City Branding; City Image and Re-imaging.

Readings

- Sassen Saskia, 2012. *Cities in a World Economy*, Sage.
- Fujita Masahisa, Krugman Paul and Venables Anthony, 2001. *The Spatial Economy: Cities, Regions and International Trade*, The MIT Press.
- MacKinnon D. and Cumbers A. 2007. *An Introduction to Economic Geography: Globalization, Uneven Development and Place*, Pearson/Prentice Hall, Harlow.

Unit 4: **(15 Hours)**

Space-Economy of International Systems: Economic Groupings, Economic Regionalism, Economic Cooperation and Integration.

Readings

- Murray Warwick E. 2006. *Geographies of Globalization*, Routledge.
- Machlup Fritz, 1977. *A History of Thought on Economic Integration*, Columbia University Press, New York.
- Jovanović M. N. 1998. *International Economic Integration: Limits and Prospects*, Routledge.

Tutorial Exercise **(15 Hours)**

- Case Study of [illegible]
- Case Study of spatial networking of informal workers
- Case Study of information overload
- Case Study of city re-imaging and place marketing

- [illegible] (the study of [illegible] a body of [illegible])

Practical Exercise: Not Applicable

Suggested Readings:

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Digital Homework: Not Applicable

DISCIPLINE SPECIFIC CORE COURSE — GEOG-CRE2: TOWARDS VIKSIT BHARAT: GEOGRAPHICAL DIMENSIONS

Course title & Code	Credits	Duration (hrs per week)			Eligibility criteria	Prerequisite
		Lecture	Tutorial	Practical / Practice		
GEOG-CRE2: TOWARDS VIKSIT BHARAT: GEOGRAPHICAL DIMENSIONS	4	3	1	0	BA/BSc in Geography	

Learning Objectives:

The learning objectives of this course are as follows:

- To develop comprehensive understanding of Viksit Bharat @2047's vision and frameworks while critically evaluating geographical influences on India's development trajectory.
- To analyze multidisciplinary linkages across environment, demographics, infrastructure, and technology to assess how national strategies drive inclusive growth.
- To integrate institutional frameworks, stakeholder ecosystems, and indigenous epistemologies to propose culturally grounded, evidence-based development strategies.

Learning Outcomes:

Having completed this course, students will learn:

- To critically geographical factors like resources, demography, and infrastructure while evaluating perspectives on regional disparities.
- To explain interconnections between sustainability, human development, technology, and governance, demonstrating holistic understanding of national progress.
- To evaluate governance, innovation, and indigenous wisdom in advancing sustainability while proposing implementable, context-specific solutions.

Course Outline

THEORY (45 hours)

Unit 1 (12 hours)

Introduction:

Introduction to Viksit Bharat @2047 and Geographical Foundations: Concept, Goals, Vision and Strategic Framework; Geographical Diversity and Heritage; Geographical Implications in National Development: Vitality and Vulnerabilities.

Readings:

- Aiyar, S., & Mody, A. (2011). The Demographic Dividend: Evidence from the Indian States. International Monetary Fund, Washington, D.C.
- Gupta, R. L., & Singh, S. (Eds.) (2024). Viksit Bharat @2047: Challenges & Opportunities. [illegible] Publishers & Distributors, New Delhi.
- Rao, C. R. (2024). Viksit Bharat 2047: Infrastructure, Innovation, Inclusion. Notion Press Media Pvt. Limited, Chennai, India.

Unit 2: (11 hours)

Resources and Environmental Sustainability:

Natural Resources & Ecosystems: Diversity, Degradation and Sustainability; Renewable Energy and Green Energy Development; Agricultural Development; Climate Action; Indigenous Knowledge Systems (IKS).

Readings:

- Brokensha, D., Warren, D. M., Slikkerveer, L. J. & Dechering, W. (Eds.). (1995). The cultural dimension of development: Indigenous knowledge systems. Intermediate Technology Publications, United Kingdom.
- Harris, J. M., & Roach, B. (2022). Environmental and Natural Resource Economics: A Contemporary Approach (5th ed.). Routledge, New York.
- Mishra, P. K., Kumar, M., [illegible] S., & [illegible], T. (Eds.). (2024). Climate Change and Socio-Ecological Transformation: Vulnerability and Sustainability. Springer Nature, Singapore.

Unit 3: (11 hours)

Changing Demography, Social & Economic Progress:

Demographic Changes and Dividends; Economic Dimension; Regional Development; Human Development; Education, Healthcare and Skill Development; Socio-economic indicators; Quality of Life and Human Well-being; [illegible].

Readings:

- Shaikh, F. B. (2023). Urban Dynamics: Geographical Approaches to Urbanism. Cambridge Scholars Publishing, United Kingdom.
- Chacha, I. (2023). Social Sector Development and Inclusive Growth in India. Emerald Publishing Limited, United Kingdom.
- Huber, L. (2018). Demographic Change and Economic Growth. Conditions of Growth Models. Springer Gabler, Wiesbaden.

Unit-II (12 hours)

Infrastructure, Innovation, Technology Transformation and Future Prospects:

Rural-Urban infrastructure and Transformations, Industrial Corridors and Regions, Hi-Tech Industry & Development and innovation, Digital Infrastructure, Skilled Digital, Knowledge Based, Sustainable Future cities.

Readings:

- Nagendra, S., Raghuramapatruni, N., & Shyam, S. M. J. (2018). Web Portal 2047: Empowering India. Notion Press Publishing House.
- Meyer, J., & Kaner, S. (Eds.). (2023). A Roadmap to Industry 4.0: Smart Production, Sharp Business and Sustainable Development. Springer Nature, Switzerland.
- Mi Hang (2018). Field Based BIM Technology for Residential Interior Design.

Tutorial Exercises (10 hours)

- Prepare a geographical map of a region and identify its spatial patterns and development indicators.
- Examine some case studies and consumer field surveys to identify key success factors and challenges.
- Collect demographic data and visualize trends using charts, graphs, or maps, then interpret the significance.
- Investigate local indigenous knowledge systems and discuss their relevance for sustainable regional development.
- Case based study on rural-urban infrastructure transformation and identify impact on regional growth and connectivity.
- Research digital twin applications, their data integration, and the skilled workforce needed, outlining their role in national development.
- Discuss roles in a governance ecosystem and propose policies or solutions for a given spatial challenge.

- [illegible]

Suggested Readings:

- Chatterjee, U., Bhasin, A., Bhattacharya, J., & Mahanta, S. (Eds.). (2022). Advances in urbanism, industrial ecology, and sustainability. CRC Press, Taylor and Francis Group.
- Department of Science and Technology. (2021). Vision document: Emerging Science, Technology and Innovation Corridor (ESTIC 2035: Kolkata Metropolitan Region). Vision Document 2047. Government of India.
- Gupta, A. K., & Singh, S. (Eds.). (2020). Vikas Bharat 2047: Aspirations & Opportunities. Rajiv Gyan Publication & Distribution, New Delhi.
- Kundu, S. S. (2012). Health status, issues and access [Unpublished manuscript]. Taylor & Francis Group.
- [illegible]
- MIT Faculty. (2018). Successful Innovation Ecosystems [Working paper]. MIT Sloan School of Management.

Digital materials: Not Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-D40 : APPLIED CLIMATOLOGY (PRACTICAL)

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical / Practice		
GEOG-D40: APPLIED CLIMATOLOGY (PRACTICAL)	4	2	0	2	BA/ BSc in Geography	Basic Knowledge of Geography

Learning Objectives:

The learning objectives of this course are as follows:

- To acquire the fundamental concepts of climatology, including climate components, their interactions, and their significance in society, health, and the environment.
- To analyse and interpret various types of climatic data using statistical and computational techniques.
- To evaluate the principles, processes, and limitations of numerical weather prediction.
- To apply advanced techniques for practical weather prediction and forecasting.

Learning Outcomes:

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

- Demonstrate proficiency in handling and analysing climate data for understanding spatial and temporal climatic patterns.
- Assess and interpret the accuracy and limitations of different weather prediction models and techniques.
- Develop informed weather forecasts and climate interpretations using both theoretical knowledge and practical computational tools.

Course Outline:

THEORY (30 hours)

Unit 1 (7.5 hours)

Introduction (Theory): Introduction to Climatology, climate components and its linkages; climate and weather; weather and climate.

Readings:

- Singh, S. 2023. Climatology: Concepts and applications. [illegible] Academic Press.
- Thompson, R. D. & Perry, A. H. 1997. Applied climatology: principles and practice. London: Routledge.

Unit 2: **(15 hours)**

Climate data and its use (Theory): Methods and techniques of data analysis; downscaling methods [illegible].

Readings:

- Kotamarthi, R. et al. 2021. Downscaling Techniques for High-Resolution Climate Projections: From Global Change to Local Impacts. Cambridge: Cambridge University Press.
- [illegible] (eds.) 2018. [illegible]: Advances in [illegible]. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-[illegible]

Unit 3 (Practical) **(30 hours)**

Weather Predictability (Practical): Numerical weather prediction: processes and limitations.

Readings:

- [illegible] Park, S. K. (ed.) 2022. Numerical Weather Prediction: East Asian Perspectives. Springer International Publishing.
- Palmer, T. and Hagedorn, R. (eds.) 2006. Predictability of Weather and Climate. Cambridge: Cambridge University Press.

Unit 4 (Practical) **(30 hours)**

Techniques in Weather Prediction (Practical): [illegible], Ensemble probability [illegible] statistical downscaling (SDC), regression methods and [illegible] models for weather prediction.

Readings:

- Wilks, D. S. 2019. Statistical Methods in the Atmospheric Sciences. Fourth Edition (pp. 1-[illegible]). Elsevier. https://doi.org/10.1016/C2017-0-03921-6
- Neelin, J.D. 2011. Climate Change and Climate Modeling. Cambridge: Cambridge University Press.

Tutorial/Exercises: Not Applicable

Practical Hours:

Four practical exercises to be completed from week one, and this will involve training students to develop hands-on skills relevant to climatology and weather prediction. In Unit 1, they will analyze climate components, study teleconnections, precipitation, and humidity variations, and evaluate their impacts on health and sustainability. Unit 2 involves collecting and analyzing climate data using downscaling and bias correction methods, generating localized projections, and assessing ecosystem and societal effects. In Unit 3, students will explore numerical weather prediction models, interpret outputs, and evaluate forecasts. Unit 4 focuses on applying statistical and dynamical techniques, including EOF, regression, and GCMs, to identify climate patterns and predict atmospheric behavior.

Suggested Readings:

- Nguyen, Linda D., Evans, Chris E., Fowler, Hayley J., Cooper, Simon, Wilby, Robert L., (eds.). 2021. Uncertainty in Climate Change Research. Springer Nature Switzerland. https://doi.org/10.1007/978-3-030-73568-9
- Shahid, A. M., Ahmad, W., & Ayaz, O., 2019. Extreme hydrology and climate variability: Monitoring, modelling, adaptation and mitigation (pp. 1–561). Elsevier. https://doi.org/10.1016/C2017-0-04130-X
- Stocker, Thomas and Pedro Vasquez 2016. Indo-Pacific Climate Variability and Predictability, World Scientific, Singapore.
- Marcos, D. A. & Jewson, M., 2018. Statistical Downscaling and Bias Correction for Climate Research. Cambridge University Press. https://doi.org/10.1017/9781107706705
- John R. Lenhard, 2018. Applied Climatology: A study of Atmosphere, Routledge, Taylor & Francis, London
- Antonio Navarra , Vidiani Simoncini, 2010. A Guide to Empirical Orthogonal Functions for Climate Data Analysis, Springer, Dordrecht, The Netherlands
- Antonio Navarra, Vidiani Simoncini, 2003. Atmospheric Modeling, Data Assimilation and Predictability, Cambridge University Press, London
- Sohl, N., Robertson, A. W., Bliss, R., Bytnar, K., DeWitt, D. G., Tarnay, K., ... Siegel, R. B., 2011. Performance of seasonal streamflow forecasts of the Owens River basin based on generic simulation models. Northern Intermountain Research and Risk Assessment, 3(1), 1545–1558. https://doi.org/10.1175/JHM477.1/1.1757.1
- Lorenz, E. N., 1956. Empirical Orthogonal Functions and Statistical Weather Prediction. Statistical Forecasting Project Rep. 1. MIT Department of Meteorology, 49.

Digital materials: Not Applicable

[illegible] SPECIFIC ELECTIVE [illegible] GEOG 4302 DIGITAL CULTURES AND LANDSCAPES

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GEOG 4302: DIGITAL CULTURES AND LANDSCAPES	4	3	1	0	Ability in Geography	

Learning Objectives

- [illegible]
- Critically engage with digital technologies and their cultural implications.
- Explore the relationship between space, place, and digital infrastructures.

Learning Outcomes

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

- Apply key theoretical frameworks to critically analyze digital technologies and their implications.
- Examine the relationship between digital technologies and spatialities and the formation of digital landscapes.
- To understand the role of digital technologies in mediating contemporary issues, such as surveillance, climate change, and political unrest, and their capacity to enable collective futures.

Course Outline

THEORY (45 hours)

Unit I (12 hours)

Introduction to Digital Cultures: Historical and conceptual overviews of digital cultures. Digitization of culture vs. culture of the digital.

Reading:

- Lievrouw, L., & Livingstone, S. (2010). The handbook of new media. John Wiley & Sons.

(Chapter 1)

- [illegible]. (2018). Cultural gaps: Where old and new media collide. New York University Press. (Introduction)
- [illegible]. (2020). Understanding digital culture. [illegible]

Unit 2: **(11 hours)**

Digital Spaces and Sociality: Coherence and incoherence in digital discourse. Geographies of digital media. Location, locality and connection. Digital sociality.

Readings

- Zook, M. A., & Graham, M. (2007). Mapping DigiPlace: Geocoded Internet Data and the Representation of Place. *Environment and Planning B: Planning and Design, 34*(3), 466–482.
- [illegible], A., & Crampton, J. (2012). Introduction: Spatial Big Data and everyday life. *Big Data & Society, 2*(2), 2053951715602494.
- Farman, J. (2013). *Mobile interface theory: Embodied space and locative media*. Routledge. (Chapter 2, 6)

Unit 3: **(11 hours)**

Cyberculture and Virtual Communities: Online identity, performance, and self-presentation. Digital tribes, online forums, and fandoms. Memes, virality, and internet subcultures.

Readings

- Papacharissi, Z. (2012). Affective publics and structures of storytelling: Sentiment, events and mediality. *Information, Communication & Society, 19*(3), 307–324.
- Turkle, S. (Ed.). (2012). *Personal connections in the digital age*. John Wiley & Sons. (Chapter 6, 9, 8)

Unit 4: **(11 hours)**

Ethics, Technology, and Digital Futures: Misinformation and digital activism. Feminist, human rights, and critical digital literacy. Speculative futures: AI, metaverse, and algorithms.

Readings

- Crawford, K. (2021). *The atlas of AI: Power, politics, and the planetary costs of artificial intelligence*. Yale University Press. (Introduction)
- Griffin, T. (2022). *Data Feminism: How data are made and shape our world*. Bristol University Press (Chapters 6, 10)

Tutorial Exercises **(10 hours)**

- Critically appraise how Miller (2011) and Ashton et al. (2018) define what constitutes "digital activity." Do these definitions reflect [illegible]'s claims in the first lecture?

- [illegible]
- [illegible]
- [illegible]
- [illegible]

Practical Exercise: [illegible]

Suggested Readings:

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Digital materials: [illegible]

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-DSE: ENERGY GEOGRAPHIES

[illegible]	Credit	Lecture	Tutorial	Practical/ Practice	[illegible]	[illegible]
GEOG-DSE/ ENERGY GEOGRAPHIES	4	3	1	0	MA/MSc in Geography	Nil

Learning Objectives:

The learning objectives of this course are as follows:

- To understand the geographical perspectives on Energy
- To understand the centrality of energy to human civilization
- To engage with key debates on wider energy systems

Learning Outcomes:

Having completed this course, students will learn:

- Geographical study of Energy as a key concept in the discipline
- Knowledge of current debates in field of energy geographies

Course Outline:

[illegible]	[illegible]
Unit I:	(12 hours)

Introduction: Geographical perspectives on energy

Readings for Unit I:

- Calvert, K. 2016. From 'energy geography' to 'energy geographies': Perspectives on a fertile cross-disciplinary borderland. Progress in Human Geography 40(1): 105–125.
- Huber, M. 2015. Theorizing energy geographies. Geography Compass. 9(6): 327-338.

[illegible]	[illegible]
Unit 2:	(08 hours)

Financial investment in energy: the global trends and sectors in energy

Readings for Unit 2

- Goodall, B. T. (2013). Investments that changed the World. [illegible]
- [illegible] Petroleum Economics and Practice: A Review of World Energy Reports

Unit 3: [illegible]

Energy resources of the World: Coal, Oil, Natural Gas, Nuclear and Renewable energy.

Readings for Unit 3

- Hosier, R. (2013). Coal: A Human History. New World.
- Kalu, M. (2020). Dissipation of Petroleum wealth and the Nigerian oil boom: Nigeria's economy in the era of violence working papers, 20.
- Vaclav, S. S., Jeffrey, K. M., & Richard, M. H. (Eds.). (2006). Mountaintop mining/valley fills in Appalachia: final programmatic environmental impact statement (No. 6). DIANE Publishing.
- Kuhn-Mundy, S., and Dodds, T., 2017. Liquefied natural gas projects: New Delhi, India, and communities. Geography Compass, 11(9), p.e12325.

Unit 4: [illegible]

Contemporary issues: Energy security, Geo-Politics of energy, Energy, environment and sustainable development

Readings for Unit 4

- Chen, P. and Hall, J., 2011. The three principles of energy security: International politics, supply risk and the potential for integration. Current Opinion in Environmental Sustainability, 3(4), pp.232-237.
- Ian Morris, P. A., Ladislaw, S. O., Ayub, M., and Tyndall, L. 2010. The geopolitics of energy in the twenty-first century: Innovation, governance, and security. A Report of the CSIS Energy and National Security Program. October.

Tutorial/ Assignment: [illegible]

- Revising basic discussions on
  - 3P framework: review of world energy
  - Thinking energy geographies
  - Local Participation & the Global Low Carbon Transition
  - Oil fossil fuels
  - Global production networks and the economic social of Oil
  - Actor-Network Theory
  - Geo-political Energy
  - Climate Change & Energy

Practical Report: [illegible]

Suggested Readings:

- Kyle, T., 1983, The wealth of plants: Oil boom and petrochemicals (Vol. 88): Univ. of California Press.
- Kennedy, S., 2014, From Petrostates to "low-carbon": Perspectives on the Geographies of Oil Geography Compass, 8(11), pp.792-810.
- Scholten, D., 2020. Introduction: The geopolitics of the energy transition. In Handbook on the geopolitics of the energy transition (pp. 1-16). Edward Elgar Publishing.
- Yergin, D. 2020, The New Map: Energy, Climate and the Clash of Nations, Penguin Press UK.

Digital materials: N/A (if not)

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOGRAPHY OF GENDER: SPACE AND SOCIETY IN INDIA

[illegible]	[illegible]	Credits			[illegible]	[illegible]
		Lecture	Tutorial	Practical / Practice		
GEOGRAPHY OF GENDER: SPACE AND SOCIETY IN INDIA	6	5	1	0	Applicable to Geography	

Learning Objectives

The learning objectives of this course are as follows:

- To enable students to understand the relevance of geographies in the subject of geography of gender in India.
- To equip students with an understanding of regional variations in construction of gender through the lenses of gendered space.
- To provide an understanding of issues of marginalised communities in the Indian context.

Learning Outcomes

Having completed this course, students will learn:

- [illegible] the emergence of the context of geography of gender as well as importance of gender in India.
- [illegible] gendered construction of public and private spaces and spatial variations in construction of gender in India.
- [illegible] the impact of a gender-blind and caste-ridden regional governance in India.

Course Outline

THEMES	[illegible] Hours
Unit I	12 hours

Geography of Gender: Concept, Development of gendered approaches in the study of gender in geography, constructing gender and development of the subject globally and in India.

Readings for Unit 1

- Peake, Linda. "Women in geography." *International Encyclopedia of Geography: People, the Earth, Environment and Technology*. New York: Wiley. https://doi.org/10.1002/9781118786352.wbieg1078 (2017).
- Datta, Ayona. From mobility, cycle provision, Hindutva Order, and Lutyens' Delhi. In *The Routledge handbook of gender and feminist geographies*. London: Routledge, 2022 (Chapter 3).
- Sultana, Farhana, Kavita Datta, and Fiona Wilson. "Gender and geography: Global views and practices." *Region: Revista de geografia* 3 (2017): 217-260.

Unit 2: (11 hours)

Spatial Patterns and Bases of Gender Inequalities: Livelihood, Caste, Patriarchy, sex preference, access to/use of reproductive technology, sex and sexuality

Readings for Unit 2

- Jeffrey, Craig, Patricia G. Jeffery, Roger Jeffery, and Jesse B. Townsend. "Jats: A Punjabi Jat view of Haryana's skewed sex ratio." (2008).
- Sharma, Ravi Kant, and Indrajit Hazra. "Making Decisions: India's Sex Ratio Gets Worse." *Unemployment Income*. Mittal Publications, Delhi.
- Datta, Ayona. "Informal landscapes and regional variations of gender: Assessing changes in the Indian context." *Gender, Technology and Development* 15, no. 3 (2011): 349-369.

Unit 3: (11 hours)

Towards Genderscapes: Spatial variations in the construction of gender in India. Concept of Genderscape, Regional Gendrescapes in India. Gendrescapes of violence and well-being in India: gendered patterns of crime and violence, gender disparities in selected indicators of social wellbeing.

Readings for Unit 3

- Hastings, Rose. "Significance of gender-related development indicators: An analysis of Indian states." *Indian Journal of Gender Studies* 15, no. 3 (2008): 345-381.

Unit 4: (11 hours)

Indigenous Feminisms and feminist ecologies. Theorising indigenous feminisms, indigenous feminism, power and agency in rituals, narratives, indigenous feminisms and feminist ecologies.

Readings for Unit 4

- Datta, Ayona. "Reterritorializing resistance and agency: Assessing feminist ecologies within indigenous feminisms." In *Gender, Space and Agency in India*, pp. 145-170. Routledge India, 2020.

Practical Examples [illegible]

Practical Record: Not Applicable

Suggested Readings

- Agarwal Bina, 2001, A Field of One's Own: Gender and Land Rights in South Asia, Cambridge University Press.
- Bambra C. 2007, Typologies, Blackwell publications
- Gregory Derek et al., 2009, Dictionary of Human Geography, 5th Edition, Wiley
- Hawley Donald, 1998, Slaves, Plows and Cotton, University of Minnesota Press, Minneapolis
- Mitchell Linda, 1999, Women, Identity and Place: Understanding Feminist Geographies, Rowman & Littlefield, Oxford
- Mitchell, Lloyd and Evans, Jennifer, eds. 2007, Race/Gender/Sexuality, Contested Readings, London: Ashgate.
- Pradhan Sidha, Basanta Dhoj Lama and Sanjib Kafle, 2011, Why Girls Should Ride a Bicycle, Kathmandu: Room to Read.
- Sayre Donald, 1992, Gendered Spaces, University of North Carolina Press.
- Valley Fabric, 1990, Promoting Humanity, Valley Macdonald publishers.

Digital materials like Applicable

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE:
GEOG C409: GEOCHRONOLOGY OF HIMALAYAN GLACIERS

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GEOG C409: GEOCHRONOLOGY OF HIMALAYAN GLACIERS	6	5	1	0	Bachelor in Geography	Basic knowledge of Quaternary and Paleoclimate

Learning Objectives

The teaching objectives of the course are as follows:

- The course imparts understanding the temporal and climatic drivers of glacier fluctuations in the Himalaya.
- The course aims to expose the students with the progress made in the glacier chronology in the Himalayan region from Last Glacial maximum to the Little Ice Age.
- The course intends to identify the future areas of work in the field chronology of the region.

Learning Outcomes

On the completion of course, students will learn:

- The students will be able to evaluate the glacial chronology of the Himalaya and can draw their correlations and synchronous pattern with Global Last Glacial Maximum.
- The students will be able to target the future areas of research in the domain.
- The course will generate capacity building in trained human resource in the country who can work as per the objective of DST, Government of India regarding Himalayan cryosphere.

Course Outline:

THEORY	**(45 hours)**
Unit 1	**(12 hours)**

Introduction: Introduction to Himalayan orogeny, its role in controlling the Global Circulation Model and Monsoon. Himalayan variation of mid-latitude temperature and precipitation, distribution and patterns of glacier response across valleys and their topographic and climatic drivers.

Readings for Unit 1

- Bush, G.L., Owen, J. a., 1968. The role of the Indian summer monsoon and the mid-latitude

- [illegible]
- Ajai et al., [2011]. Snow Line Studies in the Himalayan Space Applications Centre, Ahmedabad.
- Hijmans, R.J., Cameron, S.E., Parra, J.L., Jones, P.G., Jarvis, A., 2005. Very high resolution interpolated climate surfaces for global land areas. [illegible]

Unit 2: [illegible]

Unit Customary Glacial Regime of Himalayas: history of glacial studies in Himalaya, Jain Committee glacial theory of Himalaya, its contribution and shortcomings in objective, East Glacial Maximum in Local Last Glacial Maximum, style and timing of glaciation across valleys of Himalaya.

Readings for Unit 2

- [illegible]
- Shroder, J.F., Bishop, M.P., Copland, L., Sloan, V.F., 2004. Debris-covered glaciers and recent environmental change in the Karakoram Himalaya. Annals of Glaciology, 39, pp. 75–82.
- Owen, L.A., Caffee, M.W., Bovard, K.R., Finkel, R.C., Sharma, M.C., 2006. Terminal Late Quaternary moraines and subsequent glacial fluctuations in the Lahul Himalaya, Northern India. Quaternary Science Reviews, 25(13–14), pp. 1735–1751.
- Owen, L.A., Finkel, R.C., Caffee, M.W., Gualtieri, L., 2002. Timing of multiple late Quaternary glaciations in the Hunza Valley, Karakoram Mountains, northern Pakistan. Geological Society of America Bulletin, 114(5), pp. 593–604.
- Owen, L.A., Spencer, J.Q., Ma, H., Barnard, P.L., Derbyshire, E., Finkel, R.C., Caffee, M.W., Zeng, Y., Xu, C., 2003. Timing of multiple late Quaternary glaciations in the Hunza and Shimshal valleys, Karakoram Mountains, northern Pakistan. Geomorphology, 55(1–4), pp. 159–178.

Unit 3: [illegible]

Recession Curve Analysis of Himalayan streams of Climate change, periods of Rapid Climatic Change (RCC), persistent conditions (LIA, Pre-LIA, Post-LIA) and periods of warm events. Study and Mapping of Holocene Glacier Recession across Himalayan valleys and their patterns. Phases of Glacial expansion and retreat, Process and yield studies applied in reconstruction, evaluation of the glacial chronology of the period and future glacial scenario.

Readings for Unit 3

- Dimri, A.P., Kotlia, B.S., Rogist, J.C., Joshi, M., Mamgain, A.K., Khanduri, A.K., Semwal, D.P., Ranhotra, P.S., Singh, A.K., Bisht, P., Shekhawat, M., Sundriyal, Y.P., Tiwari, S., 2020. Himalayan climate variability: Gaps and future directions. Journal of Earth System Science, 129(1), pp. 1–23.
- Sakai, A., Fujita, K., Yamada, R., Tsushima, A., Ohno, H., Yamaguchi, S., Nuimura, T., Kayastha, R.B., Sunako, S., Matsuoka, K., Kunimi, K., Kodama, Y., 2015. Glacier surface temperature observations on Mount Everest, Nepal–Tibet Plateau, 2007 to 2014. Journal of Glaciology, 61(227), pp. 507–517.

Unit 4: [illegible]

Glacial Chronology of last Millennium: Introduction to the Little Ice Age (LIA), causes of Little Ice Age, Global knowledge of the last Millennium in the literature, methods used for the reconstruction of LIA in Himalaya in spatial pattern and timeline, future areas of research.

Readings for Unit 4

- Kaser, G. V., [illegible], The Little Ice Age in the tropical Andes: Assessing glacier advance dynamics in Northern Peru and [illegible] climate change, The [illegible] and [illegible] (2013). [illegible]
- Fagan, Brian (2000) The Little Ice Age, how climate made history, 1300-1850, Basic Books, New York.
- Raj, R., R. C., 2014, Little Ice Age in the Tibetan Plateau and its bordering mountains: Evidence from [illegible] moraines, Global and Planetary Change, 118, 61–65. doi:10.1016/j.gloplacha.2014.03.003

Tutorial Exercises [illegible]

- What is the study proposed by the [illegible] in Global Glacier Chronology and Himalaya perspective?
- Describe the role of tropical valley on the distribution and dynamics of glaciers.
- Evaluate the work and timing of Late Glacial Maximum in Himalaya and its spatial and temporal pattern.
- Generate a synthesis of glacial fluctuation across Himalayan valleys in last the Holocene.
- Critically examine the glacial chronology of the last millennium in the Himalayan region, and the methods applied with shortcomings.

Practical Record Not Available

Suggested Readings:

- Singh, P. [illegible], M.R., Bandyo, K.N. [illegible] the Key to Earth History [illegible] Wiley Singapore.
- Fagan, Brian (2013) The Little Ice Age, how Climate made History 1300-1850, Basic Books, New York.
- Hambrey, M. and Alean, A.J. (2004) Glaciers, Cambridge University Press, Cambridge.
- Holmlund, B. and Glasser, N.F. (2008) RAM Techniques in Glaciology and Glacial Geomorphology, John Wiley & Sons, Singapore.
- Hughes, P.D., Gibbard, P.L., A stratigraphical basis for the Late Glacial Maximum (LGM), Quaternary International (2014), [illegible]
- Matthews, R.W. (2013) Glacial Epoch and Warm Polar Climates, Read Books Ltd.
- Raj, R., R. C., 2014, Little Ice Age in the Tibetan Plateau and its bordering mountains: Evidence from moraine chronologies, Global and Planetary Change, 118, 61–65.

Digital materials Not Available

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOGRAPHY OF SOCIAL JUSTICE IN INDIA

[illegible]	Credit	Lecture	Tutorial	Practical / Practice	[illegible]	[illegible]
GEOG 4.06: GEOGRAPHY OF SOCIAL JUSTICE IN INDIA	4	5	1	0	BA/BSc (Hons) Geography	NIL

Learning Objectives:

The learning objectives of the course are as follows:

- To provide a critical understanding of conceptual foundations, key components, and evolving theoretical approaches to social justice from a geographical and interdisciplinary perspective.
- To examine the historical trajectory of marginalization, social exclusion, and spatial disparities in India, including the roles of caste, class, and minority identities within rural and urban contexts.
- To analyse the effectiveness and limitations of major constitutional provisions, welfare policies, and programmes addressing the marginalized communities in India.

Learning Outcomes:

Having completed this course, learners will be able to:

- To develop a nuanced understanding of social justice as a geographical construct, especially its relevance in addressing inequality and promoting equitable spatial development in India.
- To critically examine the historical processes and spatial patterns of exclusion based on caste, religion, gender, and resource access across diverse socio-economic landscapes.
- To acquire analytical tools to assess constitutional provisions, human rights frameworks, development programs, and the role of civil society in achieving empowerment and substantive justice for the marginalized groups.

Course Outline:

UNIT ONE [40 hours]

Unit 1: [illegible] (12 hours)

Introduction to Geography of Social Justice:

[illegible] Nature, Scope and Dimensions of Geography of Social Justice; Conceptual framework, components, principles and approaches of Social Justice; Geographical Perspectives of Social Justice; Survey of classical political theorists.

Readings:

- [illegible] Ahmad, A. (2013). Social Geography of India (2nd Revised and Enlarged ed.). Concept Publishing Company Pvt. Ltd., New Delhi.
- [illegible] Hannan, N. (1991). Social science and me. Oxford University Press.
- [illegible] Chakrabarti, G. (2014). Dalits and the Democratic Revolution: Dr. Ambedkar and the Dalit Movement in Colonial India. Sage Publications Pvt. Ltd., New Delhi.

Unit 2: [illegible] (11 hours)

Historical Context of Marginalization and Inequities:

[illegible] Identification of Indian society; Caste system; Caste Stigma Index; Atrocities and exclusive legislations SC/ST; Special provisions of SC, ST, OBC and Minorities population. Research case studies.

Readings:

- [illegible] Sengupta, K. (2018). Problem in the Political Economy of Agrarian Classes and Caste(s). (Not online ed.). Perspectives, Netherlands.
- [illegible] Ambedkar, B. R. et al. (2002). Caste, Discrimination, and Exclusion in Modern India. Sage Publications Pvt. Ltd., New Delhi.
- [illegible] Sharma, S. M., & Mendhekar, J. P. (Eds.). (2018). Caste in India: Struggle, Status and Solidarity. Sage Publications Pvt. Ltd., New Delhi.

Unit 3: [illegible] (11 hours)

Social (in) Justice in India:

[illegible] Urban and Rural dimensions; Dalit Rights; Social exclusion and segregation; Violence, Poverty, Inequality, and rights and security; Case Studies.

Readings:

- [illegible] Gandhi, P. C., & Pandey, L. S. (2004). Case Studies on Diversity and Social Justice (1st ed.). Routledge, New Delhi.
- [illegible] Kundu, J. (Ed.). (2018). Development planning and balanced urban growth in India. Cambridge Scholars Publishing, United Kingdom.
- [illegible] Schaffner, A. (2018). Urban Bias revisited. Rural Sociology, 67(1), 55-73.

Unit 4: [illegible] (11 hours)

Social Justice: Empowerment and Legal Framework

Role of civil society and media; Contemporary movements; Judicial Developments; Human rights; Constitutional Provisions, Laws, Acts, Programs & Policies

Readings

- [illegible], A. G. (2021). Social Justice and Public Policy (First MIT press ed.). Wheatsheaf Books Ltd., Great Britain.
- Srivastava, D. K. (2019). Legal Protection of Scheduled Castes and Tribes: (Constitutional Safeguards and Social Justice). Deep Book Agency, New Delhi.
- Thorat, S. (2006). Ambedkar's Role in Economic Planning, Water and Power Policy (3rd ed.). Shipra Publications, New Delhi.

Tutorial Exercises (15 Hours)

- Based on case studies, evaluate the marginalized communities to map local knowledge on resource access, discrimination, and inclusion.
- Use district-level data to identify spatial clusters of educational disadvantage among Scheduled castes, tribes, and minorities.
- Compare spatial patterns of inequality in urban cities through key historical and contemporary events.
- Examine development-induced displacement and its social-geographic impacts on indigenous and marginalized communities.
- Analyse the geographic spread of social justice movements using social media and demographic data.
- Create a spatial database comparing multiple indicators of inequality for a selected district.
- Analyse the intersection of caste, class, and gender in access to urban public spaces [illegible] [illegible].

Suggested Readings

- Arneson, R. J. (1989). Equality and Equal Opportunity for Welfare. Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition, 56 (1), 77-93. Springer Nature, Singapore.
- Dalal, N. (Ed.). (2021). Social justice and human rights in India (1st ed.). Navya Publications.
- Hopkins, P. (2019). Social justice and geographies. In R. Kitchin (Ed.), The encyclopedia of human geography. Springer Nature, Switzerland.
- Kumar, A., & Das, P. (2025). Reimagining spatial justice in India through the lens of legal geography: Challenges and Reviews. Springer Nature, United Kingdom.
- Pandey, R. (2018). Social Justice (In Hindi) (Translated). Vani Prakashan, Delhi (Hindi).
- Marlene, J. (2007). Social justice and human rights. In An approach to rights, law and Philosophy

[10] J. Sun, et al., [illegible]

Digital materials for practice

DISCIPLINE SPECIFIC ELECTIVE: DSE (A) (ii) [DE]
GLOBAL GEOGRAPHY OF ENVIRONMENT

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Lecture	Tutorial	Practical / Practice		
GLOBAL ENVIRONMENTAL GEOGRAPHY OF ENVIRONMENT	4	3	1	0	Basic knowledge of Geography	

Learning Objectives

The learning objectives of this course are as follows:

- To make students understand the nature and dimensions of the environment in a changing climate.
- To understand the different perspectives of global and geographical environments.
- To have a good knowledge of global hazards and the role of technology and indigenous knowledge in risk mitigation.
- To be well-versed in how global environmental issues are addressed in international contexts and SDGs.

Learning Outcomes

On successful completion of this course, students will be able to:

- [illegible] ability in understanding the [illegible] and in relation to the challenges of the Anthropocene.
- [illegible] and also learn how to identify various global environmental hazards, risks and vulnerabilities and adopt various risk-mitigating measures.
- [illegible] this course will give them the opportunity to look for changing environments with a view to engage and reflect on a geographical perspective.

Course Outline

THEORY (45 Hours)

Unit I (12 hours)

Introduction: Concept, Nature, Scope, Scientific foundations of environment

Readings:

- Barry, Roger G and Gan, Thian Yew. 2011. The Global Cryosphere Past, Present and Future. Cambridge University Press.
- Marshall, S.J. 2011. The Cryosphere. Princeton University Press.
- Qin, D., Yao, T., Xiong, Y., and Ren, J. (Eds.). (2021). Introduction to Cryosphere Science. Springer Nature.

Unit 2: **(11 hours)**

Glacial System and Climate Change: Glacial System, Periglacial Environment, Role of GLOF and GLOF in Snow, Glaciers and Glacial Lake Monitoring.

Readings

- Cuffey, K.M. and Paterson, W.S.B., 2010. The physics of glaciers. Academic Press.
- Sugden, D.E. and John, B.S. 1976. Glaciers and Landscape. New York, New York.
- Pellikka, P., and Rees, W.G. 2010. Remote Sensing of Glaciers: Techniques for Topographic, Spatial and Thematic Mapping of Glaciers. CRC Press/Taylor and Francis Group, London, U.K.

Unit 3: **(11 hours)**

Cryospheric Hazards and Risk: Types of Cryospheric hazards, Avalanche, Glacial Lake Outburst Floods (GLOF), GLOF and Vulnerability, Technology (Participation GIS, EO, Early Warning System) and Traditional Knowledge in Resilience Building, Hazards and Risk Mapping.

Readings

- Bajracharya, Basanta and Shrestha, Arun B. 2011. An overview of glacial hazards in the Himalayas. Quaternary International, 65/66, 71-87.
- ICIMOD. 2011. Glacial Lakes and Glacial Lake Outburst Floods in Nepal. http://www.icimod.org/resource/1847
- Beniston, M., Farinotti, D., Stoffel, M., Andreassen, L.M., Coppola, E., Eckert, N., Fantini, A., Giacona, F., Hauck, C., Huss, M., Huwald, H., Lehning, M., López-Moreno, J.I., Magnusson, J., Marty, C., Morán-Tejéda, E., Morin, S., Naaim, M., Provenzale, A., Rabatel, A., Rixen, D., Ros, S., Steffen, K., Wunderle, S., Zekollari, H., Zemp, M., and Zolles, T. 2018. The European mountain cryosphere: a review of its current state, trends, and future challenges. The Cryosphere, 12(2), 759–794.

Unit 4: **(11 hours)**

Applied Glaciology: Climate and Environment Trend in Cryosphere, Glacier Variations, Response to Water and Energy Security, Cultural dimensions of Cryosphere, Changing Cryosphere and Sustainable Development Goals (SDGs), Fieldwork/Field Trip

Readings

- IPCC Special Report: Ocean and the Cryosphere (Report). 2019. https://www.ipcc.ch/srocc/chapter/chapter-regional-2/
- Stenchikov, Alan and Kelly, Richard. 2006. The Cryosphere and Global Environmental Change. Wiley Blackwell.
- Glacier Retreat and Calving. 2019. Tobin G. Knight. London: Hodder Books. ISBN: 978-1-788-70014-4.

Tutorial Exercises [illegible]

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Practical Exercise [illegible]

Suggested Readings

- [illegible]
- [illegible]
- [illegible]
- [illegible]

Digital Materials [illegible]

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG-E-(08) GEOGRAPHY OF HEALTH

Course Code & Title	Credits	Credit distribution of the course			Eligibility criteria	Prerequisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
GEOG-E-(08): GEOGRAPHY OF HEALTH	4	3	1	0	BA/ BSc (H) Geography	Basic Knowledge of Geography

Learning Objectives:

The learning objectives of this course are as follows:

- To explore the spatial foundations of health and disease, including major sources of health risk and the geographical dimensions of emerging and re-emerging diseases.
- To identify and analyse environmental pollution and global health risks, focusing on determinants, exposure patterns, and hotspots of vulnerability.
- To examine spatial inequalities in health across global, regional, and neighbourhood scales, combined with vulnerability mapping and community-level assessment.
- To evaluate emerging health challenges and policy responses at national, regional, and international levels, emphasizing geographically informed health interventions.

Learning Outcomes:

Having completed this course, students will learn:

- Apply spatial techniques and data sources to interpret patterns in health outcomes, identify emerging health risks, and understand spatial variations in health outcomes.
- Assess environmental pollutants and their health impacts through spatial analysis, including mapping pollution sources, risk zones, and changing risk environments.
- Carry out vulnerability mapping, and generate community-level vulnerability profiles.
- Critically analyse health policies and interventions at various spatially informed strategies for addressing health inequities, and improving health challenges.

Course Outline:

THEORY (48 hours)

Unit 1 (32 hours)

Introduction: Conceptual Foundations of Health & Disease, Mortality and morbidity, International Classification of Diseases (ICD), Sources of Health Data, Health Indicators and Measurements, Spatial Epidemiology

Readings

- Arokiasamy, C. Gauvin, & Smeeth L. (Eds). (2018). Geographies of health: An Introduction (2nd ed.). Wiley-Blackwell.
- Lynch, M., Rees, E. D., & Cassell, M. (2013). Health and national geography (3rd ed.). Guilford Press.
- Meade, Melinda S., & Emslie, Richard F. (2010). A historical perspective of the geography of medical care. Southeastern Geographer, 10(2), 115–133. https://doi.org/10.1353/sgo.1970.0013

Unit 2: (16 hours)

Changing Environment and Health Landscape: Climate change and geographic distribution, Social and Environmental Determinants of Health, emerging pathogens of the 21st century and Migration, Outbreak, Epidemics, Pandemics, HIV/AIDS, and Ebola, epidemic and pandemic diseases, Monitoring of pandemic, Traditional medicine, Global environmental change and health.

Readings

- Cliff, A. D., & Haggett, P. (1979). Spatial aspects in epidemic systems. In Introduction to mathematical analysis of spatial data (pp. 1–30). Cambridge University Press.
- Gatrell, A. C. (2002). Geographies of health: An introduction. Blackwell Publishers.
- Meade, M. S., & Emslie, R. F. (2010). Medical geography (3rd ed.). Guilford Press.

Unit 3: (16 hours)

Spatial Inequalities and Health Risks: Geographical perspectives on health and inequality, Health inequalities across global, regional and neighborhood scales, Vulnerability Mapping, Community Level Vulnerability Assessment

Readings

- Gatrell, A. C., & Elliott, S. J. (2009). Geographies of health: An introduction (2nd ed.). Wiley-Blackwell.

Publishers.

- Dykeman, B. (2016). Social health inequalities: Adopting GIS tools and data analysis. CRC Press. https://doi.org/10.1201/9781315371498
- Smith, M. (2018). Epidemiology and geography: Principles, methods and tools of spatial analysis. Wiley. https://doi.org/10.1002/9781119282280

Week 6: **(1 hours)**

Emerging Health Challenges and Policy Initiatives: Global and Regional Health Challenges, National Level Health Initiatives (Ethics, Health care system, Political economy of health and health care), Emerging health issues and policies

Readings

- Brown, D. W., Kawachi, I., & Wamala, S. (2014). The handbook of global health policy. Wiley. https://doi.org/10.1002/9781118800942
- Dietrich, S., & Rodin, D. (Eds.). (2017). Global health and geopolitical regimes. Routledge. https://doi.org/10.4324/9781315232522
- Johnson, S. A. (2017). Challenges of health and development: From global to community perspectives. second edition. Newcastle: International Publishing. https://doi.org/10.1007/978-3-319-53123-3

Tutorial Exercises **(15 hours)**

- Discussion on the spatial foundations of health and disease with emphasis on geographical factors that shape disease patterns.
- Identification and analysis of environmental problems caused and associated global health risk issues.
- Discussion on global inequalities in health at global, regional, and neighborhood scales.
- Analysis of emerging health challenges and relevant international policy initiatives.
- Review and comparison of major methods used in global health research, including disease surveillance, hotspot identification, and community-level vulnerability assessment.

Practical Research Not Applicable)

Suggested Readings

- Alali, Y. H., Abd, M. S., Sadiq, S. G., Ahmed, N. J., & Alwarafy, F. S. (2023). Understanding global health inequities and inequity: Causes, consequences, and the path toward justice in healthcare. Future Health Challenges, 9(1), Article 9001. https://doi.org/10.53797/fhc.9001.58
- Andrew, T. A. Lecturer (2008). Disease ecology: An introduction to ecological medical geography. Read Books Ltd.
- Anupa, M. C., Anupa, A. L., & Subramaniam, S. V. (2013). Innovations in Health Definitions, Concepts, and Services. Global Health Issues, 3(3), 27104. https://doi.org/10.5402/ghi.v3.i3.27104
- Archibugi, F., & Hamel, H. (2011). An Introduction to the geography of health. Routledge.
- Bambra, Fairman, Kelleher, Trinkoff, & Subramanian, S. V. (2011). Health care and migrant in

- Jones, The Lancet, 377(9769), 93–97. https://doi.org/10.1016/S0140-6736(10)61829-7
- Rothman, J., Greenland, S. (2008). Some epidemiology. Oxford University Press.
- Rose, Kay, R., & Leyland, J. (Eds.). (2018). Geographies of health and development. Routledge.
- Braveman, P., Egerter, S., Williams, D.R. (2011). The social determinants of health: coming of age. Annual Review of Public Health, 32, 381–398.
- Bowen, T., McCarthy, S., & Moon, G. (Eds.). (2012). A companion to health and medical geography. Wiley-Blackwell.
- Bowen, L.M., Kemp, S.P., Lang, M., Matthews, S.A., & Edwards, R.A. (2011). Communities, neighborhoods, and health: Expanding the boundaries of place. Springer.
- Curtis, S. (2010). Health and inequality: Geographical perspectives. Sage Publications.
- Diez Roux, A., Glass, T., & Schulz, A. (Eds.). (2006). Urban health and society: Interdisciplinary approaches to health and social science. Oxford.
- Gatrell, A.C. 2004. Population and Health in Developing Countries. Springer, New York.
- Gatrell, A., & Loytonen, M. (Eds.). (2006). GeoMedicine. Springer. https://doi.org/10.1007/3-540-31335-3
- Gatrell, A.C., & Elliott, S.J. (2015). Geographies of health. An introduction (3rd ed.). Wiley-Blackwell.
- Harrington, D.W., McLafferty, S., & Ellison, N.C. (Eds.). (2018). Population health research: Geographical perspectives. Routledge. https://doi.org/10.4324/9781315619880
- James, Kulldorff, K., & Mayer, J. (Eds.). (2013). Health disease and society: A critical medical geography. Routledge & Kegan Paul.
- Cromley, E., Delmelle, E., & Post, A. (Eds.). (2015). Spatial analysis in health geography. Routledge. https://doi.org/10.4324/9781315619941
- Edwards, L., and Bateman, J.P., (eds.) (2001). Neighborhoods and health. Oxford, Oxford University Press.
- Logan, J., & Kan, R.-J. (Eds.). (2014). Geographies of health and development. Routledge.
- Lovett, J. (2020). Residential segregation: The political economy of health and wealth. Cambridge University Press. https://doi.org/10.1017/9781108854726
- Mohr, R. F. (2007). Geography of health: a review of progress of life and health in India. Current Publishing Company.
- Openshaw, S. B. (1983). The modifiable areal unit problem. A review of the spatial interaction of population change. The Midland Regional Field Quarterly, 19(4), 309–319. https://doi.org/10.2307/2349775
- Oudenhoven, E. (2016). Spatial Health Inequalities. Routledge. https://doi.org/10.1201/9781315371894
- Raphael, D., Bryant, T., Mikkonen, J., & Raphael, A. (2020). Social determinants of health: The Canadian facts (2nd ed.). Ontario Tech University Faculty of Health Sciences & York University School of Health Policy and Management. http://thecanadianfacts.org/The_Canadian_Facts-2nd_ed.pdf
- Rees, R., Weale, K., & Gibson, V. (2018). Management of complex public health issues and their multidisciplinary approaches to the changing environment. Elsevier. https://doi.org/10.1016/C2013-0-04904-6
- Sen, G. (2003). Universal health coverage in India: A step and working way. Economic and

Political Weekly, 47(38), 40–44.
- Smith, N. J., & Saunders, D. (2005). The strategic geography of health inequalities. Transactions of the Institute of British Geographers, 30(2), 173–190. https://doi.org/10.1111/j.1475-5661.2005.00159.x
- Valerie A. Cassidy, Sheena J. Andrews, & Nisha Patria (Eds.). (2018). Routledge handbook of health geography. Routledge. https://doi.org/10.4324/9781315104584
- Williams, A., & Lapchick, R. (Eds.). (2022). Geographies, health and vulnerability. Cambridge. Routledge
- Wilson, Mary E. (2015). Geographies of infectious diseases. In Infectious Diseases (4th ed., Vol. 1, pp. 958–967.e1). Elsevier. https://doi.org/10.1016/B978-0-7020-6285-8.00104-4
- World Health Organization. (2005). Global health risks: Mortality and burden of disease attributable to selected major risks. World Health Organization.

Digital Materials: Not Applicable

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
		Lectures	Tutorials	Practical / Practice		
[redacted]	4	3	1	0	AA/Bs in Geography	–

Learning Objectives

The learning objectives of this course are as follows:

- [redacted]
- [redacted]
- [redacted]

Learning Outcomes

[redacted]

- [redacted]
- [redacted]
- [redacted]

Course Outline

THEORY (45 Hours)

Unit I (12 Hours)

[redacted]

Readings for Unit I:

- [redacted]
- [redacted]

Unit 2: [illegible]

[illegible] and Uttarakhand Valley/Basin Floods, Cloudburst, Earthquake, Landslides and [illegible] (Case Studies).

Readings for Unit 2

- [illegible]
- [illegible]

Unit 3: [illegible]

[illegible] (Case Studies)

Readings for Unit 3

- [illegible]
- [illegible]

Unit 4: [illegible]

[illegible]

Tutorial Exercises [illegible]

- **Physiographic Mapping:** [illegible]
- **River Basin Analysis:** [illegible]
- **Hazard Mapping:** [illegible]
- **Livelihood and Sustainability:** [illegible]
- **Conservation Case Study:** [illegible]

Practical Record: [illegible]

Suggested Readings:

- [illegible] (ed.) 2001. [illegible]. Oxford University Press, Delhi.
- [illegible] 2001. [illegible]. [illegible], London.
- [illegible] and [illegible] 2014. [illegible]. [illegible], New Delhi.
- [illegible] 2008. [illegible]. [illegible], New Delhi.
- [illegible] and [illegible] 2013. [illegible]. [illegible], Mauritius.
- [illegible] and [illegible] 1992. [illegible]. [illegible], Kolkata.
- [illegible] and [illegible] 2002. [illegible]. [illegible], page 132.
- [illegible] 2011. [illegible]. [illegible].
- [illegible] 1998. [illegible]. [illegible]. Pages 345.

[illegible]

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG-[illegible]: MACHINE LEARNING AND ADVANCE GEO COMPUTATION

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
GEOG-[illegible]: MACHINE LEARNING AND ADVANCE GEO COMPUTATION	4	3	1	0	BA/BSc in Geography	Foundations of Geospatial Science

Learning Objectives:

- This course introduces the domain of data science in geo-spatial analysis.
- It lays the foundation of AI-ML with the integration of advanced geo-spatial analysis.
- To skill students solve contemporary geographical problems with AI-ML tools.

Learning Outcomes:

Having completed this course, students will learn:

- Students will be acquainted with contemporary Data Science and conceptual understanding of Artificial Intelligence - Machine Learning theories.
- Ability to execute geo-spatial problems with data mining and extraction approach through AI-ML models.
- Capability to provide solutions to contemporary geographical problems with AI-ML tools.

Course Outline:

SYLLABUS (45 Hours)

Unit 1 (12 Hours)

Concept of Geocomputation: scope and Definition, Introduction to AI-ML, evolution, basic concepts and terminologies.

Readings for Unit 1

- Sen, D. J. (2020) Artificial Intelligence and Geo-informatics for Earth Sciences, Springer.
- Gao, S., Hu, Y., & Li, W. (2023) Handbook of Geospatial Artificial Intelligence, CRC Press.

Unit 2: (1 hours)

Fundamental NLP, mathematical underpinning, stochastic models, n-gram language models, word embeddings, backpropagation algorithm

Readings for Unit 2

- Zhang, C., & Zhu, X. (2018). Machine Learning in Bioinformatics: Theory and Applications. Springer.
- Gao, S., Hu, Y., & Li, W. (2014). Handbook of Geographic Information. CRC Press.

Unit 3: (11 hours)

Convolving AI/ML in geospatial methodologies, data mining, evolutionary computation, clustering and regression, Algorithms/models and software available, random trees, support vector machine, [illegible] Model validation, accuracy assessment

Readings for Unit 3

- Hughes, M. M., & Getis, A. (2010). Handbook of Applied Spatial Analysis: Software Tools, Methods and Applications. Springer.
- Kazmierski, A. (2021). Machine Learning on Geographical Data using Python: Introduction with Examples in Earth Observation and Use Cases. Apress Berkeley, CA.

Unit 4: (12 hours)

Applications of ML in Environmental Study: hazard assessment, spatial planning, climate modelling

Readings for Unit 4

- Lary, D. J. (2010). Artificial intelligence and Deep Learning for Geoscience. Springer.
- Steed, Mills, M. P., & Langley, P. (2009). The future of the Geographic Information Infrastructure. Wiley.

Tutorial

- Qgis interface
- Data generation and pre processing
- Vector and raster data, Data structure and algorithm GSA
- Unsupervised GSA
- Data loading and preprocessing
- Building of models
- Model evaluation, telemetry and Hyperparameter tuning
- Accuracy metrics and visualization
- Prediction on new data and post processing in GIS software

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Suggested Readings:

- Brunsdon, C., & Singleton, A. (2015). Geocomputation: A Practical Primer. SAGE Publications.
- Fischer, M. M., & Getis, A. (2010). Handbook of Applied Spatial Analysis: Software Tools, Methods and Applications. Springer.
- Goodchild, M. F., & Longley, P. (2005). The future of the spatial information infrastructure. Wiley.
- Lary, D. J. (2018). Artificial Intelligence and Deep Learning for Earth Sciences. Springer.
- Miller, H. J., & Han, J. (2009). Geographic Data Mining and Knowledge Discovery (2nd ed.). CRC Press.
- Mitsi, I. T., Kamp, A., Stich, C. M., & Aragón Carrasco, F. (2024). Machine Learning for Remote Sensing Applications. CRC Press.
- Muth, D., Qure, S., & Wu Saya, M. F. (2024). GIS: A Computational Perspective (3rd ed.). CRC Press.
- Rubiano, J. (2021). Machine Learning on Geographical Data Using Python: Introduction into Concepts with Applications and Use Cases. Apress. De Ruiter, D.

Digital materials for purchase

BSG-IV (A): SPECIFIC ELECTIVE (DSE) COURSE: GEOGRAPHY: REGIONAL GEOGRAPHY OF INDIA

Course Name & Code	Credit	Distribution of Credit per week			Type of Course	Prerequisite
		Lecture	Tutorial	Practical / Practice		
BSG-IV (A): REGIONAL GEOGRAPHY OF INDIA	6	4	1	0	BA/BSc in Geography	

Learning Objectives

The learning objectives of this course are as follows:

- The students will be exposed to 'regional' approach in studying geography.
- The students will be introduced to the various facets of regional geography – homogeneous and dynamic regions, regional characteristics and diversity, and their interrelations.
- The students will be aware of the hierarchy of regional divisions of India.

Learning Outcomes

On successful completion of this course, students will learn:

- The students will be able to understand and analyze the principal issues confronting the regions/states.
- The students will get an insight into their regional history through case studies from India.
- The students will be able to understand and analyze the principal issues confronting the different regions of India.

Course Outline

THEORY 140 hours

Unit 1 112 hours

Introduction: Regional Studies and Approach; Concept of Region; Formation of Regions; Regional Consciousness; Regionalism; Regional Planning

Readings

- Baljit Singh (C. D. 1982) India: A Regional Interpretation, ICSSR, New Delhi.
- Sharma, D. N. S. and Chakrabarti, S. T. A. (2004) India and Pakistan – A General and Regional Geographical Overview

Unit 2 (11 hours)

Geography of India: An overview of land, People and Economy.
Readings:

- Nayar K., Adams S.S., and Zanten F. R., 1971. Spatial Organization: A Geographer's View of the World, Englewood Cliffs, Prentice-Hall.
- Worsley Peter, 2007. Regional Geography: Theory and Practice, Transaction Publishers.

Unit 3: (11 hours)

Regionalization of India: Basis of Division, Regional Elements
Readings:

- David Faul, 1978. An Introduction to Regional Geography, Macmillan Publishers, Oxford and Massachusetts.
- Johnston R. J. and Knox P., 1986. Regional Geography: Current Developments and Future Prospects, Taylor and Francis.

Unit 4: (11 hours)

Regionalizations by Spate and Learmonth (1954) and Singh (2011): Selective case studies.
Readings:

- Johnston R. J. and Sidaway J. D. 2004. Geography and Geographers: Anglo-American Human Geography since 1945, Arnold, London.
- Whittlesey, D. 1952. The Regional Concept and the Regional Method. In P. James and C. F. Jones (eds.) American Geography – Inventory and Prospect, AAAS.

Tutorial Exercises (15 hours)

- Discuss the relevance of regional planning
- Selected study of problem and their contributors
- Assignment on selected theories
- Review the working of planning process
- Analyse the contemporary planning practices in India

Practical Record: Not Applicable

Suggested Readings:

- Gleason Acts and Marshall Fox, 2007. Analysis of Planning, Taylor and Francis, London and New York.
- Hall Peter and Tewdwr-Jones Mark, 2010. Urban and Regional Planning, Routledge, London and New York.
- Rajamanickam S. R., 2012. Urban and Regional Planning in India: A Handbook for Professional Practice, Sage, New Delhi.

- Lichfield N., Kettle P. and Whitbread M. (1975). Evaluation in the Planning Process. The urban and regional planning series (Internet) (Vol. 1st ed.).
- Robertson K. J. (2013). The Dimensions of Urban and Regional Planning: Concepts and Case Studies from the Developing World. Wiley-Blackwell.
- Sutton S. and Watson V. (2011). Strategies in Urban and Regional Planning. Routledge.
- Wang X. and Hofe R. (2008). Research Methods in Urban and Regional Planning. Springer.
- Wong C. (2006). Indicators for Urban and Regional Planning: The Interplay of Policy and Methods. Routledge.

Digital materials not accessible.

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE
GEOG-8412: SACRED LANDSCAPE AND PILGRIMAGE GEOGRAPHIES IN INDIA

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SEDS-8412: SACRED LANDSCAPE AND PILGRIMAGE GEOGRAPHIES IN INDIA	4	3	1	0	[illegible]	[illegible]

Learning Objectives

The learning objectives of this course are as follows:

- To introduce students to the interdisciplinary field of pilgrimage studies with a specific focus on geographical perspectives and tools.
- To critically analyse the social, cultural, economic, and political impacts of pilgrimage on landscapes and the communities associated within.
- To explore different theoretical frameworks used in the study of pilgrimage geographies, including the concepts of [illegible] and [illegible].

Learning Outcomes

[illegible] course, students will learn:

- [illegible] the spatial organisation of sacred landscapes and pilgrimages.
- [illegible] and assess [illegible] the significance of cultural heritage.
- [illegible] the socio-spiritual character of India.

Course Outline:

[illegible]	[illegible]
Unit I	[illegible]

[illegible]: [illegible] of Sacred Landscapes and Pilgrimage, Religious and Temple Economies, [illegible] of Traditional Arts, [illegible] of Pilgrimage Studies in Geography

Readings for Unit I:

- [illegible], D., 2018. [illegible] Sacred Landscapes, Pilgrimage, and Ritual Practices in Everyday

[illegible] Sacred Landscape: Pilgrimage and Ritual Practices (pp. 1-20). Oberlin: Carnegie Mellon University.

- Singh, R.P.B., Singh, G.S., & Rana, P.S. (Eds.). (2013). *Pilgrimage and Cultural Landscapes*. Springer.
- Jones, L. et al., (2022). *Geography of World Pilgrimages*. World Cultural and Territorial Perspectives. Springer Nature.

Unit 2: [illegible]

Key Concepts: Sacred & Profane, Hierophany, Axis Mundi, Sacred Geometric Cosmography (Mandalas, Mylocosm, Macrocosm), Sacred Journeys and Spaces

Readings for Unit 2

- Singh, R. P. B., 2013. Hindu Traditions of Pilgrimage: Sacred Texts and Spaces. [Panel Guide & Cultural Universe Building Series, Vol. 3]. Dev Publishers & Distributors, New Delhi.

Unit 3: [illegible]

Geography of Sacred Sites: Mandalas, Sacred Circles, Directions, Axiom and Symmetry, Core Studies: Some Geographies of India

Readings for Unit 3

- Singh, R. P. B., 2013. Hindu Traditions of Pilgrimage: Sacred Texts and Spaces. [Panel Guide & Cultural Universe Building Series, Vol. 3]. Dev Publishers & Distributors, New Delhi.
- Singh, R., P.B., 2001. Sacred order and cultural ecosystems: sacred areas of India. Cambridge Scholars Publishing.
- Singh, R. P.B., 2008. Cultural Landscapes and the Universal Literary Images of Sacred Hindu Books, Varanasi.

Unit 4: [illegible]

Contemporary Issues: Modernity and Tradition, Development, Regulation & Planning Issues and Approaches, Policies and Sustainable Practices

Readings for Unit 4

- Dahlmann, R., 2005. Perception and Perception: Changing Landscape Pilgrimage Studies in research. Tijdschrift voor economische en sociale geografie, 100(4), pp.413-448.
- Chandan, S. and Kumar, A., 2015. Challenges for urban conservation in new era in pilgrim cities of India. Journal of Urban Management, 4(3), pp.472-494.
- Shackley, C. and Thapa, A., 2018. Development and sustainability in relation to religious pilgrimage cities and trails in Religious pilgrimage routes and trails: Sustainable development,

and Management (pp. 49-59). Wallingford UK: CAB International.

Tutorial Exercises (15 hours)

- Sacred landscape: Characteristics
- Case study of sacred site in Delhi
- Mapping Pilgrimage routes in India
- Analysis of Sacred settlements in India, for example: Kashi, Rameshwaram, Rishikesh, Dwarka

Practical Record: Not Applicable

Suggested Readings:

- Bhardwaj, S. M., 1973. *Hindu places of pilgrimage in India: A study in cultural Geography*. Univ of California Press.
- Eck, D. L., 2012. India: A sacred geography. Harmony.

Digital materials: Not Applicable

[illegible] COURSE: GEOGRAPHY TERRAIN MODELLING

[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
		Lecture	Tutorial	Practical / Practice		
GEOGRAPHY TERRAIN MODELLING	4	4	1	0	BA/BSc in Geography	Knowledge of Geographic Science

Learning Objectives:

- To develop an understanding of terrain representation principles, modelling and geometric applications
- To enable students to efficiently and safely perform analysis of physical geography and environmental issues.

Learning Outcomes:

[illegible] [illegible] [illegible] [illegible]

- Broad understanding of Digital Terrain Modelling
- Understanding of digital terrain analysis and visualization tools
- Understanding of Primary and Secondary topographic attributes and application

Course Outline:

THEORY (45 hours)

Unit 1 (12 hours)

Digital Terrain Modelling principles and Concepts, data sources, scale and quality assessment

Readings for Unit 1

- Wilson, J.P. and Gallant, J.C. (eds.) 2000. Terrain Analysis: Principles and Applications. John Wiley & Sons.
- El-Sheimy, N., Valeo, C. and Habib, A. 2020. Digital Terrain Modelling: Acquisition, Manipulation and Applications. Artech House.

Unit 2: (11 hours)

Principles of Photogrammetry, Remote Sensing, LiDAR and GPS, Spatial Attitude Determination: Exterior and Interior Orientation, DEM, Contour, DWord Interpolation, DEM, Typical, Applications, 3D Visualization

Readings for Unit 2:

- Johnson, J.R. (2015). Introductory Digital Image Processing: A Remote Sensing Perspective, (4th Edition), Prentice.
- Li, Z., Zhu, C. and Gold, C. (2004). Digital Terrain Modeling: Principles and Methodology, CRC Press.

Unit 3: (13 hours)

Terrain Analysis: Slope, Aspect, Curvature, Flow direction, Watershed, Flow accumulation, etc.

Readings for Unit 3:

- Zhou, Q., Lin, H. and Tang, G. (eds.). 2007. Advances in Digital Terrain Analysis. Springer.
- Li, Z., Zhu, C. and Gold, C. 2004. Digital Terrain Modeling: Principles and Methodology. CRC Press.

Unit 4: (11 hours)

Terrain Classification: Terrain's topography and Slope – Wetness, Hillslope, Stream power, Valley, Isolation, Texture, Temperature, Multi-Level.

Readings for Unit 4:

- Wilson, J.P. and Gallant, J.C. (eds.). 2000. Terrain Analysis: Principles and Applications. John Wiley & Sons.
- Wilson, J.P. 2018. Environmental Applications of Digital Terrain Modeling. Wiley-Blackwell.

Tutorial Exercises: (15 hours)

- DEM Sources
- DEM Quality Assessment
- Morphometric parameters computations
- Profile/Cross-section/Curvature
- Interpolation
- DEM Derivatives
- Watershed Analysis
- Topographic Indices

Practical Record: Not Applicable

Suggested Readings:

- De Smith, M.R. 2018. Fundamentals of Geographic Information Systems, 4th Edition, Matador.

& Sons, New York).
- [illegible] S., Valera, C. and Galea, A. 2024. Digital Terrain Modelling: Overview, Methodologies and Applications. arXiv preprint.
- Florinsky, I.V. 2012. Digital Terrain Analysis in Soil Science and Geology. Academic Press, Oxford.
- Jensen, J.R., 2007. Remote Sensing of the Environment: An Earth Resource Perspective. 2nd Edition, Pearson.
- Jensen, J.R. 2015. Introductory Digital Image Processing: A Remote Sensing Perspective. 4th Edition, Pearson.
- Pacheco, R.D. and Cetan, G. 2007. Digital Terrain Modelling: Development and Applications in a Policy Support Environment. Springer.
- Wilson, J.P. 2018. Environmental Applications of Digital Terrain Modeling. Wiley-Blackwell.

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOG: E404: TRANS GEOGRAPHIES

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Lectures	Tutorials	Practicals/ Practice		
GEOG-E404: TRANS GEOGRAPHIES	3	6	1	0	BA/BSc (H) Geography	NA

Learning Objectives:

The learning objectives of this course are as follows:

- To apply the concepts of geography to understand Transgender lives and their worlds
- To bring awareness about Transgender issues.
- To examine the significance for socio-economic development of Trans Nations.

Learning Outcomes:

Having completed this course, students will learn:

- Understanding of concepts and terminologies of Trans communities
- Application of geographical knowledge in Transgenders issues and life worlds
- Awareness of Trans persons' needs for policy implementations at different levels and society

Course Outline:

[illegible]	[illegible]
Unit I	[illegible]

Introduction: Concepts and Terminologies; Geographical sensibility; Trans bodies; Sex; Transitions

Readings for Unit I:

- Browne, K., Nash, C. J., & Hines, S. (Eds). Introduction: towards trans geographies. Gender, Place & Culture, 17(5), 573-577.
- Datta, Ayona (Ed), and Rinku Roy. 2018. Decolonising transgender in India: Some reflections. Transgender Studies Quarterly 5, no. 4: 550-567.
- Halberstam, J. (2005). In a Queer Time and Place: Transgender Bodies, Sub-cultural Lives. NYU

Term.

Unit 2 (12 hours)

Trans persons and spatial norms: public space, private space & region

Readings for Unit 2

- Jones, P. ... 2010. The 'norms' of prisoners' social reflection. Brief Digest for gender, sexuality, Space, Place & Culture, 17(2), 631-653.
- Dutt, S. (2012). The Meaning of Home for Transgendered People in Delhi (Re)Visited and Revisited (pp. 1-9). 240. Palgrave Macmillan, London.
- Goodrich, R. J. (1982). Investigation into the use of Volkmann's nail, rasp, and osteotome in bunion relief. Journal of Bone and Joint Surgery, 64(3), 301-312.

Unit 3: (12 hours)

Trans persons & the Nation-state: laws, regulations and policies for transgender inclusion, and discrimination.

Readings for Unit 3

- Dhall, P., & Joseph, P. (2015). Livelihood activities and opportunity costs of work: evidence from a non-commercial sample in India. Rau IIM Graduate Report, 2(6), 824.
- Mittal, A. and Garg, S., 2015. Transgender in India: New developments and emerging issues. International Journal of Multidisciplinary Research and Development, 2(11), pp.382-401.
- Bhattacharya, S., Shukla, G. and Purushotha, S., 2012. Transgender persons' protection of rights act of India: an analysis of vulnerable access to rights of a marginalized community. Journal of Human Rights Practice, 12(3), pp.535-547.

Unit 4 (12 hours)

Rehabilitation: Activism & Rights, Trans-kinship Network connections

Readings for Unit 4

- Tyagi, N.S., Vats, A.K. and Tyagi, S.S., 2015. Trans men across borders: A Comparative Study of Transgender Rights and Realities in India and USA. Journal of Marketing & Social Research, 2, pp.17-24.
- Dutta, A., 2012. Legible identities and illegitimate citizens: Re-gendering of transgender and subaltern activism in Eastern India. International Feminist Journal of Politics, 12(4), pp.494-514.
- Dutta, A., 2014. Travelling through the universal trans- figure, and the Making of Queer and Trans Identities in India. Bloomsbury Publishing.

Tutorial Exercise (24 hours)

- Identifying trans communities in India and their problems

- Visiting/ interacting with Trans persons in Delhi to review data on their experiences in everyday spaces.
- Identifying issues and methods to identify problems and finding solutions through community based engagements for transgender persons in public and economic policy.
- Debating the development of rights perspectives through feminist and transnational discussions.

Practical Record: Not Applicable

Suggested Readings:

- Nanda, S. (1999). The hijras of India: Cultural and individual dimensions of an institutionalized third gender role. In G. Herdt (Ed.), Third sex, third gender: Beyond sexual dimorphism in culture and history (pp. 373–417). Zone Books.
- Reddy, G. (2006). With respect to sex: Negotiating hijra identity in South India. Yoda Press.
- Mondal, S., Das, S., Ray, U., and Banerjee, S. (2020). "They are not humans": Lived experiences of living as transgender in rural Kolkata, India: A qualitative study. International Journal of Transgender Health, 22(1–2), pp. 161–173.
- Jakobsh, D., and Kramer, S. (2006). The Transgender Studies Reader. (Ed.). Routledge.

Digital materials for learners:

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE: GEOGRAPHY: URBAN AND REGIONAL PLANNING

Course Title & Code	Credits	Credit distribution of the course			Eligibility Criteria	Prerequisite
		Lecture	Tutorial	Practical / Practice		
DSE03 (12th) URBAN AND REGIONAL PLANNING	6	4	2	0	Subjects in Geography	Basic knowledge of Economics

Learning Objectives:

The learning objectives of this course are as follows:

- The students will be exposed to basic concepts of urban and regional planning.
- The students will be well aware of pioneering thinkers in urban planning.
- The students will be aware of the issues and theories of regional planning and its principles.

Learning Outcomes:

Having completed this course, students will learn:

- The students will learn about basic concepts of urban and regional planning.
- The students will know about pioneering thinkers in the field of urban planning.
- The students will briefly about the different theoretical background and structure of the regional planning process.

Course Outline:

UNIT(S)	(30 Lectures)
Unit 1	(15 Hours)

Introduction: Applications of Urban and Regional Planning; Planning as an Activity; Objectives of Planning – Single and Complex Planning Problems in Urban Planning – Angle Approach and Simulation Tradition.

Readings:

- Chapman, Allmendinger and Marshall Tim, 2007, Rowley's Planning Theory and Practice, Routledge and New York.
- Hall, Peter and Tewdwr-Jones, Mark, 2011, Urban and Regional Planning, Routledge, London and New York.

Unit 2: (18 hours)

Planning Regional Planning: Introduction, Approaches, Context, Policy Cycle and Planning Process, Planning, Professionals, Power, Institutions, Regional Growth and Development, Regional Spatial Structure, Sustainable Regional Development

Readings:

- Mitchell B. and Watkins K. 2005. Synthesis: Systems and Regional Planning. Psychology Press
- Wang X. and Hofe R. 2007. Research Methods in Urban and Regional Planning. Springer.

Unit 3: (18 hours)

The Planning Process: Systems Planning versus Master Planning, New Planning Paradigms, Spatial Strategy Coordination.

Readings:

- Litchfield N., Kaiser P. and Whitehead W. 2018. Textbook to the Planning Process: The Urban and Regional Planning Series (Volume 10). Elsevier
- Wang C. 2003. Reflections on Urban and Regional Planning: The Interplay of Policy and Methods. Routledge

Unit 4: (12 hours)

Urban and Regional Planning Practices in India: Public Sector (National, Inter-State, State, Sectoral, Metropolitan and Local), Private and Joint Sector

Readings:

- Nallathiga R. K. 2012. Urban and Regional Planning in India: A Handbook for Professional Practice. Sage, New Delhi.
- Rahmeier A. B. 2011. The Impossibility of Urban and Regional Planning: Concepts and Case Studies from the Developing World. Alan Rahmeier.

Tutorial Exercises (15 hours)

- Discuss the relevance of regional planning
- collected study of thinkers and their contributions
- Report writing on selected theories
- Exercises on writing of planning process
- Exercises on contemporary of planning practices in India

Practical Record: Not Applicable

Suggested Readings:

- Cloke John and Marshall Tim. 2009. Regional Planning. Taylor and Francis, London and New York.
- Hall Peter and Tewdwr-Jones Mark. 2010. Urban and Regional Planning. Routledge, London and

New York.
- Kulshrestha S. K. (2012). Urban and Regional Planning (A Handbook for Professional Practice). Regal, New Delhi.
- Lichfield N., Kettle P. and Whitbread M. (2016). Evaluation in the Planning Process: The Urban and Regional Planning Series (Vol. 34). Elsevier.
- Rabinowitz A. (2013). The Value(s) of Urban and Regional Planning: Its Costs and Benefits. Routledge.
- Schmidt J. and Watson K. (2017). Dialogues in Urban and Regional Planning. Psychology Press.
- Wang X. and Hills R. (2008). Research Methods in Urban and Regional Planning. Springer.
- Wang C. (2015). Industrial Structure and Regional Planning: The Interplay of Policy and Market. Routledge.

Digital materials for Application:-

GENERAL ELECTIVE (GE) COURSE:
GEOG-E408: PRINCIPLES, POLICIES AND PRACTICES OF EIA

Course Title	Credits	Lecture	Tutorial	Practicum / Practice	Prerequisite	Remarks
GEOG-E408: PRINCIPLES, POLICY AND PRACTICES OF EIA	4	3	1	0	BA/ BSc in Geography	Basic Knowledge of Geography

Learning Objectives:

The learning objectives of this course are as follows:

- To build a foundational understanding of Environmental Impact Assessment (EIA), its principles, and methodologies.
- To critically examine the socio-economic and ecological implications of development projects through EIA.
- To introduce national and international legal frameworks, policies, and practices relating to environmental assessment.
- To equip students with analytical tools to assess, evaluate, and propose mitigation strategies for environmental impacts.

Learning Outcomes:

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

- Students will be able to explain key concepts, principles, and different aspects of Environmental Impact Assessment.
- Students will develop the ability to evaluate the environmental consequences of development projects and suggest mitigation strategies.
- Students will be able to critically analyze EIA reports and identify strengths and weaknesses in policies and practices.

Course Outline:

THEORY (45 hours)

Unit 1 **(12 hours)**

Introduction (Theory): Definition and principles of EIA, Concepts and approaches, Methods and procedures and common issues in EIA.

Readings

- [illegible]
- [illegible]

Unit 2: **(15 hours)**

EIA practices in India and the World (Theory): Development of Environmental Impact Assessment (EIA), Notified Projects, Environmental Clearance and Conditions of Permit (EC).

Readings

- [illegible]
- [illegible]
- [illegible]

Unit 3 **(15 hours)**

Evaluation Strategies (Theory): Environmental analysis and evaluation of environmental impacts, Environmental Impact Assessment Regulations and Policies in India.

Readings

- [illegible]
- [illegible]
- [illegible]

Unit 4: **(15 hours)**

Selected Case Studies (Theory): Nuclear Energy and Environmental Impact assessment, Coastal Issues and EIA.

Readings

- [illegible]

- Barker, Mark, , & from these Concepts in Utrecht, Netherlands, (2014) Social Impact Assessment: Method And Experience In Europe, North America And The Developing World (1st ed.). Routledge. https://doi.org/10.4324/9781315853345

Tutorial Exercises (25 hours)

- Guided discussion on key concepts, principles and purposes of Environmental Impact Assessment (EIA).
- Critical review of EIA reports, environmental policies and regulatory frameworks.
- Case study analysis of development projects and their environmental impacts.
- Guided presentations and group discussions on contemporary environmental issues.
- Debates on environmental governance, sustainability, mitigation measures and decision-making processes.

Practical Content: Not Applicable

Suggested Readings:

- Glasson, J. et al, 2014. Environmental Impact Assessment: A Survey in Economic Development. Springer.
- Canter, A. et., 2021. Handbook of environmental impact assessment. Elsevier Applied Publishing
- Gupta, A 2008. On Environ Impact on the Natural Environment. Blackwell Publishers Oxford
- Rao, Brown Newton., 1997. Environmental Impact Assessment. Mc Graw Hill Professional Education
- Glasson, J. & Therivel, R. (2019). Introduction to Environmental Impact Assessment (pp. 1–30). Taylor and Francis. https://doi.org/10.4324/9781315167220-1
- Mannan, S., & Rafiq, S. M. F. (2012). Evaluating Environmental and Social Impact Assessment in Developing Countries (pp. 1–19). Springer. https://doi.org/10.1007/978-3-642-25425-3_1
- Somasundaram, V., 1991. Text Book on Environmental Sciences. Narosa Publishing House, New Delhi.
- Prasad, R., and Sinha, R. S. 2005. Environmental Management in Major Dams. Project Concepts, New Delhi.
- Smith, L. G., 1993. Impact Assessment and Sustainable Resource Management. Longman, Harlow.
- Holling, & Morgan, 1998. Environmental Impact Assessment: A Multidisciplinary Handbook. Springer.
- Wathern, A. (1988). Making and the Environment: Case Studies from the Americas (Environmental Development). Routledge. Google Scholar

Digital materials: Not Applicable

SKILL BASED ORIENTED COURSE
TITLE: GROUND INSTRUMENTS FOR GEOGRAPHICAL ANALYSIS

[illegible]	[illegible]	Lecture	Tutorial	Practical / Project	[illegible]	[illegible]
GROUND INSTRUMENTS FOR GEOGRAPHICAL ANALYSIS	2	1	0	3	Applied Geography	

Learning Objectives:

[illegible]

- To provide advanced theoretical understanding of ground-based instruments essential for geographical research and high-precision data collection.
- To highlight strengths and challenges of using these tools to support high-quality research, monitoring, and policy assessment.

Learning Outcomes:

[illegible]

- Describe principles, and applications of various ground-based instruments used in environmental monitoring, hydrology, and geomorphological analysis.
- Understand the strengths, limitations, and suitability of different instruments for specific geographical contexts.

Course Outline:

Unit I – Theory [illegible]

[illegible] Ground-based instrumentation: Introduction and theory, Digital elevation models for processing, interpolation, hydrological, and geophysical measurements. Total stations, Global Positioning Systems (GPS), Automatic Weather Stations (AWS), Thermometer, Barometer, Sunshine recorder, Rain Gauge, Ground Penetrating Radar (GPR), Water Level Recorder (radar-based) and other tools. [illegible] Terrestrial Laser Scanner, Drone (UAV) with RGB/Multispectral

Cosmo/USAR and Edu Scorder.

Readings for Unit 3

- [illegible], S., & Bleam, W. F. (2003). Field techniques in geology and geological engineering. John Wiley & Sons.
- Jackson, M. (2020). Guide to selected digital mapping servers and methods of dissemination (WMO-No. 8). World Meteorological Organization: Geneva, Switzerland, 25.
- Surveying Committee. (2003). Land surveying and geodetic engineering: Principles, methodologies, and applications. Reston, VA: American Society of Civil Engineers.

Unit 3: Practical **(28 Hours)**

Demonstration of open software mechanisms for geographical analysis in the dissemination and presentation of research findings.

Field Exercises: Two practical exercises will be conducted during the Unit's tenure.

Practical Record: Not applicable.

Suggested Readings:

- Gustic, A. (2008). Science (biological) notebooks. Notebook.
- [illegible], S. D. (2014). Sedimentological measurements and micromorphology. John Wiley & Sons.
- [illegible], C. M., & Hogan, R. (2011). Tools in fluvial geomorphology: Problem statement and recent practice. Chichester, Wiley.
- Reynolds, J. M. (2011). An introduction to applied and environmental geophysics. John Wiley & Sons.
- Ware, J. (2008). Hydrographic surveying. CRC press.

Digital materials: Not applicable.

[illegible] COURSE:
CODE [illegible]:
TECHNIQUES OF RESEARCH WRITING

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MGMS 5422: Techniques of Research Writing	3	3	45	3	60/80 in duration	Basic knowledge of Geography

Learning Objectives:

The learning objectives of this course are as follows:

- To equip students with techniques and an understanding of the concepts and ethical standards of scientific and academic writing in Geography.
- To help conduct literature reviews using a range of academic databases and strategies and evaluate different types of sources.
- To enable students to apply various techniques for planning, writing, referencing, editing, and detecting plagiarism in research writing, and to gain insights into and produce original, ethical, and research manuscript presentations.

Learning Outcomes:

[illegible] this course, students will have:

- The students will be able to write their own ideas, arguments, and ethical moral dimensions in the manner of academic format.
- The students will be able to organize their dissertation and theses in the future using referencing and language editing skills to improve the quality and presentation of their writing.
- The course will build capacity in training human resources in the domain of academic research writing.

Course Outline:

Unit 1 - Theory 115 hours

Introduction: How to begin with a dissertation writing, basic rules, structure, aims and ethics of academic dissertations and manuscripts. Literature review: Finding Relevant Research Papers, Sites literature review, reviewed literature, Major Publishers and Databases, identifying Research Gaps.

Readings for Unit-I

- Booth, W. C., Colomb, G. G., & Williams, J. M. (2008). The craft of research. University of Chicago press.
- Kothari, C. R. (2004). Research methodology: Methods and techniques. New Age International.
- Parsons, T., & Knight, P. G. (2015). How to do your dissertation in geography and related disciplines. Routledge.
- Hart, C. (2018). Doing a literature review: Releasing the research imagination. Sage publications.
- Fink, A. (2019). Conducting research literature reviews: From the internet to paper. Sage publications.

Unit-II: Practical (30 Hours)

Preparing the chronological description of chorochromatic maps or Tools of Map Mapping for Thematic Review, Hands on Language reference Tools, Hands on Referencing Tools.

Practical Record: Not Applicable
Exercise: Few exercise will be conducted in the classroom and in assignment mode.

Suggested Readings:

- Haigh, M. (2002). Writing successfully for the journals in Geography in Higher Education. Journal of Geography in Higher Education, 27(1), 107-118.
- Swales, J. M., & Feak, C. B. (2004). Academic writing for graduate students: Essential tasks and skills (Vol. 1). Ann Arbor, MI: University of Michigan Press.
- University Grants Commission. (2018). UGC Promotion of academic integrity and prevention of plagiarism in higher educational institutions Regulations, 2018.

Digital materials: Not Applicable