



University of Gour Banga

Draft Syllabus for

**FOUR-YEAR UNDERGRADUATE
(HONOURS/ HONOURS WITH RESEARCH)
COURSE IN GEOGRAPHY**

Geography (MAJOR)

For Session: 2023-2024

UNDER NEP- 2020

Semester (I, II, III, IV, V, VI, VII, VIII)

**University of Gour Banga
P.O. – Mokdumpur
District – Malda
West Bengal
PIN - 732103**

Descriptive Tye Question Pattern

For Major Core (MC), Minor Core (MnC), Skill Enhancement Course(SEC), and Discipline Specific Elective (DSE)

Theory (Semester End Written Examination)

Full Marks = 25 (upto Sem-IV)

(10 Marks x 1 Question) + (5 Marks x 3 Questions)

Question(s) containing 10 marks will be divided into three parts
containing 5 marks will be divided into two parts
and

Full Marks = 30 (Sem-V Onwards)
(6 Marks × 4 Questions) + (1 Mark (MCQ x 6 Questions)

Internal Assessment

Full Marks = 10 (upto Sem-IV)

(As mentioned in the corresponding syllabus)

Full Marks = 25 (Sem-V Onwards)
(Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva
Voce 5 marks)

Practical (Semester End Laboratory Based Test)

Full Marks = 15 (upto Sem-IV)

(07 Marks x 1 Question) + (05 Marks x 1 Question) + (03 Marks for Laboratory
Notebook & Viva-voce)

Full Marks = 20 (Sem-V Onwards)
(07 Marks x 1 Question) + (05 Marks x 1 Question) + (04 Marks x 1 Question) + (04 Marks for
Laboratory Notebook (2) & Viva-voce (2))

Word limits for descriptive type questions (Theory)

10 marks: 600 - 700

6 marks: 350 - 400

Duration of Examination

Theory paper of 25/30 Marks: 2 hours
Practical paper of 15/20 marks: 2 hours

SEMESTER WISE COURSE STRUCTURE

for

4-Year Undergraduate Programme under NEP-2020 (Session-2023-2024)

Semester	Major Core& Discipline Specific Elective (MC/ DSE)	Interdisciplinary / Multidisciplinary Course (IDC/ MDC)	Minor Core (MnC)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Internship/ Apprenticeship/ Project/ Community Outreach (2)	Value Addition Course (VAC)	Total Credits
I	MC-1 (4) MC-2 (4)	MDC-1 (3)	Minor-1 MnC-1 (4) Subject-A	MIL-1 (2)	Choose one SEC from Major Discipline SEC-1 (3)		ENVS (2)	22
II	MC-3 (4) MC-4 (4)	MDC-2 (3)	Minor-2 MnC-2 (4) Subject-B	MIL-2 (2)	Choose one SEC from Major Discipline SEC-2 (3)	Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2) *(Optional)	Choose one from a pool of courses (2)	24
Students on exit shall be awarded Undergraduate Certificate (in the field of study/ discipline) after securing the requisite 44+2= 46 credits in semester-I and II after completion of Summer Internship (2) (optional)*								
III	MC-5 (4)	MDC-3 (3)	Minor-1 MnC-3 (4) Subject-A	English Language-1 (2)	Choose one SEC from Major Discipline SEC-3 (3)			16
IV	MC-6 (4) MC-7 (4)		Minor-2 MnC-4 (4) Subject-B	English Language-2 (2)		Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)**	VAC-3 (2) Choose one from a pool of courses	20
V	MC-8 (4) MC-9 (4) MC-10 (4) MC-11 (4)		Minor-5 (4)					20
VI	MC-12 (4) MC-13 (4) MC-14 (4) MC-15 (4)		Minor-6 (4)					20
VII	MC-16 (4) MC-17 (4) MC-18 (4) MC-19 (4)		Minor-7 (4)					20
VIII	(For Honours) MC-20 (4) MC-21 (4) MC-22 (4) MC-23 (4) (For Honours with Research) MC-20 (4) DRP-1 (12)		Minor-8 (4)					20
Total								162

Semester-Wise Course Structure Under NEP- 2020 (Session-2023-2024)

For B.Sc. (Honours/ Honours with Research) in Geography

Semester wise Distribution of Credits/ Marks

SEMESTER-I				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-01A: Geotectonics and Geomorphology (03)	GEOMJ-MC-01B: Geotectonics and Geomorphology (01)	04	50
	GEOMJ-MC-02A: Cartographic Techniques (03)	GEOMJ-MC-2B: Cartographic Techniques (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC1 One course to be selected from a pool of MDC/IDC courses		03	50
Minor Core (MnC)	GEOMN-MN-01A: Geotectonics and Geomorphology (03)	GEOMN-MN-1B: Geotectonics and Geomorphology (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC1-MIL-01 (02)		02	25
Skill Enhancement Course(SEC)	GEOMJ-SEC-01A Elementary Statistics (02)	GEOMJ-SEC-01B Elementary Statistics(01)	03	50
Value Addition Course (VAC)	VAC1.1 ENVS (02)		02	25
Total			22	300

SEMESTER-II				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-03A: Human Geography (03)	GEOMJ-MC-03B: Human Geography (01)	04	50
	GEOMJ-MC-04A: Geography of India (03)	GEOMJ-MC-04B: Geography of India (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC2 (03) One course to be selected from a pool of MDC/IDC courses		03	50
Minor Core (MnC)	GEOMN-MN-02A: Human Geography (03)	GEOMN-MN-02B: Practical (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC-MIL-02 (02)		02	25
Skill Enhancement Course(SEC)	GEOMJ-SEC-02A Basics of Surveying Techniques (02)	GEOMJ-SEC-02B Basics of Surveying Techniques (01)	03	50
Value Addition Course(VAC)	VAC2-One course to be selected from a pool of courses.		02	25
Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)		IAPC-01	02*	25*
Total			22+2*	300+25*

SEMESTER-III				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-05A: Climatology (03)	GEOMJ-MC-05B: Climatology (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC3 (03) One course to be selected from a pool of MDC courses		03	50
Minor Core (MnC)	GEOMN-MN-03A: Climatology (03)	GEOMN-MN-03B: Climatology (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC4-English Language-1 (02)		02	25
Skill Enhancement Course (SEC)	GEOMJ-SEC-03A Basics of Cadastral Surveying (02)	GEOMJ-SEC-03B Basics of Cadastral Surveying (01)	03	50
Total			16	225

SEMESTER-IV				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-06A: Population Geography (03)	GEOMJ-MC-06B: Population Geography (01)	04	50
	GEOMJ-MC-07A: Biogeography (03)	GEOMJ-MC-07B: Biogeography (01)	04	50
Minor Core (MnC)	GEOMN-MN-04A: Economic Geography (03)	GEOMN-MN-04B: Economic Geography (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC4-English Language-2(02)		02	25
Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)**		IAPC-02	02**	25**
Total			14+2**	175+25**

SEMESTER-V				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-8A: Social & Cultural Geography (03)	GEOMJ-MC-8B: Social & Cultural Geography (01)	04	75
	GEOMJ-MC-9A: Fundamentals of Surveying and Mapping (03)	GEOMJ-MC-9B: Fundamentals of Surveying and Mapping (01)	04	75
	GEOMJ-MC-10A: Quantitative Techniques in Geography (03)	GEOMJ-MC-10B: Quantitative Techniques in Geography (01)	04	75
	GEOMJ-MC-11A: Economic and Political Geography (03)	GEOMJ-MC-11B: Economic and Political Geography (01)	04	75
Minor Core (MnC)	GEOMN-MN-05A: Social & Cultural Geography (03)	GEOMN-MN-05B: Social & Cultural Geography (01)	04	75
Total			20	375

SEMESTER-VI				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-12A: Regional Planning & Development (03)	GEOMJ-MC-12B: Regional Planning & Development (01)	04	75
	GEOMJ-MC-13A: Evolution of Geographical Thought (03)	GEOMJ-MC-13B: Evolution of Geographical Thought (01)	04	75
	GEOMJ-MC-14A: Basics of Remote Sensing & GIS (03)	GEOMJ-MC-14B: Basics of Remote Sensing & GIS (01)	04	75
	GEOMJ-MC-15: Field work in Geography (04)		04	75
Minor Core (MnC)	GEOMN-MN-06A: Field work techniques in Geography (03)	GEOMN-MN-06B: Field work techniques in Geography (01)	04	75
Total			20	375

SEMESTER-VII (HONOURS/ HONOURS WITH RESEARCH)				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-16A: Hydrology & Oceanography (03)	GEOMJ-MC-16B: Hydrology & Oceanography (01)	04	75
	GEOMJ-MC-17A: Settlement Geography (03)	GEOMJ-MC-17B: Settlement Geography (01)	04	75
	GEOMJ-MC-18A: Geography of Health and Wellbeing (3)	GEOMJ-MC-18B: Geography of Health and Wellbeing (01)	04	75
	GEOMJ-MC-19 A: Research Methodology (04)	GEOMJ-MC-19B: Research Methodology (01)	04	75
Minor Core (MnC)	GEOMN-MN-07A: Hydrology and Oceanography (03)	GEOMN-MN-07B: Hydrology and Oceanography (01)	04	75
Total			20	375

SEMESTER-VIII (HONOURS WITH RESEARCH)				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-20A: Environment, Hazard and Sustainability (03)	GEOMJ-MC-20B: Environment, Hazard, and Sustainability (01)	04	75
	DRP-1 Dissertation / Research/Project		12	225
Minor Core (MnC)	GEOMN-MN-08A: Disaster Management (03)	GEOMN-MN-08B: Disaster Management (01)	04	75
Total			20	375

SEMESTER-VIII (HONOURS)				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-20A: Environment, Hazard and Sustainability (03)	GEOMJ-MC-20B: Environment, Hazard and Sustainability (01)	04	75
	GEOMJ-MC-21A: Advanced Geomorphology (03)	GEOMJ-MC-21B: Advanced Geomorphology (01)	04	75
	GEOMJ-MC-22A: Geography of Public Policy (03)	GEOMJ-MC-22B: Geography of Public Policy (01)	04	75
	GEOMJ-MC-23: Term Paper (04)		04	75
Minor Core (MnC)	GEOMN-MN-08A: Disaster Management (03)	GEOMN-MN-08B: Disaster Management (01)	04	75
Total			20	375

DETAILED SYLLABUS

SEMESTER-I

Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-01A: Geotectonics and Geomorphology (03)	GEOMJ-MC-01B: Geotectonics and Geomorphology (01)	04	50
	GEOMJ-MC-02A: Cartographic Techniques (03)	GEOMJ-MC-2B: Cartographic Techniques (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC1 One course to be selected from a pool of MDC/IDC courses		03	50
Minor Core (MnC)	GEOMN-MN-01A: Geotectonics and Geomorphology (03)	GEOMN-MN-1B: Geotectonics and Geomorphology (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC1-MIL-01 (02)		02	25
Skill Enhancement Course (SEC)	GEOMJ-SEC-01A Elementary Statistics (02)	GEOMJ-SEC-01B Elementary Statistics (01)	03	50
Value Addition Course (VAC)	VAC1.1 ENV5 (02)		02	25
Total			22	300

Note:

Minor Core (MnC) of this discipline will be opted by other disciplines and students of this discipline will have to opt Minor Core (MnC) from other disciplines as per availability of the college and staying within the periphery of the University guidelines.

GEOMJ-MC-01A: Geotectonics and Geomorphology (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	- To inculcate fundamental knowledge of the different aspects of geomorphology. - To examine Earth's internal structure through seismological evidence and explain mineral and rock formation processes - To analyze isostatic principles, plate tectonics, and continental drift theories with their global implications - To enhance the ability to distinctly identify and characterize the various Earth surface processes and resulting landforms.
Course Outcome	- Learners will be able to explain the major theories related to the origin and evolution of the Earth through geological time. - Learners will be able to interpret seismological data to understand the interior structure of the Earth and identify various types of rocks and minerals. - Learners will be able to analyze isostatic principles and evaluate the theories of continental drift, plate tectonics, and mountain-building processes. - Learners will gain a comprehensive understanding of the fundamental principles and concepts of geomorphology and they will understand the earth's tectonic and structural evolution. - Learners will gain insight into the dynamic nature of the earth's crust and its significance in the formation of landforms and will be able to summarize and critically evaluate different models explaining how landforms develop. - Learners will be able to analyse the pivotal roles played by structures and processes in

shaping landforms, interpret topographic maps, and apply knowledge gleaned from geomorphological investigations.		
● Semester End Examination	25 Marks Mode: Written Examination duration: 2 Hours	Question Pattern: Students shall answer <i>One</i> question carrying 10 marks out of <i>Two</i> given questions; <i>Three</i> questions carrying 5 marks each out of given <i>Six</i> questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
● Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department.	

Part 1: Geotectonics

1. Origin of universe, solar system, and earth: Tidal hypothesis and Big Bang theory.
2. Earth's tectonic and structural evolution: Special reference to geological time scale
3. Interior of the Earth: Structure, seismology, and earth's Interior
4. Isostasy: Theory of Airy and Pratt; Isostatic adjustments, and distribution of gravity anomalies.
5. Drifting of continents and ocean: Continental drifting (Alfred Wegener), paleo-magnetism and seafloor spreading.
6. Tectonic processes and landforms: Plate tectonics, earthquake, volcanoes, folding, faulting.

Part 2: Geomorphology

1. Geomorphology: Nature, scope, and approaches; fundamental concepts (Thornbury)
2. Denudational processes and landforms: Weathering and mass movement.
3. Models on landscape evolution: Davis, Penck, and Hack.
4. Development of river networks and landforms: Uniclinal and folded structures.
5. Slope development and evolution of slope: Davis and King's models
6. Geomorphic processes and landforms: Fluvial, glacial, fluvio-glacial, aeolian, fluvio-aeolian, coastal and karst.

Suggested Readings

1. Bloom, A. L. (2001): Geomorphology - A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
2. Bridges, E. M. (1990): World Geomorphology, Cambridge University Press, Cambridge.
3. Christopherson, Robert W. (2011): Geosystems - An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
4. Fairbridge, R.W. (1968): The encyclopaedia of geomorphology, (Edge). Reinhold Book, New York
5. Huggett, R.J. (2011): Fundamentals of Geomorphology. Routledge, New York
6. Kale, V. S. and Gupta A. (2001): Introduction to Geomorphology, Orient Longman, Hyderabad.
7. Knighton, A. D. (1984): Fluvial Forms and Processes, Edward Arnold Publishers, London.
8. Selby, M.J. (2005): Earth's Changing Surface, Indian Edition, OUP
9. Skinner, Brian J., and Stephen C.P (2000): The Dynamic Earth: An Introduction to Physical Geology, 4th Edition, John Wiley, and Sons.

10. Summerfield, M.A. (1991): Global Geomorphology: An Introduction to the Study of Landforms. Longman, London.
11. Sing, S., (2020): Physical Geography, Pravalika Publications, Allahabad
12. Sing, S., (2018): Geomorphology, Pravalika Publications, Allahabad
13. Thornbury, W. D. (1969): Principles of Geomorphology, Wiley.

GEOMJ-MC-01B: Geotectonics and Geomorphology (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	- To provide the idea of topographical maps. - To analyse and interpret the morphometric aspects of the SOI topographical map.
Course Outcome	Learners will be able to identify and analyse the survey of India topographical map and they will be able to interpret the features and their interrelationship which will help them in future research in practical fields.
Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; Another <i>One</i> Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

List of Practical

1. SOI topographical maps of plateau region (1:50000): Construction and interpretation of relief profiles(serial, superimposed, projected and composite).
2. Drainage Basin Morphometry: Delineation of watershed, stream ordering (Strahler) and morphometric analysis: Relative relief (after Smith), dissection index (after Dov Nir), average slope (after Wentworth).

Suggested Readings

1. Gupta K. K. and Tyagi V. C., (1992): Working with Maps, Survey of India, DST, New Delhi.
2. Mishra R.P. and Ramesh, A., (1989): Fundamentals of Cartography, Concept, New Delhi.
3. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata.
4. Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
5. Sen, P.K. (1989): Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan.
6. Singh, R.L. and Singh, P.B. (2009): Elements of Practical Geography, Kalyani Publishers, New Delhi

GEOMJ-MC-02A: Cartographic Techniques (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course Objective	● To acquire knowledge of cartography and its application. ● To develop ideas in collecting, processing, and analysing spatial data and the gain knowledge about the preparation of map scale. ● To learn about map projections and choose the right one for specific mapping tasks. ● To provide the knowledge about various techniques of representation of data.
Course Outcome	● Learners will be able to understand the basics of cartography and its application in mapping and gain knowledge about the map scale. ● The learners will gain a better knowledge of how to represent locations in the real world on a two-dimensional surface through earth models, coordinate systems and map projections. ● Learners will understand the various data representation techniques and their field of application.
● Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
● Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department.

Cartographic Techniques

1. Introduction to cartography: Nature, scope and development, elements, and applications.
2. Concept and application of map scale: Plain, comparative, diagonal and positive vernier.
3. Coordinate systems: Grid, concept of geoid, spheroid, rectangular and geographical coordinate system.
4. Map projections: concept, classification, properties and uses; Concept and significance of UTM projection.
5. Map: Concept, components, classifications, importance and uses.
6. Geographical data and cartograms: Techniques, advantages, and disadvantages of line, bar, dot and sphere, proportional circles, isopleths, and choropleth.

Suggested Readings

1. Anson R. and Ormelling F. J. (1994): International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C. (1992): Working with Map, Survey of India, DST, New Delhi.
3. Kennedy, M., Kopp, S. (2001): Understanding Map Projections, Esri Press
4. Mishra R.P. and Ramesh, A. (1989): Fundamentals of Cartography, Concept, New Delhi.
5. Monkhouse F. J. and Wilkinson H. R. (1973): Maps and Diagrams, Methuen, London.
6. Rhind D. W. and Taylor D. R. F. (eds.) (1989): Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
7. Robinson A. H. (2009): Elements of Cartography, John Wiley and Sons, New York.
8. Singh R. L. and Singh R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.

9.Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

GEOMJ-MC-02B: Cartographic Techniques (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objective	- To provide the skills of basic conversion and construction of map scale. - To have the basic knowledge and skills of transformation procedures from 3-dimensional globe to 2-dimensional maps - To provide basic techniques of geographic data representation and interpretation.
Course Outcome	- Students shall gain the skills of basic conversion and construction of map scale. - Learners will get the basic knowledge and skills of transformation procedures from 3-dimensional globe to 2-dimensional maps. - Skills about the techniques of geographic data representation and interpretation shall be developed in the learners.
Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

- Map scale: Scale conversion: statement, RF, graphical (linear, comparative, diagonal, positive vernier); Enlargement and reduction of scale.
- Map projections: Cylindrical equal area, Mercator's, simple conical with one standard parallel, Bonne's, polar zenithal gnomonic.
- Geographical data representation and interpretation: Line, bar, dot, and sphere, proportional circles, isopleth, and choropleth.

Suggested Readings

- Kennedy, M., Kopp, S. (2001): Understanding Map Projections, Esri Press.
- Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. (2011): Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press.
- Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alpha-numera-Kolkata. Pearson II,
- Pearson, F. (1990): Map Projections: Theory and Applications 2nd ed, CRC Press.
- Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. (1995): Elements of Cartography, 6th ed, Wiley.
- Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.
- Singh, R.L., Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers.

GEOMJ-SEC-01A: Elementary Statistics (Theory)

Total Credit	02 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course Objective	- To ensure learners grasp the foundational concepts of statistics and to help students understand about various methods of data collection. - To enable students to understand and interpret the measures of central tendency and measures of dispersion and to familiarize learners with regression analysis and correlation techniques to examine relationships between variables.
Course Outcome	- Learners will gain knowledge about the organisation and representation of data and will understand how geography employs statistics and the crucial role of data in geographical studies. - Learners will be equipped with various sampling techniques employed in geographical research and acquire the expertise to create questionnaires and schedules for data collection in geographic research. - Learners will delve into the utilization of statistical methods to comprehensively comprehend spatial phenomena through univariate and bivariate statistical techniques using geographical data.
Semester End Examination	25 Marks Mode: Written Examination. Exam duration: 2 Hours. Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department.

Elementary Statistics

1. Statistics in geography: Concepts and significance
2. Collection of data: Primary and secondary.
3. Preparation of questionnaire and schedule: Open, closed, structured and non-structure.
4. Classification and tabulation of data: Frequency distribution (simple and cumulative) and diagrammatic representation.
5. Data measurement scales: Nominal, ordinal, interval, and ratio.
6. Sampling: Needs, types, and significance. method of random sampling.
7. Central tendency: Concept and uses of mean, median and mode.
8. Dispersion: Concept and uses of range, quartile deviation, mean deviation, and standard deviation; coefficient of variation (CV).
9. Correlation and regression: Concept and applications of rank correlation, product moment correlation and linear regression.

Suggested Readings

1. Berry B. J. L. and Marble D. F. (eds.) (1968): Spatial Analysis – A Reader in Statistical Geography, Prentice Hall.
2. Ebdon D. (1977): Statistics in Geography: A Practical Approach.
3. Gupta, S.P. (2003): Statistical Methods (31st Edition), S. Chand & Sons.
4. Hammond P. and McCullagh P. S. (1978): Quantitative Techniques in Geography: An Introduction, Oxford University Press

5. King L. S. (1969): Statistical Analysis in Geography, Prentice-Hall.
6. Mahmood A. (1998): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
7. Pal S. K. (1998): Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
8. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations. Orient Black Swan Private Ltd., Orient Blackswan Pvt. Ltd, New Delhi
9. Silk J. (1979): Statistical Concepts in Geography, Allen and Unwin, London.
10. Spiegel M., Lindstrom, D. (1999): Statistics, Schaum's Outline Series.
11. Yeats M. (1974): An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

GEOMJ-SEC-01B: Elementary Statistics (Practical)

Total Credit	01 Credit
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	15 Marks
Course Objective	- To enable learners to represent the statistical graphs and calculate and interpret measures of central tendency and measures of dispersion. - To make learners skilled with regression analysis and correlation techniques to examine relationships between variables.
Course Outcome	- Learners will be able to classify, organise and represent geographical data into different statistical tables and graphs. - Learners will be able to utilize statistical methods for analysing spatial phenomena through univariate and bivariate statistical techniques using geographical data.
Semester End Examination	15 Marks Mode: Laboratory based Examination. Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Statistical graphs and diagrams: Construction of histogram and frequency curve.
2. Measures of central tendency: Computation of mean (arithmetic and geometric), median and mode.
3. Measures of dispersions: Mean deviation, standard deviation, and coefficient of variation
4. Computation of correlation and regression: Correlation (Pearson) and linear regression (least square method).

Suggested Readings

1. Berry B. J. L. and Marble D. F. (ed.) (1968): Spatial Analysis – A Reader in Statistical Geography, Prentice Hall.
2. Ebdon D. (1977): Statistics in Geography: A Practical Approach.
3. Gupta, S.P. (2003): Statistical Methods (31st Edition), S. Chand & Sons.
4. Hammond P. and McCullagh P. S. (1978): Quantitative Techniques in Geography: An Introduction, Oxford University Press
5. King L. S. (1969): Statistical Analysis in Geography, Prentice-Hall.
6. Mahmood A. (1998): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
7. Pal S. K. (1998): Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
8. Rogerson, P.A. (2001): Statistical methods for geography. Sage publications, London
9. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata.
10. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations. Orient Black Swan Private Ltd., Orient Blackswan Pvt. Ltd, New Delhi
11. Silk J. (1979): Statistical Concepts in Geography, Allen and Unwin, London.
12. Spiegel M., Lindstorm, D. (1999): Statistics, Schaum's Outline Series.
13. Yeats M. (1974): An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

SEMESTER-II				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-03A: Human Geography (03)	GEOMJ-MC-03B: Human Geography (01)	04	50
	GEOMJ-MC-04A: Geography of India (03)	GEOMJ-MC-04B: Geography of India (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC2 (03) One course to be selected from a pool of MDC/IDC courses		03	50
Minor Core (MnC)	GEOMN-MN-02A: Human Geography (03)	GEOMN-MN-02B: Human Geography Practical (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC-MIL-02 (02)		02	25
Skill Enhancement Course (SEC)	GEOMJ-SEC-02A Basics of Surveying Techniques (02)	GEOMJ-SEC-02B Basics of Surveying Techniques (01)	03	50
Value Addition Course (VAC)	VAC2-One course to be selected from a pool of courses.		02	25
Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)		IAPC-01	02*	25*
Total			22+2*	300+25*

Note:

Minor Core (MnC) of this discipline will be opted by other disciplines and students of this discipline will have to opt Minor Core (MnC) from other disciplines as per availability of the college and staying within the periphery of university guidelines.

***Project Report (15 Marks) shall be opted by those students who are willing to exit after completion of Semester-II.**

GEOMJ-MC-03A: Human Geography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	- To provide the basic concepts, elements, and approaches to Human geography. - To give insights about the origin, evolution and classification of human races, ethnic groups and cultures and their spatial arrangements.
Course Outcome	- Learners will acquire knowledge and develop an understanding of concepts, processes, elements, and methods of Human Geography. - Learners will also acquire knowledge on the history and evolution of humans. - It helps learners understand the relationship between man and environment in the light of development-environment conflict. - Ideas about space, society and culture shall be developed among learners.
Semester End Examination	25 Marks Mode: Written Examination duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
Internal Assessment	10 Marks Mode: Preparation of PowerPoint presentation on relevant theoretical aspects as directed by the Department.

Human Geography

1. Human geography: Nature, scope, approaches, elements, and recent trends.
2. Human races: Evolution, concept of race and ethnicity.
3. Space, society, and culture: Concepts and characteristics, cultural regions (language and religion).
4. Evolution of human societies: hunting and food gathering, pastoral nomadism, subsistence farming, industrial and urban societies.
5. Human adaptation to the environment: Eskimo, Masai, Jarwa, Gaddi, and Santhals.
6. Population–resource regions: World (Ackerman) and India (P. Sen Gupta).
7. Human-environment interactions: Challenges and conflicts

Suggested Readings

1. Bergman, E.F (1995): Human Geography-Culture, Connections and Landscape, Prentice Hall, New Jersey
2. Chisholm. (1975): Human Geography, Penguin Books, Harmondsworth.
3. Daniel, P.A. and Hopkinson, M.F. (1989): The Geography of Settlement, Oliver & Boyd, London.
4. Hussain M (2018): Human Geography, Rawat Publications
5. Johnston R; Gregory D, Pratt G. et al. (2008): The Dictionary of Human Geography, Blackwell Publication.
6. Jordan-Bychkov et al. (2006): The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York. Page 11.
7. Norton. W. (2001): Human Geography, 4th Edition Oxford University press, Oxford
8. Pearce D. (1995): Tourism Today: A Geographical Analysis, 2nd edition, Longman Scientific & Technical, London
9. Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London.
10. Raw, M. (1986): Understanding Human Geography: A Practical Approach, Bell and Hyman. London
11. Rubenstein, J.M. (2002): The Cultural Landscape, 7th edition, Prentice Hall, Englewood Cliffs
12. Smith D M (1982): Human Geography: A Welfare Approach, Edward Arnold, London

GEOMJ-MC-03B: Human Geography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	• To provide the ability of analysing spatial dynamics of the human population. • To provide the skills of measuring human development.
Course Outcome	• Learners will be able to identify and analyse the spatial dynamics of human population and able to apply the techniques of population potential, mean and median centres of population. • Learners will gain proficiency of the various indicators and measures of human development and able to calculate human development indices, and gender inequality index.
• Semester End Examination	15 Marks Mode: Laboratory based Examination duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Population potential, mean and median centres of population.
2. Computation of Human Development Index (HDI): UNDP 2004 and 2014.
3. Gender Development Index (GDI), Gender Inequality Index (GII)

Suggested Readings

1. Craig, J. (1972): Population Potential and Population Density. *Area*, 4(1), 10–12. <http://www.jstor.org/stable/20000603>
2. Craig, J. (1987): Population Potential and Some Related Measures. *Area*, 19(2), 141–146. <http://www.jstor.org/stable/20002432>
3. Gaye, A., Klugman, J., Kovacevic, M., Twigg, S., & Zambrano, E. (2010): Measuring key disparities in human development: The gender inequality index. *Human development research paper*, 46(10).
4. Pal S. K. (1998): Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
5. Sarkar A (2013): Quantitative Geography Techniques And Presentations 1st Edition, Orient Blackswan.
6. UNDP technical notes (2021): <https://hdr.undp.org/system/files/documents/technical-notes-calculating-human-development-indices.pdf>

GEOMJ-MC-04A: Geography of India (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	• To provide detailed ideas about the physiography, drainage, soil and climate of India and West Bengal. • To grab the ideas of population and economy of India and West Bengal for better understanding about the regional geography of India and West Bengal.
Course Outcome	• Learners will understand the geography of our country and shall acquire an understanding the relationship between physiography and drainage, climate, and soil and will also learn about different physiographic, economic, and agricultural regions of India and develop a solid understanding of the concept of region and its importance in planning and development. • Learners will understand different mineral and power resources and become aware about the resources and its conservation. • Learners will acquire knowledge on the physical and economic setup of West Bengal.
• Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
• Internal Assessment	10 Marks Mode: Preparation of PowerPoint presentation on relevant theoretical aspects as directed by the Department.

Geography of India

1. Geology and physiography: Tectonic and stratigraphic provinces, and physiographic divisions.
2. Climate, soil, and vegetation: Characteristics and classification.
3. Drainage: Evolution and characteristics of Himalayan and Peninsular drainage systems.
4. Agriculture: Characteristics, problems, and prospects; Green revolution and its consequences.
5. Distribution and utilisation of mineral and power resources: Iron ore, coal, petroleum, natural gas, and non-conventional energy sources (solar, wind, and geothermal).
6. Regionalisation of India: Physiographic (R. L. Singh); Socio-cultural (D. Sopher); Economic (Sengupta); Agricultural regions (ICAR), agroclimatic regions (Planning Commission of India).
7. West Bengal: Physical setup (physiography, drainage, soil, and natural vegetation); economic setup (agriculture, mining, and industry).

Suggested Readings

1. Chatterjee, A., (2021): Bharat O Paschimbanger Bhugol, Nabodaya Publication, Kolkata, 1st ed.
2. Deshpande C. D. (1992): India - A Regional Interpretation, ICSSR, New Delhi.

3. Guha G.S. and Basu D.N. and Kashyap S.P. (ed.) (1996): Agro-Climatic Regional Planning in India, Concept Publishing Company Pvt. Ltd.
4. Johnson, B. L. C., (ed.) (2001): Geographical Dictionary of India. Vision Books, New Delhi.
5. Khullar, D. R. (2018): India a Comprehensive Geography. Kalyani Publishers, New Delhi
6. Mandal R. B. (ed.) (1990): Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.
7. Mondal K.C. (2023): Geography India, West Bengal and World, Oriental book company private limited
8. Pathak, C. R. (2003): Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
9. Pattrea M. and Chakraborty G. (2023): Know Your State West Bengal, Arihant Publications; Eighth edition.
10. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
11. Sharma, T.C. (2013): Economic Geography of India. Rawat Publication, Jaipur.
12. Singh R. L. (1971): India: A Regional Geography, National Geographical Society of India.
13. Singh, Jagdish (2003): India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
14. Spate O. H. K. and Learmonth A. T. A. (1967): India and Pakistan: A General and Regional Geography, Methuen.
15. Tirtha, Ranjit (2002): Geography of India, Rawat Pubs., Jaipur & New Delhi.
16. Tiwari, R.C. (2007): Geography of India. Prayag Pustak Bhawan, Allahabad

GEOMJ-MC-04B: Geography of India (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	● To provide practical knowledge and experience about the rocks and minerals and its megascopic identification. ● To improve the knowledge about the geological structure in relation to landforms and practical exercise on the geological maps.
Course Outcome	● Learners will be able to identify different types of rocks and minerals and their importance. ● Learners can understand different types of geological structure and will be able to draw geological sections and interpret geological maps.
● Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Identification of rocks and minerals and their characteristics: Sandstone, limestone, shale, basalt, granite, pegmatite, gneiss, marble, quartz, quartzite, conglomerate, chalcopryrite, feldspar, galena, calcite, haematite, magnetite, mica, and talc.
2. Geological maps: Construction of geological section of horizontal, uniclinal, and folded structures with unconformities and intrusions.

Suggested Readings

1. Bennison, George, Moseley, and Keith (2003): An Introduction to Geological Structures and Maps 7th ed., Arnold Publication
2. Borradaile, Graham (2014): Understanding Geology through Maps, Elsevier, Inc.
3. Khan, MD.Z.A. (1998): Textbook of Practical Geography: Concept Publishing Company.
4. Monkhouse F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
5. Maltman, A. (1990): Geological Map: An Introduction, Open University Press.
6. Platt, J.I., (1974): Selected Exercises upon Geological Map, Part I, Unwin, London.
7. Roy, A. K. (1966): Introduction to the study of geological maps, World Press Private Ltd
8. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
9. Saha, P.K. and Basu P. (2004): Advanced Practical Geography: Books and Allied, Kolkata
10. Singh, R.L. and Singh R.P.B. (1972): Elements of Practical Geography; Kalyani Publishers.
11. Spencer, Edger W. (2006): Geologic Maps – A Practical Guide to Preparation and Interpretation, Waveland Press, Inc.

GEOMJ-SEC-02A: Basics of Surveying Techniques (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	- To provide the basic concepts, and principles of land surveys. - Help students to understand the various surveying instruments and its field of application.
Course Outcome	- Students will be able to understand the concept, principle, classification, application of surveying and levelling and will learn the usages of various survey instruments. - They will be able to understand the techniques of topographic survey and its representation on map.
Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
Internal Assessment	10 Marks Mode: Preparation of PowerPoint presentation on relevant theoretical aspects as directed by the Department.

Basics of Surveying Techniques

1. Surveying: Definition, principles, classification, and applications.
2. Surveying techniques and applications: Prismatic compass, transit theodolite.
3. Levelling: Concept, principles, types, procedure, and applications.
4. Levelling techniques and applications: Dumpy level, Abney level, and clinometer.
5. Topographic Survey: Concept of topographic survey, its importance, conventional and modern methods of topographic survey, interpretation, and importance of contours.

Suggested Readings

1. Adams, H. (1913): Practical Surveying and Elementary Geodesy, Including Land Surveying, Levelling, Contouring, Compass Traversing, Theodolite Work, Town Surveying, Engineering Field Work and Setting Out Railway Curves,
2. Agor, R. (1980): A Textbook of Surveying and Levelling, Khanna Publishers
3. Basak, N.N. (2017): Surveying & Levelling, 2nd ed., McGraw Hill Education (India).
4. Bhavikatti, S.S. (2019): Surveying and Levelling, Vol II, 2nd ed., Wiley.
5. Kanetkar, T.P. (2006): Surveying & Levelling Vol – I, Pune Vidyarthi Griha Prakashan
6. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed. Orient Blackswan Private Ltd. Macmillan and Company, limited.
7. Singh, R.L. and Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers.

GEOMJ-SEC-02B: Basics of Surveying Techniques (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	- To provide practical experience about types and principles of traverse survey and plotting. - Help students to understand the various surveying instruments and its usages.
Course Outcome	- Students will be able to learn the handling and application of basic surveying instruments and techniques. - Will be able to apply skills to conduct traverse surveys & calculate the area. - They will learn to use theodolite (for the measurement of horizontal and vertical angle) and dumpy level for determination of reduced levels of points and contouring using these elevation values.

- Semester End Examination 15 Marks
Mode: Laboratory based Examination
Exam duration: 2 Hours
Question Pattern: Students shall perform **One** Practical carrying 7 marks; Another **One** Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Surveying and plotting: Prismatic compass (closed and open traverse), determination of heights and distance of objects by transit theodolite with base accessible (with measuring tape and assumed angle method), and inaccessible (instrument and object in same vertical plane with instrument axes at same or different heights).
2. Levelling and contouring: Profile line survey using a dumpy level; radial contouring by dumpy level and prismatic compass.

Suggested Readings

1. Adams, H. (1913): Practical Surveying and Elementary Geodesy, Including Land Surveying, Levelling, Contouring, Compass Traversing, Theodolite Work, Town Surveying, Engineering Field Work and Setting Out Railway Curves,
2. Agor, R. (1980): A Textbook of Surveying and Levelling, Khanna Publishers.
3. Basak, N.N. (2017): Surveying & Levelling, 2nd ed., McGraw Hill Education (India).
4. Bhavikatti, S.S. (2019): Surveying and Levelling, Vol II, 2nd ed., Wiley.
5. Kanetkar, T.P. (2006): Surveying & Levelling Vol – I, Pune Vidyarthi Griha Prakashan.
6. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed. Orient Blackswan Private Ltd. Macmillan and Company, Ltd.
7. Singh, L.R. (2010): Fundamentals of Practical Geography, Sarada Pustak Bhavan, Alahabad.
8. Venkatramaiah, C. (2011): Textbook of Surveying, Universities Press, Hyderabad

IAPC-01: Summer Internship/ Apprenticeship/Project/ Community Outreach (IAPC)-Project*

Total Credit	02 Credit
Total Credit hours	02 hours per week (Lectures/ Practical)
Total Marks	25 Marks
Course objective	• To build the ability among learners to apply theoretical knowledge to solve real world problems which is integral to studying experimental subjects such as geography. • To verify the acquired theoretical knowledge with an objective world perspective. • Making relevant the acquired knowledge of the subject by solving real problems.
Course Outcome	• Through project construction, learners will acquire fundamental problem-solving skills. • Learners will be able to achieve their professional skills through project construction and delivery.
Project Report Preparation	20 Marks • Mode: Data collection and report preparation under the supervision of the Faculty Members of the Department.
Viva-voce	• 05 Marks

*Project Report (25 Marks) shall be opted by those students who are willing to exit after completion of Semester-II

General Guidelines

1. A group project report is to be prepared and submitted based on any one of the following topics:
 - i. Riverbank erosion
 - ii. Arsenic contamination
 - iii. Drought and flood
 - iv. Tropical cyclone
 - v. Landslide
 - vi. Wetlands
 - vii. Biodiversity
 - viii. Labour migration
 - ix. Child marriage
 - x. Poverty
 - xi. Maternal and child health issues
 - xii. Urban amenities and services
 - xiii. Waste disposal system
 - xiv. Water and sanitation practices
 - xv. Slum
 - xvi. Street vendors & petty traders
 - xvii. Drop-outs.
 - xviii. Relevant other local issues
2. For writing project reports, students be divided into groups under teachers of the concerned department of the college.
3. The report is to be prepared for a C.D. Block /P.S./ Mouza/ G. P./ Municipality/ Sub- division/ Drainage Basin area or any other suitable physical units/ administrative unit.
4. Participation of each student in the project work is mandatory & certificate of project coordinator is to be attached in the report.
5. Project report is to be prepared by the student in his/her own handwriting, but maps and diagrams may be prepared with the aid of software.
6. Length of the report not to exceed 3000 words.
7. The project report should contain up to 5 pages for diagrams and a maximum of 3 pages for photographs.
8. Questionnaire(s)/ schedule(s) can be prepared for collection of primary data and one of the same as filled in during the study, duly signed by the concerned teacher, and be annexed with the project report.
9. The report may be prepared either with primary data or secondary data or combination of both.

Viva-voce on Project Report (05 Marks)

Duration of the viva-voce: 4-5 minutes for each candidate.

Suggested Readings

1. Clifford, N., Cope, M., Gillespie, T.W., French, S. (ed) (2016): Key Methods in Geography, 3rd ed, Sage.
2. Gardiner, V., Dacombe, R.V. (1982): Geomorphological Field Manual, George Allen & Unwin
3. Lindholm, R. (1987): A Practical Approach to Sedimentology, Allen & Unwin.
4. Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed. (2017 reprint), Alphaenumera-Kolkata
5. Northey, N., Draper, D., Knight, D.B. (2015): Making Sense in Geography and Environmental Sciences:
6. Northey M., McKibbin J. (2012): Making Sense: Making Sense: A Student's Guide to Research and Writing 7th ed., Oxford University Press.
7. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata

SEMESTER-III				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-05A: Climatology (03)	GEOMJ-MC-05B: Climatology Practical (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC3 (03) One course to be selected from a pool of MDC courses		03	50
Minor Core (MnC)	GEOMN-MN-03A: Climatology (03)	GEOMN-MN-03B: Climatology Practical (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC4-English Language-1 (02)		02	25
Skill Enhancement Course(SEC)	GEOMJ-SEC-03A Basics of Cadastral Surveying (02)	GEOMJ-SEC-03B: Basics of Cadastral Surveying (01)	03	50
Total			16	225

Note:

Minor Core (MnC) of this discipline will be opted by other disciplines and students of this discipline will have to opt Minor Core (MnC) from other disciplines as per availability of the college and staying within the periphery of university guidelines.

GEOMJ-MC-05A: Climatology (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	- To provide ideas of the dynamic nature of the weather and climate and its importance. - To provide understanding and analytical capabilities among the learners about contemporary climatic issues in relation to anthropogenic activities.
Course Outcome	- Learners will gain the ideas of climate as the result of mass and energy accumulations over time, and they will also be able to identify atmospheric processes and mechanisms. - Learners will understand the types and regional pattern of climates. - Learners will identify the natural causes of climate change and distinguish how these causes differ from anthropogenic causes of climate change.
Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
Internal Assessment	10 Marks Mode: Preparation of term paper as directed by the Department.

Climatology

1. Atmosphere: Structure and Composition.
2. Energy in the atmosphere: Insolation, and heat budget.
3. Temperature of atmosphere: Horizontal and vertical distribution; Inversion of temperature-concept, types, causes and consequences.
4. Cloud development and precipitation: Atmospheric stability and instability, condensation, and precipitation: processes and form; mechanisms of precipitation- Bergeron Findeisen theory, and Collision and coalescence theory.
5. Air mass: Source region and classification; Fronts: frontogenesis and frontolysis, typology, and associated weather conditions.
6. Atmospheric circulations: Planetary winds, jet streams; Indian monsoon: mechanisms and impacts; Ocean- atmosphere interaction (El-Nino, La-Nina, MJO).
7. Cyclone: Origin, characteristics, and impacts (tropical and midlatitude cyclones).
8. Climatic classification: Köppen (1936) and Thornthwaite (1948).

Suggested Readings

1. Ahrens, C.D. (2012): Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning.
2. Barry R. G. and Carleton A. M. (2001): Synoptic and Dynamic Climatology, Routledge, UK.
3. Barry R. G. and Corley R. J. (1998): Atmosphere, Weather and Climate, Routledge, New York.
4. Critchfield H. J. (1987): General Climatology, Prentice-Hall of India, New Delhi.
5. Lal, D.S. (2012): Climatology. Sharda Pustak Bhawan. Lutgens,
6. Lutgens F. K., Tarbuck E. J., and Tasa D. (2009): The Atmosphere: An Introduction to Meteorology, Prentice-Hall, EnglewoodCliffs, New Jersey.
7. Oliver J. E. and Hidore J. J. (2002): Climatology: An Atmospheric Science, Pearson Education, New Delhi.
8. Siddharth, K. (2016): A Climatology Atmosphere, Weather & Climate, Kitab Mahal,
9. Tarbuck, E.J. (1998): The Atmosphere: An Introduction to Meteorology, 9th Ed, Prentice Hall Inc.
10. Trewartha G. T. and Horne L. H. (1980): An Introduction to Climate, McGraw-Hill.

GEOMJ-MC-05B: Climatology (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	• To provide the basic skills of handling manual weather instruments and collection of weather information. • To provide the ideas of construction of various climatic graphs for the purpose of representation. • To give comprehensive knowledge about the analysis and interpretation of weather maps so that learners can understand the spatial behaviour and relationships of weather phenomena.
Course Outcome	• Learners will gain the basic skills of handling manual weather instruments and the collection of weather information. • Learners will be able to construct various climatic graphs for the purpose of representation of climatic data. • Learners will be able to analyse and interpret weather maps and will understand the spatial behaviour and relationships of weather phenomena.
• Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Measurement of weather elements by meteorological instruments: Hygrometer, maximum-minimum thermometer, barometer, and rain gauge (Simon's), anemometer and windvane.
2. Preparation of climatic graphs: Taylor's climograph, hythergraph, star diagram and ergograph; Synoptic station model.
3. Interpretation of Indian daily weather map: Temperature, pressure, sky condition, wind direction and speed, sea condition and other weather phenomena (Pre-monsoon, Monsoon and Post-monsoon).

Suggested Readings

1. Asnani, G. C., De, U. S., Hatwar, H. R., and Mazumdar, A. B. (2012): Monsoon Monograph, Indian Meteorological Department
2. Ahmed, I. (1994): Practical Geography, Jawahar Publishers and Distributors, New Delhi
3. Das, P.K. (2018): The Monsoons, The National Book Trust of India
4. Harrison, G. (2014): Meteorological measurements and instrumentation. John Wiley & Sons.
4. Khan, MD.Z.A. (1998): Textbook of Practical Geography: Concept Publishing Company.
5. Khullar, D. (2014): King's Practical Geography, Educational Publisher, Delhi
6. Monkhouse, F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
7. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata.
8. Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
9. Vazquez, T. (2008): Weather Map Handbook 2nd ed.

GEOMJ-SEC-03A: Basics of Cadastral Surveying (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	● To provide students with the knowledge about the nature and basic principles of functioning cadastral survey. ● To learn about the land Classification and Area Measurement. ● To make an understanding about land survey (Hands-on-training). ● The connections of land cadastre with other land information systems will be explained and the experience of information search will be obtained. ● The knowledge and experience of cadastral surveying will be obtained. ● The course will be helpful for students to understand the role and importance of land.
Course Outcome	● Learners will understand the necessity of the land cadastre and land information systems in society and will be able to explain it. ● Learners will acquire the knowledge about the theoretical basis of creation and functioning land cadastres and will be able to explain it. ● Learners will be able to acquire information from the land cadastre and from the other land information systems.
	● Learners will understand the basic trends of development land cadastres and land information systems and is able to explain it. ● Learners will be able to compile a cadastral survey as well as land survey with the help of different tools and techniques.

● Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
● Internal Assessment	10 Marks Mode: Preparation of term paper as directed by the Department.

Basics of Cadastral Surveying

1. Land and Land Revenue System: Concept. classification of land, nature of land, land rights, land deed, mutation and conversion, Integrated Land Record Management System (ILRMS).
2. Cadastral map: Concept, objectives, characteristics and uses; Evolution of cadastral map in India; Types and scale of cadastral map.
3. Terminology in cadastral map: Quadrilaterals, triangulation, prolongation, J.L number, R.S map, C.S map, L.R map, plot number, bata number, shikmi line, portal line, goda, chanda, dhai, khaka, thoka line, trijunction pillar, alamat khatian, khanapuri, bhujarat, parcha.
4. Cadastral mapping: Preparation methodology, unique identification number of the parcel, the position of existing control points and their types, adjacent boundaries, and features.
5. Cadastral surveying: Units of measurements- basic units of length and area, conversion of basic units; Chain survey: concept, types of chain, chaining of line, tie line, offsets, and methods of chain survey; Plane table survey: Principle, accessories, procedures and methods, errors and precautions.
6. Basics of GPS: Concept, basic principles of position and waypoint determination.

Suggested Readings

1. Alam, A. (2023): The Transfer of property Act, Kamrul Book House, Dhaka
2. Basak, N. N. (2017): Surveying & Levelling 2/E, McGraw Hill Education, Noida, Uttar Pradesh
3. Bhatta, B. (2014): Remote Sensing and GIS, Oxford University Press, Delhi.
4. Biswas, D. (2020): Jaripbidya, Bharati Book Stall
5. Dasgupta, S.K. (2021): Jami Jarip Paddhati O Bhumi Swatta Aine, Tapan Pustakalaya
6. Gangopadhyay, A. (2018): Amin Survey, NSQF Level - 3, Sector - Construction (Paperback, Bengali)
7. Kanungo, A. (2020): A Simple Guide to Land Survey — Rules, Methods & Application (In Bengali), Eastern Law House, Kolkata
8. Pal, S. (2018): Guide to Land Survey Procedure (In Bengali), Kamal Law House, India
9. Roy, S.K. (2023): The West Bengal land Reforms Act, 1955 (Bengali), Kamal Law House, Kolkata
10. Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
11. Sarkar, B. (2023): Bhumi Adhigrahan Praddati, Kamrul Book House, Dhaka
12. Sarkar, G.N. (2023): Jomi Kray-Brikay, Kamrul Book House, Dhaka
13. Sengupta, P. (2020): Adhunik Jarip Bidya O Bhumi Satta Ayene, Latika.

GEOMJ-SEC-03B: Basics of Cadastral Surveying (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	- To provide basic skills of land survey concepts and techniques to make learners employable and self-dependent. - To provide basic skills of usages of surveying instruments for determining land area, horizontal and vertical position of points.
Course Outcome	- Learners will be skilled in land survey concepts and techniques. - Learners will be able to use the surveying instruments for determining land area, horizontal and vertical position of points. - Learners will be skilled in the use of chains in survey, plane table survey, prismatic compass survey, theodolite, and dumpy level survey.
Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

- Determination of the area of a plot from mouza map using Guniya scale, planimeter and digital planimeter.
- Balancing of error in area measurement.
- Traversing of land area with few details using prismatic compass; and plane table (radiation and intersection methods).
- Chain surveying: Preparation of field book, plotting and area measurement with the help of given northline, chain line, corner of plots and objects.
- Position, way points calculation and area mapping through GPS.

Suggested Readings

- Alam, A. (2023): The Transfer of property Act, Kamrul Book House, Dhaka
- Basak, N. N. (2017): Surveying & Levelling 2/E, McGraw Hill Education, Noida, Uttar Pradesh
- Bhatta, B. (2014): Remote Sensing and GIS, Oxford University Press, Delhi.
- Biswas, D. (2020): Jaripbidya, Bharati Book Stall
- Dasgupta, S.K. (2021): Jami Jarip Paddhati O Bhumi Swatta Aine, Tapan Pustakalaya
- Gangopadhyay, A. (2018): Amin Survey, NSQF Level - 3, Sector - Construction (Paperback, Bengali)
- Kanungo, A. (2020): A Simple Guide to Land Survey — Rules, Methods & Application (In Bengali), Eastern Law House, Kolkata
- Pal, S. (2018): Guide to Land Survey Procedure (In Bengali), Kamal Law House, India
- Roy, S.K. (2023): The West Bengal land Reforms Act, 1955 (Bengali), Kamal Law House, Kolkata
- Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi
- Sarkar, B. (2023): Bhumi Adhigrahan Praddati, Kamrul Book House, Dhaka
- Sarkar, G.N. (2023): Jomi Kray-Brikay, Kamrul Book House, Dhaka
- Sengupta, P. (2020): Adhunik Jarip Bidya O Bhumi Satta Ayene, Latika.

SEMESTER-IV				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-06A: Population Geography (03)	GEOMJ-MC-06B: Population Geography Practical (01)	04	50
	GEOMJ-MC-07A: Biogeography (03)	GEOMJ-MC-07B: Biogeography Practical (01)	04	50
Minor Core (MnC)	GEOMN-MN-04A: Economic Geography (03)	GEOMM-MN-04B: Economic Geography Practical (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC4-English Language-2(02)		02	25
Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)**		IAPC-02	02**	25**
Total			14+2**	175+25**

Note:

Minor Core (MnC) of this discipline will be opted by other disciplines and students of this discipline will have to opt Minor Core (MnC) from other disciplines as per availability of the college and staying within the periphery of the University guidelines.

****Project Report (25 Marks) shall be opted by those students who are willing to exit after completion of Semester-IV, but not opted IAPC in Semester-II. All other candidates must complete the IAPC (2) either in semester-II* or in semester-IV**.**

GEOMJ-MC-06A: Population Geography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	- To know the concept of population geography and different theories, concepts related to population dynamics. - To study about the determinants and measures of human population. - It will help in knowing various kinds of demographic problems and to understand the population policies in developed & developing countries.
Course Outcome	- Learners will gain the concept of population geography and will be able to understand the distribution of population and its problems, population dynamics over space and time. - Learners could understand different population policies & its importance and the contemporary population issues, and mitigation strategies.
Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
Internal Assessment	10 Marks Mode: Preparation of term paper as directed by the Department.

Population Geography

1. Population geography: Definition, scope, contents, and development; population geography and demography relations; Sources of population data.
2. Fertility, mortality, and migration: Concept, determinants, measures, and consequences.
3. Population theories and models: Malthusian and Marxian theories, demographic transition model, optimum population theory.
4. Demographic situation in developed and developing countries: Concept of underpopulation, optimum population and overpopulation.
5. Population composition: Age, sex, social and economic composition of population.
6. Spatial patterns of population: Growth, density, and distribution in India.
7. Population policy: Types and characteristics; Indian population policies (post-independence).
8. Contemporary population issues in India: Poverty, malnutrition and unemployment, maternal and child health issues, labour migration, and diaspora.

Suggested Readings

1. Banerjee Guha, S. ed. (2004): Space, Society & Geography, Rawat Publication, Delhi.
2. Bardhan, P. (2003): Poverty, Age Structure & Political Economy in India, Oxford University Press.
3. Barrett H. R. (1995): Population Geography, Oliver and Boyd.
4. Bhende A. & Kanitkar T. (2000): Principles of Population Studies, Himalaya Publishing House.
5. Chandna R. C. & Sidhu M. S. (1980): An Introduction to Population Geography, Kalyani Publishers.
6. Clarke, J. I. (1965): Population Geography, Pergamon Press, Oxford.
7. Fellmann, J. D., Getis, A., & Getis, J. (2000): Human Geography- Landscape of Human Activity, McGraw Hill.
8. Hussain, M. (2007): Models in Geography, Rawat Publication.
9. Jones, H. R. (2000): Population Geography, 3rd ed. Paul Chapman, London.
10. Jhingan, M.L., Bhat, B.K. Desai, J.N. (2016): Demography (3rd), Vrinda Publication, Delhi
11. Lutz W., Warren C. S. & Scherbov S. (2004): The End of the World Population Growth in the 21st Century, Earthscan.
12. Newbold, K. B. (2009): Population Geography- Tools and Issues, Rowman and Littlefield Publishers.
13. Pacione, M. (1986): Population Geography- Progress and Prospect, Taylor, and Francis.
14. Wilson, M. G. A. (1968): Population Geography, Nelson.

GEOMJ-MC-06B: Population Geography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	● To handle and analyse the population data and its measures. ● To develop the skill about various measurements of vital statistics of the human population.
Course Outcome	● Learners will be able to analyse the population data, determine the projected population and measure the densities of population. ● Learners will be skilled in various measurements of vital statistics of the human population.
● Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Population data analysis: Decadal growth, population projection (Trend extrapolation: linear, geometric), population density (Arithmetic and Agricultural) and Age-sex pyramid.
2. Measures of fertility: CBR, ASFR, TFR.
3. Measures of mortality: CDR, IMR, MMR.
4. Life Table Preparation.

Suggested Readings

1. Alvi, Z: Statistical Geography (2002): Methods and Applications, Rawat Pub.
2. Caselli, G., Wunsch, G., & Vallin, J. (2005): Demography. Analysis and synthesis, a treatise in population (Four volume set). Oxford: Academic.
3. Mahmood, A. (1999): Statistical Methods in Geographical Studies: Student Edition, Rajesh; New Edition.
4. Monkhouse, F. J. and Wilkinson, H. R., (1973): Maps and Diagrams, Methuen, London.
5. Jhingan, M.L., Bhat, B.K. Desai, J.N. (2016): Demography (3rd), Vrinda Publication, Delhi
6. Sarkar, A. (2015): Practical geography - A systematic approach. Orient Black Swan Private Ltd., New Delhi
7. Singh, L.R. (2010): Fundamentals of Practical Geography, Sarada Pustak Bhavan, Allahabad.
8. Singh, R. L. & Singh, R. P. B. (2005): Elements of Practical Geography, Kalyani Publishers.
9. Thomas, R. K. (2018): Concepts, Methods, and Practical Applications in Applied Demography: An Introductory Textbook. Springer publication.

GEOMJ-MC-07A: Biogeography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	• To properly understand the interaction between all the elements of the environment. • Analysing environmental issues related to flora and fauna to find the right environmental protection strategy.
Course Outcome	• Learners will perceive the physical environment and organisms of the planet clearly. • Learners will acquire the ability to solve environmental problems related to the habitats of organisms.
• Semester End Examination	25 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer One question carrying 10 marks out of Two given questions; Three questions carrying 5 marks each out of given Six questions. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts.
• Internal Assessment	10 Marks <u>Mode: Participation in Group Discussion as directed by the Department)</u>

Biogeography

1. Biogeography: concept, scope, content, approaches, branches, and development
2. Biogeographical regions of the world and India.
3. Ecosystem: Concept, components, types, structures (trophic levels, food chain, and food web), and hierarchy (biosphere, biomes, ecosystem, and biotope), ecological pyramids (Energy, number, and biomass).
4. Ecological succession: Concept, stages, and significance.
5. Biogeochemical cycles: Carbon and nitrogen cycles and their significance.
6. Biodiversity: Definition, classification (Whittaker), significance, biodiversity hotspot and regions; threats and conservation practices.
7. Major biomes of the world: Tropical rainforest, hot desert, mangrove, and coral reef.

Suggested Readings

1. Chapman, J.L. and Rens, M.J. (1993): Ecology: Principle and Applications, Cambridge University Press, Cambridge.
2. Dash, M.C. (2001): Fundamental of Ecology, 2nd ed., Tata McGraw-Hill, New Delhi.
3. Huggett, R. (1998): Fundamentals of Biogeography, Routledge, London.
4. Joy, T. et al. (1989): Human Impact on The Ecosystem, Oliver and Boyd, London.
5. Kendeigh, S.C. (1975): Ecology with Special Reference to Man and animals, Prentice Hall,
6. Khinchí, Shyam S. (editor) (2015): Biodiversity Distribution and Conservation, Pointer
7. Kormondy, E.J. (1991): Concepts of Ecology, Prentice Hall India, New Delhi.
8. Kormondy, E.J. (1996): Concept of Ecology, 4th ed., Prentice- Hall, India, New Delhi
9. Myers, A. A. and Giller, P.S. (editors) (1988): Analytical Biogeography: An Integrated Approach to the Study of Animal and Plant Distribution. Chapman and Hall, London
10. Nebel, J.B. (1981): Environmental Science, Prentice Hall, New York.
11. Odum, E.P. (1971): Fundamentals of Ecology, W.B. Sanders, Philadelphia.
12. Sharma, P. D. (1996): Ecology and Environment, 7th edition, Rastogi Publications, Meerut.
13. Shukla, R.S. and Chandel, P.S. (1930): Plant Ecology and Soil Science, S Chand, New Delhi.
14. Simmons, I. G. (1981): The Ecology of Natural Resources, ELBS/ Edward Arnold, London.
15. Simmons, I.G. (1980): Bio-geographical Processes, George Allen and Unwin, London.
16. Spellerberg, I. F. and Sarwyer, J. W. D. (1999): An Introduction to Applied Biogeography, University Press, Cambridge.

GEOMJ-MC-07B: Biogeography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course objective	● To measure biodiversity and to determine the temporal loss of species using living planet index and red list index. ● To assess the ecological footprint
Course Outcome	● Learners will be able to measure the richness and evenness of biodiversity. ● Learners will be able to calculate and determine the temporal loss of different species. ● Learners will be able to measure the level of ecological footprint.
● Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

1. Measurement of Biodiversity – Simpson's evenness index and Shannon-Weiner diversity index
2. Living planet index (WWF)
3. Red List Index (RLI)
4. Ecological footprint (Global Footprint Network)

Suggested Readings

1. Almond, R.E.A., Grooten, M., Juffe Bignoli, D. & Petersen, T. (Ed). (2022): Living Planet Report 2022 – Building a nature-positive society, WWF, Gland, Switzerland.
2. Loh, J., Green, R. E., Ricketts, T., Lamoreux, J., Jenkins, M., Kapos, V., & Randers, J. (2005). The Living Planet Index: using species population time series to track trends in biodiversity. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 360(1454), 289-295.
3. Wackernagel, M., Lillemor Lewan, & Carina Borgström Hansson. (1999). Evaluating the Use of Natural Capital with the Ecological Footprint: Applications in Sweden and Subregions. *Ambio*, 28(7), 604–612. <http://www.jstor.org/stable/4314966>
4. Westveer, J, Freeman, R., McRae, L., Marconi, V., Almond, R.E.A, and Grooten, M. (2022): A Deep Dive into the Living Planet Index: A Technical Report. WWF, Gland, Switzerland. (https://www.livingplanetindex.org/documents/LPR_2022_TechnicalSupplement_DeepDiveLPI.pdf)
5. World Wildlife Fund Hong Kong. (2013): Hong Kong Ecological Footprint Report 2013 (Appendix). WWF Hong Kong. http://awsassets.wwfhk.panda.org/downloads/hong_kong_ecological_footprint_report_2013_appendix.pdf

IAPC-02: Summer Internship/ Apprenticeship/Project/ Community Outreach (IAPC)-Project**

Total Credit	02 Credits
Total Credit hours	02 hours per week (Lectures/ Practical)
Total Marks	25 Marks
Course objective	● To build the ability among learners to apply theoretical knowledge to solve real world problems which is integral to studying experimental subjects such as geography. ● To verify the acquired theoretical knowledge with an objective world perspective. ● Making relevant the acquired knowledge of the subject by solving real problems.
Course Outcome	● Through project construction, learners will acquire fundamental problem-solving skills. ● Learners will be able to achieve their professional skills through project construction and delivery.
● Project Report Preparation	20 Marks Mode: Data collection and report preparation under the supervision of the Faculty Members of the Department.
● Viva-voce	05 Marks

****Project Report (25 Marks) shall be opted by those students who are willing to exit after completion of Semester-IV, but not opted IAPC in Semester-II. All other candidates must complete the IAPC (2) either in semester-II* or in semester-IV**.**

General Guidelines

1. A group project report is to be prepared and submitted based on any one of the following topics:
 - i. Riverbank erosion
 - ii. Arsenic contamination
 - iii. Drought and flood
 - iv. Tropical cyclone
 - v. Landslide
 - vi. Wetlands
 - vii. Biodiversity
 - viii. Labour migration
 - ix. Child marriage
 - x. Poverty
 - xi. Maternal and child health issues
 - xii. Urban amenities and services
 - xiii. Waste disposal system
 - xiv. Water and sanitation practices
 - xv. Slum
 - xvi. Street vendors & petty traders
 - xvii. Drop-outs.
 - xviii. Relevant other local issues
2. For writing project reports, students be divided into groups under teachers of the concerned department of the college.
3. The report is to be prepared for a C.D. Block /P.S./ Mouza/ G. P./ Municipality/ Sub- division/ Drainage Basin area or any other suitable physical units/ administrative unit.
4. Participation of each student in the project work is mandatory & certificate of project coordinator is to be attached in the report.
5. Project report is to be prepared by the student in his/her own handwriting, but maps and diagrams may be prepared with the aid of software.
6. Length of the report not to exceed 3000 words.
7. The project report should contain up to 5 pages for diagrams and a maximum of 3 pages for photographs.
8. Questionnaire(s)/ schedule(s) can be prepared for collection of primary data and one of the same as filled in during the study, duly signed by the concerned teacher, and be annexed with the project report.
9. The report may be prepared either with primary data or secondary data or combination of both.

Viva-voce on Project Report (05 Marks)

Duration of the viva-voce: 4-5 minutes for each candidate.

Suggested Readings

1. Clifford, N., Cope, M., Gillespie, T.W., French, S. (2016): Key Methods in Geography, 3rd ed, Sage.
2. Gardiner, V., Dacombe, R.V. (1982): Geomorphological Field Manual, George Allen & Unwin
3. Lindholm, R. (1987): A Practical Approach to Sedimentology, Allen & Unwin.
4. Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed. (2017 reprint), Alpha Numera-Kolkata
5. Northey, N., Draper, D., Knight, D.B. (2015): Making Sense in Geography and Environmental Sciences:
6. Northey M., McKibbin J. (2012): Making Sense: Making Sense: A Student's Guide to Research and Writing 7th ed., Oxford University Press.
7. Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-V				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEOMJ-MC-8A: Social & Cultural Geography (03)	GEOMJ-MC-8B: Social & Cultural Geography (01)	04	75
	GEOMJ-MC-9A: Fundamentals of Surveying and Mapping (03)	GEOMJ-MC-9B: Fundamentals of Surveying and Mapping (01)	04	75
	GEOMJ-MC-10A: Quantitative Techniques in Geography (03)	GEOMJ-MC-10B: Quantitative Techniques in Geography (01)	04	75
	GEOMJ-MC-11A: Economic and Political Geography (03)	GEOMJ-MC-11B: Economic and Political Geography (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	GEOMN-MN-05A: Social & Cultural Geography (03)	GEOMN-MN-05B: Social & Cultural Geography (01)	04	75
Total			20	375

GEOMJ-MC-8: Social and Cultural Geography

Title of the Course:	SOCIAL AND CULTURAL GEOGRAPHY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-8A
Semester = V (THEORY)	
Credits = 03	
Objectives of the Course	i. To understand the foundational concepts, scope, and evolution of Social and Cultural Geography, including major approaches and contemporary trends. ii. To analyse the spatial dimensions of social elements such as class, caste, ethnicity, race, and gender, with special emphasis on their distribution and impacts in the Indian context. iii. To interpret cultural processes such as diffusion, regionalization, and identity formation through the lens of geography, and evaluate how these processes shape cultural landscapes and regions. iv. To assess components of social well-being (housing, health, and education) and examine the spatial patterns of social problems (slums, crime) and policy responses in post-independence India. v. To explore the diversity and distribution of world and Indian cultural patterns—language, religion, folk traditions, and rituals—with specific reference to cultural ecology and folk geography.
Learning Outcomes of the Course	On completion of the course, students are able to i. Identify and critically analyse the key concepts, approaches, and contemporary trends in Social and Cultural Geography, with an understanding of their historical evolution and relevance to modern geographical studies. ii. Examine the spatial distribution of social elements such as class, caste, race, ethnicity, and gender, and evaluate their impact on societal structures in India. iii. Demonstrate an understanding of cultural processes such as cultural diffusion, landscape formation, and identity creation, and how these processes are spatially organized within cultural regions and realms in India and globally.

	iv. Assess the spatial distribution of social well-being indicators (housing, health, education) and social problems (slums, crime) in India, and evaluate the role of social policies and planning in addressing these issues. v. Analyse the role of language, religion, folk traditions, and rituals in shaping cultural identities and regions, with a special focus on the cultural ecology and folk geography of West Bengal.
Course Content	
Module: -1: Introduction to social Geography and its elements	i) Social Geography: Concept, scope, content, approaches and evolution. ii) Social Elements: Class, caste, race, and ethnicity with special reference to India. iii) Concept and types of Society, social space, social groups and social processes.
Module: -2: Social wellbeing and issues in Social Geography	i) Social Well-being: Concept and Components. ii) Concept of Social inclusion and exclusion. iii) Social segregation in India (Urban and Rural) and Social Problems in India: dowry, child marriage, Domestic violence and crime.
Module: -3: Introduction to Cultural Geography and its elements	i) Cultural Geography: Meaning, scope, content and contemporary trends. ii) Culture: Concept and type (material and non-material) iii) Concept of cultural diffusion, cultural landscape, Cultural space, cultural region (India, after Sopher), Cultural Hearth and Realm, cultural diversity (India).
Module: -4: Issues in Cultural Geography	i) Language and major linguistic groups in India; Language extinction. ii) Religion: Major religious groups in World and India. iii) Cultural ecology, folk culture and rituals with special reference to West Bengal. iv) Concept of Globalization and cultural change.
Suggestive Readings	- Ahmad, A. (1999). Social Geography. Rawat Publications. - Anderson, K., Domosh, M., Pile, S., & Thrift, N. (Eds.). (2003). Handbook of Cultural Geography. London: Sage. - Duncan, J. S., & Ley, D. (1993). Place/Culture/Representation. London: Routledge. - Jackson, P. (1989). Maps of Meaning: An Introduction to Cultural Geography. London: Routledge. - Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (2000). The Dictionary of Human Geography (4th ed.). Blackwell. - Knox, P., & Marston, S. (2016). Places and Regions in Global Context: Human Geography (6th ed.). Pearson. - Kuper, A. (1999). Culture: The Anthropologists' Account. Harvard University Press. - Majid Husain (2012). Human Geography. Rawat Publications. - Mitchell, D. (2000). Cultural Geography: A Critical Introduction. Oxford: Blackwell. - Price, M. (1995). The Cultural Geography Reader. Routledge. - Raza, M., & Agarwal, Y. (1999). Cultural Geography of India. New Delhi: National Book Trust. - Smith, D. M. (1977). Human geography: A welfare approach. Edward Arnold. - Sopher, D. E. (1980). An Exploration of India: Geographical Perspectives on Society and Culture. Longman.
Method of Assessment, Measurement, & Evaluation:	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours

	Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks
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Title of the Course:	SOCIAL AND CULTURAL GEOGRAPHY (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-8 B
Semester = V (PRACTICAL)	
Credit = 01	
Objectives of the Course	i. To introduce key social indices used in human geography for evaluating development, equity, and well-being. ii. To develop analytical skills for interpreting and applying statistical measures. iii. To enable spatial visualization of socio-cultural characteristics using cartographic and thematic mapping techniques. iv. To train students in survey design and data collection techniques for assessing socio-economic conditions in real-world contexts. v. To promote critical thinking on spatial inequalities and social diversity across urban and rural settings in India.
Learning Outcomes of the Course	By the end of this course, students will be able to: i. Identify and explain various social indices and their significance in human geography and development studies. ii. Calculate and interpret key social indicators using real or simulated data. iii. Design and execute basic socio-economic surveys using structured questionnaires in field-based or classroom settings. iv. Produce thematic and cartogram maps using socio-cultural data (e.g., language, caste, religion) for different regions of India. v. Critically analyze spatial patterns of inequality, segregation, and access to resources using both quantitative indices and maps. vi. Communicate findings effectively through reports, presentations, and visual tools combining statistical and spatial data.
Course Content	
Module-1: Social Indices	i) Human Poverty Index (HPI) ii) Gender Parity Index (GPI) iii) Social Affinity Index (SAI) iv) Social Segregation Indices: Dissimilarity Index (DI) & Isolation Index (II).
Module-2: Spatial representation of Socio-cultural aspects	i) Preparation of cartogram (Bar diagram and Proportional Divided Circle) and thematic Map (Choropleth) of India using socio-cultural data (caste, religion and language).
Module-3: Framing of questionnaire & Schedule	i) Preparation of a questionnaire and Schedule regarding socio-economic status and access to basic amenities and services in rural or urban areas.
Suggestive Readings:	1. Census of India. (2011). <i>Primary Census Abstracts</i>. 2. Husain, M. (2008). <i>Human Geography</i>. Rawat Publications.

	3. Massey, D. S., & Denton, N. A. (1988). The dimensions of residential segregation. <i>Social forces</i> , 67(2), 281-315. 4. Mitchell, D. (2000). <i>Cultural Geography: A Critical Introduction</i> . Blackwell Publishers. 5. NFHS-5 (2021). <i>India National Family Health Survey Reports</i> . 6. Sarkar A (2015) Practical geography: A systematic approach, Orient Black Swan Private Ltd., New Delhi. 7. Singh, R.L. and Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers. 8. Sopher, D. E. (1980). <i>An Exploration of India: Geographical Perspectives on Society and Culture</i> . Longman. 9. UNDP (2023). <i>Human Development Reports – Technical Notes and Indices</i> . 10. World Economic Forum. (2023). <i>Global Gender Gap Report</i> .
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-9: Fundamentals of Surveying and Mapping

Title of the Course:	FUNDAMENTALS OF SURVEYING AND MAPPING (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-9A
Semester = V (THEORY)	
Credits = 03	
Objectives of the Course	i. To equip students with knowledge and skills in thematic cartography. ii. To develop understanding of mathematical map projections. iii. To impart practical knowledge of compass and plane table surveying. iv. To train students in field surveying techniques.
Learning Outcomes of the Course	Upon successful completion of the course, students will be able to: i. Construct and interpret thematic maps using appropriate cartographic techniques. ii. Demonstrate proficiency in constructing and understanding mathematical map projections. iii. Conduct traverse surveys and apply surveying methods. iv. Execute levelling and contouring operations in the field.
<u>Course Content</u>	
Module-1: Principles and techniques of surveying	i) Surveying: definition, classification, and applications; Principles: plane and geodetic surveying, Bearing and triangulation. ii) Techniques of surveying by Plane table, Prismatic compass, theodolite. iii) Concept and importance of topographic survey.
Module-2: Principles and techniques of Levelling and contouring	i) Levelling: Concept, principles, types, procedure, and applications; techniques of levelling by Dumpy level, Abney level, and Clinometer. ii) Concept of contours and their topographic representation; methods and techniques of contouring.

Module-3: Fundamentals of Mapping	i) Cartography: Nature, scope and development, elements and applications. ii) Map: Concept, components, classification, Importance and uses. iii) Thematic Mapping: Concept, Significance, types and applications in spatial analysis.
Module-4: Geodetic framework and map projection	i) Coordinate systems: Polar, Grid, rectangular and Geographic Coordinate system ii) Shape of earth: Spheroid, Ellipsoid, Geoid and Datum (Everest and WGS-84) iii) Map projection: Concept, Classification, properties and uses; Concept and significance of UTM projection.
Suggestive Readings	1. Anson R, Ormelling FJ (1994) Basic Cartography. Pregmen Press. 2. Basak, N.N. (2017): Surveying & Levelling, 2ed., McGraw Hill Education (India). 3. Iliffe, J., & Lott, R. (2008). <i>Datums and map projections for remote sensing, GIS and surveying</i> (2nd ed.). Whittles Publishing. 4. Kanetkar, T.P. (2006): Surveying & Levelling Vol – I, Pune Vidyarthi Griha Prakashan 5. Mishra RP, Ramesh A (1989): Fundamentals of Cartography, New Delhi. 6. Robinson A. H. (2009): Elements of Cartography, John Wiley and Sons, New York. 7. Sarkar A (2015): Practical geography: A systematic approach, Orient Black Swan Private Ltd., New Delhi. 8. Singh, Gopal (2008): Map work and Practical Geography, Vikas Publishing House Pvt. Ltd.: New Delhi. 9. Singh, R.L. and Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers. 10. Wolf, P. R., & Ghilani, C. D. (2012): <i>Elementary surveying: An introduction to geomatics</i> (13th ed.). Pearson.
Method of Assessment, Measurement, & Evaluation:	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	FUNDAMENTALS OF SURVEYING AND MAPPING (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-9B
Semester = V (PRACTICAL)	
Credit = 01	
Objectives of the Course	i. To equip students with knowledge and skills in thematic cartography. ii. To develop understanding of mathematical map projections. iii. To provide hands-on experience in compass, plane table, dumpy level, and theodolite surveying.
Learning Outcomes of the Course	Upon successful completion of the course, students will be able to: i. Construct and interpret thematic maps using appropriate cartographic techniques. ii. Demonstrate proficiency in constructing and understanding mathematical map projections. iii. Conduct traverse surveys and apply surveying methods. iv. Execute levelling and height measurement using dumpy levels and theodolites.

Course Content

Module-1: Bearing conversion and Prismatic Compass	i) Conversion of Bearing (Between Whole Circle Bearing and Quadrantile/Reduced Bearing). ii) Traverse survey using Prismatic Compass (closed traverse) and Plane table (Intersection method).
Module-2: Dumpy Level and Theodolite	i) Levelling by Dumpy Level and plotting of profile (Collimation and Rise & Fall method); ii) Determination of Height of objects using Transit Theodolite (Base Accessible and base Inaccessible with same vertical plane) (Using stadia method and One degree method).
Module-3: Cartographic Techniques and Map Projections	ii) Thematic Mapping (On state/district/sub-district level Map of India) using choropleth technique iii) Construction of Projections (Mathematical): Polar Zenithal stereographic projection, Polyconic projection and Mercator's Projection.
Suggestive Readings	1. Agor, R. (2015): <i>A textbook of surveying and levelling</i> (2nd ed.). Khanna Publishers. 2. Anson R, Ormelling FJ (1994) Basic Cartographic. Pregmen Press. 3. Basak, N.N. (2017): <i>Surveying & Levelling</i> , 2ed., McGraw Hill Education (India). 4. Kanetkar, T.P. (2006): <i>Surveying & Levelling Vol – I</i> , Pune Vidyarthi Griha Prakashan 5. Mishra RP, Ramesh A (1989) <i>Fundamentals of Cartography</i> , New Delhi. 6. Robinson A. H. (2009): <i>Elements of Cartography</i> , John Wiley and Sons, New York. 7. Sarkar A (2015) <i>Practical geography: A systematic approach</i> , Orient Black Swan Private Ltd., New Delhi. 8. Singh, R.L. and Singh, R.P.B. (2008): <i>Elements of Practical Geography</i> , Kalyani Publishers. 9. Wolf, P. R., & Ghilani, C. D. (2012): <i>Elementary surveying: An introduction to geomatics</i> (13th ed.). Pearson.
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-10: Quantitative Techniques in Geography

Title of the Course:	QUANTITATIVE TECHNIQUES IN GEOGRAPHY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-10A
Semester = V (THEORY)	
Credits = 03	
Objectives of the Course	- To introduce students to fundamental statistical techniques used in geographical data analysis. - To develop proficiency in calculating and interpreting descriptive statistics for spatial data.

	- To build competence in analysing relationships between geographical variables through correlation and regression. - To enhance students' ability to identify temporal patterns using time series analysis methods. - To familiarize students with basic probability concepts for spatial analysis and decision-making. - To develop practical skills in applying statistical methods to solve geographical problems.
Learning Outcomes of the Course	- Upon successful completion of this course, students will be able to: - Calculate and appropriately apply measures of central tendency and dispersion to analyze geographical data. - Create and interpret statistical graphs and plots to visualize spatial patterns. - Determine and evaluate relationships between geographical variables using correlation and regression techniques. - Analyze temporal trends in geographical data using time series analysis methods. - Apply basic probability concepts to assess geographical phenomena and risks. - Make evidence-based interpretations of geographical data using appropriate statistical tools. - Demonstrate practical competence in using statistical methods for geographical research questions.
Course Content	
Module-1: Basics of Quantitative Techniques in Geography	i) Importance and significance of quantitative techniques in geographical studies; concepts of data, parameter, constant, variable, population and sample. ii) Types of geographical data: discrete & continuous, spatial & non-spatial, cross-sectional & time-series; Sources of data: primary and secondary. iii) Scales of measurement: nominal, ordinal, interval, ratio. iv) Data organization: tabulation, frequency distribution, cross-tabulation.
Module-2: Descriptive Statistics: Central Tendency and Dispersion	i) Measures of central tendency and partition value: concept, merits, demerits and uses. ii) Measures of dispersion: concept, merits, demerits and uses.
Module-3: Correlation, Regression and Time Series Analysis	i) Correlation: Product moment (Pearson's) and rank correlation (Spearman). ii) Linear regression: concept, regression equation, interpretation of coefficients and standard error of estimate. iii) Time series analysis: concept, methods and applications.
Module-4: Basics of Probability	i) Introduction to Probability: Basic terms: experiment, outcome, event, sample space; Simple event operations: union, intersection, complement. ii) Basic Rules of Probability: Addition, Multiplication, Conditional Probability.
Suggestive Readings	1. Bhagabati, D. K., & Pillai, R. S. N. (2022). Practical Statistics. S. Chand Publishing. 2. Burt, J. E., Barber, G. M., & Rigby, D. L. (2009). Elementary Statistics for Geographers (3rd ed.). Guilford Press. 3. Clark, W. A. V., & Hosking, P. L. (1986). Statistical Methods for Geographers. Wiley. 4. Das, N. J. (2015). Statistical Method. Eastern Economy Edition. 5. Ebdon, D. (1985). Statistics in Geography: A Practical Approach (2nd ed.). Blackwell. 6. Gupta, S. C. (2021). Fundamentals of Statistics. Himalaya Publishing House. 7. Gupta, S. C., & Kapoor, V. K. (2020). Fundamentals of Mathematical Statistics (12th ed.). Sultan Chand & Sons. 8. Gupta, S. P. (2020). Statistical Methods (45th ed.). Sultan Chand & Sons. 9. Hammond, R., & McCullagh, P. (1978). Quantitative Techniques in Geography: An Introduction (2nd ed.). Oxford University Press. 10. John E. Freund (2010). Mathematical Statistics with Applications (7th ed.). Pearson.

	11. Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Age International. 12. Kothari, C. R. (2009). Quantitative Techniques. Vikas Publishing House. 13. Mahmood, A. (1998). Statistical Methods in Geographical Studies. Rajesh Publications. 14. McGrew, J. C., & Monroe, C. B. (2009). An Introduction to Statistical Problem Solving in Geography (2nd ed.). Waveland Press. 15. Rogerson, P. A. (2020). Statistical Methods for Geography: A Student's Guide (5th ed.). SAGE Publications. 16. Sarkar, A. (2013). Quantitative Geography: Techniques and Presentations. Orient BlackSwan. 17. Shaw, G., & Wheeler, D. (1994). Statistical Techniques in Geographical Analysis (2nd ed.). David Fulton Publishers. 18. Sheldon Ross (2014). A First Course in Probability (9th ed.). Pearson. 19. William Feller (1968). An Introduction to Probability Theory and Its Applications, Vol. 1 (3rd ed.). Wiley.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	QUANTITATIVE TECHNIQUES IN GEOGRAPHY (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-10B
Semester = V (PRACTICAL)	
Credit = 01	
Objectives of the Course	i. To build hands-on skills in applying statistical techniques to geographical data. ii. To train students in computing descriptive statistics using real spatial datasets. iii. To develop competence in analysing spatial relationships through correlation and regression. iv. To guide students in constructing and interpreting time series for detecting geographical trends. v. To enhance graphical representation of spatial data using charts and diagrams. vi. To apply basic probability concepts in solving geography-related problems. vii. To prepare students for conducting quantitative geographical research.
Learning Outcomes of the Course	Upon successful completion of this course, students will be able to: i. Understand and apply fundamental statistical concepts relevant to geographical data analysis. ii. Compute and interpret measures of central tendency and dispersion in spatial datasets. iii. Analyze relationships between geographical variables using correlation and regression techniques. iv. Identify and interpret temporal patterns in geographical data through time series analysis. v. Apply basic probability principles to assess geographical events and uncertainties. vi. Use statistical tools and graphical methods to visualize spatial data and trends.

	vii. Formulate and investigate geographical research questions using appropriate statistical techniques. viii. Interpret statistical results critically within the context of geographical theories and real-world applications.
Course Content	
Module-1: Descriptive Statistics: Central Tendency and Dispersion	i) Measures of central tendency: mean (arithmetic mean), median, mode (Calculation and Graphical Plotting). ii) Measures of dispersion: Quartile deviation, mean deviation, standard deviation and Coefficient of variation.
Module-2: Correlation, Regression and Time Series Analysis	i) Correlation: Product moment correlation (Pearson's). ii) Linear regression: Linear Regression Equation of Y on X. iii) Time series analysis: Semi-average and moving average method.
Module-3: Basics of Probability	i) Event Operations: Union, intersection, and complement of events using Venn diagrams. ii) Probability Calculation: Addition Rule for mutually exclusive and non-exclusive events, Multiplication Rule for independent and dependent events, Conditional Probability.
Suggestive Readings	1. Bhagabati, D. K., & Pillai, R. S. N. (2022). Practical Statistics. S. Chand Publishing. 2. Burt, J. E., Barber, G. M., & Rigby, D. L. (2009). Elementary Statistics for Geographers (3rd ed.). Guilford Press. 3. Clark, W. A. V., & Hosking, P. L. (1986). Statistical Methods for Geographers. Wiley. 4. Das, N. J. (2015). Statistical Method. Eastern Economy Edition. 5. Ebdon, D. (1985). Statistics in Geography: A Practical Approach (2nd ed.). Blackwell. 6. Gupta, S. C. (2021). Fundamentals of Statistics. Himalaya Publishing House. 7. Gupta, S. C., & Kapoor, V. K. (2020). Fundamentals of Mathematical Statistics (12th ed.). Sultan Chand & Sons. 8. Gupta, S. P. (2020). Statistical Methods (45th ed.). Sultan Chand & Sons. 9. Hammond, R., & McCullagh, P. (1978). Quantitative Techniques in Geography: An Introduction (2nd ed.). Oxford University Press. 10. Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Age International. 11. Kothari, C. R. (2009). Quantitative Techniques. Vikas Publishing House. 12. Mahmood, A. (1998). Statistical Methods in Geographical Studies. Rajesh Publications. 13. McGrew, J. C., & Monroe, C. B. (2009). An Introduction to Statistical Problem Solving in Geography (2nd ed.). Waveland Press. 14. Rogerson, P. A. (2020). Statistical Methods for Geography: A Student's Guide (5th ed.). SAGE Publications. 15. Sarkar, A. (2013). Quantitative Geography: Techniques and Presentations. Orient BlackSwan. 16. Shaw, G., & Wheeler, D. (1994). Statistical Techniques in Geographical Analysis (2nd ed.). David Fulton Publishers. 17. Sheldon Ross (2014). A First Course in Probability (9th ed.). Pearson. 18. William Feller (1968). An Introduction to Probability Theory and Its Applications, Vol. 1 (3rd ed.). Wiley.
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours

	Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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GEOMJ-MC-11: Economic and Political Geography

Title of the Course:	ECONOMIC AND POLITICAL GEOGRAPHY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-11A
Semester - V (THEORY)	
Credits = 03	
Objectives of the Course	i. To acquire knowledge of the basic concepts of Economic Geography. ii. To understand the different types of economic activities. iii. To introduce the fundamental concepts, nature, and scope of Political Geography. iv. To explain key ideas related to the State, Nation, Nation-State, Enclave, Exclave, Territory, and Sovereignty, and understand the emergence of new states. v. To develop an understanding of geopolitics and major geopolitical theories such as the Heartland and Rimland theories. vi. To examine and assess contemporary geopolitical challenges, especially those linked to resource distribution, water-sharing conflicts, and strategic vulnerabilities in the Indian subcontinent.
Learning Outcomes of the Course	i. Learner will gain comprehensive understanding of the basic concepts of Economic Geography. ii. Learner will also acquire knowledge about different types of economic activities. iii. Understand the definition, nature, and scope of Political Geography as an academic discipline. iv. Explain key concepts of State, Nation, Nation-State, Enclave, Exclave, Territory, and Sovereignty, and interpret the emergence of new states. v. Analyze the concepts of Geopolitics and critically evaluate major geopolitical theories like the Heartland and Rimland theories. vi. Apply geopolitical knowledge to critically assess current issues, including resource conflicts, and India's geostrategic challenges
Course Content	
Module-1: Basics of Economic Geography	i) Economic Geography: Meaning and approaches. ii) Basic concepts: Goods, services, production, exchange and consumption. iii) Resource: Concept, nature, classification, creating factors and conservation.
Module-2: Economic Sectors and Theories of Industrial Location	i) Economic activities: Concept and classification. ii) Primary activities: Agriculture (paddy, jute & tea), forestry (lumbering), fishing (inland and coastal of India) and mining (coal, iron ore in India). iii) Secondary and Tertiary activities: Manufacturing (cotton textile and iron & steel); transport network connectivity and accessibility, transportation and economic development (Golden quadrilateral, PMGSY, Freight corridor). iv) Theories of industrial location: Least cost theory (Weber) & Profit maximisation theory (Losch).

Module-3: Fundamentals of Political Geography	i) Political Geography: Definition, nature and scope. ii) Basic concepts: State, Buffer state, Nation and Nation-State, Frontiers, Boundaries, Enclave and exclave.
Module-4: Geopolitics and Contemporary Geopolitical Issues	i) Geopolitics and geopolitical theories: Concepts of geopolitics, theory of Heartland and Rimland. ii) Contemporary geopolitical issues: Water (Indus water treaty, Kaveri water dispute); Geostrategic importance and vulnerability of Siliguri Corridor.
Suggestive Readings	1. Adhikari, S. (2001). <i>Fundamentals of Political Geography</i> . Rawat Publications, Jaipur and New Delhi. ISBN: 9788170336944. 2. Agnew, J. (1998). <i>Geopolitics: Re-visioning World Politics</i> . Routledge, London and New York. ISBN: 9780415171455. 3. Alexander J. W. (1963). <i>Economic Geography</i> . Prentice-Hall Inc., Englewood Cliffs, New Jersey. 4. Bagchi-Sen S. and Smith H. L. (2006). <i>Economic Geography: Past, Present and Future</i> . Taylor and Francis. 5. Chand, M., & Puri, V. K. (2015, 8th Edition). <i>Regional Planning in India</i> . Allied Publishers Pvt. Ltd., New Delhi. ISBN: 9788170235063. 6. Coe N. M., Kelly P. F. and Yeung H. W. (2007). <i>Economic Geography: A Contemporary Introduction</i> . Wiley Blackwell. 7. Combes P., Mayer T. and Thisse J. F. (2008). <i>Economic Geography: The Integration of Regions and Nations</i> . Princeton University Press 8. Dikshit, R. D. (1999). <i>Political Geography: The Spatiality of Politics</i> . Tata McGraw-Hill Education, New Delhi. ISBN: 9780074630068. 9. Dikshit, R. D. (2004). <i>Geopolitics: A Contemporary Perspective</i> . Tata McGraw-Hill Education, New Delhi. ISBN: 9780070588301. 10. Flint, C. (2006, 3rd Edition). <i>Introduction to Political Geography: Space, Place and Politics</i> . Routledge, London and New York. ISBN: 9780415321225. 11. Husain, M. (2019). <i>Models in Geography</i> (4th Edition). Rawat Publications, Jaipur and New Delhi. ISBN: 9788131609398. 12. Husain, M. (2021, 8th Edition). <i>Geography of India</i> . McGraw Hill Education (India), New Delhi. ISBN: 9789354600853. 13. Mitra, A. (2002). <i>Resource Studies</i> . Sreedhar Publishers. 14. Pandey, R. (2007). <i>Resource Conflicts and Governance: Exploring Solutions for Resource-Based Conflicts in India</i> . Academic Foundation, New Delhi. ISBN: 978817188636. 15. Roy, P. (2005). <i>Economic Geography- A Study of Resources</i> . New Central Book Agency Ltd. 16. Singh, R. P. B. (1987). <i>Political Geography: A Reader</i> . Heritage Publishers, New Delhi. ISBN: 978817026005. 17. Taylor, P. (2012, 5th Edition). <i>Political Geography: World-Economy, Nation-State and Locality</i> . Routledge, London and New York. ISBN: 9781408261714.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	ECONOMIC AND POLITICAL GEOGRAPHY (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-11B
Semester -V (PRACTICAL)	
Credit = 01	
Objectives of the Course	i. To develop skill to measure agricultural efficiency. ii. To introduce transport network indices for understanding regional connectivity and accessibility. iii. To introduce key indices measuring political systems, including democracy and autocracy. iv. To explain the concept and significance of the Happiness Index in assessing societal well-being. v. To develop an understanding of methods for measuring voting behaviour and political participation.
Learning Outcomes of the Course	i. They will also be able to measure the agriculture efficiency of different regions. ii. Analyse transport networks using topological indices for evaluating accessibility. iii. Understand the concepts and methods behind the Democracy Index and Autocracy Index. iv. Explain the significance and interpretation of the Happiness Index in global and national contexts. v. Analyse voting behaviour patterns and methods of measuring political participation.
Course Content	
Module-1: Measures of Agricultural efficiency and concentration	i) Kendall's Ranking Co-efficient. ii) Crop Combination by Weaver. iii) Dominant and Distinctive Analysis.
Module-2: Measures of Transport network connectivity and accessibility	i) Alpha, Beta and Gamma index. ii) Shimbil Index and Konig Number.
Module-3: Measuring Democracy, Governance, and Political Behaviour	i) Index of democracy. ii) Index of autocracy. iii) Happiness Index. iv) Measuring voting behaviour.
Suggestive Readings	1. Adhikari, S. (2001). <i>Fundamentals of Political Geography</i>. Rawat Publications, Jaipur and New Delhi. ISBN: 9788170336944. 2. Dikshit, R. D. (1999). <i>Political Geography: The Spatiality of Politics</i>. Tata McGraw-Hill, New Delhi. ISBN: 9780074630068. 3. Flint, C. (2006, 3rd Ed.). <i>Introduction to Political Geography: Space, Place and Politics</i>. Routledge, London and New York. 4. Khullar, D. R. (2022). <i>India: A Comprehensive Geography</i>. Kalyani Publishers, New Delhi. ISBN: 9789327261545. 5. Mahmood, A. (2016). <i>Statistical methods in Geographical Studies</i>. Rajesh Publications. 6. Marshall, M. G., & Gurr, T. R. (2020). Polity5: Political regime characteristics and transitions, 1800-2018. Center for Systemic Peace. 7. Sanjay Kumar and Praveen Rai (2003). <i>Measuring Voting Behaviour in India</i>, New Delhi, SAGE Publications 8. Sarkar, A. (2013). <i>Quantitative Geography: Techniques and Presentations</i>. Orient BlackSwan Publication.

	9. Singh, S. (1991). <i>Political Geography</i>. Rastogi Publications, Meerut. ISBN: 9788171330392. 10. Unit, E. I. (2023). Democracy Index 2022: Frontline democracy and the battle for Ukraine. Economist Intelligence.
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and one practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-VI				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-12A: Regional Planning & Development (03)	GEOMJ-MC-12B: Regional Planning & Development (01)	04	75
	GEOMJ-MC-13A: Evolution of Geographical Thought (03)	GEOMJ-MC-13B: Evolution of Geographical Thought (01)	04	75
	GEOMJ-MC-14A: Basics of Remote Sensing & GIS (03)	GEOMJ-MC-14B: Basics of Remote Sensing & GIS (01)	04	75
	GEOMJ-MC-15: Field work in Geography (04)		04	75
Minor Core (MnC)	GEOMN-MN-06A: Field work techniques in Geography (03)	GEOMN-MN-06B: Field work techniques in Geography (01)	04	75
Total			20	375

GEOMJ-MC-12: Regional Planning and Development

Title of the Course:	REGIONAL PLANNING AND DEVELOPMENT (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-12A
Semester = VI (THEORY)	
Credits = 03	
Objectives of the Course	i. To introduce students to the fundamental concepts, types, and delineation of regions used in regional planning. ii. To understand the significance and approaches of regional planning in the context of India. iii. To explore the concepts and indicators of regional development and disparities with specific reference to India. iv. To provide a theoretical grounding in the major models and theories of regional development. v. To assess regional development strategies and policy initiatives in India for achieving balanced and sustainable growth.
Learning Outcomes of the Course	i. Students will develop a conceptual understanding of regions, types of planning, and planning models used in India. ii. Learners will be able to distinguish between growth and development and evaluate regional disparities in India using relevant indicators. iii. Students will demonstrate comprehension of major regional development theories and apply them in geographical contexts. iv. Learners will be able to critically analyse India's regional planning strategies and the role of institutional frameworks like NITI Aayog. v. Students will gain insight into sustainable and inclusive regional development policies and practices.

Course Content

Module-1: Introduction of region and regional planning	i) Region: Concept, Types and delineation (Formal, functional, and Planning). ii) Regional Planning: Concept, objectives and types. iii) Regional planning in India: Centralised and decentralised planning, Multilevel planning. iv) Classification of planning region in India: Schemes of Planning Commission (1969) and P. Sengupta (1980).
Module-2: Regional development and disparities	i) Regional development: Concept and Indicators (Economic, social and environmental); SDG-10; Role of Planning commission (NITI Ayog). ii) Causes and consequences of regional inequality, disparity and diversity in India.
Module-3: Theories of regional development	i) Stages of Economic Development (Rostow, 1960), Cumulative Causation Theory (Myrdal, 1963). ii) Growth Pole Model (François Perroux, 1966), Core-Periphery Model (Friedmann, 1966).
Module-4: Regional development strategies in India	i) Need and measures for balanced development. ii) Drought Prone Area programme (DPAP) and Tribal Area Development Programme, and EAG states. iii) SEZs and industrial clusters.
Suggestive Readings	1. Berry, B. J. L., & Horton, F. F. (1970). <i>Geographic perspectives on urban systems</i>. Prentice Hall. 2. Bhat, L. S. (1972). <i>Regional planning in India</i>. Statistical Publishing Society. 3. Blij, H. J. de. (1971). <i>Geography: Regions and concepts</i>. John Wiley and Sons. 4. Chand, M., & Puri, V. K. (1983). <i>Regional planning in India</i>. Allied Publishers. 5. Claval, P. (1998). <i>An introduction to regional geography</i>. Blackwell Publishers. 6. Dickinson, R. E. (1964). <i>City and region</i>. Routledge. 7. Friedmann, J., & Alonso, W. (Eds.). (1975). <i>Regional policy: Readings in theory and applications</i>. MIT Press. 8. Gore, C. G. (1984). <i>Regions in question: Space, development theory and regional policy</i>. Methuen. 9. Gore, C. G., Köhler, G., Reich, U.-P., & Ziesemer, T. (1996). <i>Questioning development: Essays on the theory, policies and practice of development intervention</i>. Metropolis-Verlag. 10. Hall, P. (1992). <i>Urban and regional planning</i>. Routledge. 11. Haynes, J. (2008). <i>Development studies</i>. Polity Press. 12. Johnson, E. A. J. (1970). <i>The organization of space in developing countries</i>. MIT Press. 13. Kulshetra, S. K. (2012). <i>Urban and regional planning in India: A handbook for professional practitioners</i>. Sage Publications. 14. Kundu, A. (1992). <i>Urban development and urban research in India</i>. Khanna Publishers. 15. Misra, R. P. (1992). <i>Regional planning: Concepts, techniques, policies and case studies</i>. Concept Publishing. 16. Misra, R. P., Sundaram, K. V., & Prakash Rao, V. L. S. (1974). <i>Regional development planning in India</i>. Vikas Publishing. 17. Peet, R. (1999). <i>Theories of development</i>. The Guilford Press. 18. UNDP. (2001–2018). <i>Human development report</i> (Various years). Oxford University Press.

	19. World Bank. (2001–2015). <i>World development report</i> (Various years). Oxford University Press.
Method of Assessment, Measurement, & Evaluation:	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	REGIONAL PLANNING AND DEVELOPMENT (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-12B
Semester- VI (PRACTICAL)	
Credit = 01	
Objectives of the Course	i. To train students in the techniques for delineating formal and functional regions using quantitative and spatial models. ii. To equip learners with skills to measure and interpret regional inequalities using statistical tools and indices.
Learning Outcomes of the Course	i. Learners will be able to delineate Formal Regions Using Quantitative Techniques and Identify Functional Regions Using Spatial Interaction Models. ii. Students will be able to measure and interpret regional disparities and interpret results for planning and policy.
Course Content	
Module-1: Delineation of formal region	i) Weighted Index Method. ii) Composite Z-Score Method.
Module-2: Delineation of functional region	i) Gravity Analysis (Reilly's Law of Retail Gravitation). ii) Breaking Point Analysis (Converse).
Module-3: Measuring regional disparity	i) Lorenz Curve, Gini Coefficient. ii) Shopper's Disparity Index. iii) Coefficient of Geographical Association and Location Quotient.
Suggestive Readings	1. Converse, P. D. (1949). New laws of retail gravitation. <i>Journal of Marketing</i>, 14(3), 379–384. 2. Mahmood, A. (1998): <i>Statistical methods in Geographical Studies</i> 3. Mishra, R.P. (2002): <i>Regional Planning: Concepts, Techniques, Policies and Case Studies</i>, Concept, New Delhi 4. Reilly, W.J. (1931): <i>The Law of Retail Gravitation</i>, Knickerbocker Press, New York. 5. Rodrigue J. P. (2017): <i>The Geography of Transport System</i>, Routledge, New York. 6. Sarkar, A. (2013): <i>Quantitative Geography</i>, Orient Black Swan

Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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GEOMJ-MC-13: Evolution of Geographical Thought

Title of the Course:	EVOLUTION OF GEOGRAPHICAL THOUGHT (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-13A
Semester = VI (THEORY)	
Credits = 03	
Objectives of the Course	i) To understand the development of Geography as a discipline. ii) To acquire knowledge about the contributions of School of Thought. iii) To acquire knowledge about the changing methodologies and paradigms. iv) To encourage critical thinking and theoretical awareness.
Learning Outcomes of the Course	i) Learners will gain a deeper theoretical understanding. ii) They will also gain enhanced critical thinking skills. iii) Synthesize concepts from multiple geographical frameworks to analyze complex problems iv) Recognize the relevance of geographical theory to contemporary environmental and social challenges.
Course Content	
Module-1: Basic concept and evolution of geographical thought	i) Geography as discipline: Definition, nature, scope and content. ii) Ancient Period: Greek, Roman and Indian geographers. iii) Medieval Period: Dark Age of Geography, Arab geographers. iv) Modern Period: German, French, British and American geographers.
Module-2: Dichotomies in Geography	i) Based on content: Physical vs. Human Geography. ii) Based on approach: Determinism vs. Possibilism and Neo-Determinism. iii) Based on methodology: General vs. Particular, Systematic vs. Regional Geography.
Module-3: Conceptual Foundations and Paradigm Shifts in Geography	i) Concept of Space, place and time in geography. ii) Quantitative Revolution in Geography. iii) Behaviouralism, Humanistic Approach, Radicalism, Feminism. iv) Paradigm shifts in Geography.
Module-4: Scientific Approaches in Geography	i) Approaches to Scientific enquiry: Inductive, Deductive, Abductive method. ii) Elements of Scientific methods: Observation, Hypotheses testing, validation, Theory, Model, Laws. iii) Probability Theory: Concept and significance to geographical studies.
Suggestive Readings	1. Bonnett, A. (2008). <i>What is geography?</i> Sage Publications. 2. Dikshit, R. D. (1997). <i>Geographical thought: A contextual history of ideas</i> . Prentice-Hall of India.

	3. Dikshit, R. D. (2006). <i>The art and science of geography: Integrated readings</i>. Prentice-Hall of India. 4. Hartshorne, R. (1959). <i>Perspective on the nature of geography</i>. Rand McNally & Company. 5. Harvey, D. (1969). <i>Explanation in geography</i>. Edward Arnold. 6. Harvey, D. (1973). <i>Social justice and the city</i>. Edward Arnold. 7. Holt-Jensen, A. (2011). <i>Geography: History and its concepts: A student's guide</i> (4th ed.). Sage Publications. 8. Husain, M. (2019). <i>Models in geography</i> (4th ed.). Rawat Publications. 9. Johnston, R. J. (2018). <i>Geography and geographers: Anglo-American human geography since 1945</i> (7th ed.). Routledge. 10. Johnston, R. J. (Ed.). (2010). <i>The dictionary of human geography</i> (5th ed.). Routledge. 11. Kapur, A. (2001). <i>Indian geography: Voice of concern</i>. Concept Publishing. 12. Martin, G. J. (2005). <i>All possible worlds: A history of geographical ideas</i> (4th ed.). Oxford University Press. 13. Peet, R. (1998). <i>Modern geographical thought</i>. Blackwell Publishers. 14. Rana, L. (2013). <i>Geographical thought: A systematic record of evolution</i>. Concept Publishing.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ type questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	EVOLUTION OF GEOGRAPHICAL THOUGHT (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-13B
Semester -VI (PRACTICAL)	
Credit = 01	
Objectives of the Course	i) To understand hypothesis testing. ii) To provide knowledge about the application of hypothesis testing in Real-World Problems. iii) To build the ability of the learners to choose and apply the appropriate test based on data type and research question. iv) To know the importance of correlation and probability in geographical studies.
Learning Outcomes of the Course	i) Learners will be able to understand the hypothesis testing. ii) Learner will gain knowledge about the application of hypothesis testing in Real-World Problems. iii) They will be able to choose the most appropriate hypothesis testing, based on data type and research question. iv) The students will be able to understand the use and procedure of correlation and probability.

Course Content

Module-1: Correlation & Probability Distribution	i) Rank Correlation (Spearman). ii) Probability Distribution: Normal Distribution.
Module-2: Parametric Test	i) T- test ii) Z- test iii) One-way ANOVA
Module-3: Non-Parametric Test	i) Mann-Whitney Test ii) Chi-square Test
Suggestive Readings	1. Das, N. J. (2015). Statistical Method. Eastern Economy Edition. 2. Ebdon, D. (1985). Statistics in Geography: A Practical Approach (2nd ed.). Blackwell. 3. Gomes, B., Jones III, J.P. (Eds) (2010): Research Methods in Geography: A Critical Introduction, Wiley- Blackwell. 4. Gupta, S. C. (2021). Fundamentals of Statistics. Himalaya Publishing House. 5. Gupta, S. C., & Kapoor, V. K. (2020). Fundamentals of Mathematical Statistics (12th ed.). Sultan Chand & Sons. 6. Gupta, S. P. (2020). Statistical Methods (45th ed.). Sultan Chand & Sons. 7. Hammond P. and McCullagh P. S. (1978): Quantitative Techniques in Geography: An Introduction, Oxford University Press. 8. Khan, N. (1998): Quantitative Methods in Geographical Research, Concept Publishing Company, New Delhi 9. Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Age International. 10. Kothari, C. R. (2009). Quantitative Techniques. Vikas Publishing House. 11. Mahmood A., (1977): Statistical Methods in Geographical Studies, Concept. 12. Mahmood, A. (1998). Statistical Methods in Geographical Studies. Rajesh Publications. 13. Pal S. K., (1998): Statistics for Geoscientists, Tata McGraw Hill, New Delhi. 14. Rogerson, P. A. (2020). Statistical Methods for Geography: A Student's Guide (5th ed.). SAGE Publications. 15. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations, Orient BlackSwan, New Delhi 16. Walford, N. (2011): Practical Statistics for Geographers and Earth Scientists, John Wiley & Sons, New York
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-14: Basics of Remote Sensing and GIS

Title of the Course:	BASICS OF REMOTE SENSING AND GIS (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-14A
Semester = VI (THEORY)	
Credits= 03	
Objectives of the Course	i. To familiarize students with GIS software interfaces and basic functionalities. ii. To gain foundational knowledge of Remote Sensing (RS) and GIS tools and techniques. iii. To develop skills in geospatial phenomenon analysis.
Learning Outcomes of the Course	i. Analyse spatial data for applications in various phenomenon. ii. Design geospatial workflows for disaster risk assessment and resource management. iii. Interpret satellite imagery and create actionable insights.
Course Content	
Module-1: Introduction and Principal of Remote Sensing (RS)	i) Remote Sensing: Definition, principles, stages, applications, and limitations ii) Source of Energy and radiation principles: EMR, EMS and laws of radiation; interactions with atmosphere and earth's surface. iii) Types of RS: Based on platform, energy sources, EMS regions, and number of bands. iv) Orbit and Satellite: Different types of satellite orbits, Sun-synchronous and geosynchronous satellites.
Module-2: RS Data Acquisition & Interpretation	i) Resolutions: Spatial, spectral, temporal, radiometric resolutions. ii) Types of sensors and their applications: Landsat series (TM, ETM, OLI) and IRS series (Cartosat-1, 2, & 3, Resourcesat-1 & 2). iii) False Colour Composite (FCC): Concept and generation of FCC using IRS LISS-IV and Landsat-OLI data. iv) Elements of visual image interpretation; LULC Mapping principle; Preparation of land use/land cover (LULC) inventories from satellite images (IRS LISS-IV and Landsat-OLI).
Module-3: Introduction to GIS	i) GIS: Concepts, components, Functions, application and advantages. ii) Raster and Vector data structure: Concept, principal, types, advantages, and limitations. iii) Attribute data structure: Concept of DBMS, RDBMS, principles of preparing attribute tables.
Module-4: GIS Data Integration, Analysis, and GNSS Applications	i) Data Attachment: linking spatial and non-spatial/attribute data. ii) Data manipulation: Joins, queries, calculations. iii) GNSS: Concepts of GNSS; principles of positioning and data collection, Application, advantages, and limitations.
Suggestive Readings	1. Bhatta, B. (2011). <i>Remote sensing and GIS</i> (2nd ed.). Oxford University Press. 2. Burrough, P. A., & McDonnell, R. A. (1998). <i>Principles of geographical information systems for land resource assessment</i> (2nd ed.). Oxford University Press. 3. Campbell, J. B., & Wynne, R. H. (2011). <i>Introduction to remote sensing</i> (5th ed.). Guilford Press.

	4. Cuff, J. D., & Mattson, M. T. (1982). <i>Thematic maps: Their design and production</i>. Methuen Young Books. 5. Demers, M. N. (1997). <i>Fundamentals of geographic information systems</i>. Wiley. 6. Dent, B. D., Torguson, J. S., & Holder, T. W. (2008). <i>Cartography: Thematic map design</i> (6th ed.). McGraw-Hill Higher Education. 7. Heywood, I., Cornelius, S., & Carver, S. (2011). <i>An introduction to geographical information systems</i> (4th ed.). Pearson Education. 8. Jensen, J. R. (2013). <i>Remote sensing of the environment: An earth resource perspective</i> (2nd ed.). Pearson Education. 9. Joseph, G. (2005). <i>Fundamentals of remote sensing</i> (2nd ed.). University Press (India) Pvt. Ltd. 10. Laurini, R., & Thompson, D. (1992). <i>Fundamentals of spatial information systems</i>. Academic Press. 11. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2004). <i>Remote sensing and image interpretation</i> (5th ed.). Wiley. 12. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographic information systems and science</i> (4th ed.). Wiley. 13. Nag, P., & Kudra, M. (1998). <i>Digital remote sensing</i>. Concept Publishing. 14. Narayan, L. R. A. (1999). <i>Remote sensing and its application</i>. Universities Press (India). 15. Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2008). <i>Thematic cartography and geovisualization</i> (3rd ed.). Prentice Hall.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	BASICS OF REMOTE SENSING AND GIS (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-14B
Semester = VI (PRACTICAL)	
Credit = 01	
Objectives of the Course	i. To familiarize students with GIS software interfaces and basic functionalities. ii. To enable students to import and visualize spatial data (raster and vector). iii. To develop skills in thematic map preparation.
Learning Outcomes of the Course	i. Students will install QGIS and identify its main components. ii. Analyse spatial data for applications in various phenomenon. iii. Design geospatial workflows for disaster risk assessment and resource management. iv. Interpret satellite imagery and create actionable insights.

Course Content

Module-1: Introduction to Q-GIS Software	i) Q-GIS & Interface: Introduction to Q-GIS; Navigation through Q-GIS main interface: menus, toolbars, panels, and map canvas. ii) Importing and Loading Spatial Data: Download satellite image; visualizing bands and understanding metadata; other raster (Geo-TIFF) and vector (Shapefile) layers Import. iii) Geo-referencing: Scanned maps/ images georeferencing and assigning projection.
Module-2: Data Management & composition	i) Digitization: Point, line, and polygon layers creation; Edit vertexes and geometry topology and save edits. ii) Attribute Joins & Field Calculations: Join external CSV/Excel tables to spatial layers; Use Field Calculator for spatial and non-spatial calculations. iii) Preprocessing and Analysis of Raster Data: Extracting an area of interest (AOI); False colour composition (FCCs) generation using Landsat: adjust colour ramps, stretch types, and transparency.
Module-3: Thematic Cartography and Spatial Analysis Techniques	i) Preparation of thematic map and output generation: Choropleth, Bar, Pie map layout preparation.
Suggestive Readings	1. Bhatta, B. (2011). <i>Remote sensing and GIS</i> (2nd ed.). Oxford University Press. 2. Burrough, P. A., & McDonnell, R. A. (1998). <i>Principles of geographical information systems for land resource assessment</i> (2nd ed.). Oxford University Press. 3. Campbell, J. B., & Wynne, R. H. (2011). <i>Introduction to remote sensing</i> (5th ed.). Guilford Press. 4. Cuff, J. D., & Mattson, M. T. (1982). <i>Thematic maps: Their design and production</i>. Methuen Young Books. 5. Demers, M. N. (1997). <i>Fundamentals of geographic information systems</i>. Wiley. 6. Dent, B. D., Torguson, J. S., & Holder, T. W. (2008). <i>Cartography: Thematic map design</i> (6th ed.). McGraw-Hill Higher Education. 7. Heywood, I., Cornelius, S., & Carver, S. (2011). <i>An introduction to geographical information systems</i> (4th ed.). Pearson Education. 8. Jensen, J. R. (2013). <i>Remote sensing of the environment: An earth resource perspective</i> (2nd ed.). Pearson Education. 9. Joseph, G. (2005). <i>Fundamentals of remote sensing</i> (2nd ed.). University Press (India) Pvt. Ltd. 10. Laurini, R., & Thompson, D. (1992). <i>Fundamentals of spatial information systems</i>. Academic Press. 11. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2004). <i>Remote sensing and image interpretation</i> (5th ed.). Wiley. 12. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographic information systems and science</i> (4th ed.). Wiley. 13. Nag, P., & Kudra, M. (1998). <i>Digital remote sensing</i>. Concept Publishing. 14. Narayan, L. R. A. (1999). <i>Remote sensing and its application</i>. Universities Press (India). 15. Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2008). <i>Thematic cartography and geovisualization</i> (3rd ed.). Prentice Hall.

Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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GEOMJ-MC-15: Field Report

Title of the Course:	FIELD REPORT
Discipline Specific Minor Paper Code:	GEOMJ-MC-15
Semester = VI (PRACTICAL)	
Credits = 04	
Objectives of the Course	i. To develop practical field research competencies in geographical investigation through hands-on experience in data collection, analysis, and interpretation. ii. To familiarize students with various geographical field techniques, survey methods, and tools for collecting primary data. iii. To enhance students' ability to identify and analyze geographical phenomena and processes through direct observation and field-based inquiry. iv. To train students in the preparation of comprehensive field reports with proper documentation, analysis, and presentation of findings. v. To develop critical thinking and problem-solving skills by addressing real-world geographical issues at local and regional scales. vi. To strengthen students' understanding of the relationships between theoretical geographical concepts and their practical manifestations in the field.
Learning Outcomes of the Course	i. Upon successful completion of this course, students will be able to: ii. Design and execute field-based geographical research using appropriate methodological approaches and tools. iii. Collect, organize, and analyze geographical data with precision and methodological rigor. iv. Apply analytical techniques to interpret field data and derive meaningful conclusions. v. Utilize geospatial tools (GPS, mobile applications, GIS) for field data collection and visualization. vii. Connect theoretical concepts with field observations to explain geographical patterns and processes. vi. Produce well-structured field reports with clear presentation of findings through maps, diagrams, and text. vii. Conduct ethical field research respecting local communities and environments. viii. Demonstrate understanding of physical and human geographical characteristics of the study area. ix. Formulate practical, evidence-based recommendations to address geographical issues identified during fieldwork.
Course Content	
Module-1: Field Report Preparation	General Guidelines for the Preparation of Field Report - The report is to be prepared for a C.D. Block / P.S. / Mouza / G.P. / Municipality / Subdivision / Drainage Basin area primarily on the basis of field survey. - Participation of each student in the Field Work is mandatory & Certificate of Supervisor regarding the participation in Field Work is to be attached in the Report.

	• The field report will be conducted using any relevant single topic from Physical and Human Geography. Any specific issue could be addressed. • A single Field Report is to be prepared individually by each student on the same topic based on the fieldwork conducted within any place(s) of geographical importance. • The entire field report has to prepare in English language. • The department must assign a supervisor to conduct local fieldwork if any student is unable to participate in a field excursion to a distant location from the institution due to valid reasons, such as i. Non-affordability ii. Exigency iii. Physical/Mental Illness/Sickness iv. Women health issues • Students must prepare the report based on data collected through field survey under the assigned faculty member(s) of the concerned college. • Questionnaire(s)/ schedule(s) are to be prepared for collection of primary data and one of the same as filled in during the field work, duly signed by the concerned teacher, be annexed with the field report. • The report should be prepared normally with primary data collected by field survey. • Incorporation of secondary data should not exceed 1/5th of the total report. • Field report is to be prepared by the student in his/her own hand writing. • Length of the report not to exceed 8000 words. • The Field Report should contain up to 12 pages for diagrams and maximum of 8 pages for photographs. • Maps and diagrams may be prepared with the aid of software but must be original and related to the fieldwork. • Use only geo-tagged field photographs (taken by the student during fieldwork) in the report. • All photographs, maps, and diagrams should be clearly captioned and referred to in the main text. • No part of the report should contain any photocopied or printed/typed material (Except software generated Maps and diagrams related to the fieldwork) Viva-voce on Field Report (20 Marks) • Duration of viva-voce: not to exceed 10 minutes. <u>Structure for Field Report Preparation</u> 1. Cover Page Include the following details clearly: • Title of the Field Report • Name of the Student • Roll Number and Registration Number • Paper Name and Code • Semester • Name of the College and University • Name of the Supervising Teacher • Date of Submission 2. Certificate of Participation • Attach a certificate issued by the assigned faculty supervisor, confirming your active participation in the fieldwork.
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	• This certificate must be signed, dated, and printed on institutional letterhead 3. Acknowledgement • A short note of thanks to your supervisors, field assistants, local respondents, or institutions who supported your fieldwork efforts. 4. Table of Contents • List all major sections and chapters, along with accurate page numbers (e.g., Introduction, Literature review, Methodology, Chapter titles, References, etc.). 5. Chapter Scheme Chapter 1: Introduction • Brief background of the topic • Relevance and importance of the study in the geographical context • Objectives of the Study: Clearly state 2–4 specific objectives or research questions the report aims to address. • Location and scope of the field investigation • A concise outline of the report structure Chapter 2: Review of Literature • A thematic review of relevant previous studies or published work • Identification of research gaps or limitations in existing knowledge • Justification for conducting the current study in light of those gaps Chapter 3: Study Area • Detailed description of the study area: ○ Administrative identity (e.g., CD Block / P.S. / Mouza / G.P. / Municipality / Subdivision) / Drainage Basin ○ Geographical coordinates (latitude and longitude) ○ Physical features: topography, drainage, soil, climate, vegetation etc. ○ Socio-economic features: population, settlement pattern, land use, livelihood, etc. • Include a location map (hand-drawn or software-generated and geo-referenced) Chapter 4: Methodology • Types of data: Primary and Secondary • Methods of data collection: surveys, interviews, observations, photography, mapping, measurements etc. • Sampling design and sample size • Tools and instruments used: questionnaire, GPS, camera, mobile apps, surveying instruments, topographic maps, satellite images etc. • Data processing and analysis methods (quantitative, qualitative, etc.) • Ethical considerations: e.g., informed consent from respondents, confidentiality, respectful conduct Chapters 5, 6, ...: Thematic Chapters Based on Objectives Each of these chapters should: • Correspond directly to one or more specific objectives • Be independently titled based on content (e.g., “<i>Hydrogeomorphic Characteristics of the Ganga Basin</i>”, <i>Spatio-Temporal Analysis of Drought Patterns in Purulia District</i>”, <i>Livelihood Vulnerabilities in Slum Areas in Kolkata etc.</i>) Include: • Data presentation: tables, graphs, charts, maps, photographs, etc. • Analytical interpretation of data and findings • Spatial or temporal comparison, where relevant
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	• Integration of mini case studies or local narratives to support findings • Discussion of patterns, causes, and implications linked to theoretical or empirical literature Final Chapter: Summary, Conclusions and Recommendations • Comprehensive summary of the key findings from each thematic chapter • Synthesis of findings in relation to the objectives • Conclusions derived from the analysis • Practical recommendations for policy, planning, or development • Identification of research limitations • Suggestions for future research directions 7: References • Books, journal articles, government reports, and web sources • Use consistent citation style (APA) 8: Appendices • Filled-in questionnaire/schedule (signed by teacher) • Extra data tables, charts, maps etc.
Suggestive Readings	1. Bernard, H. R. (2017). <i>Research Methods in Anthropology: Qualitative and Quantitative Approaches</i> (6th ed.). Rowman & Littlefield. 2. Clifford, N., Cope, M., French, S., & Valentine, G. (Eds.). (2023). <i>Key Methods in Geography</i> (4th ed.). Sage Publications. 3. Creswell, J. W., & Creswell, J. D. (2018). <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i> (5th ed.). Sage Publications. 4. Dawson, C. (2009). <i>Introduction to Research Methods: A Practical Guide for Anyone Undertaking a Research Project</i> (4th ed.). How To Books. 5. Flowerdew, R., & Martin, D. (2021). <i>Methods in Human Geography: A Guide for Students Doing a Research Project</i> (3rd ed.). Routledge. 6. Goddard, W., & Melville, S. (2019). <i>Research Methodology: An Introduction</i> (3rd ed.). Juta Academic. 7. Gomez, B., & Jones, J.P. (2020). <i>Research Methods in Geography: A Critical Introduction</i> (3rd ed.). Wiley-Blackwell. 8. Hay, I. (2021). <i>Qualitative Research Methods in Human Geography</i> (5th ed.). Oxford University Press. 9. Kitchin, R., & Tate, N.J. (2013). <i>Conducting Research in Human Geography: Theory, Methodology and Practice</i>. Routledge. 10. Kothari, C. R., & Garg, G. (2019). <i>Research Methodology: Methods and Techniques</i> (4th ed.). New Age International Publishers. 11. Kumar, R. (2023). <i>Research Methodology: A Step-by-Step Guide for Beginners</i> (6th ed.). Sage Publications. 12. Montello, D.R., & Sutton, P.C. (2020). <i>An Introduction to Scientific Research Methods in Geography and Environmental Studies</i> (3rd ed.). SAGE Publications. 13. Scheyvens, R., & Storey, D. (Eds.). (2014). <i>Development Fieldwork: A Practical Guide</i> (2nd ed.). Sage Publications. 14. Wheeler, J. O., & White, G. K. (2009). <i>Fieldwork in Geography</i> (Reprint ed.). Cengage Learning.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 50 Marks 30 Marks for Field Report Preparation 20 Marks for Viva-Voce Internal Assessment: 25 Marks Mode: Field Report Preparation and Presentation 10 marks, viva voce 5 marks; Field Attendance 5 marks and Class Performance (in due course of report preparation) 5 marks.

SEMESTER- VII (HONOURS/ HONOURS WITH RESEARCH)

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-VII (HONOURS/ HONOURS WITH RESEARCH)				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	■ GEOMJ-MC-16A: Hydrology & Oceanography (03)	■ GEOMJ-MC-16B: Hydrology & Oceanography (01)	04	75
	■ GEOMJ-MC-17A: Settlement Geography (03)	■ GEOMJ-MC-17B: Settlement Geography (01)	04	75
	■ GEOMJ-MC-18A: Geography of Health and Wellbeing (3)	■ GEOMJ-MC-18B: Geography of Health and Wellbeing (01)	04	75
	■ GEOMJ-MC-19 A: Research Methodology (04)	■ GEOMJ-MC-19B: Research Methodology (01)	04	75
Minor Core (MnC)	■ GEOMN-MN-07A: Hydrology and Oceanography (03)	■ GEOMN-MN-07B: Hydrology and Oceanography (01)	04	75
Total			20	375

GEOMJ-MC-16: Hydrology & Oceanography

Title of the Course:	HYDROLOGY & OCEANOGRAPHY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-16A
Semester = VII (THEORY)	
Credits = 03	
Objectives of the Course	i) To introduce students to the basic principles and components of the hydrological cycle, including surface and subsurface processes ii) To develop an understanding of river basin hydrology, flood estimation, and watershed management approaches iii) To explore the structural and physical characteristics of ocean basins and ocean water properties iv) To analyze sedimentation processes and the development of coral reef systems in marine environments v) To build capacity in applying hydrological and oceanographic knowledge to address environmental and water resource challenges
Learning Outcomes of the Course	Upon successful completion of this course, students will be able to: i) Explain the fundamental components of the hydrological cycle and distinguish between surface and subsurface hydrological processes ii) Analyze river basin dynamics, channel morphology, and methods of flood estimation and watershed planning iii) Describe the morphology of ocean basins and interpret the distribution and behavior of oceanic water properties

	iv) Identify and classify marine sediments and coral reef systems, including the causes and implications of coral bleaching v) Apply hydrological and oceanographic concepts to interpret water-related environmental issues and management strategies
Course Content	
Module: -1: Fundamentals of Hydrology: Surface and Subsurface Processes	i) Hydrology: Definition, Hydrological Cycle, Characteristics, Significance, Global Hydrological Cycles and World Water Resources ii) Hydro-Atmospheric Processes: Definitions, Characteristics and Determining Factors of Precipitation, Evaporation, and Evapotranspiration iii) Surface Hydrology: Surface Runoff, Rainfall–Runoff Relationship iv) Subsurface Hydrology: Aquifer Characteristics, Infiltration, and Rainfall–Recharge Relationship
Module: -2: River Basin Hydrology and Watershed Management	i) River Regime and Flood Hydrology: Seasonal flow patterns, flood estimation techniques (Rational Method, empirical formula, Flood frequency analysis), hydrograph analysis, and their applications ii) Human Impacts on Channel Hydro-morphology: Influence of dams, embankments, irrigation canals, and artificial channel diversions on river form and flow iii) Micro Watershed Planning and Integrated River Basin Management: Definition, delineation, conservation strategies, and principles of holistic river basin management.
Module: -3: Ocean Basin Morphology and Physical Oceanography	i) Ocean Structure and Morphological Features: Origin, Characteristics, and Classification of Major Structural and Morphological Features of the Ocean Basins ii) Bottom Topography: Configuration of the Indian, Atlantic, and Pacific Ocean Basins iii) Physical Properties of Ocean Water: Distribution of Temperature, Salinity, and Density; Factors Influencing Vertical and Horizontal Variability iv) Ocean Circulation: Surface Ocean Currents, Gyres, Thermohaline (Deep Ocean) Circulation, and their Climatic Significance.
Module: -4: Ocean Sediments & Coral Reef systems	i) Oceanic Sediments: Origin and Classification, Marine Resources. ii) Coral Reefs and Atolls: Evolutionary Theories (After Darwin and W. M. Davis), Environmental Factors Affecting Reef Growth, Classification and Types of Coral Reefs, Coral Bleaching.
Suggestive Readings	1. Chow, V. T., Maidment, D. R., & Mays, L. W. (1988). Applied Hydrology. McGraw-Hill Education. 2. Dingman, S. L. (2015). Physical Hydrology (3rd ed.). Waveland Press. 3. Duxbury, A. C., Duxbury, A. B., & Sverdrup, K. A. (2002). An Introduction to the World's Oceans (7th ed.). McGraw-Hill Education. 4. Garrison, T. (2016). Oceanography: An Invitation to Marine Science (9th ed.). Cengage Learning. 5. Heathcote, I. W. (2009). Integrated Watershed Management: Principles and Practice (2nd ed.). Wiley. 6. King, C. A. M. (1972). Beaches and Coasts. Edward Arnold. 7. Raghunath, H. M. (2006). Hydrology: Principles, Analysis and Design (2nd ed.). New Age International. 8. Ramaswamy, C. (2011). Water Resources and Hydrology. Narosa Publishing House.

	9. Reddy, J. (2008). A Textbook of Hydrology. University Science Press. 10. Singh, S. (2008). Oceanography (4th ed.). Prayag Pustak Bhawan. 11. Singh, V. P. (1992). Elementary Hydrology. Prentice Hall of India. 12. Subramanya, K. (2017). Engineering Hydrology (5th ed.). McGraw-Hill Education. 13. Suresh, R. (2008). Hydrology, Water Resources and Watershed Management. Standard Publishers Distributors. 14. Tideman, E. M. (1996). Watershed Management: Guidelines for Indian Conditions (2nd ed.). Omega Scientific Publishers. 15. Ward, R. C., & Robinson, M. (2000). Principles of Hydrology (4th ed.). McGraw-Hill.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	HYDROLOGY & OCEANOGRAPHY (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-16B
Semester- VII (PRACTICAL)	
Credit = 01	
Objectives of the Course	i) To provide hands-on training in hydrological and oceanographic data interpretation ii) To develop practical skills in preparing water budget and runoff analysis from real or simulated data iii) To train students in discharge computation methods and streamflow analysis techniques iv) To enable interpretation of ocean temperature and salinity profiles through mapping and diagrammatic representation
Learning Outcomes of the Course	Upon successful completion of the course, students will be able to: i) Construct water budget graphs to evaluate groundwater recharge, surface runoff, surplus, and deficit conditions. ii) Estimate evapotranspiration using the Blaney-Criddle method. iii) Apply empirical and analytical methods (e.g., Rational Method, Darcy's Law) for runoff and base flow estimation. iv) Develop rainfall hyetographs and annual hydrographs to analyze temporal rainfall and runoff variations. v) Compute river discharge using both velocity–area and slope–area methods from field data.
Course Content	
Module: -1: Hydrological Estimation Techniques	i) Preparation of Water Budget Graph ii) Estimation of Evapotranspiration (Blaney-Criddle) iii) Runoff Estimation: Surface Runoff -Empirical Methods (Rational Method); Subsurface: Darcy's Law, Base Flow Estimation (Graphical Method) iv) Rainfall & Runoff Analysis: Construction of Rainfall Hyetograph and Annual Hydrograph

Module2: Streamflow Measurement	i) Computation of Discharge from Field Data: Velocity–Area Method: Slope–Area Method ii) Construction of Rating Curve iii) Estimation of Flood Peak (Dickens, and Inglis)
Module 3: Oceanographic Data Representation and Analysis	i) Isotherm and Isohaline Mapping ii) Preparation of Temperature–Salinity (T-S) Diagram
Suggestive Readings	1. Chow, V. T., Maidment, D. R., & Mays, L. W. (1988). Applied Hydrology. McGraw-Hill Education. 2. Dingman, S. L. (2015). Physical Hydrology (3rd ed.). Waveland Press. 3. Duxbury, A. C., Duxbury, A. B., & Sverdrup, K. A. (2002). <i>An Introduction to the World's Oceans</i> (7th ed.). McGraw-Hill Education. 4. Garrison, T. (2016). Oceanography: An Invitation to Marine Science (9th ed.). Cengage Learning. 5. Raghunath, H. M. (2006). Hydrology: Principles, Analysis and Design (2nd ed.). New Age International. 6. Reddy, J. (2008). A Textbook of Hydrology. University Science Press. 7. Sharma, R. C., & Vatal, S. (2018). Oceanography for Geographers. Rawat Publications. 8. Singh, V. P. (1992). <i>Elementary Hydrology</i> . Prentice Hall of India. 9. Subramanya, K. (2017). Engineering Hydrology (5th ed.). McGraw-Hill Education. 10. Suresh, R. (2008). Hydrology, Water Resources and Watershed Management. Standard Publishers Distributors. 11. Thurman, H. V., & Trujillo, A. P. (2013). Essentials of Oceanography (11th ed.). Pearson Education.
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-17: SETTLEMENT GEOGRAPHY

Title of the Course:	SETTLEMENT GEOGRAPHY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-17A
Semester = VII (THEORY)	
Credit = 03	
Objectives of the Course	i) To provide fundamental knowledge about the different aspects of settlement geography. ii) To enable students to understand basic concepts related to rural and urban settlement. iii) To provide idea about the morphology of rural and urban settlement. iv) To gain knowledge about the hierarchical structure of urban settlement. v) To enhance the understanding of students about different urban issues in India. vi) To provide idea about some urban development programmes launched in India.
Learning Outcomes of the Course	i) Learners will develop an understanding of the basic concepts of Settlement Geography. ii) Learners will understand the difference between rural and urban settlement. iii) Learners will gain knowledge about rural house types and how does it change with changes in geographical environment. iv) Learners will be able to explain different theories related to urban structure.

	v) Learners will be aware of different urban issues as well as the initiatives taken by the government to resolve those issues.
Course Content	
Module-1: Fundamentals of Settlement Geography	i) Definition, scope and contents of Settlement Geography. ii) Site, situation and ecological determinants of settlements. iii) Morphogenesis of house types.
Module-2: Rural Settlements: Concepts, Patterns, and Evolution	i) Concept of Rural Settlement and Ekistics. ii) Rural House Types: Forms and Functional Basis of Classification in India Bases of Classification, Pattern, Hierarchy, Rural-Urban Continuum, Segregation with Special Reference to India iii) Theories of Evolution: Bylund, Hudson and Green.
Module-3: Urban Settlements: Urbanization, Hierarchy, and Morphological Models	i) Urbanization: Definition of Urban Settlements; Urbanism and Urbanization in the World and India. ii) Urban Hierarchy: Functional and Technological (Taylor and Huston, Mumford); Theory of Christaller and Losch. iii) Morphology: Types, Structure and Theories (Concentric Zone theory, Sector theory, Multiple Nuclei Theory, Bid Rent Theory (Alonso))
Module-4: Urban Issues, Planning & Development Programmes	i) Urban issues: Solid waste (Kolkata), Air Quality (Delhi), Water Crisis (Chennai), Housing & Slums (Mumbai), urban crime and geriatric population in Metropolitan cities of India. ii) Urban renewal programmes: JNNURM, AMRUT and Smart Cities Mission. iii) Urban Regeneration Processes with Special Reference to India. iv) Urban Development through Master Plans: Case Study of Chandigarh and Delhi.
Suggestive Readings	1. Daniel, P., Geography of Settlement. Rawat Publications., Jaipur and New Delhi, 2002 2. Singh, R.Y., Geography of settlements. Rawat Publications., Jaipur and New Delhi, 2003 3. Ghosh, S. (2009): Settlement Geography, Orient Longman Ltd., Kolkata 4. Mandal R.B. (2000): Urban Geography, Concept Publishing Co., New Delhi. 5. Ramachandran R (1989): Urbanization and Urban Systems of India, Oxford University Press, New Delhi 6. Ramachandran, R., 1992: The Study of Urbanization, Oxford University Press, Delhi 7. Dubey, K.K. and Singh, A.K. (1983): Urban Environment in India. Deep and Deep, New Delhi 8. Misra, R. P. and Achyutha, R. N. (1998): Micro-Level Rural Planning: Principles, Methods and Case Studies. Concept Publishing. Company, New Delhi 9. Sidhartha K. and Mukherjee. S. (2000): Cities-Urbanizations & Urban Systems. Kisalaya pub. Pvt.Ltd., New Delhi. 10. David Peter & Hopkinson M.(1983): The Geography of Settlements, Oliver & Boyot, Edin burph. 11. Haggett, P. (1991): Geography- A Modern Synthesis, Harper & Row, New York. 12. Johnston J.H. (1974): Urban Geography, Pergoman Press, Oxford. 13. Johnston R.J. (1984): City & Society. Unwin hyman, London.

	14. Mayer H.M. & Cohen (1967): Readings in Urban Geography, Central Book Depot. Allahabad. 15. Robinson, Brian T. (1973): Urban growth, Mathuen & Company, London. 16. Yeates & Garner (1971): Readings in Urban Geography. The North American City. Harper & Row. New York
Method of Assessment, Measurement, & Evaluation:	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	SETTLEMENT GEOGRAPHY (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-17B
Semester = VII (PRACTICAL)	
Credit = 03	
Objectives of the Course	i) To enhance the ability of the learners to rank and classify towns and cities. ii) To develop the skill of the learners to measure size, spacing and density of settlement. iii) To build practical skills in spatial mapping and analysis of urban sprawl, and urban environmental conditions using cartographic and geospatial techniques.
Learning Outcomes of the Course	i) Learners will be able to classify settlements based on different aspects. ii) Learners will be able to measure the size, spacing and density of settlement. iii) Learners will be able to interpret settlement typology from Survey of India toposheets with reference to rural settlement forms. iv) Learners will be able to apply geospatial techniques for mapping land use–land cover change, urban sprawl, and urban environmental indicators such as air and noise pollution.
Course Content	
Module-1: Classification of Settlement	i) Rank-Size Rule by G. K. Zipf (Log Scale) and B.J.L. Berry. ii) Nelson’s method of town classification. iii) Functional classification of Towns using Ternary diagram (Ashok Mitra).
Module-2: Measurement of growth, spacing	i) Measurement of spacing of settlements: Nearest Neighbour Index, Spacing index (Mather’s model, 1944). ii) Growth of Urban Population and Index of Urbanization. iii) Typological classification of rural settlement from SOI Topo-sheets.
Module-3: Mapping of Urban Sprawl and urban environment	i) Urban Sprawl mapping: Onscreen digitization and NDBI. ii) Air quality (PM-2.5 and PM-10) mapping using IDW interpolation, Noise Pollution Assessment: Mapping of Noise Hotspots using IDW interpolation and Buffer Analysis.

Suggestive Readings:	1. Basu, R., & Bhaduri, S. (2013). <i>Contemporary issues and techniques in geography</i>. Progressive Publishers. 2. Berry, B. J. L. (1961). City size distributions and economic development. <i>Economic Development and Cultural Change</i>, 9(4), 573–588. 3. Census of India. (2011). <i>Primary census abstract</i>. Office of the Registrar General & Census Commissioner, India. 4. Central Pollution Control Board. (2022). <i>National ambient air quality standards and monitoring guidelines</i>. Government of India. 5. Clark, P. J., & Evans, F. C. (1954). Distance to nearest neighbor as a measure of spatial relationships in populations. <i>Ecology</i>, 35(4), 445–453. 6. Cole, J. P., & King, C. A. M. (1969). <i>Quantitative geography: Techniques and theories in geography</i>. John Wiley & Sons. 7. Gibbs, J. (1961). <i>Urban research methods</i>. East-West Press. 8. Mahmood, A. (2016). <i>Statistical methods in geographical studies</i>. Rajesh Publications. 9. Mandal, R. B. (2014). <i>Statistics for geographers and social scientists</i>. Concept Publishing Company. 10. Nelson, H. J. (1955). A service classification of American cities. <i>Economic Geography</i>, 31(3), 189–210. 11. Singh, R. Y. (2002). <i>Geography of settlements</i>. Rawat Publications. 12. Zipf, G. K. (1949). <i>Human behavior and the principle of least effort</i>. Addison-Wesley Press.
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-18: Geography of Health and Well-Being

Title of the Course:	GEOGRAPHY OF HEALTH AND WELL-BEING (THEORY)
Discipline Specific Minor Paper Code:	GEOMJ-MC-18A
Semester = VII (THEORY)	
Credit = 03	
Objectives of the Course	i) To understand the spatial dimensions of health and disease. ii) To explore the interactions between environment, society, and health. iii) To assess health care delivery systems and inequalities. iv) To develop analytical skills for mapping and analyzing health data.
Learning Outcomes of the Course	i) Students would be acquainted with the basic concepts of population health from geographical perspectives. ii) Students would get clear understanding about the process of population health transition and its major drivers. iii) Students should recognize the mechanism of how social and economic environment shapes population health.

Course Content

Module: -1: Introduction to Health Geography	i) Concept, nature and scope of geography of health and wellbeing; Concept of health, well-being, disease, illness (morbidity), mortality, public health, hygiene, and epidemiology. ii) Factors affecting human health and diseases: Physical, social, economic and environmental; Data sources of health statistics (NFHS, LASI, WHO, World Bank, MoHFW). iii) Health and Nutrition: Meaning, nutritional status (Stunting, wasting, Underweight and obesity); Malnutrition: Concept, causes and consequences.
Module: -2: Health risks and diseases	i) Classification of disease; Characteristics of major communicable, non-communicable and lifestyle diseases; Regional pattern of health and disease in India with special reference to Malaria, Tuberculosis, Diabetes, COPD, Cancer. ii) Exposure and health risks: Air, water and plastic pollution, Household and municipal waste. iii) Environment and health; Climate change and associate health risk: Concept of heat stress, heat stroke.
Module: -3: Health and well-Being	i) Well-Being: Definition, scope, nature; factors influencing human well-being. ii) Approaches and indicators of well-being (Physical, mental, Social, and Economic). iii) WHO programmes on health and well-being.
Module: -4: Health care system and policies in India	i) Health infrastructure, Health care systems (Public and Private) and disparity in healthcare provision in India, ii) Indigenous health systems, Role of AYUSH in healthcare system. iii) National health schemes and policies in India since independence and SDG-3 (Good Health and Wellbeing).
Suggestive Readings	1. Askari, H. M., & Gupta, K. (2016). Conceptualizing medical geography. <i>Transactions of the Institute of Indian Geographers</i>, 38(1), 127–135. 2. Bircher, J. (2005). Towards a dynamic definition of health and disease. <i>Medicine, Health Care and Philosophy</i>, 8(3), 335–341. https://doi.org/10.1007/s11019-005-0538-y 3. Brown, T., McLafferty, S., & Moon, G. (Eds.). (2010). <i>A companion to health and medical geography</i>. Wiley-Blackwell. 4. Clemow, F. A. (2011). <i>The geography of disease</i>. Cambridge University Press. 5. Cliff, A. D., & Haggett, P. (1988). <i>Atlas of disease distributions: Analytic approaches to epidemiological data</i>. Blackwell Publishers. 6. De Angulo, J. M., & Losada, L. S. (2015). Health paradigm shifts in the 20th century. <i>Christian Journal for Global Health</i>, 2(1), 49–58. https://doi.org/10.15566/cjgh.v2i1.48 7. Gatrell, A. C. (2002). <i>Geographies of health: An introduction</i>. Blackwell Publishers. 8. Gatrell, A. C., & Lloytonen, M. (Eds.). (1998). <i>GIS and health</i>. Taylor & Francis. 9. Grover, A., & Singh, R. B. (2020). <i>Urban health and wellbeing: Indian case studies</i>. Springer.

	10. Hancock, T. (1985). The mandala of health: A model of the human ecosystem. <i>Family & Community Health</i>, 8(3), 1–10. 11. Hazen, H., & Anthamatten, P. (2020). <i>An introduction to the geography of health</i> (2nd ed.). Routledge. 12. Jayasinghe, S., Parnell, S., & Zhang, Y. (2017). <i>Advancing health and wellbeing in the changing urban environment: Implementing a systems approach</i>. Springer. 13. Kearns, R., & Moon, G. (2002). From medical to health geography: Novelty, place and theory after a decade of change. <i>Progress in Human Geography</i>, 26(5), 605–625. https://doi.org/10.1191/0309132502ph389oa 14. McCartney, G., Popham, F., McMaster, R., & Cumbers, A. (2019). Defining health and health inequalities. <i>Public Health</i>, 172, 22–30. https://doi.org/10.1016/j.puhe.2019.03.023 15. Meade, M. S., & Emch, M. (2010). <i>Medical geography</i> (3rd ed.). Guilford Press. 16. Mishra, R. P. (2007). <i>Geography of health: A treatise on geography of life and death in India</i>. Concept Publishing Company. 17. Murray, C. J. L., & Lopez, A. D. (1996). <i>The global burden of disease</i>. Harvard University Press. 18. NITI Aayog. (2021). <i>Best practices compendium: Urban transformation sector</i>. Development Monitoring and Evaluation Office (DMEO), Government of India. 19. Phillips, D. R., & Verhasselt, Y. (Eds.). (1994). <i>Health and development</i>. Routledge. 20. Rajput, S. (2024). <i>Geography of health</i>. Concept Publishing Company. 21. Rao, M., Rao, K. D., Kumar, A. K. S., Chatterjee, M., & Sundararaman, T. (2015). Draft National Health Policy 2015: A review. <i>Economic and Political Weekly</i>, 50(17), 94–101. 22. Rosenberg, M. W. (2014). Health geography II: ‘Dividing’ health geography. <i>Progress in Human Geography</i>, 38(3), 466–475. https://doi.org/10.1177/0309132513494451 23. Sen, A. (2002). Why health equity? <i>Health Economics</i>, 11(8), 659–666. https://doi.org/10.1002/hec.762 24. Singh, R. B. (Ed.). (2015). <i>Urban development challenges, risks and resilience in Asian mega cities</i>. Springer. 25. Tromp, S. W. (1980). <i>Biometeorology: The impact of weather and climate on humans and their environment</i>. Heyden & Son. 26. Walker, P., & John, M. (2011). Wellbeing. In <i>From public health to wellbeing: The new driver for policy and action</i> (pp. 57–78). Bloomsbury Publishing.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	GEOGRAPHY OF HEALTH AND WELL-BEING (PRACTICAL)
Discipline Specific Minor Paper Code:	GEOMJ-MC-18B
Semester = VII (PRACTICAL)	
Credit = 01	
Objectives of the Course	i) To understand the basic concepts and importance of morbidity and mortality measures in public health analysis. ii) To explain different measures of morbidity such as incidence and prevalence rates and their applications. iii) To develop an understanding of nutritional status measurement using BMI, WHO standards, and anthropometric indicators. iv) To introduce composite indices like PQLI and Z-score for assessing quality of life and health infrastructure. v) To build skills in mapping health, diseases, and health facilities using secondary health data sources such as NFHS, Census, SRS, and HMIS.
Learning Outcomes of the Course	i) Learners will be able to define and calculate key measures of morbidity and mortality accurately. ii) Learners will be able to interpret incidence, prevalence, and mortality rates for health assessment and comparison. iii) Learners will be able to assess nutritional status using BMI, stunting, wasting, obesity, and anthropometric measurements. iv) Learners will be able to explain and apply PQLI in evaluating overall physical quality of life. v) Learners will be able to use health-related datasets to analyze spatial patterns of diseases and health facilities. vi) Learners will be able to prepare basic health and infrastructure maps using composite indices and simple statistical techniques.
Course Content	
Module: -1: Measures of Morbidity and Mortality	i) Measures of Morbidity: Incidence rate and prevalence rate. ii) Measures of Mortality: Case Fatality Rate, Cause specific mortality Rate
Module: -2: Measurement of Nutritional status	i) Body Mass Index (BMI), Measurement of Stunting, Wasting and Obesity (WHO Standard), Anthropometric measurement. ii) Physical Quality of Life Index (PQLI).
Module: -3: Mapping of Health and diseases	i) Thematic Mapping of disease incidence and health facilities using health statistics: NFHS, Census, SRS, HMIS. ii) Mapping of Health infrastructure and facilities using Composite Index (Z-Score).
Suggestive Readings	1. Basu, P. (2021): Advanced Practical Geography — a Laboratory Manual, 4 ed, Books and Allied. 2. Mahmood, A. (1999): Statistical Methods in Geographical Studies, Rajesh Publications. 3. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan. 4. Singh, R.L., Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers. 5. Park, K. (2023). Park's Textbook of Preventive and Social Medicine. Banarsidas Bhanot, Jabalpur.

	6. Gordis, L. (2019). Epidemiology. Elsevier, Philadelphia. 7. Bonita, R., Beaglehole, R., & Kjellström, T. (2017). Basic Epidemiology. World Health Organization, Geneva. 8. WHO (2006). WHO Child Growth Standards: Length/Height-for-Age, Weight-for-Age, Weight-for-Height and BMI-for-Age. World Health Organization. 9. Deaton, A. (2013). The Great Escape: Health, Wealth, and the Origins of Inequality. Princeton University Press. 10. Census of India (Latest Edition). Primary Census Abstract and Health Tables. Office of the Registrar General of India. 11. International Institute for Population Sciences (IIPS). National Family Health Survey (NFHS) Reports. 12. Registrar General of India. Sample Registration System (SRS) Statistical Reports. 13. Ministry of Health and Family Welfare, Government of India. Health Management Information System (HMIS) Portal Reports. 14. Cromley, E. K., & McLafferty, S. L. (2012). GIS and Public Health. Guilford Press, New York.
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-19: Research Methodology

Title of the Course:	RESEARCH METHODOLOGY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-19A
Semester = VII (THEORY)	
Credit = 03	
Objectives of the Course	i) The course addresses the basic issues related to fundamentals of research and should guide in every step of research process including problem identification, hypothesis building, data collection and analysis and finally developing a conclusion. ii) The course will also help in understanding the philosophy of research integrity and publication ethics.
Learning Outcomes of the Course	i) Will develop the skill of contextualization of knowledge and critical thinking and will have the ability to choose methods appropriate to research aims and objectives. The course will also enable students to apply ethical principles in research work. ii) Will develop skills in qualitative and quantitative data analysis and presentation and will be well equipped about ethical issues in research.

Course Content

Module-1: Fundamentals of Research Methodology	i) Understanding Research: Meaning, nature, scope and objectives. ii) Research Types: descriptive-analytical, pure-applied, conceptual-empirical, qualitative-quantitative. iii) Types of research methods: Comparative, Historical, Experimental, Survey, Case study, Ethnographic.
Module-2: Research Planning, Proposal Development, and Design	i) Literature Review: Sources of literature, purpose, methods, and organization of literature surveys. ii) Identification of research gap; Selection of research objectives. iii) Research Question and Design: Designing research questions (specific, measurable, relevant); Characteristics of good research design; Types of research design: Exploratory, Descriptive, Experimental, Correlational, Longitudinal, Cross-sectional. iv) Formulating a Research Proposal: Meaning, importance, and elements of a research proposal; Defining research problem; Developing hypotheses.
Module-3: Data Collection Methods and research approaches	i) Data: Concept, types and sources. ii) Techniques and Methods of data collection: Sampling- concept and types; Questionnaire and Schedule, Focus Group Discussion (FGD), Participant Observation and case study. iii) Research approaches: Qualitative, quantitative and mixed method.
Module-4: Research Writing, AI, and Publication Ethics	i) Principles of research writing: Intellectual honesty and research integrity; Steps for writing research papers; ii) Artificial Intelligence in Research and Academic Writing: Concept, scope, application and limitations iii) Citation and referencing: Concept, needs, referencing style (MLA, APA, Chicago, Harvard), foot note, text note, end note, bibliography, annotated bibliography. iv) Research and Publication Ethics: Concept and issues; Publication Misconduct: Types, Reasons and Consequences. Plagiarism: Concept, types and importance of detection.
Suggestive Readings	1. Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2016): Key methods in Geography. Sage. 2. Gomez, B., & Jones III, J. P. (Eds.). (2010): Research methods in geography: A critical introduction (Vol. 6). John Wiley & Sons. 3. Hegde, D. S. (Ed.). (2015): Essays on research methodology. Springer. 4. Kleiner, S. (1993): The logic of discovery: A theory of the rationality of scientific research. Springer Science & Business Media. 5. Kumar, R. (2019): Research methodology: A step-by-step guide for beginners. Sage Publications Limited. 6. Locharoenrat, K. (2017): Research Methodologies for Beginners. Pan Stanford. 7. Mellenbergh, G. J., & Adèr, H. J. (Eds.). (1999): Research Methodology in the Life, Behavioural and Social Sciences. Sage. 8. Pruzan, P. (2016): Research Methodology: The aims, practices and ethics of science. Springer. 9. Singh, Y. K. (2006): Fundamental of Research Methodology and Statistics. New Age International. 10. Baker LT (1988) Doing social research. McGraw Hill, New York.

	11. Barnett V, Lewis T (1978) Outliers in statistics. Wiley, New York. 12. Das, N.G. (2002a) Statistical methods, vol 1 &2. M Das and Co, Salt Lake.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Each examinee shall prepare a short research-based write-up on an approved concept / theme / idea related to the syllabus. The assignment shall include: Statement of the problem / concept, Major objectives, Methodology, Study area, Observations and analysis, Conclusion) and Presentation (Each Examinee shall present his / her Project before an audience comprising Internal / External Examiners and others on the day of Examination)- Project/Presentation 10 marks, Viva Voce 5 marks, Class Attendance 5 marks, Class Performance 5 marks

Title of the Course:	RESEARCH METHODOLOGY (PRACTICAL)		
Discipline Specific Major Paper Code:	GEOMJ-MC-19B		
Semester = VII (PRACTICAL)			
			Credit = 01
Objectives of the Course	i) To introduce the student to the basics of geographical research methods Prerequisite ii) To enable the student to appreciate the difference between various research approaches and methodologies, methods of data collection and analysis. iii) To expose the student to different aspects of fieldwork from recruitment of participants, formulation of questionnaire and Interview Guides, iv) To provide in depth knowledge of the different research techniques		
Learning Outcomes of the Course	i) Students will acquire an understanding of different research statistical methods and techniques in Geography. ii) Students will be able to formulate a research hypothesis and carry out their hypothesis testing iii) Students will be familiarized with application of MS-Excel in their Research work and will be able to structure a report/ dissertation		
Course Content			
Module-1: Multivariate Statistical Techniques and Matrix Applications	i) Matrix operations: addition, multiplication, transposition, inverse ii) Determinants and Cramer’s Rule. iii) Estimation and interpretation of Multiple and Partial Correlation Coefficients. iv) Multiple Linear Regression.		

Module-2: Formulation and Testing of Hypothesis	i) Parametric Test: F-test, Analysis of variance (One Way and Two way). ii) Non-Parametric Test: Kolmogorov–Smirnov Test.
Module-3: Data handling and presentation using MS-Excel	i) Descriptive Statistics, Correlation matrix, Regression, ANOVA (One Way and Two Way), Time Series Analysis (Moving Average Method). ii) Scatter Diagram, Box Plot, Histogram, Radar Diagram.
Suggestive Readings	1. Gupta, S. C., & Kapoor, V. K. (2019). Fundamentals of Mathematical Statistics. Sultan Chand & Sons. 2. Spiegel, M. R., Schiller, J. J., & Srinivasan, R. A. (2013). Probability and Statistics. Schaum's Outline Series, McGraw-Hill. 3. Anderson, T. W. (2003). An Introduction to Multivariate Statistical Analysis. Wiley. 4. Johnson, R. A., & Wichern, D. W. (2018). Applied Multivariate Statistical Analysis. Pearson Education. 5. Montgomery, D. C., & Runger, G. C. (2014). Applied Statistics and Probability for Engineers. Wiley. 6. Kothari, C. R. (2004). Research Methodology: Methods and Techniques. New Age International. 7. Siegel, S., & Castellan, N. J. (1988). Nonparametric Statistics for the Behavioral Sciences. McGraw-Hill. 8. Box, G. E. P., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2015). Time Series Analysis: Forecasting and Control. Wiley. 9. Newbold, P., Carlson, W. L., & Thorne, B. M. (2013). Statistics for Business and Economics. Pearson Education. 10. Walkenbach, J. (2015). Excel 2016 Bible. Wiley.
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

SEMESTER- VIII (HONOURS WITH RESEARCH)

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-VIII (HONOURS WITH RESEARCH)				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-20A: Environment, Hazard and Sustainability (03)	GEOMJ-MC-20B: Environment, Hazard and Sustainability (01)	04	75
	DRP-1 Dissertation / Research/Project		12	225
Minor Core (MnC)	GEOMN-MN-08A: Disaster Management (03)	GEOMN-MN-08B: Disaster Management (01)	04	75
Total			20	375

GEOMJ-MC-20: (Environment, Hazard and Sustainability)

Title of the Course:	(ENVIRONMENT, HAZARD AND SUSTAINABILITY) (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-20A
Semester = VIII (THEORY)	
Credits = 03	
Objectives of the Course	i) To understand environmental systems, their structure, functions, and resilience mechanisms. ii) To examine major theoretical perspectives such as Political Ecology, and Social Ecological Systems (SES). iii) To analyze ecosystem services and their relevance in sustainable natural resource management. iv) To evaluate climate change theories, evidences, mitigation policies, and climate-related hazards. v) To explore sustainable development approaches, urban resilience strategies, and community based environmental management practices.
Learning Outcomes of the Course	i) Learners will able to explain the concept, structure, and functioning of environmental systems, including feedback and resilience. ii) Students will apply key environmental theories to understand human nature interactions and resource conflicts. iii) Learners will able to assess ecosystem services and ecological factors governing biodiversity and habitat distribution. iv) Learners will analyze climate change drivers, paleoclimate evidence, mitigation frameworks, and climate extremes. v) Learners will evaluate urban environmental issues such as UHI, pollution episodes, and climate health linkages. vi) Learners will able to interpret sustainable development frameworks, urban sustainability models, and participatory governance practices.

Course Content

Module-1: Environmental Systems, Ecosystem Services	i) Environmental Systems: Concept, Structure, and Functions; Feedback mechanisms, thresholds, and resilience. ii) Key theoretical approaches: Political Ecology, Social–Ecological Systems (SES). iii) Ecosystem Services: Concepts and typologies (Provisioning, Regulating, Cultural, Supporting); relevance in natural resource management.
Module-2: Hazards, Disasters, and Risk Governance	i) Concept and classification of hazards and disasters; approaches to hazard study. ii) Risk perception and vulnerability assessment, hazard paradigms. iii) Responses to hazards: Preparedness, trauma and aftermath. Resilience and capacity building. iv) Disaster Governance: Disaster Management Cycle; Sendai Framework (2015-2030); Role of Local Governance & Community-Based Disaster Risk Reduction
Module-3: Climate Change and Climatic Extremes	i) Climate Change: Theories, Evidences, and key drivers; international treaties and protocols to mitigate climate change. ii) Climate Hazards and Extremes: Droughts, Floods, Heatwaves, Cyclones iii) Urban Microclimate and Urban Heat Island (UHI): Formation Processes and Impacts in Tropical Cities
Module-4: Sustainability and Resource Management	i) Sustainable development: From the Brundtland Report to Agenda 2030 and SDGs. ii) Sustainable resource management: Climate-resilient and regenerative agriculture; Blue economy; Watershed management and afforestation; Decentralized and participatory water governance. iii) Community-based environmental management practices.
Suggestive Readings:	1. Botkin, D. B., & Keller, E. A. (2014). <i>Environmental Science: Earth as a Living Planet</i>. Wiley. 2. Bradley, R. S. (2015). <i>Paleoclimatology: Reconstructing climates of the Quaternary</i> (3rd ed.). Academic Press. 3. Chapin, F. S., Matson, P. A., & Vitousek, P. M. (2011). <i>Principles of terrestrial ecosystem ecology</i> (2nd ed.). Springer. 4. Hussain, C. M., & Velasco-Muñoz, J. F. (Eds.). (2021). <i>Sustainable resource management: Modern approaches and contexts</i>. Elsevier. 5. IPCC. (2023). <i>Climate change 2023: Synthesis report</i>. Intergovernmental Panel on Climate Change. 6. Maslin, M. (2021). <i>Climate Change: A Very Short Introduction</i>. Oxford University Press. (Great for a concise overview of theories and evidence). 7. McMichael, A. J. (2017). <i>Climate change and the health of nations</i>. Oxford University Press. 8. Odum, E. P., & Barrett, G. W. (2005). <i>Fundamentals of ecology</i> (5th ed.). Brooks/Cole. 9. Oke, T. R., Mills, G., Christen, A., & Voogt, J. A. (2017). <i>Urban climates</i>. Cambridge University Press.

	10. Smith, K. (2013). <i>Environmental hazards: Assessing risk and reducing disaster</i> (6th ed.). Routledge. 11. UNFCCC. (2015). <i>The Paris Agreement</i>. United Nations Framework Convention on Climate Change. 12. UN-Habitat. (2020). <i>World cities report: The value of sustainable urbanization</i>. United Nations. 13. United Nations. (2015). <i>Transforming our world: The 2030 Agenda for Sustainable Development</i>. United Nations. 14. Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). <i>At risk: Natural hazards, people's vulnerability and disasters</i> (2nd ed.). Routledge.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	ENVIRONMENT, HAZARD AND SUSTAINABILITY (PRACTICAL)	
Discipline Specific Major Paper Code:	GEOMJ-MC-20B	
Semester- VIII (PRACTICAL)		
Credit = 01		
Objectives of the Course	i) To understand statistical methods for climatic trend detection and drought assessment using temperature and rainfall datasets. ii) To analyze meteorological drought conditions through the computation of Standardized Precipitation Index (SPI). iii) To examine urban thermal heterogeneity and microclimate variation using MODIS Land Surface Temperature (LST) and NDVI. iv) To compute human thermal comfort indices such as THI and PMV for evaluating heat stress and urban comfort levels. v) To develop Climate Vulnerability Indices (CVI) through indicator selection, normalization, and multi-criteria composite analysis. vi) To apply geospatial and environmental techniques for soil–water quality analysis, satellite-based LULC mapping, ecosystem service valuation, and spectral index generation.	
Learning Outcomes of the Course	i) Learners will able to detect long-term climatic trends using the Mann–Kendall statistical test. ii) Learners will able to estimate drought severity and variability using SPI derived from rainfall data. iii) Learners will able to assess urban microclimate patterns using MODIS LST and vegetation-based indices such as NDVI. iv) Learners will be able to compute and interpret human thermal comfort indices (THI and PMV) for urban climate assessment. v) Students will able to construct Climate Vulnerability Indices (CVI) using exposure, sensitivity, and adaptive capacity indicators.	

	vi) Learners will be able to perform satellite image preprocessing, LULC classification in QGIS, ecosystem service estimation using Costanza's coefficients.
Course Content	
Module-1: Climate Trends and Drought Monitoring	i) Trend Analysis of Temperature and Precipitation: Application of Mann-Kendall test for detecting climatic trends. ii) Estimation of meteorological drought through SPI using rainfall data.
Module-2: Urban Thermal Environment and Vulnerability Assessment	i) Analysis of urban thermal heterogeneity using MODIS LST data; Use of NDVI (vegetation health) and LST (surface temperature) to assess urban microclimate ii) Computation of Human Thermal Comfort Indices: THI (Temperature Humidity Index) and PMV (Predicted Mean Vote) estimation. iii) Computation of Climate Vulnerability Index (CVI): Selection and normalization of exposure, sensitivity, and adaptive capacity indicators; Construction of composite CVI using multi-criteria analysis.
Module-3: Environmental Quality and Ecosystem Services Evaluation	i) Measurement and interpretation of water quality (pH, TDS, BOD, COD) ii) Satellite image analysis (Landsat): Preprocessing, LULC classification (supervised and unsupervised) using QGIS. iii) Ecosystem service estimation: Costanza's co-efficient (2014)
Suggestive Readings	1. American Public Health Association (APHA). (2017). <i>Standard methods for the examination of water and wastewater</i> (23rd ed.). APHA 2. Bhattacharya, P., & Samal, N. R. (2018). <i>Soil and water analysis: A laboratory manual</i> . Allied Publishers. 3. Brady, N. C., & Weil, R. R. (2016). <i>The nature and properties of soils</i> (15th ed.). Pearson. 4. Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S. J., Kubiszewski, I., Farber, S., & Turner, R. K. (2014). Changes in the global value of ecosystem services. <i>Global Environmental Change</i> , 26, 152–158. 5. Fanger, P. O. (1970). <i>Thermal comfort: Analysis and applications in environmental engineering</i> . Danish Technical Press. 6. Jensen, J. R. (2015). <i>Introductory digital image processing: A remote sensing perspective</i> (4th ed.). Pearson. 7. Mohanty, A., & Wadhawan, S. (2021). <i>Mapping India's climate vulnerability: A district level assessment</i> . Council on Energy, Environment and Water (CEEW) 8. Oke, T. R., Mills, G., Christen, A., & Voogt, J. A. (2017). <i>Urban climates</i> . Cambridge University Press 9. United Nations Habitat. (2020). <i>World cities report 2020: The value of sustainable urbanization</i> . 10. Weng, Q. (2009). <i>Thermal infrared remote sensing for urban climate and environmental studies</i> . Springer. 11. Wilks, D. S. (2011). <i>Statistical methods in the atmospheric sciences</i> (3rd ed.). Academic Press 12. WMO. (2012). <i>Standardized precipitation index user guide</i> (WMO-No. 1090). World Meteorological Organization.

Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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DRP-1 Dissertation / Research/Project (12)

Title of the Course:	DISSERTATION/RESEARCH/PROJECT
Discipline Specific Minor Paper Code:	DRP-1
Objectives of the Course	i) To familiarize students with the fundamentals of geographical research design and problem formulation. ii) To develop the ability to review scientific literature and identify relevant research gaps. iii) To train students in field-based data collection and the use of appropriate tools, techniques, and ethical practices. iv) To enhance skills in data processing, analysis, and interpretation using quantitative and qualitative methods. v) To enable students to prepare a systematic, well-structured dissertation/report following academic standards. vi) To strengthen students' capacity for critical thinking, scientific writing, and oral presentation through seminars and viva-voce. vii) To encourage application of geographical knowledge for local, regional, and contemporary problem-solving.
Learning Outcomes of the Course	i) Define a clear research problem, develop research questions and a feasible plan. ii) Apply appropriate field / lab / GIS / statistical methods to collect and analyse data. iii) Produce a structured dissertation report with literature review, methodology, results and discussion. iv) Present and defend findings in a departmental seminar and viva; identify future work / policy implications.
General Guidelines for the Report Preparation	• Each student shall prepare an individual and original dissertation/research/project (DRP) report under the direct supervision of an assigned faculty supervisor. Joint or group submissions are not permitted. • The entire report must be written in English, using clear, academic, and grammatically correct language. • Students shall conduct independent fieldwork and/or data collection, wherever applicable. • Only geo-tagged field photographs, taken by the student during field investigation, shall be used in the report. • All photographs, maps, diagrams, tables, and figures must be: ▪ Clearly numbered ▪ Properly titled/captioned ▪ Referred to in the main text at appropriate places • Maps must include essential cartographic elements such as scale, north direction, legend, and source. • Students must strictly adhere to the approved document format, referencing style, and plagiarism

	limits prescribed by the University. • Submission of the dissertation/research/project shall be subject to: ▪ Supervisor's certification ▪ Plagiarism (<10%) and AI similarity (<20%) verification clearance. ▪ Completion of presentation and viva-voce ○ <u>Structure for Dissertation/Research/Project Preparation:</u> A. <u>Preliminary Pages:</u> Cover Page: Title of the report; student's name; roll & registration number; paper name & code; semester; college & university; supervisor's name; date of submission. Supervisor's Certificate: Certification of active participation in data collection, analysis, and report preparation; signed, dated, and on institutional letterhead. Acknowledgement: Brief note of thanks to supervisors, field assistants, respondents, and supporting institutions. Table of Contents: Chapters and major sections with correct page numbers. List of Figures List of Tables B. <u>Main text / Core content</u> Literature Review • Critical and thematic review of relevant books, journal articles, reports, and previous studies related to the research topic. • Identification of key concepts, approaches, and findings used by earlier researchers. • Establishment of the theoretical and empirical background of the present study. Research Gap • Clear identification of gaps, limitations, or unresolved issues in existing literature. • Explanation of how the present study addresses these gaps or contributes new perspectives, data, or methods. Objectives • Clear statement of 2–4 specific and measurable objectives or research questions. • Objectives should be logically derived from the research gap and guide the overall analysis and interpretation. Materials • Description of datasets and materials used in the study. • Includes primary data (field surveys, observations, measurements) and secondary data (census records, maps, reports, satellite imagery, published datasets etc.). Methods • Explanation of data collection techniques such as surveys, interviews, field measurements, mapping, or remote sensing. • Description of sampling design, tools, instruments, and analytical techniques (quantitative and/or qualitative). • Brief mention of ethical considerations followed during the study. Results • Systematic presentation of analysed data and findings. • Use of tables, graphs, charts, maps, and photographs to clearly display results.
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- Focus on factual outcomes without interpretation.

g. Discussion

- Interpretation of results in relation to research objectives and existing literature.
- Explanation of spatial and temporal patterns, processes, causes, and implications.
- Comparison of findings with previous studies to highlight similarities or differences.

h. Major Findings and Conclusion

- Summary of the most significant findings derived from the analysis.
- Conclusions drawn in direct relation to the stated objectives.
- Brief statement on the geographical, social, or environmental significance of the study and possible recommendations

i. References (APA style)

- Comprehensive list of all sources cited in the text, including books, journal articles, government reports, and web sources.
- References must follow a consistent and internationally accepted citation style such as APA (7th Edition).

C. Appendices

- Copy of one filled-in questionnaire/schedule (signed by teacher).
- Supplementary data tables, charts, maps, photographs etc.

○ **Course content and time allocation:**

Description	Hours
Research methodology, research design, scientific ethics, plagiarism, and referencing standards	45
Topic identification, problem formulation, literature review, research gap identification, and proposal preparation	60
Field investigation / data collection (primary & secondary), sampling design, use of tools and instruments	120
Scientific writing, data analysis, and interpretation	75
Finalization, revision, and presentation preparation	60
Total	360

○ **Execution framework:**

▪ **Topic Approval**

Each student shall submit a formal research proposal/synopsis outlining the proposed title, objectives, research questions, methodology, study area (where applicable), and preliminary references. The proposal shall be evaluated and approved by the department/supervisor based on academic relevance, originality, feasibility, and ethical considerations.

▪ **Supervised Academic Work**

Upon approval of the topic, students shall undertake systematic literature review, field investigation, laboratory work, or data analysis, as relevant to the nature of the study. All research activities shall be conducted under the continuous guidance and supervision of the assigned faculty supervisor.

▪ **Drafting and Revision**

Students shall prepare interim drafts of the DRP report. These drafts shall be reviewed by the

	supervisor to ensure scientific accuracy, analytical coherence, methodological rigour, and adherence to prescribed academic and formatting standards. Necessary revisions shall be incorporated based on feedback. ▪ Final Submission The completed DRP report shall be submitted in the prescribed format, both in hard copy and soft copy, within the notified timeline. The submission must comply with institutional guidelines regarding structure, referencing style, plagiarism limits, and certification requirements. ○ <u>Document Format and Technical Specifications:</u> • Length and copies: Within 100 pages or 10,000 words and 3 Nos of printed copies • Font: Times New Roman, 12 pt • Line spacing: 1.5 • Figures, tables, and scientific notation/equations: Properly labeled • Referencing style: APA (7th Edition) • Plagiarism threshold: Plagiarism (<10%) and AI similarity (<20%) verification clearance.																												
Method of Assessment, Measurement, & Evaluation	▪ DRP report evaluation (150 Marks): <table border="1" data-bbox="448 911 1399 1319"> <thead> <tr> <th>Components</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>Topic relevance, clarity of problem statement, and objectives</td><td>15</td></tr> <tr> <td>Review of literature and identification of research gap</td><td>25</td></tr> <tr> <td>Research methodology, materials, and data collection techniques</td><td>35</td></tr> <tr> <td>Data analysis, results, and interpretation</td><td>35</td></tr> <tr> <td>Discussion, major findings, conclusions, and recommendations</td><td>25</td></tr> <tr> <td>Referencing, format, and overall presentation</td><td>15</td></tr> <tr> <td>Total</td><td>150</td></tr> </tbody> </table> ▪ <u>Presentation & Viva-Voce (75 Marks):</u> ▪ Mode: Presentation followed by viva-voce ▪ Duration: Power Point Presentation (10-15 minutes) + Viva-voce (10–15 minutes) <table border="1" data-bbox="437 1512 1410 1792"> <thead> <tr> <th>Component</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>Quality and clarity of presentation (structure, slides/poster, time management)</td><td>25</td></tr> <tr> <td>Understanding of the topic, methodology, and results</td><td>25</td></tr> <tr> <td>Ability to answer questions, critical thinking, and defence of the work</td><td>15</td></tr> <tr> <td>Communication skills and confidence</td><td>10</td></tr> <tr> <td>Total</td><td>75</td></tr> </tbody> </table> ○ <u>Evaluation Note (For Record):</u> • The evaluation of the DRP shall be conducted in accordance with the approved assessment scheme prescribed by the University. • The assessment shall consider originality, relevance of the topic, methodological rigour, quality of analysis, interpretation of results, and overall academic presentation. • Marks awarded for the written report and presentation/viva-voce shall be clearly recorded, signed, and dated by the examiner(s).	Components	Marks	Topic relevance, clarity of problem statement, and objectives	15	Review of literature and identification of research gap	25	Research methodology, materials, and data collection techniques	35	Data analysis, results, and interpretation	35	Discussion, major findings, conclusions, and recommendations	25	Referencing, format, and overall presentation	15	Total	150	Component	Marks	Quality and clarity of presentation (structure, slides/poster, time management)	25	Understanding of the topic, methodology, and results	25	Ability to answer questions, critical thinking, and defence of the work	15	Communication skills and confidence	10	Total	75
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Communication skills and confidence	10																												
Total	75																												

	• The evaluation sheet and viva-voce report shall be preserved by the department for future reference and audit purposes. • Any case of academic misconduct or plagiarism detected during evaluation shall be dealt with strictly as per university regulations. ○ <u>Viva-Voce Guidelines:</u> • Viva-voce shall be conducted after submission of the final DRP report. • The viva-voce board shall normally consist of the supervisor and one internal/external examiner, as per university rules. • The viva-voce shall assess the students: ▪ Conceptual understanding of the topic ▪ Knowledge of literature and methodology ▪ Ability to interpret and justify results ▪ Original contribution and critical thinking • The viva-voce shall follow a short presentation (10-15 minutes) by the student, followed by question answer interaction. • Marks for viva-voce shall be awarded independently and recorded in the prescribed format. ○ <u>Maintenance of Academic Records:</u> • Each department shall maintain a complete academic record of the DRP, including: • Approved synopsis/proposal • Supervisor's certificate • Final dissertation/report (hard copy and/or soft copy) • Plagiarism (<10%) and AI similarity (<20%) verification clearance • Evaluation and viva-voce score sheets • Soft/Hard copies of DRP shall be archived digitally by the department/library for academic reference. • Academic records shall be preserved for a minimum period as prescribed by the University. • The department shall ensure confidentiality, integrity, and accessibility of academic records for examination, accreditation, and quality assurance purposes.	
Suggested Topics for DRP	Broad Area	Dissertation Topics
	i) Physical Geography & Natural Hazards	• Riverbank erosion • Drought and flood • Tropical cyclone • Landslide • Any other relevant issues
	ii) Environmental Geography & Ecology	• Arsenic contamination • Wetlands • Biodiversity • Any other relevant issues
	iii) Population & Social Geography	• Labour migration • Child marriage • Poverty • Drop-outs • Population dynamics • Any other population and social issues
	iv) Health Geography	• Maternal and child health issues • Water and sanitation related health problems • Any other health issues
	v) Urban Geography & Urban Studies	• Urban amenities and services • Slum • Street vendors and petty traders • Waste disposal system • Any other urban related issues

	vi) Economy & Development	• Water and sanitation practices • Tourism • Rural Development • Micro and Small-Scale Industry • Any other relevant issues
	vii) Applied / Local & Contemporary Issues	• Other relevant geographical issues
Suggested readings	1. Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2023). <i>Key methods in geography</i> (4th ed.). SAGE Publications. 2. Creswell, J. W., & Creswell, J. D. (2018). <i>Research design: Qualitative, quantitative, and mixed methods approaches</i> (5th ed.). SAGE Publications. 3. Flowerdew, R., & Martin, D. (Eds.). (2005). <i>Methods in human geography: A guide for students doing a research project</i> (2nd ed.). Routledge. 4. Goddard, W., & Melville, S. (2001). <i>Research methodology: An introduction</i> (2nd ed.). Juta & Co. 5. Gomez, B., & Jones, J. P. (Eds.). (2010). <i>Research methods in geography: A critical introduction</i>. Wiley-Blackwell. 6. Kothari, C. R., & Garg, G. (2019). <i>Research methodology: Methods and techniques</i> (4th ed.). New Age International Publishers. 7. Kumar, R. (2019). <i>Research methodology: A step-by-step guide for beginners</i> (5th ed.). SAGE Publications. 8. Montello, D. R., & Sutton, P. C. (2013). <i>An introduction to scientific research methods in geography and environmental studies</i> (2nd ed.). SAGE Publications. 9. National Credit Framework. (2023). <i>National credit framework (NCrF)</i>. Government of India. 10. Phillips, R., & Johns, J. (2012). <i>Fieldwork for human geography</i>. SAGE Publications. 11. Scheyvens, R., & Storey, D. (Eds.). (2014). <i>Development fieldwork: A practical guide</i> (2nd ed.). SAGE Publications. 12. University Grants Commission. (2020). <i>National education policy 2020</i>. Ministry of Education, Government of India. 13. University Grants Commission. (2023). <i>Curriculum and credit framework for undergraduate programmes</i>. New Delhi. 14. University of Delhi. (2022). <i>Guidelines for undergraduate dissertation/research projects under NEP-2020</i>. 15. Walliman, N. (2017). <i>Research methods: The basics</i> (2nd ed.). Routledge. 16. Wheeler, J. O., & White, G. K. (2009). <i>Fieldwork in geography</i>. Cengage Learning.	

SEMESTER- VIII (HONOURS)
Curriculum of Discipline Specific Course / Major Core)

SEMESTER-VIII (HONOURS)				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-20A: Environment, Hazard and Sustainability (03)	GEOMJ-MC-20B: Environment, Hazard and Sustainability (01)	04	75
	GEOMJ-MC-21A: Advanced Geomorphology (03)	GEOMJ-MC-21B: Advanced Geomorphology (01)	04	75
	GEOMJ-MC-22A: Geography of Public Policy (03)	GEOMJ-MC-22B: Geography of Public Policy (01)	04	75
	GEOMJ-MC-23: Term Paper (04)		04	75
Minor Core (MnC)	GEOMN-MN-08A: Disaster Management (03)	GEOMN-MN-08B: Disaster Management (01)	04	75
Total			20	375

GEOMJ-MC-20: Environment, Hazard and Sustainability

Title of the Course:	ENVIRONMENT, HAZARD AND SUSTAINABILITY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-20A
Semester = VIII (THEORY)	
Credits = 03	
Objectives of the Course	i) To understand environmental systems, their structure, functions, and resilience mechanisms. ii) To examine major theoretical perspectives such as Political Ecology, and Social Ecological Systems (SES). iii) To analyze ecosystem services and their relevance in sustainable natural resource management. iv) To evaluate climate change theories, evidences, mitigation policies, and climate-related hazards. v) To explore sustainable development approaches, urban resilience strategies, and community based environmental management practices.
Learning Outcomes of the Course	i) Learners will able to explain the concept, structure, and functioning of environmental systems, including feedback and resilience. ii) Students will apply key environmental theories to understand human nature interactions and resource conflicts. iii) Learners will able to assess ecosystem services and ecological factors governing biodiversity and habitat distribution. iv) Learners will analyze climate change drivers, paleoclimate evidence, mitigation frameworks, and climate extremes. v) Learners will evaluate urban environmental issues such as UHI, pollution episodes, and climate health linkages. vi) Learners will able to interpret sustainable development frameworks, urban sustainability models, and participatory governance practices.

Course Content

Module-1: Environmental Systems, Ecosystem Services	i) Environmental Systems: Concept, Structure, and Functions; Feedback mechanisms, thresholds, and resilience. ii) Key theoretical approaches: Political Ecology, Social–Ecological Systems (SES). iii) Ecosystem Services: Concepts and typologies (Provisioning, Regulating, Cultural, Supporting); relevance in natural resource management.
Module-2: Hazards, Disasters, and Risk Governance	i) Concept and classification of hazards and disasters; approaches to hazard study. ii) Risk perception and vulnerability assessment, hazard paradigms. iii) Responses to hazards: Preparedness, trauma and aftermath. Resilience and capacity building. iv) Disaster Governance: Disaster Management Cycle; Sendai Framework (2015-2030); Role of Local Governance & Community-Based Disaster Risk Reduction
Module-3: Climate Change and Climatic Extremes	i) Climate Change: Theories, Evidences, and key drivers; international treaties and protocols to mitigate climate change. ii) Climate Hazards and Extremes: Droughts, Floods, Heatwaves, Cyclones iii) Urban Microclimate and Urban Heat Island (UHI): Formation Processes and Impacts in Tropical Cities
Module-4: Sustainability and Resource Management	i) Sustainable development: From the Brundtland Report to Agenda 2030 and SDGs. ii) Sustainable resource management: Climate-resilient and regenerative agriculture; Blue economy; Watershed management and afforestation; Decentralized and participatory water governance. iii) Community-based environmental management practices.
Suggestive Readings	1. Botkin, D. B., & Keller, E. A. (2014). <i>Environmental Science: Earth as a Living Planet</i>. Wiley. 2. Bradley, R. S. (2015). <i>Paleoclimatology: Reconstructing climates of the Quaternary</i> (3rd ed.). Academic Press. 3. Chapin, F. S., Matson, P. A., & Vitousek, P. M. (2011). <i>Principles of terrestrial ecosystem ecology</i> (2nd ed.). Springer. 4. Hussain, C. M., & Velasco-Muñoz, J. F. (Eds.). (2021). <i>Sustainable resource management: Modern approaches and contexts</i>. Elsevier. 5. IPCC. (2023). <i>Climate change 2023: Synthesis report</i>. Intergovernmental Panel on Climate Change. 6. Maslin, M. (2021). <i>Climate Change: A Very Short Introduction</i>. Oxford University Press. (Great for a concise overview of theories and evidence). 7. McMichael, A. J. (2017). <i>Climate change and the health of nations</i>. Oxford University Press. 8. Odum, E. P., & Barrett, G. W. (2005). <i>Fundamentals of ecology</i> (5th ed.). Brooks/Cole. 9. Oke, T. R., Mills, G., Christen, A., & Voogt, J. A. (2017). <i>Urban climates</i>. Cambridge University Press.

	10. Smith, K. (2013). <i>Environmental hazards: Assessing risk and reducing disaster</i> (6th ed.). Routledge. 11. UNFCCC. (2015). <i>The Paris Agreement</i>. United Nations Framework Convention on Climate Change. 12. UN-Habitat. (2020). <i>World cities report: The value of sustainable urbanization</i>. United Nations. 13. United Nations. (2015). <i>Transforming our world: The 2030 Agenda for Sustainable Development</i>. United Nations. 14. Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). <i>At risk: Natural hazards, people's vulnerability and disasters</i> (2nd ed.). Routledge.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	ENVIRONMENT, HAZARD AND SUSTAINABILITY (PRACTICAL)		
Discipline Specific Major Paper Code:	GEOMJ-MC-20B		
Semester- VIII (PRACTICAL)			
Credit = 01			
Objectives of the Course	i) To understand statistical methods for climatic trend detection and drought assessment using temperature and rainfall datasets. ii) To analyze meteorological drought conditions through the computation of Standardized Precipitation Index (SPI). iii) To examine urban thermal heterogeneity and microclimate variation using MODIS Land Surface Temperature (LST) and NDVI. iv) To compute human thermal comfort indices such as THI and PMV for evaluating heat stress and urban comfort levels. v) To develop Climate Vulnerability Indices (CVI) through indicator selection, normalization, and multi-criteria composite analysis. vi) To apply geospatial and environmental techniques for soil–water quality analysis, satellite-based LULC mapping, ecosystem service valuation, and spectral index generation.		
Learning Outcomes of the Course	i) Learners will able to detect long-term climatic trends using the Mann–Kendall statistical test. ii) Learners will able to estimate drought severity and variability using SPI derived from rainfall data. iii) Learners will able to assess urban microclimate patterns using MODIS LST and vegetation-based indices such as NDVI. iv) Learners will be able to compute and interpret human thermal comfort indices (THI and PMV) for urban climate assessment. v) Students will able to construct Climate Vulnerability Indices (CVI) using exposure, sensitivity, and adaptive capacity indicators.		

	vi) Learners will be able to perform satellite image preprocessing, LULC classification in QGIS, ecosystem service estimation using Costanza's coefficients.
Course Content	
Module-1: Climate Trends and Drought Monitoring	i) Trend Analysis of Temperature and Precipitation: Application of Mann-Kendall test for detecting climatic trends. ii) Estimation of meteorological drought through SPI using rainfall data.
Module-2: Urban Thermal Environment and Vulnerability Assessment	i) Analysis of urban thermal heterogeneity using MODIS LST data; Use of NDVI (vegetation health) and LST (surface temperature) to assess urban microclimate ii) Computation of Human Thermal Comfort Indices: THI (Temperature Humidity Index) and PMV (Predicted Mean Vote) estimation. iii) Computation of Climate Vulnerability Index (CVI): Selection and normalization of exposure, sensitivity, and adaptive capacity indicators; Construction of composite CVI using multi-criteria analysis.
Module-3: Environmental Quality and Ecosystem Services Evaluation	i) Measurement and interpretation of water quality (pH, TDS, BOD, COD) ii) Satellite image analysis (Landsat): Preprocessing, LULC classification (supervised and unsupervised) using QGIS. iii) Ecosystem service estimation: Costanza's co-efficient (2014)
Suggestive Readings	1. American Public Health Association (APHA). (2017). <i>Standard methods for the examination of water and wastewater</i> (23rd ed.). APHA 2. Bhattacharya, P., & Samal, N. R. (2018). <i>Soil and water analysis: A laboratory manual</i> . Allied Publishers. 3. Brady, N. C., & Weil, R. R. (2016). <i>The nature and properties of soils</i> (15th ed.). Pearson. 4. Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S. J., Kubiszewski, I., Farber, S., & Turner, R. K. (2014). Changes in the global value of ecosystem services. <i>Global Environmental Change</i> , 26, 152–158. 5. Fanger, P. O. (1970). <i>Thermal comfort: Analysis and applications in environmental engineering</i> . Danish Technical Press. 6. Jensen, J. R. (2015). <i>Introductory digital image processing: A remote sensing perspective</i> (4th ed.). Pearson. 7. Mohanty, A., & Wadhawan, S. (2021). <i>Mapping India's climate vulnerability: A district level assessment</i> . Council on Energy, Environment and Water (CEEW) 8. Oke, T. R., Mills, G., Christen, A., & Voogt, J. A. (2017). <i>Urban climates</i> . Cambridge University Press 9. United Nations Habitat. (2020). <i>World cities report 2020: The value of sustainable urbanization</i> . 10. Weng, Q. (2009). <i>Thermal infrared remote sensing for urban climate and environmental studies</i> . Springer. 11. Wilks, D. S. (2011). <i>Statistical methods in the atmospheric sciences</i> (3rd ed.). Academic Press 12. WMO. (2012). <i>Standardized precipitation index user guide</i> (WMO-No. 1090). World Meteorological Organization.
Method of Assessment,	20 Marks Mode: Laboratory-based Examination

Measurement, & Evaluation	Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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GEOMJ-MC-21: Advanced Geomorphology

Title of the Course:	ADVANCED GEOMORPHOLOGY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-21A
Semester = VIII (THEORY)	
Credits = 03	
Objectives of the Course	i) To introduce students to foundational and advanced concepts in advanced geomorphology, emphasizing both natural and human-influenced processes. ii) To develop an understanding of system-based approaches in geomorphology for analyzing landscape dynamics. iii) To enable students to explain key geomorphic processes in fluvial, glacial, paraglacial, and coastal environments. iv) To foster the ability to critically analyze human impacts on different geomorphic systems and landforms. v) To cultivate skills for interpreting geomorphological data and applying theoretical knowledge to contemporary environmental issues.
Learning Outcomes of the Course	Upon successful completion of this course, students will be able to: i) Students will clearly define and explain the concept, scope, and significance of applied/advanced geomorphology, including the systems approach and process studies. ii) Students will identify and analyze morphogenetic regions and discuss their geomorphic importance. iii) Students will be able to distinguish between glacial, periglacial, and paraglacial processes and landforms, and outline the role of the cryosphere in landscape evolution. iv) They will apply geomorphological principles to assess and predict landscape responses to environmental and anthropogenic changes.
Course Content	
Module: -1: Introduction to Advanced Geomorphology	i) Introduction to Advanced Geomorphology: Definition, scope, historical evolution, and contemporary relevance. ii) Geomorphic systems: scales, thresholds, feedbacks, and non-linear dynamics. iii) Morphogenetic regions and their importance. Significance of process studies in geomorphology.
Module: -2: Channel Morphology	i) Channel morphology: Channel profiles, patterns, and classification; Effects of floods: channel modification and characterization. ii) Streamflow hydraulics: Types of flow, stream velocity and resistance, Stream Energy. Factors controlling entrainment, transportation, and deposition by running water.

	iii) Slope processes in fluvial landscapes: Factors and processes of bank erosion and valley walls.
Module: -3: Glacial and Paraglacial Geomorphology	i) Overview and concepts: glacial, periglacial, and paraglacial, permafrost, proglacial geomorphology. ii) Glacial dynamics: mechanism of glacial movement; Formation of glacial and periglacial landforms; Anthropogenic impacts: glacier retreat and permafrost degradation.
Module: -4: Coastal Processes and Anthropogenic Impact	i) Principles of coastal geomorphology: Relative dominance of wave, tidal, and fluvial processes on coastal landforms dynamics; Coastal processes: Bioturbation, bio-tidal accretion, and coral formation; impact of storm surge and tsunami. ii) Coastal landforms: Formation, dynamics, and classification of coastal landforms; Special focus on rhythmic beach topography, coastal dunes, and deltas. iii) Anthropogenic influences: human roles as geomorphic agents; effects of river control and coastal modification.
Suggestive Readings	1. Bierman, P.R. and Montgomery, D.R. (2014): Key Concepts in Geomorphology. W.H. Freeman and Co. 2. Charlton, R. (2007): Fundamentals of Fluvial Geomorphology. Routledge, USA. 3. Chorley, R. J., & Kennedy, B. A. (1971): Physical geography: a systems approach. Prentice-Hall. 4. Fryiris, K.A. and Brierley, G.J. (2013): Geomorphic analysis of river systems: An approach to reading the landscape. Wiley-Blackwell Chichester, UK. 5. Goudie, A.S. (ed.) (2004): Encyclopaedia of Geomorphology. Routledge, London. 6. Gutiérrez, M. (2013): Geomorphology, CRC Press, Boca Ranton, Florida. 7. Harvey, A. (2012): Introducing Geomorphology: A guide to landforms and processes. Dunedin, London. 8. McKenna Neuman, C., Ashmore, P., Bennett S.J. (2013): Laboratory and experimental geomorphology: examples from fluvial and aeolian systems. In: Shroder, J. (Editor in Chief), Orme, A.R., Sack, D. (Eds.), Treatise on Geomorphology. Academic Press, San Diego, CA, vol. 1, The Foundations of Geomorphology, pp. 325–348. 40 9. National Research Council (2010): Landscapes on the Edge: New Horizons for Research on Earth's Surface. Washington, DC: The National Academies Press. https://doi.org/10.17226/12700 [pp. 1-12]. 10. Plater, A.J., Daniels, M.D. & Oguchi, T. (2013): Present research frontiers in geomorphology. In: Shroder, J., Orme, A.R., Sack, D. (Eds.), Treatise on Geomorphology. Academic Press, San Diego, CA, vol. 1, The Foundations of Geomorphology [pp. 349–376]. 11. Richter, G. (1981): Recent trends of experimental geomorphology in the field. Earth Surface Processes and Landforms, vol. 6, 215-219. 12. Sack, D. & Orme, A.R. (2013): Introduction to the Foundations of Geomorphology. In: Orme, A.R. & Sack, D. (eds.), Treaties on Geomorphology, Academic Press. San Diego, CA. Vol. 1 Foundations of geomorphology. 10.1016/B978-0-12-374739-6.00001-4. 13. Thorn (Eds.), Channel changes: observations and experiments (pp. 299-310). University of Minnesota Press. 14. Starkel, L. (1999): Space and time scales in geomorphology. Fourth international conference on geomorphology – Italy, 1997 plenary lecture. Suppl. Geogr. Fis. Dinam. Quat. III, T.3 (1999), 61-66.

	15. Summerfield, M.A. (1991): Global Geomorphology: An Introduction to the Study of Landforms. Longman, London 16. Vitek, J.D. & Giardino, J.R. Ed. (1993): Geomorphology: the research frontier and beyond. Proceedings of the 24th Binghamton Symposium in Geomorphology, August 25, 1993. Reprinted from Geomorphology, Volume 7, Nos. 1-3 [pp. 1-7; 251-262].
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	ADVANCED GEOMORPHOLOGY (PRACTICAL)
Discipline Specific Major Paper Code:	GEOMJ-MC-21B
Semester- VIII (PRACTICAL)	
Credit = 01	
Objectives of the Course	i) To understand the use of DEMs and GIS tools for preparing slope, aspect, and elevation maps. ii) To learn drainage network extraction, watershed delineation, and stream ordering using QGIS. iii) To measure river channel geometry and analyze channel changes using topographical maps and satellite data. iv) To develop basic field and laboratory skills for discharge measurement and sediment analysis.
Learning Outcomes of the Course	i) Students will be able to create and interpret slope, aspect, elevation, and flood susceptibility maps using GIS and remote sensing data. ii) Students will be able to extract drainage networks, delineate watersheds, and apply Strahler stream ordering in QGIS. iii) Students will be able to analyze channel planform geometry, migration, and bank erosion–accretion using satellite imagery. iv) Students will be able to measure river discharge in the field and perform sediment and pebble analysis for environmental interpretation.
Course Content	
Module-1: Terrain Analysis and Channel Morphometry Mapping Using QGIS	i) Preparation of Slope, Aspect, and Elevation Maps using Digital Elevation Models (DEMs) using Aster GDEM. ii) Drainage Network Extraction, Watershed Delineation, and Stream Ordering (after Strahler) using QGIS.

	iii) Measurement of Channel Planform Geometry (meander wavelength, sinuosity (Leopold), and radius of curvature) from Topographical Maps and Satellite Imagery using Landsat data.
Module-2: Hazard Risk Zonation and Geomorphic Change Detection Using QGIS	ii) Flood Susceptibility Mapping (FSM) based on terrain factors and GIS overlay techniques. iii) Channel Migration and Bank Erosion–Accretion Mapping using temporal satellite imagery using Landsat data.
Module-3: Field-Based Discharge Measurement and Sediment Analysis	i) Discharge Measurement Using Field Equipment (Current Meter) through direct velocity-area method. ii) Pebble and Sediment Analysis: Shape Indices (Roundness, Sphericity, Flatness); Textural Analysis by Sieving; Grain Size Classification and Environmental Interpretation.
Suggestive Readings	1. Burrough, P. A., & McDonnell, R. A. (2015). <i>Principles of Geographical Information Systems</i>. Oxford University Press. 2. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographic Information Science and Systems</i>. Wiley. 3. Wilson, J. P., & Gallant, J. C. (2000). <i>Terrain Analysis: Principles and Applications</i>. John Wiley & Sons. 4. QGIS Development Team. <i>QGIS User Guide and Documentation</i>. Open Source Geospatial Foundation. 5. Horton, R. E. (1945). Erosional development of streams and their drainage basins. <i>Geological Society of America Bulletin</i>, 56, 275–370. 6. Strahler, A. N. (1964). Quantitative geomorphology of drainage basins and channel networks. In <i>Handbook of Applied Hydrology</i>. McGraw-Hill. 7. Leopold, L. B., Wolman, M. G., & Miller, J. P. (1964). <i>Fluvial Processes in Geomorphology</i>. W.H. Freeman. 8. Chorley, R. J., Schumm, S. A., & Sugden, D. E. (1984). <i>Geomorphology</i>. Methuen. 9. Knighton, D. (2014). <i>Fluvial Forms and Processes: A New Perspective</i>. Routledge. 10. Jensen, J. R. (2016). <i>Introductory Digital Image Processing: A Remote Sensing Perspective</i>. Pearson. 11. Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). <i>Remote Sensing and Image Interpretation</i>. Wiley. 12. NASA & USGS. <i>Landsat Science Users Handbook</i>. 13. Guzzetti, F., Reichenbach, P., Cardinali, M., Galli, M., & Ardizzone, F. (2006). Landslide hazard and risk assessment. <i>Landslides</i>, 2, 273–291. 14. Sanyal, J., & Lu, X. X. (2004). Application of remote sensing in flood management. <i>International Journal of Remote Sensing</i>, 25(20), 4075–4091. 15. Pradhan, B. (2010). Landslide susceptibility mapping using GIS and remote sensing. <i>Journal of Spatial Science</i>, 55(1), 1–20. 16. Charlton, R. (2008). <i>Fundamentals of Fluvial Geomorphology</i>. Routledge. 17. Kale, V. S., & Gupta, A. (2001). <i>Introduction to Geomorphology</i>. Orient Blackswan. 18. Singh, S. (2003). <i>Geomorphology</i>. Prayag Pustak Bhawan.

Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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GEOMJ-MC-22: Geography of Public Policy

Title of the Course:	GEOGRAPHY OF PUBLIC POLICY (THEORY)
Discipline Specific Major Paper Code:	GEOMJ-MC-22A
Semester = VIII (THEORY)	
Credits = 03	
Objectives of the Course	i) To contextualize public policy within the spatial framework ii) To familiarize with key public policies in India related to poverty alleviation, financial inclusion, skill development, health, agriculture, water and urban development, and their regional impacts. iii) To build the ability to analyze how policies differentially affect rural and urban areas, regions, social groups and environments, using maps, case studies, and spatial data. iv) To explore the emerging frontiers of Health Geography v) Encourage critical evaluation of policy outcomes in terms of socio-economic development, environmental sustainability, and equity, with focus on contemporary debates. vi) To foster critical evaluation through sectoral case studies
Learning Outcomes of the Course	i) Students will explain the spatial dimensions and interdisciplinary linkages of governance, planning, and policy-making. ii) Students will analyze key Indian policies for poverty alleviation, financial inclusion, and skill development, assessing their regional impacts and equity outcomes. iii) Students will evaluate the role of public policy in promoting socio-economic development, sustainable practices, and green economies, identifying spatial variations in policy effectiveness across rural-urban divides. iv) Students will critique emerging directions in health policy, such as the Digital Health Mission and AI applications, mapping their potential to address regional disparities in access and governance. v) Students will critically examine agricultural policies, water crises, urban housing/slum issues, and National Health Missions' implementations. vi) Students will apply geographic tools to map, visualize, and compare policy impacts, using spatial data to highlight disparities in resource allocation and development outcomes.

	vii) Students will learn the ability to link interdisciplinary concepts to propose sustainable solutions for contemporary geographical problems.
Course Content	
Module-1: Introduction to Geography of Public Policy	i) Nature, scope, and significance of public policy in geography. ii) Interdisciplinary Links: Governance, Planning, and Policy. iii) Role of Public Policy in regional development.
Module-2: Policies Related to Inclusive Growth and Social Sector	i) Poverty alleviation policies (MGNREGA, 2005 and National Rural Livelihood Mission, 2011). ii) Financial inclusion policies (Jan Dhan Yojana, Mudra Yojana). iii) Skill development and human capital policies (Skill India Mission, NEP 2020).
Module-3: Emerging Health and Environmental Issues in India: Challenges and Policy Response	i) Mental Health Policies (Mental Healthcare Act, 2017; National Mental Health Programme). ii) Occupational and environmental health policies. iii) Environmental Policy of India (1986 & 2006). Indian Policies for climate change adaptation and mitigation.
Module-4: Case Studies and Applied Policy Analysis	i) Agricultural Policy analysis: National Agricultural Policy (2000), PM-Kisan, crop insurance, Minimum Support Price (MSP). ii) Case Studies on Water Policy (water crisis in detail with reference to Bhopal). iii) National Health Missions: Implementations and Achievements, Digital Health Mission.
Suggestive Readings	1. Dye, T. R. (2017). <i>Understanding public policy</i> (15th ed.). Pearson Education. 2. Anderson, J. E. (2015). <i>Public policymaking</i> (8th ed.). Cengage Learning. 3. Hill, M., & Hupe, P. (2014). <i>Implementing public policy: An introduction to the study of operational governance</i> (3rd ed.). SAGE Publications. 4. Parsons, W. (1995). <i>Public policy: An introduction to the theory and practice of policy analysis</i>. Edward Elgar Publishing. 5. Knox, P., & Pinch, S. (2014). <i>Urban social geography: An introduction</i> (6th ed.). Pearson Education. 6. Glasson, J., & Marshall, T. (2007). <i>Regional planning</i>. Routledge. 7. Johnston, R. J., Sidaway, J. D., & Castree, N. (2020). <i>Geography and geographers: Anglo-American human geography since 1945</i> (7th ed.). Routledge. 8. Leftwich, A. (2000). <i>States of development: On the primacy of politics in development</i>. Polity Press. 9. World Bank. (2023). <i>World development report 2023: Migrants, refugees, and societies</i>. World Bank Publications. 10. United Nations Development Programme (UNDP). (2024). <i>Human development report 2023/2024: Breaking the gridlock—Reimagining cooperation in a polarized world</i>. UNDP. 11. Government of India. (2024). <i>Economic survey 2023–24</i>. Ministry of Finance, Government of India. 12. NITI Aayog. (2018). <i>Strategy for New India @75</i>. Government of India. (For historical context, Five-Year Plans may be cited as Planning Commission publications prior to 2015.) 13. Sen, A. (1999). <i>Development as freedom</i>. Oxford University Press. 14. Drèze, J., & Sen, A. (2013). <i>An uncertain glory: India and its contradictions</i>. Princeton University Press.

	15. Bardhan, P. (2016). <i>The political economy of development in India</i> (Expanded ed.). Oxford University Press. 16. Molle, F. (2009). <i>Water policy and governance</i>. Routledge. 17. World Health Organization (WHO). (2023). <i>Global health policy and systems governance report</i>. WHO Press. 18. Ministry of Health & Family Welfare. (2017). <i>National health policy 2017</i>. Government of India. 19. Ministry of Rural Development. (2023). <i>MGNREGA operational guidelines</i>. Government of India. 20. Ministry of Housing & Urban Affairs. (2023). <i>Urban development and housing sector report</i>. Government of India.
Method of Assessment, Measurement, & Evaluation	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Class Attendance 5 marks, Class Performance 5 marks, Project/Presentation 10 marks, Viva Voce 5 marks

Title of the Course:	GEOGRAPHY OF PUBLIC POLICY (PRACTICAL)		
Discipline Specific Major Paper Code:	GEOMJ-MC-22B		
Semester- VIII (PRACTICAL)			
Credit = 01			
Objectives of the Course	i) To understand the concept and construction of composite indices for social policy and development analysis. ii) To examine health and community infrastructure indices used in India. iii) To apply quantitative techniques for regional and spatial analysis. iv) To develop skills in interpreting socio-economic and demographic data. v) To link index-based analysis with real-world policy challenges through case studies.		
Learning Outcomes of the Course	i) Students will be able to construct and interpret social and development indices. ii) Learners will assess community health infrastructure using standard indices. iii) Students will apply spatial and statistical techniques in regional analysis. iv) Learners will analyze socio-economic and demographic issues using field and digital data. v) Learners will critically evaluate public policies through applied case studies.		
Course Content			
Module-1: Constructing indices for various social and development policy	i) Multidimensional Poverty Index (MPI), Regional Social Disparity Index, Composite Index for community development. ii) Urban Living Index; Social Progress Index (SPI) (EAC-PM); SDG India Index (NITI Aayog).		

Module-2: Indices related to community health infrastructure	i) NITI Aayog State Health Index: Rural Health Infrastructure Index (HII): India Health Index (IHI). ii) Comprehensive Child Health Index (CHI); Women's Health Index (WHI).
Module-3: Questionnaire & Field-Based Policy Evaluation	i) Questionnaire framing on effectiveness of various Government schemes and policies at ground level (MGNREGA, Jal Jeevan Mission, Skill India Mission, Antyodaya Anna Yojana, PMAY), Likert Scale–Based Policy Satisfaction Index
Suggestive Readings	- Alkire, S., Foster, J. E., Seth, S., Santos, M. E., Roche, J. M., & Ballon, P. (2015). <i>Multidimensional poverty measurement and analysis</i>. Oxford University Press. - Anselin, L. (1988). <i>Spatial econometrics: Methods and models</i>. Kluwer Academic Publishers. https://doi.org/10.1007/978-94-015-7799-1 - Bhatia, S. (2020). <i>Social development and public policy in India</i>. Routledge India. - Burrough, P. A., McDonnell, R. A., & Lloyd, C. D. (2015). <i>Principles of geographical information systems</i> (3rd ed.). Oxford University Press. - Cliff, A. D., & Ord, J. K. (1973). <i>Spatial autocorrelation</i>. Monograph in Spatial and Environmental Systems Analysis. Pion. - Davenhall, W. F., & Kinabrew, C. (2011). GIS in health and human services. In <i>Springer Handbook of Geographic Information</i> (pp. 557-578). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-540-72680-7_29 - Food and Agriculture Organization (FAO). (2014). <i>Geospatial analysis for development</i>. FAO Publications. - Goodchild, M. F., & Janelle, D. G. (2004). <i>Spatially integrated social science</i>. Oxford University Press. - Government of India. (2024). <i>Economic survey 2023-24</i>. Ministry of Finance, Department of Economic Affairs. - International Institute for Population Sciences (IIPS). (2021). <i>National Family Health Survey (NFHS-5), 2019-21: India report</i>. IIPS. - Johnston, R. J., & Sidaway, J. D. (2016). <i>Geography and geographers: Anglo-American human geography since 1945</i> (7th ed.). Routledge. - Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). <i>Geographic information systems and science</i> (4th ed.). Wiley. - NITI Aayog. (2021). <i>Healthy states, progressive India: Health Index - Round IV</i>. NITI Aayog. - NITI Aayog. (2024). <i>SDG India Index & Dashboard 2023-24: Partnerships for the goals</i>. NITI Aayog. - Office of the Registrar General & Census Commissioner. (2011). <i>Census of India 2011: Primary census abstract</i>. Ministry of Home Affairs, Government of India. - Sen, A. (2000). <i>Development as freedom</i>. Oxford University Press. - United Nations Development Programme (UNDP) & Oxford Poverty and Human Development Initiative (OPHI). (2023). <i>2023 Global Multidimensional Poverty Index (MPI): Unstacking global poverty - Data for high-impact action</i>. United Nations Development Programme. - World Bank. (2024). <i>World development indicators</i>. World Bank Group. - World Health Organization (WHO). (2003). <i>Health systems performance assessment: Debates, methods and empiricism</i>. World Health Organization.
Method of Assessment, Measurement, & Evaluation	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

GEOMJ-MC-23: TERM PAPER

Title of the Course:	Term Paper
Discipline Specific Minor Paper Code:	GEOMJ-MC-23
Semester = VIII (THEORY)	
Credits = 03	
Objectives of the Course	i) To familiarize students with the fundamentals of geographical research design and problem formulation. ii) To develop the ability to review scientific literature and identify relevant research gaps. iii) To train students in field-based data collection and the use of appropriate tools, techniques, and ethical practices. iv) To enhance skills in data processing, analysis, and interpretation using quantitative and qualitative methods. v) To enable students to prepare a systematic, well-structured report following academic standards. vi) To strengthen students' capacity for critical thinking, scientific writing, and oral presentation through seminars and viva-voce. vii) To encourage application of geographical knowledge for local, regional, and contemporary problem-solving.
Learning Outcomes of the Course	i) Define a clear research problem, develop research questions and a feasible plan. ii) Apply appropriate field / lab / GIS / statistical methods to collect and analyse data. iii) Produce a structured term paper with literature review, methodology, results, and discussion. iv) Present and defend findings in a departmental seminar and viva; identify future work / policy implications.

1. General Guidelines for the Report Preparation:

- Each student shall prepare an individual and original term paper under the direct supervision of an assigned faculty supervisor. Joint or group submissions are not permitted.
- The entire report must be written in English, using clear, academic, and grammatically correct language.
- Students shall conduct independent fieldwork and/or data collection, wherever applicable.
- Only geo-tagged field photographs, taken by the student during field investigation, shall be used in the report.
- All photographs, maps, diagrams, tables, and figures must be:
 - Clearly numbered
 - Properly titled/captioned
 - Referred to in the main text at appropriate places
- Maps must include essential cartographic elements such as scale, north direction, legend, and source.
- Students must strictly adhere to the approved document format, referencing style, and plagiarism limits (<10%) and AI similarity (<20%) prescribed by the University.
- Submission of the term paper shall be subject to:
 - Supervisor's certification
 - Plagiarism (<10%) and AI similarity (<20%) verification clearance
 - Completion of presentation and viva-voce

2. Structure for Term Paper Preparation:

D. Preliminary Pages:

- a. **Cover Page:** Title of the report; student's name; roll & registration number; paper name & code; semester; college & university; supervisor's name; date of submission.
- b. **Supervisor's Certificate:** Certification of active participation in data collection, analysis, and report preparation; signed, dated, and on institutional letterhead.
- c. **Acknowledgement:** Brief note of thanks to supervisors, field assistants, respondents, and supporting institutions.
- d. **Table of Contents:** Chapters and major sections with correct page numbers.
- e. **List of Figures**
- f. **List of Tables**

E. Main text / Core content

a. Literature Review

- Critical and thematic review of relevant books, journal articles, reports, and previous studies related to the research topic.
- Identification of key concepts, approaches, and findings used by earlier researchers.
- Establishment of the theoretical and empirical background of the present study.

b. Research Gap

- Clear identification of gaps, limitations, or unresolved issues in existing literature.
- Explanation of how the present study addresses these gaps or contributes new perspectives, data, or methods.

c. Objectives

- Clear statement of 1-2 specific and measurable objectives or research questions.
- Objectives should be logically derived from the research gap and guide the overall analysis and interpretation.

d. Materials

- Description of datasets and materials used in the study.
- Includes primary data (field surveys, observations, measurements) and secondary data (census records, maps, reports, satellite imagery, published datasets).

e. Methods

- Explanation of data collection techniques such as surveys, interviews, field measurements, mapping, or remote sensing.
- Description of sampling design, tools, instruments, and analytical techniques (quantitative and/or qualitative).
- Brief mention of ethical considerations followed during the study.

f. Results

- Systematic presentation of analysed data and findings.
- Use of tables, graphs, charts, maps, and photographs to clearly display results.
- Focus on factual outcomes without interpretation.

g. Discussion

- Interpretation of results in relation to research objectives and existing literature.
- Explanation of spatial and temporal patterns, processes, causes, and implications.
- Comparison of findings with previous studies to highlight similarities or differences.

h. Major Findings and Conclusion

- Summary of the most significant findings derived from the analysis.
- Conclusions drawn in direct relation to the stated objectives.
- Brief statement on the geographical, social, or environmental significance of the study and possible recommendations

i. References (APA style)

- Comprehensive list of all sources cited in the text, including books, journal articles, government reports, and web sources.
- References must follow a consistent and internationally accepted citation style such as APA (7th Edition).

F. Appendices

- Filled-in questionnaire/schedule (signed by teacher)
- Extra data tables, charts, maps etc.

3. Course content and time allocation

Description	Hours
Research methodology, research design, scientific ethics, plagiarism, and referencing standards	15
Topic identification, problem formulation, literature review, research gap identification, and proposal preparation	20
Field investigation / data collection (primary & secondary), sampling design, use of tools and instruments	40
Scientific writing, data analysis, and interpretation	25
Finalization, revision, and presentation preparation	20
Total	120

4. Execution framework

A. Topic Approval

Each student shall submit a formal research proposal/synopsis outlining the proposed title, objectives, research questions, methodology, study area (where applicable), and preliminary references. The proposal shall be evaluated and approved by the department/supervisor based on academic relevance, originality, feasibility, and ethical considerations.

B. Supervised Academic Work

Upon approval of the topic, students shall undertake systematic literature review, field investigation, laboratory work, or data analysis, as relevant to the nature of the study. All research activities shall be conducted under the continuous guidance and supervision of the assigned faculty supervisor.

C. Drafting and Revision

Students shall prepare interim drafts of the term paper. These drafts shall be reviewed by the supervisor to ensure scientific accuracy, analytical coherence, methodological rigour, and adherence to prescribed academic and formatting standards. Necessary revisions shall be incorporated based on feedback.

D. Final Submission

The completed term paper shall be submitted in the prescribed format, both in hard copy and soft copy, within the notified timeline. The submission must comply with institutional guidelines regarding structure, referencing style, plagiarism limits, and certification requirements.

5. Document Format and Technical Specifications

- **Length and copies:** Within 30-40 pages or 5,000 words and 3 Nos of copies
- **Font:** Times New Roman, 12 pt
- **Line spacing:** 1.5
- **Figures, tables, and scientific notation/equations:** Properly labeled
- **Referencing style:** APA (7th Edition)
- **Plagiarism threshold:** Plagiarism (<10%) and AI similarity (<20%) verification clearance

**Method of Assessment,
Measurement, & Evaluation**

A. Term Paper evaluation (50 Marks)

Components	Marks
Topic relevance, clarity of problem statement, and objectives	5
Review of literature and identification of research gap	10
Research methodology, materials, and data collection techniques	10
Data analysis, results, and interpretation	10
Discussion, major findings, conclusions, and recommendations	10
Referencing, format, and overall presentation	5
Total	50

B. Presentation & Viva-Voce (25 Marks)

- **Mode:** Presentation followed by viva-voce
- **Duration:** Presentation (5-10 minutes) + Viva-voce (5–10 minutes)

Component	Marks
Quality and clarity of presentation (structure, slides/poster, time management)	7
Understanding of the topic, methodology, and results	8
Ability to answer questions, critical thinking, and defense of the work	5
Communication skills and confidence	5
Total	25

6. Evaluation Note (For Record)

- The evaluation of the Term paper shall be conducted in accordance with the approved assessment scheme prescribed by the University.
- The assessment shall consider originality, relevance of the topic, methodological rigour, quality of analysis, interpretation of results, and overall academic presentation.
- Marks awarded for the written report and presentation/viva-voce shall be clearly recorded, signed, and dated by the examiner(s).
- The evaluation sheet and viva-voce report shall be preserved by the department for future reference and audit purposes.
- Any case of academic misconduct or plagiarism detected during evaluation shall be dealt with strictly as per university regulations.

7. Viva-Voce Guidelines

- Viva-voce shall be conducted after submission of the final report.
- The viva-voce board shall normally consist of the supervisor and one internal/external examiner, as per university rules.
- The viva-voce shall assess the students:
 - Conceptual understanding of the topic
 - Knowledge of literature and methodology
 - Ability to interpret and justify results
 - Original contribution and critical thinking
- The viva-voce shall follow a short presentation (5-10 minutes) by the student, followed by question answer interaction.

	8. Maintenance of Academic Records: - Each department shall maintain a complete academic record of the Term Paper, including: - Approved synopsis/proposal - Supervisor's certificate - Final term paper (hard copy and soft copy) - Plagiarism (<10%) and AI similarity (<20%) verification clearance - Evaluation and viva-voce score sheets - Soft/Hard copies of Term Paper shall be archived digitally by the department/library for academic reference. - Academic records shall be preserved for a minimum period as prescribed by the University. - The department shall ensure confidentiality, integrity, and accessibility of academic records for examination, accreditation, and quality assurance purposes.	
Suggested Topics for Term Paper	Broad Area	Term paper Topics
	i) Physical Geography & Natural Hazards	- Riverbank erosion - Drought and flood - Tropical cyclone - Landslide - Any other relevant issues
	ii) Environmental Geography & Ecology	- Arsenic contamination - Wetlands - Biodiversity - Any other relevant issues
	iii) Population & Social Geography	- Labour migration - Child marriage - Poverty - Drop-outs - Population dynamics - Any other population and social issues
	iv) Health Geography	- Maternal and child health issues - Water and sanitation related health problems - Any other health issues
	v) Urban Geography & Urban Studies	- Urban amenities and services - Slum - Street vendors and petty traders - Waste disposal system - Any other urban related issues
	vi) Economy & Development	- Water and sanitation practices - Tourism - Rural Development - Micro and Small Scale Industries - Any other relevant issues
	vii) Applied / Local & Contemporary Issues	Other relevant geographical issues

Suggested readings	1. Clifford, N., Cope, M., Gillespie, T., & French, S. (Eds.). (2023). <i>Key methods in geography</i> (4th ed.). SAGE Publications. 2. Creswell, J. W., & Creswell, J. D. (2018). <i>Research design: Qualitative, quantitative, and mixed methods approaches</i> (5th ed.). SAGE Publications. 3. Flowerdew, R., & Martin, D. (Eds.). (2005). <i>Methods in human geography: A guide for students doing a research project</i> (2nd ed.). Routledge. 4. Goddard, W., & Melville, S. (2001). <i>Research methodology: An introduction</i> (2nd ed.). Juta & Co. 5. Gomez, B., & Jones, J. P. (Eds.). (2010). <i>Research methods in geography: A critical introduction</i>. Wiley-Blackwell. 6. Kothari, C. R., & Garg, G. (2019). <i>Research methodology: Methods and techniques</i> (4th ed.). New Age International Publishers. 7. Kumar, R. (2019). <i>Research methodology: A step-by-step guide for beginners</i> (5th ed.). SAGE Publications. 8. Montello, D. R., & Sutton, P. C. (2013). <i>An introduction to scientific research methods in geography and environmental studies</i> (2nd ed.). SAGE Publications. 9. National Credit Framework. (2023). <i>National credit framework (NCrF)</i>. Government of India. 10. Phillips, R., & Johns, J. (2012). <i>Fieldwork for human geography</i>. SAGE Publications. 11. Scheyvens, R., & Storey, D. (Eds.). (2014). <i>Development fieldwork: A practical guide</i> (2nd ed.). SAGE Publications. 12. University Grants Commission. (2020). <i>National education policy 2020</i>. Ministry of Education, Government of India. 13. University Grants Commission. (2023). <i>Curriculum and credit framework for undergraduate programmes</i>. New Delhi. 14. University of Delhi. (2022). <i>Guidelines for undergraduate dissertation/research projects under NEP-2020</i>. 15. Walliman, N. (2017). <i>Research methods: The basics</i> (2nd ed.). Routledge. 16. Wheeler, J. O., & White, G. K. (2009). <i>Fieldwork in geography</i>. Cengage Learning.
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