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)

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 partsQuestion(s) 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)

Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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 forLaboratory 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 apool 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

Semester-Wise Course Structure Under NEP- 2020

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: Practical (01)	04	50
	GEOMJ-MC-02A: Cartographic Techniques (03)	GEOMJ-MC-2B: Practical (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC1 One course to be selected from a pool of MDC courses		03	50
Minor Core (MnC)	GEOMN-MN-01A: Geotectonics and Geomorphology (03)	GEOMN-MN-1B: Practical (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: Practical (01)	04	50
	GEOMJ-MC-04A: Geography of India (03)	GEOMJ-MC-04B: Practical (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: 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: 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**

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: Practical (01)	04	50
	GEOMJ-MC-07A: Biogeography (03)	GEOMJ-MC-07B: Practical (01)	04	50
Minor Core (MnC)	GEOMN-MN-04A: Economic Geography (03)	GEOMM-MN-04B: 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****

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**

SEMESTER-VI				
Course Type	**Course Code-Course Name (Credits)**		**Total Credits**	**Marks**
	Theory	**Practical**		
Discipline Specific Course/ Major Core (DC-MJ)	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
Disciplinary Minor Course (IDC/DC-MN)	GEOMN-MN-06A: Field work techniques in Geography (03)	GEOMN-MN-06B: Field work techniques in Geography (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: Practical (01)	04	50
	GEOMJ-MC-02A: Cartographic Techniques (03)	GEOMJ-MC-2B: Practical (01)	04	50
Multidisciplinary/ Interdisciplinary (MDC/IDC)	MDC1 One course to be selected from a pool of MDC courses		03	50
Minor Core (MnC)	GEOMN-MN-01A: Geotectonics and Geomorphology (03)	GEOMN-MN-1B: Practical (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**

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 variousEarth 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 itssignificance in the formation of landforms and will be able to summarize

	andcritically 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 ExaminationExam 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 bythe 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 topographicalmap.
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 ExaminationExam duration: 2 Hours Question Pattern: Students shall perform *One* Practical carrying 7 marks;Another *One* Practical carrying 5 marks. 3 marks for submission of LaboratoryNotebook 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 CartographicAssociation.
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

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

Suggested Readings

1. Kennedy, M., Kopp, S. (2001): Understanding Map Projections, Esri Press.
2. Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. (2011): Map Use: Reading, Analysis, Interpretation, 7th ed,Esri Press.
3. Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint),Alphaneumera-Kolkata. Pearson II,
4. Pearson, F. (1990): Map Projections: Theory and Applications 2nd ed, CRC Press.
5. Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Guptill, S.C. (1995): Elements of Cartography, 6th ed, Wiley.
6. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.
7. 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., Lindstorm, 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: Practical (01)	04	50
	GEOMJ-MC-04A: Geography of India (03)	GEOMJ-MC-04B: Practical (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***

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 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.

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 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 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, chalcopyrite, 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, Londan.
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 FacultyMembers 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), Alphaneumera-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: 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: 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, Englewood Cliffs, 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-Brikray, 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

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

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-Brikray, Kamrul Book House, Dhaka
13. 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: Practical (01)	04	50
	GEOMJ-MC-07A: Biogeography (03)	GEOMJ-MC-07B: Practical (01)	04	50
Minor Core (MnC)	GEOMN-MN-04A: Economic Geography (03)	GEOMM-MN-04B: Practical (01)	04	50
Ability Enhancement Compulsory (AEC)	AEC4-English Language-2 (02)		02	25
Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)**	GEOMJ-DPE-01		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 Mode: Participation in Group Discussion as directed by the Department)

Biogeography

1. Biogeography: con ept, 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. Khinchi, 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.pd)
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), Alphaneumera-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 (GEOMJ)	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 (GEOMN)	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:	1. Ahmad, A. (1999). Social Geography. Rawat Publications. 2. Anderson, K., Domosh, M., Pile, S., & Thrift, N. (Eds.). (2003). Handbook of Cultural Geography. London: Sage. 3. Duncan, J. S., & Ley, D. (1993). Place/Culture/Representation. London: Routledge. 4. Jackson, P. (1989). Maps of Meaning: An Introduction to Cultural Geography. London: Routledge. 5. Johnston, R. J., Gregory, D., Pratt, G., & Watts, M. (2000). The Dictionary of Human Geography (4th ed.). Blackwell. 6. Knox, P., & Marston, S. (2016). Places and Regions in Global Context: Human Geography (6th ed.). Pearson. 7. Kuper, A. (1999). Culture: The Anthropologists' Account. Harvard University Press. 8. Majid Husain (2012). Human Geography. Rawat Publications. 9. Mitchell, D. (2000). Cultural Geography: A Critical Introduction. Oxford: Blackwell. 10. Price, M. (1995). The Cultural Geography Reader. Routledge. 11. Raza, M., & Agarwal, Y. (1999). Cultural Geography of India. New Delhi: National Book Trust. 12. Smith, D. M. (1977). Human geography: A welfare approach. Edward Arnold. 13. 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 carrying1mark.Questionscarrying 6 marks will have at least two parts. **Internal Assessment:** 25 Marks **Mode:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks.

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). *Primary Census Abstracts*. 2. Husain, M. (2008). Human Geography. Rawat Publications. 3. Massey, D. S., & Denton, N. A. (1988). The dimensions of residential segregation. *Social forces*, *67*(2), 281-315. 4. Mitchell, D. (2000). *Cultural Geography: A Critical Introduction*. Blackwell Publishers. 5. NFHS-5 (2021). *India National Family Health Survey Reports*. 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). *An Exploration of India: Geographical Perspectives on Society and Culture*. Longman. 9. UNDP (2023). *Human Development Reports – Technical Notes and Indices*. 10. World Economic Forum. (2023). *Global Gender Gap Report*.
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.
Course Content	
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). *Datums and map projections for remote sensing, GIS and surveying* (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): *Elementary surveying: An introduction to geomatics* (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. Questionscarrying 6 marks will have at least two parts. **Internal Assessment:** 25 Marks **Mode:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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	i)Thematic Mapping (On state/district/sub-district level Map of India) using choropleth technique ii) Construction of Projections (Mathematical): Polar Zenithal stereographic projection, Polyconic projection and Mercator's Projection.

Suggestive Readings:	1. Agor, R. (2015): *A textbook of surveying and levelling* (2nd ed.). Khanna Publishers. 2. Anson R, Ormelling FJ (1994) Basic Cartographic. Pregmen Press. 3. Basak, N.N. (2017): Surveying & Levelling, 2ed., McGraw Hill Education (India). 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, R.L. and Singh, R.P.B. (2008): Elements of Practical Geography, Kalyani Publishers. 9. Wolf, P. R., & Ghilani, C. D. (2012): *Elementary surveying: An introduction to geomatics* (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. Questionscarrying 6 marks will have at least two parts. **Internal Assessment:** 25 Marks **Mode:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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

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). *Fundamentals of Political Geography*. Rawat Publications, Jaipur and New Delhi. ISBN: 9788170336944. 2. Agnew, J. (1998). *Geopolitics: Re-visioning World Politics*. Routledge, London and New York. ISBN: 9780415171455. 3. Alexander J. W. (1963). *Economic Geography*. Prentice-Hall Inc., Englewood Cliffs, New Jersey. 4. Bagchi-Sen S. and Smith H. L. (2006). *Economic Geography: Past, Present and Future*. Taylor and Francis. 5. Chand, M., & Puri, V. K. (2015, 8th Edition). *Regional Planning in India*. Allied Publishers Pvt. Ltd., New Delhi. ISBN: 9788170235063. 6. Coe N. M., Kelly P. F. and Yeung H. W. (2007). *Economic Geography: A Contemporary Introduction*. Wiley Blackwell. 7. Combes P., Mayer T. and Thisse J. F. (2008). *Economic Geography: The Integration of Regions and Nations*. Princeton University Press 8. Dikshit, R. D. (1999). *Political Geography: The Spatiality of Politics*. Tata McGraw-Hill Education, New Delhi. ISBN: 9780074630068.

	9. Dikshit, R. D. (2004). *Geopolitics: A Contemporary Perspective*. Tata McGraw-Hill Education, New Delhi. ISBN: 9780070588301. 10. Flint, C. (2006, 3rd Edition). *Introduction to Political Geography: Space, Place and Politics*. Routledge, London and New York. ISBN: 9780415321225. 11. Husain, M. (2019). *Models in Geography* (4th Edition). Rawat Publications, Jaipur and New Delhi. ISBN: 9788131609398. 12. Husain, M. (2021, 8th Edition). *Geography of India*. McGraw Hill Education (India), New Delhi. ISBN: 9789354600853. 13. Mitra, A. (2002). *Resource Studies*. Sreedhar Publishers. 14. Pandey, R. (2007). *Resource Conflicts and Governance: Exploring Solutions for Resource-Based Conflicts in India*. Academic Foundation, New Delhi. ISBN: 978817188636. 15. Roy, P. (2005). *Economic Geography- A Study of Resources*. New Central Book Agency Ltd. 16. Singh, R. P. B. (1987). *Political Geography: A Reader*. Heritage Publishers, New Delhi. ISBN: 978817026005. 17. Taylor, P. (2012, 5th Edition). *Political Geography: World-Economy, Nation-State and Locality*. 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 4questions 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:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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. Shimbel 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). *Fundamentals of Political Geography*. Rawat Publications, Jaipur and New Delhi. ISBN: 9788170336944. 2. Dikshit, R. D. (1999). *Political Geography: The Spatiality of Politics*. Tata McGraw-Hill, New Delhi. ISBN: 9780074630068. 3. Flint, C. (2006, 3rd Ed.). *Introduction to Political Geography: Space, Place and Politics*. Routledge, London and New York. 4. Khullar, D. R. (2022). *India: A Comprehensive Geography*. Kalyani Publishers, New Delhi. ISBN: 9789327261545. 5. Mahmood, A. (2016). *Statistical methods in Geographical Studies*. 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). Measuring Voting Behaviour in India, New Delhi, SAGE Publications 8. Sarkar, A. (2013). *Quantitative Geography: Techniques and Presentations*. Orient BlackSwan Publication. 9. Singh, S. (1991). *Political Geography*. 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**		
Discipline Specific Course/ Major Core (GEOMJ)	GEOMJ-MC-12A: Regional Planning and Development (03)	GEOMJ-MC-12B: Regional Planning and 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
Disciplinary Minor Course (GEOMN)	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). *Geographic perspectives on urban systems*. Prentice Hall. 2. Bhat, L. S. (1972). *Regional planning in India*. Statistical Publishing Society. 3. Blij, H. J. de. (1971). *Geography: Regions and concepts*. John Wiley and Sons. 4. Chand, M., & Puri, V. K. (1983). *Regional planning in India*. Allied Publishers. 5. Claval, P. (1998). *An introduction to regional geography*. Blackwell Publishers. 6. Dickinson, R. E. (1964). *City and region*. Routledge. 7. Friedmann, J., & Alonso, W. (Eds.). (1975). *Regional policy: Readings in theory and applications*. MIT Press. 8. Gore, C. G. (1984). *Regions in question: Space, development theory and regional policy*. Methuen. 9. Gore, C. G., Köhler, G., Reich, U.-P., & Ziesemer, T. (1996). *Questioning development: Essays on the theory, policies and practice of development intervention*. Metropolis-Verlag. 10. Hall, P. (1992). *Urban and regional planning*. Routledge. 11. Haynes, J. (2008). *Development studies*. Polity Press. 12. Johnson, E. A. J. (1970). *The organization of space in developing countries*. MIT Press. 13. Kulshetra, S. K. (2012). *Urban and regional planning in India: A handbook for professional practitioners*. Sage Publications. 14. Kundu, A. (1992). *Urban development and urban research in India*. Khanna Publishers. 15. Misra, R. P. (1992). *Regional planning: Concepts, techniques, policies and case studies*. Concept Publishing. 16. Misra, R. P., Sundaram, K. V., & Prakash Rao, V. L. S. (1974). *Regional development planning in India*. Vikas Publishing. 17. Peet, R. (1999). *Theories of development*. The Guilford Press. 18. UNDP. (2001–2018). *Human development report* (Various years). Oxford University Press. 19. World Bank. (2001–2015). *World development report* (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 carrying1mark.Questions carrying 6 marks will have at least two parts. **Internal Assessment:** 25 Marks **Mode:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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 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) Shopher's Disparity Index. iii) Coefficient of Geographical Association and Location Quotient.
Suggestive Readings	1. Converse, P. D. (1949). New laws of retail gravitation. Journal of Marketing, 14(3), 379–384. 2. Mahmood, A. (1998): Statistical methods in Geographical Studies 3. Mishra, R.P. (2002): Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept, New Delhi

	4. Reilly, W.J. (1931): The Law of Retail Gravitation, Knickerbocker Press, New York. 5. Rodrigue J. P. (2017): The Geography of Transport System, Routledge, New York. 6. Sarkar, A. (2013): Quantitative Geography, 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

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). *What is geography?* Sage Publications.

	2. Dikshit, R. D. (1997). *Geographical thought: A contextual history of ideas*. Prentice-Hall of India. 3. Dikshit, R. D. (2006). *The art and science of geography: Integrated readings*. Prentice-Hall of India. 4. Hartshorne, R. (1959). *Perspective on the nature of geography*. Rand McNally & Company. 5. Harvey, D. (1969). *Explanation in geography*. Edward Arnold. 6. Harvey, D. (1973). *Social justice and the city*. Edward Arnold. 7. Holt-Jensen, A. (2011). *Geography: History and its concepts: A student's guide* (4th ed.). Sage Publications. 8. Husain, M. (2019). *Models in geography* (4th ed.). Rawat Publications. 9. Johnston, R. J. (2018). *Geography and geographers: Anglo-American human geography since 1945* (7th ed.). Routledge. 10. Johnston, R. J. (Ed.). (2010). *The dictionary of human geography* (5th ed.). Routledge. 11. Kapur, A. (2001). *Indian geography: Voice of concern*. Concept Publishing. 12. Martin, G. J. (2005). *All possible worlds: A history of geographical ideas* (4th ed.). Oxford University Press. 13. Peet, R. (1998). *Modern geographical thought*. Blackwell Publishers. 14. Rana, L. (2013). *Geographical thought: A systematic record of evolution*. 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 8given questions (2 questions from each module); ***6*** MCQ typesquestionscarrying1mark.Questionscarrying 6 marks will have at least two parts. **Internal Assessment:** 25 Marks **Mode:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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 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 virous 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). *Remote sensing and GIS* (2nd ed.). Oxford University Press. 2. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of geographical information systems for land resource assessment* (2nd ed.). Oxford University Press. 3. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to remote sensing* (5th ed.). Guilford Press. 4. Cuff, J. D., & Mattson, M. T. (1982). *Thematic maps: Their design and production*. Methuen Young Books. 5. Demers, M. N. (1997). *Fundamentals of geographic information systems*. Wiley.

	6. Dent, B. D., Torguson, J. S., & Holder, T. W. (2008). *Cartography: Thematic map design* (6th ed.). McGraw-Hill Higher Education. 7. Heywood, I., Cornelius, S., & Carver, S. (2011). *An introduction to geographical information systems* (4th ed.). Pearson Education. 8. Jensen, J. R. (2013). *Remote sensing of the environment: An earth resource perspective* (2nd ed.). Pearson Education. 9. Joseph, G. (2005). *Fundamentals of remote sensing* (2nd ed.). University Press (India) Pvt. Ltd. 10. Laurini, R., & Thompson, D. (1992). *Fundamentals of spatial information systems*. Academic Press. 11. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2004). *Remote sensing and image interpretation* (5th ed.). Wiley. 12. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information systems and science* (4th ed.). Wiley. 13. Nag, P., & Kudra, M. (1998). *Digital remote sensing*. Concept Publishing. 14. Narayan, L. R. A. (1999). *Remote sensing and its application*. Universities Press (India). 15. Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2008). *Thematic cartography and geovisualization* (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. Questionscarrying 6 marks will have at least two parts. **Internal Assessment:** 25 Marks **Mode:** Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 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 virous 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). *Remote sensing and GIS* (2nd ed.). Oxford University Press. 2. Burrough, P. A., & McDonnell, R. A. (1998). *Principles of geographical information systems for land resource assessment* (2nd ed.). Oxford University Press. 3. Campbell, J. B., & Wynne, R. H. (2011). *Introduction to remote sensing* (5th ed.). Guilford Press. 4. Cuff, J. D., & Mattson, M. T. (1982). *Thematic maps: Their design and production*. Methuen Young Books. 5. Demers, M. N. (1997). *Fundamentals of geographic information systems*. Wiley. 6. Dent, B. D., Torguson, J. S., & Holder, T. W. (2008). *Cartography: Thematic map design* (6th ed.). McGraw-Hill Higher Education. 7. Heywood, I., Cornelius, S., & Carver, S. (2011). *An introduction to geographical information systems* (4th ed.). Pearson Education. 8. Jensen, J. R. (2013). *Remote sensing of the environment: An earth resource perspective* (2nd ed.). Pearson Education. 9. Joseph, G. (2005). *Fundamentals of remote sensing* (2nd ed.). University Press (India) Pvt. Ltd. 10. Laurini, R., & Thompson, D. (1992). *Fundamentals of spatial information systems*. Academic Press. 11. Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2004). *Remote sensing and image interpretation* (5th ed.). Wiley. 12. Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information systems and science* (4th ed.). Wiley. 13. Nag, P., & Kudra, M. (1998). *Digital remote sensing*. Concept Publishing. 14. Narayan, L. R. A. (1999). *Remote sensing and its application*. Universities Press (India). 15. Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2008). *Thematic cartography and geovisualization* (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

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. • 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., *"Hydrogeomorphic Characteristics of the Ganga Basin", Spatio-Temporal Analysis of Drought Patterns in Purulia District", Livelihood Vulnerabilities in Slum Areas in Kolkata etc.*)

Include:

- Data presentation: tables, graphs, charts, maps, photographs, etc.
- Analytical interpretation of data and findings
- Spatial or temporal comparison, where relevant
- 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). *Research Methods in Anthropology: Qualitative and Quantitative Approaches* (6th ed.). Rowman & Littlefield. 2. Clifford, N., Cope, M., French, S., & Valentine, G. (Eds.). (2023). *Key Methods in Geography* (4th ed.). Sage Publications. 3. Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). Sage Publications. 4. Dawson, C. (2009). *Introduction to Research Methods: A Practical Guide for Anyone Undertaking a Research Project* (4th ed.). How To Books. 5. Flowerdew, R., & Martin, D. (2021). Methods in Human Geography: A Guide for Students Doing a Research Project (3rd ed.). Routledge. 6. Goddard, W., & Melville, S. (2019). Research Methodology: An Introduction (3rd ed.). Juta Academic. 7. Gomez, B., & Jones, J.P. (2020). Research Methods in Geography: A Critical Introduction (3rd ed.). Wiley-Blackwell. 8. Hay, I. (2021). Qualitative Research Methods in Human Geography (5th ed.). Oxford University Press. 9. Kitchin, R., & Tate, N.J. (2013). Conducting Research in Human Geography: Theory, Methodology and Practice. Routledge. 10. Kothari, C. R., & Garg, G. (2019). *Research Methodology: Methods and Techniques* (4th ed.). New Age International Publishers. 11. Kumar, R. (2023). *Research Methodology: A Step-by-Step Guide for Beginners* (6th ed.). Sage Publications. 12. Montello, D.R., & Sutton, P.C. (2020). An Introduction to Scientific Research Methods in Geography and Environmental Studies (3rd ed.). SAGE Publications. 13. Scheyvens, R., & Storey, D. (Eds.). (2014). *Development Fieldwork: A Practical Guide* (2nd ed.). Sage Publications. 14. Wheeler, J. O., & White, G. K. (2009). *Fieldwork in Geography* (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 10 marks and Presentation 5 marks; Field Attendance 5 marks and Classroom Activities (in due course of report preparation) 5 marks.