



University of Gour Banga

Syllabus for

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

UNDER NEP- 2020

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

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

Descriptive Type 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

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

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

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

Internal Assessment

Full Marks = 10

(As mentioned in the corresponding syllabus)

Practical (Semester End Laboratory Based Test)

Full Marks = 15

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

Word limits for descriptive type questions (Theory)

10 marks: 600 - 700

5 marks: 300 - 350

Duration of Examination

Theory paper of 25 marks: 2 hours

Practical paper of 15 marks: 2 hours

SEMESTER WISE COURSE STRUCTURE
for
4-Year Undergraduate Programme under NEP-2020

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)	22+2*
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) MC-6 (4)	MDC-3 (3)	Minor-1 MnC-3 (4) Subject-A	English Language-1 (2)	Choose one SEC from Major Discipline SEC-3 (3)			20
IV	MC-7 (4) MC-8 (4) MC-9 (4)		Minor-2 MnC-4 (4) Subject-B	English Language-2 (2)		Internship/ Apprenticeship/ Project/ Community Outreach (IAPC) (2)**		18+2**
Students on exit shall be awarded Undergraduate Diploma (in the field of study/ discipline) after securing the requisite 84 credits in semester-IV after completion of IAPC (2) (either in semester-II* or in semester-IV**). All other candidates must complete the IAPC (2) (either in semester-II* or in semester-IV**).								
V	MC-10 (4) MC-11(4) DSE-1 (4) DSE-2 (4)		Minor-1 MnC-5 (4) Subject-A				Choose one from a pool of courses (2)	22
VI	MC-12 (4) MC-13 (4) DSE-3 (4) DSE-4 (4)		Minor-2 MnC-6 (4) Subject-B					20
Students on exit shall be awarded Undergraduate Degree (in the Field of Study/ Discipline) after securing the requisite 126 credits in Semester- VI								
VII	MC-14 (4) DSE-5 (4) DSE-6 (4)		Minor-1 MnC-7 (4) Subject-A			Dissertation on Major (4) or Academic project/ Entrepreneurship (4)		20
VIII	MC-14 (4) DSE-7 (4) DSE-8 (4)		Minor-2 MnC-8 (4) Subject-B			Dissertation on Major (4) & Academic project/ Entrepreneurship (4)		24

Students on exit shall be awarded Bachelor of (in the Field of Study/ Discipline) (Honours with Research/Academic projects/Entrepreneurship) or (Honours with Research in Discipline-1 (Major) with Discipline-2 (Minor) after securing the requisite 170 credits on completion of Semester-VIII								170
VII	MC-14 (4) DSE-5 (4) DSE-6 (4) DSE-7 (4)		Minor-1 MnC-7 (4) Subject-A					20
VIII	MC-14 (4) DSE-8 (4) DSE-9 (4) DSE-10 (4)		Minor-2 MnC-8 (4) Subject-B			Dissertation on Major (4) or Academic project/ Entrepreneurship (4)		24
Students on exit shall be awarded Bachelor of (in the Field of Study/ Discipline) Honours in Discipline-1 (Major) with Discipline-2 (Minor) after securing the requisite 170 credits on completion of Semester-VIII								170

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)	GEOMJ-DPE-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
	GEOMJ-MC-06A: Population Geography (03)	GEOMJ-MC-06B: 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			20	275

SEMESTER-IV				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Major Core (MC)	GEOMJ-MC-07A: Economic Geography (03)	GEOMJ-MC-07B: Practical (01)	04	50
	GEOMJ-MC-08A: Settlement Geography (03)	GEOMJ-MC-08B: Practical (01)	04	50
	GEOMJ-MC-09A: Biogeography (03)	GEOMJ-MC-09B: 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			18+2**	225+25**

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	<ul style="list-style-type: none"> To inculcate fundamental knowledge of the different aspects of physical geology and geomorphology. To gain expertise in discerning and acknowledging the dynamic tectonic and structural evolution of Earth's geosphere. To enhance the ability to distinctly identify and characterize the various Earth surface processes and resulting landforms.
Course Outcome	<ul style="list-style-type: none"> 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 be able to acquire a comprehensive understanding of the composition and dynamics within the earth's interior. Learners will gain insight into the dynamic nature of the earth's crust and its significance in the formation of landforms and will be able to summarize and critically evaluate different models explaining how landforms develop. Learners will be able to identify various types of landforms and establish their connections. 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.
<ul style="list-style-type: none"> 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.

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	<ul style="list-style-type: none"> • To provide the idea of topographical maps. • To analyse and interpret the morphometric aspects of the SOI topographical map.
Course Outcome	<ul style="list-style-type: none"> • Learners will be able to identify and analyse the survey of India topographical map and they will be able to interpret the features and their interrelationship which will help them in future research in practical fields.
• Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours

Question Pattern: Students shall perform **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. 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● Internal Assessment 	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department).

Cartographic Techniques

1. Introduction to cartography: Nature, scope and development, elements, and applications.
2. Concept and application of map scale: Plain, comparative, diagonal and positive vernier.
3. Coordinate systems: Grid, concept of geoid, spheroid, rectangular and geographical coordinate system.
4. Map projections: concept, classification, properties and uses; Concept and significance of UTM projection.
5. Map: Concept, components, classifications, importance and uses.

6. Geographical data and cartograms: Techniques, advantages, and disadvantages of line, bar, dot and sphere, proportional circles, isopleths, and choropleth.

Suggested Readings

1. Anson R. and Ormelling F. J. (1994): International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
2. Gupta K.K. and Tyagi, V. C. (1992): Working with Map, Survey of India, DST, New Delhi.
3. Kennedy, M., Kopp, S. (2001): Understanding Map Projections, Esri Press
4. Mishra R.P. and Ramesh, A. (1989): Fundamentals of Cartography, Concept, New Delhi.
5. Monkhouse F. J. and Wilkinson H. R. (1973): Maps and Diagrams, Methuen, London.
6. Rhind D. W. and Taylor D. R. F. (eds.) (1989): Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
7. Robinson A. H. (2009): Elements of Cartography, John Wiley and Sons, New York.
8. Singh R. L. and Singh R. P. B. (1999): Elements of Practical Geography, Kalyani Publishers.
9. Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

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

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objective	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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 IL,
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.

GEOMN-MN-01A: Geotectonic & Geomorphology (Theory)

[This will be opted by the students of other disciplines only]

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none">● To inculcate fundamental knowledge of the different aspects of physical geology and geomorphology.● To gain expertise in discerning and acknowledging the dynamic tectonic and structural evolution of Earth's geosphere.● To enhance the ability to distinctly identify and characterize the various Earth surface processes and resulting landforms.
Course Outcome	<ul style="list-style-type: none">● 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 be able to acquire a comprehensive understanding of the composition and dynamics within the earth's interior.● Learners will gain insight into the dynamic nature of the earth's crust and its significance in the formation of landforms and will be able to summarize and critically evaluate different models explaining how landforms develop.● Learners will be able to identify various types of landforms and establish their connections.● 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.
<ul style="list-style-type: none">● 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.
<ul style="list-style-type: none">● Internal Assessment	10 Marks Mode: Preparation of assignment on relevant theoretical aspects as directed by the Department.

Part 1: Geotectonics

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

Part 2: Geomorphology

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

Suggested Readings

1. Bloom, A. L. (2001): Geomorphology - A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
2. Bridges, E. M. (1990): World Geomorphology, Cambridge University Press, Cambridge.

3. Christopherson, Robert W. (2011): Geosystems - An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
4. Fairbridge, R.W. (1968): The encyclopaedia of geomorphology, (Edge). Reinhold Book, New York
5. Huggett, R.J. (2011): Fundamentals of Geomorphology. Routledge, New York
6. Kale, V. S. and Gupta A. (2001): Introduction to Geomorphology, Orient Longman, Hyderabad.
7. Knighton, A. D. (1984): Fluvial Forms and Processes, Edward Arnold Publishers, London.
8. Selby, M.J. (2005): Earth's Changing Surface, Indian Edition, OUP
9. Skinner, Brian J. and Stephen C.P (2000): The Dynamic Earth: An Introduction to Physical Geology, 4th Edition, John Wiley and Sons.
10. Summerfield, M.A. (1991): Global Geomorphology: An Introduction to the Study of Landforms. Longman, London.
11. Sing, S., (2020): Physical Geography, Pravalika Publications, Allahabad
12. Sing, S., (2018): Geomorphology, Pravalika Publications, Allahabad
13. Thornbury, W. D. (1969): Principles of Geomorphology, Wiley.

GEOMN-MN-01B: Geotectonics and Geomorphology (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	<ul style="list-style-type: none"> ● To provide the idea of topographical maps. ● To analyse and interpret the morphometric aspects of the SOI topographical map.
Course Outcome	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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. 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-SEC-01A: Elementary Statistics (Theory)

Total Credit	02 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course Objective	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • Semester End Examination 	<p>15 Marks</p> <p>Mode: Laboratory based Examination.</p> <p>Exam duration: 2 Hours</p> <p>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.</p>

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)	GEOMJ-DPE-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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ● To provide the ability of analysing spatial dynamics of the human population. ● To provide the skills of measuring human development.
Course Outcome	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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. Patrea 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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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.
<ul style="list-style-type: none">Semester End Examination	15 Marks Mode: Laboratory based Examination Exam duration: 2 Hours Question Pattern: Students shall perform One Practical carrying 7 marks; Another One Practical carrying 5 marks. 3 marks for submission of Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce.

List of Practical

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

Suggested Readings

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

GEOMN-MN-02A: Human Geography (Theory)

[This will be opted by the students of other disciplines only]

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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

GEOMN-MN-02B: Human Geography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	<ul style="list-style-type: none"> ● To provide the ability of analysing spatial dynamics of the human population. ● To provide the skills of measuring human development.
Course Outcome	<ul style="list-style-type: none"> ● 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-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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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.
<ul style="list-style-type: none">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

- 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).
- Levelling and contouring: Profile line survey using a dumpy level; radial contouring by dumpy level and prismatic compass.

Suggested Readings

- 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,
- Agor, R. (1980): A Textbook of Surveying and Levelling, Khanna Publishers.
- Basak, N.N. (2017): Surveying & Levelling, 2nd ed., McGraw Hill Education (India).
- Bhavikatti, S.S. (2019): Surveying and Levelling, Vol II, 2nd ed., Wiley.
- Kanetkar, T.P. (2006): Surveying & Levelling Vol – I, Pune Vidyarthi Griha Prakashan.
- Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed. Orient Blackswan Private Ltd. Macmillan and Company, Ltd.
- Singh, L.R. (2010): Fundamentals of Practical Geography, Sarada Pustak Bhavan, Alahabad.
- Venkatramaiah, C. (2011): Textbook of Surveying, Universities Press, Hyderabad

GEOMJ-DPE-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	<ul style="list-style-type: none">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	<ul style="list-style-type: none"> Through project construction, learners will acquire fundamental problem-solving skills. Learners will be able to achieve their professional skills through project construction and delivery.
<ul style="list-style-type: none"> Project Report Preparation 	20 Marks Mode: Data collection and report preparation under the supervision of the Faculty Members of the Department.
<ul style="list-style-type: none"> 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

- A group project report is to be prepared and submitted based on any one of the following topics:
 - Riverbank erosion
 - Arsenic contamination
 - Drought and flood
 - Tropical cyclone
 - Landslide
 - Wetlands
 - Biodiversity
 - Labour migration
 - Child marriage
 - Poverty
 - Maternal and child health issues
 - Urban amenities and services
 - Waste disposal system
 - Water and sanitation practices
 - Slum
 - Street vendors & petty traders
 - Drop-outs.
 - Relevant other local issues
- For writing project reports, students be divided into groups under teachers of the concerned department of the college.
- 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.
- Participation of each student in the project work is mandatory & certificate of project coordinator is to be attached in the report.
- 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.
- Length of the report not to exceed 3000 words.
- The project report should contain up to 5 pages for diagrams and a maximum of 3 pages for photographs.
- 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.
- 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

- Clifford, N., Cope, M., Gillespie, T.W., French, S. (ed) (2016): Key Methods in Geography, 3rd ed, Sage.
- Gardiner, V., Dacombe, R.V. (1982): Geomorphological Field Manual, George Allen & Unwin
- Lindholm, R. (1987): A Practical Approach to Sedimentology, Allen & Unwin.
- Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed. (2017 reprint), Alphaneumera-Kolkata
- Northey, N., Draper, D., Knight, D.B. (2015): Making Sense in Geography and Environmental Sciences:
- Northey M., McKibbin J. (2012): Making Sense: Making Sense: A Student's Guide to Research and Writing 7th ed., Oxford University Press.
- 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
	GEOMJ-MC-06A: Population Geography (03)	GEOMJ-MC-06B: 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			20	275

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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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 Horn 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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-MC-06A: Population Geography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none">● 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	<ul style="list-style-type: none">● 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.
<ul style="list-style-type: none">● 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.
<ul style="list-style-type: none">● 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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.
<ul style="list-style-type: none"> ● 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.

GEOMN-MN-03A: Climatology (Theory)

[This will be opted by the students of other disciplines only]

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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 Horn L. H. (1980): An Introduction to Climate, McGraw-Hill.

GEOMN-MN-03B: Climatology (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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

- Measurement of weather elements by meteorological instruments: Hygrometer, maximum-minimum thermometer, barometer, and rain gauge (Simon's), anemometer and windvane.
- Preparation of climatic graphs and charts: Taylor's climograph, hythergraph, star diagram and ergograph; Synoptic station model.
- 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

- Asnani, G. C., De, U. S., Hatwar, H. R., and Mazumdar, A. B. (2012): Monsoon Monograph, Indian Meteorological Department
- Ahmed, I. (1994): Practical Geography, Jawahar Publishers and Distributors, New Delhi
- Das, P.K. (2018): The Monsoons, The National Book Trust of India
- Harrison, G. (2014): Meteorological measurements and instrumentation. John Wiley & Sons.
- Khan, MD.Z.A. (1998): Textbook of Practical Geography: Concept Publishing Company.
- Khullar, D. (2014): King's Practical Geography, Educational Publisher, Delhi
- Monkhouse, F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi
- Saha, P.K. and Basu, P. (2009): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata.
- Sarkar, A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad
- 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Learners will be skilled in land survey concepts and techniques.

	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • Semester End Examination 	<p>15 Marks</p> <p>Mode: Laboratory based Examination</p> <p>Exam duration: 2 Hours</p> <p>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.</p>

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-07A: Economic Geography (03)	GEOMJ-MC-07B: Practical (01)	04	50
	GEOMJ-MC-08A: Settlement Geography (03)	GEOMJ-MC-08B: Practical (01)	04	50
	GEOMJ-MC-09A: Biogeography (03)	GEOMJ-MC-09B: 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			18+2**	225+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-07A: Economic Geography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none"> To help students understand the dynamic nature of the discipline that examines the economic functions and elements of the economy in terms of space and time. To provide ideas about the utilities of resources and the forms of economies and analyse the causal relationship of economic issues from a geographical perspective. To find effective ways of solving locational problems of economic activities by understanding the locational theories.
Course Outcome	<ul style="list-style-type: none"> Learners will acquire a detailed, informative, and analytical study of economic activities and resources of the nation and the world. Learners will achieve the ideas of the present status of economy and human as well as material resources of the country and the world.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Participation in Group Discussion as directed by the Department)

Economic Geography

1. Economic geography: Definition, nature, scope, content, and approaches.

2. Resource: Concept, definition, classification, importance, uses and conservation; Functional theory of resource.
3. Concept and classification of economic activities: Primary activities - subsistence agriculture (paddy in south-east Asia) and commercial farming (tea and rubber in south-east Asia); fishing (major fishing belts of the world), and mining (coal, iron ore) in India; Secondary activities: manufacturing industries (iron and steel and cotton textile industries of India), Tertiary activities: transport (types and importance).
4. Industrial regions and SEZ: Concept and classification; industrial regions of India- Haldia and Mumbai-Pune.
5. Locational theories: Agriculture (Von Thünen), and industrial (Weber and Losch)
6. Economic reforms: Concepts of liberalization, privatization, globalization, and their impacts on the Indian economy with special reference to industry and agriculture.
7. Industrial development in India: Automobile, and information technology.
8. International trade and economic blocks: WTO, OPEC, and G-20.

Suggested Readings

1. Alexander J. W. (1963): Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Bagchi-Sen S. and Smith H. L. (2006): Economic Geography: Past, Present and Future, Taylor and Francis.
3. Clark, G. L., Feldman, M. P., & Gertler, M. S. (Ed.). (2003): The Oxford handbook of economic geography. Oxford University Press.
4. Coe N. M., Kelly P. F. and Yeung H. W. (2007): Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
5. Combes P., Mayer T., and Thisse J. F. (2008): Economic Geography: The Integration of Regions and Nations, Princeton University Press.
6. Dhilon, S.S. (2004): Agricultural Geography, Tata McGraw-Hill Education.
7. Durand, L. (1961): Economic Geography, Crowell.
8. Gautam, A. (2022): Advanced Economic Geography, Sharda Pustak Bhavan, Allahabad.
9. Hodder, B. W., and Lee Roger (1974): Economic Geography, Taylor and Francis.
10. Khullar, D. R. (2023): India: A comprehensive geography. Kalyani Publishers.
11. Siddhartha, K. (2016): Economic geography. Kitab Mahal, Kolkata
12. Singh, J. (1984): Agricultural Geography, Tata McGraw-Hill Education.
13. Shafi, M. (1993): Agricultural Geography, Dorling Kindersley (India) Pvt. Ltd.
14. Wheeler J. O. (1998): Economic Geography, Wiley.
15. Wilmington D. E. (2008): Economic Geography, Husband Press.

GEOMJ-MC-07B: Economic Geography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	<ul style="list-style-type: none"> ● To analyse agricultural efficiency and to measure transport connectivity and accessibility. ● To analyse spatial industrial development.
Course Outcome	<ul style="list-style-type: none"> ● Learners will be able to analyse agricultural efficiency and its field applications and will gain the different measures of transport connectivity and accessibility and its applications. ● Learners will be skilled to analyse spatial industrial development with suitable measures and their applicability.
● 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. Agricultural efficiency analysis: Kendal's method
2. Measuring transport connectivity and accessibility: Alpha, beta, gamma indices, cyclomatic number, Shimmel index.
3. Comparison of spatial industrial development: Location quotient and coefficient of geographical association (Sargent Florence's method)

Suggested Readings

1. Latham, W.R. (1976): Locational Behaviour in Manufacturing Studies, Springer, Boston.
2. Latham, W.R. (1976): Measurement of Spatial Association, The Review of Regional Studies, URL: https://link.springer.com/chapter/10.1007/978-1-4613-4369-1_4
3. Mahmood, A. (1998): Statistical methods in Geographical Studies, Rajesh Publications, New Delhi.
4. Raja, M and Aggarwal, Y. (1999): Transport Geography of India, Concept.
5. Rodrigue J. P. (2017): The Geography of Transport System, Routledge, New York.
6. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations. Orient Black Swan Private Ltd., Orient Blackswan Pvt. Ltd, New Delhi
7. Saxena, H.M. (2005): Transport Geography, Rawat.

GEOMJ-MC-08A: Settlement Geography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none">● To analyse the nature and characteristics of human settlements in terms of geographical environment and time.● To analyse settlement-related problems, finding solutions to them, and pointing out ways of future development.
Course Outcome	<ul style="list-style-type: none">● Learners will be able to acquire the ability to analyse the type, layout, and nature of urban and rural settlements.● Learners will also identify the problems related to the settlement and develop a plan to solve the issues.
<ul style="list-style-type: none">● 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.
<ul style="list-style-type: none">● Internal Assessment	10 Marks Mode: Participation in Group Discussion as directed by the Department)

Settlement Geography

1. Settlement geography: Definition, scope, contents, and relevance.
2. Rural settlement: Definition, nature, and characteristics; site and situation, and morphology (internal and external morphology, layout, types, and patterns).
3. Rural house types in India: Census classification and regional pattern.
4. Urban settlement: Definition and types of urban settlements in India; functional classification of cities (Ashok Mitra and C. D. Harris).
5. Concept of city-region, rural-urban fringe, urban agglomeration, metropolis, conurbation, and smart city.
6. Urban morphology and theories: Classical models- Burgess, H. Hoyt, and Harris and Ullman.
7. Hierarchy of settlements: Central place theory (W. Christaller), rank size rule, primate city.

Suggested Readings

1. Ghosh, S. (1998): Introduction to Settlement Geography, Sangam Books Ltd.
2. Harishchandra, T. S. (2020): Population and Settlement Geography (Geography 122), Nirali Prakashan
3. Hornby, W.F and Jones, M. (1991): An Introduction to Settlement Geography, Cambridge University Press
4. Hussain, J. (2021): Settlement Geography, Notion Press
5. Khullar, D. R. (2023). India: A comprehensive geography. Kalyani Publishers.
6. Maurya, S.D. (2023): Settlement Geography, Sharda Pustak Bhawan
7. Pacione, M. (1984). Rural geography. Harper and Row.
8. Ramachandran, R. (1992). Urbanization and urban systems in India. Oxford University Press
9. Sahay, A., Sinha V.N.P., and Verma U. (2017): Introduction to Settlement Geography, Rajesh Publications
10. Siddhartha, K, and Mukherjee, S. (2016): Cities, Urbanisation, and urban systems, Kitab Mahal
11. Singh, R.Y. (2002): Geography of Settlements, Rawat Publication

12. Singh, Y.I. (2021): Population and Settlement Geography: As Per CBCS Based U.G. Course In Geography: English Medium. Global Net Publication
13. Tiwari, R.C. (2020): Settlement Geography, Pravalika publication

GEOMJ-MC-08B: Settlement Geography (Practical)

Total Credit	01 Credits
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course objective	<ul style="list-style-type: none"> ● To analyse spatial distribution and interaction of settlement and to analyse hierarchy of urban settlement. ● To measure level of urbanization ● To measure threshold and urban is fare of inference
Course Outcome	<ul style="list-style-type: none"> ● Learners will be able to analyse the spatial distribution and interaction measures of settlement. ● Learners will be to analyse the hierarchy of urban settlements, different measures, and their applicability and also to measure the threshold services and urban influence.
<ul style="list-style-type: none"> ● Semester End Examination 	<p>15 Marks</p> <p>Mode: Laboratory based Examination</p> <p>Exam duration: 2 Hours</p> <p>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.</p>

List of Practical

1. Spatial distribution and interactions: Nearest-neighbour analysis (Clerk and Evans), centrality index (Bhat, 1976).
2. Hierarchy of urban settlements: Rank-size rule (Zipf), indices of primacy (M. Jefferson's two city and four city index).
3. Measurement of threshold (Christaller); Urban sphere of influence (Huff's model)

Suggested Readings

1. Ghosh, S. (1998): Introduction to Settlement Geography, Sangam Books Ltd.
2. Harishchandra, T. S. (2020): Population and Settlement Geography (Geography 122), Nirali Prakashan
3. Hornby, W.F and Jones, M. (1991): An Introduction to Settlement Geography, Cambridge University Press
4. Hussain, J. (2021): Settlement Geography, Notion Press
5. Khullar, D. R. (2023): India: A comprehensive geography. Kalyani Publishers.
6. Maurya, S.D. (2023): Settlement Geography, Sharda Pustak Bhawan
7. Pacione, M. (1984): Rural geography. Harper and Row.
8. Ramachandran, R. (1992): Urbanization and urban systems in India. Oxford University Press
9. Sahay, A., Sinha V.N.P., and Verma U. (2017): Introduction to Settlement Geography, Rajesh Publications
10. Siddhartha, K, and Mukherjee, S. (2016): Cities, Urbanisation, and urban systems, Kitab Mahal
11. Singh, R.Y. (2002): Geography of Settlements, Rawat Publication
12. Singh, Y.I. (2021): Population and Settlement Geography: As Per CBCS Based U.G. Course In Geography: English Medium. Global Net Publication
13. Tiwari, R.C. (2020): Settlement Geography, Pravalika publication

GEOMJ-MC-09A: Biogeography (Theory)

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> Internal Assessment 	10 Marks Mode: Participation in Group Discussion as directed by the Department)

Biogeography

- Biogeography: concept, scope, content, approaches, branches, and development.
- Biogeographical regions of the world and India.
- 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).
- Ecological succession: Concept, stages, and significance.
- Biogeochemical cycles: Carbon and nitrogen cycles and their significance.
- Biodiversity: Definition, classification (Whittaker), significance, biodiversity hotspot and regions; threats and conservation practices.
- Major biomes of the world: Tropical rainforest, hot desert, mangrove, and coral reef.

Suggested Readings

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

GEOMJ-MC-09B: Biogeography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course objective	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
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List of Practical

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

Suggested Readings

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

GEOMN-MN-04A: Economic Geography (Theory)

[This will be opted by the students of other disciplines only]

Total Credit	03 Credits
Total Credit hours	03 hours per week (Lectures/ Tutorials)
Total Marks	35 Marks
Course objective	<ul style="list-style-type: none"> ● To help students understand the dynamic nature of the discipline that examines the economic functions and elements of the economy in terms of space and time. ● To provide ideas about the utilities of resources and the forms of economies and analyse the causal relationship of economic issues from a geographical perspective. ● To find effective ways of solving locational problems of economic activities by understanding the locational theories.
Course Outcome	<ul style="list-style-type: none"> ● Learners will acquire a detailed, informative, and analytical study of economic activities and resources of the nation and the world. ● Learners will achieve the ideas of the present status of economy and human as well as material resources of the country and the world.

● 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)

Economic Geography

1. Economic geography: Definition, nature, scope, content, and approaches.
2. Resource: Concept, definition, classification, importance, uses and conservation; Functional theory of resource.
3. Concept and classification of economic activities: Primary activities - subsistence agriculture (paddy in south-east Asia) and commercial farming (tea and rubber in south-east Asia); fishing (major fishing belts of the world), and mining (coal, iron ore) in India; Secondary activities: manufacturing industries (iron and steel and cotton textile industries of India), Tertiary activities: transport (types and importance).
4. Industrial regions and SEZ: Concept and classification; industrial regions of India- Haldia and Mumbai-Pune.
5. Locational theories: Agriculture (Von Thünen), and industrial (Weber and Losch)
6. Economic reforms: Concepts of liberalization, privatization, globalization, and their impacts on the Indian economy with special reference to industry and agriculture.
7. Industrial development in India: Automobile, and information technology.
8. International trade and economic blocks: WTO, OPEC, and G-20.

Suggested Readings

1. Alexander J. W. (1963): Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Bagchi-Sen S. and Smith H. L. (2006): Economic Geography: Past, Present and Future, Taylor and Francis.
3. Clark, G. L., Feldman, M. P., & Gertler, M. S. (Eds.). (2003). The Oxford handbook of economic geography. Oxford University Press.
4. Coe N. M., Kelly P. F. and Yeung H. W. (2007): Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
5. Combes P., Mayer T. and Thisse J. F. (2008): Economic Geography: The Integration of Regions and Nations, Princeton University Press.
6. Dhilon, S.S. (2004): Agricultural Geography, Tata McGraw-Hill Education.
7. Durand, L. (1961): Economic Geography, Crowell.
8. Gautam, A. (2022): Advanced Economic Geography, Sharda Pustak Bhavan, Allahabad.
9. Hodder, B. W. and Lee Roger (1974): Economic Geography, Taylor and Francis.
10. Khullar, D. R. (2023): India: A comprehensive geography. Kalyani Publishers.
11. Siddhartha, K. (2016): Economic geography. Kitab Mahal, Kolkata
12. Singh, J. (1984): Agricultural Geography, Tata McGraw-Hill Education.
13. Shafi, M. (1993): Agricultural Geography, Dorling Kindersley (India) Pvt. Ltd.
14. Wheeler J. O. (1998): Economic Geography, Wiley.
15. Wilmington D. E. (2008): Economic Geography, Husband Press.

GEOMN-MN-04B: Economic Geography (Practical)

Total Credit	01 Credit
Total Credit hours	02 hours per week (Practical)
Total Marks	15 Marks
Course Objectives	<ul style="list-style-type: none"> ● To analyse agricultural efficiency and to measure transport connectivity and accessibility. ● To analyse spatial industrial development.
Course Outcome	<ul style="list-style-type: none"> ● Learners will be able to analyse agricultural efficiency and its field applications and will gain the different measures of transport connectivity and accessibility and its applications. ● Learners will be skilled to analyse spatial industrial development with suitable measures and their applicability.
● 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. Agricultural efficiency analysis: Kendal's method
2. Measuring transport connectivity and accessibility: Alpha, beta, gamma indices, cyclomatic number, Shimmel index.
3. Comparison of spatial industrial development: Location quotient and coefficient of geographical association (Sargant Florence's method)

Suggested Readings

1. Latham, W.R. (1976): Locational Behaviour in Manufacturing Studies, Springer, Boston.
2. Latham, W.R. (1976): Measurement of Spatial Association, The Review of Regional Studies, URL: https://link.springer.com/chapter/10.1007/978-1-4613-4369-1_4
3. Mahmood, A. (1998): Statistical methods in Geographical Studies, Rajesh Publications, New Delhi.
4. Raja, M and Aggarwal, Y. (1999): Transport Geography of India, Concept.
5. Rodrigue J. P. (2017): The Geography of Transport System, Routledge, New York.
6. Saxena, H.M. (2005): Transport Geography, Rawat.
7. Sarkar, A. (2013): Quantitative Geography: Techniques and Presentations. Orient Black Swan Private Ltd., Orient Blackswan Pvt. Ltd, New Delhi.

GEOMJ-DPE-01: 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	<ul style="list-style-type: none">● 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	<ul style="list-style-type: none">● Through project construction, learners will acquire fundamental problem-solving skills.● Learners will be able to achieve their professional skills through project construction and delivery.
<ul style="list-style-type: none">● Project Report Preparation	20 Marks Mode: Data collection and report preparation under the supervision of the Faculty Members of the Department.
<ul style="list-style-type: none">● 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