Raja N.L. Khan Women's College
(Autonomous)

Syllabus

Department of Geography (UG & PG)

Programme under NEP-2020

w.e.f. 2024-2025 Academic Session

Raja N.L. Khan Women's College (Autonomous)

Department Of Geography (UG)

Major Course

Full Marks=75 (Theory – 40, Practical- 20, Cumulative Assessment-15 (10+05)

Sl No.	Paper Code		Title of the Paper	Sem	Credit	Allot. Class	
						Th.	Pr.
1	GEOMJ-101		Geomorphology	I	04	03	01
2	GEOMJ-201		Hydrology and Oceanography	II	04	03	01
3	GEOMJ-301		Climatology	III	08	03	01
4	GEOMJ-302		Soil and Bio-geography			03	01
5	GEOMJ-401		Social and Cultural Geography	IV	12	03	01
6	GEOMJ-402		Settlement Geography			03	01
7	GEOMJ-403		Regional Development and Planning			03	01
8	GEOMJ-501		Statistical Methods in Geography	V	16	03	01
9	GEOMJ-502		Geography of India and West Bengal			03	01
10	GEOMJ-503		Research Methodology and Field work			03	01
11	GEOMJ-504		Economic Geography			03	01
12	GEOMJ-601		Evolution of Geographical Thought	VI	16	03	01
13	GEOMJ-602		Population Geography			03	01
14	GEOMJ-603		Geo-spatial Technology			03	01
15	GEOMJ-604		Thematic Cartography			03	01
16	GEOMJ-701		Surveying Techniques and Mapping	VII	16	03	01
17	GEOMJ-702		Disaster Management			03	01
18	GEOMJ-703		Sustainable Development			03	01
19	GEOMJ-704		Political Geography			03	01
20	GEOMJ-801		Landscape Ecology	VIII	20	03	01
21	GEOMJ-802		Trade and Transport Geography			03	01
22	GEODSE-01	Research Project	Watershed Management			03	01
23	GEODSE-02		Urban Geography			03	01
24	GEODSE-03		Geomatics and Spatial Analysis			03	01
Total Credits=					**96**		

Raja N.L. Khan Women's College (Autonomous)
Department Of Geography (UG)

Minor Course
Full Marks=75 (Theory- 40, Practical- 20, Cumulative Assessment-15 (10+05)

Sl No	Paper Code	Title of the Paper	Sem.		Credit	Allot. Class	
			1st Minor	2nd Minor		Th	Tu
1	GEOMI-01	Geomorphology	I	III	04	03	01
2	GEOMI-02	Hydrology and Oceanography	II	IV	04	03	01
3	GEOMI-03	Rural Development	V	VI	04	03	01
4	GEOMI-04	Industrial Geography	VII	VIII	04	03	01
Total Credits=					**16**		

SEC Course
Full Marks=50 (Theory- 20, Practical- 20, Cumulative Assessment-10 (05+05)

Sl No.	Paper Code	Title of the Paper	Sem.	Credit	Allot. Class	
					Th	Tu
1	SEC-101	Climate Change: Vulnerability and Adaptation	I	03	02	01
2	SEC-201	Map Projection	II	03	02	01
3	SEC-301	Geography of Tourism	III	03	02	01
Total Credits=				**09**		

Objectives:

The Raja Narendra Lal Khan Women's College is located at Jungle Mahal area of Paschim Medinipur District (West Midnapore, West Bengal). A large number of the students belong to economically weaker section of the society including scheduled tribe and scheduled caste category. Moreover the college was established to cater the needs of women education. Under this background, teaching Geography in Under Graduate level has immense significance:

- As Geography is the study of places and the relationships between people and their environments, students are able to correlate between the physical properties of Earth's surface and the human societies spread over the surface of the earth.
- Syllabus structure provides students to encounter practical problems with theoretical knowledge in Geography and Environment.
- Introduction of research methodology and field survey as well as laboratory-based field works will be helpful to gain practical experience on topics already taught theoretically.
- This syllabus is designed to deliver students about basic knowledge of geography as a spatial science and train the undergraduates to secure employment in the sectors of geospatial analysis, development and planning, mapping and surveying.
- Changing syllabus structure offered a number of interdisciplinary courses through the students. So, they are benefited and gained with world wise subject experts, their knowledge and research views.

Outcomes of the Academic Programme of B.Sc. (Major) in Geography

Geography stands as a unique fusion of the natural and social sciences, offering essential insights into understanding the world. In 1961, Raja N.L. Khan Women's College introduced Geography as a discipline at the undergraduate level. Since then, it has upheld a tradition of academic and co-curricular excellence.

In today's world, where resources are dwindling, the population is booming, and cultural, economic, and environmental tensions are rising, geography offers crucial insights into global changes and their local impacts. The course tries to impart a geographical approach to the students thus to make them capable of explaining aspects of natural and social environment where they live and in answering some fundamental environmental, economical, socio-cultural and political questions. It is an intellectually challenging subject that synthesizes appreciation of critical thinking and synergizing sciences with Humanities. In the pursuit of making sense of the space where one live, we tries to blend both the traditional and modern methodological tools in our class rooms. Thus it involves the traditional approach of fieldwork, mapping and spatial analysis, complemented by the latest statistical methods, computer cartography, and Geographical Information System.

The course opens numerous avenues for academically inclined students and those seeking careers beyond geography. It also offers rewarding opportunities in teaching at various educational levels. Over the years, the Department of Geography has produced numerous dedicated scholars, teachers, and professionals excelling in diverse fields. The department boasts two laboratories for teaching purposes: one dedicated to traditional cartographic exercises and the other equipped with modern computerized cartography and GIS technology. The Department of Geography at Raja N.L. Khan Women's College maintains a robust research culture involving both faculty members and students. This commitment to research and academic excellence continues to uphold the department's prestigious legacy and contributes to its dynamic learning environment.

Outcome 1: Comprehensive Understanding of the Natural and Social Environment

Students gain a thorough comprehension of the natural and social environments in which they live. By studying various geographical elements, they learn to analyze and interpret the intricate relationships between human societies and their physical surroundings. This holistic understanding enables them to address critical environmental, economic, socio-cultural, and political questions, fostering a deeper appreciation for the complexities of global changes and their local impacts.

Outcome 2: Development of Critical Thinking and Analytical Skills

The course emphasizes the development of critical thinking and analytical skills. By engaging with both the natural and social sciences, students learn to synthesize information from diverse sources and perspectives. This intellectual rigor prepares them to tackle complex problems, make informed

decisions, and contribute to discussions on pressing global issues, ensuring they are well-equipped for both academic pursuits and practical applications.

Outcome 3: Proficiency in Traditional and Modern Methodologies

Students become proficient in both traditional and modern geographical methodologies. The curriculum includes hands-on fieldwork, mapping, and spatial analysis, complemented by advanced techniques such as statistical methods, computer cartography, and Geographic Information Systems (GIS). This blend of old and new tools equips students with the practical skills needed for accurate data collection, analysis, and interpretation, making them versatile in various professional settings.

Outcome 4: Career and Academic Advancement Opportunities

The course opens numerous pathways for career and academic advancement. Graduates are well-prepared for roles in teaching, research, and various professional fields. The department's strong emphasis on academic excellence and research culture ensures that students are not only knowledgeable but also capable of contributing significantly to their chosen disciplines. This preparation is reflected in the success of alumni who excel as scholars, educators, and professionals.

Outcome 5: Enhanced Research and Technological Competence

Students enhance their research capabilities and technological competence. With access to two specialized laboratories—one for traditional cartographic exercises and another equipped with computerized cartography and GIS technology—they gain hands-on experience with state-of-the-art tools. This exposure fosters a robust research culture, encouraging students to undertake innovative projects and contribute to the department’s dynamic learning environment, ultimately preparing them for advanced studies and professional excellence.

B.A. / B.Sc. Geography

Under NEP-2020 (w.e.f. 01.07.2023) Credit, Marks and Question Pattern

	Credit	Paper Code	Paper Name	Full Marks	Marks Distribution	L-T-P	Question Pattern
Semester- I	Major 4	GEOMJ-101	Geomorphology	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-01	Geomorphology	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	SEC 3	GEOSEC-101	Climate Change: Vulnerability and Adaptation	**50**	Theory-20 Practical-20 Continuous Assessment-10	0-0-3/ 3-0-0	SQ: 2M x 5Q =10 Medium: 5M x 2Q =10
Semester- II	Major 4	GEOMJ-201	Hydrology and Oceanography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-02	Hydrology and Oceanography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	SEC 3	GEOSEC-201	Map Projection	**50**	Theory-20 Practical-20 Continuous Assessment-10	0-0-3/ 3-0-0	SQ: 2M x 5Q =10 Medium: 5M x 2Q =10

	Credit	Paper Code	Paper Name	Full Marks	Marks Distribution	L-T-P	Question Pattern
Semester- III	Major 4	GEOMJ-301	Climatology	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-302	Soil and Biogeography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-01	Geomorphology	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	SEC 3	GEOSEC-301	Geography of Tourism	**50**	Theory-20 Practical-20 Continuous Assessment-10	0-0-3/ 3-0-0	SQ: 2M x 5Q =10 Medium: 5M x 2Q =10
Semester- IV	Major 4	GEOMJ-401	Social and Cultural Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-402	Settlement Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-403	Regional Development and Planning	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-02	Hydrology and Oceanography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10

	Credit	Paper Code	Paper Name	Full Marks	Marks Distribution	L-T-P	Question Pattern
Semester- V	Major 4	GEOMJ-501	Statistical Methods in Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-502	Geography of India & West Bengal	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-503	Research Methodology and Field work	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-504	Economic Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-03	Rural Development	**75**	Theory-60 Continuous Assessment-10 Attendance-5	4-0-0	SQ: 2M x 10Q =20 Medium: 5M x 4Q =20 Long: 10M x 2Q =20
Semester- VI	Major 4	GEOMJ-601	Evolution of Geographical Thought	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-602	Population Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-603	Geo-spatial Technology	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-604	Thematic Cartography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-03	Rural Development	**75**	Theory-60 Continuous Assessment-10 Attendance-5	4-0-0	SQ: 2M x 10Q =20 Medium: 5M x 4Q =20 Long: 10M x 2Q =20

	Credit	Paper Code	Paper Name	Full Marks	Marks Distribution	L-T-P	Question Pattern
Semester- VII	Major 4	GEOMJ-701	Surveying Techniques and Mapping	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-702	Disaster Management	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-703	Sustainable Development	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-704	Political Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-04	Industrial Geography	**75**	Theory-60 Continuous Assessment-10 Attendance-5	4-0-0	SQ: 2M x 10Q =20 Medium: 5M x 4Q =20 Long: 10M x 2Q =20
Semester- VIII	Major 4	GEOMJ-801	Landscape Ecology	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Major 4	GEOMJ-802	Trade and Transport Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	DSE 4	GEODSE-01	Watershed Management	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	DSE 4	GEODSE-02	Urban Geography	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	DSE 4	GEODSE-03	Geomatics and Spatial Analysis	**75**	Theory-40 Practical-20 Continuous Assessment-10 Attendance-5	3-0-1	SQ: 2M x 5Q =10 Medium: 5M x 4Q =20 Long: 10M x 1Q =10
	Minor 4	GEOMI-04	Industrial Geography	**75**	Theory-60 Continuous Assessment-10 Attendance-5	4-0-0	SQ: 2M x 10Q =20 Medium: 5M x 4Q =20 Long: 10M x 2Q =20

Semester-I
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	01	04	75
2	Minor	01	04	75
3	IDC/MDC	01	03	50
4	AEC ENGLISH	01	02	50
5	SEC	01	03	50
6	VAC	02	04(02+02)	100(50+50)
Total=		***07***	***20***	***400***

Semester - I

Syllabus (Major)

GEOMJ-101: Geomorphology **4 Credits (L-T-P 3-0-1) 75 Marks**

Course Outcomes: Students will learn about the mechanism and working principle of processes that lead to the shape present earth-surface. Students gain practical skills in rock and mineral identification, map interpretation, and geological profile creation. process-form relationship help in concretizing ideas of geomorphology. This understanding may help in formulating hydrological, geologic and economic planning. Learners may take part in hazard management too.

GEOMJ-101-TH: Geomorphology (Theory) **3 Credits / 40 Marks**

1. Earth: Interior Structure and Isostasy: Pratt, Bowie, Airy.
2. Earth Movements: Plate Tectonics Types of Folds and Faults,
3. Geomorphic Processes: Weathering, Mass Wasting,
4. Cycle of Erosion (Davis, Penck and Hack).
5. Evolution of Landforms (Erosional and Depositional): River, Karst, Aeolian.
6. Evolution of Landforms and Drainage Systems: Uniclinal and Folded Structure.

GEOMJ-101-P: Geomorphology and Mapping Technique (Practical) **1 Credit/ 20 Marks**

1. Identification of rocks and minerals. Rocks: Granite, Basalt, Laterite, Sandstone and Marble. Minerals: Talc, Mica, Hematite, Calcite, Quartz.
2. Scale- Liner Scale (Simple and Comparative), Diagonal Scale, and Vernier Scale.
3. Interpretation of Topographical Map: Reference System, Broad Physiographic Division, Topographic Profile (Serial, Superimposed, Projected and Composite Profile), Relative Relief Map, Drainage Frequency Map, Drainage density Map, Bifurcation Ratio, Slope Map (Wentworth), and Transect Chart.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Bloom A. L., 2003: *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. Kale V. S. and Gupta A., 2001: *Introduction to Geomorphology*, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: *Fluvial Forms and Processes*, Edward Arnold Publishers, London.
6. Richards K. S., 1982: *Rivers: Form and Processes in Alluvial Channels*, Methuen, London.
7. Selby, M.J., (2005), *Earth's Changing Surface,* Indian Edition, OUP

8. Skinner, Brian J. and Stephen C. Porter (2000), *The Dynamic Earth: An Introduction to physical Geology*, 4th Edition, John Wiley and Sons
9. Thornbury W. D., 1968: *Principles of Geomorphology*, Wiley.
10. Gautam, A (2010): *Bhautik Bhugol*, Rastogi Punlications, Meerut
11. Tikkaa, R N (1989): *Bhautik Bhugol ka Swaroop*, Kedarnath Ram Nath, Meerut
12. Singh, S (2009): *Bhautik Bhugol ka Swaroop*, Prayag Pustak, Allahabad
13. Gupta K.K. and Tyagi, V. C., 1992: *Working with Map*, Survey of India, DST, New Delhi.
14. Mishra R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
15. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
16. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
17. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.

Syllabus (Minor)

GEOMI-01: Geomorphology **4 Credits (L-T-P 3-0-1) 75 Marks**

Course Outcomes: Students will learn about the mechanism and working principle of processes that lead to the shape present earth-surface. Students gain practical skills in rock and mineral identification, map interpretation, and geological profile creation. process-form relationship help in concretizing ideas of geomorphology. This understanding may help in formulating hydrological, geologic and economic planning. Learners may take part in hazard management too.

GEOMI-01-TH: Geomorphology (Theory) **3 Credits / 40 Marks**

1. Earth: Interior Structure.
2. Earth Movements: Plate Tectonics. Types of Folds and Faults.
3. Geomorphic Processes: Weathering, Mass wasting
4. Cycle of Erosion: W. M. Davis.
5. Evolution of Landforms (Process and Landforms): Fluvial and Aeolian.
6. Evolution of Landforms and Drainage Systems: Uniclinal Structure.

GEOMI-01-P: Geomorphology and Mapping Technique (Practical) 1 Credit/ 20 Marks

1. Identification of rocks and minerals. Rocks: Granite, Basalt and Sandstone. Minerals: Talc, Mica, Hematite.
2. Scale- Linear Scale (Simple and Comparative)
3. Interpretation of Topographical Map: Broad Physiographic Division based on representative profile, Relative Relief Map, Drainage Frequency Map,
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Bloom A. L., 2003: *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. Kale V. S. and Gupta A., 2001: *Introduction to Geomorphology*, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: *Fluvial Forms and Processes*, Edward Arnold Publishers, London.
6. Richards K. S., 1982: *Rivers: Form and Processes in Alluvial Channels*, Methuen, London.
7. Selby, M.J., (2005), *Earth's Changing Surface,* Indian Edition, OUP
8. Skinner, Brian J. and Stephen C. Porter (2000), *The Dynamic Earth: An Introduction to physical Geology,* 4th Edition, John Wiley and Sons
9. Thornbury W. D., 1968: *Principles of Geomorphology*, Wiley.
10. Gautam, A (2010): *Bhautik Bhugol*, Rastogi Punlications, Meerut
11. Tikkaa, R N (1989): *Bhautik Bhugol ka Swaroop*, Kedarnath Ram Nath, Meerut
12. Singh, S (2009): *Bhautik Bhugol ka Swaroop*, Prayag Pustak, Allahabad
13. Gupta K.K. and Tyagi, V. C., 1992: *Working with Map*, Survey of India, DST, New Delhi.
14. Mishra R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
15. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
16. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
17. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.

Skill Enhancement Course (SEC)

GEOSEC-101: Climate Change: Vulnerability and Adaptation

3 Credits (L-T-P 0-0-3/3-0-0) 50 Marks

Course Outcomes: This course covers climate change science, vulnerability, and impacts on agriculture, water, ecosystems, and health. It also explores global climate change mitigation, including the Kyoto Protocol. Practical exercises involve measuring weather elements and assessing their effects on temperature, rainfall, and crop productivity, enhancing students & understanding of climate-related vulnerabilities and adaptations.

GEOSEC-101-TH: Climate Change: Vulnerability and Adaptation 2 Credits / 20 Marks

1. Science of Climate Change: Understanding Climate Change; Green House Gases and Global Warming; Global Climatic Assessment- IPCC.
2. Climate Change and Vulnerability: Physical Vulnerability; Economic Vulnerability; Social Vulnerability.
3. Impact of Climate Change: Agriculture and Water; Flora and Fauna; Human Health.
4. Global initiation of climate change mitigation: Kyoto protocol.

GEOSEC-101-P: Climate Change: Vulnerability and Adaptation 1 Credit / 20 Marks

1. Measuring the weather elements using analogue instruments: Mean Daily Temperature, Relative Humidity and Rainfall.
2. Long-term changes in (a) Temperature and its impact on agricultural crop productivity, (b) Rainfall and its impact on agricultural crop productivity
3. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
2. IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
3. Masson-Delmotte, V. P., Zhai, P., Pirani, S. L., Connors, C., Péan, S., Berger, N., & Scheel Monteiro, P. M. (2021). Ipcc, 2021: Summary for policymakers. in: Climate change 2021: The physical science basis contribution of working group I to the sixth assessment report of the intergovernmental panel on climate change.
4. Kikstra, J. S., Nicholls, Z. R., Smith, C. J., Lewis, J., Lamboll, R. D., Byers, E., ... & Riahi, K. (2022). The IPCC Sixth Assessment Report WGIII climate assessment of mitigation pathways: from emissions to global temperatures. *Geoscientific Model Development*
5. OECD. (2008) Climate Change Mitigation: What Do we Do? Organisation and Economic Cooperation and Development.
6. UNEP. (2007) Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.
7. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer.
8. Sen, Roy, S. and Singh, R.B. (2002) Climate Variability, Extreme Events and Agricultural Productivity in Mountain Regions, Oxford & IBH Pub., New Delhi.

Semester-II
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	01	04	75
2	Minor	01	04	75
3	IDC/MDC	01	03	50
4	AEC MIL (Beng./ Hindi)	01	02	50
5	SEC	01	03	50
6	VAC	02	04(2+2)	100(50+50)
7	CESR	01	02	50
Total=		***08***	***22***	***450***

Semester – II

Syllabus (Major)

GEOMJ-201: Hydrology and Oceanography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This course equips students with a comprehensive understanding of hydrology and oceanography. They learn about the hydrological cycle, river basin characteristics, and oceanic movements. Additionally, students gain insight into coral reefs and acquire practical skills in data interpretation and laboratory techniques. Overall, this course empowers them with both theoretical knowledge and practical proficiency in these critical fields.

GEOMJ-201-TH: Hydrology and Oceanography (Theory) 3 Credits / 40 Marks

1. Hydrological Cycle: Systems Approach in Hydrology, Human Impact on the Hydrological Cycle.
2. Elements of Hydrological Cycle: Precipitation, Interception, Evaporation, Evapo-transpiration, Infiltration, Ground-water, Run off and over land flow.
3. River Basin Hydrology: Characteristics of River Basins, River Basin as a Hydrological Unit, Basin Surface Run-Off, Measurement of River Discharge; Floods and Droughts.
4. Ocean Floor Topography (Indian Ocean) and Oceanic Movements –Waves, Currents and Tides.
5. Ocean Salinity and Temperature –Distribution and Determinants, Rules of Constant Proportion.
6. Coral reef: Formation, Types, Threats.

GEOMJ-201-P: Hydrology and Oceanography (Practical) 1 Credit /20 Marks

1. Construction and Interpretation of Hypsometric Curve.
2. Construction and Interpretation of Unit Hydrograph.
3. Temperature-Salinity diagram.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Andrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis Publishers, CRC Press.
2. Karanth, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata- McGraw Hill, New Delhi.
3. Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
4. Rao, K.L., 1982: India's Water Wealth 2nd edition, Orient Longman, Delhi.
5. Singh, Vijay P. (1995): Environmental Hydrology. Kluwar Academic Publications, the Netherlands.

6. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
7. Garrison T., 1998: *Oceanography*, Wordsworth Company, Belmont.
8. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
9. Pinet P. R., 2008: *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
10. Sharma R. C. and Vatal M., 1980: *Oceanography for Geographers*, Chaitanya Publishing House, and Allahabad.

Syllabus (Minor)

GEOMI-02: Hydrology and Oceanography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This course equips students with a comprehensive understanding of hydrology and oceanography. They learn about the hydrological cycle, river basin characteristics, and oceanic movements. Additionally, students gain insight into coral reefs and acquire practical skills in data interpretation and laboratory techniques. Overall, this course empowers them with both theoretical knowledge and practical proficiency in these critical fields.

GEOMI-02-TH: Hydrology and Oceanography (Theory) 3 Credits / 40 Marks

1. Hydrological Cycle, Human Impact on the Hydrological Cycle.
2. Elements of Hydrological Cycle: Precipitation, Evaporation, Infiltration and Run off.
3. Ocean Floor Topography (Indian Ocean) and Oceanic Movements –Waves and Tides.
4. Ocean Salinity – Distribution and Determinants.
5. Ocean Temperature – Distribution and Determinants.
6. Coral reef: Formation, Types, Threats.

GEOMI-02-P: Hydrology and Oceanography (Practical) 1 Credit /20 Marks

1. Construction of rainfall diagram.
2. Construction and Interpretation of Hydrograph.
3. Temperature-Salinity diagram
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Andrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis Publishers, CRC Press.
2. Karanth, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill, New Delhi.
3. Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
4. Rao, K.L., 1982: India's Water Wealth 2nd edition, Orient Longman, Delhi.

5. Singh, Vijay P. (1995): Environmental Hydrology. Kluwar Academic Publications, the Netherlands.
6. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
7. Garrison T., 1998: *Oceanography*, Wordsworth Company, Belmont.
8. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
9. Pinet P. R., 2008: *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
10. Sharma R. C. and Vatal M., 1980: *Oceanography for Geographers*, Chaitanya Publishing House, and Allahabad.

Skill Enhancement Course (SEC)

GEOSEC-201: Map Projection **3 Credits (L-T-P 0-0-3/3-0-0) 50 Marks**

Course outcomes: Students will develop cartographic skills for constructing various maps with projection and foster their abilities to show the spatial distribution of various physical and social elements and their proper interpretation. Skill of understanding spatial integration among physical elements will be developed to foster the abilities of holistic abilities.

GEOSEC-201-TH: Map Projection (Theory) **2 Credits / 20 Marks**

1. Maps – Classification and Types, Components.
2. Map projection: classification, properties, limitation and uses.
3. Coordinate system: Polar and Rectangular.
4. Geoids: Angular and Linear measurement.

GEOSEC-201-P: Map Projection (Practical) **1 Credit / 20 Marks**

1. Scale factor and Transformation: Transformation of Angel, Transformation of Areas, Transformation of Distance and Transformation of Direction.
2. Map projection: Polar Zenithal Gnomonic Projection, Polar Zenithal Stereographic Projection, Cylindrical Equal-Area Projection, Sinusoidal Projection, Bonne's Projection and Simple Conical Projection with I Standard Parallel).
3. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Bhopal Singh R L and Duttta P K (2012) Prayogatama Bhugol, Central Book Depot, Allahabad.
2. Cuff J. D. and Mattson M. T., 1982: *Thematic Maps: Their Design and Production*, Methuen Young Books.
3. Dent B. D., Torguson J. S., and Holder T. W., 2008: *Cartography: Thematic Map Design* (6th Edition), Mcgraw-Hill Higher Education.

4. Gupta K. K. and Tyagi V. C., 1992: *Working with Maps*, Survey of India, DST, New Delhi.
5. Kraak M.-J. and Ormeling F., 2003: *Cartography: Visualization of Geo-Spatial Data*, Prentice-Hall.
6. Mishra R. P. and Ramesh A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
7. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
8. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
9. Rhind D. W. and Taylor D. R. F., (eds.), 1989: *Cartography: Past, Present and Future*, Elsevier, International Cartographic Association.
10. Robinson A. H., 2009: *Elements of Cartography*, John Wiley and Sons, New York.
11. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
12. Singh R L & Rana P B Singh (1991) Prayogtmak Bhugol ke Mool Tatva, Kalyani Publishers, New Delhi.
13. Slocum T. A., Mcmaster R. B. and Kessler F. C., 2008: *Thematic Cartography and Geovisualization* (3rd Edition), Prentice Hall.
14. Singh, L R & Singh R (1977): Manchitra or Pryaogatamek Bhugol, Central Book, Depot, Allahabad.
15. Tyner J. A., 2010: *Principles of Map Design*, The Guilford Press.

Semester-III
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	02	08(4+4)	150(75x2)
2	Minor	01	04	75
3	IDC/MDC	01	03	50
4	AEC MIL (Beng./ Hindi)	01	02	50
5	SEC	01	03	50
Total=		***06***	***20***	***375***

Semester – III

Syllabus (Major)

GEOMJ-301: Climatology **4 Credits (L-T-P 3-0-1) 75 Mark**

Course Outcomes: Students will helpful to understand the elements of weather and climate, different atmospheric phenomena. It gives a brief idea for the students to understand the weather pattern and the temperature changes that are occurring over time. They are able to learn the approaches to climate classification. They are also learn to prepare seasonal weather maps and charts and interpret them and trained about the use of various meteorological instruments.

GEOMJ-301-TH: Climatology (Theory) **3 Credits / 40 Marks**

1. Atmospheric Composition and Structure – Variation with Altitude, Latitude and Season.
2. Insolation and Temperature – Factors and Distribution, Heat Budget.
3. Atmospheric Pressure and Winds – Planetary Winds, Forces affecting Winds, General Circulation, Jet Streams.
4. Process and forms of condensation, mechanisms of precipitation.
5. Cyclones – Tropical Cyclones, Extra Tropical Cyclones, Monsoon - Origin and Mechanism (Thermal Engine Theory, Jet Stream Theory, MONEX).
6. Climatic classification: Koppen, Thornthwaite.

GEOMJ-301-P: Climatology (Practical) **1 Credit / 20 Marks**

1. Interpretation of daily weather map: Monsoon Season, Post-Monsoon Season.
2. Construction and Interpretation of Climograph, Hythergraph.
3. Weather forecasting and station modeling.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
2. Barry R. G. and Corley R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York.
3. Critchfield, H. J., 1987: General Climatology, Prentice-Hall of India, New Delhi
4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey.
5. Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, New Delhi.
6. Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw-Hill.
7. Gupta L S (2000): Jalvayu Vigyan, Hindi Madhyam Karyanvay Nidishalya, Delhi Vishwa Vidhyalaya, Delhi
8. Lal, D S (2006): Jalvayu Vigyan, Prayag Pustak Bhavan, Allahabad
9. Vatal, M (1986): Bhautik Bhugol, Central Book Depot, Allahabad

10. Singh, S (2009): Jalvayu Vigyan, Prayag Pustak Bhawan, Allahabad

GEOMJ-302: Soil and Biogeography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This paper gives knowledge about the character and profile of different soil types, properties of soil and students are able to understand the causes and conservation methods of soil erosion and land degradation. It is very helpful to understand the various ecosystems and consequences of habitat destruction in West Bengal with special references with elephant migration. Students are trained to use soil kits for testing of different chemical properties of soil and the textural difference has been identified by different methods. The biodiversity of plants has been done by numerous methods which will be very essential for species diversity identification.

GEOMJ-302-TH: Soil and Biogeography (Theory) 3 Credits / 40 Marks

1. Soil: Forming Factors, Classification (Zonal, Azonal, Intra-zonal).
2. Physical and Chemical Properties of soil: Texture, Structure, Colour, pH, Organic Matter.
3. Mechanism and Formation of Laterite and Podzol Soil.
4. Causes of Soil Erosion and land degradation, methods of soil conservation.
5. Biomes: concepts, types; adaptation with environments (Tropical Rainforest and Temperate Grass Land).
6. Migration of animals due to habitat destruction in West Bengal with special references with elephant.

GEOMJ-302-P: Soil and Biogeography (Practical) 1 Credit / 20 Marks

1. Determination of Soil Reaction (Organic Carbon, pH, N, P and K) Using Field Kit.
2. Determination of Soil Texture using Sieve Method.
3. Plant Species Diversity Determination by Matrix Method, Shannon-Weiner Index, and Simpson's Index.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
2. Cunninghum W. P. and Cunninghum M. A., 2004: Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
3. Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford.
4. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur.
5. Miller G. T., 2004: Environmental Science: Working with the Earth, Thomson Brooks Cole, and Singapore.
6. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.

7. Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer.
8. Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India.
9. Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
10. UNEP, 2007: Global Environment Outlook: GEO4: Environment for Development, United Nations Environment Programme.
11. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
12. Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Publication.
13. Singh, Savindra 2001. Paryavaran Bhugol, Prayag Pustak Bhawan, Allahabad. (In Hindi)

Syllabus (Minor)

GEOMI-01: Geomorphology **4 Credits (L-T-P 3-0-1) 75 Marks**

Course Outcomes: Students will learn about the mechanism and working principle of processes that lead to the shape present earth-surface. Students gain practical skills in rock and mineral identification, map interpretation, and geological profile creation. process-form relationship help in concretizing ideas of geomorphology. This understanding may help in formulating hydrological, geologic and economic planning. Learners may take part in hazard management too.

GEOMI-01-TH: Geomorphology (Theory) **3 Credits / 40 Marks**

1. Earth: Interior Structure.
2. Earth Movements: Plate Tectonics. Types of Folds and Faults.
3. Geomorphic Processes: Weathering, Mass wasting.
4. Cycle of Erosion: W. M. Davis.
5. Evolution of Landforms (Process and Landforms): Fluvial and Aeolian.
6. Evolution of Landforms and Drainage Systems: Uniclinal Structure.

GEOMI-01-P: Geomorphology and Mapping Technique (Practical) 1 Credit / 20 Marks

1. Identification of rocks and minerals. Rocks: Granite, Basalt and Sandstone. Minerals: Talc, Mica, Hematite.
2. Scale- Linear Scale (Simple and Comparative).
3. Interpretation of Topographical Map: Broad Physiographic Division based on representative profile, Relative Relief Map, Drainage Frequency Map.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Bloom A. L., 2003: *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. Kale V. S. and Gupta A., 2001: *Introduction to Geomorphology*, Orient Longman, Hyderabad.
5. Knighton A. D., 1984: *Fluvial Forms and Processes*, Edward Arnold Publishers, London.
6. Richards K. S., 1982: *Rivers: Form and Processes in Alluvial Channels*, Methuen, London.
7. Selby, M.J., (2005), *Earth's Changing Surface,* Indian Edition, OUP
8. Skinner, Brian J. and Stephen C. Porter (2000), *The Dynamic Earth: An Introduction to physical Geology*, 4th Edition, John Wiley and Sons
9. Thornbury W. D., 1968: *Principles of Geomorphology*, Wiley.
10. Gautam, A (2010): *Bhautik Bhugol*, Rastogi Punlications, Meerut
11. Tikkaa, R N (1989): *Bhautik Bhugol ka Swaroop*, Kedarnath Ram Nath, Meerut
12. Singh, S (2009): *Bhautik Bhugol ka Swaroop*, Prayag Pustak, Allahabad
13. Gupta K.K. and Tyagi, V. C., 1992: *Working with Map*, Survey of India, DST, New Delhi.
14. Mishra R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
15. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
16. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
17. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi

Skill Enhancement Course (SEC)

GEOSEC-301: Geography of Tourism 3 Credits (L-T-P 0-0-3/3-0-0) 50 Marks

Course Outcomes: To successfully completion of the course, students are able to know and discuss the main steps of tourism development and tourism impacts on environment and society. They are able understand the spatial issues of tourism change and development, as well as the contested issues regarding tourism's contribution to overall local development.

GEOSEC-301-TH: Geography of Tourism 2 Credits / 20 Marks

1. Scope and Nature: Concepts and Issues.
2. Tourism, Recreation and Leisure Inter-Relations.
3. Geographical Parameters of Tourism.
4. Type of Tourism: Nature Tourism, Cultural Tourism, Medical Tourism, Pilgrimage, Eco-Tourism, Sustainable Tourism.
5. Impact of Tourism: Economy; Environment; Society.
6. Tourism in India: Tourism Infrastructure, National Tourism Policy.

GEOSEC-301-P: Geography of Tourism 1 Credit / 20 Marks

1. Assessment of present condition and future prospects on (Term paper): ecotourism, sustainable tourism and geo tourism.

Continuous Assessment: 10 Marks

Reading List

1. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, New Delhi.
2. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
3. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practice, Kanishka Publishers, Pune.
4. Nandi Shreyashi (2016) Parjatan Bhugol (Geography of Tourism) Bhu-Bhabna publishers
5. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-HeinemannUSA.
6. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge, USA, www.cabi.org.
7. Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow
8. Singh Jagbir (2014) "Eco-Tourism" Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com)

Semester-IV
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	03	12(4x3)	225(75x3)
2	Minor	01	04	75
3	AEC ENGLISH	01	02	50
4	Professional Course	01	02	50
Total=		***06***	***20***	***400***

Semester –IV

Syllabus (Major)

GEOMJ-401: Social and Cultural Geography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: The paper is based on the nature, scope and content of social and cultural Geography. The paper will examine the role of social divisions such as class, 'race'/ethnicity and the social geographies of regions. Emphasis is given on cross-disciplinary, critical engagement with current events. On completion of the course, students are able to Understand the nature, scope, and concept of the relationship between culture and social environment; it also helps to understand the cultural system according to religion, language etc. Students will develop cartographic skills for constructing various thematic maps and foster their abilities in showing the spatial distribution of various social elements and their proper interpretation.

GEOMJ-401-TH: Social and Cultural Geography (Theory) 3 Credits / 40 Marks

1. Definition, Nature, Scope and Content of Social and Cultural Geography.
2. Space and Society: Cultural Regions, Cultural Hearths.
3. Social Structure and Social Processes, Social Justice, Social Security with Special reference to India.
4. Geographies of welfare: concepts and components, healthcare, housing and education.
5. Ethnicity, Race, Religion, Linguistic Groups of India.
6. Major Tribes of India (Gonds, Bhils, Santhal, Khasi, Garo, Jarwa).

GEOMJ-401-P: Social and Cultural Geography (Practical) 1 Credit / 20 Marks

1. Preparation of Spatial Distribution Map of India: Gender, Caste, Religion and Language.
2. Estimation and Mapping of Human Development Index.
3. Estimation and Mapping of Gender Development Index.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
2. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.
3. Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
4. Maurya, S.D. (2012) Manav Bhugol, Sharda Pustak Bhawan. Allahabad.
5. Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur
6. Chattopadhyay,Anish (2020) Bharat o Paschim Banger Bhugol, Nabodaya Publications,Kolkata
7. UNDP 2001-04: Human Development Report, Oxford University Press.

GEOMJ-402: Settlement Geography **4 Credits (L-T-P 3-0-1) 75 Marks**

Course Outcomes: The paper is based on the nature, scope and content of human Geography. This paper emphasizes on the cultural regions of the world, human races, religions, languages and tribal groups of India, concepts of welfare geography, types of rural settlements and urban settlements and pattern of urbanization of India. The practical portion emphasizes on the spatial distribution of different aspects of demographic composition, urban hierarchy and spacing of settlements through Nearest Neighborhood analysis.

GEOMJ-402-TH: Settlement Geography (Theory) **3 Credits / 40 Marks**

1. Definition, Nature, Scope and Development of Settlement Geography.
2. Rural Settlement: Site, Situation, Types, Pattern and Morphology in Indian Context.
3. Urban Settlement: Census Definition, Urban Agglomeration, Urban Sprawl, Rural-Urban Continuum, Rurban and Peri urban, Primate City and Rank Size Rule.
4. Classification of Urban Settlements.
5. Land use and Morphology: Burges, Hoyt, Harris and Ullman.
6. Trends and Patterns of Indian Urbanization.

GEOMJ-402-P: Settlement Geography (Practical) **1 Credits/ 20 Marks**

1. Identification of Urban Hierarchy using Rank-Size Rule
2. Identification of Settlement Pattern using Nearest Neighbour Analysis.
3. Mapping of Accessibility using Detour Index from Survey of India 1:50,000 Topographical Map.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
2. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
3. Kaushik, S.D. (2010) Manav Bhugol, Rastogi Publication, Meerut.
4. Maurya, S.D. (2015) Settlement Geography, Sharda Pustak Bhawan. Allahabad.
5. Hussain, Majid (2012) Manav Bhugol. Rawat Publications, Jaipur
6. Tiwari, R.C. (2020) Settlement Geography-Rural and Urban Settlements, Pravalika Publications, Prayagraj
7. Ghosh, Sumita. (1998) Introduction to Settlement Geography, Orient Blackswan Pvt. Ltd.,
8. Singh, R.Y. (2002) Geography of Settlements, Rawat Publication,
9. Siddhartha, K. and Mukherjee, S. (2019) Cities Urbanisation and Urban Systems, Kitab Mahal Publications
10. Mandal, R.B. (2001) Introduction to Rural Settlement, Concept Publishing Co.
11. Mandal, R.B. (2001) Urban Geography-A Textbook, Concept Publishing Co.

GEOMJ-403: Regional Development and Planning (Theory)

4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This course is focused on the fundamental concepts of regional geography including the classical approach to define an area as region. It includes the methods of regional delineation and classification of region based on their properties. On completion of this course, the pupils get a comprehensive understanding of the regional analysis. They will also learn about the concept of planning region and their delineation methods and this understanding may help them to assist in various planning process.

GEOMJ-403-TH: Regional Development and Planning (Theory) 3 Credits / 40 Marks

1. Definition and Types of Regions: Formal, Functional, and Planning Regions.
2. Regional planning: Needs, principles, Types of regional Planning.
3. Planning region: characteristics, delineation of Indian planning region (V. Nath, Sengupta).
4. Theories and Models for Regional Planning: Growth Pole Model of Perroux.
5. Growth Centre Model in Indian Context; Myrdal, Rostow, Core Periphery Model by Friedman.
6. Measuring development: Indicators (Economic, Social and Environmental).

GEOMJ-403-P: Regional Development and Planning (Practical) 1 Credit / 20 Marks

1. Measurement of inequality by Lorenz curve.
2. Measurement of inequality by Location Quotient and Index of Dissimilarity.
3. Mapping of spatial distribution of regional disparity.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Blij H. J. De, 1971: Geography: Regions and Concepts, John Wiley and Sons.
2. Claval P.l, 1998: An Introduction to Regional Geography, Blackwell Publishers, Oxford and Massachusetts.
3. Friedmann J. and Alonso W. (1975): Regional Policy - Readings in Theory and Applications, MIT Press, Massachusetts.
4. Gore C. G., 1984: Regions in Question: Space, Development Theory and Regional Policy, Methuen, London.
5. Gore C. G., Köhler G., Reich U-P. and Ziesemer T., 1996: Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention, Metropolis- Verlag, Marburg.
6. Haynes J., 2008: Development Studies, Polity Short Introduction Series.
7. Johnson E. A. J., 1970: The Organization of Space in Developing Countries, MIT Press, Massachusetts.
8. Peet R., 1999: Theories of Development, The Guilford Press, New York.
9. Mahmood, Aslam. (1999) Statistical Methods in Geographical Studies, Rajesh Publishers

Syllabus (Minor)

GEOMI-02: Hydrology and Oceanography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This course equips students with a comprehensive understanding of hydrology and oceanography. They learn about the hydrological cycle, river basin characteristics, and oceanic movements. Additionally, students gain insight into coral reefs and acquire practical skills in data interpretation and laboratory techniques. Overall, this course empowers them with both theoretical knowledge and practical proficiency in these critical fields.

GEOMI-02-TH: Hydrology and Oceanography (Theory) 3 Credits / 40 Marks

1. Hydrological Cycle, Human Impact on the Hydrological Cycle.
2. Elements of Hydrological Cycle: Precipitation, Evaporation, Infiltration and Run off.
3. Ocean Floor Topography (Indian Ocean) and Oceanic Movements –Waves and Tides.
4. Ocean Salinity – Distribution and Determinants.
5. Ocean Temperature – Distribution and Determinants.
6. Coral reef: Formation, Types, Threats.

GEOMI-02-P: Hydrology and Oceanography (Practical) 1 Credit /20 Marks

1. Construction of rainfall diagram.
2. Construction and Interpretation of Hydrograph.
3. Temperature-salinity diagram.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Andrew. D. ward and Stanley, Trimble (2004): Environmental Hydrology, 2nd edition, Lewis Publishers, CRC Press.
2. Karanth, K.R., 1988: Ground Water: Exploration, Assessment and Development, Tata- McGraw Hill, New Delhi.
3. Ramaswamy, C. (1985): Review of floods in India during the past 75 years: A Perspective. Indian National Science Academy, New Delhi.
4. Rao, K.L., 1982: India's Water Wealth 2nd edition, Orient Longman, Delhi.
5. Singh, Vijay P. (1995): Environmental Hydrology. Kluwar Academic Publications, the Netherlands.
6. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
7. Garrison T., 1998: *Oceanography*, Wordsworth Company, Belmont.
8. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
9. Pinet P. R., 2008: *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
10. Sharma R. C. and Vatal M., 1980: *Oceanography for Geographers*, Chaitanya Publishing House, and Allahabad.

Semester-V
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full marks
1	Major	04	16(4x4)	300(75x4)
2	Minor	01	04	75
Total=		***05***	***20***	***375***

Semester –V

Syllabus (Major)

GEOMJ-501: Statistical Methods in Geography 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: Students will develop statistical techniques and skill with a robust understanding of statistical analysis in the context of geographical data. The course covers a range of statistical tools and techniques, enabling students to conduct meaningful spatial analysis and research.

GEOMJ-501-TH: Statistical Methods in Geography (Theory) 3 Credits / 40 Marks

1. Sources of Data, Scales of Measurement (Nominal, Ordinal, Interval, Ratio).
2. Measures of central tendency: Mean; Median and Mode.
3. Measures of dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation.
4. Sampling: Concepts, Types and Significance.
5. Theoretical Distribution: Probability and Normal Distribution.
6. Association and Correlation: Rank Correlation, Product Moment Correlation and Simple Regression.

GEOMJ-501-P: Statistical Methods in Geography (Practical) 1 Credit / 20 Marks

1. Frequency distribution and graphical construction: histogram, frequency polygon, frequency curve.
2. Measuring central tendency and dispersion.
3. Analysis of bivariate data: scatter diagram, regression line, and residual, Correlation Co-efficient (rank correlation, product moment correlation).
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Berry B. J. L. and Marble D. F. (eds.): *Spatial Analysis – A Reader in Geography.*
2. Ebdon D., 1977: *Statistics in Geography: A Practical Approach.*
3. Hammond P. and McCullagh P. S., 1978: *Quantitative Techniques in Geography: An Introduction, Oxford University Press.*
4. King L. S., 1969: *Statistical Analysis in Geography*, Prentice-Hall.
5. Mahmood A., 1977: *Statistical Methods in Geographical Studies, Concept*.
6. Pal S. K., 1998: *Statistics for Geoscientists,* Tata McGraw Hill, New Delhi.
7. Sarkar, A. (2013) *Quantitative geography: techniques and presentations, Orient Black Swan Private Ltd*., New Delhi.
8. Silk J., 1979: *Statistical Concepts in Geography*, Allen and Unwin, London.
9. Spiegel M. R.: *Statistics, Schaum's Outline Series*.

10. Yeates M., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.

GEOMJ-502: Geography of India and West Bengal 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: This course is designed to provide students with a holistic understanding to the regional Geography. It integrates physical and human geography, emphasizing spatial science and practical application in geospatial analysis, developmental planning and environmental management. The curriculum prepares students for employment opportunities by equipping them with knowledge and skill pertinent to the geographical aspects of India and West Bengal.

GEOMJ-502-TH: Geography of India and West Bengal (Theory) 3 Credits /40 Marks

1. Physical: Physiographic Divisions (India and West Bengal), Indian soil, vegetation and climate (characteristics and classification).
2. Population: Distribution and growth, Structure and Policy.
3. Economic: Distribution and utilization of iron ore, coal, petroleum, natural gas (India and West Bengal).
4. Regionalization of India: Basis of classification with special reference to Agro- climatic region of India, Green Revolution and consequence.
5. Industrial development: automobile and Information technology.
6. Regional Issues of West Bengal: Sundarban and Darjeeling Himalaya.

GEOMJ-502-P: Geography of India and West Bengal (Practical) 1 Credit / 20 Marks

1. Comparison among Monthly Temperature and rainfall graphs of five selected stations from different physiographic region of India.
2. Crop Combination of Any Two Contrasting Districts of West Bengal.
3. Annual Trend of Production of Mineral Resources and Decadal trend of population growth: by time series analysis. Construction of Population Pyramid: Indian Perspective.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Deshpande C. D., 1992: India: *A Regional Interpretation*, ICSSR, New Delhi.
2. Johnson, B. L. C., ed. 2001. *Geographical Dictionary of India*, Vision Books, New Delhi.
3. Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective, Vol. 3, Indian Perspective.
4. Sdyasuk Galina and P Sengupta (1967): Economic *Regionalisation of India, Census of India*
5. Sharma, T. C. 2003: *India - Economic and Commercial Geography*. Vikas Publ., New Delhi.
6. Singh R. L., 1971: India: *A Regional Geography, National Geographical Society of India*.
7. Singh, Jagdish 2003: India - *A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.

8. Spate O. H. K. and Learmonth A. T. A., 1967: *India and Pakistan: A General and Regional Geography, Methuen.*
9. Tirtha, Ranjit 2002: *Geography of India*, Rawat Publs., Jaipur & New Delhi.
10. Pathak, C. R. 2003: *Spatial Structure and Processes of Development in India. Regional Science Assoc*., Kolkata.
11. Tiwari, R.C. (2007*) Geography of India*. Prayag Pustak Bhawan, Allahabad.
12. Sharma, T.C. (2013) *Economic Geography of India*. Rawat Publication, Jaipur.

GEOMJ-503: Research Methodology and Field work 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: The learners will get the initial training on various steps involved in geographical research. They will develop the idea on fundamentals of research methodology including data collection, methodology and report writing. This course aims to develop fundamental research aptitude among all the students.

GEOMJ-503-TH: Research Methodology (Theory) 3 Credits / 40 Marks

1. Literature review, Identification of research gap and formulation of research design.
2. Defining of research problems, objectives and hypothesis, Materials and Methods of Research.
3. Quantitative and Qualitative Data: Data Representation Technique.
4. Field Techniques – Merits, Demerits and Selection of the Appropriate Technique; Observation (Participant / Non-Participant), Questionnaires (Open / Closed / Structured / Non-Structured); Interview with Special Focus on Focused Group Discussions; Space Survey (Transects and Quadrants, Constructing a Sketch)
5. Use of Field Tools – Physical and Socio-Economic Surveys.
6. Designing the Field Report – Aims and Objectives, Methodology, Analysis, Interpretation, References, Bibliography, Citation, and Abstract.

GEOMJ-503-P-Field Work and Research Methodology (practical) 1 Credit / 20 Marks

1. Group of students (not more than 30) will prepare an individual report based on primary and secondary data collected during field work.
2. The duration of the field work should not exceed 10 days.
3. The word count of the report should be about 8000 to 12,000 excluding figures, tables, photographs, maps, references and appendices. One copy of the report on A 4 size paper should be submitted in soft binding. Report excluding the maps and diagrams will be hand written.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.

2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
4. Mukherjee, Neela 1993. Participatory Rural Appraisal: Methodology and Application. Concept Publication Co., New Delhi.
5. Mukherjee, Neela 2002. Participatory Learning and Action: with 100 Field Methods. Concept Publication Co., New Delhi
6. Robinson A., 1998: "Thinking Straight and Writing That Way", in Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
7. Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
8. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
9. Wolcott, H. 1995. The Art of Fieldwork, Alta Mira Press, Walnut Creek, CA.

GEOMJ-504: Economic Geography **4 Credits (L-T-P 3-0-1) 75 Marks**

Course outcomes: This paper gives knowledge about the concept and classification of economic activity and location of economic activity, Von Thunen theory & Weber's theory. It includes primary activities & different agricultural process and secondary activities of India's manufacturing fields, SEZ, WTO & BRICS structure and function. The practical section is helpful to acquire knowledge about Choropleth map, pie diagram and detour index and shortest path analysis.

GEOMJ-504-TH: Economic Geography (Theory) **3 Credits / 40 Marks**

1. Introduction: Concept and classification of economic activity
2. Factors Affecting location of Economic Activity with special reference to Agriculture (Von Thunen theory), Industry (Weber's and Losch theory).
3. Primary Activities: Subsistence and Commercial agriculture, forestry, fishing and mining.
4. Secondary Activities: Manufacturing (Cotton Textile, Iron and Steel), Concept of Manufacturing Regions. Information technology: Problems and prospects
5. Special Economic Zones of India.
6. WTO and BRICS: Formation, structure and function.

GEOMJ-504-P: Economic Geography (Practical) **1 Credit / 20 Marks**

1. Choropleth map: state wise GDP variation.
2. Pie diagram: sate wise variation of occupation structure.
3. Transport network analysis: detour index and shortest path analysis.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
3. Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis.
4. Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.
5. Wheeler J. O., 1998: Economic Geography, Wiley.
6. Durand L., 1961: Economic Geography, Crowell.
7. Bagchi-Sen S. and Smith H. L., 2006: Economic Geography: Past, Present and Future, Taylor and Francis.
8. Willington D. E., 2008: Economic Geography, Husband Press.
9. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: The Oxford Dictionary.

Syllabus (Minor)

GEOMI-03: Rural Development **4 Credits (L-T-P 4-0-0) 75 Marks**

Course Outcomes: This course equips students with a thorough understanding of rural development, including its concepts, economic base, government programs, and service provision. It empowers them to contribute effectively to rural development initiatives.

GEOMI-03-TH: Rural Development (Theory) **4 Credits / 60 Marks**

1. Rural Development: Concept, Basis, Elements, Measuring the level of rural development.
2. Rural Economic Base: Resource allocation and management under Panchayati raj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives.
3. Area Based Approach to Rural Development: Drought Prone Area Programme, Flood Prone Area Programmes, Pradhan Mantri Gram Sadak Yojana (PMGSY), Providing Urban Amenities to Rural Areas (PURA).
4. Target Group Approach to Rural Development: Swarnajayanti Gram Swarozgar Yojana (SGSY), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Jan Dhan Yojana, Pradhan Mantri Awas Yojana, Swachh Bharat Mission and Kanyashree Prakalpa.
5. Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care.

Continuous Assessment: 10 Marks

Reading List

1. Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
2. Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Publs., Jaipur.
3. Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.
4. Palione M., 1984: Rural Geography, Harper and Row, London.

5. Ramachandran H. and Guimaraes J.P.C., 1991: Integrated Rural Development in Asia – Leaning from Recent Experience, Concept Publishing, New Delhi.
6. UNAPDI 1986: Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publishing, New Delhi.
7. Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: Studies in Village India: Issues in Rural Development, Concept Publishing, New Delhi.

Semester-VI
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	04	16(4x4)	300(75x4)
2	Minor	01	04	75
3	Summer Internship	01	02	50
Total=		***06***	***22***	**425**

Semester –VI

Syllabus (Major)

GEOMJ-601: Evolution of Geographical Thought 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: Students will develop of geographical thinking from ancient to modern periods. It explores key philosophical and methodological sifts that have shaped the discipline. Students will understand human and natural process and its application in addressing contemporary issues.

GEOMJ-601-TH: Evolution of Geographical Thought (Theory) 3 Credits / 40 Marks

1. Development of pre-modern geography: contribution of Greek, Chinese, Indian, Romans; Contribution of Arab Geographers
2. Development of geography in classical period: contribution of Humboldt and Ritter.
3. Development of geography in modern period: contribution of German, French, British, American school of thought.
4. Debates: Environmental Determinism and Possibilism, Systematic and Regional, Ideographic and Nomothetic.
5. Approaches in geography: quantitative revolution and its importance; Behaviouralism, Radicalism, System approach, Feminism; Paradigm shift in geography.
6. Changing concept of space in geography.

GEOMJ-601-P: Evolution of Geographical Thought (Practical) 1 Credit / 20 Marks

1. Changing Perception of Map: (Hecataeus-Herodotus-Strabo-Ptolemy)
2. Debates/group discussions/poster presentation/power point presentation (Group wise) on a selected paradigm phase/philosophical approach/evolution in geographical thought.
3. Construction of travel routes and explorations (Marco Polo, Chrispher Columbus, Vasco-da-Gama, Ferdinand Magellan, James Cook, Humboldt)
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Arentsen M., Stam R. and Thuijis R., 2000: *Post-modern Approaches to Space*, ebook.
2. Bhat, L.S. (2009*) Geography in India* (Selected Themes). Pearson
3. Bonnett A., 2008: *What is Geography? Sage*.
4. Dikshit R. D., 1997: *Geographical Thought: A Contextual History of Ideas*, Prentice– Hall India.
5. Hartshone R., 1959: *Perspectives of Nature of Geography*, Rand MacNally and Co.
6. Holt-Jensen A., 2011: *Geography: History and Its Concepts: A Students Guide, SAGE.*
7. Johnston R. J., (Ed.): *Dictionary of Human Geography*, Routledge.

8. Johnston R. J., 1997: *Geography and Geographers, Anglo-American Human Geography* since 1945, Arnold, London.
9. Kapur A., 2001: *Indian Geography Voice of Concern, Concept Publications.*
10. Martin Geoffrey J., 2005: *All Possible Worlds: A History of Geographical Ideas*, Oxford.
11. Soja, Edward 1989. *Post-modern Geographies*, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.

GEOMJ-602: Population Geography 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: Students will learn the various aspects of population growth, process, and its impact on economy, society and politics. Various Contemporary issues regarding the human resources, their necessity, and outcome will be understood.

GEOMJ-602-TH: Population Geography (Theory) 3 Credits / 40 Marks

1. Sources of Data with special reference to India (Census, Vital Statistics and NSSO).
2. Population Growth – Determinants and Patterns; Theories of Growth – Malthusian Theory.
3. Demographic Transition Theory.
4. Population Dynamics: Fertility, Mortality and Migration – Measures, Determinants and Implications.
5. Population Composition and Characteristics – Age-Sex Composition; Rural and Urban Composition.
6. Contemporary Issues – Ageing of Population; Declining Sex Ratio.

GEOMJ-602-P: Population Geography (Practical) 1 Credit / 20 Marks

1. Assessment of population growth data (decadal) and projection of future population
2. Identification of center point analysis of region population by mean center analysis.
3. Construction of Age-sex pyramid of different types (Expansive, Constrictive, and Stationary).
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Barrett H. R., 1995: Population Geography, Oliver and Boyd.
2. Bhende A. and Kanitkar T., 2000: Principles of Population Studies, Himalaya Publishing House.
3. Chandna R. C. and Sidhu M. S., 1980: An Introduction to Population Geography, Kalyani Publishers.
4. Clarke J. I., 1965: Population Geography, Pergamon Press, Oxford.
5. Jones, H. R., 2000: Population Geography, 3rd ed. Paul Chapman, London.
6. Lutz W., Warren C. S. and Scherbov S., 2004: The End of the World Population Growth in the 21st Century, Earthscan
7. Newbold K. B., 2009: Population Geography: Tools and Issues, Rowman and Littlefield Publishers.

8. Pacione M., 1986: Population Geography: Progress and Prospect, Taylor and Francis.
9. Wilson M. G. A., 1968: Population Geography, Nelson.
10. Panda B P (1988): Janasankya Bhugol, M P Hindi Granth Academy,Bhopal
11. Maurya S D (2009) Jansankya Bhugol, Sharda Putak Bhawan, Allahabad
12. Chandna, R C (2006), Jansankhya Bhugol, Kalyani Publishers, Delhi.

GEOMJ-603: Geospatial Technology 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: The course is designed for the general ideas of GIS, GPS and image-based information. Upon completion of this course, students get benefit from these baseline concepts to further increase their knowledge.

GEOMJ-603-TH: Geospatial Technology (Theory) 3 Credits / 40 Marks

1. Physics of Remote sensing, stages, EMR, EMS, Spectral signature.
2. Interaction EMR with Atmosphere and earth surface features.
3. Types of Remote sensing Platforms, Different types of sensors (special reference to IRS, Landsat satellite), Different types of Resolution.
4. Introduction to GIS, Components, Data models and Data structures (Raster and vector)
5. GIS data structure (spatial and non-spatial), Data Base Management System and types.
6. Introduction to GPS, Principle used, component of GPS, Data collection methods, errors in observation.

GEOMJ-603-P: Geospatial Technology (Practical) 1 Credit / 20 Marks

1. Digitization (Point, Line, Polygon) using open-source software, Map composition and representation.
2. Managing attribute table and thematic mapping.
3. GPS data collection, waypoint and route creation, data integration with GIS software, and real-world applications in surveying, and environmental monitoring.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Jensen, J. R., & Lulla, K. (1987). Introductory digital image processing: a remote sensing perspective.
2. Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). Remote sensing and image interpretation. John Wiley & Sons.
3. Bhatta, B. (2010) Analysis of Urban Growth and Sprawl from Remote Sensing,Springer, Berlin Heidelberg.41.
4. Burrough, P.A., and McDonnell, R.A. (2000) Principles of Geographical Information System-Spatial Information System and Geo-statistics. Oxford University Press.
5. Chauniyal, D.D. (2010) Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad.
6. Heywoods, I., Cornelius, S and Carver, S. (2006) An Introduction to Geographical Information system. Prentice Hall.

7. Jha, M.M. and Singh, R.B. (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
8. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.
9. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
10. Singh, R.B. and Murai, S. (1998) Space Informatics for Sustainable Development, Oxford and IBH, New Delhi.

GEOMJ-604: Thematic Cartography **4 Credits (L-T-P 3-0-1) 75 Marks**

Course outcomes: This paper is very helpful to prepare thematic maps through the representation of various geographical data using different cartographic techniques and methods (manual and computer based). Students are able to learn the usages of survey instruments like Prismatic Compass, Dumpy level and Theodolite.

GEOMJ-604-TH: Thematic Cartography (Theory) **3 Credits / 40 Marks**

1. History of Cartography: Sequence of Development, Impact of changing Idea and Technology.
2. Nature of cartography, Forms of representation and techniques.
3. Map: need, basic characteristics and purpose. Classification according to scale, function and theme.
4. Cartographical representation of Geographical data.
5. Indexing and symbol used in cartographical technique.
6. Fundamental concept of Geological map.

GEOMJ-604-P: Thematic Cartography (Practical) **1 Credit / 20 Marks**

1. Diagrammatic representation of data: Proportional circle, Proportional Pie, Proportional Square, and Flow Chart.
2. Chorochromatic map: Preparation of Land use map using cadastral map.
3. Geological map interpretation: Uniclinal, Folded structure.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Cuff J. D. and Mattson M. T., 1982: Thematic Maps: Their Design and Production, Methuen Young Books.
2. Dent B. D., Torguson J. S., and Holder T. W., 2008: Cartography: Thematic Map Design (6th Edition), Mcgraw-Hill Higher Education.
3. Gupta K. K. and Tyagi V. C., 1992: Working with Maps, Survey of India, DST, New Delhi.
4. Kraak M.J. and Ormeling F., 2003: Cartography: Visualization of Geo-Spatial Data, Prentice-Hall.
5. Mishra R. P. and Ramesh A., 1989: Fundamentals of Cartography, Concept, New Delhi.
6. Sharma J. P., 2010: Prayogic Bhugol, Rastogi Publishers, Meerut.

7. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
8. Slocum T. A., Mcmaster R. B. and Kessler F. C., 2008: Thematic Cartography and Geovisualization (3rd Edition), Prentice Hall.
9. Tyner J. A., 2010: Principles of Map Design, The Guilford Press.
10. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
11. Singh, L R & Singh R (1977): Manchitra or Pryaogatamek Bhugol , Central Book, Depot, Allahabad.
12. Bhopal Singh R L and Duttta P K (2012) Prayogatama Bhugol, Central Book Depot, Allahabad

Syllabus (Minor)

GEOMI-03: Rural Development **4 Credits (L-T-P 4-0-0) 75 Marks**

Course Outcomes: This course equips students with a thorough understanding of rural development, including its concepts, economic base, government programs, and service provision. It empowers them to contribute effectively to rural development initiatives.

GEOMI-03-TH: Rural Development (Theory) **4 Credits /60 Marks**

1. Rural Development: Concept, Elements, Measuring the level of rural development.
2. Rural Economic Base: Panchayati raj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives.
3. Area Based Approach to Rural Development: Drought Prone Area, Flood Prone Area Programmes, Pradhan Mantri Gram Sadak Yojana (PMGSY), Providing Urban Amenities to Rural Areas (PURA).
4. Target Group Approach to Rural Development: Swarnajayanti Gram Swarozgar Yojana (SGSY), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Jan Dhan Yojana, Pradhan Mantri Awas Yojana, Swachh Bharat Mission and Kanyashree Prakalpa.
5. Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care.

Continuous Assessment: 10 Marks

Reading List

1. Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
2. Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Publs., Jaipur.
3. Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.
4. Palione M., 1984: Rural Geography, Harper and Row, London.
5. Ramachandran H. and Guimaraes J.P.C., 1991: Integrated Rural Development in Asia – Leaning from Recent Experience, Concept Publishing, New Delhi.
6. UNAPDI 1986: Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publishing, New Delhi.

7. Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: Studies in Village India: Issues in Rural Development, Concept Publishing, New Delhi.

Semester-VII
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	04	16(4x4)	300(75x4)
2	Minor	01	04	75
Total=		***05***	***20***	***375***

Semester –VII

Syllabus (Major)

GEOMJ-701: Surveying Techniques and Mapping 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: The course offers students both theoretical knowledge and practical experience in surveying techniques. It covers the principles of surveying, using modern instruments such as Levelling and GPS. Students will learn to measure distances, angles, and elevations, and understand topographic and cadastral surveys. Practical exercises include real-ground surveys, data collection, processing, and mapping. Fieldwork involves laying out construction projects, conducting topographic surveys, and creating detailed site maps. These hands-on sessions ensure students can apply their theoretical knowledge to solve practical problems, preparing them for professional surveying tasks.

GEOMJ-701-TH: Surveying Techniques and Mapping (Theory) 3 Credits / 40 Marks

1. Surveying: concept, classification and uses.
2. Bearing: Magnetic and True Bearing, whole circle and Reduced Bearing.
3. Traverse surveying: concept, methods, Principles, Types, uses and limitation.
4. Levelling Survey: Concept, method, Principles, types, uses and limitation.
5. Tacheometric Surveying: concept, method, principles, limitation
6. Contour survey: concept, Method, uses.

GEOMJ-701-P: Surveying Techniques and Mapping (Practical) 1 Credit / 20 Marks

1. Traverse Survey by Prismatic Compass (closed and open).
2. Levelling survey by Dumpy Level (collimation method and Rise-fall method) and contour survey by Dumpy level and Prismatic compass.
3. Determination of Height and distance by Theodolite (Base accessible and base Inaccessible) on same vertical plain.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

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. Mishra R. P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: *Cartography: Past, Present and Future*, Elsevier, International Cartographic Association.
6. Robinson A. H., 2009: *Elements of Cartography*, John Wiley and Sons, New York.
7. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.

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
10. Singh, R. L. & Rana P. B. Singh, (1991) Prayogtmak Bhugolke Mool Tatva, Kalyani Publishers, New Delhi.

GEOMJ-702: Disaster Management 4 Credits (L-T-P 3-0-1) 75 Marks

Course outcomes: This course covers both theoretical and practical aspects of disaster management, including planning, risk assessment, mitigation, preparedness, response, recovery, and rehabilitation. Students will explore challenges encountered during disasters, such as inadequate infrastructure, slow response times, and logistical problems. The course features a detailed case study on a significant disaster event, where students will analyze the causes, consequences, and mitigation strategies. They will work on a project to develop a comprehensive report outline lessons learned and propose improvements for future disaster management practices.

GEOMJ-702-TH: Disaster Management (Theory) 3 Credits / 40 Marks

1. Hazards and Disaster: Definition, hazards and disaster linkages and effects.
2. Concept of risk and vulnerability, mitigation, preparedness, response, recovery and rehabilitation. Concept of resilience.
3. Meteorological Hazards-cyclones: causes, effects and control measures.
4. Hydrological Hazards-Floods and droughts: causes, effects and control measures.
5. Geomorphic Hazards-Landslides: causes, effects and control measures.
6. Anthropogenic Hazards-Bhopal Gas Disaster: causes, effects and rehabilitation.

GEOMJ-702-P: Disaster Management (Practical) 1 Credit / 20 Marks

Case study on issues related to disaster management will be done by a group not exceeding 10. The report should be prepared on secondary data and hand written on A4 size pages in candidate's own words not exceeding 2000 words. The report should contain a proper title. The report should incorporate relevant tables, maps, diagrams and references, not exceeding 20 pages. Photographs are optional and should not exceed three. A copy of the stapled/spiral – bound report in a transparent cover, duly signed by the concerned teacher, is to be submitted during examination. Without the report the candidates will not be evaluated for GEOMJ-702-P.

Continuous Assessment: 10 Marks

Reading List

1. Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.

3. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
4. Singh, R. B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi.
5. Singh, R.B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
6. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.
7. Stoltman, J. Petal. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications, Dordrecht.
8. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher I. K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com)

GEOMJ-703: Sustainable Development **4 Credits (L-T-P 3-0-1) 75 Marks**

Course outcomes: Students will learn sustainable development principles, focusing on balancing environmental protection with socio-economic progress. They'll explore global issues such as SDGs, political instability, and socio-economic imbalances. The course covers carbon emissions' impact on climate change and biodiversity conservation strategies. Students will study water use, land management, and create land use maps for sustainable agriculture. Practical work includes case studies, carbon footprint evaluation, biodiversity assessment, and water resource management. They'll use GIS tools for mapping and develop sustainable practices. Through fieldwork and simulations, students will gain hands-on experience, preparing them for careers in environmental management, policy-making, and sustainable development.

GEOMJ-703-TH: Sustainable Development (Theory) **3 Credits / 40 Marks**

1. Sustainable Development: Definition, importance, history and current practices.
2. Dimensions to sustainable development: society, environment, culture and economy.
3. Frame work for sustainability: analytical framework in sustainability studies, sustainability matrix- criteria and indicators, significance of quantitative and qualitative assessment of sustainability.
4. Sustainable Regional Development: Needs and examples from different eco-systems.
5. Sustainable Development policies and programmes: Millenium Development goals, SDGs at Rio de Janeiro in 2012; Illustrative SDGs; goal-based development, financing for sustainable development; principles of good Governance.
6. Current challenges- Natural, Political, socio-economic imbalance.

GEOMJ-703-P: Sustainable Development (Practical) **1 Credit / 20 Marks**

1. Mapping and interpreting sustainability indicators (e.g. carbon emissions, bio-diversity and water uses).
2. Preparation of land use map and assessing sustainable agricultural practices.
3. Assessment of local renewable energy potential (e.g. solar, wind, bio-gas plant).
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Agyeman, Julian, Robert D. Bullard and Bob Evans (Eds.) (2003) Just Sustainabilities: Development in an Unequal World. London: Earthscan. (Introduction and conclusion.).
2. Ayers, Jessica and David Dodman (2010). "Climate change adaptation and development: the state of the debate". Progress in Development Studies, 10 (2):161-168.
3. Baker, Susan (2006). Sustainable Development. Milton Park, Abingdon, Oxon; New York, N. Y.: Routledge. (Chapter-2, "The concept of sustainable development").
4. Brosius, Peter (1997). "Endangered forest, endangered people: Environmentalist representations of indigenous knowledge", Human Ecology. 25. 47-69.
5. Lohman, Larry (2003). "Re-imagining the population debate". Corner House Briefing28.
6. Martínez-Alier, Joanetal (2010). "Sustainable de-growth: Mapping the context, criticisms and future prospects of an emergent paradigm" Ecological Economics 69.1741-1747.
7. Merchant, Carolyn (Ed.) (1994) Ecology. Atlantic Highlands, N.J: Humanities Press. (Introduction, pp. 1-25.)
8. Osorio, Leonardo et.al. (2005). "Debates on sustainable development: towards a holistic view of reality". Environment, Development and Sustainability, 7. 501-518.
9. Robbins, Paul (2004). Political Ecology: A Critical Introduction. Blackwell Publishing.
10. Singh, R.B. (Eds.) (2001). Urban Sustainability in the Context of Global Change, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.

GEOMJ-704: Political Geography **4 Credits (L-T-P 3-0-1) 75 Marks**

Course outcomes: The undergraduate course in Political Geography provides a comprehensive look at both theoretical and practical aspects essential for understanding today's geopolitical issues. Students will examine international and inter-state water distribution, focusing on strategic boundaries and buffer zones, and study key geopolitical theories like the Heartland and Rimland theories to understand global power dynamics. The course includes debates on specific conflicts, such as those involving water resources in the Ganga and Teesta rivers and political issues around forest rights in India. It also addresses the politics of displacement, including relief, compensation, and rehabilitation related to major infrastructure projects.

GEOMJ-704-TH: Political Geography (Theory) **3 Credits / 40 Marks**

1. Nature, scope and approaches of political Geography.
2. Concept of Nation, nation –state, borders, boundaries, frontiers, buffer zones and land locked states, federalism and regional integration.
3. Concept of core-periphery, Wallerstein's world system theory.
4. Geopolitics and geopolitical theories: Heartland and Rimland.
5. Political conflicts of water resources: Ganga and Teesta.
6. Politics of Displacement: issues of relief, compensation and rehabilitation with reference to dams and special Economic Zone of India.

GEOMJ-704-P: Political Geography (Practical) **1 Credit / 20 Marks**

1. Mapping of the river basins along with conflicting states and nations over water sharing (Godavari, Kaveri, Ganga, Teesta). Debates/group discussion on issues related to international and interstate water dispute.
2. Debates/ group discussion on issue related to organic theory of state; special reference on geopolitics and roles and responsibility of geopolitics in 2nd World War etc.
3. Conflict over forest rights in Indian context. Debates/group discussion on Displacement: issues of relief, compensation and rehabilitation with reference to dams and special Economic Zone of India.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Adhirari, S. (2004): Political Geography, Rawat Pub. Jaipur.
2. Alexander, L. M. (1963): The World Political Pattern, Rand Menally, Chicago.
3. Bergman, E. (1975): Modern Political Geography, WMC Brown Co. Pub. Iowa.
4. Taylor, P. J. (1985): Political Geography, World Economy, Nation, State & Locality, Longman, Landon.
5. Tomlinson, J (1999): Globalization and Culture, Cambridge Polity Press.
6. Weigest, H. (1957): Principles of Political Geography, Appleton century, Crasts Inc. New York.
7. Goblet, Y.M. (1955): Political Geography and the World Map, George Philip and sons Ltd.

Syllabus (Minor)

GEOMI- 04: Industrial Geography **4 Credits (L-T-P 4-0-0) 75 Marks**

Course outcomes: This course provides students with a comprehensive understanding of Industrial Geography, covering its nature, scope, and economic significance. It explores factors influencing industrial location in India, with a focus on specific industries. Students analyze the Chota Nagpur Industrial Region and assess the impact of industrialization on the environment, society, and the economy. Additionally, they stay updated on recent industrial policies in India.

GEOMI-04-TH: Industrial Geography (Theory) **4 Credits / 60 Marks**

1. Nature and Scope of Industrial Geography.
2. Factors of location and Distribution (India) of Industries: Coal and Iron based industries; Rural based Industries, Footloose Industry.
3. Mega Industrial Complex: Chota Nagpur Industrial Region.
4. Impact of Industrialization in India: Environmental, Social and Economic Perspective
5. Industrial Policy of India (Recent).

Continuous Assessment: 10 Marks

Reading List

1. Alexander J.W. (1979). Economic Geography, Printice Hall of India Pvt. Ltd., New Delhi.
2. Goh Cheng Leong (1997). "Human and economic geography", Oxford University Press, New York.
3. Thoman, R.S., Conkling E.C. and Yeates, M.H. (1968). Geography of Economic Activity, McGraw Hill Book Company, 1968.
4. Miller, E. (1962) Geography of Manufacturing Printice Hall - Englewood Cliff, New Jersey.
5. Gunnar Alexandersson (1967). "Geography of Manufacturing, Prentice Hall, New Jersey Truman, A. Harishorn, John W. Alexander (2000) " Economic Geography", Prentice Hall of India Ltd., New Delhi.
6. Singh, Jagdish 2003: *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
7. Tirtha, Ranjit 2002: *Geography of India,* Rawat Publs., Jaipur & New Delhi.
8. Pathak, C. R. 2003: *Spatial Structure and Processes of Development in India*. Regional Science Assoc., Kolkata.
9. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad.
10. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur.

Semester-VIII
Course Structure

Sl. No.	Name of the Courses	No. of Papers	Credits	Full Marks
1	Major	02	08(4x2)	150(75x2)
2	Minor	01	04	75
3	DSE/Research Project	03	12(4x3)	225(75x3)
Total=		***06***	***24***	***450***

Semester –VIII

Syllabus (Major)

GEOMJ-801: Landscape Ecology **4 Credits (L-T-P 3-0-1) 75 Marks**

Course Outcomes: In this Landscape Ecology course, students will study how land use, ecosystem functions, and human impacts intersect, focusing on issues like agricultural intensification, deforestation, and development. Indigenous practices for environmental sustainability will also be explored. Key topics include the impact of disturbances on vital ecosystem services and human well-being. The course emphasizes landscape management and planning with geospatial technology. Students will engage in fieldwork and secondary data analysis to measure biodiversity, analyze landscape features such as patches and boundaries from topographical maps, and use GIS to assess forest fragmentation, aiming to enhance management and conservation strategies.

GEOMJ-801-TH: Landscape Ecology (Theory) **3 Credits / 40 Marks**

1. Concept of landscape ecology and its relation to other sub-fields of ecology.
2. Concept of landscape ecological pattern: change and measurement techniques.
3. Landscape disturbance dynamics: agricultural intensification, deforestation and development activities.
4. Effects of landscape pattern on population community and ecosystem services (provisioning services, regulation services, supporting services and cultural services).
5. Traditional ecological knowledge: Indigenous practices (community ethics and low) for environment sustainability.
6. Landscape management and planning: using geospatial technology.

GEOMJ-801-P: Landscape Ecology (Practical) **1 Credit / 20 Marks**

1. Measurement of diversity indices: Shannon diversity Index, Margalef's richness Index, Evenness index and Dominance Index based on field measurement and secondary data.
2. Landscape matrix: measurement of patches, boundary shape and network of forest resources from a topographical map.
3. GIS based forest fragmentation analysis.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Farina, Almo: Principles and Methods in Landscape Ecology Towards a Science of the Landscape Series: Landscape Series, Vol. 3, Springer.

2. Forman R.T.T.: Land mosaic: The ecology of landscape and region. Academic press Cambridge UK
3. Frohn Robert C. (1997): Remote Sensing for Landscape Ecology: New Metric Indicators for Monitoring, Modeling, and Assessment of Ecosystems, Taylor & Francis
4. Gadgil Madhav, Guha Ramachandra: The Use and Abuse of Nature: incorporating This Fissured Land: An Ecological History of India and Ecology and Equity, Oxford University Press.
5. Hutchinson and Smith, D. (1996): Ethnicity: Oxford University Press, Delhi
6. Turner M.G. & Gardner R.H.: Quantitative method in landscape ecology Springer-Verlag New York
7. Turner M.G.: Landscape Heterogeneity and disturbance Springer-Verlag, Germany
8. Turner, Monica G., Gardner, Robert H., O'Neill, Robert V.: Landscape Ecology in Theory and Practice Pattern and Process, Springer
9. Vink A.P.A.: Landscape ecology and land use, Longman, London & New York
10. Wu jianguo and Hobbs Richard j. (2007): Key Topics in Landscape Ecology, Cambridge University Press

GEOMJ-802: Trade and Transport Geography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This course provides students with insights into the spatial patterns and processes of trade, different transport modes, and their environmental and global trade impacts. Students will practice measuring traffic flow, analyze the hinterlands of major Indian ports and evaluate the environmental impacts of various transport modes. Combining theory with practical exercises, students will gain skills to effectively manage and analyze global trade and transportation complexities, considering economic, environmental, and technological factors.

GEOMJ-802-TH: Trade and Transport Geography (Theory) 3 Credits / 40 Marks

1. Introduction, Definitions and scope of trade and transport Geography, historical perspectives on trade routes and transportation networks. Transport cost: principles and factors
2. Mode of transportation: railways, roads, airways and waterways. Public transport: advantage and planning.
3. Technological Innovations in transport: Impact of ICT (Information and Communication technology) on logistics and transport, future trends in transportation technology (e.g. autonomous vehicles, hyper loop).
4. Trade and commodity flows: gravity and interaction modeling.
5. Globalization and trade: Global trade patterns and trends, economic globalization and its impact on trade flows.
6. Transportation and environment: external costs of transport, environmental impact assessment.

GEOMJ-802-P: Trade and Transport Geography (Practical) 1 Credit / 20 Marks

1. Measurement of the surface traffic flow with suitable techniques.
2. Delineation of Hinterland of a port (Calcutta, Vishakhapatnam, Mumbai, Port Blair)

3. Assessment of environmental impact of different types of transportation (Bus, goods vehicles, private car)
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Adler, H.A (1987): Economic Appraisal of Transport Project, John Hapkins Press. Washington.
2. Dasgupta, A.K. and Pearee, D.W. (1972); Cost Benefit analysis, theory and practice; Mac Millan, London.
3. Flahesly CAO (2006): Transport Planning and Traffic Engineering, Butterworth- Heinemann
4. Gwillian, K.M. (Ed.) (1993): Transport Policy and Global Warming, European Conference of Ministers of Transport, Paris.
5. Lays M.G. (1993): Wags of the World, Primarera Press, Sydwen
6. Pearce D.W. and Markyanda, A. (1989): Environmental policy Benefits, Manetany valuation OECD, Paris.
7. While, P. (1986): Public Transport Planning, Management and operation, Hatechinson, London.

GEODSE-1: Watershed Management 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: The Watershed Management course equips students with key knowledge and skills for effective hydrological and environmental planning. It covers the role of watersheds in water conservation, micro-catchment water harvesting techniques, and the development of management plans. Students will learn about administrative arrangements, agency selection, and setting up monitoring and evaluation systems for watershed programs. The course also includes practical exercises in land capability analysis, Manning equation applications for velocity and discharge, and flood frequency analysis, alongside exploring watershed-based rural development and NGO roles.

GEODSE-1-TH: Watershed Management (Theory) 3 Credits / 40 Marks

1. Concept and types of watersheds, utility as units of hydrological, environmental, and land-use planning and management.
2. Water conservation: Micro-catchment water harvesting, evaporation suppression and seepage reduction, supplemental irrigation, groundwater recharge, and afforestation.
3. Management of soil erosion: Overland flow and gullies.
4. Preparation of a watershed development plan, administrative arrangements and agency selection for plan implementation, monitoring and evaluation system.
5. Programmes on watershed management: Govt. of India guidelines on watershed development.
6. Watershed-based rural development and the role of NGOs in watershed management.

GEODSE-1-P: Watershed Management (Practical) 1 Credit / 20 Marks

1. Land capability analysis using additive parameters in a watershed demarcated from Survey of India 1:50,000 topographical maps.
2. Calculation of velocity and discharge using Manning equation.
3. Flood frequency analysis from long-term discharge data.
4. Laboratory Notebook and Viva-Voce.

Continuous Assessment: 10 Marks

Reading List

1. Clark, J.R. 1998. Coastal Seas: The Conservation Challenge, Blackwell Science
2. Kay, R. and Alder, 1999. A. Coastal Planning and Management, E & FN Spon.
3. Mitchell, C.W. 2014. Terrain Evaluation, end ed, Routledge.
4. Morgan, R.P.C. 2005. Soil Erosion and Conservation, 3rd ed, Wiley-Blackwell.
5. Murthy, V.V.N. 2005. Land and Water Management, Kalyani Pub.
6. Pethick, J. 1984. An Introduction to Coastal Geomorphology. Arnold.
7. Tideman, E.M. 1996. Watershed Management, Omega Scientific Publishers.
8. Woodroffe, C.D. 2002. Coasts: Form, Process and Evolution, Cambridge University Press.
9. Yousuf, A. and Singh, M. 2021. Watershed Hydrology: Management and Modeling, CRC Press.

GEODSE-2: Urban Geography 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: The Urban Geography course explores urban environments, focusing on recent trends and theories like August Losch's Market Centres theory, which examines economic and spatial patterns. Students will study pressing urban issues, including housing shortages, slums, civic amenities, poverty, crime, and the Heat Island effect etc. Key environmental concerns such as sewage, waste management, urban pollution, and green spaces will also be covered. The course includes an analysis of urban policies like the Smart City initiative, Indian housing policies, and AMRUT. Students will prepare a practical report based on secondary data, addressing urban challenges in water, sewage, traffic, and land use etc.

GEODSE-2-TH: Urban Geography (Theory) 3 Credits / 40 Marks

1. Urban Geography: nature and scope, different approaches and recent trends in urban geography.
2. Origin of urban places in Ancient, Medieval, Modern and Post- Modern periods factors, stages and characteristics.
3. Urban Hierarchies: Central Place Theory; August Losch's theory of Market Centres.
4. Urban Issues: problems of housing, slums, civic amenities, urban poverty and crime.
5. Urban Problems: Heat Island, sewage, solid waste, urban pollution, Green space and Ecological footprint.
6. Polices of Urban Development: Smart city, housing policies of Indian govt., AMRUT.

GEODSE-2-P: Urban Geography (Practical) 1 Credit / 20 Marks

Preparation of a report based on secondary data on urban environmental issues (Water, sewage, traffic, urban pollution, urban land use, green belts) in any one topic to be done by a group of not exceeding 10 students. The report should be hand written on A4 page in candidates own words not exceeding 2000 excluding references. The report should contain a proper title and incorporate relevant tables, maps, diagrams and references. Photographs are optional and should not exceed 2 pages.

Continuous Assessment: 10 Marks

Reading List

1. Fyfe N. R. and Kenny J.T., 2005. The Urban Geography Reader, Routledge.
2. Hall, T., 2006. Urban Geography. Taylor and Francis.
3. Husain, Majid, 2003. Urban Geography, Annual Publication.
4. Knox, P. L. and Pinch, S., 2006. Urban Social Geography: An Introduction, Prentice-Hall.
5. Kaplan, D. H., Wheeler, J. O. and Holloway, S. R., 2008. Urban Geography, John Wiley.
6. Mandal, R. B., 2008. Urban Geography: A textbook, Concept Publishing Company
7. Maurya, S. D., 2022. Urban Geography, Pustak Bhawan
8. Pacione, M., 2009. Urban Geography: A Global Perspective, Taylor and Francis.
9. Ramachandran, R., 1992. The Study of Urbanisation. Oxford University Press, Delhi.
10. Singh, Balwinder, 2004. Urban Geography, Rajesh Publications.
11. Verma, L. N., 2006. Urban Geography, Rawat Publication

GEODSE-3: Geomatics and Spatial Analysis 4 Credits (L-T-P 3-0-1) 75 Marks

Course Outcomes: This course challenges students who have past expertise with data manipulation and analysis using Geographical Information Systems (GIS) to deepen their understanding of spatial information science and GIS procedures. Students will develop and apply advanced data analytic approaches to plan, construct, and execute a major research project in their subject of interest. The theoretical foundation of the concepts underlying geomatics and spatial analysis is thoroughly examined, while practical sessions help students build increasingly complicated spatial analysis capabilities.

GEODSE-3-TH: Geomatics and Spatial Analysis (Theory) 3 Credits / 40 Marks

1. Definition, Scope and nature of Geomatics, Key Components of Geomatics: Remote Sensing, GIS, GPS, Applications in various fields (environmental monitoring, urban planning etc.).
2. Digital Image Processing: Definition and Source of Image, Pre-Processing (Radiometric and Geometric Correction), Image Enhancement, and Digital Image Classification: Supervised and Unsupervised.
3. Concepts of Spatial Analysis: Definition and significance of spatial analysis, Types of spatial data (vector and raster), Sources of spatial data, Types of Geo-database used in GIS.

4. GIS Data Analysis: Data Storage (Spaghetti Model, Topological Model, Quadtree), Database Modelling (Hierarchical Model, Network Model etc.), Data Organization (Chain Coding, Run-length Coding, Block Coding)
5. Techniques of Spatial Analysis: Types of Spatial Analysis, Measurement in GIS, Spatial Queries by Attributes, Neighbourhood Analysis, Connectivity Analysis, Overlay.
6. GNSS- Principle used, Components of GNSS, Data collection methods, DGPS, Errors in observations and corrections.

GEODSE-3-P: Geomatics and Spatial Analysis (Practical) 1 Credit / 20 Marks

1. Geometric and Atmospheric Correction, Indices (Ratios, NDVI, NDWI).
2. Image Classification: Supervised And Unsupervised, Accuracy Assessment (Kappa).
3. Creation of Buffer and IDW through GIS software, Errors Inspections, Corrections of errors in spatial database.
4. Laboratory Notebook and Viva Voce.

Continuous Assessment: 10 Marks

Reading List

1. Jensen, J. R., & Lulla, K. (1987). Introductory digital image processing: a remote sensing perspective.
2. Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). Remote sensing and image interpretation. John Wiley & Sons.
3. Bhatta, B. (2010) Analysis of Urban Growth and Sprawl from Remote Sensing,Springer, Berlin Heidelberg.41.
4. Burrough, P.A., and McDonnell, R.A. (2000) Principles of Geographical Information System-Spatial Information System and Geo-statistics. Oxford University Press .
5. Chauniyal, D.D. (2010) Sudur Samvedan evam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad.
6. Heywoods, I., Cornelius, S and Carver, S. (2006) An Introduction to Geographical Infromation system. Prentice Hall.
7. Jha, M.M. and Singh, R.B. (2008) Land Use: Reflection on Spatial Informatics Agriculture and Development, New Delhi: Concept.
7. Nag, P. (2008) Introduction to GIS, Concept India, New Delhi.
8. Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.
9. Singh, R.B. and Murai, S. (1998) Space Informatics for Sustainable Development, Oxford and IBH, New Delhi

Syllabus (Minor)

GEOMI- 04: Industrial Geography 4 Credits (L-T-P 4-0-0) 75 Marks

Course outcomes: This course provides students with a comprehensive understanding of Industrial Geography, covering its nature, scope, and economic significance. It explores factors influencing industrial location in India, with a focus on specific industries. Students analyze the Chota Nagpur

Industrial Region and assess the impact of industrialization on the environment, society, and the economy. Additionally, they stay updated on recent industrial policies in India.

GEOMI-04-TH: Industrial Geography (Theory) 4 Credits / 60 Marks

1. Nature and Scope of Industrial Geography
2. Factors of location and Distribution (India) of Industries: Coal and Iron based industries; Rural based Industries, Footloose Industry.
3. Mega Industrial Complex: Chota Nagpur Industrial Region
4. Impact of Industrialization in India: Environmental, Social and Economic Perspective
5. Industrial Policy of India (Recent).

Continuous Assessment: 10 Marks

Reading List

1. Alexander J.W. (1979). Economic Geography, Printice Hall of India Pvt. Ltd., New Delhi.
2. Goh Cheng Leong (1997). "Human and economic geography", Oxford University Press, New York.
3. Thoman, R.S., Conkling E.C. and Yeates, M.H. (1968). Geography of Economic Activity, McGraw Hill Book Company, 1968.
4. Miller, E. (1962) Geography of Manufacturing Printice Hall - Englewood Cliff, New Jersey
5. Gunnar Alexandersson (1967). "Geography of Manufacturing, Prentice Hall, New Jersey Truman, A. Harishorn, John W. Alexander (2000) " Economic Geography", Prentice Hall of India Ltd., New Delhi.
6. Singh, Jagdish 2003: *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
7. Tirtha, Ranjit 2002: *Geography of India*, Rawat Publs., Jaipur & New Delhi.
8. Pathak, C. R. 2003: *Spatial Structure and Processes of Development in India*. Regional Science Assoc., Kolkata.
9. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
10. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur