



**Department of Geography**  
**Kazi Nazrul University**



**DEPARTMENT OF GEOGRAPHY**  
**KAZI NAZRUL UNIVERSITY**

ASANSOL 713 340

WEST BENGAL

[www.knu.ac.in](http://www.knu.ac.in)



## **Structure and Detailed Syllabus of the Post Graduate Courses**

### **Department of Geography**

*Department of Geography, Kazi Nazrul University was established in 2015. Two Post Graduate Courses in (1) Geography and (2) Geoinformatics are offered at present by the department. Two-year M.Sc. programme in Geography was started in 2015-16 academic year and Geoinformatics in 2017-18 academic year. The thrust areas of the department are on Advance Geomorphology, Environmental Issues in Geography, Urban Geography, Disaster Management along with Photogrammetry, Remote Sensing Web Mapping and Web GIS and application of Geographic Information System (GIS). The department is equipped with advanced RS and GIS laboratory and seminar library. In this short period of journey, the number of students of the department has increased almost thrice. The Department of Geography aims to promote a balanced sense of theoretical geography and its application in various fields among the students. Both, the students of Geoinformatics and Geography are trained with professional ethics and scientific temper.*

### **Courses offered in the Department**

- *M.Sc. in Geography (Two years)*
- *M.Sc. in Geoinformatics (Two years)*

### **Mission**

*Department of Geography, Kazi Nazrul University has a mission to develop the future generation Geographers sensitive towards the region-specific issues of the nation with special emphasis on the local developmental issues. The department also aims to foster this future generation of Geographers with a systematic understanding of physical and human geography and equip them with state-of art technology.*

### **Vision**

*Department of Geography, Kazi Nazrul University envisions to be a global destination for practising Geography and Geoinformatics. Working in collaboration with government, industry and non-governmental developmental organization, the department upholds a vision to apply the knowledge of Geography and technology of Geoinformatics in reducing spatial disparity, promoting equality and social justice.*



### **Programme Outcomes**

*Two years Post-Graduate programmes have been designed as a base for research and application of Geography and Geoinformatics. These two years programme will enable the students to enhance their learning after under-graduate course and to join the workforce in the field of Geography and Geoinformatics.*

### **Programme- specific Outcomes**

*Two years Post-Graduate programmes will enable the students with understanding the spatial logic and methodology of geography. After two years, students will be able to work in the areas of urban and regional planning, disaster management, environmental planning and management and related areas.*

*Two years Post-Graduate programmes in Geoinformatics will enable the students with recent development in the field of Remote Sensing and Geographic Information System. After two years, students will be able to work in the areas mapping and digital cartography, application of GIS in the field urban planning, disaster management, web mapping and web GIS and related areas.*

### **Course Description**

*Duration of Post Graduate Course of Studies in Geography and will be two years with Semester I, Semester II, Semester III and Semester IV, each of six months leading to Semester I, Semester II, and Semester III and Semester IV examinations in Geography at the end of each semester. Semester I and III comprise ODD SEMESTER and Semester II and IV comprise EVEN SEMESTER of each year. Syllabus for post graduate course in Geography is hereby reframed into Choice Based Credit System (CBCS) in compliance with recent directives from the University Grants Commission (UGC).*

### **Scheme:**

*Both the course Geography and Geoinformatics consists of 88 credits with at least 20 credits in a semester within the faculty of science. In Semester II and Semester III, students have to choose Minor Elective papers of minimum 4 credits offered by the other Departments or their own Department. There are Major Elective papers in Semester III and Semester IV. The department offers a cluster of Major Elective papers and the students have to choose Major Elective papers according to the norms decided by the Department.*



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### **Choice Based Credit System (CBCS)**

*The CBCS is an effective 'Supply side Initiative' measure evolved as a process of 'Academic Reforms' to sustain the Quality Education that focuses on the learner centric education. It provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill-based courses. It allows students to choose interdisciplinary, intra-disciplinary courses, skill-oriented papers (even from other disciplines according to their learning needs, interests and aptitude) and more flexibility for students). As a result, this not only broadens their horizons but also aims to make students well rounded in all spheres of development. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system.*

*It is also a cafeteria-type learning system in a semester pattern to foster creativity and innovation that bridges the gap between professional and liberal education to empower the students for meeting the challenges of Globalization with an inbuilt International acceptance of recognition of Degrees. Syllabus for Post Graduate course in Geography and Geoinformatics of Kazi Nazrul University, Asansol is hereby reframed into Choice Based Credit System (CBCS) in compliance with recent directives from the University Grants Commission (UGC). The main objective of this new curriculum is to give the students a holistic understanding of the subject, putting equal weightage to the core content and techniques used in Geography as well as in Geoinformatics.*



Department of Geography  
Kazi Nazrul University

**CBCS SYLLABUS**  
*for*  
**Post Graduate Courses in Geography**

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(REVISED)



With effect from Academic Session 2019-21

**KAZI NAZRUL UNIVERSITY**

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### • Semester System: terms and conditions

There shall be regular M.Sc. Course in Geography of two years duration. There shall be semester system spreading over four semesters, each of six months duration. There shall be 1200 marks in total and each semester shall carry 300 marks. There shall be 24 courses/modules (16 theoretical courses, 8 practical courses including Dissertation) to cover the whole syllabus and each semester shall contain six modules. The Students shall be evaluated on the basis of continuous (internal) assessment during the semester and End Semester Examination at the end of the semester. Procedure of assessment/examination and evaluation of any course in a semester will be guided by Rules and regulations pertaining to the PG courses of the University.

### • Dissertation

A Dissertation (Master's Thesis) on any branch of Geography will be a comprehensive work based on conceptual aspects, field work and analysis of primary and secondary data. It is to be produced individually by the students and this must be stated clearly in a certificate from the supervisor (s) and concerned Head of the Department of Geography, Kazi Nazrul University.

### ✧ Semester-wise Course Structure and Credits: M.Sc. in Geography

Semester	Core Course (C)		Major Elective Course (MJE)		Minor Elective Course (MIE)	Total Credit
	Theory (Th)	Practical (Pr)	Theory (Th)	Practical (Pr)		
I	16	4	---	---	---	20
II	12	6	---	---	4	22
III	8	2	4	4	4	22
IV	12	4	4	4	---	24
<b>Total</b>	<b>48</b>	<b>18</b>	<b>8</b>	<b>6</b>	<b>8</b>	<b>88</b>

• **Course Credits** denote the number of teaching hours allocated to the module/ week during the course of the semester. One credit is equivalent to one hours of teaching (lecture or tutorial) or two hours of practical work/ field work per week. Actually, assigning of credits is based on the course content and hours of teaching.

• **Core Courses:** Every student will take only core courses in the Semester I. In the Semester II, III and IV, students will take core courses along with the other courses.



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- **Major Elective Courses (Specialization):** Student will opt one out of the *three Major Electives Subjects* in Semester III and IV.

**Option-A: Advanced Geomorphology**

**Option-B: Environmental Issues in Geography**

**Option-C: Urban Geography**

Any student has to opt for total four major elective courses i.e. one theory (4 credit) and one practical (4 credit) in Semester III and one theory (4 credit) and one practical (4 credit) in semester IV. All these four courses have to be related to one particular subject chosen from the above three elective subjects. Students will be submitting one dissertation based on *Major Elective* course in the Semester III and IV.

- **Minor Elective Courses (Interdisciplinary Course):** M.Sc. Geography students will opt two *Minor Elective* courses in the Semester II and Semester III offered by other allied PG Departments or their own department. Out of these Two (2) *Minor Elective* courses, one must be from any of the other disciplines across the Post Graduate courses of study.

### ❖ Semester-wise Course Structure and Module Composition: M.Sc. in Geography

Semester	Papers	No. of Modules	Total Credit	Marks	Total Marks
<b>I</b>	Theory	4	16	200	300
	Practical	2	4	100	
<b>II</b>	Theory	4	16	200	300
	Practical	2	6	100	
<b>III</b>	Theory	4	16	200	300
	Practical	2	6	100	
<b>IV</b>	Theory	4	16	200	300
	Practical	2	8	100	
<b>Total</b>	Theory	16	64	800	<b>1200</b>
	Practical	8	24	400	

**Academic Session:** Each semester shall contain at least 16 teaching weeks.

**Odd Semesters:** *Semester One and Three* - July to December; **Even Semesters:** *Semesters Two and Four* - January to June.



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**P.G. COURSES: FACULTY OF SCIENCE, TECHNOLOGY AND VOCATIONAL STUDIES ALL SEMESTERS**

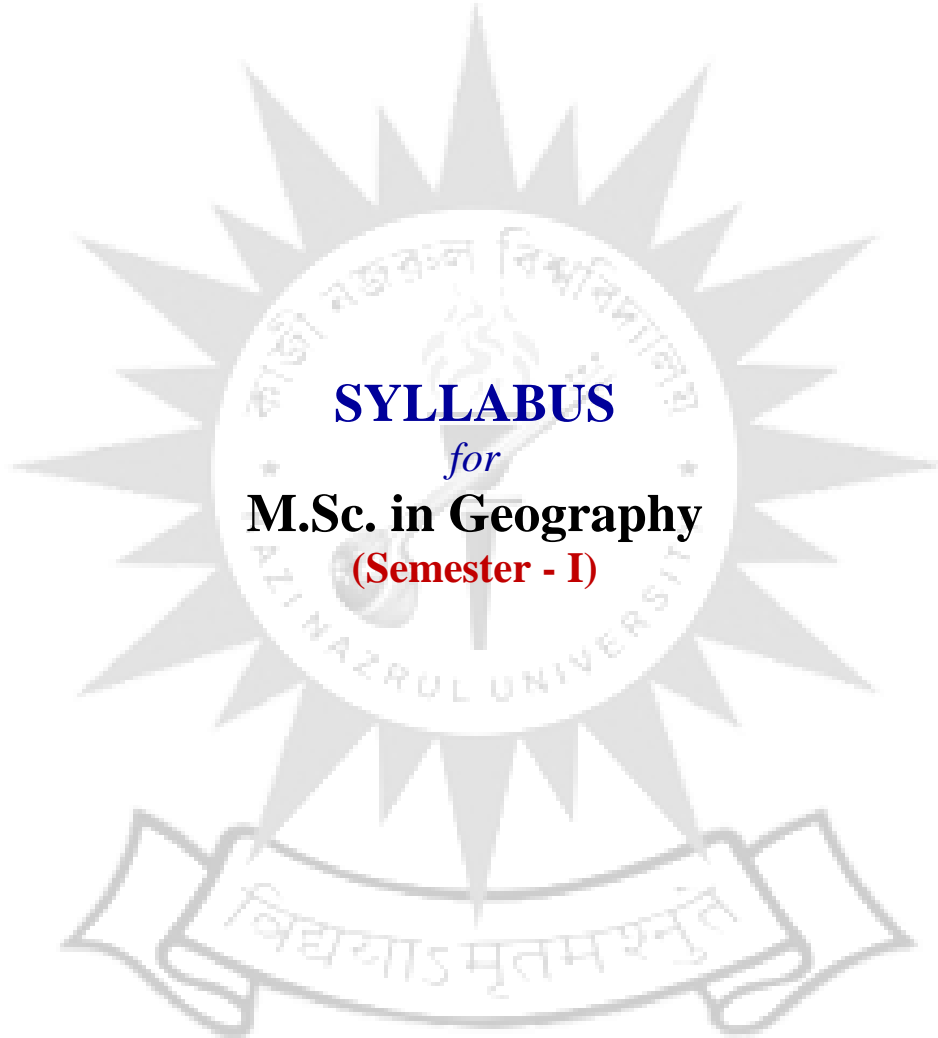
Course of Study Code	Discipline Code	Discipline	Semester	Course Name	Course Type	Course Code	Course Details	L - T - P	Course Credit	Sem Credit	Continuous Assessment		End Sem Exam		Total Marks	Sem Marks	
											Pr	Th	Pr	Th			
MSC	MSCGEOG	M.Sc. in Geography	I	Geographical Thought	C	MSCGEOGC101	CC - 1	4 - 0 - 0	4	20		10		40	50	300	
				Geotectonics and Geomorphology	C	MSCGEOGC102	CC - 2	4 - 0 - 0	4			10		40	50		
				Hydrology and Oceanography	C	MSCGEOGC103	CC - 3	4 - 0 - 0	4			10		40	50		
				Geography of Resources	C	MSCGEOGC104	CC - 4	4 - 0 - 0	4			10		40	50		
				Map Projection and Surveying	C	MSCGEOGC105	CC - 5	0 - 0 - 4	2		30		20		50		
				Thematic Mapping	C	MSCGEOGC106	CC - 6	0 - 0 - 4	2		30		20		50		
			II	Climatology	C	MSCGEOGC201	CC - 7	4 - 0 - 0	4		10		40	50	300		
				Soil and Biogeography	C	MSCGEOGC202	CC - 8	4 - 0 - 0	4		10		40	50			
				Social, Cultural and Settlement Geography	C	MSCGEOGC203	CC - 9	4 - 0 - 0	4		10		40	50			
				Quantitative Techniques in Geography	C	MSCGEOGC204	CC - 10	0 - 0 - 4	2	30		20		50			
				Computer Basics and Field Report	C	MSCGEOGC205	CC - 11	0 - 0 - 8	4	30		20		50			
				Choose from Pool of Minor Electives	MIE	See Pool	MIE - 1	4 - 0 - 0	4		10		40	50			
			III	Agricultural Geography and Landuse Planning	C	MSCGEOGC301	CC - 12	4 - 0 - 0	4		10		40	50	300		
				Remote Sensing & Geographic Information System - I	C	MSCGEOGC302	CC - 13	4 - 0 - 0	4		10		40	50			
				Remote Sensing & Geographic Information System - II	C	MSCGEOGC303	CC - 14	0 - 0 - 4	2	30		20		50			
				Advanced Geomorphology - I	Option A	MJE (Any one option to be selected)	MSCGEOGMJE301	MJE - 1	4 - 0 - 0	4+4=8	22	30	10	20		40	50+50=100
				Advanced Geomorphology - II	Option A	MSCGEOGMJE302	MJE - 2	0 - 0 - 8									
				Environmental Issues in Geography - I	Option B	MSCGEOGMJE303	MJE - 1	4 - 0 - 0									
				Environmental Issues in Geography - II	Option B	MSCGEOGMJE304	MJE - 2	0 - 0 - 8									
				Urban Geography - I	Option C	MSCGEOGMJE305	MJE - 1	4 - 0 - 0									
				Urban Geography - II		MSCGEOGMJE306	MJE - 2	0 - 0 - 8									
				Choose from Pool of Minor Electives	MIE	See Pool	MIE - 1	4 - 0 - 0	4		10		40	50			
			IV	Historical and Political Geography	C	MSCGEOGC401	CC - 15	4 - 0 - 0	4		10		40	50	300		
				Contemporary Issues in Geography	C	MSCGEOGC402	CC - 16	4 - 0 - 0	4		10		40	50			
				Regional Planning and Research Methodology in Geography	C	MSCGEOGC403	CC - 17	4 - 0 - 0	4		10		40	50			
				Dissertation	C	MSCGEOGC404	CC - 18	0 - 2 - 4	4	30		20		50			
				Advanced Geomorphology - III	Option A	MJE (Same option to be continued based on Semester III)	MSCGEOGMJE401	MJE - 3	4 - 0 - 0	4+4=8	24	30	10	20		40	50+50=100
				Advanced Geomorphology - IV		MSCGEOGMJE402	MJE - 4	0 - 0 - 8									
				Environmental Issues in Geography - III	Option B	MSCGEOGMJE403	MJE - 3	4 - 0 - 0									
				Environmental Issues in Geography - IV		MSCGEOGMJE404	MJE - 4	0 - 0 - 8									
Urban Geography - III	Option C	MSCGEOGMJE405		MJE - 3	4 - 0 - 0												
Urban Geography - IV		MSCGEOGMJE406		MJE - 4	0 - 0 - 8												
<b>88</b>															<b>1200</b>		
<b>Minor Elective [Offered by the Department of Geography for all other Departments across faculties]</b>																	
MSC	MSCGEOG	M.Sc. in Geography	II	Geospatial Science	MIE	MSCGEOGMIE201	MIE-1	4 - 0 - 0	4	NA		10		40	50	NA	
			III	Geography of Tourism with Special Reference to India Disaster Management	MIE ( Any one)	MSCGEOGMIE301 MSCGEOGMIE302	MIE - 2	4 - 0 - 0	4	NA		10		40	50	NA	

Approved by the Post Graduate Board of Studies (PGBoS) in Geography & Geoinformatics in its meeting held on 8<sup>th</sup> June 2018, 22<sup>nd</sup> February 2019 and 07<sup>th</sup> June 2019.





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**Semester - I**

**(MSCGEOGC101: Core Course-1, Theoretical)**

**Geographical Thought**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. *Learn the fundamentals of the evolution and the philosophical bases of geography as a discipline.*
2. *Trace the development of geography in chronological phases and the debate which define the nature of geography as multidimensional.*
3. *Learn uniqueness of geography as locational and spatial science.*
4. *Learn emerging modern concepts of geography.*

**Unit-1: Evolution of Geographical Thought**

**[10 Marks]**

1.1 Place of Geography in the classification of knowledge; Geography as a Social Science; Physical and Human Geography: linkages among the sub-disciplines of Physical and Human Geography.

1.2 The emergence of Scientific Geography: Humboldt, Ritter and their Legacy; Conceptual and Methodological development of Geography during 20th Century; Impact of World War in the development of Geography; Progress of Geography in India.

**Unit-2: Development of Geography since World War II**

**[10 Marks]**

2.1 The Hartshorne- Schaefer Debate; Exceptionalism to Generalisation and Theory; Geography as Science of Spatial Analysis; Realism as the basis of knowing the World.

2.2 Approaches to Regional Studies; The Grigg-Bunge Debate; Man-Nature-Nurture: The Current views on Man- Environment Relations

**Unit-3: Dualism and Concept of Space in Geography**

**[10 Marks]**

3.1 Dichotomies in Geography: Physical and Human Geography, Idiographic and Nomothetic, Determinism and Possibilism, Systematic and Regional.

3.2 Place, Space and Locality; Geographical perception of space with special emphasis on behavioural space; Social space, social problems and processes in spatial analysis.

**Unit-4: Modern Trends in Geography**

**[10 Marks]**

4.1 Development of Critical Geography: Critiques of Positivism, Humanistic Geography; Concept of System; Revival of ecological studies in Geography.



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4.2 Geography of Inequality and Uneven development: International, Intra-National and Intra-Urban. Modern Geography and changeover to Post- Modern Geography.

*Continuous Assessment (The department shall decide the method)*

[10 Marks]

### ✧ Suggested Readings:

1. Adhikari, S. (1992): *Fundamentals of Geographical Thought*, Chaitanya Publishing House, Allahabad.
2. Banerjee-Guha, S. (2004): *Space, Society and Geography*, Rawat, New Delhi.
3. Broek, J.O.M. (1965): *Geography: Its Scope and Spirit*, Charles E. Merrill Publishing Co., Columbus, Ohio.
4. Dickinson, R.E. (1969): *The Makers of Modern Geography*, Routledge, London
5. Dikshit, R. (2006): *Geographical Thought: A Contextual History of Ideas*, Prentice Hall of India Private Limited,
6. Dikshit, R.D. (ed.) (1994): *The Art and Science of Geography: Selected Readings*, Prentice Hall India Ltd.
7. Freeman, T.W. (1961): *A Hundred Years of Geography*, Gerald Duckworth, London.
8. Gregory, D (1978): *Ideology, Science & Human Geography*, Hutchinson, London.
9. Gregory, D. and Walford, R. (1988): *Horizons in Human Geography*, Macmillan, London.
10. Hartshorne, R. (1959): *Perspective on the Nature of Geography*, McNally and Co., Chicago.
11. Hartshorne, R. (1994): *The Nature of Geography*, Rawat, New Delhi.
12. Harvey, D. (1972): *Explanations in Geography*, Edward-Arnold, London.
13. Harvey, Milton E. and Brian, P. Holly (ed.) (1981): *Themes in Geographical Thought*, Rawat Publication, Delhi.
14. Hussain, M. (1988): *Evolution of Geographical Thought*, Rawat Publications, Jaipur.
15. Johnston, R.J. (1997): *Geography & Geographers*, Arnold, London.
16. Lefebvre, H. (1991): *The Production of Space*, Blackwell, Oxford.
17. Pandey, P. (1983): *Modern Geographical Trends*, Today's and Tomorrow Printers and Publishers, New Delhi.
18. Peet, R. (2001): *Modern Geographical Thought*, Rawat, New Delhi.
19. Peet, R. (2003): *Radical Geography*, Rawat, New Delhi.
20. Rana, L. (2008): *Geographical Thought (A Systematic Record of Evolution)*, Concept Publishing Company.
21. Soja, E. (2003): *Postmodern Geographies*, British Library Cataloguing in Publication Data, UK.
22. Stoddart, D.R. (1986): *On Geography and its History*, Basil Blackwell, Oxford.
23. Taylor, G. (ed.) (1953): *Geography in the Twentieth Century*, Methuen and Company, London.
24. Wooldridge, S.W. (1956): *The Geographer as Scientist*, Thomas Nelson and Sons Ltd., London.



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Semester - I  
(MSCGEOGC102: Core Course-2, Theoretical)  
Geotectonics and Geomorphology

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

1. Understand theory regarding of Origin of Earth and Universe.
2. Establish the correlation between the tectonism and geomorphology with the knowledge of interior of the Earth.
3. Understand and explain how the geotectonic processes shape landforms.
4. Get knowledge about the evolution of continents and ocean basins.
5. Understand landscape development through the help of various traditional and time independent models.

**GROUP-A: GEOTECTONICS**

Unit-1: Fundamentals of Geotectonics

[10 Marks]

1.1 Origin of the Earth (monistic theories) and Universe (views of Stephen W. Hawking); Geological Time Scale and related topographic and structural evolution; Earth's Crust and the interior; Basics of Earth's gravity, thermal and electric field.

1.2 Earth's magnetic field: Origin, Geomagnetism and Paleomagnetism; Continental Drift and Seafloor Spreading with special reference to paleomagnetism; Paleomagnetic Dating.

Unit-2: Geotectonics and Landforms

[10 Marks]

2.1 Isostasy and evolution of landforms; Plate tectonics: landforms and tectonics of plate margins and plate interiors; Triple-Plate Junctions: varieties, plate geometry and movements, surface expressions.

2.2 Global topography and hypsometry; Tectonic Geomorphology: Principles, Geomorphic Markers; Rates of Uplift and Erosion, Isostatic Relations.

**GROUP-B: GEOMORPHOLOGY**

Unit-3: Theoretical Geomorphology

[10 Marks]

3.1 Evolution of Geomorphological Ideas: Brief Review of developments in Europe and North America in last two centuries; Progress of geomorphological researches in India; Approaches to Geomorphology: Static, Dynamic, Environmental and Applied.

3.2 Time and space in geomorphology; Gradualism vs Catastrophism, Neocatastrophism; Systems approach in geomorphology: Feedback mechanisms, ideas of equilibrium, threshold, sensitivity, connectivity, equifinality.



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### Unit-4: Geomorphology: Concepts and Processes

[10 Marks]

4.1 Models of long-term landscape development: Traditional models (Davisian Cycle of erosion and Penck's model), Time- independent model (Hack dynamic equilibrium model); Responses of geomorphic systems to climate, sea level and tectonics in the Quaternary: evidences and chronologies

4.2 Elements of slope and slope evolution models (King, Wood and Young); Denudation processes: mechanism and controls; Processes of channel initiation and network development; Forms of valley development and profile of equilibrium.

#### *Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

#### ❖ Suggested Readings:

1. Anderson, R.S. and Anderson, S.P. (2010): *Geomorphology: The Mechanics and Chemistry of Landscapes*, Cambridge University Press, Cambridge.
2. Bierman, P.R. and Montgomery, D.R. (2014): *Key Concepts in Geomorphology*, W.H. Freeman and Company Publishers, New York.
3. Bloom, A.L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey.
4. Brown, G.C. and Mussett, A.E. (1993): *The Inaccessible Earth (An integrated view to its structure and composition)*, Chapman & Hall, London.
5. Bull, W.B. (1991): *Geomorphic Responses to Climatic Change*, Oxford University Press, New York.
6. Bull, W.B. (2007): *Tectonic Geomorphology of Mountains: A New Approach to Paleoseismology*, Blackwell Publishing Ltd., USA.
7. Burbank, D.W. and Anderson, R.S. (2001): *Tectonic Geomorphology*, Blackwell Publishing, USA.
8. Chorley R.J. (ed.) (1973): *Introduction of Fluvial Process*, Methuen & Co., London.
9. Chorley, R., Schumm, S. and Sugden, D.E. (1994): *Geomorphology*, Methuen, London.
10. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey.
11. Coates D.R. and Vitek J.I. (1980): *Thresholds in Geomorphology*, George Allen & Unwin, London.
12. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Fourth Edition, Butterworth-Heinemann, Oxford.
13. Cox, A. and Hart, R.B. (1986): *Plate Tectonics: How it Works*, Blackwell Scientific Publications, Oxford.
14. Fairbridge, R.W. (1968): *The Encyclopedia of Geomorphology*, Reinhold Book Corporation, New York.
15. Fowler, C.M.R. (2005): *The Solid Earth (An introduction to Global Geophysics)*, Cambridge University Press, UK.
16. Frisch, W., Meschede, M. and Blakey, R.C. (2011): *Plate Tectonics: Continental Drift and Mountain Building*, Springer.
17. Fryirs, K.A. and Brierley, G.J. (2012): *Geomorphic Analysis of River Systems: An Approach to Reading the Landscape*, Wiley, New York.
18. Gregory, K.J. and Lewin, J. (2014): *The Basics of Geomorphology: Key Concepts*, Sage.



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19. Gutierrez, M. (2013): *Geomorphology*, CRC Press, Boca Ranton, Florida.
20. Hallam, A. (1973): *A revolution in the Earth Sciences (From Continental Drift to Plate Tectonics)*, Clarendon Press, Oxford.
21. Hamblin, W.K. and Christiansen, E. (2003): *Earth's Dynamic Systems*, Prentice Hall, Upper Saddle River, New Jersey.
22. Hart, M.G. (1986): *Geomorphology: Pure and Applied*, George Allen and Unwin, London.
23. Harvey, A. (2012): *Introducing Geomorphology: A Guide to Landforms and Processes*, Dunedin Academic Press.
24. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York.
25. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Balckswan Ltd., Hyderabad.
26. Kearey, P., Klepeis, K.A. and Vine, F.J. (2009): *Global Tectonics*, 3rd Edition, Wiley-Blackwell, UK.
27. Knighton, A.D. (1984): *Fluvial Forms and Processes*, Edward Arnold.
28. Lobeck, A.K. (1939): *Geomorphology (An Introduction to the Study of Landscapes)*, McGraw-Hill Book Company, New York.
29. Lowrie, W. (2007): *Fundamentals of Geophysics*, Second Edition, Cambridge University Press, UK.
30. Mussett, A.E. and Khan, M.A. (2009): *Looking into the Earth (An introduction to geological geophysics)*, Cambridge University Press, UK.
31. Ollier, C.D. (1981): *Tectonics and landforms*, Longman Scientific & Technical, London.
32. Pichon, X.L., Francheteau, J. and Bonnin, J. (1973): *Plate Tectonics*, Elsevier Scientific Publishing Company, Amsterdam.
33. Rice, R.J. (1988): *Fundamentals of Geomorphology*, 2nd Edition, *Longman Scientific and Technical*, London.
34. Ruhe, R.V. (1982): *Geomorphology*, Houghton Mifflin Company, Boston.
35. Selby, M.J. (1985): *An Introduction to Geomorphology*, Clarendon, Oxford.
36. Sparks, B.W. (1972): *Geomorphology*, Longman, London.
37. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, John Wiley and Sons Ltd., New York.
38. Thornbury, W.D. (1969): *Principles of Geomorphology*, Wiley Eastern Limited, New Delhi.
39. Wirthmann, A. (1987): *Geomorphology of the Tropics* (Translated by Detlef Busche), Springer.



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Semester - I  
(MSCGEOGC103: Core Course-3, Theoretical)

## Hydrology and Oceanography

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

### Course Learning Outcomes:

1. Learn various aspects of pure hydrology and hydrological cycle.
2. Delineate -river basin and acquire knowledge regarding Artificial rainmaking, Rainwater harvesting; Principles of integrated basin management and water resource management strategies with special reference to tropical cities.
3. Learn various basic concepts of Physical Oceanography such as origin of the major structural and morphological features of the ocean floor, properties of ocean water, Oceanic circulation etc.
4. Understand concept of costal environment and Ocean Resources.

### **GROUP-A: HYDROLOGY**

#### Unit-1: Pure Hydrology

[10 Marks]

1.1 Cycle and Regional Water Budget; Ground Water in the Hydrological Cycle; Significance of the Global Hydrological Cycle.

1.2 Surface hydrology: delineation, properties and significance Hydrological Systems; Hydrological of drainage basin as a hydrological unit; Runoff: components and cycle; Groundwater hydrology: components, factors, processes and laws controlling movement and storage.

#### Unit-2: Applied Hydrology

[10 Marks]

2.1 Precipitation, evaporation and transpiration in different landuse/landcover conditions and methods of recording these attributes; Runoff estimates (curve number) and stream discharge estimates (area-velocity method); Unit Hydrograph and Rating Curve: concept and significance.

2.2 Water management in tropical farmlands: techniques and approaches; Artificial rainmaking. Water management in tropical cities: techniques and approaches; Rainwater harvesting; Principles of Integrated Basin Management with reference to Micro-Watershed Planning.

### **GROUP-A: OCEANOGRAPHY**

#### Unit-3: Physical Oceanography

[10 Marks]

3.1 Classification, characteristics and origin of the major structural and morphological features of the ocean floor with particular reference to plate tectonics; Bottom topography of Indian Ocean.





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3.2 Properties of Ocean Water and their nature of distribution (Temperature, Salinity and Density); Classification of Water Masses; Ocean Circulation: Thermohaline circulation and Oceanic Conveyor Belt; Tides: generating forces, types, theories and effects; Oceanic sediments.

### Unit-4: Marine Environment: Hazards and Ocean Resources [10 Marks]

4.1 Coastal Habitats: Estuaries, lagoons, salt marshes, mangrove swamps; Coral Reefs and Atolls: types, factors and evolution; Marine Pollution and Tsunamis: types, causes and implications.

4.2 Pelagic and Benthic Communities of the Ocean; Ocean as a resource: Anthropogenic utilization of the oceans; Importance of EEZ and CRZ; Human impact on the coastline.

*Continuous Assessment* [10 Marks]  
(The department shall decide the methods of internal assessment)

#### ✧ Suggested Readings:

1. Brutsaert, W. (2005): *Hydrology: An Introduction*, Cambridge University Press, Cambridge.
2. Carter, R.W.G. (1988): *Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines*, Academic Press, London.
3. Chow, V.T. (1988): *Applied Hydrology*, McGraw-Hill Education, New York.
4. Davis, R.J.A. (1986): *Oceanography - An Introduction of the Marine Environment*, Win C. Brown, Iowa
5. Dingman, S.L. (2002): *Physical Hydrology*, 2nd Edition, Prentice Hall, Englewood Cliffs.
6. Garrison, T.S. (2007): *Oceanography: An Invitation to Marine Science*, 6th Edition, Brooks Cole, Chicago.
7. Keith, D. and Mays, L.W. (2004): *Groundwater Hydrology*, 3rd Edition, Wiley, Chichester.
8. King, C.A. (1962): *Oceanography for Geographers*, Edward Arnold, New York.
9. Meinzer, O.E. (1949): *Hydrology*, Dover Publications, Mineola, New York.
10. Pinet, P.R. (2006): *Invitation to Oceanography*, 4th Edition, Jones & Bartlett Pub., New York.
11. Raghunath, H.M. (2006): *Hydrology: Principles, Analysis and Design*, New Age International (P) Limited Publishers.
12. Reddy, P.J.R. (2005): *A Textbook of Hydrology*, Firewall Media, New Delhi.
13. Sverdrup, K.A. and Armstrong, E.V. (2010): *An Introduction to the World Oceans*, 10th Edition, McGraw Hill.
14. Thorpe, S.A., Steele, J.H. and Turekian, K.K. (eds.) (2009): *Elements of Physical Oceanography*, Academic Press, London.
15. Thurman, H.V. and Trujillo, A.P. (2003): *Introductory Oceanography*, 10th Edition, Prentice Hall, Englewood Cliffs.
16. Todd, D.K. (2004): *Groundwater Hydrology*, 3rd Edition, Wiley, Chichester.
17. Trujillo, A.P. and Thurman, H.V. (2007): *Essentials of Oceanography*, 9th Edition, Prentice Hall, Englewood Cliffs.
18. Weyl, P.K. (1970): *Oceanography: An Introduction of the Marine Environment*, John Wiley and Sons Ltd., London.
19. Woodroffe, C.D. (2003): *Coasts: Form, Process and Evolution*, Cambridge University Press, Cambridge.





**Department of Geography  
Kazi Nazrul University**

**Semester - I**

**(MSCGEOGC104: Core Course-4, Theoretical)**

**Geography of Resources**

❖ **Full Marks: 50**

❖ **CA+ESE Marks: 10+40**

❖ **Credit: 4**

❖ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. *Acquire knowledge about the concepts and classification of resources.*
2. *Describe importance of conservation and management of resources for sustainable development.*
3. *Get knowledge about water resource management along with waste water management and water quality assessment.*
4. *Understand different theories of Human Resource Management and enhance the knowledge towards understanding the debate on Automation vs Manual Labor.*

**Unit-1: Concept of Resources**

**[10 Marks]**

1.1 Resource: Concept and Classification; Economic and Environmental approaches of Resource utilization; Resource depletion and resource conservation; Forrester-Meadows model on Limits to Growth; Sustainable use of resources.

1.2 Natural Resource Economics; Markets and Natural Resource Services. Resource Scarcity: Reuse and Recycling.

**Unit-2: Conservation and Management of Resources**

**[10 Marks]**

2.1 Land and Soil as resources; and Conservation. Problems of land acquisition in developing countries; Development of EPZ and SEZ; Land reforms in India with special reference to West Bengal.

2.2 Bio-resource and their utilisation: Forestry, Fishing, livestock farming. Problems of Resource Depletion: Global Scenario (Forest, Water, Fossil Fuels).

**Unit-3: Water Resource Management**

**[10 Marks]**

3.1 Use, Issues and Management of River Water for Irrigation and Hydel power. Overuse of Ground Water and measures of conservation.

3.2 Parameters of Water Quality: Sources and types of Pollution; Waste Water Management.

**Unit-4: Human Resource Management**

**[10 Marks]**

4.1 Concept of Human Resource: Components, Classification and Importance. Scenario of Human Resource in developed and developing countries. Debate on Automation vs Manual Labor.

4.2 Human Capital: Issues related to Human Resource Management; Theories of Human Resource Management: Gini, De Castro, Leibenstein, Schumpeter, Cole.

**Continuous Assessment**

**[10 Marks]**

*(The department shall decide the methods of internal assessment)*



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### ✧ Suggested Readings:

1. Bagchi-Sen S. and Smith H. L., (2006): *Economic Geography: Past, Present and Future*, Taylor and Francis
2. Beaujau-Garnier, J., (1978): *Geography of Population*, Longman, London.
3. Becker, G.S. (1993): *Human Capital: A Theoretical and Empirical Analysis*, Chicago: University of Chicago Press.
4. Berry, B.J.L., Conklin, E.C. and Ray, M.D. (1976): *The Geography of Economic Systems*, Prentice Hall, New Jersey.
5. Boyce, Ronald Reed (1974): *The Bases of Economic Geography*, Holt, Rine Hart and Winston Inc, New York.
6. Bradford, M.G. and Kent, W.A. (1977): *Human Geography, Theories and Applications*, Oxford University Press, Oxford.
7. Brereton, E. (1992): *Resource Use and Management*, Cambridge University Press, Cambridge.
8. Brock, J.O.M. and Webb, J.W. (1973): *A Geography of Mankind*, McGraw Hill, New York.
9. Combes, P., Mayer, T. and Thisse, J.F. (2008): *Economic Geography: The Integration of Regions and Nations*, Princeton University Press.
10. Guha, J.L. and Chattaraj, P.R. (1989): *A New Approach to Economic Geography: A Study of Resources*, World Press, Kolkata.
11. Hartshorn, T.A. and Alexander, J.W. (1988): *Economic Geography*, Prentice Hall India, New Delhi.
12. Jhingan, M.L. (1978): *Economics of Development and Planning*, Vikash Publishing House, New Delhi.
13. Jones, C.F. and Darkenwald, G.G. (1954): *Economic Geography*, Macmillan, New York.
14. Leong. G.C. and Morgan, G.C. (1975): *Human and Economic Geography*, Oxford University Press, Hong Kong.
15. Mamoria, C.B. (1997): *Economic and Commercial Geography of India*, Shiva Lal Publications, Agra.
16. Mitchell, B. (1997): *Resources and Environment Management*, Addison Wesley Lon~an Ltd., Harlow.
17. Paterson, J.H. (1976): *Land, Work and Resources: An Introduction to Economic Geography*, Edward Arnold, London.
18. Sadhukhan, S.K. (1986): *Economic Geography*, S. Chand, New Delhi.
19. Simmons, I.G. (1981): *The Ecology of Natural Resources*, ELBS/ Edward Arnold, London.
20. Simmons, I.G. (1991): *Earth, Air and Water: Resources and Environment in the 20th Century*, Edward Arnold, London.
21. Tiwari, R.C. (2008): *Geography of India*, Prayag Pustak Bhawan, Allahabad.
22. Wheeler, J.O., Muller, P.O., Thrall, G.I. and Fik, T.J. (1998): *Economic Geography*, 3rd Edition, Wiley.
23. Willington, D.E. (2008): *Economic Geography*, Husband Press.
24. Wood, A. and Roberts, A. (2010): *Economic Geography: Places, Networks and Flows*, Routledge.



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Semester - I

(MSCGEOGC105: Core Course-5, Practical)

Map Projection and Surveying

✧ Full Marks: 50

✧ CA+ESE Marks: 30+20

✧ Credit: 2

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

1. Understand definition, types, necessity and graphical construction of different map projections.
2. Develop skill to choose of map projection according to purpose of map making.
3. Learn different types of surveying techniques using dumpy level, theodolite and total station.
4. Prepare of land use and land cover map (tacheometric method) using theodolite/ total station.

Unit-1: Elements of Map Projection and their construction

[15 Marks]

1.1 Map Projections: Necessity and Classification. Basic concepts: parallels and meridians, datum, spheroid, geoid, great circles, scale factor, deformations, orthodrome, loxodrome and geodesic (simple problems).

1.2 Gnomonic, Stereographic and Orthographic (Equatorial case); Mercator, Gall stereographic and Mollweide Projection.

1.3 Universal Transverse Mercator (UTM) Grid System.

1.4 Perspective of Suitable Projections; Numerical Problems of Projections: Coordinate, Distance, Azimuth and Scale Variation.

Unit-2: Surveying and Mapping`

[15 Marks]

2.1 Levelling (simple and reciprocal methods) using Dumpy level.

2.2 Measurement of height and distance (Oblique method) by Theodolite

2.3 Triangulation, Traversing and Area Calculation using Theodolite.

2.4 Land use and Land cover mapping (Tacheometric Method) using Theodolite/ Total Station

In the End Semester Examination, students have to answer one compulsory question from the above two Units.

*Viva-voce*

[5 Marks]

*Continuous Assessment*

[30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

✧ Suggested Readings:

1. Alvi, Z. (1994): *A Textbook of Practical Geography*, Vikas Publishing House Pvt. Ltd., New Delhi.
2. Basak, N.N. (2008): *Surveying and Levelling*, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Beaumont, J.R. and Williams, S.W. (1983): *Project Work in the Geography Curriculum*, Croom Helm, London.
4. Bygott, J. (1964): *Introduction to Mapwork and Practical Geography*, Harper Collins Distribution Services, London.



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5. Elfic, M.H., Fryer, J.G., Brinkner, R.C. and Wolf, P.R. (1994): *Elementary Surveying*, 8th Edition, Harper Collins Publishers, London.
6. Hussain, S.K. and Nagaraj, M.S. (1992): *Text Book of Surveying*, S. Chand & Co. Ltd., New Delhi.
7. Ishtiaq, M. (1994): *Practical Geography*, Jawahar Publishers & Distributors, New Delhi.
8. Kanetkar, R.P. and Kulkarni, S.V. (1988): *Surveying and Levelling*, Part-I, Vaidyarthi Griha Prakashani, Pune.
9. Kellaway, G.P. (1979): *Map Projections*, 1st Indian Edition, B.I. Publication, Delhi.
10. Khan, Md. Z.A. (1998): *Text Book of Practical Geography*, Concept Publishing Company, New Delhi.
11. Kochher, C.L. (1993): *A Text Book of Surveying*, S.K. Katariya & Sons, Delhi.
12. Mailing, D.H. (1973): *Coordinate Systems and Map Projections*, George Phillip & Sons, London.
13. Mishra R.P. and Ramesh, A., (1989): *Fundamentals of Cartography*, Concept, New Delhi
14. Monkhouse F.J. and Wilkinson, H.R. (1971): *Maps and Diagrams: Their Compilation and Construction*, B.I. Publications Private Limited, New Delhi.
15. Punmia, B.C. (1985): *Surveying*, Volume II, Standard Book House, Delhi.
16. Raisz, E.J. (1962): *Principles of Cartography*, McGraw-Hill.
17. Robinson, A.H., Sale, R.D. and Morrison, J. (1984): *Elements of Cartography*, Wiley, New York.
18. Saha, P.K. and Basu, P. (2009): *Advanced Practical Geography*, Books and Allied (P) Ltd., Kolkata.
19. Sarkar, A. (1997): *Practical Geography: A Systematic Approach*, Orient Longman Ltd., Hyderabad.
20. Shepherd, F.A. (1983): *Engineering Surveying*, Edward Arnold, London.
21. Singh, Gopal (1998): *Map Work and Practical Geography*, Vikas Publishing, New Delhi.
22. Singh, L.R. (2005): *Fundamentals of Practical Geography*, Sharda Pustak Bhawan, Allahabad.
23. Singh, R.L. and Singh, R.P.B. (1991): *Elements of Practical Geography*, Kalyani Pub., New Delhi.
24. Steers J.A., (1965): *An Introduction to the Study of Map Projections*, University of London Press, London.
25. Talukder, S. 2008): *An Introduction to Map Projections*, EBH Publishers (India), Guwahati.
26. Venkatramaiah, C. (1996): *A Textbook of Surveying*, Universities Press/Orient Longman Ltd., Hyderabad.



**Department of Geography**  
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**Semester - I**

**(MSCGEOGC106: Core Course-6, Practical)**

**Thematic Mapping**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 30+20**

✧ **Credit: 2**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Understand interpretation techniques of topographical maps and its application in practical.
2. Get skill of creating slope map, dissection Index map, relative relief map, absolute relief map, altimetric frequency and hypsometric Curve.
3. Predict Soil fertility (NPK, pH) and Organic Matter.
4. Create different types of thematic maps (economic and social environment) and interpreting the results.

**Unit-1: Thematic Mapping of Physical Environment**

**[15 Marks]**

1.1 Mapping and Interpretation of Morphometric aspects (Dissection Index, Drainage Density, Ruggedness Index, Slope by Raisz and Henry), Preparation and Interpretation of Altimetric frequency and Hypsometric Curve from SoI (1:50000) topographical maps of plateau region.

1.2 Preparation of Geomorphic Maps of Flood-prone and Drought-prone areas and their interpretation. Analysis and Interpretation of Geological Maps, Subsurface lithological correlation techniques and its interpretation.

1.3 Computation, Drawing and Mapping of Pluviometric Coefficient; Equipluves, Aridity and Moisture Index and Coefficient of Variability of Rainfall; Construction of Thiessen Polygon from Precipitation data.

1.4 Analysis of Soil and its Mapping: NPK, pH and Organic Matter.

**Unit-2: Thematic Mapping of Economic and Social Environment**

**[15 Marks]**

2.1 Test for Clustering and Regularity (Nearest Neighbour Analysis); Lorenz curve and Determination of Gini's coefficient; Location Quotient Analysis.

2.2 Index of Disparity by Kendall's method; Preparation of Maps on Crop Combination (Weaver and Rafiullah's methods) and Diversification of Crops (Bhatia's method).

2.3 Functional Classification of Towns by Dominant and Distinctive Functions; Applicability of Rank Size Rule with settlement data (Normal and Log).

2.4 Network as a Graph; Alfa, Beta and Gamma Index of Connectivity; Accessibility by Detour Index; Mapping of Sphere of Influence (Breaking Point).

**In the End Semester Examination, students have to answer three compulsory questions from the above Four Units.**

*Viva-voce*

**[5 Marks]**

*Continuous Assessment (\*A Project File, comprising one exercise each is to be submitted)*

**[30 Marks]**



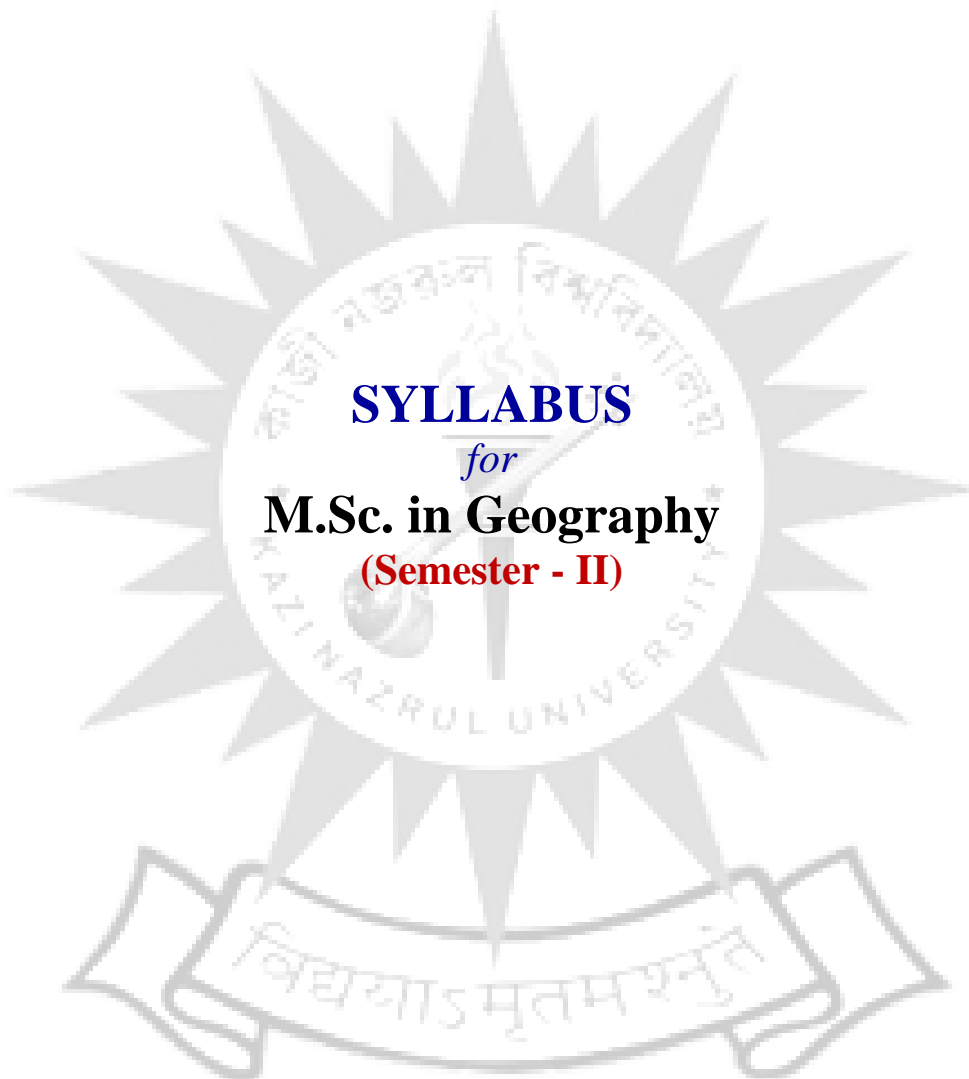
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### ✧ Suggested Readings:

1. Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Pub., New Delhi.
2. Campbell, J. (1993): *Map Use and Analysis*, Wm. C. Brown Publishers, USA.
3. Dackombe, R.V. and Gardiner, V. (1983): *Geomorphological Field Manual*, George Allen and Unwin, London.
4. FitzGerald, B.P. (1974): *Science in Geography (Data description and presentation)*, Oxford University Press.
5. Goudie, A. (1990): *Geomorphological Techniques*, Unwin Hyman, London.
6. Hammond, R. and McCullagh, P. (1991): *Quantitative Techniques in Geography*, Clarendon Press, Oxford.
7. Khan, N. (2002): *Quantitative Methods in Geographical Research*, Concept Publishing Company, New Delhi.
8. Liendsor, J.M. (1997): *Techniques in Human Geography*, Routledge.
9. Mahmood, A. (1998): *Statistical Methods in Geographical Studies*, Rajesh Publication.
10. Maltman, A. (1990): *Geological Maps: An Introduction*, Open University Press, Buckingham.
11. Monkhouse F.J. and Wilkinson, H.R. (1971): *Maps and Diagrams: Their Compilation and Construction*, B.I. Publications Private Limited, New Delhi.
12. Platt, J.I. and Challinor, J. (1956): *Simple Geological Structures (A Series of Notes and Map Exercises)*, Thomas Murby & Co, London.
13. Raghunath, H.M. (2006): *Hydrology: Principles, Analysis, Design*, 3rd Edition, New Age International Publishers.
14. Sarkar, A. (2015): *Practical Geography: A Systematic Approach*, 3rd Edition, Orient Blackswan Private Ltd.
15. Sarkar, A. 2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, Hyderabad.
16. Saxena, H.M. (2005). *Transport Geography*, Rawat Publications.
17. Sen, A.K. (1995): *Laboratory Manual of Geology*, Modern Book Agency (P) Ltd., Kolkata.
18. Singh, R.L. and Singh, R.P.B. (1991): *Elements of Practical Geography*, Kalyani Pub., New Delhi.
19. Toyne, P. and Newby, P.T. (1971): *Techniques in Human Geography*, Macmillan Education, London.
20. United States Department of Agriculture (USDA) (2014): *Soil Survey and Laboratory Methods Manual*, Soil Survey Investigations Report No. 51.
21. Yeates, M. (1974): *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.



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**SYLLABUS**  
*for*  
**M.Sc. in Geography**  
**(Semester - II)**





**Department of Geography  
Kazi Nazrul University**

**Semester - II**

**(MSCGEOGC201: Core Course-7, Theoretical)**

**Climatology**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Learn the dynamics of climatic phenomenon and their interrelationship.
2. Get insights in occurrences and variability of extremity of weather events.
3. Apply knowledge of climate towards identification and demarcating the region of geographical importance.
4. Predict future climatic changes through analysing the past events and current climatic scenario

**Unit 1: Introduction to Climatology**

**[10 Marks]**

1.1 Concept, Nature and Scope of Climatology and its Relationship with Meteorology; Insolation; Heat Budget of Earth; Temperature, Pressure and Winds, Precipitation.

1.2 Atmospheric Stability and Instability; Fronts and Upper Air Circulation; Cyclones and Anticyclones (Tropical and Temperate).

**Unit 2: Monsoon and Extreme Climatic Events**

**[10 Marks]**

2.1 Genesis of Indian Monsoon and its Variability; Jet streams; ENSO Events: El Nino, La Nina and Southern Oscillations; MONEX.

2.2 Thunderstorms, Tornadoes and Hailstorms; Heat and Cold waves; Drought and Cloudburst.

**Unit 3: Climatic Classification and Agro-climatic Regions**

**[10 Marks]**

3.1 Classification of World Climate –Koppen, Thornthwaite, Trewartha; Classification of Climate: The Case of India-Koppen, Thornthwaite and R.L.Singh.

3.2 Agro-climatic Regions; Basis of Identification of Agro-climatic Regions; Bio-climatic Regions with Special Reference to Tropical Climate.

**Unit 4: Climate Change and Associated Phenomena**

**[10 Marks]**

4.1 Climate Change: Evidences and Causes of Climatic Change; Global warming; Vulnerability of Climate Change & its Impact Assessment; Weather Forecasting and Recent Trends in Climatology.

4.2 Paleo Climate: Concept and Reconstruction; Snowball Earth; Cretaceous Hot House; Cenozoic Climate (Palaeocene-Eocene Thermal Maximum, Pleistocene Glaciation, Maximum Holocene).

**Continuous Assessment**

**[10 Marks]**





*(The department shall decide the methods of internal assessment)*

✧ **Suggested Readings:**

1. Anthes, R.A. (1997): *Meteorology*, Prentice Hall, Upper Saddle River, N.J.
2. Barry, R.G. and Chorley R.J. (2003): *Atmosphere, Weather and Climate*, Routledge, London and New Work.
3. Bigg, G.R. (2003): *The Ocean and Climate*, Cambridge University Press, Cambridge.
4. Byers H .R. (1974): *General Meteorolgy*, 4th Edition, McGraw Hill, New York.
5. Chatterjee, S.B. (1953): *Indian Climatology, Climostatics, Climate classification of India with special reference to the Monsoons*, Calcutta.
6. Cock, N.K.(1995) : *Geohazards: Natural and Human*, Prentice Hall.
7. Critchfield, J.H. (1983): *General Climatology*, Prentice HALL.
8. Cronin, T.M. (2009): *Paleoclimates: Understanding Climate Change Past and Presen*, Columbia University Press, New Work.
9. Das, P.K. (1995): *Monsoons*, National Book Trust, New Delhi
10. Griffiths, J.F. (1976): *Applied Climatology*, Oxford University Press, London.
11. Hobbs, J.E.(1980): *Applied Climatology: A Study of Atmospheric Resources*, Westview Press.
12. Huntington, E. and S.S. Visher.(1922): *Climatic Changes; Their Nature and Causes*, Yale University Press, New Haven.
13. Lal, D.S. (2003): *Climatology*, Sharda Pustak Bhavan, Allahabad.
14. Lal. M. (Eds.) (1993): *Global Warming: Concern for Tomorrow*, Tata McGraw Hill, New Delhi.
15. Lamb, H.H. (2011): *Climate : Present, Past and Futur*, Vol.1&2. Routledge.
16. Linacre, E. and Geerts, B.(1997): *Climates and Weather Explained*, Routledge, London.
17. Lutgens, F.K.. and Tarbuck, E.J.(2010): *The Atmosphere: An Introduction to Meteorology*, 11th edition, Prentice-Hall.
18. Oliver J.E. & Hioddore J.J, (2003): *Climatology: An Atmospheric Science*, Prentice Hall.
19. Pant, G.B. and Kumar, R.K.(1997): *Climates of South Asia*, Wiley, Chichester.
20. Singh R.L (Eds.) (1971): *India: A Regional Geography*, National Geog. Society of India, Varanasi.
21. Singh, S. (2013): *Physical Geography*, Prayag Pub., Allahabad.
22. Singh, S. (2009): *Climatology*, Prayag Pustak Bhandar, Allahabad.
23. Trewartha,G.T. and Horn, L.A., (1980): *An Introduction to Climate*, McGraw Hill, New Work



**Department of Geography  
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**Semester - II**

**(MSCGEOGC202: Core Course-8, Theoretical)**

**Soil and Biogeography**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Describe the major factors and processes governing the soil formation.
2. Get knowledge about the different issues regarding soil degradation and soil conservation.
3. Explain the major principles and processes that govern the local and global distribution of plants and animals
4. Identify the roles of energy flow and biogeochemical cycling in ecosystems.
5. Critically assess theoretical and conceptual issues relating to anthropogenic impacts on biodiversity and biodiversity conservation.

**Unit 1: Soil Geography**

**[10 Marks]**

1.1 Soil Formation: Factors and Processes; Soil Properties (Physical and Chemical); Soil Nutrients and Organisms; Soil Profile.

1.2 Soil Taxonomy: Classification by USDA and FAO; Soil Degradation: Causes and Consequences; Soil Conservation.

**Unit 2: Plant and Animal Community**

**[10 Marks]**

2.1 Plant Community: Meaning and Concepts; Evolution and Classification of Plants; Plant Response to Environment: Adaptation, Succession, and Climax; Dispersal and Distribution of Plants.

2.2 Animal Community: Factor influencing the Distribution, Dispersal and Migration of Animals; Means and Barriers; Extinction of Animal Species.

**Unit 3: Ecosystem and Ecology**

**[10 Marks]**

3.1 Ecosystem: Meaning and Concepts; Components and Classification of Ecosystem; Functions: Trophic Levels, Energy Flows, Cycles (Geo-chemical, Carbon, Nitrogen and Oxygen), Food Chain, Food Web and Ecological Pyramid.

3.2 Ecology: Concept of Ecology; Principles of Physical and Human Ecology; Ecosystem: Forest and Desert with Special Reference to India.

**Unit 4: Biomes and Biodiversity**

**[10 Marks]**

4.1 Biomes with Special Reference to Tropical Rain Forests, Tropical Monsoon Deciduous Forest, Tropical and Temperate Grass Lands.



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4.2 Biodiversity: Concept, Types and Importance; Biodiversity Conservation; Biosphere Reserve with Special Reference to Sundarbans and Western Ghats.

*Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

### ✧ Suggested Readings:

1. Allee, W.C. & Schmidt, K.P. (1937): *Ecological Animal Geography*, New York.
2. Cox, C.B. and Moore, P.D. (1993): *Biogeography: An Ecological and Evolutionary Approach, 5th Edition*, Blackwell, Oxford.
3. Cloudsley-Thompson, J.L.(1975): *Terrestrial Environment*, Wiley, New York.
4. Darlington, P. J. (1957): *Zoogeography: The Geographical Distribution of Animals*, Wiley, New York.
5. Dansereau, P.(1957): *Biogeography: An Ecological Perspective*, Ronald Press, New York
6. Good, R. (1974): *Geography of the Flowering Plants*, Longman, 4th Edition, Green & Co. London.
7. Haggett, R.J., (1998): *Fundamentals of Biogeography*, Routledge, London.
8. Illies, J. (1974): *Introduction to Zoogeography*, translated by W.D.Williams, Macmillan, London.
9. Jeffries, M.J. (1997): *Biodiversity and Conservation*, Routledge, London.
10. Jones, R.L. (1980): *Biogeography: Structure, Process Pattern and Change within the Biosphere*.
11. Mathur, M.S. (1988): *Essentials of Biogeography*, Jaipur
12. Miller, C.E. et al., (1990): *Fundamentals of Soil Science*, 8th edition, John Wiley and Sons, New York.
13. Newbigin, M.I.(1936): *Plant and Animal Geography*, Methuen & Co, London.
14. Odum, E.P. (1971): *Fundamentals of Ecology*, Saunders, Philadelphia.
15. Pielou, E.C.(1979) : *Biogeography*, John Wiley and Sons, New York.
16. Pimm,S.L.(1991) : *Balance of Nature-Ecological Issues in the Conservation of Species and Communities*, University Press, Chicago.
17. Shimvelli, D.W.(1971): *Description and Classification of Vegetation*, University of Washington Press, Seattle.
18. Simmon, I.G.(1979):*Biogeography: Natural and Cultural*,E. Arnold, London.
19. Singer. M.J. & Donald, N.M. (1987): *Soils: An Introduction*, 2nd edition, Macmillan, N.Y.
20. Singh, R.B. (2009): (Eds.) *Biogeography and Biodiversity*. Rawat Publication, New Delhi.
21. Watts, David. (1971): *Principles of Biogeography*, McGraw Hill, New York.
22. Wilson, E.O.(1992): *Diversity of Life*, Harvard University Press, Cambridge.



**Department of Geography  
Kazi Nazrul University**

**Semester - II**

**(MSCGEOGC203: Core Course-9, Theoretical)**

**Social, Cultural and Settlement Geography**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Learn the components of society with varied nomenclature.
2. Get an insight to the richness of culture across spaces which give shape to the very branch of social and cultural geography.
3. Trace the evolutionary processes of human habitation which further gives input in the emergence of settlement patterns.
4. Locate the change in settlements in between rural to urban settings and the dynamism of human development.

**GROUP-A: SOCIAL AND CULTURAL GEOGRAPHY**

**Unit 1: Concepts and Elements of Social Geography [10 Marks]**

1.1 Scope and Content of Social Geography; Social space, Social Structure and Social Processes; Social Distance and Conflicts, Social Inequality, Concept of Welfare and Social Wellbeing

1.2 Social Groups and Ethnicity, Distribution of Social Groups with Special reference to Language, Race and Tribes in India.

**Unit 2: Cultural Geography [10 Marks]**

2.1 Definition, Components and Functions of Culture; Cultural Diffusion, Cultural Hearth and Realm, Culture as a Geographical Process.

2.2 Acculturation; Metropolitan Culture and Cultural Globalization; Cultural Ecology and Folk Geography: study on Folk Architecture, Folk Music and Dance, Folk Fairs and Festivals.

**GROUP-B: SETTLEMENT GEOGRAPHY**

**Unit 3: Rural Settlements [10 Marks]**

3.1 Evolution and Growth of Rural Settlement, Site and Situation, Patterns and Segregation of Rural Settlements; Rural Morphology

3.2 Rural House Forms and Types in Different Geographic Environment in India; Rural-urban Linkages with Special References to India.

**Unit 4: Urban Settlements [10 Marks]**

4.1 Definition of Urban: World and India, Classification of Towns based on Function, Urban Systems and Hierarchy: Central Place, Rank Size Rule and Primacy.



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4.2 Classical Models of Urban Land Use, Type of Urbanized Regions: Conurbation, Metropolis, Megalopolis, Socio-environmental Problems of Urban Settlement.

*Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

### ✧ Suggested Readings:

1. Ahmad, A. (1999): *Social Geography*, Rawat Publications, Jaipur and New Delhi.
2. Carter, H. (1972): *The Study of Urban Geography*, Edward Arnold, London.
3. Chisholm, M. (1967): *Rural Settlement and Land use*, John Wiley, New York.
4. Clout, H.D. (1977): *Rural Geography*, Pergamon, Oxford.
5. Coates, B.E., Johnston, R.J. and Knox, P.L. (1977): *Geography and Inequality*, Oxford University Press.
6. Doniel, P. and Hopkinson, M. (1986): *The Geography of Settlement*, Oliver & Boyd, Edinburgh.
7. Forde, C.D. (1934): *Habitat, Economy and Society*, Methuen and Company, London.
8. Gore, M.S. (1985): *Social Aspects of Development*, Rawat Publications, Jaipur.
9. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London.
10. Grover, N. (1985): *Rural Settlement: A Cultural Geographical Analysis*, Inter India Publication, Delhi.
11. Hudson, F.S. (1976): *A Geography of Settlements*, Macdonald and Evans, New York.
12. Johnson, J.H. (1976): *Urban Geography: An Introductory Analysis*, Pergamon Press.
13. Johnston, R.J. (1984): *Urban Geography*, Penguin, London.
14. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London.
15. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press.
16. Ramachandran, H. (1985): *Village clusters and Rural Development*, Concept Publication, New Delhi.
17. Ramachandran, R. (1989): *Urbanization and Urban Systems in India*, Oxford University Press, New Delhi.
18. Rao, R.N. (1986): *Strategy for Integrated Rural Development*, B.R. Publication, Delhi.
19. Rapoport, A. (1969): *House Form and Culture*, Prentice Hall, New Jersey.
20. Singh R. L. (1975): *Readings in rural settlement geography*, National Geographical Society of India.
21. Singh, R.Y. (2002): *Geography of Settlements*, Rawat Publication.
22. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London.
23. Sopher, D. (1980): *An Exploration of India: Geographical Perspectives on Society and Culture*, Cornell University Press, Ithaca, New York.
24. Srinivas, M.N. (1968): *Village India*, Asia Publication House, Bombay.
25. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, UK.
26. Verma, L.N. (2006): *Urban Geography*, Rawat Publications, Jaipur.
27. Wanmati, S. (1983): *Service Centers in Rural India*, B.R. Publication Corporation, Delhi



**Department of Geography  
Kazi Nazrul University**

**Semester - II**

**(MSCGEOGC204: Core Course-10, Practical)**

**Quantitative Techniques in Geography**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 30+20**

✧ **Credit: 2**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. *Learn probability, types of probability and applications in different field of geography.*
2. *Understand the concept of sampling and designing and conducting a sample survey for data collation and data analysis.*
3. *Examine relationship between two or more variables with correlation and regression analysis.*
4. *Perform Test of Hypothesis as well as calculate confidence limit.*
5. *Apply comprehensive knowledge of matrix for analysis of geographical data.*
6. *Develop capability to writing reports of the results of statistical analysis giving summaries and conclusions using nontechnical language.*

**Unit 1: Probability & Sampling, Correlation, Regression & Time Series Analysis [15Marks]**

1.1 Concept of Probability: classical theory, conditional and independent probability, Application of Bayes' theorem Selected distribution: Normal distribution curve and Z-score, Binomial and Poisson.

1.2 Levels of Measurement: Nominal, Ordinal, Ratio and Interval. Sampling techniques; Estimation from sample points and interval: Sampling distribution, standard error of mean.

1.3 Bivariate (Rank: Kendall and Spearman; Product Moment); Multiple and Partial Correlation. Regression: Linear and Curvilinear (Parabolic, Geometric and Exponential).

1.4 Residuals and Standard Error of Estimate. Time series analysis: Least Square, Moving Average and Seasonal Index Method.

**Unit 2: Hypothesis testing and Application of Matrix in Geography [15 Marks]**

2.1 Hypothesis: formulation and rejection rule; Confidence limit; Parametric Hypothesis tests: t-test; Z-test and Analysis of Variance (ANOVA): Objectives, One-way and Two-way.

2.2 Test of Significance of Correlation Coefficient, Regression Coefficient and Intercept; Nonparametric Hypothesis tests:  $\chi^2$  test, Mann-Kendall (MK) test and Kruskal-Wallis Test.

2.3 Elementary ideas of Matrix algebra; Determinant and Cramer's rule; Application of Cramer's Rule in solving Multiple Regression.

2.4 Markov Chains: Mapping Transition Matrix; Factor Analysis (Centroid Method).

**In the End Semester Examination, students have to answer one compulsory question from the above two Units.**

**Viva-voce**

**[5 Marks]**





## Department of Geography Kazi Nazrul University

### *Continuous Assessment*

[30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

1. Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publications, New Delhi.
2. Chakravorty, J.G. and Ghosh, P.R. (2007): *Advanced Higher Algebra*, U.N. Dhur & Sons Private Ltd., Kolkata.
3. Clark, W.A.V and Hosking, P.L. (1986): *Statistical Methods for Geographers*, Wiley and Sons.
4. Cole, J.P. and King, C.A.M. (1969): *Quantitative Geography (Techniques and Theories in Geography)*, John Wiley & Sons Ltd., London.
5. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): *Fundamental of Statistics (Volume One and Two)*, The World Press Private Limited, Kolkata.
6. Hammond, R. and McCullagh, P. (1991): *Quantitative Techniques in Geography*, Clarendon Press, Oxford
7. Hayslett, H.T. (1976): *Statistics: Made Simple*, W.H. Allen, London.
8. Joreskog, K.G., Klován, J.E. and Reyment, R.A. (1976): *Geological Factor Analysis*, Elsevier Scientific Publishing Company, Amsterdam.
9. Khan, N. (2002): *Quantitative Methods in Geographical Research*, Concept Publishing Company, New Delhi.
10. Kothari, C.R. (2009): *Research Methodology: Methods and Techniques*, New Age International Publishers, Kolkata.
11. Kothari, C.R. (1979): *Quantitative Techniques*, Vikas Publishing House Pvt. Ltd., New Delhi.
12. Kurtz, N.R. (1983): *Introduction to Social Statistics*, McGraw-Hill International Book Company, Auckland.
13. Mahmood, A. (1998): *Statistical Methods in Geographical Studies*, Rajesh Publication.
14. Malhotra, O.P. and Gupta, S.K. (1990): *Elementary Statistics*, S. Chand & Company Ltd., New Delhi.
15. Pal, S.K. (1999): *Statistics for Geoscientists*, Concept publishing Company, New Delhi.
16. Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, Hyderabad.
17. Silk, J. (1979): *Statistical techniques in Geography*, George Allen and Unwin, London.
18. Spiegel, M.R. and Stephens, L.J. (2000): *Theory and Problems of Statistics*, Tata McGraw-Hill Publishing Company Limited, New Delhi.
19. Walford, P. (1995): *Geographical Data Analysis*, John Wiley and Sons Inc., New York.
20. Yeates, M. (1974): *An introduction to Quantitative Analysis in Human Geography*, McGraw-Hill.



**Department of Geography  
Kazi Nazrul University**

**Semester - II**

**(MSCGEOGC205 Core Course-11, Practical)**

**Computer Basics and Field Report**

❖ **Full Marks: 50**

❖ **CA+ESE Marks: 30+20**

❖ **Credit: 4**

❖ **End Sem Exam Duration: 2 Hours**

***Course Learning Outcomes:***

1. Prepare and design maps, charts and diagram with the help of computer software.
2. Apply appropriate computational techniques in the discipline of Geography.
3. Acquire knowledge about primary and secondary data collection and preparation of field report from the collected data.
4. Select the suitable technique for graphical presentation of a data to their field report.

**Unit 1: Computer Basics, Application and Presentation**

**[15+10=25 Marks]**

1.1 Computer components: Hardware and software: CPU, Input and Output devices; Common computer languages, System Software, Application Software and Operating Systems.

1.2 Representation of data; Numbering Systems; Binary Arithmetic; Basic Logic Gates; Boolean Logic and Reduction Techniques.

1.3 Computation, Storing and Formatting Spreadsheets: Computation of Rank, Mean, Median, Mode, Standard Deviation, Moving Averages, Sample Variation; Derivation of Correlation, Covariance and regression; Selection of technique and interpretation

1.4 Regression, correlation, curve fitting, multivariate analysis.

***Continuous Assessment***

**[15 Marks]**

**In the End Semester Examination, students have to answer one compulsory question from the above unit.**

**[10 Marks]**

**Unit 2: Field report on either a Rural Mouza or at least one ward of an Urban area to be conducted during Field Excursion**

**[15+10=25 Marks]**

**Guideline for field report on Rural Mouza**

❖ The following methods are to be followed before the preparation of field report:

- (a) Plot-to-Plot Land Use Survey
- (b) Collection of Socio-Economic and Physical Data
- (c) Classification and Tabulation of Data
- (d) Preparation of Land Use Map on Cadastral Plan
- (e) Preparation of Maps and Diagrams showing Physiography, Drainage, Soil, Forest, Settlement, Irrigation, Cropping pattern, Demographic Characteristics etc.
- (f) Interrelation and Analysis of Data, Maps and Diagrams

❖ The Reports is to be Prepared under the following sections:

- (a) Introduction: Objective, Extent and Space Relations, Sources of Information, Methodology etc.





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- (b) Physical Components: Lithology, Drainage, Surface Condition, Slope, Climate, Soil Vegetation, etc.
- (c) Population: Number, FMR, Literacy, Occupational Structure, Ethnic and Religious Composition, Language, Mobility, Media Exposure, Per Capita Income etc.
- (d) Settlement: Number of Houses, Building Materials, Number and Size of Rooms, Amenities etc.
- (e) Agriculture: Soil Properties, Irrigational Facilities, General Land Use, Cropping Intensity, Crop- Combination, Use of Fertilisers, Production and Marketing etc.
- (f) Other Economic Activities: Fishing, Horticulture, Brick-Kiln Industries
- (g) Problems, Prospects, Suggestion and Conclusion.
- (h) Bibliography.

Guideline for field report on Urban Area (At least One Ward)

- ❖ The following methods are to be followed before the preparation of Field Report:
  - (a) Plot – to- Plot Land Use Survey
  - (b) Collection of Socio-Economic Data.
  - (c) Classification and Tabulation of Data.
  - (d) Preparation of Urban Land Use Maps.
  - (e) Preparation of Maps and Diagrams showing Urban Morphology, Drainage and Sewage Networks, Communication Networks, Traffic Flow and Travel- Time, Demographic Characteristics, Cultural and Economic Zonation etc.
  - (f) Interrelation and Analysis of Data, Maps and Diagrams.
- ❖ The report is to be prepared under the following sections:
  - (a) Introduction: Objective, Extent and Space Relations, Sources of Information, Methodology etc.
  - (b) Physical Components: Surface Conditions, Slope, Drainage, Climate etc.
  - (c) Demography: Spatial Analyses of Population Density, FMR, Literacy, Occupational Structure, Ethnic and Religious Composition, Language, Mobility, Media Exposure, etc.
  - (d) Town Morphology: Activity Zones, Sectors of Land Use, Linkages between different Zones and Sectors.
  - (e) Economy: Economic Individuality of the Town, Production and Marketing Patterns, Spatial differences in Occupation and Per Capita Income Characteristics etc.
  - (f) Urban Waste and its Management: Types of Wastes Generated, Network of Drains, Efficiency of Waste Removal and Sewage Treatment, Peoples' Perception of Pollution Problem.
  - (g) Bibliography
    - Field Reports is to be computerised.
    - Text of the Report should not Exceed 4,000 words
    - Maps and Diagrams Excluding Photo-Plates should not Exceed 20

*Continuous Assessment for unit 2 will be based on field performance and preparation of the field report and presentation of the field report.* [15 Marks]

*End Semester for unit 2 will be based on Field Report+ Viva-voce* [5 +5= 10 Marks]



**Department of Geography  
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**Semester - II**

**(MSCGEOGMIE201: Minor Elective-1, Theoretical)**

**Geospatial Science**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

*After completion of this course, students will be able to –*

1. *Learn the conceptual foundation of Remote Sensing (RS), Geographic Information System (GIS) and Global Positioning System (GPS).*
2. *Learn various data Acquisition and analysis techniques in remote sensing.*
3. *Learn supervised and unsupervised image classification techniques with the help of software.*
4. *Examine and understand the spatial data models and its applications in geography.*

**Unit 1: Basic Concept of Remote Sensing**

**[10 Marks]**

1.1 Physics of Remote Sensing: Electro Magnetic Radiation (EMR), Radiation Laws (wavelength- frequency-energy relationship of EMR numerical problems).

1.2 Data Acquisition techniques; Types of Remote Sensing data and methods of interpretation and analysis with special reference to study of aerial photographs and satellite images.

**Unit 2: Fundamental Concept of Remote Sensing**

**[10 Marks]**

2.1 Concepts of Thermal Remote Sensing, Microwave Remote Sensing, Hyper spectral Remote Sensing. Satellite Sensors: Concept of IFOV, Resolution, Band Combination, TCC, FCC and SFCC

2.2 Referencing scheme of satellite system (path/row calculation). Digital image Classification, supervised and unsupervised classification.

**Unit 3: Geographic Information System**

**[10 Marks]**

3.1 Concept, Component and Data structure of GIS , Concept of Spatial data in GIS; Types of Spatial Data-Vector and Raster Data

3.2 Data Acquisition using GPS. Using Google earth image.

**Unit 4: Image Rectification and Vectorizations**

**[10 Marks]**

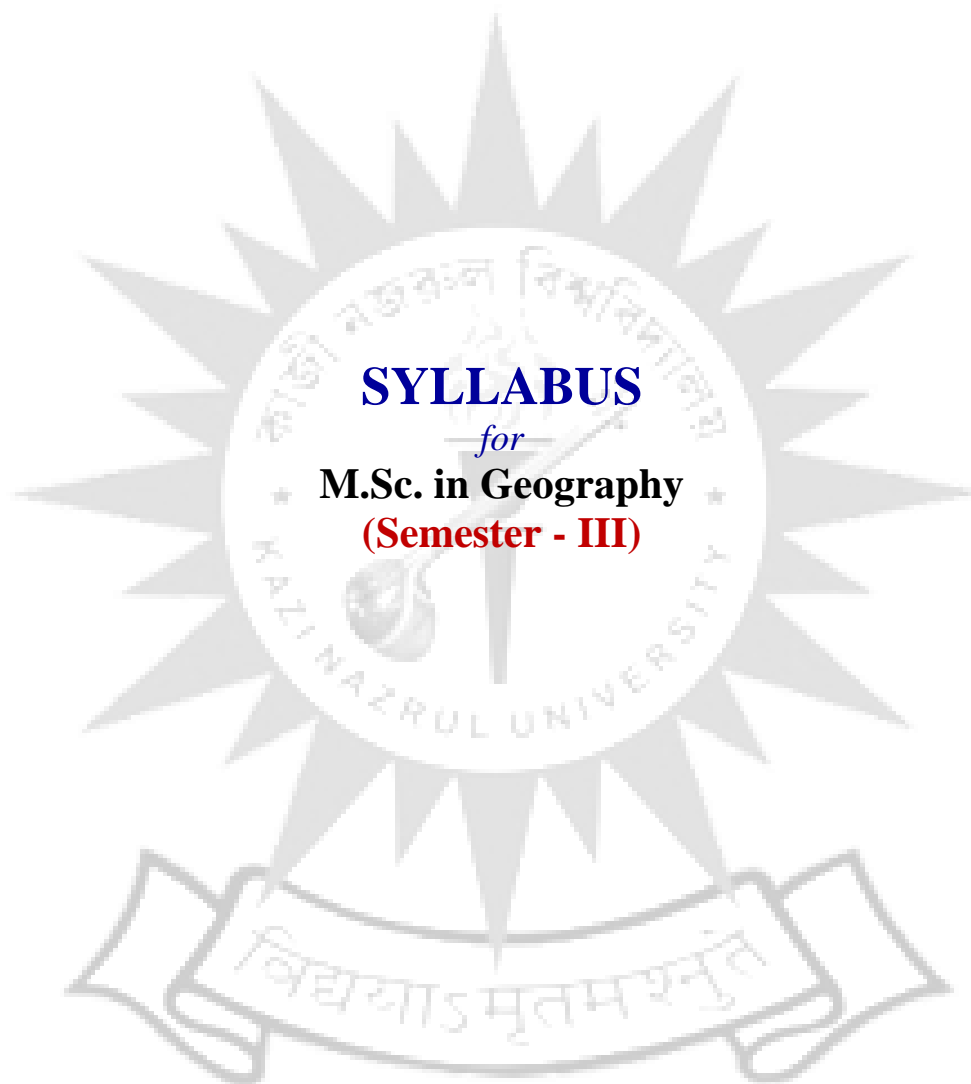
4.1 Demonstration of software (open Source)

4.2 Georeferencing, Reprojection Vectorization and Spatial data editing, Digitization of points, line and polygons, Preparation of different types of FCC and map composition.



✧ **Suggested Readings:**

1. Agarwal, G.C. (1974): *Photogrammetric Surveys, their Planning, Execution and Costing*, Survey of India Technical Publication, No. 7401.
2. Bhatta, B. (2011): *Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others*, CRC Press.
3. Bhatta, B. (2011): *Remote Sensing and GIS*, 2nd ed., Oxford Univ. Press.
4. Campbell, J.B. (1996): *Introduction to Remote Sensing*, 2nd edition, Taylor and Francis, London.
5. Chaisman, N. (1992): *Exploring Geographical Information Systems*, John Wiley and Sons Inc., New York.
6. Curran, P.J. (1988): *Principles of Remote Sensing*, ELBS Edition, Longman Group Ltd., UK.
7. Heywood, D.I., Cornelius, S. and Carver, S. (2006): *An Introduction to Geographical Information Systems*, Prentice Hall, Upper Saddle River, New Jersey.
8. Jensen, J.R. (2006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, Upper Saddle River, New Jersey.
9. Joseph, G. (2003): *Fundamental of Remote Sensing*, University Press (India) Pvt. Ltd.
10. Joseph, G. and Jegannathan, C. (2018): *Fundamentals of Remote Sensing*, 3rd ed., Universities Press.
11. Lillesand, T.M. and Kiefer, R. W. (1994): *Remote Sensing and Image Interpretation*, 3rd edition, John Wiley and Sons, New York.
12. Marcolongo, B. and Mantorani, F. (1997): *Photogeology: Remote Sensing Application in Earth Science*, Oxford and IBH Pub. Pvt. Ltd., New Delhi





**Department of Geography  
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**Semester - III**

**(MSCGEOGC301: Core Course-12, Theoretical)**

**Agricultural Geography and Landuse Planning**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Trace the dynamism and evolutionary processes of agriculture as a discipline of geography over time.
2. Apply the knowledge of agricultural geography in identification and demarcation of region having agricultural importance using statistics.
3. Learn to plan the best possible uses of land applying suitable techniques over varied geographical locations

**GROUP-A: AGRICULTURAL GEOGRAPHY**

**Unit-1: Concept of Agriculture**

**[10 Marks]**

1.1 Scope, content and its relation with other branches of Geography. History of evolution of agriculture in India.

1.2 Theories of Agricultural location: Von-Thünen's classical theory, Theory by Hoover; Sinclair's model of Peri urban agriculture. Agricultural innovations and their diffusion.

**Unit-2: Dimensions of Agriculture and Distribution**

**[10 Marks]**

2.1 Determinants of agricultural land use: Physical, Socio-economic and Technological; Concept and techniques of delineation of Agricultural Regions, Cropping pattern, Crop combination, Crop diversification, Agricultural productivity and efficiency.

2.2 Changing pattern of world agriculture: Tropical, Temperate and Mediterranean region. Spatial and temporal variation of climate and their impact on agriculture.

**GROUP-B: LANDUSE PLANNING**

**Unit-3: Landuse Techniques and Survey**

**[10 Marks]**

3.1 Principles of Land use (after Graham, Stamp and Lewis). Land Classification - Storie's rating index, Azzi's index, Land Capability Classification by USDA.

3.2 Landuse survey - Reconnaissance, Topographical Survey, Remote Sensing, Integrated Survey Technique.

**Unit-4: Landuse Model and Perception**

**[10 Marks]**

4.1 Landuse pattern in Wetlands and suggestions for optimum use.



4.2 Landuse in Glaciated lands and suggestions for optimum use.

*Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

❖ **Suggested Readings:**

1. Briggs, D. (1985): *Agriculture and Environment*, Longman, London.
2. De, N.K. and Jana, N.C. (1997): *The Land: A Multifaceted Appraisal and Management*, Sribhumi Publishing Co.
3. FAO (1974): *A Framework for Land classification*, Soil Bulletin No. 32, FAO, Rome.
4. Gregor, H.P. (1970): *Geography of Agriculture*, Prentice Hall, New York.
5. Grigg, D. (1984): *An Introduction to Agricultural Geography*, Hutchinson Publication, London.
6. Grigg, D.B. (1974): *The Agricultural Systems of the World*, Cambridge University Press, New York.
7. Hironi, K. (1991): *Land use Planning and Geomorphology: A study of Swai Madhopur*, Concept Pub Co., New Delhi.
8. Husain, M. (1996): *Systematic Agricultural Geography*, Rawat Pub., New Delhi.
9. Joy, T.V. (1990): *Agricultural Ecology*, Longman, London.
10. Lindgren, D. (2002): *Land Use Planning*, Springer.
11. Mandal, R.B. (1982): *Land Utilization: Theory and Practice*, Concept Pub. Co., New Delhi.
12. Mather, A.S. (1986): *The Land*, Longman Group Ltd., UK.
13. Morgan, W.B. (1978): *Agriculture in the Third World: A spatial analysis*, Westview Press, Boulder.
14. Morgan, W.B. and Munton, R.J.C. (1971): *Agricultural Geography*, Methuen, London.
15. Randolph, John. (2003): *Environmental Land Use Planning and Management*, Island Press.
16. Roychaudhuri, S.P. (1966): *Land and Soil*, National Book Trust, New Delhi.
17. Shafi, M. (2005): *Agricultural Geography*, Pearson.
18. Sharma, K.D. and Soni, B. (2006): *Land Use Diversification for Sustainable Rainfed Agriculture*, Atlantic Publishers and Distributors.
19. Silberstein, J. and Maser, C. (2000): *Landuse planning for Sustainable Development*, CRC Press.
20. Singh, J. and Dhillon, S.S. (1988): *Agricultural Geography*, Tata McGraw-Hill, New Delhi.
21. Symons, L. (1972): *Agricultural Geography*, Bell and Sons, London.
22. Tarrant, J.R. (1974): *Agricultural Geography: Problems in Modern Geography Series*, John Wiley and Sons.



Semester - III  
(MSCGEOGC302: Core Course-13, Theoretical)  
**Remote Sensing and Geographic Information System**

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

1. Recognize and explain at a fundamental principle of remote sensing and Satellite System.
2. Learn basic computational attributes of remote sensing data acquisition, storage, and processing.
3. Learn interpretation, analysis and comparative assessment methods of aerial photographs, satellite images and SOI toposheet.
4. Use GIS software to perform different spatial analysis and digital analysis of satellite image.
5. Learn digital image enhancement and digital image classifications (supervised and unsupervised) techniques.

**Unit-1: Physical Basis of Remote Sensing and Satellite Systems**

[10 Marks]

1.1 *Physics of Remote Sensing*: Electro Magnetic Radiation (EMR), Radiation laws (wave length frequency- energy relationship of EMR); Requirements and Stages of Remote Sensing; Satellite Platforms and Sensors: Basics, Kepler's laws, Major-Semi major axis and eccentricity, Velocity, Period, Historical development, Launch Vehicle, Indian scenario.

1.2 Satellite Data Acquisition techniques; Interpretation and analysis of aerial photographs and satellite images; Satellite Sensors: Concept of IFOV, Resolution, Band Combination, FCC and SFCC; Satellite Systems: Whiskbroom Systems (LANDSAT Series), Pushbroom Systems (SPOT, IRS series), Microwave Systems (RADARSAT), Coarse resolution/ Meteorological Satellite systems (NOAA, INSAT), Very high-resolution satellite systems (Quickbird, Cartosat, IKONOS, WorldView series). Referencing scheme of satellite system (path/row calculation). Spectral signature curve.

**Unit-2: Applications of Remote Sensing and Global Navigation Satellite System (GNSS)**

[10 Marks]

2.1 Application of Remote Sensing: Comparative assessment of SOI toposheet; Aerial photographs and Satellite imageries in representing geographical data. Remote Sensing in Landuse/ Landcover applications, Soil and Agriculture applications, Geomorphic Mapping, Watershed Management.

2.2 Principles of GNSS positioning with special reference to GPS; Sources of error in a GNSS system; DGPS and its uses.

**Unit-3: Fundamentals of Geographic Information System**

[10 Marks]

3.1 *Basic Concepts*: Definition of GIS, Components of GIS, Variables: points, lines, polygon, Functionality of GIS, Advantage and Limitation of GIS; *GIS Data*: Spatial and Attribute Data, Information Organization and Data Structures, Data file and database.





3.2 *Creating GIS Database*: File organization and formats, Geo-database, Rectification, Digitization and Map Composition. *GIS Data Input*: Nature and Source of data, Methods of spatial data capture: Primary and Secondary, digitization and scanning method; Techniques and procedure for digitizing, Errors of Digitization, Attribute data capture; *Data Editing*: Detecting and correcting errors, Re-projection, Transformation and Generalization, Edge matching and Rubber sheeting, Topology.

#### Unit-4: Digital Image Classifications

[10 Marks]

4.1 Definition of Digital Image; Source of Data and Data Formats; Hardware and Software consideration for Digital Image Processing; Satellite Data Encoding and Decoding, Data Loading; Image Restoration, Image Reduction and Magnification.

4.2 *Image Enhancement Techniques*: Grey Level Thresholding, Level Slicing, Contrast Stretching - Linear and Non-Linear, Density Slicing; Image Filtering (Types and Methods), Multiband Enhancement (Band Ratioing, RGB Transformations, Principal Component Analysis, Image fusion); Digital image classification: supervised and unsupervised classification.

#### *Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

#### ✧ Suggested Readings:

1. Bhatta, B. (2011): *Global Navigation Satellite Systems: Insights into GPS, GLONASS, Galileo, Compass and Others*, CRC Press.
2. Bhatta, B. (2011): *Remote Sensing and GIS*, 2nd ed., Oxford Univ. Press.
3. Campbell, J.B. (1996): *Introduction to Remote Sensing*, 2nd edition, Taylor and Francis, London.
4. Chaisman, N. (1992): *Exploring Geographical Information Systems*, John Wiley and Sons Inc., New York.
5. Curran, P.J. (1988): *Principles of Remote Sensing*, ELBS Edition, Longman Group Ltd., UK.
6. Heywood, D.I., Cornelius, S. and Carver, S. (2006): *An Introduction to Geographical Information Systems*, Prentice Hall, Upper Saddle River, New Jersey.
7. Jensen, J.R. (2006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, Upper Saddle River, New Jersey.
8. Joseph, G. (2003): *Fundamental of Remote Sensing*, University Press (India) Pvt. Ltd.
9. Joseph, G. and Jegannathan, C. (2018): *Fundamentals of Remote Sensing*, 3rd ed., Universities Press.
10. Lillesand, T.M. and Kiefer, R. W. (1994): *Remote Sensing and Image Interpretation*, 3rd edition, John Wiley and Sons, New York.
11. Marcolongo, B. and Mantorani, F. (1997): *Photogeology: Remote Sensing Application in Earth Science*, Oxford and IBH Pub. Pvt. Ltd., New Delhi.
12. Martin, D. (1991): *Geographical Information Systems and their Socioeconomic Applications*, London, Routledge.
13. Sabins, F.F. (1997): *Remote Sensing: Principles and Applications*, 3rd edition, W.H. Freeman & Company, New York.





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**Semester - III**

**(MSCGEOGC303: Core Course-14, Practical)**

**Remote Sensing & Geographic Information System - II**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 30+20**

✧ **Credit: 2**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. *Collect different Satellite Data Products (IRS, LANDSAT and Declassified images) independently and get basic knowledge regarding hard copy and soft copy satellite images.*
2. *Understand the effect of different resolutions of satellite image on identifying different terrestrial features.*
3. *Create - Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI) map.*
4. *Georeference the spatial data and handle spatial and non-spatial database.*
5. *Learn DEM generation and Surface Analysis including Contour, Slope, Aspects, Hill shade.*
6. *Prepare different Morphometric aspects from DEM such as Relative Relief, Drainage Density and Hypsometry.*

**Unit-1: Techniques in Remote Sensing and Digital Image Processing (DIP) [15 Marks]**

1.1 Familiarization with hard copy and soft copy satellite images; Selection procedure of IRS series satellite images; Exercise on Visual Image Interpretation: Preparation of thematic overlays from satellite images on the basis of feature identification keys.

1.2 Downloading of different Satellite Data Products (IRS, LANDSAT and Declassified images); File export-import/ translation, Georeferencing of scanned maps and satellite images; Applying reference spheroids and projections; Mosaicing and layering of images and maps of different dates and scales; Creating Region of Interest (sub setting/ clipping).

1.3 Preparation of Colour Composites using different band combinations; Extraction of Spectral Signature of different landuse / landcover features from Satellite Data; Image enhancement techniques: Linear and non-linear contrast enhancement, band rationing, edge enhancement, High pass and Low pass filtering, density slicing, principal component transformation.

1.4 Image Classification: Unsupervised and Supervised Classification. Post Classification Filtering, Accuracy assessment, Creation of look-up table, Classification report generation; Preparation of Iron Index map, Moisture map, Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI) map.

**Unit-2: GIS Data Processing and Global Positioning System & DEM Analysis [15 Marks]**

2.1 Scanning, Editing and Conversion in different file format; Generation of vector layers, buffers and attribute tables from image and/or map data; Preparation of annotated (i) town plan, (ii) landuse/ landcover map, (iii) map representing demographic or landuse data through choropleth/ pie charts and (iv) map showing feature changes over time.



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2.2 Querying the database; Spatial analysis and modelling in GIS: Interpolation methods (IDW and Kriging), DEM, TIN, variance filter, surface modelling; Application of GIS modelling in Geomorphology or emerging issues in Environment (Case Study: any one).

2.3 Conceptual Framework of GPS surveying; Techniques of GPS data collection and mapping (using Map Source / any other GPS Software/ GIS Software) of a locality with prominent features.

2.4 DEM generation and Surface Analysis: Contour, Slope, Aspects, Hill shade; Representation of Morphometric aspects from DEM: Relative Relief, Drainage Density and Hypsometry.

**In the End Semester Examination, students have to answer one compulsory question from the above two Units.**

*Viva-voce*

[5 Marks]

*Continuous Assessment*

[30 Marks]

*(\*A Project File, comprising one exercise each is to be submitted)*

### ✧ Suggested Readings:

1. Agarwal, G.C. (1974): *Photogrammetric Surveys, their Planning, Execution and Costing*, Survey of India Technical Publication, No. 7401.
2. Bolstad, P. (2016): *GIS Fundamentals: A First Text on Geographic Information Systems*, 5th ed., XanEdu Publishing.
3. Brewer, C.A. (2015): *Designing Better Maps: A Guide for GIS Users*, 2nd ed., ESRI Press.
4. Campbell, J.B. (1996): *Introduction to Remote Sensing*, 2nd edition, Taylor and Francis, London.
5. Chaisman, N. (1992): *Exploring Geographical Information Systems*, John Wiley and Sons Inc., New York.
6. Chang, K-t. (2015): *Introduction to Geographical Information System*, McGraw-Hill Education.
7. Fazal, S. (2008): *GIS Basics*, New Age International (P) Limited, Publishers, New Delhi
8. Harvey, F. (2015): *A Primer of GIS: Fundamental Geographic and Cartographic Concepts*, The Guilford Press.
9. Jensen, J.R. (2006): *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, Upper Saddle River, New Jersey.
10. Joseph, G. and Jegannathan, C. (2018): *Fundamentals of Remote Sensing*, 3rd ed., Universities Press.
11. Lillesand, T.M. and Kiefer, R.W. (1994): *Remote Sensing and Image Interpretation*, 3rd edition, John Wiley and Sons, New York.
12. Longley, P., Goodchild, M., Maguire, D.J. and Rhind, D.W. (2011): *Geographic Information Systems and Science*, John Wiley & Sons, New York.
13. Marcolongo, B. and Mantorani, F. (1997): *Photogeology: Remote Sensing Application in Earth Science*, Oxford and IBH Pub. Pvt. Ltd., New Delhi.
13. Rajan, M.S. (1995): *Space Today*, 2nd edition, National Book Trust, New Delhi.
14. Rao, U.R. (1996): *Space Technology for Sustainable Development*, Tata McGraw-Hill, New Delhi.
15. Sabins, F.F. (1997): *Remote Sensing: Principles and Applications*, 3rd edition, W.H. Freeman & Company, New York.
16. Sahu, K.C. (2007): *Textbook of Remote Sensing and Geographical Information Systems*, Atlantic Publishers, New Delhi

### Semester - III

### (MSCGEOGMJE301: Major Elective-1, Theoretical)



## Advanced Geomorphology – I

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

### Course Learning Outcomes:

After completion of this course, students will be able to –

1. Understand the concept theoretical and applied geomorphology, and their linkages with other discipline of knowledge.
2. Develop an advanced understanding of the distinct regions of the world in relation to morphological and climatic parameters.
3. Describe evolution of landscapes and related processes in areas influenced by fluvial, glacial, periglacial, aeolian, karst, and coastal systems.
4. Analyze geomorphological issues at global, regional and local scale and application of knowledge of geomorphology to resolve different real problems.

### Unit-1: Perspectives and Models in Geomorphology

[10 Marks]

1.1 Nature and scope of Geomorphology: Theoretical and Applied, its linkages with other branches of Geography and other disciplines; Methodology and recent trends in Geomorphological studies; Climatic Geomorphology and morphogenetic regions in the tropics.

1.2 Concepts of planation surfaces: Peneplanation, Pediplanation, Etchplanation and Cryoplanation. Theories and models of landforms: Tors and Bornhardts, Cirque, Pediment and Delta. Weathering processes and profiles in humid tropical environment.

### Unit-2: Fluvial processes and forms

[10 Marks]

2.1 River hydraulics: flow, energy and hydraulic geometry; Channel geometry (bedrock and alluvial rivers) and the Concept of grade; Catchment processes and fluvial processes; Factors regulating entrainment, transportation and deposition of sediments.

2.2 Adjustment of channel forms and patterns to morphodynamic variables; Fluvial landforms: genetic classification, ordering, formation and evolution; River metamorphosis and Quaternary fluvial systems.

### Unit-3: Coastal processes and landforms

[10 Marks]

3.1 Tidal and fluvial processes in Coasts; Processes and effects of Bioturbation; Bio-tidal accretion; Coral formation and Storm surge/Tsunamis in coasts.

3.2 Formation, System of change and Classification of Coastal Landforms with special reference to Rhythmic Beach Topography, Coastal Dunes and Deltas.

### Unit-4: Applied and Regional Geomorphology

[10 Marks]



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4.1 Application of geomorphology in feasibility assessment of engineering and industrial projects; Geomorphic approaches to hazard studies and management of Geomorphic Hazards (Landslides and Riverbank erosion).

4.2 Sikkim-Darjeeling Himalaya: Structure, Process and Landforms; Chhotanagpur Plateau: Delineation, Stratigraphy and Geomorphic Features; Evolution of Indian part of Ganga-Brahmaputra delta (GBD) with reference to climate, tectonics and eustasy.

*Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

### ❖ Suggested Readings:

1. Bierman, P.R. and Montgomery, D.R. (2014): *Key Concepts in Geomorphology*, W.H. Freeman and Company Publishers, New York.
2. Bridge, J.S. (2003): *Rivers and Floodplains: Forms, Processes, and Sedimentary Record*, Blackwell Publishing, Oxford.
3. Charlton, R. (2008): *Fundamental of Fluvial Geomorphology*, Routledge.
4. Gregory K.J. (1997): *River Channel Changes*, John Wiley & Sons., New York.
5. Gregory, K.J. and Goudie, A.S. (2011): *The SAGE Handbook of Geomorphology*, SAGE.
6. Gregory, K.J. and Lewin, J. (2014): *The Basics of Geomorphology: Key Concepts*, SAGE.
7. Gregory, K.J. and Walling, D.E. (1985): *Drainage Basin: Forms and Process - A Geomorphological Approach*, John Wiley & Sons., New York.
8. Gupta, A. (2011): *Tropical Geomorphology*, Cambridge University Press, New York.
9. Kingston D. (1984): *Fluvial Forms and Processes*, Edward Arnold, London.
10. Leopold, L.B., Wolman, M.G. and Miller, J.P. (1964): *Fluvial Processes in Geomorphology*, Dover Publications, Inc., New York.
11. Morisawa M. (1968): *Streams: their dynamics and morphology*, McGraw Hill, New York.
12. Pethick, J. (1984): *An Introduction to Coastal Geomorphology*, Edward Arnold, London.
13. Richards K. (1995): *Rivers*, Methuen & Co., London.
14. Robert, A. (2003): *River Processes: An Introduction to Fluvial Dynamics*, Arnold, London.
15. Schumm S.A. (1977): *The Fluvial System*, Wiley Interscience Publication.
16. Sen, P.K. and Prasad, N. (2002): *An Introduction to the Geomorphology of India*, Allied Publishers Pvt. Ltd., New Delhi.
17. Thorn, C.E. (1988): *An Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston.
18. Tinkler, K.J. (1985): *A Short History of Geomorphology*, Barnes & Noble.
19. Twidale, C.R. (1982): *Granite Landforms*, Elsevier Scientific Publishing Company, Amsterdam.
20. Woodroffe, CD. (2002): *Coasts: Form, Process and Evolution*. Cambridge University Press, Cambridge.

### Semester – III



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**(MSCGEOGMJE302: Major Elective-2, Practical)**

**Advanced Geomorphology - II**

✧ Full Marks: 50

✧ CA+ESE Marks: 30+20

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

1. Represent relief features of the flood plains, plateaus, hills, foothills, valleys and through serial, superimposed, composite, projected profiles.
2. Get skill of creating slope map, dissection Index map, relative relief map, absolute relief map, altimetric frequency and hypsometric Curve.
3. Apply different statistical methods used in geomorphological data analysis.
4. Make an initial geomorphological fieldwork.
5. Learn the techniques of geomorphological analysis.
6. Learn sediment collection and analysis techniques of coastal and riverine sediments.

**Unit-1: Measurement, Computation and Analysis in Geomorphology and Fluvial Geomorphology** [15 Marks]

1.1 Profile analysis from Indian Topographical sheets (1:50,000): superimposed, projected and composite; Areal representation of slope by Raisz and Henry (1937) method; Construction of hypsometric curve and derivation of hypsometric integral.

1.2 Stream order (Strahler's and Horton method), Linear, areal and relief aspects of drainage basins, their bivariate and multivariate analysis; Analysis of Drainage Network Orientation and Topological Distinct Channel Network (TDCN).

1.3 Computation of Braiding index, Sinuosity index, Meander wavelength and Radius of curvature; longitudinal profiles of rivers and Hack's stream gradient index.

1.4 Measurement of channel cross-section in the field, study of erosional and depositional features in the field (Creating sketch maps); Calculation of hydraulic geometry equations; Calculation of velocity and discharge using Manning equation.

**Unit-2: Field techniques in Geomorphology and Analysis of Sediments** [15 Marks]

2.1 Measurement of hillslope profiles with abney's level and drawing of profiles maintaining slope forms; Measurement of dip and strike using clinometer; Field study of the weathering profiles/ laterite profiles; Calculation and interpretations of Si/Sesquioxide ratios and chemical weathering indices.

2.2 Study of fluvial sedimentary sequences in the field (facies and major sedimentary structures, Mialls' facies notations/lithocodes) and interpret in terms of past and present geomorphic processes; Use of Munsell colour chart in sedimentary sequences.

2.3 Collection and analysis of Coastal or Riverine sediments using Ø-graded sieves and chemicals/electronic balance; Measurement of suspended sediment concentration.

2.4 Analysis of Pebble-grade fluvial and coastal sediments for shape, size and materials using Zingg's classification; Microscopic identification of minerals and biogenic forms.



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In the End Semester Examination, students have to answer one compulsory question from the above two Units.

*Viva-voce*

[5 Marks]

*Continuous Assessment*

[30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

### ❖ Suggested Readings:

1. Baker, V., Craig-Kochel, R. and Patton, P.C. (1988): *Flood Geomorphology*, Wiley, Chichester
2. Dackombe, R.V. and Gardiner, V. (1983): *Geomorphological Field Manual*. George Allen and Unwin, London.
3. Doornkamp, J.C. and King, C.A.M. (1971): *Numerical analysis in Geomorphology*. Edward Arnold, London.
4. Goudie, A.S. *et al.* (2005): *Geomorphological Techniques*, Second Edition, Routledge (Taylor & Francis Group), London.
5. King, C.A.M. (1966): *Techniques in Geomorphology*, Edward Arnold, London
6. Prasad, N. And Basu, R. (eds.) (2000): *Contemporary Dimensions in Geography*, Academic Staff College, The University of Burdwan.
7. Ramasamy, S.M. (2005): *Remote Sensing in Geomorphology*, New India Publishing Agency.
8. Sen, P.K. (1993): *Geomorphological Analysis of Drainage Basin*, The University of Burdwan, Burdwan.
9. Sengupta, S.M. (2010): *Introduction to Sedimentology*, Second Edition, CBS Publishers & Distributors Pvt. Ltd., New Delhi.

### Semester - III

#### (MSCGEOGMJE303: Major Elective-1, Theoretical)

### Environmental Issues in Geography – I

❖ Full Marks: 50

❖ CA+ESE Marks: 10+40

❖ Credit: 4

❖ End Sem Exam Duration: 2 Hours

#### Course Learning Outcomes:

1. Learn the philosophical base which shapes the environmental concepts and enhance their ideas towards generating thought process.
2. Understand the dilemma over global resource crises along with sustainable solution for better resource utilization.
3. Get insights about the physical vulnerability of a geographical place and social processes in the context of environmental degradation.
4. Broaden the thinking towards utilization of varied technological and biological innovation in preserving and expanding the environmental space.

#### Unit-1: Basic Concepts and Philosophies of Environmental Geography

[10 Marks]

1.1 Scope, Content and Approaches to Environmental Studies: Organismic, Environmentalist, Holistic vs Reductionist and Deep vs. Shallow Ecology.

1.2 Philosophical bases of Environmental Studies: Gaia Hypothesis, Limits to Growth, Spaceship Earth, Ecosystem Balance, Population Equilibrium and Stationary State Economy.

#### Unit-2: Issues of Environmental Resource Utilization

[10 Marks]

2.1 Global Resource Crisis with special reference to Coal, Petroleum and Natural Gas.

2.2 Environmental politics regarding conflicts over water resource: Examples from World and





India.

Unit-3: Environmental Degradation

[10 Marks]

3.1 Natural and quasi-natural Hazards: Risk, Vulnerability and Management of Cyclones, Earthquake, Droughts, Floods and Landslide.

3.2 Social Hazards: Tropical Diseases, Poverty, Crime, Human Trafficking and Social Exclusion.

Unit-4: Environmental Technology

[10 Marks]

4.1 Changes in the trend of Production Technology (with special reference to Green, Red and Brown Technology); Role of State Control, Privatization and Out-sourcing; Environmental Audit.

4.2 Environmental microbiology: Bio-gas, Bio-remediation, Bio-transformation, Bio-conversion.

*Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

❖ Suggested Readings:

1. Abbasi, A., Krishnakumari, P., and Khan, F. (2000): *Hot Topics: Everyday Environmental Concern*, Oxford University Press.
2. Adams, W.M. (1995): *Green Development: Environmental Sustainability in the Third World*, Routledge, London.
3. Alexander, D. (1993): *Natural Disasters*, Research Press, New Delhi.
4. Allaby, M. (1996): *Basics of Environmental Science*, Routledge, London.
5. Bryant, E.A. (1991): *Natural Hazards*, Cambridge University Press, Cambridge.
6. Buchholz, R.A. (1993): *Principles of Environmental Management, the Greening of Biosphere*, Prentice Hall Inc., New Jersey.
7. Chary, S.N. (2008): *Environmental Studies*, Macmillan Publication.
8. Dasgupta, P. and Miller, K.G. (1997): *The Environment and Emerging Development Issues*, (Volumes I and II), Clarendon Press, Oxford.
9. Gilpin, A. (1996): *Dictionary of Environment and Sustainable Development*, John Wiley and Sons Ltd.
10. Goudie, A. (1986): *The Human Impact on the Natural Environment*, 2<sup>nd</sup> edition, Blackwell Pub. Co., London.
11. Guha, R. (2008): *Social Ecology*, Oxford India Paperbacks.
12. Hardoy, J.E., Mittin, D. and Satterthwaite, D. (1992): *Environment Problems in the World Cities*, Earthscan Pub. Ltd., London.
13. Johansen, B.E. (2006): *Global Warming in the 21st Century*, Atlantic Publication.
14. Masters, G.M. (1991): *Introduction to Environmental Engineering and Sciences*, Prentice Hall India Ltd., New Delhi.
15. Mishra, R.N. (2008): *Environment and Forest Resource Management*, Sonali Publication, New Delhi.
16. Park, C. (1998): *The Environment: Principles and Applications*, Routledge, London.
17. Pickering, K.T. and Owen, L.A. (1997): *An Introduction to Global Environmental Issues*, Routledge, London.





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18. Santra, S.C. (2001): *Environmental Science*, Central Publication.
19. Shaw, R. and Krishnamurty, R.R. (2009): *Disaster: Global Challenges and Local Solutions*, University Press.
20. Singh, R.B. and Misra, S. (1996): *Environmental Laws in India: Issues and Responses*, Rawat Pub., New Delhi.
21. Speth, I.G. (Reprint 2005): *Global Environmental Challenges - Transitions to a Sustainable World*, Orient Longman, New Delhi.
22. Whyte, I.L. (1995): *Climate Change and Human Society*, Arnold, London.
23. Woodward, F.I. (1992): *Global Climatic Change: The Ecological Consequences*, Academic Press, London.

**Semester - III**

**(MSCGEOGMJE304: Major Elective-2, Practical)**  
**Environmental Issues in Geography - II**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 30+20**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Enhance the skill towards identifying and analysing the environmental problems along with modelling the environmental data.
2. Instill the quality in perceiving the ground reality through primary survey and learn the technique in developing questionnaire schedule.
3. Learn to map and represent the environmental data for a better aerial and spatial understanding with sound management practices.

**Unit-1: Modelling and Techniques and Quantitative Analysis`**

**[15Marks]**

- 1.1 Identification and Modelling of Environmental Problems.
- 1.2 Regression analysis and Standard Error of the Estimate with Environmental data.
- 1.3 Correlation (Bivariate) analysis of Environmental Data.
- 1.4 Time series analysis of climatic data.

**Unit-2: Environmental Survey. Mapping and Technology [15Marks]**

- 2.1 Perception Survey Techniques; Preparation of Survey Schedule and Questionnaires for Perception survey of Natural and Social hazards.
- 2.2 Cartographic Representation of Primary or Secondary Data and Collation of Environmental Data and Map Preparation of Environmental Management Plan.
- 2.3 Preparation and Interpretation of Environmental Maps: Micro levels (Area and Problem specific).
- 2.4 Pollution and Hazard Mapping.

**In the End Semester Examination, students have to answer one compulsory question from the above two Units.**



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*Viva-voce*

[5 Marks]

*Continuous Assessment*

[30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

✧ **Suggested Readings:**

1. Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publications, New Delhi.
2. Chakravorty, J.G. and Ghosh, P.R. (2007): *Advanced Higher Algebra*, U.N. Dhur & Sons Private Ltd., Kolkata.
3. Clark, W.A.V and Hosking, P.L. (1986): *Statistical Methods for Geographers*, Wiley and Sons.
4. Cole, J.P. and King, C.A.M. (1969): *Quantitative Geography (Techniques and Theories in Geography)*, John Wiley & Sons Ltd., London.
5. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): *Fundamental of Statistics (Volume One and Two)*, The World Press Private Limited, Kolkata.
6. Hammond, R. and McCullagh, P. (1991): *Quantitative Techniques in Geography*, Clarendon Press, Oxford
7. Hayslett, H.T. (1976): *Statistics: Made Simple*, W.H. Allen, London.
9. Khan, N. (2002): *Quantitative Methods in Geographical Research*, Concept Publishing Company, New Delhi.
10. Kothari, C.R. (2009): *Research Methodology: Methods and Techniques*, New Age International Publishers, Kolkata.
11. Kothari, C.R. (1979): *Quantitative Techniques*, Vikas Publishing House Pvt. Ltd., New Delhi.
12. Kurtz, N.R. (1983): *Introduction to Social Statistics*, McGraw-Hill International Book Company, Auckland.
13. Mahmood, A. (1998): *Statistical Methods in Geographical Studies*, Rajesh Publication.
14. Malhotra, O.P. and Gupta, S.K. (1990): *Elementary Statistics*, S. Chand & Company Ltd., New Delhi.
15. Pal, S.K. (1999): *Statistics for Geoscientists*, Concept publishing Company, New Delhi.
17. Silk, J. I(979): *Statistical techniques in Geography*, George Allen and Unwin, London.
19. Walford, P. (1995): *Geographical Data Analysis*, John Wiley and Sons Inc., New York.

**Semester - III**

**(MSCGEOGMJE305: Major Elective-1, Theoretical)**

**Urban Geography – I**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Learn the concept of urban, urban space and process of urbanization and its temporal variation
2. Learn theories of types and patterns of urban settlements.
3. Trace the spacing of urban settlement over time based on models, theories and laws.
4. Keep pace with the changing economies, production system and phases of transition and changing pattern of urbanization

**Unit-1: Urbanization: Concept and Processes**

[10 Marks]

1.1 Concept of urban, urbanism and urbanization; Concept of urban space; Attributes of urban places; Approaches to the Study of urban geography: traditional, modern and post-modern

1.2 Processes of Urbanization; Urbanization in the developing and developed world, causes of urban growth, urbanization cycles

**Unit-2: Classification of Urban Settlements**

[10 Marks]



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2.1 Classification of Urban settlements: J.M. Houston, G.Taylor , Mumford, Concepts of Megacity, Megalopolis, Ecumenopolis, Conurbation, Counter-urbanization, Planned Towns, New Towns, Satellite Towns, Green/ Garden cities, Sister Towns, Urban Corridor, Rural-urban Fringe, Urban Sprawl, Urban Umland.

2.2 Concept of City Region after Dickinson; Urban Primacy; Rank-size Distribution of Towns after Zipf and B.J.L. Berry

### Unit-3: Theories and Spacing of Urban Settlements

[10 Marks]

3.1 Theories of urban hierarchy and spacing of urban settlements after Christaller, Smailes and Philbrick, Role of Urban Hierarchy in Regional Planning

3.2 The theories and Model of Urban Morphology after Burgess, Homer Hoyt, Harris and Ullman, Mann, Sinclair with merits and demerits

### Unit-4: Urban Economy and Segregation of Urban Spaces

[10 Marks]

4.1 Economic Base Theory, Formal and Informal Economy; Types of Urban Linkages and its significance, Concept of Economic Marginalization and reasons behind the proliferation of Slums and Shanty Towns

4.2 New Production Systems and New Industrial Spaces, Deindustrialisation and Tertiarisation of urban work force, The world city and Transnational urban systems

### *Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

### ❖ Suggested Readings:

1. Bhattacharya, B. (2006). Urban Development in India. New Delhi: Concept Publishing Company
2. Bird, James 1977: Centrality And Cities. Routledge, London
3. Carter, H. 1981: Urban Geography, 3rd edition Arnold-Heinemann, New Delhi.
4. Chakroborty, J., & Ghosh, P. (2007). Higher Algebra. kolkata: Un Dhur and Sons Pvt Ltd.
5. Das, A. K. (2007). Urban Planning in India. Jaipur: Rawat Publications.
6. Dave, M. (1991). Urban Ecology and Levels of Development. Jaipur: Rawat Publications .
7. Dickinson, R.E. (1968): City and Region: A Geographical Interpretation. Routledge and Kegan Paul Ltd. London.
8. Ghosh, S. (1998): Introduction to Settlement Geography. Orient Longman Ltd., Calcutta
9. Gibbs.J(1961) : Urban Research Methods. East-West Press Pvt Ltd. New Delhi
10. Glasson,J.(1975): An Introduction to Regional Planning. Hutchinson and Co.,London
11. Hardoy, J. E., Mittin, D. & Satterthwaite, D. 1(1992) : Environmental Problems in the World Cities. Earthscan Pub. Ltd. London.
12. Hudson, F.S. (1970): Geography of Settlements, Macdonald and Evans Ltd. PlymouthHerbert, David and Thomas, Colin, 1982: Urban Geography A First Approach, Jhon Wiley & Sons. New Delhi
13. Johnston .R.J (2000): The Dictionary of Human Geography. Blackwell. UK
14. Kaplan.D and Wheeler.J ( 2008):Urban Geography. John Wiley
15. Knox, P. (1982): Urban Social Geography. Longman Scientific and Technical, Harlow.
16. Law.N,Smith.D,(1991),Decision Making Geography. Stanley Thornes Pub. Ltd, Leckhampton
17. Mandal, R.B. (2000): Urban Geography: A Textbook. Concept Pub. Co., New Delhi.
18. Markandey, K., & Simhadri, S. (2009). Urban Environment and Geoinformatics. Jaipur: Rawat Publication.
19. McDonnell, M. J., Halns, A. K., & Breste, J. H. (2009). Ecology of Cities and Towns. Cambridge University Press.



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20. Misra, H. N. (ed) 1987: Contributions to Indian Geography. Volume 9: Rural Geography, Heritage Pub., New Delhi.
21. Mohan Sudha (2005): Urban Development and New Localism. Rawat Publications, Jaipur.
22. Pacione, Micheal, (2001): Urban Geography, Routledge, London
23. Naqvi, H. K. (1971). Urbanisation and Urban Centres under the Great Mughals. Shimla: Indian Institute of Advance Studies .
24. Raza, M., & Aggarwal, Y. (1999). Transport Geography of India. New Delhi: Concept Publishing Company.
25. Ramachandran R. (1989): Urbanisation arid Urban Systems in India. Oxford University Press, New Delhi.
26. Rao, R. Rammohan and S. Simhadri (1999): Indian Cities: Towards Next Millenium, Rawat Publications, Jaipur.
27. Ray Chaudhuri, Jayasri (2001): An Introduction to Development and Regional Planning. Orient Longman, Kolkata
28. Sharma, R.N. and K. Sita (2001): Issues in Urban Development. Rawat Publications, Jaipur.
29. Short, J. R. (1984). An Introduction to Urban Geography. London: Routledge and Keygen Paul.
30. Singh, A. K. (1990). Urbanisation and Administration of Urban Infrastructure. New Delhi: Inter-India Publications.
31. Singh, R.L. et. al. (ed) (1976): Geographic Dimensions of Rural Settlements. National Geographical Society of India, Varanasi.
32. Singh, R. Y. (1994): Geography of Settlements, Rawat Pub. Co., New Delhi.
33. Singh, Ravinder Sandhu (ed) 2003: Urbanisation in India. Sage Publications, New Delhi.
34. Taylor, Griffith (1949): Urban Geography, Methuen and Co. Ltd., London.
35. Tewari, V. Weinston, J. and Prakash Rao, V.L.S. (1986): Indian Cities: Ecological Perspectives. Concept Pub. Co., New Delhi.
36. Thudipara, Jacob Z. (2007): Urban Community Development. Rawat Publications, Jaipur.
37. Vishwanadhan, G. (ed) 1986: Readings in Urban Structure of India. Ajanta Publications, Delhi.
38. Taafee, E. J., & Gauthier, H. L. (1973). Geography of Transportation. New Delhi: Prentice

### Semester - III

#### (MSCGEOGMJE306: Major Elective-2, Practical)

### Urban Geography- II

✧ Full Marks: 50

✧ CA+ESE Marks: 30+20

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

#### Course Learning Outcomes:

1. Learn the techniques and tools in measuring and predicting the urban growth.
2. Make sense of identifying and analysing urban diversity in terms of regional and occupational pattern.
3. Learn to graph the spacing of town over time and rank the size keeping pace with population growth.

#### Unit-1: Analysis of Urban Growth and Urban Diversity

[15 Marks]

1.1 Growth Index of Urban Population and Index of Urbanization, Urban Growth by Time Series analysis in Least Square and Moving Mean Method

1.2 Concentration of Urban Population by Location Quotient, Measurement of Inequality by Lorenz Curve and Ginni Co-efficient



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1.3 Urban Occupational Diversities and Specialization, Weighted Score and Combination Analysis

1.4 Analysis of Regional Disparity after Sopher's Index, Breaking point analysis

**Unit-2: Analysis of Urban pattern** [15 Marks]

2.1 Rank-size Distribution of Towns after Zipf (Normal and Log/log), Nearest Neighbour Analysis

2.2 Bivariate Regression and Spatial Correspondence, Index of Dissimilarity and Similarity

**In the End Semester Examination, students have to answer one compulsory question from the above two Units.**

*Viva-voce* [5 Marks]

*Continuous Assessment* [30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

❖ **Suggested Readings:**

1. Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publications, New Delhi.
2. Cole, J.P. and King, C.A.M. (1969): *Quantitative Geography (Techniques and Theories in Geography)*, John Wiley & Sons Ltd., London.
3. Gibbs, J. (1961): *Urban Research Methods*. East-West Press Pvt Ltd. New Delhi
4. Glasson, J. (1975): *An Introduction to Regional Planning*. Hutchinson and Co., London
5. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): *Fundamental of Statistics* (Volume One and Two), The World Press Private Limited, Kolkata.
6. Lillesand, T.M. and Kiefer, R. W. (1994): *Remote Sensing and Image Interpretation*. 3rd edition, John Wiley and Sons, New York
7. Mahmood, A. (1998): *Statistical Methods in Geographical Studies*, Rajesh Publication.
8. Malhotra, O.P. and Gupta, S.K. (1990): *Elementary Statistics*, S. Chand & Company Ltd., New Delhi.
9. Mandal, R.B. (1989): *Statistical Techniques for Social Scientist*. Concept Pub. Co., New Delhi
10. Markandey, K., & Simhadri, S. (2009). *Urban Environment and Geoinformatics*. Jaipur: Rawat Publication.
11. Pacione, Micheal, (2001): *Urban Geography*, Routledge, London.
12. Pal, S.K. (1999): *Statistics for Geoscientists*, Concept publishing Company, New Delhi. Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, Hyderabad
13. Raza, M., & Aggarwal, Y. (1999). *Transport Geography of India*. New Delhi: Concept Publishing Company.
14. Taafee, E. J., & Gauthier, H. L. (1973). *Geography of Transportation*. New Delhi: Prentice
15. Toyne, P. and Newby, P. (1971) *Techniques in Human Geography*. Macmillian, London
16. Vishwanadhan, G. (ed) 1986: *Readings in Urban Structure of India*. Ajanta Publications, Delhi.



**Department of Geography  
Kazi Nazrul University**

**Semester - III**

**(MSCGEOGMIE301: Minor Elective-2, Theoretical)**

**Geography of Tourism: Special Reference to India**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. *Get to learn the conceptual foundation of tourism as a discipline of geography.*
2. *Trace the importance of a location to be a potential space for the development of tourism as an industry.*
3. *It gives a sense of development when infrastructure and buildings are made to attract the tourist and to protect the places having scenic beauties.*
4. *Get to learn the places having importance from tourism point of view in India and to think for plans from management perspective.*

**Unit-1: Basic Concepts of Geography of Tourism**

**[10 Marks]**

1.1 Concepts, Scope, Nature and issues of Tourism, Recreation and Leisure inter-relation; Geographical Parameters of Tourism. Factors influencing tourism: historical, natural, sociocultural and economic.

1.2 Types of Tourism: Ecotourism, Cultural Tourism, Adventure Tourism, Medical Tourism, pilgrimage, International, National. (Case studies from India).

**Unit-2: Factors and Impact of Tourism**

**[10 Marks]**

2.1 Spatial pattern of tourism in India: Spatial affinity; areal and locational dimensions comprising physical, cultural, historical and economic; Role of international tourist organizations and travel agents in Indian Tourism Industry.

2.2 Motivation of Tourism; Impact of tourism: physical, economic and social and perceptive (positive and negative impacts).

**Unit-3: Infrastructure and capital in tourism Industry**

**[10 Marks]**

3.1 Tourism circuits- short and longer duration - agencies and intermediaries - Indian hotel Industry, Infrastructure and support system- accommodation and supplementary accommodation; other facilities and amenities.

3.2 Recent trends in tourism, role of foreign capital and impact of globalization on tourism in India.

**Unit-4: Tourist attractions in India**

**[10 Marks]**

4.1. Tourism in India: Tourism Infrastructure; Regional dimensions of tourist attraction; case studies of Dal Lake, western Ghat, Himalaya, Desert, and coastal Areas, plateaus. Likelihood to travel International travel destinations of Indian citizens.





4.2 Environmental laws and tourism: current trends, spatial patterns and recent changes;  
Promotion of Tourism- National tourism policy.

*Continuous Assessment*

[10 Marks]

*(Method of internal assessment is consisting of Term Paper on any case study. The size of the project report may be between 15 and 20 pages)*

✧ **Suggested Readings:**

1. Ateljevic, I., Pritchard, A. and Morgan, N. (2007): *The Critical Turn in Tourism Studies: Innovative Research Methodologies*, Elsevier.
2. Beeton, S. (2006): *Community Development through Tourism*, Landlinks Press.
3. Buckley, R. (2009): *Ecotourism: Principles and Practices*, CABI.
4. Butler, R. and Hinch, T. (2007): *Tourism and Indigenous Peoples*, Taylor and Francis.
5. Hall, C.M. and Higham, J. (2005): *Tourism, Recreation and Climate Change*, Channel View Publications.
6. Cooper, C. and Hall, C.M. (2008): *Contemporary Tourism: An International Approach*, Butterworth-Heinemann.
7. Fennell, D.A. and Malloy, D.C. (2007): *Codes of Ethics in Tourism: Practice, Theory and Synthesis*, Channel View Publications.
8. Gössling, S. and Hall, C.M. (2006): *Tourism and Global Environmental Change: Ecological, Social, Economic and Political Interrelationships*, Routledge.
9. Hall, C.M. and Page, S.J. (2014): *The Geography of Tourism and Recreation: Environment, Place and Space*, Taylor & Francis.
10. Hudman, L.E. and Jackson, R.H. (2003): *Geography of Travel and Tourism*, Thomson/Delmar Learning.
11. Jafari, J. (2003): *Encyclopedia of Tourism*, Routledge.
12. Jansen-Verbeke, M., Priestley, G.K. and Russo, A.P. (2008): *Cultural resources for tourism: patterns, processes and policies*, Nova Science Publishers.
13. Knudsen, D.C. (2008): *Landscape, Tourism, and Meaning*, Ashgate Publishing.
14. Lew, A., Hall, C.M. and Timothy, D.J. (2008): *World Geography of Travel and Tourism: A Regional Approach*, Elsevier Science.
15. Lew, A.A., Hall, C.M. and Williams, A.M. (2008): *A Companion to Tourism*, Wiley.
16. Lovelock, B. (2008): *Tourism and the Consumption of Wildlife: Hunting, Shooting and Sport Fishing*, Routledge.
17. Mathur, R. (2007): *International Tourism*, ABD Publishers.
18. Department of Tourism (2002): *National Tourism Policy*, Ministry of Tourism and Culture, Govt. of India.
19. Newsome, D., Dowling, R.K. and Moore, S.A. (2005): *Wildlife Tourism*, Channel View Publications.
20. Pearce, D.G. and Butler, R. (1999): *Contemporary Issues in Tourism Development*, Routledge.
21. Scott, D., Hall, C.M. and Gössling, S. (2012): *Tourism and Climate Change: Impacts, Adaptation and Mitigation*, Taylor & Francis.
22. Scott, N., Cooper, N.S.R.B.C. and Baggio, R. (2008): *Network Analysis and Tourism*, Channel View Publications.
23. Sharma, K.K. (2005): *Tourism and Development*, Sarup & Son.
24. Spirou, C. (2011): *Urban Tourism and Urban Change: Cities in a Global Economy*, Taylor & Francis.
25. Tribe, J. (2009): *Philosophical Issues in Tourism*. Channel View Publications
26. Wearing, S. and Neil, J. (2013): *Ecotourism*, Taylor & Francis.
27. Williams, S. (2009): *Tourism Geography: A New Synthesis*, Taylor & Francis.





Department of Geography  
Kazi Nazrul University

Semester - III

(MSCGEOGMIE302: Minor Elective-2, Theoretical)

**Disaster Management**

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

After completion of this course, students will be able to –

1. Understand the foundations of hazards, disasters and associated natural, anthropogenic and social phenomena.
2. Develop an idea about factors, consequences and management of earthquake, landslide, flood and riverbank erosion, drought, accidental release of toxic chemicals and nuclear fallouts.
3. Get idea about the human assistance before and after disaster.
4. Identify the role of local peoples, NGOs, police, army, paramilitary forces in disaster management
5. Acquire knowledge about Hazard/ mapping techniques and mitigation methods.

**Unit-1: Understanding Disasters**

[10 Marks]

1.1 Definition, concept and Classification of hazards and disasters.

1.2 Risk and Vulnerability: concept, analysis and reduction.

**Unit-2: Types of Disasters**

[10 Marks]

2.1 Causes, impact, Distribution, and mapping and mitigation of Natural Hazards: Earthquake and Tsunami, Landslides.

2.2 Cause, impact, Distribution and mapping and mitigation of manmade disasters: Soil erosion, accidental release of toxic chemicals, Nuclear Fallouts.

**Unit-3: Disasters Preparedness**

[10 Marks]

3.1 Emerging approaches to Disaster Management: (a) Pre-disaster phase Preparedness. (b) Syn- Disaster phase Training. (c) Post Disaster phase. Role of Geospatial technology in Disaster management.

3.2 Role of NGOs and organizations (national and international) in Disaster management. (UNDMT, NDMA and NIDM).

**Unit-4: Climate Change and its impacts on Disasters in Rural-Urban Scenarios**

[10 Marks]

4.1 Rural Livelihood Management: case studies of Droughts in India.

4.2 Rainfall and Flood Disasters in Indian Cities.

**Continuous Assessment**

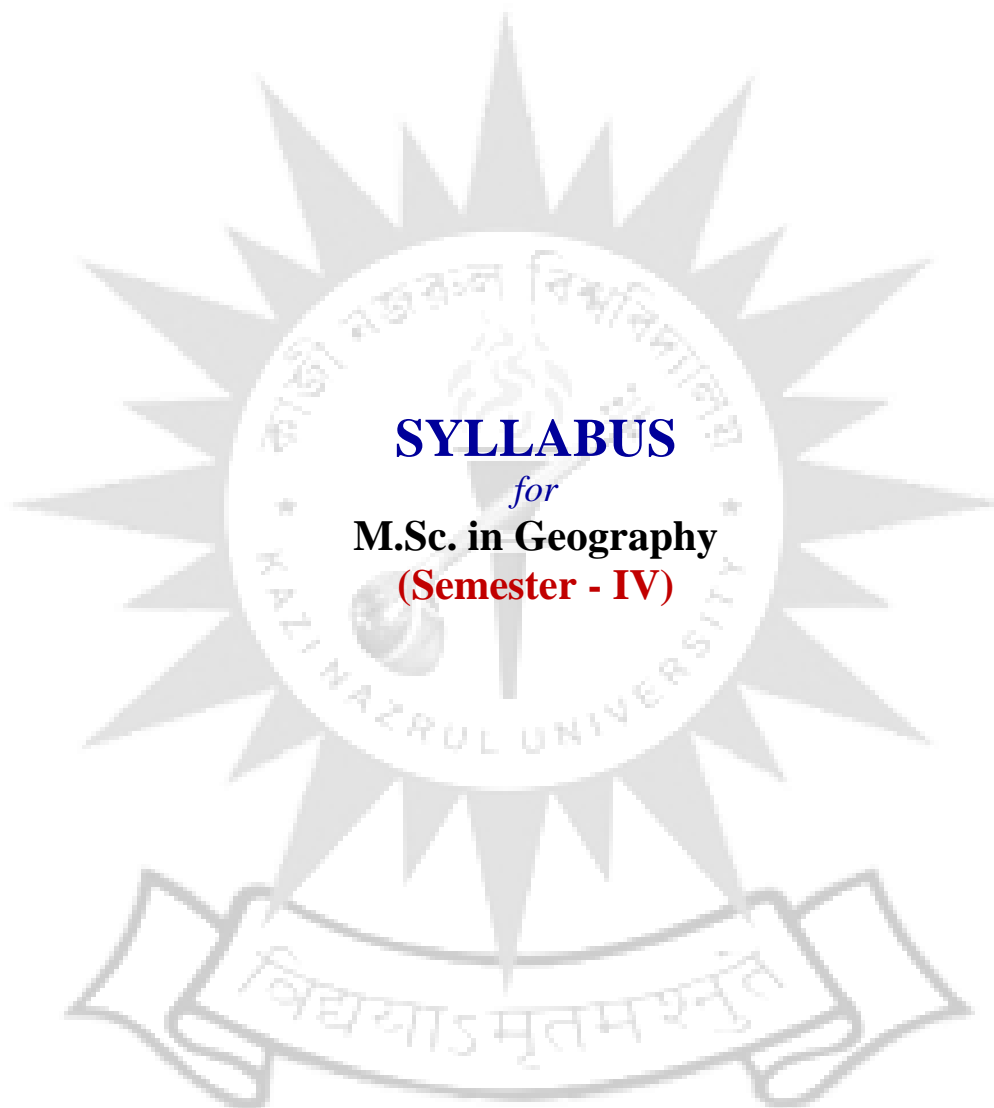
[10 Marks]

(Method of internal assessment is consisting of Term Paper on any case study. The size of the project report may be between 15 and 20 pages)



❖ Suggested Readings:

1. Alexander, D. (1993): *Natural Disasters*, ULC press Ltd, London.
2. Alexander, D. (2000): *Introduction in Confronting Catastrophe*, Oxford University Press.
3. Carter, W.N. (1991): *Disaster Management: A Disaster Management Handbook*, Asian Development Bank, Bangkok.
4. Chakrabarty, U.K. (2007): *Industrial Disaster Management and Emergency Response*, Asian Books Pvt. Ltd., New Delhi.
5. Coch, N.K. (1994): *Geohazards: Natural and Human*, Prentice-Hall, Englewood Cliffs.
6. David, A. (1993): *Natural Disaster*, UCC Press, London.
7. Mishra, A. (2012): *New Dimensions of Disaster Management in India: Perspectives, Approaches and Strategies* (Set of 2 Volumes), Serials Publications, New Delhi.
8. Nasios, A.S. (1990): Disaster Mitigation and Economic Incentives. In: *Colloquium on the Environment and Natural Disaster Management*, The World Bank, Washington, D.C.
9. Nishith, R. and Singh, A.K. (2012): *Disaster Management in India: perspectives, issues and strategies*, New Royal Book Company, Lucknow.
10. Parasuraman, S and Unnikrishnan, P.V. (ed.) (2000): *India Disasters Report towards a policy initiative*. Oxford.
11. Sahni, P. *et al.* (eds.) (2002): *Disaster Mitigation Experiences and Reflections*, Prentice Hall of India, New Delhi.
12. Sharma, V.K. (1999): *Disaster Management*, National Centre for Disaster management, IIPPE, New Delhi.
13. Smith, K. (1992): *Environmental Hazards: Assessing Risk and Reducing Disaster*, Routledge, London.
14. Taori, K. (2005): *Disaster Management through Panchayati Raj*, Concept Publishing Company, New Delhi.
15. United Nations Disaster Relief Organization (1978): *Disaster Prevention and Mitigation: A Compendium Of Current Knowledge*, United Nations New York.
16. Wijkman, A. and Timberlake, L. (1988): *Natural Disasters: Acts of God, or Acts of Man*, Earthscan, London.



**SYLLABUS**  
*for*  
**M.Sc. in Geography**  
**(Semester - IV)**



Department of Geography  
Kazi Nazrul University

Semester - IV

(MSCGEOGC401: Core Course-15, Theoretical)

**Historical and Political Geography**

◇ Full Marks: 50

◇ CA+ESE Marks: 10+40

◇ Credit: 4

◇ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

1. Understand the Nature, scope and content and evolution of Historical and Political Geography.
2. Study of historical geography in India.
3. Get knowledge of Geopolitical theories and learn basic concept of Electoral Geography and Political Ecology
4. Identify the necessity of political and economic blocks all over the world.

**GROUP-A: HISTORICAL GEOGRAPHY**

Unit-1: Historical Geography: Conceptual Issues

[10 Marks]

1.1 Development of Historical Geography as a discipline; From Historical Geography to Historiography.

1.2 Sources of Historical Geography and cartographic materials; Elements of Historical Geography and travel literature: Hiuen Tsang, Ibn-E-Batuta, Barnier

Unit-2: Historical Geography of India

[10 Marks]

2.1 Development of the identity of India: Pilgrimage, population dynamics and sacred space; India in Mughal Period: Territorial Administration and Revenue Collection.

2.2 Colonial India: Plantation Farming; Trade and Transport; Independent India: State Reorganization and Industrialization.

**GROUP-B: POLITICAL GEOGRAPHY**

Unit-3: Concepts of Political Geography

[10 Marks]

3.1 Nature, scope and content, relationship with Political Science, Political Geography in the era of Globalisation; Concept of Geo-Politics and evolution of Geo-strategic views.

3.2 Concept of State, Nation and Nation State; Frontiers and Boundaries; Geopolitical Theories - Mackinder and Spykman. Electoral Geography: overview of models; Political ecology: tragedy of commons.

Unit-4: Politics of World Resources

[10 Marks]

4.1 Politics of World Energy Resources: Petroleum and Nuclear. Political and Economic blocs.

4.2 Bases of Re-organization of Indian states since Independence; India: Federalism, SAARC and BRICS.



❖ **Suggested Readings:**

1. Ali, S.M. (1966): The Geography of the Puranas, People's Publishing House, Delhi.
2. Baker, A.R.H (ed.) (1972): Progress in Historical Geography, David and Charles.
3. Tamaskar, B.G. (1985): Contributions to Historical Geography of India, Inter-India Publications, New Delhi.
4. Roberts, P.E. (1995): Historical Geography of India, Vol. I and II, Printwell, Jaipur.
5. Pacione, M. (1987): Historical Geography: Progress and Prospect, Croom Helm, London.
6. Butin, R.A. (1993): Historical Geography: Through the Gates of Space and Time, Edward Arnold, London.
7. Agnew, John (1997): Political Geography: A Reader, Arnold, London.
8. Adhikari, Sudeepta (2002): Political Geography, Rawat Publications, New Delhi.
9. Pounds, Norman J.G. (1963): Political Geography, McGraw Hill Book Company.
10. Husain Majid (1994): Political Geography, Anmol Publications Pvt. Ltd.
11. Cox, Kevin R. (2002): Political Geography: Territory, State, and Society, Blackwell Publishers, Oxford.
12. Dixit, R.D. (2000): Political Geography: The Spatiality of Politics, New Delhi, Tata McGraw Hill Publishing Co.Ltd.
13. Johnston, R.J., Taylor, P.J. and Watts, M.J. (eds.) (1995): Geographies of Global Change: Re-mapping the World in the Late Twentieth Century, Blackwell, Oxford.
14. Taylor, P.J. and House, J. (1984): Political Geography: Recent Advance and Future Direction, Crom Helm, Kent.

**Semester – IV**

**(MSCGEOGC402: Core Course-16, Theoretical)**

**Contemporary Issues in Geography**

❖ **Full Marks: 50**

❖ **CA+ESE Marks: 10+40**

❖ **Credit: 4**

❖ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

*After completion of this course, students will be able to –*

1. *Learn concept of Development.*
2. *Get familiar with concept of GNP,GDP, Gross Happiness Index (GHI),HDI and GEM*
3. *Identify the constraints of Human Development and get knowledge about fertility, morbidity and mortality and expectancy of life.*
4. *Acquire knowledge about some Contemporary Geographical Issues in India such as impact assessment of big dams and mining, Joint forest management, white and green revolution etc.*
5. *Learn some important Contemporary Geographical Issues in West Bengal.*



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### Unit-1: Economic Development

[10 Marks]

1.1 Concept of Development and Basic indicators of economic development.

1.2 Concepts of GNP, GDP of New World and Third World. Gross Happiness Index.

### Unit-2: Human Development

[10 Marks]

2.1 Basic indicators of human development; Disparities in Human Development. Concept of Gender Empowerment Ratio (GEM)

2.2 Demographic constraints: Significance of high fertility, morbidity and mortality, low expectancy of life.

### Unit-3: Contemporary Geographical Issues in India

[10 Marks]

3.1 Large Scale Development Projects and Impact: (Big Dams and Mining); Forest Policies and Forest People; Success and Failure of Forest Management.

3.2 Green Revolution and White Revolution: Social and Ecological Consequences.

### Unit-4: Contemporary Geographical Issues in West Bengal

[10 Marks]

4.1 Contamination of Ground Water in West Bengal: Arsenic and Fluoride; Tribal Development in Western Plateau and its Fringe Areas of West Bengal

4.2 Conflicting Issues in Sundarban Region: Human Ecosystem vs. Natural Ecosystem; Agriculture in Eastern Bardhaman District and Mining in Western Bardhaman District.

### *Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

### ❖ Suggested Readings:

1. Agarwal, A.N. (1995): Indian Economy, Problems of Development and Planning, Vishwa Prakashan, New Delhi.
2. Misra, S.K, and Puri, V.K. (1997): Indian Economy, Himalaya Publishing House, Mumbai.
3. Adams, W.M. (1995): Green Development: Environmental Sustainability in the Third World, Routledge, London.
4. Alexander, D. (1993): Natural Disasters, Research Press, New Delhi.
5. Acharya S.S., Singh S. and Sagar V. (2005): Sustainable Agriculture Poverty and Food Security, Rawat Publication
6. Dasgupta P. (1996): An enquiry into Wellbeing and distribution. Clarendon Press, Oxford.
7. Raza, M. (1992): Development and Ecology, Rawat Publication.
8. Smith, D.M. (1980): Human Geography: a Welfare Approach, Edward Arnold.
9. Chandra R.G., Tribal development in India: the contemporary debate, Sage New Delhi



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10. Smith, K, Environmental hazards: assessing risk and reducing disaster, Routledge London
11. Desai Vasant: Forest management in India-issues and problems, Himalaya Publishing House Bombay.
12. Swaminathan, S. (2007): Agriculture cannot wait, Academic Foundation, New Delhi.
13. Jain P.C. (2001): Globalization and tribal economy, Rawat.
14. Shaw R and Krishnamurthy R.R. (2009): Disaster: Global challenges and local solutions, University Press.
15. Newson, M. (2009): Land, Water and Development, Routledge.
16. Social forestry in India (1984): Birla Institute of Scientific Research, Radiant Publisher.
17. Sharma, T.C. and Coutinho, O. (1989): Green Revolution Gaps, Rawat.

**Semester - IV**

**(MSCGEOGC403: Core Course-17, Theoretical)**

**Regional Planning and Research Methodology in Geography**

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

1. Get to learn the methodological foundation and the importance of planning at varied level.
2. Trace the linkages of planning with the regional development.
3. Come to know the conceptual and theoretical bases of doing scientific research.
4. Enhance the understanding towards framing and testing the hypothesis in producing scientific knowledge.

**GROUP-A: REGIONAL PLANNING AND DEVELOPMENT**

**Unit-1: Regional Planning: Concepts and Methods**

**[10 Marks]**

1.1 Concept, Scope and Approaches of Regional Development and Planning. Multi-level planning in India. Need for regional planning in India. Metropolitan Region: Concept and Structure; Metropolitan Regions of India. Multi-Nuclei Development and Functional Inter-linkages.

1.2 City Region in Regional Planning. Decentralized Planning and People's Participation in planning process. Theories and Models of Regional Development: Growth Pole, Cumulative Causation and Core periphery.

**Unit-2: Strategies for Regional Development**

**[10 Marks]**

2.1 Regional Inequality, Regional Disparity and Regional Diversity in India. State as a Planning unit; Criteria for dividing a State into Planning Region: West Bengal as a case study.

2.2 Regional planning in India: Metropolitan planning (NCR), Tribal Regions (Bastar), River





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Valley Region (Damodar Valley Region). Special Economic Zones with special reference to West Bengal.

### **GROUP-B: RESEARCH METHODOLOGY**

#### Unit-3: Introduction to Research Methodology [10 Marks]

3.1 Concepts and Significance of Research in Geography; Objectives and Types of Research. Approaches to Research in Geography: Philosophy-Empiricist, Positivist and Post-Positivist; Methods- Inductive and Deductive; Analysis- Descriptive and Analytical.

3.2 Nature and Sources of data; Preparation of Data - Data Recording and Coding, Treatment of Missing Data; Types of Survey - Preparation of Questionnaires and Survey Schedule. Identification of a Research Problem, Research Questions and Hypothesis Building.

#### Unit-4: Research Design and Findings [10 Marks]

4.1 Research Design: Need for Research Design, Important Concepts, Different Research Design. Qualitative and Quantitative research methods, Scaling Techniques, Sampling Design.

4.2 Data Management: Collection, Reliability and Authenticity; Processing and Analysis of Data, Hypothesis testing: t-test, z-test and  $\chi^2$ -test. Methods of Manuscript Writing and Scientific Drafting of Dissertation, Methods of Citation, Referencing and Bibliography

*Continuous Assessment* [10 Marks]  
(The department shall decide the methods of internal assessment)

#### ❖ Suggested Readings:

1. Agarwal, A.N. (1995): Indian Economy, Problems of Development and Planning, Vishwa Prakashan, New Delhi.
2. Ahuja, R. (2001): Research Methodology, Rawat Publication, Kolkata.
3. Boudeville, J.R. (1966): Problems of Regional Economic Planning, Edinburgh University Press, Edinburgh.
4. Chand, M. and Puri, V.K. (1983): Regional Planning in India, Allied Publishers, New Delhi.
5. Chandrasekhara, C.S. and Sundaram, K.V. (1968): Metropolitan Centres and Regions in India, 21st International Geographical Congress, Metropolitan Growth and Planning.
6. Chandrasekhara, C.S. and Sundaram, K.V. (1968): Planning Regions in India, Town and Country Planning Organisation (mimeo).
7. Chitambar, J.B. (1993): Introductory Rural Sociology, Wiley Eastern, New Delhi.
8. Das, D.L. (2000): Practice of Social Research, Rawat Publication, New Delhi.
9. David, F.E. (2000): Scientific Method for Ecological Research, Cambridge, U.K.
10. Dickinson, J., Gould, B., Clarke, C., Mather, S., Prothero, M., Siddle, D., Smith, C. and Thomas-Hope, E. (1996): A Geography of the Third World, 2nd edition, Routledge, London.
11. Dickinson, R.E. (1964): City and Region: A geographical interpretation, Routledge and Kegan Paul Ltd., London.
12. Goomen, M.A. and Datta, A. (1995): Panchayats and their Finance, Rawat Pub. Co., New Delhi.
13. Harper, C., and Marcus, R. (2007): Research for Development: A Practical Guide, Vistaar Publication, New Delhi.
14. Institute of Social Sciences (1994): Decentralised Planning and Panchayati Raj, Rawat Pub. Co., New Delhi.



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15. Kothari, C. (2009): Research Methodology: Methods and Techniques, New Age International Publishers, Kolkata.
16. Mandal, R.B. (1988): Systems of Rural Settlements in Developing Counties, Concept Pub. Co., New Delhi.
17. Matthews, A. (1994): Panchayati Raj: From Legislation to Movements, Rawat Pub. Co., New Delhi.
18. Matthews, G. (editor) (1995): Status of Panchayati Raj: 1994, Institute of Social Sciences. Rawat Pub. Co., New Delhi.
19. Misra, H.M. (ed.) (1987): Contributions to Indian Geography, Volume 9: Rural Geography, Heritage Pub., New Delhi.
20. Misra, R.P. (1969): Regional Planning: Concepts, Techniques, Policies and Case Studies, Concept, New Delhi.
21. Ray Chaudhuri, J. (2001): An Introduction to Development and Regional Planning, Orient Longman, Kolkata.
22. Singh, R.L. (editor) (1971): India: A Regional Geography, National Geographical Society of India, UBS Pub.Distributors Ltd., New Delhi.
23. Spate, O.H.K. and Learmonth, A.T.A. (1967): India and Pakistan, 3rd edition, Munshiram Monoharlal Pub. Pvt.Ltd., New Delhi.

### Semester - IV (MSCGEOGC404: Core Course-18) Dissertation

✧ Full Marks: 50

✧ CA+ESE Marks: 30+20

✧ Credit: 4

#### Course Learning Outcomes:

1. Learn the skill in finding and drafting a research problem.
2. Become familiar with the scientific terminologies and concepts needed for conducting a scientific research.
3. Develop the skill of scientific writing and proficiency in presenting the research outcome.

### Dissertation and Seminar Presentation

The dissertation will be evaluated based on (a) written report and (b) seminar presentation the internal assessment for Dissertation on (a)written report will be of 20 marks and (b)seminar presentation of 10 marks. End semester evaluation for Dissertation on (a)written report will be of 10 marks and (b)seminar presentation of 10 marks.

1. Preparation of report mainly based on primary data and field work.
2. Seminar and presentation.
3. Evaluation of report.
4. Viva-voce on report.

The dissertation on respective special paper will be a solely individual comprehensive work based on conceptual aspects, field work analysis of primary and secondary data in the laboratory. It should mention the objectives, sources of information, methods and approaches. Interrelations between different aspects of the study should be the focus of the term paper.

Text of the report should not exceed 10,000 words and should ideally be divided into the following sections:

- ◆ Introduction ◆ Statement of problem (s) and Objectives ◆ Information and Analysis



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◆ Results ◆ Discussions ◆ Conclusions ◆References / Bibliography and ◆ Appendices (if any).

Maps, diagrams and sketches, excluding photographs, should not exceed 30 pages of A4 size paper. Each of the dissertations is to be produced individually by the students and this must be stated clearly in a certificate from the supervisor(s). Photocopying and/or bulk computer typing are not to be allowed in any form.

**Semester - IV**

**(MSCGEOGMJE401: Major Elective-3, Theoretical)**

**Advanced Geomorphology - III**

✧ Full Marks: 50

✧ CA+ESE Marks: 10+40

✧ Credit: 4

✧ End Sem Exam Duration: 2 Hours

**Course Learning Outcomes:**

After completion of this course, students will be able to –

1. Understand and give explanation how the endogenic and exogenic interactions shape landforms and distinguish the mechanisms that control these processes.
2. Gain knowledge about the techniques for Sediment dating.
3. Understand some basic concept of process geomorphology.
4. Apply geomorphological knowledge to different resolve realistic problems.

**Unit-1: Endogenic-exogenic interactions in Geomorphology**

[10 Marks]

1.1 Rates of uplift and denudation. Tectonics and drainage development (active and passive tectonic controls). Time-dependent and time-independent landforms.

1.2 Impact of Quaternary climate change on landform evolution. Sea-level change and landform development.

**Unit-2: Adjustments in Geomorphic System**

[10 Marks]

2.1 2.1 Rates and changes in surface processes: techniques for process measurement and dating of sediment (Palaeomagnetism, Cosmogenic nuclides, Luminescence and  $^{14}\text{C}$  dating).

2.2 2.2 River response to climate, tectonics and human disturbance. Human impacts on landforms during Anthropocene

**Unit-3: Process Geomorphology**

[10 Marks]

3.1 Bedrock channels: Stream Power law and Bedrock incision process. Coastal morphodynamic variables and their influence on evolution of coastal forms. Classification and evolution of periglacial landforms.

3.2 The geomorphology of the World's Largest Floods. Planetary geomorphology with special reference to Moon and Mars.



**Unit-4: Applied Geomorphology**

[10 Marks]

4.1 Quantitative Geomorphology: Geomorphological mapping and geomorphometry; DEM and digital geomorphometry, Fractals in Geomorphology.

4.2 Applied geomorphology in coastal-zone management; Urban Geomorphology: applications of geomorphology in urban planning; Geoheritage and Geomorphosites.

*Continuous Assessment*

[10 Marks]

*(The department shall decide the methods of internal assessment)*

❖ **Suggested Readings:**

1. Anderson, R.S. and Anderson, S.P. (2010): Geomorphology: The Mechanics and Chemistry of Landscapes, Cambridge University Press, Cambridge.
2. Brown, A.G. (1997): Alluvial Geoarchaeology: Floodplain Archaeology and Environment Change, Cambridge University Press, Cambridge.
3. Chorley, R., Schumm, S. and Sugden, D.E. (1994): Geomorphology, Methuen, London.
4. French, H.M. (2007): The Periglacial Environment, Third Edition, John Wiley & Sons, Ltd.
5. Goswami, A.B. (2010): Principles of Quaternary Geology and Environment Study (Concept, Methodology and Technique), Books Way, Kolkata.
6. Goudie, A.S. and Viles, H.A. (2016): Geomorphology in the Anthropocene, Cambridge University Press, UK.
7. Gupta, A. (2011): Tropical Geomorphology, Cambridge University Press, New York.
8. Gutierrez, M. (2013): Geomorphology, CRC Press, Boca Ranton, Florida.
9. Kale, V.S. (eds.) (2017): Atlas of Geomorphosites in India (Glimpses of India's incredible Geodiversity and Geoheritage, Indian Institute of Geomorphologists (IGI).
10. Kale, V.S. and Gupta, A. (2001): Introduction to Geomorphology, Orient Longman, Kolkata.
11. Ollier, C.D. (1981): Tectonics and Landforms, Longman Group Ltd., London.
12. Richards, K. (1982): Rivers: Form and processes in alluvial channels, Methuen, London.
13. Shroder, J. (eds.) (2013): Treatise on Geomorphology, Elsevier.
14. Summerfield, M.A. (1991): Global Geomorphology: An Introduction to the Study of Landforms, Longman, London.
15. Wallace-Murray, CV. and Woodroffe (2014): Quaternary Sea-Level Changes: A Global Perspective, Cambridge University Press, New York.



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**Semester - IV**

**(MSCGEOGMJE402: Major Elective-4, Practical)**

**Advanced Geomorphology - IV**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 30+20**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

*After completion of this course, students will be able to –*

1. *Acquire knowledge of Mapping and Clustering through Principal Component Analysis.*
2. *Learn selected Quantitative techniques such as Interpolation and Extrapolation: Newton, Lagrange and Binomial Method, Gravity model etc.*
3. *Develop skill of map making using software.*
4. *Learn techniques regarding extraction of drainage network from DEM*
5. *Identify Identification of coastal features using topographical maps/ satellite images.*

**Unit 1: Multivariate Statistics and Advanced Statistical Techniques in Geomorphology**

**[15 Marks]**

1.1 Mapping and Clustering through Principal Component Analysis (PCA); Discriminant and Cluster analysis.

1.2 Introduction of Canonical Correlation; Use of dummy variable and Logistic Regression; System Component Growth.

1.3 Interpolation and Extrapolation: Newton, Lagrange and Binomial Method; Mean centre of population and its shift over time; Population Potential by Gravity model.

1.4 Shortest Path Analysis: Transport and Allocation Problems; Trend Surface Analysis (TSA): computation of linear trend and ideas of quadratic and cubic surfaces.

**Unit 2: Flood analysis and Mapping techniques in Geomorphology**

**[15 Marks]**

2.1 Computation and preparation of Annual hydrograph; Computation of Runoff Co-efficient; Flow Duration Curves; Rating curves.

2.2 Estimation of shear stress and unit stream power; Analysis of Flood Frequency and Recurrence Interval: Weibull (1939) and Gumbel (1941) methods.

2.3 Interpretation of geological maps of India (Scale: 1:250,000). Preparation of geomorphic maps of fluvial features from field data and satellite images using standard symbols and colours and their interpretation. Flood hazard mapping using satellite images and interpretation (using Software).

2.4 Extraction of drainage network from DEM, catchment demarcation and stream ordering, extraction and mapping of morphometric parameters. Temporal analysis of channel shifting and planform dynamics using geoinformatics (using Software). Identification of coastal features using topographical maps/ satellite images and geomorphic mapping of coastal features (using Software).



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In the End Semester Examination, students have to answer one compulsory question from the above two Units.

*Viva-voce*

[5 Marks]

*Continuous Assessment*

[30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

❖ **Suggested Readings:**

1. Doornkamp. J.C. and King C.A.M. (1971): Numerical Analysis in Geomorphology: An Introduction, St. Martin's Press, New York.
2. Dackombe, R.V. and Gardiner, V. (1983): Geomorphological Field Manual. George Allen and Unwin, London.
3. King, C.A.M. (1966): Techniques in Geomorphology, Edward Arnold, London.
4. Miall, A.D. (2006): The Geology of Fluvial Deposits (Sedimentary Facies, Basin Analysis, and Petroleum Geology), Springer.
5. Sengupta, S.M. (2010): Introduction to Sedimentology, Second Edition, CBS Publishers & Distributors Pvt. Ltd., New Delhi.

**Semester – IV**

**(MSCGEOGMJE403: Major Elective-3, Theoretical)**

**Environmental Issues in Geography - III**

❖ **Full Marks: 50**

❖ **CA+ESE Marks: 10+40**

❖ **Credit: 4**

❖ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. Enhance the knowledge towards understanding the global debate on SDGs and climate change.
2. Learn the significance behind the environmental movements in India towards preserving the natural resources and to protect the ecological stability.
3. Introduce them to the legal understanding of the existing policies, laws and protocol and to instil moral values, ethical practices to save the environment.

**Unit-1: Global Environmental Issues, Assessment and Management**

[10 Marks]

1.1 Environmental study of ecological history of human civilization. Concept of Sustainable Development. Environmental policies and laws with reference to Climate change, Earth summit, and Protocols (Kyoto and Montreal).

1.2 Environmental Impact Assessment (EIA); Case study of Big Dams and Environmental Management Plan (EMP); Case study of Chilka.

**Unit-2: Environment and Development debate in India**

[10 Marks]

2.1 Environmental Movement: Objectives, Dynamics, Importance and Ecological foundation of Chipko Movement, Silent Valley Project and Narmada Banchao Andolan (NBA).





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2.2 Anthropogenic Intervention on River Valley Planning: Case Study of Damodar River Valley (DVC) and Concept of Sustainable Development.

**Unit-3: Environmental Laws and Policies in India` [10 Marks]**

3.1 Environmental Ethics, Policies and Laws in India. Forest Policies: Social Forestry and Participatory Forest Management; Case Studies of JFM and Urban Forestry in West Bengal.

3.2 Policies and management of Wasteland –Case Studies from West Bengal. Wetland and Micro Watershed Management: Case Studies from West Bengal

**Unit-4: Urbanization and Environmental Issues in India [10 Marks]**

4.1 Impact of Industrialization and Urbanization on Air, Water, Land and Forests in modern times and their managements; Dam Failure.

4.2 Loss of Biodiversity with special reference to deforestation in Darjeeling Himalayas.

*Continuous Assessment [10 Marks]*

*(The department shall decide the methods of internal assessment)*

❖ **Suggested Readings:**

1. Adams, W.M. (1995): Green Development: Environmental Sustainability in the Third World, Routledge, London.
2. Alexander, D. (1993): Natural Disasters, Research Press, New Delhi.
3. Allaby, M. (1996): Basics of Environmental Science, Routledge, London.
4. Baarrsches, W.H. (1996): Eco-facts and Eco-fiction: Understanding the Environmental Debate, Routledge, London.
5. Blaikie, P., Cannon, T, Davis, I. and Wisener, (1994): At Risk: Natural Hazards, People's Vulnerability and Disasters, Routledge, London: 320p.
6. Bryant, E.A. (1991): Natural Hazards, Cambridge University Press, Cambridge.
7. Canter, L. W. (1996): Environmental Impact Assessment, 2nd edition, McGraw Hill, New York.
8. Chapman, D. (1994): Natural Hazards, Oxford University Press, Melbourne.
9. Chhatwal, G.R., Mensa, M.C., Satke, M., Katyal, T., Katyal, M., and Nagahiro, T. (1989): Environmental NoisePollution and its Control, Anmol Pub. Pvt. Ltd., New Delhi.
10. Colls, J. (1997): Air Pollution: An Introduction, E & FN Spon / Chapman and Hall, London.
11. Dasgupta, P. and Miller, K.G. (1997): The Environment and Emerging Development Issues, Volumes I and 2, Clarendon Press, Oxford.
12. Elsom, D.M. (1992): Atmospheric Pollution: A Global Problem, 2nd edition, Blackwell Pub. Co., London.
13. Falconer, R.A. and Goodwin, P. (editor) (1994): Wet and Management, Thomas Telford, London.
14. Farmer, A. (1997): Managing Environmental Pollution, Routledge, London.
15. Gilpin, A. (1996): Dictionary of Environment and Sustainable Development, John Wiley and Sons Ltd., Chichester.
16. Gilpin, A. (1997): Environmental Impact Assessment: Culling Edge for the Twenty-first Century, Cambridge





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University Press, Cambridge.

17. Goel, P.K. (1997): Water Pollution: Causes, Effects and Controls, New Age International (P) Ltd. Pub. New Delhi.
18. Goudie, A. (1986): The Human Impact on the Natural Environment, 2nd edition, Blackwell Pub. Co., London.
19. Marsh, W.M. and Grossa, J.M. (1996): Environmental Geography: Science, Landuse and Earth Systems, John Wiley and Sons Inc., New York.
20. Masters, G .M. (1991): Introduction to Environmental Engineering and Sciences, Prentice Hall India Ltd. New Delhi.
21. Middleton N. (1995): The Global Casino: An Introduction to Environmental Issues, John Wiley and Sons Inc., New York.
22. Park, C. (1998): The Environment: Principles and Applications, Routledge, London.
23. Pickering, K. and Owen, L.A. (1997): An Introduction to Global Environmental Issues, 2nd edition, Routledge, London.
24. Prabhakar, V.R. (1998): Social and Community Forestry, Indian Pub. Distribution, New Delhi.
25. Roberts, N. (editor) (1994): The Changing Global Environment, 3rd edition, Blackwell Pub. Co., London.
26. Singh, R.B. and Misra, S. (1996): Environmental Laws in India: Issues and Responses, Rawat Pub., New Delhi.
27. Valancy, F. and Bronstein, D.A. (1995): Environmental and Social Impact Assessment, John Wiley and Sons inc., New York.
28. Vogler, J. (1995): The Global Commons: A Regime Analysis, John Wiley and Sons Ltd., Chichester.
29. Wall, D. (1994): Green History: A Reader in Environmental literature, Philosophy and Politics, Routledge,London.
30. Wathern, P. (editor) (1988): Environmental Impact Assessment: Theory and Practice, Routledge, London.

### Semester - IV

**(MSCGEOGMJE404: Major Elective-4, Practical)**

## Environmental Issues in Geography - IV

❖ Full Marks: 50

❖ CA+ESE Marks: 30+20

❖ Credit: 4

❖ End Sem Exam Duration: 2 Hours

### Course Learning Outcomes:

1. Enhance the knowledge of mapping the physio-cultural environment, pollution zonation and soil quality estimation.
2. Get insights to map the local area and instill the skill of GIS and Statistics towards environmental monitoring and surveying.

### Unit 1: Multivariate Statistics and Advanced Statistical Techniques in Environmental Issues in Geography [15 Marks]

1.1 Mapping and Clustering through Principal Component Analysis (PCA); Discriminant and Cluster analysis.



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1.2 Introduction of Canonical Correlation; Use of dummy variable and Logistic Regression; System Component Growth.

1.3 Interpolation and Extrapolation: Newton, Lagrange and Binomial Method; Mean centre of population and its shift over time; Population Potential by Gravity model.

1.4 Shortest Path Analysis: Transport and Allocation Problems; Trend Surface Analysis (TSA): computation of linear trend and ideas of quadratic and cubic surfaces.

### Unit-2: Estimation, Environmental Survey and Mapping of Environmental Data [15 Marks]

2.1 Methods of study of Physical and Cultural Environment; Multivariate Estimation of environment from Geographical Data with t-test and  $\chi^2$  test; Mapping of Pollution Zones.

2.2 Estimation of Soil pH, organic carbon and nutrient concentration in soil (N, P, K).

2.3 Preparation and Interpretation of Environmental Maps from Cadastral Map/ Ward map; Spatial variation in Crime and Disease.

2.4 Environmental Mapping Techniques, Landuse and Landcover classification for Environmental Mapping. Mapping to correlate Physical and Social Environmental elements using GIS.

In the End Semester Examination, students have to answer one compulsory question from the above two Units.

*Viva-voce*

[5 Marks]

*Continuous Assessment*

[30 Marks]

(\*A Project File, comprising one exercise each is to be submitted)

### ❖ Suggested Readings:

1. Hammond, R. and McCullagh, P. (1991): Quantitative Techniques in Geography, Clarendon Press, Oxford
2. Mahmood, A. (1998): Statistical Methods in Geographical Studies, Rajesh Publication.
3. Monkhouse F.J. and Wilkinson, H.R. (1971): *Maps and Diagrams: Their Compilation and Construction*, B.I. Publications Private Limited, New Delhi.
4. Pal, S.K. (1999): Statistics for Geoscientists, Concept publishing Company, New Delhi.
5. Sarkar, A. (2015): *Practical Geography: A Systematic Approach*, 3rd Edition, Orient Blackswan Private Ltd.
6. Sarkar, A. 2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, Hyderabad.
7. Sen, A.K. (1995): *Laboratory Manual of Geology*, Modern Book Agency (P) Ltd., Kolkata.
8. Silk, J. 1(979): Statistical techniques in Geography, George Allen and Unwin, London.
9. United States Department of Agriculture (USDA) (2014): *Soil Survey and Laboratory Methods Manual*, Soil Survey Investigations Report No. 51.



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**Semester - IV**

**(MSCGEOGMJE405: Major Elective-3, Theoretical)**

**Urban Geography- III**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 10+40**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

*After completion of this course, students will be able to –*

- 1. Trace the trend in the migration pattern of population and societal changes over time.*
- 2. Learn to live and counter the problems emerged while be in an urban setting.*
- 3. Get an insight over the historical emergence of Indian cities and the phases of transition over time.*
- 4. Come to know the strategies and challenges of the policies and programme implemented for urban planning in India.*

**Unit-1: Migration and Urban change**

**[10 Marks]**

1.1 Impact of Rural to Urban, Urban to Rural and Urban to Urban migration on the socio-economic structure of a specific urban area; Gentrification-Concept and its impact, Typologies, and Theories

1.2 Social area analysis after Shevky and Bell, Residential Segregation and Factorial Ecology

**Unit-2: Urban Infrastructure and Urban Liveability**

**[10 Marks]**

2.1 Urban Housing and housing markets, Urban Transport and associated problems, Issues related to urban transport planning

2.2 Urban water crisis, sanitation and sewerage related problems in cities, Impact of air pollution and water pollution on urban health, Urban Crime

**Unit-3: Urbanization in India**

**[10 Marks]**

3.1. Histogenesis of Urbanization with special reference to India –Ancient, Medieval, Colonial Phases, Regional pattern of Urbanization in Post-colonial India

3.2 Functional classification of Indian cities, rural-urban transformation in India

**Unit-4: Urban Planning in India**

**[10 Marks]**

4.1 Urban planning in Five Year Plans of India with special reference to IDSMT, Urban poverty alleviation programmes in India

4.2. Analysis on Urban Housing Policies in India-its Problems and Prospects; Urban Renewal and Urban Redevelopment in India - Role of JNNURM; Smart cities and AMRUT.

*Continuous Assessment*

**[10 Marks]**

*(The department shall decide the methods of internal assessment)*



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### ✧ Suggested Readings:

1. Bhattacharya, B. (2006). Urban Development in India. New Delhi: Concept Publishing Company
2. Bird, James 1977: Centrality And Cities. Routledge, London
3. Carter, H. 1981: Urban Geography, 3rd edition Arnold-Heinemann, New Delhi.
4. Chakroborty, J., & Ghosh, P. (2007). Higher Algebra. kolkata: Un Dhur and Sons Pvt Ltd.
5. Das, A. K. (2007). Urban Planning in India. Jaipur: Rawat Publications.
6. Dave, M. (1991). Urban Ecology and Levels of Development. Jaipur: Rawat Publications .
7. Dickinson, R.E. (1968): City and Region: A Geographical Interpretation. Routledge and Kegam Paul Ltd. London.
8. Diddee, Jaymala (1997): Indian Medium Towns. Rawat Publications, Jaipur.
9. Ghosh, S. (1998): Introduction to Settlement Geography. Orient Longman Ltd., Calcutta
10. Gibbs.J(1961) : Urban Research Methods. East-West Press Pvt Ltd. New Delhi
11. Glasson,J.(1975): An Introduction to Regional Planning. Hutchinson and Co.,London
12. Hardoy, J. E., Mittin, D. & Satterthwaite, D. 1(992) : Environmental Problems in the World Cities. Earthscan Pub. Ltd. London.
13. Hudson, F.S. (1970): Geography of Settlements, Macdonald and Evans Ltd. PlymouthHerbert, David and Thomas, Colin, 1982: Urban Geography A First Approach,Jhon Wiley & Sons. New Delhi
14. Johnston .R.J (2000): The Dictionary of Human Geography.Blackwell. UK
15. Kaplan.D and Wheeler.J ( 2008):Urban Geography.John Wiley
16. Knox, P. (1982): Urban Social Geography. Longman Scientific and Technical, Harlow.
17. Law.N,Smith.D,(1991),Decision Making Geography. Stanley Thornes Pub. Ltd, Leckhampton
18. Lillesand, T.M. and Kiefer, R. W. (1994): Remote Sensing and Image Interpretation. 3rd edition, John Wiley and Sons, New York
19. Mandal, R.B. (2000): Urban Geography: A Textbook. Concept Pub. Co., New Delhi.
20. Mandal,R.B(1989):Staistical Techniques for Social Scientist. Concept Pub. Co., New Delhi
21. Markandey, K., & Simhadri, S. (2009). Urban Environment and Geoinformatics. Jaipur: Rawat Publication.
22. Mcdonnell, M. J., Halns, A. K., & Breste, J. H. (2009). Ecology of Cities and Towns. Cambridge University Press.
23. Misra. H. N. (ed) 1987: Contributions to Indian Geography. Volume 9: Rural Geography, Heritage Pub., New Delhi.
24. Mohan Sudha (2005): Urban Development and New Localism. Rawat Publications, Jaipur.
25. Pacione, Micheal, (2001): Urban Geography, Routledge, London
26. Naqvi, H. K. (1971). Urbanisation and UrbanCentres under the Great Mughals. Shimla: Indian Institute of Advance Studies .
27. Raza, M., & Aggarwal, Y. (1999). Transport Geography of India. New Delhi: Concept Publishing Company.
28. Ramachandran R. (1989): Urbanisation arid Urban Systems in India. Oxford University Press, New Delhi.
29. Rao, R. Rammohan and S. Simhadri (1999): Indian Cities: Towards Next Millenium, Rawat Publications, Jaipur.
30. Ray Chaudhuri,Jayasri(2001): An Introduction to Development and Regional Planning. Orient Longman,Kolkata
31. Sharma, R.N. and K. Sita (2001): Issues in Urban Development. Rawat Publications, Jaipur.
32. Short, J. R. (1984). An Introduction to Urban Geography. London: Routledge and Keygen Paul.
33. Singh, A. K. (1990). Urbanisation and Administration of Urban Infrastructure. New Delhi: Inter-India Publications.
34. Singh, R.L. et. al. (ed) (1976): Geographic Dimensions of Rural Settlements. National Geographical Society of India, Varanasi.
35. Singh, R. Y. (1994): Geography of Settlements, Rawat Pub. Co., New Delhi.
36. Singh, Ravinder Sandhu (ed) 2003:Urbanisation in India. Sage Publications, New Delhi.
37. Taylor, Griffith (1949): Urban Geography, Methuen and Co. Ltd., London.
38. Tewari, V. Weinston, J. and Prakash Rao, V.L.S. (1986): Indian Cities: Ecological Perspectives. Concept Pub. Co., New Delhi.
39. Thudipara, Jacob Z. (2007): Urban Community Development. Rawat Publications, Jaipur.
40. Toyne.P and Newby.P(1971)Techniques in Human Geography. Macmillian, London
41. Vishwanadhan, G. (ed) 1986: Readings in Urban Structure of India. Ajanta Publications, Delhi.
42. Taafee, E. J., & Gauthier, H. L. (1973). Geography of Transportation. New Delhi: Prentice



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**Semester – IV**

**(MSCGEOGMJE406: Major Elective-4, Practical)**

**Urban Geography- IV**

✧ **Full Marks: 50**

✧ **CA+ESE Marks: 30+20**

✧ **Credit: 4**

✧ **End Sem Exam Duration: 2 Hours**

**Course Learning Outcomes:**

1. *Become familiar with the field techniques while conducting a study over urban setting.*
2. *Learn the tools and methods of mapping the urban neighbourhood through primary survey.*
3. *Enhance the knowledge of using satellite data for a spatial analysis of urban areas.*

**Unit 1: Multivariate Statistics and Advanced Statistical Techniques in Environmental Issues in Geography [15 Marks]**

1.1 Mapping and Clustering through Principal Component Analysis (PCA); Discriminant and Cluster analysis.

1.2 Introduction of Canonical Correlation; Use of dummy variable and Logistic Regression; System Component Growth.

1.3 Interpolation and Extrapolation: Newton, Lagrange and Binomial Method; Mean centre of population and its shift over time; Population Potential by Gravity model.

1.4 Shortest Path Analysis: Transport and Allocation Problems; Trend Surface Analysis (TSA): computation of linear trend and ideas of quadratic and cubic surfaces.

**Unit-2: Application of Satellite Remote Sensing and Field Techniques in Urban Geography [15 Marks]**

2.1 Extraction of Built up Areas from Coarse to High Resolution Satellite Images. Assessment of Urban Growth Types: Infilling, Edge Growth and Leap frog.

2.2 Identification of Urban Sprawl from LULC Map using Spatial Landscape Matrices.

2.3 Urban Growth Prediction Using Cellular Automata Model.

2.4 Mapping of Urban Environment: Case Studies of Air, Water and Noise.

**In the End Semester Examination, students have to answer one compulsory question from the above two Units.**

*Viva-voce*

**[5 Marks]**

*Continuous Assessment*

**[30 Marks]**

*(\*A Project File, comprising one exercise each is to be submitted)*

✧ **Suggested Readings:**

1. Alvi, Z. (1995): *Statistical Geography: Methods and Applications*, Rawat Publications, New Delhi.
2. Cole, J.P. and King, C.A.M. (1969): *Quantitative Geography (Techniques and Theories in Geography)*, John Wiley & Sons Ltd., London.
3. Gibbs.J(1961) : *Urban Research Methods*. East-West Press Pvt Ltd. New Delhi



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4. Glasson, J. (1975): *An Introduction to Regional Planning*. Hutchinson and Co., London
5. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): *Fundamental of Statistics* (Volume One and Two), The World Press Private Limited, Kolkata.
6. Lillesand, T.M. and Kiefer, R. W. (1994): *Remote Sensing and Image Interpretation*. 3rd edition, John Wiley and Sons, New York
7. Mahmood, A. (1998): *Statistical Methods in Geographical Studies*, Rajesh Publication.
8. Malhotra, O.P. and Gupta, S.K. (1990): *Elementary Statistics*, S. Chand & Company Ltd., New Delhi.
9. Mandal, R.B. (1989): *Statistical Techniques for Social Scientist*. Concept Pub. Co., New Delhi
10. Markandey, K., & Simhadri, S. (2009). *Urban Environment and Geoinformatics*. Jaipur: Rawat Publication.
11. Pacione, Micheal, (2001): *Urban Geography*, Routledge, London.
12. Pal, S.K. (1999): *Statistics for Geoscientists*, Concept publishing Company, New Delhi. Sarkar, A. (2013): *Quantitative Geography: Techniques and Presentations*, Orient BlackSwan, Hyderabad
13. Raza, M., & Aggarwal, Y. (1999). *Transport Geography of India*. New Delhi: Concept Publishing Company.
14. Taafee, E. J., & Gauthier, H. L. (1973). *Geography of Transportation*. New Delhi: Prentice
15. Toyne, P. and Newby, P. (1971) *Techniques in Human Geography*. Macmillian, London
16. Vishwanadhan, G. (ed) 1986: *Readings in Urban Structure of India*. Ajanta Publications, Delhi.