

K.K. UNIVERSITY

NALANDA, BIHAR - 803115



SCHOOL OF ARTS & CULTURE

Master of Arts (M.A.)

(Two Year Full Programme)

2022-2023

PROGRAMME STRUCTURE & SYLLABUS

M.A. GEOGRAPHY

S. Shaha



Rumki

Pro Vice Chancellor
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Berauti, Nepura, Bihar Sharif
Nalanda - 803115 (Bihar)

M.A GEOGRAPHY – PROGRAM STRUCTURE - TOTAL CREDIT - 83							
M.A GEOGRAPHY							
Semester: I							
Sr. No.	Subject Code	Paper No.	Subject Name	L	T	P	Total Credit
1	MAGP 1101	1	Fundamentals of Geographical Thought	4	1	0	5
2	MAGP 1102	2	Geomorphology	4	1	0	5
3	MAGP 1103	3	Geography of India	4	1	0	5
4	MAGP 1104-P	4	Practical: Geological Maps, Topographical Quantitative Techniques, Instrument Survey and Identification of Rock & Minerals	0	0	10	5
			TOTAL	12	3	10	20
Semester: II							
Sr. No.	Subject Code	Paper No.	Subject Name	L	T	P	Total Credit
1	MAGP 1201	1	Advanced climatology & Oceanography	4	1	0	5
2	MAGP 1202	2	Resource Geography	4	1	0	5
3	MAGP 1203	3	Population Geography	4	1	0	5
4	MAGP 1204-P	4	Practical: Map Projections, Cartographic Method and Distribution Maps,	0	0	10	5
			TOTAL	12	3	10	20
Semester: III							
Sr. No.	Subject Code	Paper No.	Subject Name	L	T	P	Total Credit
1	MAGP 2101	1	Settlement Geography	4	1	0	5
2	MAGP 2102	2	Environment Geography	4	1	0	5
3	MAGP 2103	3	Agricultural Geography	4	1	0	5
4	MAGP 2104-P	4	Practical: Advanced Cartography Methods	0	0	10	5
			TOTAL	12	3	10	20
Semester: IV							
Sr. No.	Subject Code	Paper No.	Subject Name	L	T	P	Total Credit
1	MAGP 2201	1	Urban and Regional Planning	3	1	0	4
2	MAGP 2202	2	Water Resource Management	3	1	0	4
3	MAGP 2203	3	Elective Paper: Any One:	3	1	0	4
			a) Advance Geomorphology				
			b) Remote Sensing & Geographical Information System				
			c) Industrial Geography				
			d)Urban Geography				
			e)Nature Disaster Management				
4	MAGP 2204-P	4	Practical: Remote Sensing & Geographical Information System, Geomorphology	0	0	10	5

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5	MAGP 2205-P	5	Project Report/Based on Socio Economic Survey	0	0	12	6
			TOTAL	9	3	22	23

Master of Arts in Geography

Program Learning Goals

- Expansive capability in the discipline of geography, with a critical understanding of how specific areas of theoretical, methodological, and practical knowledge relate to erudition in other areas of the discipline.
- Students will learn to conduct legitimate and original research on geographical topics.
- Ability to engage in contemporary problem solving
- Students will develop an ability to communicate clearly and effectively.
- Students will prepare themselves for professional careers in Geography.

Program Outcomes:

PO 1: Expand their existing knowledge in different branches of Geography; compare and critique the theories, philosophies, and concepts in the discipline of Geography.

PO 2: To explore the unifying themes of spatial patterns and structures, the interrelationship between people, places and spaces; and the interactions between nature and human society and its responses..

PO 3: In the course of field surveys, students acquire a greater understanding of the socio-economic and cultural dimensions of the populations with greater focus on marginalized section of society. Physical field surveys enable the students to understand the landforms, geomorphic process and associated hazards.

PO 4: The Dissertations written by the students prepare them to examine social and environmental issues along with the causes, consequences and remedial measures emerging at local and national levels.

PO 5: Prepare objective scientific approach so that students can address research problems in Applied Geography and allied fields. Inculcate strong moral and ethical values and a sense of discipline among the students.

PO 6: Develop critical thinking and skills that train students to analyze problems and validate real life solutions.

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Semester: I							
Sr. No.	Course Code	Paper No.	Course Name	L	T	P	Total Credit
1	MAGP 1101	1	Fundamentals of Geographical Thought	4	1	0	5
2	MAGP 1102	2	Geotectonics and Geomorphology	4	1	0	5
3	MAGP 1103	3	Geography of India	4	1	0	5
4	MAGP 1104-P	4	Practical: Geological Maps, Topographical Quantitative Techniques, Instrument Survey and Identification of Rock & Minerals	0	0	10	5
TOTAL				12	3	10	20
Evaluation Method		Continuous Internal Evaluation, Assignments, Class Tests, Take-home Tests, Term Papers, Presentations and End Term Exam					

Abbreviation used: T/P → Theory/Practical; L/T/P → Lecture/Tutorial/Practical

COURSE TITLE (MAGP 1101): Fundamentals of Geographical Thought

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Develop philosophical and historical aptitude among students in the context of evolution and development of geographical ideas, theme, approaches and knowledge. Acquaint students with the philosophers of different schools of thought that have contributed in the development of geography as a branch of knowledge.

Course Outcome:

CO 1: Acquire the knowledge with fundamental concepts in geographical thought such as space, place, scale, region, landscape, and environment.

CO 2: Understand how geographical thought influences spatial analysis techniques and methods.

CO 3: Recognize the interdisciplinary nature of geographical thought and its intersections with other fields such as sociology, anthropology, economics, political science, and environmental studies.

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CO 4: Gain insights into how geographical thought has been shaped by different geographical contexts and global perspectives.

CO 5: Develop skills in critically analyzing geographical theories and paradigms.

UNIT I: Fundamentals of Geographical Thought	Lecture hours (30 hrs)	Weeks
1. Paradigms in Geography	2	1
2. Pre-Modern – Early Origins of Geographical Thinking with reference to the Classical and Medieval Philosophies.	6	2
3. Modern – Evolution of Geographical Thinking and Disciplinary Trends in Germany, France, Britain, United States of America.	5	1
4. Debates – Environmental Determinism and Possibilism, Systematic and Regional, Ideographic and Nomenclature.	5	2
5. Trends – Quantitative Revolution and its Impact, Behaviouralism, Systems Approach, Radicalism; Towards Post Modernism – Changing Concept of Space in Geography, Future of Geography.	7	4
6. Basic Concept: Spatial Praxis in Geography-Location; Areal Differentiation; Spatial Integration; Space-Time Integration and Compression.	7	4

Suggested Readings:

1. Adhikari, S. (1992). Geographical Thought. Allahabad: Chaitanya Pub. House.
2. Blis, H. J. (1971). Geography, Regions and Concepts. New York: John Wiley of Sons INC.
3. Board, C., Chorley, R., & Stoddart, D. (1974). Progress in Geography. International Reviews of Current Research Vol - 6.
4. Bunge, W. (1962). Theoretical Geography. London: Glenerp.
5. Chorley, R., & Haggett, P. (1965). Frontiers in Geographical Teaching. Oxford: OUP.
6. Coffey, W. (1981). Geography - Towards a General Spatial System Approach. USA: British Library Cataloguing in Pub.Data.
7. Dikshit, R. (2006). Geographical Thought - A Contextual History of Ideas. New Delhi: Prentice Hall of India Private Limited.
8. Dikshit, R. (1994). The Art and Science of Geography: Selected Reading. New Delhi: Prentice Hall India Ltd.
9. Dunbar, G. (1991). Modern Geography: An Encyclopedic Survey. Chicago: St. James Press.
10. Freeman, T. (1971). A Hundred Years of Geography. London: Gerald Duckworth & Co. Ltd.
11. Gregory, D., & Walford, R. (1988). Horizons in Human Geography. London: Macmillan.
12. Hartshorne, R. (1968). Perspectives on the Nature of Geography. John Murray, London: Association of American Geographers, Great Britain.
13. Hartshorne, R. (2002). The Nature of Geography. New Delhi: Rawat Pub. Co.

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14. Harvey, D. (2003). Explanation in Geography. New Delhi: Rawat Pub.Co.
15. Harvey, D. (1979). Social Justice and the City. Great Britain: The Pitman Press,Bath.
16. Harvey, E., & Holly, B. P. (2002). Themes in Geographical Thought. New Delhi: Rawat Pub.Co.
17. Husain, M. (2007). Models in Geography. New Delhi: Rawat Pub. Co.
18. Hussain, M. (1995). Evolution of Geographical Thought,3rd edition. New Delhi: Rawat Pub.co.
19. Hussain, M. (1994). Regional Geography. New Delhi: Anmol Pub.Ltd.
20. Johnston, R. (2000). Geography and Geographers. London: Oxford University Press,New York.Edward Arnold.
21. Johnston, R., & Hemer, J. (1990). Regional Geography:Current Developments and Future Prospects. London & New York: Routledge Publishers.
22. Lahiri-Dutt, K. (2002). Bhogal Chintar Vikash. World Press.
23. Legg, S. (2007). Spaces of Colonialism. UK: Blackwell Publishing.
24. Massey, D. (1994). Space,Pace and Gender. Minnesota: University of Minnesota Press.
25. Messy, D., & Allen, J. (1984). Geography Matters:A Reader,. Cambridge: Cambridge University Press.
26. Moss, P. (2002). Feminist Geography in Practice Research and Methods. UK: Blackwell Pub.Co.
27. Murdoch, J. (2006). Post-Structuralist Geography. New Delhi: Sage Publications Limited.
28. Pandey, P. (1983). Modern Geographical Trends. New Delhi: Todays and Tommorrow Printers and Publishers.
29. Peet, R. (2003). Radical Geography. New Delhi: Rawat Pub.Co.
30. Peet, R., & Thrift, N. (1989). New Models in Geography. Boston,Sydney,Wellington: Unwin Hyman.
31. Raju, S., & Lahiri-Dutt, K. (2011). Doing Gender Doing Geography Emerging Research in India. UK: Routledge.
32. Rana, L. (2008). Geographical Thought - A Systematic Record of Evolution. New Delhi: Concept Publishing Company.
33. Smith, D. (1994). Geography and Social Justice. Oxford,UK & Cambridge,USA: Blackwell.
34. Soja, E. (2003). Postmodern Geographies. UK: British Library Cataloguing in Publication Data.
35. Stoddart, D. (1986). On Geography and Its History. Oxford: Basil Blackwell.
36. Tuan, Y.-F. (1990). Topophilia:A Study of nEnvironmental Perception,Attitudes and Values, New York: Columbia University Press.

E-Resources

1. e-PG Pathshala: <https://epgp.inflibnet.ac.in/>
2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
3. National Digital Library of India: <https://ndl.iitkgp.ac.in/>
4. Swayam: <https://swayam.gov.in/>
5. NPTEL: <https://nptel.ac.in/>

COURSE TITLE(MAGP 1102): Geotectonics and Geomorphology

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Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Students shall gather ideas about structure of the Earth and the causes for the different tectonic activities over the Earth. They also get opportunity to learn about different exogenic processes and resultant landforms.

Course Outcome:

CO 1: Understand the processes of plate tectonics, including plate boundaries, earthquakes, and volcanic activity.

CO 2: Understand the geological hazards causes, impacts on the environment and society, and methods of hazard mitigation and disaster preparedness.

CO 3: Study the processes of weathering, erosion, and deposition that shape the Earth's surface features over time.

CO 4: Explore the dynamics of plate tectonics and their influence on the Earth's surface features and geological formations.

CO 5: Develop skills in spatial analysis to interpret and analyze geological maps, cross-sections, and satellite imagery.

UNIT I: Concepts in Geotectonic	Lecture hours (30 hrs)	Weeks
1. Earth's crust and interior: Internal structure with seismological evidences	5	2
2. Theories of Isostasy: Airy & Pratt	4	2
3. Continental Drift: Evidences, criticism and importance	5	2
4. Sea floor spreading: Process, evidences	5	2
5. Plate Tectonics: Mechanism of movements, vulcanism, genesis of earthquake and Mountain building	6	3
6. Folds and Faults: Origin and classification	5	3

UNIT II: Fundamentals of Geomorphology	Lecture hours (30 hrs)	
1. Fundamental principles of Geomorphology	4	1
2. Denudational processes and resultant landforms : Weathering and Mass movement	5	2
3. Theories of landscape evolution: Davis, Penck, and Hack	6	3
4. Slope development: Theories of King and Wood	4	2
5. Processes and landforms: Fluvial and Coastal	6	4

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6. Drainage development on Uniclinal and folded structure	5	1
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Suggested Readings:

1. Bloom, A. L. (2002): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice Hall, Upper Saddle River, New Jersey
2. Chorley, R.J. and Kennedy, B.A. (1971): *Physical Geography: A Systems Approach*, Prentice Hall, Upper Saddle River, New Jersey
3. Condie, K.C. (2003): *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford, Burlington
4. Duff, D. (1993): Holmes': *Principles of Physical Geology*, Stanley Thornes, Cheltenham
5. Erickson, J. (2001): *Plate Tectonics: Unravelling the Mysteries of the Earth*, Checkmark Books, New York
6. Goudie, A.S. (ed.) (2004): *Encyclopaedia of Geomorphology*, Routledge, London
7. Goudie, A.S. and Viles, H. (2010): *Landscapes and Geomorphology: A Very Short Introduction*, Oxford University Press, Oxford
8. Holmes, A. (1978): *Principles of Physical Geology*, Van Nostrand Rheinhold, New York
9. Huggett, R.J. (2011): *Fundamentals of Geomorphology*, Routledge, New York
10. Kale, V.S. and Gupta, A. (2001): *Introduction to Geomorphology*, Orient Longman, Kolkata
11. Keary, P. and Vine, M. (1997): *Global Tectonics*, Blackwell Scientific Publications, Oxford
12. Ollier, C.D. (1981): *Tectonics and Landforms*, Longman Group Ltd., London
13. Selby, M.J. (1985): *Earth's Changing Surface: An Introduction to Geomorphology*, Clarendon Press, Oxford
14. Siddhartha, K. (2001): *The Earth's Dynamic Surface*, Kisalaya Publications, New Delhi
15. Singh, S. (2000): *Geomorphology*, Prayag Pustak Bhavan, Allahabad
16. Strahler, A.H. and Strahler A.N. (1992): *Modern Physical Geography*, John Wiley & Sons, New York
17. Summerfield, M.A. (1991): *Global Geomorphology: An Introduction to the Study of Landforms*, Longman, London
18. Summerfield, M.A. (ed.) (2000): *Geomorphology and Global Tectonics*, Wiley, Chichester
19. Thorn, C. (1988): *Introduction to Theoretical Geomorphology*, Unwin Hyman, Boston
20. Thornbury, W. D. (1960): *Principles of Geomorphology*, John Wiley & Sons, New York
21. Wooldridge, S.W. and Morgan, R.S. (1937): *An Outline of Geomorphology: The Physical Basis of Geography*, Longman, London
22. Young, A. (1972): *Slopes*, Oliver and Boyd, Edinburg

E-Resources

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2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
3. National Digital Library of India: <https://ndl.iitkgp.ac.in/>
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COURSE TITLE (MAGP 1103): Geography of India

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Conceptualize the regional approaches and to examine regional differentiation in the study of India. Students will acquire in-depth knowledge of climate, natural vegetation, agriculture and energy resources and industries of India. Recognize regional identities and environmental dimension of regionalization to address the issues and concern needed for regional planning.

Course Outcome:

CO 1: Understand the physiographic divisions of India, including the Himalayas, Indo-Gangetic Plain, Western and Eastern Ghats, coastal plains, and islands.

CO 2: Study India's population distribution, demographic trends, and factors influencing population growth and distribution.

CO 3: Analyze regional disparities in economic development, including the role of agriculture, industry, and services in different parts of the country.

CO 4: Analyze geopolitical issues, borders, and disputes affecting India's relationships with neighboring countries.

CO 5: Explore environmental issues and challenges in India, including deforestation, air and water pollution, land degradation, and biodiversity conservation.

CO 6: Explore cultural landscapes, sacred sites, and heritage conservation efforts in India.

UNIT I: Geography of India	Lecture hours (30 hrs)	Weeks
1. Physical: Physiographic Divisions, soil and vegetation, climate (characteristics and classification)	6	3
2. Population: Distribution and growth, Structure	5	2
3. Economic: Mineral and power resources distribution and utilisation of iron ore, coal, petroleum, gas; agricultural production and distribution of rice and wheat, industrial development : automobile and Information technology	6	3
4. Social: Distribution of population by race, caste, religion, language, tribes and their correlates	4	2
5. Regionalisation of India: Physiographic (R. L. Singh), Socio – cultural (Sopher), Economic (Sengupta)	4	3
6. Planning regions of India, tribal and hill area drought prone and flood prone areas development, case study of	5	2

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Suggested Readings:

1. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
2. Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
3. Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An Intentional Perspective. Vol. 3 – Indian Perspective.
4. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
5. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
6. Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
7. Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
8. Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.
9. Tirtha, Ranjit 2002: Geography of India, Rawat Publs., Jaipur & New Delhi.
10. Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc., Kolkata.
11. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan, Allahabad
12. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur

E-Resources

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2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
3. National Digital Library of India: <https://ndl.iitkgp.ac.in/>
4. Swayam: <https://swayam.gov.in/>
5. NPTEL: <https://nptel.ac.in/>

COURSE TITLE(MAGP 1104-P): Geological Maps, Topographical Quantitative Techniques, Instrument Survey and Identification of Rock & Minerals (Practical)

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Comprehensive understanding of geological processes and interpretation of geological maps, Recognize the fundamentals of sampling, and bi-variate analysis using the chi-square test, regression, and correlation. Possess a thorough understanding of plate table surveying, using a theodolite to measure height, and counteracting with a dumpy level. Determined landforms or river basins by analyzing topographical maps. The ability to interpret weather maps. The purpose of teaching students about rocks and minerals is to provide them with the information, abilities, and methods needed to correctly identify and categorize a wide range of rock and mineral kinds.

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Course Outcome:

CO 1: Gain proficiency in interpreting geological maps, including understanding symbols, colors, patterns, and geological formations represented on maps. Understand the principles and conventions used in geological mapping, including scale, legend, cross-sections, and stratigraphic columns.

CO 2: Provide fundamental skills and knowledge related to interpreting and analyzing weather maps and Instruments. Recognize and classify different types of rocks and minerals based on their physical and chemical properties.

CO 3: Calculating slope angles and gradients to assess terrain steepness, which is important for infrastructure planning, erosion control, and accessibility. Identifying drainage basins and delineating watershed boundaries based on terrain characteristics and flow accumulation patterns.

CO 4: Analysis the process of examining and interpreting the features and characteristics of a terrain's surface for urban development, transportation routes, and infrastructure projects.

CO 5: Develop proficiency in using statistical methods to analyze data, and test hypotheses, regression analysis, and using surveying instruments to measure distances, angles, elevations, and coordinates accurately.

UNIT I: Geological Map	Lecture hours (40 hrs)	Weeks
Interpretation of Geological section	5	2
UNIT II: Topographic Analysis		
Superimposed, composite and projected profiles, Slope Analysis: Smith's, and Wentworth's method. Hyposmetric Curve and Altimetric Frequency Curve.	8	3
UNIT III: Weather Maps and Instruments		
Interpretation of Indian Daily Weather, Map of different Seasons, Construction and Orientation of Weather Instruments	6	2
UNIT IV: Quantitative Techniques		
Standard deviation, Spearman's rank correlation Pearson's product moment correlation Regression Analysis, Test of Significance: Chi-square Test, Student t-Test	6	3
UNIT V: Instrumental Survey		
Surveying with the help of Plane Table (Ressecti of Method), Leveling by Dumpy Level, Triangulation Survey with the help of Theodolite, Determination of Height by Theodolite	9	3
UNIT VI: Identification of Rocks and Minerals		

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Identification and Interpretation of the Main Features of Rocks and Minerals.	6	2
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Suggested Readings:

1. W. S. MacKenzie and A.E. Adams "Atlas of Rocks and Minerals in Thin Section"
2. Herbert S. Zim and Paul R. Shaffer "Rocks and Minerals: A Guide to Familiar Minerals, Gems, Ores and Rocks" by "Minerals: Their Constitution and Origin"
3. Milton Ohring and Stephen T. S. Grassby "Fundamentals of Surveying"
4. James M. Anderson "Surveying: Theory and Practice"
5. Jack C. McCormac and Wayne Sarasua "Surveying"
6. Angela L. Coe "Geological Field Techniques"
7. John Barnes "Geological Mapping"
8. Heather A. Clark "Mapping Geology in ArcGIS"
9. Ralsz, Erwin: General Cartography. McGraw Hill Book Co. INC, London. New York.
10. Mishra. R.P. & Ramesh A.: Fundamentals of Cartography Concept Publishing CO., New Delhi.
11. Saha. Pijushkanti & Basu, Partha: Advanced Practtcal Geography Books and Allied (P) Ltd.- Kolkata.
12. Monkherese. E J. & Wilkinson Maps and Diagram. Their Compilation and Construct'on, Methuen & co. Ltd. London.
13. Sharma, J.P. (2010): Prayogik Bhugol, Rastogi Publication, Meerut.
14. Singh. R.L.. & Dutt: Elements of Practical Geography, Students Friends, Allahabad.

E-Resources

1. e-PG Pathshala: <https://epgp.inflibnet.ac.in/>
2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
3. National Digital Library of India: <https://ndl.iitkgp.ac.in/>
4. Swayam: <https://swayam.gov.in/>
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Semester: II							
Sr. No.	Subject Code	Paper No	Subject Name	L	T	P	Total Credit
1	MAGP 1201	1	Advanced climatology & Oceanography	4	1	0	5
2	MAGP 1202	2	Resource Geography	4	1	0	5
3	MAGP 1203	3	Population Geography	4	1	0	5
4	MAGP 1204-P	4	Practical: Map Projections, Cartographic Method and Distribution Maps,	0	0	10	5
TOTAL				12	3	10	20
Evaluation Method		Continuous Internal Evaluation, Assignments, Class Tests, Take-home Tests, Term Papers, Presentations and End Term Exam					

School of Arts and Culture
Department of Geography

Abbreviation used: T/P → Theory/Practical; L/T/P → Lecture/Tutorial/Practical

COURSE TITLE (MAGP 1201): Advanced climatology & Oceanography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Acquire clear concepts of climatology. Greater understanding of the nature and scope of climatology; ocean atmospheric interaction; climate change and its impacts. Gain a comprehensive understanding of physical, chemical, biological, and geological processes that occur in the ocean. This includes knowledge of ocean circulation, waves, tides, biogeochemical cycles, and sediment dynamics. Understanding Ocean Processes. Marine Ecosystems and Biodiversity, Oceanography and Climate Change, Coastal and Marine Hazards.

Course Outcomes:

CO 1: Gain an in-depth knowledge of the components of the Earth's climate system, including the atmosphere, oceans and land surface.

CO 2: Study the physical processes and dynamics that drive climate variability and change, including atmospheric circulation patterns, ocean currents, and heat transport mechanisms.

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CO 3: Study the physical properties and dynamics of seawater, including temperature, salinity, density, and their variations with depth and location.

CO 4: Assess the impacts of climate change on natural ecosystems, human societies, infrastructure, and economies.

CO 5: Explore ocean circulation patterns, including currents, waves, tides, and their global and regional impacts on climate and ecosystems.

UNIT I: Advanced climatology	Lecture hours (20 hrs)	Weeks
1. Humidity, Atmospheric Stability, Instability; Vortices	5	2
2. Atmospheric Circulation: Tricellular Model, Jet Stream, ENSO, Cyclones	5	3
3. Monsoon: Recent Theories of its Origin; Classical, Flohn, Jet Stream and Koteswaram, Recent Trends of Monsoon in Indian Subcontinent	5	3
4. Climate Change and its Global Impact: Physical, Economic and Social; Adaptation and Mitigation Measures of Climate Change	5	2

UNIT II: Oceanography	Lecture hours (20 hrs)	Weeks
1. Drainage Basin Hydrology: Relief, Surficial, Linear and Shape Aspects, Basin Hydrological Cycle, Measures of Estimating Runoff: Rational Method and Soil Conservation Service Curve Number Method	5	3
6. Channel Geometry and Related Parameters, Open Channel Flow: Laminar, Turbulent, Super-critical Sub-critical, Flow Continuity & Bernoulli's Principle	5	3
7. Occurrence & Movement of Groundwater, Velocity, Viscosity, Hydraulic Conductivity and Darcy's Law	6	3
8. Management of Water Resources: Watershed Management, Rainwater Harvesting	4	2

Suggested Readings:

1. Barry R. G. and Carleton A. M., 2001: *Synoptic and Dynamic Climatology*, Routledge, UK.
2. Barry R. G. and Corley R. J., 1998: *Atmosphere, Weather and Climate*, Routledge, New York.
3. Critchfield H. J., 1987: *General Climatology*, Prentice-Hall of India, New Delhi
4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: *The Atmosphere: An Introduction to Meteorology*, Prentice-Hall, Englewood Cliffs, New Jersey.

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5. Oliver J. E. and Hidore J. J., 2002: *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
6. Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill.
7. Gupta L S(2000): *Jalvayu Vigyan*, Hindi Madhyam Karyanvay Nidishalya, Delhi Vishwa Vidhyalaya, Delhi
8. Lal, D S (2006): *Jalvayu Vigyan*, Prayag Pustak Bhavan, Allahabad
9. Vatal, M (1986): *Bhautik Bhugol*, Central Book Depot, Allahabad
10. Singh, S (2009): *Jalvayu Vigyan*, Prayag Pustak Bhawan, Allahabad
11. Andrew. D. ward and Stanley, Trimble (2004): *Environmental Hydrology*, 2nd edition, Lewis Publishers, CRC Press.
12. Karanth, K.R., 1988 : *Ground Water: Exploration, Assessment and Development*, Tata- McGraw Hill, New Delhi.
13. Ramaswamy, C. (1985): *Review of floods in India during the past 75 years: A Perspective*. Indian National Science Academy, New Delhi.
14. Rao, K.L., 1982 : *India's Water Wealth* 2nd edition, Orient Longman, Delhi,.
15. Singh, Vijay P. (1995): *Environmental Hydrology*. Kluwar Academic Publications, The Netherlands.
16. Anikouchine W. A. and Sternberg R. W., 1973: *The World Oceans: An Introduction to Oceanography*, Prentice-Hall.
17. Garrison T., 1998: *Oceanography*, Wordsworth Company, Belmont.
18. Kershaw S., 2000: *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
19. Pinet P. R., 2008: *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
20. Sharma R. C. and Vatal M., 1980: *Oceanography for Geographers*, Chaitanya Publishing House, Allahabad.
21. Sverdrup K. A. and Armbrust, E. V., 2008: *An Introduction to the World Ocean*, McGraw Hill, Boston.
22. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) *Landscape ecology and water management*. Proceedings of IGU Rohtak Conference, Volume 2. *Advances in Geographical and Environmental Studies*, Springer

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1. e-PG Pathshala: <https://epgp.inflibnet.ac.in/>
2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
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COURSE TITLE(MAGP 1202): Resource Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

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Resource Geography courses aim to provide students with a comprehensive understanding of how natural resources are distributed, managed, and utilized in different parts of the world, as well as the environmental, socioeconomic, and geopolitical implications of resource exploitation.

Course Outcomes:

CO 1: Study theories, principles, and practices of natural resource management, including sustainable resource use, conservation strategies, and ecosystem services.

CO 2: Study sustainable forestry practices, forest conservation initiatives, and the role of forests in carbon sequestration and biodiversity conservation.

CO 3: Understand the factors influencing resource distribution, including geological, climatic, environmental, and socioeconomic factors.

CO 4: Analyze the spatial distribution and patterns of natural resources (e.g., minerals, water, energy resources, land resources) at various scales, from local to global.

CO 5: Explore land resource management issues such as land degradation, soil erosion, urbanization, and land-use planning strategies.

UNIT I: Resource Geography	Lecture hours (25 hrs)	Weeks
1. Natural Resource: Concept, Classification and Techniques	5	2
2. Distribution, Utilisation, Problems and Management of Land Resources and Water Resources	5	3
3. Distribution, Utilisation, Problems and Management of Forests and Energy Resources	5	3
4. Appraisal and Conservation of Natural Resources	5	2
5. Sustainable Resource Development	5	2

Suggested Readings:

1. Cutter S. N., Renwich H. L. and Renwick W., 1991: *Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resources Use*, John Wiley and Sons, New York.
2. Gadgil M. and Guha R., 2005: *The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity*, Oxford University Press. USA.
3. Holechek J. L. C., Richard A., Fisher J. T. and Valdez R., 2003: *Natural Resources: Ecology, Economics and Policy*, Prentice Hall, New Jersey.
4. Jones G. and Hollier G., 1997: *Resources, Society and Environmental Management*, Paul Chapman, London.
5. Klee G., 1991: *Conservation of Natural Resources*, Prentice Hall, Englewood.
6. Mather A. S. and Chapman K., 1995: *Environmental Resources*, John Wiley and Sons, New York.
7. Mitchell B., 1997: *Resource and Environmental Management*, Longman Harlow, England.
8. Owen S. and Owen P. L., 1991: *Environment, Resources and Conservation*, Cambridge

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University Press, New York.

9. Rees J., 1990: *Natural Resources: Allocation, Economics and Policy*, Routledge.London.

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2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
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COURSE TITLE(MAGP 1203): Population Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Students shall gather ideas about the dynamics of population and its different measures and also about the different types & patterns of settlement. The course will help them to gather ideas about fundamental concepts in Population Geography.

Course Outcomes:

CO 1: Students will learn about the spatial patterns of human populations across the globe, including factors influencing population concentration and dispersion.

CO 2: Studying theories and models of population growth, including the demographic transition model, and factors influencing population decline or growth.

CO 3: Analyzing trends in urbanization, the push and pull factors of rural-urban migration, and the consequences of urban growth.

CO 4: Exploring key demographic concepts such as birth rates, death rates, migration patterns, and their impacts on population dynamics.

CO 5: Evaluating government policies and interventions aimed at managing population growth, promoting sustainable development, and addressing demographic challenges.

UNIT I: Population Geography	Lecture hours (30 hrs)	Weeks
1. Development of Population Geography; Relation between Population Geography and Demography	4	1
2. Determinants of Population Dynamics: Fertility, Mortality and Migration	4	1

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3. Measures of Fertility and Mortality	5	1
4. Migration: Theories, Causes and Types	5	2
5. Theories of population growth: Malthus and Marx; Demographic Transition Theory (Thompson and Notestein)	6	2
6. Population Composition (Age-Sex; Occupational Structure); Population policies (India and Sweden).	6	2

Suggested Readings:

1. Anderson, K. (2006): *Race and Crises of Human Development*, Routledge, London and New Delhi.
2. Beaujeu- Garnier, J. (1966) *Geography of Population*. London: Longman.
3. Bhende, A.S. and Kanitkar, T. (2015) *Principles of Population Studies*. Mumbai: Himalaya Publishing House.
4. Casino, V.J.D., Jr., (2009): *Social Geography: A Critical Introduction*, Wiley-Blackwell, Chichester.
5. Chandana, R.C. (2021) *Geography of Population – Concept, Determinants and World Pattern*. New Delhi: Kalyani Publishers.
6. Clarke, J.I. (1972): *Population Geography*, Pergamon Press, Oxford
7. Roy, D. (2015) *Population Geography*. Kolkata: Books & Allied (P) Ltd.

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1. e-PG Pathshala: <https://epgp.inflibnet.ac.in/>
2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
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COURSE TITLE(MAGP 1204-P): Practical: Map Projections, Cartographic Method and Distribution Maps,

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Map Projections and Cartographic Methods aims to equip students with the knowledge and skills necessary to create accurate, informative, and visually compelling maps. Definition of cartography, its importance in visualizing spatial data, and historical development. Concept of map projections, why they are necessary, and the trade-offs involved (e.g., distortion of shape, area, distance, direction).

Course Outcome:

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CO 1: Gain a comprehensive knowledge of map projections, including their purpose, principles, and the mathematical basis behind transforming the Earth's spherical surface onto a two dimension surface.

CO 2: Learn techniques for designing effective maps, including principles of layout, typography, color theory, and visual balance to enhance map readability and interpretation.

CO 3: Explore methods for symbolizing geographic features and thematic data on maps, including selection of symbols, colors, and visual variables (size, shape, texture) to effectively communicate spatial information.

UNIT I: Map Projections, Cartographic Method and Distribution Maps	Lecture hours (25 hrs)	Weeks
1. Map Projections – Classification, Properties and Uses; Graphical Construction of Polar Zenithal Stereographic, Bonne’s and Mercator’s Projections, and reference to Universal Transverse Mercator (UTM) Projection.	7	4
2. Cartography – Nature and Scope.	6	2
3. Scales – Concept and application; Graphical Construction of Plain, Comparative and Diagonal Scales.	6	4
4. Distribution Maps: Choropleth Maps, Dot Density Maps, Isopleth (Isarithmic) Maps	6	4

Suggested Readings:

1. Anson R. and Ormelling F. J., 1994: *International Cartographic Association: Basic Cartographic Vol.* Pregmen Press.
2. Gupta K.K. and Tyagi, V. C., 1992: *Working with Map*, Survey of India, DST, New Delhi.
3. Mishra R.P. and Ramesh, A., 1989: *Fundamentals of Cartography*, Concept, New Delhi.
4. Monkhouse F. J. and Wilkinson H. R., 1973: *Maps and Diagrams*, Methuen, London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: *Cartography: Past, Present and Future*, Elsevier, International Cartographic Association.
6. Robinson A. H., 2009: *Elements of Cartography*, John Wiley and Sons, New York.
7. Sharma J. P., 2010: *Prayogic Bhugol*, Rastogi Publishers, Meerut.
8. Singh R. L. and Singh R. P. B., 1999: *Elements of Practical Geography*, Kalyani Publishers.
9. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
10. Singh R L & Rana P B Singh(1991) *Prayogtmak Bhugol ke Mool Tatva*, Kalyani Publishers, New Delhi
11. Sharma, J P (2010) *Prayogtmak Bhugol ki Rooprekha*, Rastogi Publications, Meerut
12. Singh, R L & Dutta, P K (2012) *Prayogtmak Bhugol*, Central Book Depot, Allahabad

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Semester: III							
Sr. No.	Subject Code	Paper No.	Subject Name	L	T	P	Total Credit
1	MAGP 2101	1	Settlement Geography	4	1	0	5
2	MAGP 2102	2	Environment Geography	4	1	0	5
3	MAGP 2103	3	Agricultural Geography	4	1	0	5
4	MAGP 2104-P	4	Practical: Advanced Cartography Methods	0	0	10	5
TOTAL				12	3	10	20
Evaluation Method		Continuous Internal Evaluation, Assignments, Class Tests, Take-home Tests, Term Papers, Presentations and End Term Exam					

Abbreviation used: T/P → Theory/Practical; L/T/P → Lecture/Tutorial/Practical

COURSE TITLE(MAGP 2101): Settlement Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Students shall gather ideas about the dynamics of population and its different measures and also about the different types & patterns of settlement. The course will help them to gather ideas about fundamental concepts in Urban Geography.

Course Outcome:

CO 1: Study the processes of urbanization, including factors driving urban growth, dynamics of urban sprawl, and the development of metropolitan regions.

CO 2: Investigate the social and economic dimensions of settlements, including housing,

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employment, income disparities, social inequalities, and migration patterns.

CO 3: Analyze the spatial distribution and patterns of human settlements at various scales (local, regional, global), including factors influencing settlement location and density.

CO 4: Explore different types of settlement systems (e.g., dispersed, nucleated, linear) and their characteristics, functions, and relationships with the surrounding landscape.

CO 5: Explore principles and practices of settlement planning, including urban design, zoning regulations, sustainable development strategies, and land-use planning.

UNIT I: Settlement Geography	Lecture hours (30 hrs)	Weeks
1. Development of Settlement Geography	4	2
2. Characteristics of Rural Settlement: Site, Situation, types and Pattern	5	3
3. Morphology of rural Settlements	4	2
4. Urban Settlements: Census Definition, Urban Agglomeration; Urban sprawl, Rural-urban Continuum, Rurban and Periurban	5	2
5. Urban Morphology: Classical Models of Burgess, Hoyt, Harris and Ullman	6	3
6. Central place theory and Hierarchy of settlements; Urban primacy	6	3

Suggested Readings:

1. Daniel, P.A. and Hopkinson, M.F. (1989) *The Geography of Settlement*, Oliver & Boyd, London.
2. Johnston R; Gregory D, Pratt G. et al. (2008) *The Dictionary of Human Geography*, Blackwell Publication.
3. Jordan-Bychkov et al. (2006) *The Human Mosaic: A Thematic Introduction to Cultural Geography*. W. H. Freeman and Company, New York.
4. Kaushik, S.D. (2010) *Manav Bhugol*, Rastogi Publication, Meerut.
5. Maurya, S.D. (2012) *Manav Bhugol*, Sharda Pustak Bhawan. Allahabad.
6. Hussain, Majid (2012) *Manav Bhugol*. Rawat Publications, Jaipur
7. Ghosh, S. (1998) *Settlement Geography*. Kolkata: Orient Longman Ltd.
8. Gregory, D. and Larry, J. (eds.) (1985): *Social Relations and Spatial Structures*, MacMillan, London.
9. Haq, M. (2000): *Reflections on Human Development*, Oxford University Press, New Delhi.
10. Jones, E. (ed.) (1975): *Readings in Social Geography*, Oxford University Press, London
11. Mandal, R.B. (2001) *Introduction to Rural Settlements*. New Delhi: Concept Publishing Company.
12. Norton, W. (2006): *Cultural Geography: Environments, Landscapes, Identities, Inequalities*, Oxford University Press, Toronto.
13. Ramachandran, R. (2010) *Urbanisation and Urban Systems of India*. New Delhi: Oxford

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University Press.

14. Roy, D. (2015) Population Geography. Kolkata: Books & Allied (P) Ltd.

15. Rubenstein, J.M. (2002), *The Cultural Landscape*, 7th edition, Prentice Hall, Englewood Cliffs.

16. Sharma, K.L. (1980): *Essays on Social Stratification*, Rawat Publications, Jaipur and New Delhi.

17. Singh, R.Y. (1994) Geography of Settlement. Jaipur: Rawat Publications, Jaipur.

18. Smith, D. (1977): *Geography: A Welfare Approach*, Edward Arnold, London.

19. Tiwari, R.C. (2020) Settlement Geography – Rural and Urban Settlement. Allahabad: Pravalika Publications.

20. Valentine, G. (2001): *Social Geographies: Space and Society*, Prentice Hall, Harlow, U.K.

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2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
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4. Swayam: <https://swayam.gov.in/>
5. NPTEL: <https://nptel.ac.in/>

COURSE TITLE(MAGP 2102): Environment Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Environmental geography focuses on the interactions between humans and the environment. It examines how natural systems like climate, landforms, soils, and vegetation interact with human activities such as agriculture, urbanization, and industrialization.

Course Outcome:

CO 1: Study natural processes (e.g., climate change, geomorphology, hydrology) and human-induced processes (e.g., pollution, deforestation, land degradation) affecting environmental dynamics.

CO 2: Acquire a comprehensive knowledge of key concepts in environmental geography, including ecosystems, biogeography, environmental systems, and human-environment interactions.

CO 3: Analyze the spatial distribution of natural environments (e.g., forests, deserts, wetlands) and human activities (e.g., urbanization, agriculture) across local, regional, and global scales.

CO 4: Explore the concept of ecosystem services, including provisioning (e.g., food, water), regulating (e.g., climate regulation, water purification), supporting (e.g., nutrient cycling), and cultural services provided by natural environments.

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CO 5: Explore environmental policies, regulations, and governance frameworks at local, national, and international levels. Evaluate their effectiveness in addressing environmental issues and promoting sustainability.

UNIT I: Environment Geography	Lecture hours (25 hrs)	Weeks
1. Environmental Geography – Concept and Scope	4	1
2. Human-Environment Relationships – Historical Progression, Adaptation in different Biomes.	5	2
3. Ecosystem – Concept, Structure and Functions	5	2
4. Environmental Problems in Tropical, Temperate and Polar Ecosystems	5	3
5. Environmental Programmes and Policies – Global, National and Local levels	6	3

Suggested Reading:

1. Chandna R. C., 2002: *Environmental Geography*, Kalyani, Ludhiana.
2. Cunningham W. P. and Cunningham M. A., 2004: *Principals of Environmental Science: Inquiry and Applications*, Tata Macgraw Hill, New Delhi.
3. Goudie A., 2001: *The Nature of the Environment*, Blackwell, Oxford.
4. Mal, Suraj., and Singh, R.B. (Eds.) (2009) *Biogeography and Biodiversity*. Rawat Publication, Jaipur
5. Miller G. T., 2004: *Environmental Science: Working with the Earth*, Thomson BrooksCole, Singapore.
6. MoEF, 2006: *National Environmental Policy-2006*, Ministry of Environment and Forests, Government of India.
7. Singh, R.B. and Hietala, R. (Eds.) (2014) *Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India*. *Advances in Geographical and Environmental Studies*, Springer
8. Odum, E. P. et al, 2005: *Fundamentals of Ecology*, Ceneage Learning India.
9. Singh S., 1997: *Environmental Geography*, Prayag Pustak Bhawan. Allahabad.
10. UNEP, 2007: *Global Environment Outlook: GEO4: Environment For Development*, United Nations Environment Programme.
11. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) *Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1*. *Advances in Geographical and Environmental Studies*, Springer
12. Singh, R.B. (1998) *Ecological Techniques and Approaches to Vulnerable Environment*, New Delhi, Oxford & IBH Pub..
13. Singh, Savindra 2001. *Paryavaran Bhugol*, Prayag Pustak Bhawan, Allahabad. (in Hindi)

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COURSE TITLE(MAGP 2103): Agricultural Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Students learn to various agricultural systems around the world, including subsistence agriculture, commercial agriculture, agroforestry, and intensive farming. This involves studying the geographical distribution, characteristics, and practices associated with different agricultural systems.

Course Outcome:

CO 1: Study different types of agricultural land use systems, including intensive agriculture (e.g., agribusiness, monoculture), extensive agriculture (e.g., pastoralism, shifting cultivation), and subsistence farming. Analyze their environmental impacts and sustainability challenges.

CO 2: Study the concept of agro-ecosystems, including interactions between agricultural practices and ecological processes. Study agro-ecological principles and sustainable agricultural practices that promote biodiversity conservation and ecosystem resilience.

CO 3: Investigate issues related to food security, access to nutritious food, and the socio-economic implications of agricultural development on rural communities. Discuss strategies for improving food production and distribution to ensure food security.

CO 4: Analyze the spatial distribution of agricultural activities (e.g., crop cultivation, livestock production) at local, regional, and global scales. Understand factors influencing agricultural patterns, such as climate, soils, topography, and socio-economic factors.

CO 5: Explore technological advancements in agriculture, including mechanization, biotechnology, precision agriculture, and their implications for agricultural productivity, sustainability, and rural livelihoods.

UNIT I: Agricultural Geography	Lecture hours (30 hrs)	Weeks
1. Defining the Field: Introduction, nature and scope; Land use/ land cover definition and classification.	5	2
2. Determinants of Agriculture: Physical, Technological and Institutional	5	2
3. Agricultural Regions of India: Agro-climatic, Agro-	6	3

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ecological & Crop Combination Regions.		
4. Agricultural Systems of the World (Whittlesey's classification) and Agricultural Land use model (Von Thuenen, modification and relevance).	6	3
5. Agricultural Revolutions in India: Green, White, Blue, Pink	5	2

Suggested Reading:

1. Basu, D.N., and Guha, G.S., 1996: *Agro-Climatic Regional Planning in India*, Vol.I & II, Concept Publication, New Delhi.
2. Bryant, C.R., Johnston, T.R, 1992: *Agriculture in the City Countryside*, Belhaven Press, London.
3. Burger, A., 1994: *Agriculture of the World*, Aldershot, Avebury.
4. Grigg, D.B., 1984: *Introduction to Agricultural Geography*, Hutchinson, London.
5. Ilbery B. W., 1985: *Agricultural Geography: A Social and Economic Analysis*, Oxford University Press.
6. Mohammad, N., 1992: *New Dimension in Agriculture Geography*, Vol. I to VIII, Concept Pub., New Delhi.
7. Roling, N.G., and Wageruters, M.A.E.,(ed.) 1998: *Facilitating Sustainable Agriculture*, Cambridge University Press, Cambridge.
8. Shafi, M., 2006: *Agricultural Geography*, Doring Kindersley India Pvt. Ltd., New Delhi
9. Singh, J., and Dhillon, S.S., 1984: *Agricultural Geography*, Tata McGraw Hill, New Delhi.
10. Tarrant J. R., 1973: *Agricultural Geography*, David and Charles, Devon.

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COURSE TITLE(MAGP 2104-P): Advanced Cartography Methods

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Understanding of cartographic design principles, including visual hierarchy, symbolization, color theory, typography, and layout. Students learn advanced techniques for creating effective and aesthetically pleasing maps. To explore advanced digital cartography techniques using Geographic Information Systems (GIS) software.

Course Outcome:

CO 1: Study techniques for representing temporal changes and trends on maps, including

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animation, time-series visualization, and thematic mapping of historical data. Analyze spatiotemporal patterns and dynamics over time.

CO 2: Learn techniques for representing and visualizing multiple variables on maps using sophisticated symbology, color schemes, and classification methods. Understand how to effectively communicate complex spatial patterns and relationships.

CO 3: Apply advanced spatial analysis techniques to cartographic projects, including spatial interpolation, network analysis, spatial statistics, and geostatistics. Use GIS software to perform spatial operations and analyze spatial relationships.

UNIT I: Advanced Cartography Methods	Lecture hours (30 hrs)	Weeks
1. Advanced Map Design.	6	2
2. Digital Cartography and GIS Integration	6	2
3. Thematic mapping methods (choropleth, proportional symbol, dot density), statistical mapping, multidimensional mapping.	6	3
4. Spatial Analysis for Cartography	6	3
5. Time-series mapping, temporal animation techniques, dynamic data integration.	6	3

Suggested Reading:

1. Anson, R. W. and Ormerling, F. J. 1993: Basin Cartography, Elsevier Applied Science Publishers. London.
2. Maceachren, A. M. and Taylor, D. R. F. 1994: Visualization in Modern Cartography, Permamon. UK.
3. Raisz, E. 1962: Principles of Cartography, International Student Edition. Japan.
4. Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., Guptill, S. C. 2002: Elements of Cartography, John Wiley and Sons (ASIA). Singapore.
5. Robinson, A.H., Sale, R.D., Morrison, J. 1984 :Elements of Cartography, Wiley, New York.

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Semester: IV							
Sr. No.	Subject Code	Paper No.	Subject Name	L	T	P	Total Credit
1	MAGP 2201	1	Urban and Regional Planning	3	1	0	4
2	MAGP 2202	2	Water Resource Management	3	1	0	4
3	MAGP 2203	3	Elective Paper: Any One:	3	1	0	4
			a) Advance Geomorphology				
			b) Remote Sensing & Geographical Information System				
			c) Industrial Geography				
			d)Urban Geography				
			e)Nature Disaster Management				
4	MAGP 2204-P(a)	4	Practical: Remote Sensing & Geographical Information System, Geomorphology	0	0	10	5
5	MAGP 2204-P(b)	5	Project Report/Based on Socio Economic Survey	0	0	12	6
			TOTAL	9	3	22	23
Evaluation Method		Continuous Internal Evaluation, Assignments, Class Tests, Take-home Tests, Term Papers, Presentations and End Term Exam					

Abbreviation used: T/P → Theory/Practical; L/T/P → Lecture/Tutorial/Practical

COURSE TITLE(MAGP 2201): Urban and Regional Planning

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Provide an overview of the history, theories, and principles of urban planning. Understand the role of urban planners in shaping communities and addressing societal challenges. Address

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sustainability challenges and resilience planning, focusing on mitigating climate change impacts, enhancing resource efficiency, and promoting sustainable development practices.

Course Outcome:

CO 1: Knowledge of principles and practices that support environmentally sustainable urban development, including green infrastructure and mitigation of urban sprawl.

CO 2: Knowledge of principles and practices that support environmentally sustainable urban development, including green infrastructure and mitigation of urban sprawl.

CO 3: Obtain a comprehensive conception of the components that built up areas, including infrastructure, transportation, housing, and environmental systems.

CO 4: Understanding the relationship between urban planning decisions and economic development, including promoting job growth and enhancing quality of life.

CO 5: Evaluate existing urban policies and develop new ones that promote sustainability, equity, and efficient land use.

UNIT I: Urban and Regional Planning	Lecture hours (30 hrs)	Weeks
1. Definition of Region, Evolution and Types of Regional planning: Formal, Functional, and Planning Regions and Regional Planning; Need for Regional Planning; Types of regional Planning.	6	3
2. Choice of a Region for Planning: Characteristics of an Ideal Planning Region; Delineation of Planning Region; Regionalization of India for Planning (Agro Ecological Zones)	6	3
3. Theories and Models for Regional Planning: Growth Pole Model of Perroux; Growth Centre Model in Indian Context; Myrdal, Hirschman, Rostow and Friedmann; Village Cluster	6	3
4. Changing Concept of Development, Concept of underdevelopment; Efficiency-Equity Debate	6	2
5. Measuring development: Indicators (Economic, Social and Environmental); Human development.	6	2

Suggested Readings:

- 1.Bhat, L.S. (1973): Regional Planning in India, Statistical Pub. Society.
- 2.Chand, M. and Puri, V.K. (1988): Regional Planning in India, Vikas, New Delhi .
- 3.Chandana, R.C.(2000): Regional Planning and Development, Kalyani Publishers.
- 4.Glasson, J. (1974): An Introduction to Regional Planning, Hutchinson, London.
- 5.Greed (2000): Introducing Planning, Athlone Press, London.

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- 6.Hall, P. (1974): Urban and Regional Planning, Penguin, London.
- 7.Mishra, R.P. (1969): Regional Planning, Concept, Techniques, Policies, the University of Mysore Press.
- 8.Misra,R.P,Sundaram and Rao (1974): Regional Planning In India, Viking, Delhi.
- 9.Mitra, A. (1971): Levels of Regional Development India, Census of India.
- 10.Tim, Hall (2006): Urban Geography, Routledge.
11. Blij H. J. De, 1971: *Geography: Regions and Concepts*, John Wiley and Sons.
12. Claval P.I, 1998: *An Introduction to Regional Geography*, Blackwell Publishers, Oxford and Massachusetts.
13. Friedmann J. and Alonso W. (1975): *Regional Policy - Readings in Theory and Applications*, MIT Press, Massachusetts.
14. Gore C. G., 1984: *Regions in Question: Space, Development Theory and Regional Policy*, Methuen, London.
15. Gore C. G., Köhler G., Reich U-P. and Ziesemer T., 1996: *Questioning Development; Essays on the Theory, Policies and Practice of Development Intervention*, Metropolis- Verlag, Marburg.
16. Haynes J., 2008: *Development Studies*, Polity Short Introduction Series.
17. Johnson E. A. J., 1970: *The Organization of Space in Developing Countries*, MIT Press, Massachusetts.
18. Peet R., 1999: *Theories of Development*, The Guilford Press, New York.
19. UNDP 2001-04: *Human Development Report*, Oxford University Press.
20. World Bank 2001-05: *World Development Report*, Oxford University Press, New

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2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
3. National Digital Library of India: <https://ndl.iitkgp.ac.in/>
4. Swayam: <https://swayam.gov.in/>
5. NPTEL: <https://nptel.ac.in/>

COURSE TITLE(MAGP 2202): Water Resource Management

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Assessing the surface and groundwater resources of India on the contexts of occurrence, storage, quality, scarcity and sharing. Recognizing the idea, distribution, pattern, and effects of India's hydro-meteorological extremes.

Course Outcome:

CO 1: Learn knowledge of hydrological cycles, water quality parameters, and the interconnectedness of surface water and groundwater systems.

CO 2: Familiarity with local, national, and international water policies, regulations, and

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governance structures governing water allocation, usage rights, and conservation.

CO 3: Ability to apply Integrated Water Resource Management (IWRM) principles, which involve balancing competing demands for water from various sectors such as agriculture, industry, and domestic use while ensuring sustainability and equity.

CO 4: Strategies to promote water conservation behaviors and technologies to improve water use efficiency in urban, agricultural, and industrial settings.

CO 5: Appreciation for the ecosystem services provided by healthy watersheds and rivers, and techniques for maintaining or restoring these services through sustainable water management practices.

UNIT I: Water Resource Management	Lecture hours (30 hrs)	Weeks
1. Nature and Scope of Hydrology, water Resource on the Earth, Hydrological Cycle, Elements of Hydrological Cycle –Precipitation, Evaporation, Infiltration Surface Run, Man's Intervention in Hydrologic Cycle.	6	3
2. Occurrence and Assessment of Surface Water Resources, Basin Hydrological Phenomena, Runoff Factors Affecting Runoff.	6	3
3. Origin and Occurrence of Ground Water Ground Water Recharge and Utilization, Man Induced Problems Related to Ground Water, Integrated Watershed Management.	6	3
4. Concept of Water Balance, Areas of Water Surplus and Water Deficit, Conflict of Water Resources, Water Pollution,	6	2
5. Water Management, Water Conservation, Water Harvesting, National Water Resource Policy, Conservation of Water Resources of India – Indigenous and Modern Techniques.	6	3

Suggested Readings:

1. Bouwer. H. (1978): Ground WaterHydro/ogy, McGraw Hill Book Co. New York.
2. Chorley. R.J. (1967): Water, Earth and Man, Methuen London.
3. Chorley. R.J. (ed.) (1969): Introduction to Physical Hydrology, Methuen, London.
4. Charlu, T.G.K. and Dutt, DK.: Ground Water Development in India, Rural Electrification Corporation, New Delhi

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COURSE TITLE(MAGP 2203): Advance Geomorphology

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Provide knowledge of the dynamic interactions between Earth's surface processes, geological forces, and environmental changes. Quantitatively describe a landform with the knowledge of geo-morphometry, DEM and Fractals. Understand the basic concepts of fluvial geomorphology, flow regimes, runoff and drainage basin.

Course Outcome:

CO 1: Knowledge of how climate influences geomorphic processes and landforms, including the impacts of climate change on erosion rates, sediment transport, and landscape stability.

CO 2: Understanding the interactions between tectonic processes (e.g., uplift, subsidence, faulting) and landscape evolution, including the role of tectonics in shaping topography over different temporal and spatial scales.

CO 3: Understanding the role of geomorphology in natural hazards such as landslides, floods, coastal erosion, and their implications for hazard assessment, mitigation, and land-use planning.

CO 4: Proficiency in analyzing and interpreting various landforms and landscapes formed by geomorphic processes, such as hillslopes, rivers, glacial features, coastal landforms, and karst landscapes.

CO 5: Ability to assess how human activities and environmental changes (e.g., land use change, deforestation, urbanization) impact geomorphic processes and landscapes.

UNIT I: Advance Geomorphology	Lecture hours (30 hrs)	Weeks
1. Nature and Scope of Advance: Geomorphology, Basic Concepts in Geomorphology Methods and Approaches to the Study of Landforms Geomorphic Scales, Thresholds in Geomorphology.	8	4
2. Neo-Tectonism, Mass Movement and Resultant Landforms, Valley Side	7	3

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Slope. Slope Classification, Theories of Slope Development by Davis Penck, Wood and King		
3. Climatic Geomorphology: Contents and methods, Peltier's Morphogenetic Regions, and Denudation Chronology and Erosion Surfaces, Peneplain. Panplain, and Pediplain.	7	3
4. Structural Geomorphology Uniclinal Faulted and Folded Structures and their resultant Land forms Regional Geomorphology, Concepts and Methods, Bases of Recognition of Geomorphic units, Concepts of Applied Geomorphology and Anthropogenic Geomorphology.	8	4

Suggested Readings:

1. Ahmed, E. (1985): Geomorphology. Kalyani Publishers, New Delhi
2. Bloom. A. L. (1998/2001): Geomorphology. 3rd edition Prentice Hall of India, New Delhi
3. Chorley. R.J. Schumm, S A. and Sugden, D.E. (1984) Geomorphology. Methuen and Company Lad. London
4. Dayal. P. (1994): A Text Book of Geomorphology. Kalyani Publishers, New Delhi

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COURSE TITLE(MAGP 2203): Remote Sensing & Geographical Information System

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Explore how remote sensing data can be integrated into GIS for spatial decision-making and problem-solving. Discuss case studies and applications across various disciplines (e.g., agriculture, forestry, environmental monitoring, and disaster management).

Course Outcome:

CO 1: Understanding the basic principles of remote sensing, including electromagnetic radiation, sensors, platforms (satellites, drones), and image interpretation techniques.

CO 2: Remote Sensing Data Acquisition: Proficiency in acquiring, preprocessing, and

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interpreting remote sensing data from various platforms (satellites, aircraft, drones), sensors (optical, thermal, radar), and resolutions.

CO 3: Image Processing: Competence in processing remote sensing images to extract information about land cover, land use, vegetation indices, water bodies, and other environmental variables.

CO 4: Spatial Analysis: Ability to conduct spatial analysis using GIS tools and techniques, such as overlay analysis, proximity analysis, spatial interpolation, and suitability modeling.

CO 5: Geospatial Data Management: Skills in managing and integrating geospatial data within GIS platforms, including data formats, storage, retrieval, and database management systems.

UNIT I: Remote Sensing & Geographical Information System	Lecture hours (30 hrs)	Weeks
1. Definition of Remote Sensing, Stages Remote Sensing, Basic Concepts in Remote Sensing EMR, Spectral Signature, Platforms and Types of Remote Sensing.	8	3
2. Aerial Photography, Types of Aerial Photographs, Scale of Aerial Photographs, Geometry/ of Aerial Photographs.	7	3
3. Image Interpretation, Elements of Image Interpretation, Visual and Computer Assisted Methods Application of Remote Sensing in Land use/Land cover and Land forms Analysis	7	4
4. Fundamental of Geographic Information System (GIS). Components of GIS. Application of GIS Resource Mapping.	8	4

Suggested Readings:

- 1.Campbell, J.B. (2002): Introduction to Remote Sensing. 5th ed. Taylor & Francis, London.
- 2.Cracknel, A. et al (1990): Remote Sensing Year Book, Taylor and Francis, London.
- 3.Curran, P.J. (1985): Principles of Remote Sensing, Longman, London.
- 4.Deekshatuluj B.L. & Rajan, Y.S (ed.) (1984): Remote Sensing. Indian Act. of Science, Bangalore.
- 5.Floyd. F.. Sabins, Jr. (1986): Remote Sensing: Principles and Interpretation, W.H. Freeman,New York.
- 6.Guham. P.K. (2003): Remote Sensing for Beginners. Affiliated East-West Press Pvt. Ltd.,New Delhi
7. Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press.
8. Jensen J. R., 2004: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall.

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9. Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.
10. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).
11. Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.
12. Rees W. G., 2001: *Physical Principles of Remote Sensing*, Cambridge University Press.
13. Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.
14. Wolf P. R. and Dewitt B. A., 2000: *Elements of Photogrammetry: With Applications in GIS*, McGraw-Hill.
15. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
16. Chauniyal, D.D. (2010) *Sudur Samvedan evam Bhogolik Suchana Pranali*, Sharda Pustak Bhawan, Allahabad

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COURSE TITLE (MAGP 2203): Industrial Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Provide comprehensive knowledge of the spatial organization, economic dynamics, environmental impacts, and societal implications of industrial activities in different geographical contexts.

Course Outcome:

CO 1: Learn knowledge of various industrial processes, including manufacturing, resource extraction, transportation, and logistics, and their spatial distribution across regions.

CO 2: Understanding how globalization influences industrial landscapes, including the role of multinational corporations, trade agreements, and economic policies.

CO 3: Understanding the role of government policies, regulations, and planning in shaping industrial development and mitigating its negative impacts.

CO 4: Analysis of how industrialization contributes to regional development or disparities, including case studies of industrial clusters and their socio-economic impacts.

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CO 5: Awareness of the environmental impact of industrial activities, including pollution, resource depletion, and sustainable practices.

UNIT I: Industrial Geography	Lecture hours (30 hrs)	Weeks
1. Nature and Scope of Industrial Geography	6	2
2. Types, Geographical Characteristics and Location of Industries (Weber's Theory): Small and Medium Industries, Heavy Industries: Coal and Iron based industries, Rural based Industries, Footloose Industry.	6	4
3. Mega Industrial Complexes: National Capital Region, Mumbai-Pune Industrial Region, Bengaluru-Chennai Industrial Region and Chota Nagpur Industrial Region	6	3
4. Impact of Industrialisation in India: Environmental; Social and Economic	6	2
5. Industrial Policy of India	6	2

Suggested Readings:

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

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COURSE TITLE(MAGP 2203): Urban Geography

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

An Urban Geography course focuses on studying the spatial organization, development, and dynamics of cities and urban areas. The objectives of such a course typically aim to provide students with a comprehensive understanding of urban landscapes, their structures, processes, and the socio-economic factors that shape them.

Course Outcome:

CO 1: Studying the infrastructure networks (transportation, communication, utilities) that support urban life and their spatial distribution within cities.

CO 2: Understanding the processes of urbanization, including factors driving urban growth, migration patterns, and demographic changes in urban areas.

CO 3: Understanding principles of urban land use planning, zoning regulations, and policies influencing the development and redevelopment of urban areas.

CO 4: Analyzing the spatial structure of cities, including land use patterns, urban morphology, and the development of urban form over time.

CO 5: Analyzing environmental challenges in urban areas, such as pollution, waste management, urban heat island effect, and the impact of urbanization on ecosystems.

UNIT I: Urban Geography	Lecture hours (30 hrs)	Weeks
1. Urban geography: Introduction, nature and scope	6	2
2. Patterns of Urbanisation in developed and developing countries	6	2
3. Functional classification of cities: Quantitative and Qualitative Methods	6	2
4. Urban Issues: problems of housing, slums, civic	6	3

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amenities (water and transport)		
5. Case studies of Delhi, Mumbai, Kolkata, Chennai and Chandigarh with reference to Land use and Urban Issues	6	3

Suggested Readings:

1. Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
2. Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
3. Hall T., 2006: *Urban Geography*, Taylor and Francis.
4. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: *Urban Geography*, John Wiley.
5. Knox P. L. and McCarthy L., 2005: *Urbanization: An Introduction to Urban Geography*, Pearson Prentice Hall New York.
6. Knox P. L. and Pinch S., 2006: *Urban Social Geography: An Introduction*, Prentice-Hall.
7. Pacione M., 2009: *Urban Geography: A Global Perspective*, Taylor and Francis.
8. Sassen S., 2001: *The Global City: New York, London and Tokyo*, Princeton University Press.
9. Ramachandran R (1989): *Urbanisation and Urban Systems of India*, Oxford University Press, New Delhi
10. Ramachandran, R., 1992: *The Study of Urbanisation*, Oxford University Press, Delhi
11. Singh, R.B. (Eds.) (2001) *Urban Sustainability in the Context of Global Change*, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
12. Singh, R.B. (Ed.) (2015) *Urban development, challenges, risks and resilience in Asian megacities*. *Advances in Geographical and Environmental Studies*, Springer

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5. NPTEL: <https://nptel.ac.in/>

COURSE TITLE (MAGP 2203): Nature Disaster Management

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Nature Disaster Management aims to equip students with the knowledge and skills necessary to understand, mitigate, respond to, and recover from natural disasters effectively. The objectives of such a course typically encompass a range of theoretical foundations, practical applications, and case studies relevant to disaster management.

Course Outcome:

CO 1: Gain knowledge about various types of natural disasters such as earthquakes, hurricanes, tsunamis, floods, droughts, wildfires, and their causes, characteristics, and impacts. Analyze the

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environmental, social, and economic impacts of natural disasters, including long-term consequences and implications for sustainable development.

CO 2: Learn methods to assess the risk of natural disasters in different geographical areas, including vulnerability analysis of populations, infrastructure, and ecosystems.

CO 3: Understand the principles and practices of disaster preparedness, including early warning systems, evacuation planning, and emergency response protocols.

CO 4: Explore strategies to enhance community resilience against natural disasters, including community-based disaster risk reduction initiatives and fostering local capacities.

CO 5: Develop skills in coordinating and managing responses to natural disasters, including the roles of government agencies, NGOs, and international organizations.

UNIT I: Nature Disaster Management	Lecture hours (30 hrs)	Weeks
1. Disasters: Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification	6	3
2. Disasters in India: (a) Flood: Causes, Impact, Distribution and Mapping; Landslide: Causes, Impact, Distribution and Mapping; Drought: Causes, Impact, Distribution and Mapping	6	3
3. Disasters in India: (b) Earthquake and Tsunami: Causes, Impact, Distribution and Mapping; Cyclone: Causes, Impact, Distribution and Mapping.	6	3
4. Manmade disasters: Causes, Impact, Distribution and Mapping	6	3
5. Response and Mitigation to Disasters: Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During and Post Disasters	6	3

Suggested Readings:

1. Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
3. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
4. Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi. Chapter 1, 2 and 3
5. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and

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Mitigation, Rawat Publications, New Delhi.

6. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.

7. Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.

8. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

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4. Swayam: <https://swayam.gov.in/>
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COURSE TITLE(MAGP 2204-P): Remote Sensing & Geographical Information System, (Practical):

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Remote Sensing and Geographic Information Systems (GIS) typically aims to provide students with practical skills in utilizing remote sensing data and GIS technologies for spatial analysis, mapping, and environmental monitoring.

Course Outcome:

CO 1: Learn the Techniques like contrast stretching, histogram equalization, and filtering, Supervised and unsupervised classification methods to categorize land cover types.

CO 2: Conducting spatial queries, buffer analysis, overlay analysis, and spatial statistics.

CO 3: Raster Data Analysis: Analyzing raster datasets such as digital elevation models (DEMs) or satellite imagery.

CO 4: Vector Data Analysis: Working with vector data for tasks like network analysis, proximity analysis, and interpolation.

UNIT I: Remote Sensing & Geographical Information System	Lecture hours (30 hrs)	Weeks
1. Remote Sensing and GIS: Definition and Components,	6	2

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Development, Platforms and Types		
2. Aerial Photography and Satellite Remote Sensing: Principles, Types and Geometry of Aerial Photograph; Principles of Remote Sensing, EMR Interaction with Atmosphere and Earth Surface; Satellites (Landsat and IRS) and Sensors.	6	4
3. GIS Data Structures: Types (spatial and Non-spatial), Raster and Vector Data Structure	6	1
4. Image Processing (Digital and Manual) and Data Analysis: Pre-processing (Radiometric and Geometric Correction), Enhancement (Filtering); Classification (Supervised and Un-supervised), Geo-Referencing; Editing and Output; Overlays	6	4
5. Interpretation and Application of Remote Sensing and GIS: Land use/ Land Cover, Urban Sprawl Analysis; Forests Monitoring	6	4

Suggest Readings:

1. Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press.
2. Jensen J. R., 2004: *Introductory Digital Image Processing: A Remote Sensing Perspective*, Prentice Hall.
3. Joseph, G. 2005: *Fundamentals of Remote Sensing*, United Press India.
4. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).
5. Nag P. and Kudra, M., 1998: *Digital Remote Sensing*, Concept, New Delhi.
6. Rees W. G., 2001: *Physical Principles of Remote Sensing*, Cambridge University Press.
7. Singh R. B. and Murai S., 1998: *Space-informatics for Sustainable Development*, Oxford and IBH Pub.
8. Wolf P. R. and Dewitt B. A., 2000: *Elements of Photogrammetry: With Applications in GIS*, McGraw-Hill.
9. Sarkar, A. (2015) *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
10. Chauniyal, D.D. (2010) *Sudur Samvedan evam Bhogolik Suchana Pranali*, Sharda Pustak Bhawan, Allahabad

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 Nalanda - 803115 (Bihar)

COURSE TITLE(MAGP 2205-P): Project Report/Based on Socio Economic Survey

Total Marks: 100 Course Evaluation: Semester Examination (70 marks) and Internal Assessment (30 Marks)

Course Objective:

Students learn the skills and knowledge necessary to effectively plan, research, write, and present professional project reports.

Course Outcome:

CO 1: Learn how to develop a project plan and write a clear and concise project proposal, including defining objectives, scope, methodology, and deliverables.

CO 2: Acquire skills in collecting and analyzing data using appropriate methods and tools, and interpreting results to draw meaningful conclusions.

CO 3: Conduct a thorough literature review related to the project topic to establish a theoretical framework and contextualize the study within existing research.

CO 4: Enhance writing skills specific to technical and academic contexts, including organizing information logically, using proper citations and references, and adhering to formatting guidelines.

CO 5: Develop research skills necessary for gathering, analyzing, and interpreting data relevant to the project topic or problem statement.

Project Report	Lecture hours (30 hrs)	Weeks
1. Geographic Enquiry: Definition and Ethics; Framing Research Questions, Objectives and Hypothesis; Literature Review; Preparing Sample Questionnaire	6	3
2. Data Collection: Type and Sources of Data; Methods of Collection; Input and Editing	6	3
3. Data Analysis: Qualitative Data Analysis; Quantitative Data Analysis; Data Representation Techniques	6	3
4. Structure of a Research Report: Preliminaries; Text; References, Bibliography and Citations; Abstract	6	3
5. Preparation of Research Report	6	3

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Runkh
Pro Vice Chancellor
KK University
Berauti, Nepura, Bihar Sharif
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Suggested Readings:

1. Creswell J., 1994: *Research Design: Qualitative and Quantitative Approaches* Sage Publications.
2. Dikshit, R. D. 2003. *The Art and Science of Geography: Integrated Readings*. Prentice-Hall of India, New Delhi.
3. Evans M., 1988: "Participant Observation: The Researcher as Research Tool" in *Qualitative Methods in Human Geography*, eds. J. Eyles and D. Smith, Polity.
4. Misra, R.P. (2002) *Research Methodology*, Concept Publications, New Delhi.
5. Mukherjee, Neela 1993. *Participatory Rural Appraisal: Methodology and Application*. Concept Pubs. Co., New Delhi.
6. Mukherjee, Neela 2002. *Participatory Learning and Action: with 100 Field Methods*. Concept Pubs. Co., New Delhi
7. Robinson A., 1998: "*Thinking Straight and Writing That Way*", in *Writing Empirical Research Reports: A Basic Guide for Students of the Social and Behavioural Sciences*, eds. by F. Pryczak and R. Bruce Pryczak, Publishing: Los Angeles.
8. Special Issue on "Doing Fieldwork" *The Geographical Review* 91:1-2 (2001).
9. Stoddard R. H., 1982: *Field Techniques and Research Methods in Geography*, Kendall/Hunt.
11. Wolcott, H. 1995. *The Art of Fieldwork*. Alta Mira Press, Walnut Creek, CA.
12. Yadav, H. (2013) *Shodh Pravidhi Evam Matratamak Bhugol*, Raja Publications, Delhi.

E-Resources

1. e-PG Pathshala: <https://epgp.inflibnet.ac.in/>
2. e-Adhyayan: <https://epgp.inflibnet.ac.in/>
3. National Digital Library of India: <https://ndl.iitkgp.ac.in/>
4. Swayam: <https://swayam.gov.in/>
5. NPTEL: <https://nptel.ac.in/>

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