PROF. RAJENDRA SINGH (RAJJU BHAIYA) UNIVERSITY, PRAYAGRAJ
STRUCTURE OF SYLLABUS FOR THE
PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

Program Structure:

UG SEMESTER – VII / PG SEMESTER - I

Course Code		Course Title	Credits	MM=100	
				CIE	ETE
A	B	C	D		
SEMESTER I (YEAR I)					
A110701T	CORE	GEOMORPHOLOGY	4	**25**	**75**
A110702T	CORE	GEOGRAPHY OF INDIA	4	**25**	**75**
A110703T	CORE	RESEARCH METHODOLOGY	4	**25**	**75**
A110704T	DISCIPLINE CENTRIC ELECTIVE (Select any one)	ECONOMIC GEOGRAPHY	4	**25**	**75**
A110705T		BIOGEOGRAPHY			
A110706P	DISCIPLINE CENTRIC ELECTIVE (Select any one)	BASIN MORPHOMETRIC AND HYDROLOGICAL ANALYSIS	4	**25**	**75**
A110707P		CARTOGRAPHIC ANALYSIS			

UG SEMESTER – VIII
(For Four Year Undergraduate Program)

Course Code		Course Title	Credits		
A110801T	CORE	CLIMATOLOGY AND HYDROLOGY	4	**25**	**75**
A110802T	CORE	GEOGRAPHICAL THOUGHT	4	**25**	**75**
A110803R	RESEARCH PROJECT	RESEARCH PROJECT ON REMOTE SENSING & GIS	12		100

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PG SEMESTER -II **(For Two Year Post Graduate Program – lateral Entry)**					
A110801T	CORE	CLIMATOLOGY AND HYDROLOGY	4	**25**	**75**
A110802T	CORE	GEOGRAPHICAL THOUGHT	4	**25**	**75**
A110803T	DISCIPLINE CENTRIC ELECTIVE (Select any one)	BASIC OF REMOTE SENSING & GEOGRAPHIC INFORMATION SYSTEM	4	**25**	**75**
A110804T		POLITICAL GEOGRAPHY			
A110805T	DISCIPLINE CENTRIC ELECTIVE (Select any one)	AGRICULTURE GEOGRAPHY	4	**25**	**75**
A110806T		RESOURCE GEOGRAPHY			
A110807P	ABILITY ENHANCHMENT ELECTIVE (Select any one)	REMOTE SENSING & SURVEYING PRACTICAL	4	**25**	**75**
A110808P		STATISTICAL METHODS IN GEOGRAPHY			
SEMESTER III (YEAR II)					
A110901T	CORE	ENVIRONMENTAL GEOGRAPHY	4	**25**	**75**
A110902T	CORE	POPULATION & SETTLEMENT GEOGRAPHY	4	**25**	**75**
A110903T	CORE	REGIONAL PLANNING	4	**25**	**75**
A110904T	DISCIPLINE CENTRIC ELECTIVE (Select any one)	GEOGRAPHY OF RURAL SETTLEMENT	4	**25**	**75**
A110905T		URBAN GEOGRAPHY			
A110906P	GENERIC ELECTIVE (Select any one)	METHODS AND TECHNIQUES IN RURAL SETTLEMENTS	4	**25**	**75**
A110907P		METHODS AND TECHNIQUES OF URBAN GEOGRAPHY			
PG SEMESTER IV/ PG SEMESTER II (ONE YEAR PG PROGRAMME)					
A111001R	MAJOR RESEARCH PROJECT/ DISSERTATION	MORPHOMETRIC ANALYSIS AND SOCIO-ECONOMIC SURVEY BASED MASTER THESIS	20		100

Program Outcomes

After the completion of M.A. Program in Geography, Students will be able to -

PO-1 Demonstrate a comprehensive understanding of the principles, theories, methodologies of geography as well as possess a broad knowledge base in various subfields of geography, including physical geography, human geography, GIS (Geographic Information Systems), remote sensing, urban geography, and environmental geography.

PO-2 Develop strong research skills, including the ability to critically analyze geographic issues, design, implement research projects, gather/interpret data, present their findings effectively by using various research methods/techniques used in geography.

PO-3 Understand the interconnectedness of global systems such as the hydrosphere, atmosphere, biosphere and their roles in shaping natural processes, climate patterns, and on human activities.

PO-4 Proficient in spatial analysis techniques and tools, such as GIS/remote sensing. Collect, analyze, and interpret spatial data to understand patterns, relationships, and trends in various geographic phenomena.

PO-5 Develop critical thinking skills to evaluate and interpret complex geographic issues and problems. Apply geographic concepts and theories to analyze real-world situations, assess the impacts of human activities on the environment, and propose sustainable solutions.

PO-6 Present strong oral and written communication skills, allowing them to effectively communicate geographic information and research findings to both specialist and non-specialist audiences. Such as to write reports, publish scholarly articles, present papers at conferences, and contribute to policy discussions.

PO-7 Select an interdisciplinary approach, integrating knowledge from other fields such as environmental science, urban planning, sociology, economics, and political science to understand as well as address complex geographical issues from multiple angles.

PO-8 Prepare career readiness as students for various career paths in academia, government agencies, non-profit organizations, research institutions, urban planning, environmental management, cartography, international development, and consulting. They possess the skills and knowledge necessary to pursue further research or professional opportunities in geography.

PO-9 Gain a broader perspective on global issues like global and cultural awareness, including climate change, population dynamics, urbanization, social inequalities as well as the importance of understanding global interconnectedness and cultural diversity.

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UG SEMESTER – VII / PG SEMESTER - I
PAPER - I – GEOMORPHOLOGY (CORE PAPER)

Course Outcomes:

After the completion of this course, Students will be able to –

CO-1 Identify and describe different types of landforms such as mountains, valleys, plains, plateaus, dunes, river channels, beaches, and deltas. Interpret the formation and evolution of landforms based on their characteristics and spatial patterns.

CO-2 Present a comprehensive understanding of the various processes shaping the Earth's landforms including weathering, erosion, mass wasting, fluvial processes, glacial processes, coastal processes, and tectonic processes.

CO-3 Apply the acquire skills in mapping landforms, interpreting geomorphic features on topographic maps, aerial photographs, and satellite imagery.

CO- 4 Easily read and interpret contour lines, analyze slope gradients, and recognize landforms based on their visual representations.

CO- 5 Develop proficiency in applying quantitative methods and tools to analyze geomorphic data.

CO- 6 calculating stream discharge, sediment transport rates, erosion rates, other relevant measurements. Use of statistical techniques to analyze and interpret data related to landforms and processes.

CO- 7 Assess the geomorphic history and evolution of landform development. Similarly learn about the principles of stratigraphy and geomorphic dating methods, enabling them to reconstruct past landform changes and interpret landscape histories.

CO- 8 Evaluate geomorphological knowledge and principles to practical situations and real-world problems. This includes understanding the impacts of landform processes on human activities, such as land use planning, natural hazard assessment, and environmental management.

CO- 9 Produce effectively communicate and present geomorphological concepts, findings, and interpretations both orally and in written form. They will learn to prepare reports, research papers, and presentations that clearly convey their understanding and analysis of geomorphic phenomena.

Course Content

Paper Code: A110701T	**Paper Title: Geomorphology**	**Theory Core Paper**
Unit – I: Meaning, scope and Fundamental Concepts of geomorphology, Modern geomorphologists – Hutton, Strahler, King.		
Unit – II: Endo-genetic process: Plate tectonic, Mountain, Building, Vulcanicity, Seismicity, Earthquakes, Tsunami, Isostasy.		
Unit – III: Geomorphometric Analysis – Drainage density, Drainage frequency, Bifurcation ratio, Slope types and analysis.		
Unit – IV: Development of Geomorphology in India, Recent trends in Geomorphology, Applied Geomorphology, Regional geomorphology of Indo-Gangetic plain Raj Mahal hills and Malwa Plateau.		

Books Recommended

1. Ahmed, E. (1985): Geomorphology. Kalyani Publishers, New Delhi.
2. Bierman, P.R. and Montgomery, D.R. (2019): Key Concepts in Geomorphology, (2nd ed.). W.H. Freeman
3. Bloom, A. L. (1998/ 2001): Geomorphology. 3rd edition. Prentice Hall of India, New Delhi.
4. Chorley, R.J., Schumm, S. A. and Sugden, D. E. (1984): Geomorphology. Methuen and Company Ltd., London.
5. Dayal, P. (1994): A Text Book of Geomorphology. Kalyani Publishers New Delhi.
6. Dey, S. and Mandal, S. (2022): Riverbank Erosion Hazards and Channel Morpho dynamics- A perspective of Fluvial Geomorphology. Routledge Publication.
7. Fairbridge, R.W. (ed.) (1968): Encyclopedia of Geomorphology, Reinhold Book Corporation. New York
8. Gregory, K.J. and Walling, D.E. (1973): Drainage Basin Form and Process. Edward Arnold, London.
9. Huggett, R. J. (2016): Fundamentals of Geomorphology, (4th ed.). Routledge Fundamentals of Physical Geography
10. Jog, S. R. (ed.) (1995): Indian Geomorphology (2 vols.). Rawat Publications, Jaipur

11. Kale, V. and Gupta, A. (2001): Introduction to Geomorphology. Orient Longman, Hyderabad.
12. King, C.A.M. (1966): Techniques in Geomorphology. Edward Arnold, London.
13. Pethick, J. (1984): An Introduction to Coastal Geomorphology. Arnold, London. Indian reprint 2000.
14. Sharma, P. R. (ed.), (1993): Applied Geomorphology in Tropics. Rishi Publications, Varanasi.
15. Siddhartha, K. (2018): The Earth's Dynamic Surface-A book of Geomorphology. Kitab Mahal publication, India.
16. Singh, C.P. (2022): Applied Geomorphology-A Study,
17. Singh, S. (2004): Geomorphology. Prayag Pustak Bhawan, Allahabad.
18. Sparks, B.W. (1986): Geomorphology. Longmans, London.
19. Thornbury, W.D. (2005): Principles of Geomorphology. John Wiley and Sons, New York.
20. Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography- An Outline of Geomorphology. Longman, London.

- **https://www.sciencedirect.com/journal/geomorphology**
- **https://www.nature.com/subjects/geomorphology**
- **https://study.sagepub.com/sites/default/files/01_Gregory_Lewin%28web%29_Ch-01%20_1.pdf**
- **https://r.search.yahoo.com/_ylt=Awr489KdG4xk2H8IeXxXNyoA;_ylu=Y29sbwNncTEEcG9zAzIEdnRpZANBREVOR1QxXzEEc2VjA3Ny/RV=2/RE=1686932509/RO=10/RU=https%3a%2f%2farchive.org%2fdetails%2fgeomorphologybooks/RK=2/RS=0cVyOrSom2OwJ98NdHLOxoNtymY-**
- **https://www.youtube.com/watch?v=pw6EpWR4KOE&list=PLUStaOtXfx03nMWcaJxuE2RVUkixn7F0E**
- **https://www.youtube.com/watch?v=B6h4UAhHxlg&pp=ygUbZ3JvbWFycGhvbG9neSBlIHBnIHBhdGhzYWxh**
- **https://www.youtube.com/watch?v=E2Hx_6fmEv8&pp=ygUbZ3JvbWFycGhvbG9neSBlIHBnIHBhdGhzYWxh**
- **https://www.youtube.com/watch?v=udcnK4QNNw&list=PL_a1TI5CC9RHiT7Aya4jqe7erW6itQvGz**

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UG SEMESTER – VII / PG SEMESTER - I
PAPER - II – GEOGRAPHY OF INDIA (CORE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Identify and develop a comprehensive understanding of the physical geography of India. Its diverse landforms, such as the Himalayas, the Indo-Gangetic Plain, the Western Ghats and the coastal plains. Explore the country's major rivers, including the Ganges, Brahmaputra, Godavari and their associated river systems.

CO- 2 List climatic regions of India and the factors that influence its climate, such as the monsoon system, the influence of the Himalayas, the impact of ocean currents, seasonal variations, rainfall patterns and temperature distribution across different regions of the country.

CO- 3 Analyze the India's rich and diverse natural resources. Its mineral resources including coal, iron ore, petroleum, natural gas as well as its agricultural resources and biodiversity. Also explore the challenges and issues related to the sustainable management of these resources.

CO- 4 Explain cultural diversity and regional variations in language, religion, and social customs across the country. Similarly, examine the spatial organization of economic activities, patterns of agricultural, industrial and service sectors.

CO- 5 Critically evaluate and understand India's political organization, its states, union territories, and administrative divisions, including the federal system and the role of regional and local governments.

CO- 6 Examine geopolitical issues, border disputes, international relations involving India. Critically analyze the development challenges and issues faced by India such as poverty, inequality, rural-urban disparities, environmental degradation, and sustainable development.

CO- 7 Revise the strategies and policies implemented to address these challenges, including rural development programs, urban planning initiatives, and environmental conservation efforts.

Course Content

Paper Code: A110702T	**Paper Title: Geography of India**	**Theory Core Paper**
Unit – I: India through geological times, Structure and Relief regions, Physiographic division, Drainage system, soil types.		
Unit – II: Climatic characteristics, Mechanism of Indian Monsoon, Climatic Regions, Natural Vegetation & wild life.		
Unit - III: Agricultural Characteristics and Trends, Crop Combination regions, Green Revolution, White revolution, Blue revolution, and Yellow revolution.		
Unit – IV: Industrial region, Transport system – rail, road, air. Population growth, Population distribution and density, age-sex pyramid, National population policy.		

Books Recommended.

1. Chapman, G. and Baker, K.M. (eds.) (1992): The Changing Geography of Asia. Routledge, London.
2. Farmer, B.H. (1983): Introduction to South Asia. Methuen and Company Ltd. and Company Ltd., London.
3. Ganguly, S. and Neil, De Votta (eds.) (2003): Understanding Contemporary India. Lynne Reinner Publishers., Boulder and London.
4. Johnson, B. L. C. (ed.) (2001): Geographical Dictionary of India. Vision Books, New Delhi.
5. Johnson, B.L.C. (1983): Development in South Asia. Penguin Books, Harmonsworth.
6. Khullar, D. R. (2006): India. A Comprehensive Geography. Kalyani Publishers., New Delhi.
7. Krishnan, M. S. (1968): Geology of India and Burma. 4th edition. Higgin Bothams Private Ltd., Madras.
8. Nag, P. and Gupta, S. S. (1992): Geography of India. Concept Publishing. Company, New Delhi.
9. Sharma, T. C. (2003): India: Economic and Commercial Geography. Vikas Publication., New Delhi.

10. Singh, J. (2003): India: A Comprehensive and Systematic Geography. Gyanodaya Prakashan, Gorakhpur.
11. Singh, R. L. (ed.) (1971): India. A Regional Geography. National Geographical Society of India, Varanasi.
12. Spate, O.H.K., Learmonth, A.T.A. and Farmer, B. H. (1979): India and Pakistan. Methuen and Company Ltd. and Company Ltd., London.
13. Subbarao, B. (1959): The Personality of India. University of Baroda Press, Baroda.
21. Tirtha, R. (2002): Geography of India. Rawat Publications., Jaipur and New Delhi.
22. Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad
23. Wadia, D. N. (1959): Geology of India. MacMillan and Company, London and Madras. Student edition.

- https://www.youtube.com/watch?v=6RpBcta1uSc&pp=ygUiZ2VvZ3JhcGh5IG9mIGluZGlhIGUgcGcgcGF0aHNoYWxhIA%3D%3D
- https://www.youtube.com/watch?v=6RpBcta1uSc&pp=ygUiZ2VvZ3JhcGh5IG9mIGluZGlhIGUgcGcgcGF0aHNoYWxhIA%3D%3D
- https://www.youtube.com/watch?v=DU68SAYEQ8&pp=ygUiZ2VvZ3JhcGh5IG9mIGluZGlhIGUgcGcgcGF0aHNoYWxhIA%3D%3D
- https://r.search.yahoo.com/_ylt=Awr91zzIJoxk8p4HlApXNyoA;_ylu=Y29sbwNncTEEcG9zAzEEdnRpZANBREVOR1QxXzEEc2VjA3Ny/RV=2/RE=1686935369/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1h6i8p2dwju-Zx9sTzuEebYFWJyDqwFdR%2fview%3fusp%3dsharing/RK=2/RS=OgqmgfW6ros2oA_FkcixUJ0ByvY-
- https://r.search.yahoo.com/_ylt=Awr91zzIJoxk8p4HlQpXNyoA;_ylu=Y29sbwNncTEEcG9zAzIEdnRpZANBREVOR1QxXzEEc2VjA3Ny/RV=2/RE=1686935369/RO=10/RU=https%3a%2f%2fncert.nic.in%2ftextbook.php%3fkegy2%3d0-16/RK=2/RS=Ar5PWi71Dh0MmsjGMmk.eGQF0aI-
- https://drive.google.com/file/d/1h6i8p2dwju-Zx9sTzuEebYFWJyDqwFdR/view
  https://ngji.in/index.php/ngji

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UG SEMESTER – VII / PG SEMESTER - I
PAPER - III – RESEARCH METHODS AND TECHNIQUES
(CORE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Identify the components of research design, such as problem formulation, research questions, hypotheses, and variables.

CO- 2 Gain knowledge about surveys, experiments, interviews, focus groups, observations, case studies, and archival research.

CO- 3 Understand the strengths, limitations, and applications of each research method and the ethical considerations involved.

CO- 4 Able to design and administer surveys, conduct interviews and focus groups, and carry out observations. Also explore techniques for sampling, data coding, and data management.

CO- 5 Analysis of Quantitative Data with the help of descriptive statistics, correlation analysis, hypothesis testing, and regression analysis.

CO- 6 Apply ethical considerations in research, including informed consent, confidentiality, privacy, and avoiding plagiarism.

CO- 7 Develop skills in writing research proposals like to formulate research questions, write literature reviews, develop research hypotheses, and design a research plan.

CO- 8 Effectively communicate scientific information to diverse audiences, including researchers, professionals, and stakeholders.

Course Content

Paper Code: A110903T	**Paper Title: Research Methods and Techniques.**	**Theory Core Paper**
Unit – I: Meaning and objectives of Research: Concept and significance of research in geography, Philosophy and methods: empiricism, positivism, behaviorism.		
Unit – II: Planning Research and Data Generation: Primary and secondary data: Data collection and arrangement; Research design; Participatory research; Framing pilot and research project; Making survey-questionnaire.		

Unit – III: Theories and Techniques: Model making, Application of system theory; Application and relevance of statistical and cartographic techniques; Application of computer and GIS.
UNIT - IV: Analysis, writing and Dissemination: Production and arrangement of data; Analysis of data and maps; Quantitative and qualitative interpretations; writing manuals (arranging themes, maintaining coherence, cross-comparison, concluding, referencing, noting); Proof marks and marked proof; writing a research paper/report.

Books Recommended:

1. Ahuja, R. (2001): Research Methods, Rawat Publications Jaipur and New Delhi.
2. Bhattacharyya, D.K. (2005): Research Methodology, Excel Books, New Delhi.
3. Blackburn, J. and Holland, J. (cds.) (1998): Who changes? Institutionalizing Participation in Development, IT Publications, London.
4. Blaxter, L., IIughes, C. and Tight, M. (1996): How to Research. Open University Press, Buckingham.
5. Crang, Mike 1999. Cultural Geography. Routledge, London.
6. Daniels, P., Bradshaw, M., et al. (2000): Human Geography: Issues for the 21st Century, Prentice Hall, London, and Pearson Publishers., Singapore, Indian reprint, 2003.
7. Denzin, N.K. and Lincoln, Y.S., (eds.) Handbook of Qualitative, Research. Thousand Oaks CA, Sage Publications.
8. Dikshit, R.D. (2003): The Art and Science of Geography: Integrated Readings, Prentice & Hall of India, New Delhi.
9. Dorling, D. and Simpson, L. (eds.) (1999): Statistics in Society. Edward Arnold, London.
10. Fisher, P. and Unwin, D., (eds.) (2002) virtual Reality in Geography. Taylor and Francis, London.
11. Flowerdew, R. and Martin, D. (eds.) (1997): Methods in Human Geography. A Guide for Students Doing a Research Project, Longman, Harlow.
12. Hay, I. (ed) (2000): Qualitative Research Methods in Human Geography. Oxford University Press, New York.
13. Henn, M., Mark W., and Nice F. (2006): A Short Introduction to Social Research, vistaar Publications, New Delhi.
14. Eyles J. and Smith D.M. (1988): Qualitative Methods in Human Geography, Polity Press Dales Brewering Cambridge.
15. Kitchin R. and Tate, N., (2001): Conducting Research into Human Geography, Theory, Methodology and Practice, Prentice- Hall London.

16. Kitchin, R. and Fuller, D., (2003): The Academic's guide to Publishing, Vistaar Publications, New Delhi
17. Limb, M. (2001) Qualitative Methodologies for Geographers. Issue and Debates, Edward Arnold, London.
18. Lofland, J. and Lofland, L.H. (1995): Analyzing Social Setting, A Guide to Qualitative Observation and Analysis, Wadsworth, Belmont, CA.
19. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): Geographic Information Systems. Principles, Techniques, Management, Applications. John Wiley and Sons, New York.
20. Maso, I., Atkinson, P.A. Delamont, S. and Verhoeven, J.C. (eds.) (1995): Openness in Research. The Tension Between Self and Other. Van Corcum, Assen, Netherlands.
21. Mikkelsen, B. (2005) Methods for Development Work and Research: A New Guide for Practitioners, Sage Publications, London.
22. Mukherjee, N. (1993): Participatory Rural Appraisal: Methodology and Application. Concept Publishing Company, New Delhi.
23. Mukherjee, N. (2002): Participatory Learning and Action: with 100 Field Methods. Concept Publishing Company, New Delhi.
24. O' Leary, Z. (2005): The Essential Guide in Doing Research, vistarr Publications, New Delhi.
25. Pacione, M., (ed) 1999): Applied Geography: Principle and Practice. Routledge, London.
26. Parsons, T. and Knight, P.G., (1995): How to Do Your Dissertation in Geography and Related Disciplines, Chapman and Hall, London.
27. Patrick M. and Chapman S. (1990): Research Methods (Third Edition), Routledge, London
28. Peet, R. and Thrift N. (ed.) (1989/2002): New Models in Geography (2vols.) Rawat Publishers, Jaipur and New Delhi.
29. Rachel, P. et al (2001) Introducing Social Geographics, Arnold Hodder Group, London, and Oxford University Press, Oxford.
30. Robson, C. (1993): Real World Research. A Resource for Social Scientists and Practitioners-Researchers, Blackwell Publishers, Oxford.
31. Rogers, A. and Viles, H.A. (2003): The Student's Companion to Geography, Blackwell Publishers, Oxford. Indian reprint available.
32. Sheskin, Ira, M. (1987): Survey Research for Geographers, Scientific Publishers, Jodhpur.
33. Silverman, D. (1993): Interpreting Qualitative Data. Methods for Analyzing Talk, Text and Interaction. Sage Publications, London.
34. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. Kalyani Publishers, Ludhiana and New Delhi (English and Hindi editions).

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UG SEMESTER – VII / PG SEMESTER - I
PAPER - IV – ECONOMIC GEOGRAPHY (ELECTIVE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Identify the impact of globalization on the spatial organization of economic activities, trade, investment, and the integration of economies.

CO- 2 Gain knowledge of location theory and the spatial organization of economic activities such as agglomeration, economies of scale, transportation costs, and the role of infrastructure in shaping the location of industries and businesses.

CO- 3 Explain primary industries such as agriculture, mining, and forestry, as well as secondary industries such as manufacturing and construction. They will also study tertiary industries, including services, tourism, finance, and transportation.

CO- 4 Analyze trade patterns, global supply chains, and the geography of international trade such as comparative advantage, trade flows, trade agreements, and the role of multinational corporations in global production networks.

CO- 5 List the factors influencing the growth and decline of cities and regions, including industrialization, urbanization, and technological change. Explore the concept of economic clusters, innovation systems, and the role of entrepreneurship in fostering economic development.

CO- 6 Critically evaluate government policies of India and interventions aimed at promoting economic development, reducing regional disparities, and addressing social and environmental challenges and analysis the role of economic planning in shaping urban and regional economies.

CO- 7 Assess spatial dimensions of poverty, gender inequality, and social exclusion. Plan the strategies for inclusive economic development, sustainable livelihoods, and equitable resource allocation.

CO- 8 Effectively communicate economic information to diverse audiences, including policymakers, business professionals, and the general public.

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Course Content

Paper Code: A110704T	**Paper Title: Economic Geography**	**Theory, Discipline Centric Elective**
Unit – I: Meaning and scope of economic geography, Approaches to study of economic geography, Recent trends in economic geography.		
Unit – II: Evolution of world economic system, Concept and Models of Development, Agricultural location models - Vonthunen and Hagerstand		
Unit – III: Classification of industries: Iron & steel, textile, sugar & Petro-Chemical; Theories of Industrial location -Weber, Losch, Isard & Hoover.		
Unit – IV: Theories of transport development, Economic regions and their salient features. Impact of WTO, Globalization, Liberalization, Economy of developing world.		

Books Recommended:

1. Alexander, J.W., Economic Geography, Prentice- hall, New Delhi.
2. Robinson A.H., Jones, C.F. and Darkenwarld G.G., Principles of Economic Geography.
3. Boesh Hans, A Geography of World Economy, Von Nostrand, New York.
4. Bengston and Royen, Fundamentals of Economic Geography.
5. Zimmerman, E.W., Introduction to World Resources.
6. Chisholm M., Modern World Development – A Geographical Perspective.
7. Singh K.N. & Singh J., Arthik Bhoogol Ke Mool Tatva (Hindi), Gyanodaya Prakashan, Gorakhpur.
8. Jain, P. Arthik Bhoogol Ki Samiksha (Hindi).
9. Srivastava V.K. & Rao B.P., Arthik Bhoogol.
10. Wheeler, J.O. et al: Economic Geography, John Wiley, New York 1995.
11. Robertson, D. (2001): “Globalization and Environment, E. Elgas Co. U.K.

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UG SEMESTER – VII / PG SEMESTER - I
PAPER - V – BIOGEOGRAPHY (ELECTIVE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Present a comprehensive understanding of the fundamental concepts /principles of biogeography, the distribution patterns of organisms, factors influencing species distribution and the processes that shape biodiversity across the world.

CO- 2 Identify the major terrestrial and aquatic biomes around the world, including forests, grasslands, deserts, tundra, freshwater ecosystems, marine ecosystems, flora and fauna of each biome, as well as the ecological processes and sustainable ecosystems.

CO- 3 Analyze the patterns of species distribution at various scales, from global to regional and local, concepts of endemism, species richness, species diversity, the factors that influence species distribution, including climate, topography, geology, and historical events.

CO- 4 Explain different biogeographic regions, realms across the globe and the major biogeographic classifications, such as the Nearctic, Palearctic, Neotropical, Afrotropical, Indo-Malayan, and Australasian regions.

CO- 5 Evaluate connections between biogeography and evolutionary biology such as speciation, dispersal, extinction, adaptive radiation and how they contribute to the formation and distribution of species.

CO- 6 Critically examine the role of biogeography in understanding phylogenetic relationships and evolutionary history.

CO- 7 Apply biogeographic principles to address real-world issues and challenges such as biodiversity conservation, habitat fragmentation, invasive species, biotic responses to climate change, and the impact of human activities on biogeographic patterns.

CO- 8 Analyze case studies and develop strategies for managing and protecting biodiversity.

Course Content

Paper Code: A110705T	**Paper Title: Biogeography**	**Theory, Discipline Centric Elective**
Unit – I: Bio-geography: Development, Fields, Function and Problem, Biosphere-definition, nature, and composition.		
Unit – II: Plant community and biotic succession- Plant community, classification of plants, biotic succession, climax vegetation, mono-climax theory, and poly climax theory.		
Unit – III: Animal Community- meaning and concept, classification of animals, origin and evolution of animals, dispersal of animals, Extinction of species and world distribution of animals.		
Unit – IV: Biomass- meaning and type, Bio-geographical realm: Zoogeography and Zoogeographical realm, biodiversity Hot spot.		

Books Recommended

1. Agrawal, S.K. (199). Fundamental of ecology, Ashish publisher, New Delhi.
2. Bradshaw M.J. (1979). Earth and Living planet, ELBS London
3. Moore, P.D. (1993). Biogeography: An ecology and Evolution Approach, Blackwell
4. Huggett, R.J. (1998). Fundamentals of Biogeography, Routledge, U.S.A.
5. Lapedes, D.N. (ED) (1974). Encyclopedia of Environmental science, Mathur, H.S. (1998). McGraw Hill.
6. Mathur, H. S. (1998). Essential of Biogeography, Anuj Printers, Jaipur.

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- https://www.youtube.com/watch?v=ljsikUnCg9g&pp=ygUcYmlvZ2VvZ3JhcGh5IGUgcGcgcGF0aHNoYWxhIA%3D%3D
- https://www.academia.edu/19967507/Fundamentals_of_Biogeography_Second_Edition
- https://archive.org/details/Biogeography.Space.Time.and.Life.2003.MacDonald
- https://www.researchgate.net/publication/259706424_Biogeography

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STRUCTURE OF SYLLABUS FOR THE
PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

UG SEMESTER – VII / PG SEMESTER - I
PAPER - VI – BASIN MORPHOMETRY, GEOLOGICAL MAP AND HYDROLOGICAL ANALYSIS (PRACTICAL PAPER, DISCIPLINE CENTRIC PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Develop a comprehensive understanding of basin morphometry, which involves the quantitative analysis of the shape, size, and relief characteristics of drainage basins with the help of morphometric parameters, including drainage density, stream order, basin area, basin shape, slope, relief, and stream network patterns.

CO- 2 Proficient in analyzing different types of rocks, rock formations, geological structures, and geologic features depicted geological maps. Relationship between geological features and landforms and their implications for hydrological processes, such as groundwater flow, surface water runoff and erosion.

CO- 3 Apply various hydrological analysis techniques to study water-related processes in drainage basins, estimating hydrological parameters, including precipitation, evapotranspiration, streamflow, and groundwater recharge. Use of statistical analysis tools to analyze hydrological data, assess water availability and understand the dynamics of water resources in a basin.

CO- 4 Critically evaluate integrate morphometric analysis with hydrological analysis to understand the relationships between basin characteristics and hydrological processes. Examine the impact of geological features on hydrological processes and water resource management.

CO- 5 Gain practical skills in using Geographic Information Systems (GIS) and remote sensing techniques for basin morphometry, geological mapping, and hydrological analysis. Also digitize and analyze spatial data, create maps, and perform spatial analysis to study basin characteristics, hydrological processes, in mapping geological features and monitoring hydrological changes.

CO- 6 Produce effective communication skill to describe findings and analysis in reports writing, research papers, and technical documents related to basin morphometry, geological mapping, and hydrological analysis.

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Course Content

Paper Code: A110706P	**Paper Title: Basin Morphometry, Geological Map and Hydrological Analysis**	**Practical, Discipline Centric Elective**
Part A: Basin Morphometry, Geological Map and Hydrological Analysis		
Unit – I: Drainage Basin Morphometry: Delineation of basin; Linear aspects: stream ordering, bifurcation ratio, law of stream numbers, length ratio, law of Stream length. **Areal Aspects:** stream frequency, drainage density, circularity ratio; **Relief aspects:** hypsometric curve, hypsometric integral curve, clinographic curve.		
Unit-II: Advance exercises on geological maps: fold, fault and unconformable rock series.		
Unit – III: Hydrological Analysis: Water balance graph and determination of the components; Calculation of climatic indices: rainfall-runoff relationship; Hydro-graphs: components and separation; Unit hydrograph; Flood: frequency and flood peak estimation.		
Note: Practical record (Unit I, II & III) **Viva-Voce examination**		

Books Recommended:

1. Monkhouse, F.J. Maps & Diagrams.
2. Robinson, A.H. Elements of Cartography.
3. Singh, R.L., Elements of Practical Geography.
4. Singh, L.R. & Singh, R.N. Map Work and Practical Geography (Eng./Hindi)
5. Sharma, J.P. Prayogatmak Bhoogol Ki Rooprekha (Hindi)
6. Hira Lal, Prayogatmak Bhoogol Ke Adhar (Hindi)
7. Lal, Hira, Matratmak Bhoogol (Hindi)
8. Tiwari, R.C. and Tiwari, Sudha, Abhinav Prayogic Bhoogol.

- https://www.youtube.com/watch?v=jK8hH1JUAw&pp=ygUbY2FydG9ncmFwaHkgZSBwZyBwYXRoc2hhbGEg
- https://www.youtube.com/watch?v=YLwNny_gjO0&pp=ygUbY2FydG9ncmFwaHkgZSBwZyBwYXRoc2hhbGEg
- https://www.youtube.com/watch?v=gd_gj2A4scw&pp=ygUbY2FydG9ncmFwaHkgZSBwZyBwYXRoc2hhbGEg
- https://archive.org/details/cartographythema0000dent_h5e6
- https://archive.org/details/elementsofcartog01robi

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STRUCTURE OF SYLLABUS FOR THE
PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

UG SEMESTER – VII / PG SEMESTER - I
PAPER - VII – CARTOGRAPHIC ANALYSIS (PRACTICAL PAPER DISCIPLINE CENTRIC PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Understand the importance of cartographic principles in creating accurate and effective maps for analysis, design, symbolization, scale, projection, generalization and communication.

CO-2 Get proficiency in interpreting and analyzing maps. As to read and understand different types of maps, including thematic maps, topographic maps, satellite imagery, and digital maps.

CO-3 Learn and apply various geospatial technologies for cartographic analysis. Use of Geographic Information Systems (GIS) software to manipulate and analyze spatial data, create thematic maps, perform spatial queries, and overlay different data layers.

CO- 4 Analyze spatial data using cartographic techniques like to measure distances, areas, and angles on maps, as well as perform spatial analysis, such as buffering, overlay analysis, and spatial interpolation.

CO- 5 Apply these techniques to address specific research questions or solve real-world problems.

CO-6 Evaluate different map products, assess the quality and reliability of spatial data, and critically analyze the limitations and biases inherent in maps and to support decision-making processes in various fields, such as urban planning, environmental management, and transportation.

CO-7 Effectively communicate their cartographic analysis results through reports writing, creating visually appealing maps, and presenting their analysis findings to diverse audiences.

CO-8 Develop an awareness of the ethical responsibilities and the importance of using accurate and reliable data sources in cartographic analysis.

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Course Content

A110707P	**Paper Title: Cartographic Analysis**	**Practical, Discipline Centric Elective**
Unit – I: Map Projection: Mathematical Construction and Properties of, Bonne's, Gall's, Sinusoidal, and Mercator's projection.		
Unit –II: Mathematical Construction and Properties of Polar Zenithal Gnomonic, Polar Zenithal Stereographic and Polar Zenithal Orthomorphic Projections.		
Unit – III: Block diagrams		
Unit – IV: Geological maps and cross section Horizontal, Inclined,		
Note: **Practical record** **Viva-Voce examination**		

Recommended Readings:

1) Monkhouse, F.J. Maps & Diagrams.
2) Robinson, A.H. Elements of Cartography.
3) Singh, R.L., Elements of Practical Geography.
4) Singh, L.R. & Singh, R.N. Map Work and Practical Geography (Eng./Hindi)
5) Sharma, J.P. Prayogatmak Bhoogol Ki Rooprekha (Hindi)
6) Hira Lal, Prayogatmak Bhoogol Ke Adhar (Hindi)
7) Lal, Hira, Matratmak Bhoogol (Hindi)
8) Tiwari, R.C. and Tiwari, Sudha, Abhinav Prayogic Bhoogol.

- https://www.youtube.com/watch?v=jK8hH1JUAw&pp=ygUbY2FydG9ncmFwaHkgZSBwZyBwYXRoc2hhbGEg
- https://www.youtube.com/watch?v=YLwNny_gjO0&pp=ygUbY2FydG9ncmFwaHkgZSBwZyBwYXRoc2hhbGEg
- https://www.youtube.com/watch?v=gd_gj2A4scw&pp=ygUbY2FydG9ncmFwaHkgZSBwZyBwYXRoc2hhbGEg
- https://archive.org/details/cartographythema0000dent_h5e6
- https://archive.org/details/elementsofcartog01robi

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STRUCTURE OF SYLLABUS FOR THE
PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

UG SEMESTER – VIII / PG SEMESTER - II
PAPER - I – CLIMATOLOGY & HYDROLOGY (CORE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO-1 Develop a comprehensive understanding of the components and processes of the climate system. The interactions between the atmosphere, hydrosphere, lithosphere, biosphere, and cryosphere.

CO-2. Gain knowledge of the essential climate elements as temperature, precipitation, humidity, air pressure, wind patterns, solar radiation, and atmospheric composition.

CO-3. Identify and classify different climate types based on temperature and precipitation patterns, and understand the climatic characteristics associated with each type.

CO-4 Interpret and analyze meteorological data, including temperature records, precipitation records, and atmospheric circulation patterns. Use statistical techniques to analyze climate data, identify trends, detect anomalies, and assess climate variability and change.

CO-5 Apply the knowledge of climatology to address real-world problems and challenges like climate data and assess its relevance to different sectors, such as agriculture, water resources management, urban planning, and disaster risk reduction.

CO-6 Work effectively on computer-based climate models to simulate past, present, and future climate scenarios. Explore the use of Geographic Information Systems (GIS) and remote sensing techniques for climate analysis and mapping.

CO-7 Effectively communicate climate information to diverse audiences, including policymakers, stakeholders, and the general public. Express thought and ideas in writing reports, creating visualizations, and presenting research in oral and written formats.

Course Content

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STRUCTURE OF SYLLABUS FOR THE
PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

Paper Code: A110801t	Paper Title: Climatology And Hydrology	Theory, Core Paper
Unit – I: Nature and scope of climatology and its relationship with meteorology; Theatmosphere: Structure and composition; insolation, heat-balance of the earth; Distribution of temperature: Temporal, vertical and horizontal, Green House effect. Atmospheric Equilibrium: Stability and instability, potential temperature and Evapo-transpiration. Distribution of atmospheric pressure and winds: Jet streams, monsoon winds.		
Unit – II: Climatic Phenomena: Air masses and fronts, origin, growth, classification. Frontogenesis, types and weather associated with fronts. Cyclones, and anticyclones, Global warming. Climatic Classifications: Koppen's and Thornthwaites - A critical appraisal of eachclassification, World Climatic regions, Interpretation and generation of climatic information, soils, agricultural activities.		
Hydrology		
Unit – III: Meaning, scope and development of hydrology, Hydrological cycle, Elements of hydrological cycle, Man's influence on the hydrological cycle. Evapo- transpiration, Factors affecting evaporation from free water surface and soils.		
Unit – IV: Soil moisture and its zone, infiltration, Ground water: Occurrence, storage, Recharge and discharge, Run-off: its sources and components, factors affecting run- off, Principles and determination of water balance and its application in crop production.		

Suggested Readings:

1. Barry R.G. and Chorley R.J.: Atmosphere, Weather and Climate, Routledge, London and New York, 1998.
2. Critchfield, J.J.: General Climatology, Prentice Hall, New Delhi, 1993.
3. Lal, D.S.: Climatology, Chaitanya Publications, Allahabad, 1986.
4. Lydolph, P.E.: The Climate of the Earth, Rowman, 1985.
5. Robinson P.J. and Henderson S: Contemporary Climatology, Henlow, 1999.
6. Upadhyaya D.P., and Singh R.A.: Climatology and Hydrology, Vasundhara Publication, Gorakhpur, 2000 (Hindi).

7. Addison H.: Land, water and Flood, Chapman and Hall, London, 1961.
8. Chorley R.J., Water, Earth and Man, Methuen, London, 1967.
9. Jones J.A.A.: Global Hydrology: Process Resources and Environmental Management, Longman, London, 1997.
10. Todd, D.K.: Ground Water Hydrology, John Wiley, New York, 1959.

- https://rmets.onlinelibrary.wiley.com/journal/10970088
- https://www.springer.com/journal/704
- https://www.data.jma.go.jp/tcc/tcc/library/library2021/lectures/3_Introduction_to_Climatology_hosaka_20211207.pdf
- https://archive.org/details/climatology-books/BrISL-04_Weather_and_Climate
- https://digitalcommons.usu.edu/modern_climatology/15/
- https://www.youtube.com/watch?v=pCv8sQqn5ME&list=PLUStaOtXfx01YAGEANP6HBMZZ0Han-zQ5

https://www.youtube.com/watch?v=K8Bjthq9Zyg&pp=ygUZY2xpbWF0b2xvZ3kgZSBwZyBwYXRoc2FsYQ%3D%3D

UG SEMESTER – VIII / PG SEMESTER - II
PAPER - II GEOGRAPHICAL THOUGHT
(CORE PAPER)

Course Outcomes:

After the completion of this course, Students will be able to –

CO- 1 Identify and develop a comprehensive understanding of the major contributors to geographical thought throughout history. Explore the ideas and theories put forth by influential geographers such as Alexander von Humboldt, Carl Ritter, Friedrich Ratzel, Ellen Churchill Semple, Vidal de la Blache, and other significant figures.

CO- 2 Gain knowledge of geographical concepts, paradigms and become familiar with the theoretical frameworks that have shaped geographical thought such as space, place, scale, landscape, region, globalization, human-environment interactions. Spatial organization to examine different paradigms within geography, including positivism, humanism, structuralism, post-structuralism and critical geography.

CO- 3 Analyze and evaluate different geographical perspectives and approaches to identify the strengths and limitations of various theoretical frameworks. Also understand how different perspectives shape our understanding of the world. On other hand explore the influence of political, social, and cultural factors on the development of geographical thought.

CO- 4 Understand the historical context in which different geographical ideas and theories emerged. Explore the evolution of geographical thought over time and how it has been influenced by broader intellectual, social and political developments.

CO- 5 Apply geographical thought/concepts to contemporary issues and challenges. Explore the process of theoretical concepts to understand and address real-world problems such as urbanization, globalization, climate change, social inequality and environmental sustainability.

CO- 6 Critically analyze and interpret spatial phenomena using different theoretical lenses. Similarly, examine the changing methodologies and research approaches within geography.

Course Content

Paper Code: A110802T	**Paper Title: Geographical Thought**	**Theory, core Paper**
Unit – I: Geography its place in the classification of science; Basic concepts in philosophy of Geography- distribution, relationship, areal differentiation and spatial organization.		
Unit – II: Concept of Paradigm: Paradigm shift, positivism and Logical positivism, Quantitative revolution, Models, system analysis in geography, Scientific exploration: Inductive and deductive approach.		
Unit – III: A general survey of development in geography up to World War-II: Contribution of Humboldt, Ritter, Ratzel, Ritchthofen, Hettner, Blache, Mackinder, Sauer.		
Unit – IV: Modern development: Applied geography and relevance Debate, Spatial inequality and regional imbalances, Geographers and policy, Regional Planning, Feminist Geography, Future of geography.		

Books Recommended:

1. Adams, P., Steven, H. and Karel, T. (eds.) (2001): Texture of Place, Exploring Humanistic Geographies University of Minnesota Press, Minneapolis.
2. Anderson, K. Domosh, M., Pile, s. and Thrift, N. (eds.) (2003): Handbook of Cultural Geography sage Publication London.
3. Barnes, T. and Gregory, D. (eds.) (1997): Readings in Human Geography: The Poetics and Politics of Inquiry. Arnold, London.
4. Bunkse, E.V. (2004): Geography and the Art of Life. John Hopkins University Press, Baltimore.
5. Buttimer, A. (1971): Society and Milieu in the French Geographic Tradition. Rand Mc Nelly, Chicago.
6. Daniels, P., Bradshaw, M., Shaw. D. and Sidway, J. (2000): An Introduction to Human Geography. Issues for the 21st Century. Prentice Hall, London.
7. Dear, M.J. and Fusty, S. (2002): The Spaces of Post modernity: Readings in Human Geography. Blackwell Publishers, Oxford.
8. Dikshit, R.D. (2004): Geographical Thought. A Critical History of ideas. Prentice- Hall of India, New Delhi, (in English and Hindi).
9. Doel, M. (1999): Poststructuralist Geographies. The Diabolical Art of Spatial Science. Edinburgh University Press, Edinburgh.
10. Gayle, G. and Wilmot, c. (eds.) (2003): Geography in America at the Dawn of the 21st Century. Oxford University Press, Oxford and New York.
11. Harvey, D. (1969): Explanation in Geography, Arnold, London.
12. Harvey, M.E. and Holly, P.B. (2002): Themes in Geographic Thought, Rawat Publications., Jaipur and New Delhi.
13. Hubbard, P., Kitchin, R. Bartley, B. and Fuller, D. (2002): Thinking Geographically: Space, Theory and Contemporary Human Geography. Continuum, London.
14. Johnston, R, Gregory D, Pratt G, Watts M. and Whatmore S. (2003): The Dictionary of Human Geography. Blackwell Publishers, Oxford. 5th edition.
15. Johnston, R.J. (1985): The Future of Geography, Methuen and Company Ltd., New York. (2003 edition published).
16. Johnston, R.J. and Sidaway, J.D. (2004): Geography and Geographers. 6the edition, Edward Arnold, London.
17. Kapur, A. (ed.) (2001) Indian Geography – Voice of Concern. Concept Publishing Company, New Delhi.
18. Martin, G. (2005): All Possible Worlds. A History of Geographical ideas. 4th edition, Oxford University Press, New York.
19. Mathews, J.A. and Herbert, D.T. (eds.) (2004): Unifying Geography Common Heritage, Shared Future Routledge, London.
20. Peet, R. (1998): Modern Geographical Thought. Blackwell Publishers Inc, Massachusetts.

21. Sack, R.D. (ed.) (2002): Progress Geographical Essays. John Hopkins University Press, Baltimore.
22. Sauer, C.O. (1963): Land and Life, university of California Press, Berkley.
23. Singh, R.L. and Singh, Rana P.B. (eds.) (1990) Literature and Humanistic Geography, National Geographical Society of India, BHU, Varanasi, Publication number 37.
24. Singh, R.L. and Singh, Rana P.B. (eds.) (1992): The Roots of Indian Geography Search and Research. National Geographical Society of India, B.H.U., Varanasi Publication number 39.
25. Singh, Rana P.B. (ed.) (1993): Environmental Ethics. National Geographical Society of India, BHU, Varanasi, Publication number 40.
26. Singh, Rana P.B. (ed.) (1994): The Spirit and Power of Place. National Geographical Society of India, BHU, Varanasi Publication number 41.
27. Singh, Rana P.B. (2004): Cultural Landscapes and the Lifework. Indica Books, Varanasi.
28. Soja, E. (1989): Post-modern Geographies, Verso Press, London. Reprinted 1997: Rawat Publications, Jaipur and New Delhi.
29. Taylor, G. (Ed) (1953): Geography in the Twentieth Century. Methuen and Company Ltd. And Company, London.
30. Tuan, Yi-Fu (1977): Space and Place. The Perspective of Experience. Edward Arnold, London.

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- file:///C:/Users/LENOVO/Downloads/GEOGRAPHICAL-THOUGHT-A-CONTEXTUAL-HISTORY-OF-IDEAS-booksfree.org_.pdf
- https://www.booksfree.org/geographical-thought-a-contextual-history-of-ideas-by-r-d-dikshit-pdf/
- https://www.tandfonline.com/doi/abs/10.1080/08873631.2014.880602?journalCode=rjcg20
- https://www.youtube.com/watch?v=zzWt5Prcs6E&list=PLUStaOtXfx03U9u09KKSVdSUEGP48yZOb
- https://www.youtube.com/watch?v=m7grT6fvOmE&pp=ygUjZ2VvZ3JhcGhpY2FsIHRob3VnaHQgZXBnIHBhdGhzaGFsYSA%3D
- https://www.youtube.com/watch?v=w3b7U1TG1zY&pp=ygUjZ2VvZ3JhcGhpY2FsIHRob3VnaHQgZXBnIHBhdGhzaGFsYSA%3D
- https://www.youtube.com/watch?v=xaj7YOLZv2g&pp=ygUjZ2VvZ3JhcGhpY2FsIHRob3VnaHQgZXBnIHBhdGhzaGFsYSA%3D

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Only for IPA VIII Semester Students

A110803R	**Minor Research Project**	**Minor Research Project (Based On Remote Sensing & GIS)**	**12**

PG SEMESTER - II
PAPER - III - BASICS OF REMOTE SENSING & GEOGRAPHICAL INFORMATION SYSTEM (ELECTIVE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO-1 Demonstrate comprehensive knowledge and understanding of the principles and concepts of remote sensing, the electromagnetic spectrum, interaction of electromagnetic radiation with Earth's surface, remote sensing platforms and sensors. They will also understand the process of image acquisition, including the role of satellite systems, airborne sensors, and ground-based sensors.

CO- 2 Gain knowledge of different types of remote sensing data, such as optical, thermal, and microwave imagery. Understand the properties of digital images, including spatial resolution, spectral resolution, radiometric resolution, and temporal resolution.

CO- 3 Explore airborne and ground-based sensors used in remote sensing, such as LiDAR and hyperspectral sensors.

CO- 4 Identify and interpret different land cover types, land use patterns, and features such as rivers, forests, urban areas, and agricultural fields. Analyze remote sensing imagery to extract meaningful information about Earth's surface as changes land use over time using multi-temporal imagery.

CO- 5 Apply basic image processing techniques to enhance, manipulate, and analyze remote sensing imagery such as image enhancement, image classification, image fusion, and image rectification.

CO-6 Develop capability to use of remote sensing in various Earth science disciplines like use of remote sensing in environmental monitoring, land cover and land use mapping, natural resource management, disaster assessment, and urban planning.

CO-7 Expert to import remote sensing imagery into GIS software, geo-reference and analyze the images, and perform spatial analysis using remote sensing and GIS data.

CO-8 Demonstrate subject-related and transferable skills that are relevant to some of the job trades and employment opportunities. Like skills in writing reports, creating visualizations, and presenting their research or analysis in oral and written formats, communicate remote sensing information to diverse audiences, including researchers, professionals, and stakeholders.

Course Content

Paper Code: A110803T	**Paper Title: Basics of Remote Sensing**	**Theory, Discipline Centric Elective**
Unit – I: Remote Sensing: Meaning, Definition and Scope; Historical Development; Component of Remote sensing; EMR: Characteristics, Spectral regions and bands		
Unit – II: Remote sensing Platform and sensors: Types of Platforms; Types of Satellites; Orbits of Satellite; Remote Sensing Sensor; Resolution: Spatial, Spectral, Temporal, Radiometric.		
Unit – III: Aerial Photography, its geometry, Relief Displacement and Image Formations. Classification of Aerial Photographs and their Utility. Elements of Image Recognition and Aerial Photo interpretation.		
Unit – IV: Remote Sensing data processing and applications: Visual and digital image processing techniques, Image Classification-supervised and unsupervised; Application of Remote sensing in Geographical Studies.		

Books Recommended

1. Campbell, J. B. (2002): Introduction to Remote Sensing. 5th edition. Taylor and Francis, London.
2. Cracknell, A. and Hayes, L. (1990): Remote Sensing Year Book, Taylor and Francis, London.
3. Curran, P.J. (1985): Principles of Remote Sensing, Longman, London.
4. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.

5. Floyd, F. and 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 Private Ltd. New Delhi.
7. Hallert, B. (1960): Photogrammetry, McGraw Hill Book Company Inc., New York.
8. Harry, C.A. (ed.) (1978): Digital Image Processing, IEEE Computer Society, California
9. Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data, Academic Press, New York.
10. Leuder, D. R. (1959): Aerial Photographic Interpretation: Principles and Application. McGraw Hill, New York.
11. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4th edition. John Wiley and Sons, New York.
12. Nag, P. (ed.) 1992: Thematic Cartography and Remote Sensing, Concept Publishing. Company, New Delhi.
13. Reeves, R.G. (ed.) (1983): Manual of Remote Sensing, Vols. 1 and 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
14. Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology, John Wiley and Sons, New York.
15. Silver, M. and Balmori, D. (eds.) (2003): Mapping in an Age of Digital Media. Wiley-Academy, New York and Chichester.
16. Spurr, R. (1960): Photogrammetry and Photo Interpretation, The Roland Press Company, London.
17. Survey of India, (1973): Photogrammetry, Survey of India, Dehradun.
18. Swain, P.H. and Davis, S.M. (ed.), (1978): Remote Sensing: The Quantitative Approach. McGraw Hill, New York.

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- https://www.youtube.com/watch?v=pGiq7IIl4zc&list=PLUStaOtXfx029bwRga2MRrofzfPHEByfC
- https://www.youtube.com/watch?v=yoZKWuprhZ8&pp=ygUlYmFzaWMgb2YgcmVtb3RlIHNlbnNpbmcgZSBwZyBwYXRoc2FsYQ%3D%3D
- https://www.youtube.com/watch?v=4Rn0M39HOPU&list=PLLy_2iUCG87CDlroZBlwwBllYwz7KxVtA

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PG SEMESTER – II, PAPER – IV
POLITICAL GEOGRAPHY (DISCIPLINE CENTRIC ELECTIVE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Identify the key concepts and theories in political geography and explore concepts such as state, nation, territory, borders, sovereignty, geopolitics, nationalism, colonialism, and globalization.

CO- 2 Analyze the processes and dynamics involved in state formation and the establishment of territorial boundaries.

CO- 3 List the historical and contemporary factors that shape the boundaries and territories of states, including colonial legacies, nationalism, identity politics, and geopolitical interests.

CO- 4 Examine the Power and Political Relationship between geography and political power as the spatial dimensions of power, including the distribution of political authority, governance structures, the exercise of power at different scales. Similarly political processes and institutions shape territorial organization, governance, and policy-making.

CO- 5 Evaluate the geopolitical dynamics and interactions among states and regions. geopolitical rivalries, conflicts, and alliances, as well as the influence of geography on international relations as geographical factors, such as access to resources, control of strategic locations, and territorial disputes, in shaping geopolitical strategies.

CO- 6 Critically examine the significance or functions of political boundaries and borders, different types of borders, including physical boundaries, cultural boundaries, and functional boundaries. The social, economic, political implications of border regions, border disputes, border control, movement of people and goods across borders.

CO- 7 Apply political geography to understand and analyze real-world issues and challenges such as geopolitics of resources, political conflicts, peacebuilding, migration, refugees, environmental governance, urban politics and social justice movements. They will develop critical thinking skills to assess the spatial dimensions of political issues and propose informed solutions.

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STRUCTURE OF SYLLABUS FOR THE
PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

Course Content

Paper Code: A110804T	**Paper Title: Political Geography**	**Theory, Discipline Centric Elective**
Unit – I: Nature, Scope, development, recent trends and approaches of political geography. Major schools of thought in political geography. Political geography vs. geopolitics, geographic element of the state-physical, human & economic.		
Unit – II: The methodology of political geography: A critical analysis of the functional unified theory; Genetic, functional and systems approaches, function and classification. Themes in political geography, state, nation. Nation-state and Nation building, frontiers and boundaries.		
Unit – III: Colonialism, Decolonialization, Neo-colonialism, federalism, and other forms of governance. Global strategic view with particular reference to the ideas of Mackinder, and Spykeman. The changing pattern of super powers and super nationalism. Impress of politics upon the environment framework. Elements of electoral geography.		
Unit – IV: Political geography of contemporary India, India: a global strategic view, India's border with neighboring countries especially with Pakistan, China and Bangladesh. Geopolitical significance of Indian Ocean. SAARC region and India. The changing political map of India.		

Suggested Readings:

1. Alexander, L.M. World Political Patterns, Ran McNally, Chicago, 1963.
2. De Blij H.J. and Glassner, Martin: Systematic Political Geography, John Wiley, N.Y. 1968.
3. Dikshit, R.D.: Political Geography: A Contemporary Perspective, Tata McGraw Hill, New Delhi, 1996.
4. Taylor, P: Political Geography, Longman, London, 1985.
5. Sukhwal, B.L., Modern Political Geography of India, Sterling Publisher, New Delhi, 1968.
6. Taylor, P: Political Geography, Longman, London, 1985.
7. Fisher, Charles: Essays in Political Geography, Methuen, London, 1968.
8. Pounds, N.J.G.: Political Geography, McGraw Hill, N.Y., 1972.
9. John R. Short, An Introduction to Political Geography, Routledge, London, 1982.
10. Moddle A.E.: Geography Behind Politics, Hutchinson, London, 2000.
11. Prescott, J.R.V.: The Geographical Factors and Boundaries, Aldine, Chicago.
12. Deshpande, C.D.: India: A regional Interpretation, Northern Book Centre, New Delhi 1992.

13. Panikkar, K.M.: Geographical Factors in Indian History, 2 Vols. Asia Publishing House, Bombay, 1959

- https://www.youtube.com/watch?v=e69hagKLyHw&list=PLCZ5_CDD3vyAuGbj_3-tjTL6U3iJKFHve
- https://www.youtube.com/watch?v=5E90dydJSfA&pp=ygUjcG9saXRpY2FsIGdlb2dyYXBoeSBlIHBnIHBhdGhzaGFsYSA%3D
- https://www.youtube.com/watch?v=RTO8lOzoAQ&pp=ygUjcG9saXRpY2FsIGdlb2dyYXBoeSBlIHBnIHBhdGhzaGFsYSA%3D
- https://archive.org/details/political-geography_202008/The_Key_Concepts-Political_Geography_%28Carolyn_Gallaher%29/
- https://archive.org/details/politicalgeograp0000poun
- https://www.researchgate.net/publication/336241806_Political_Geography_A_Critical_Introduction

PG SEMESTER – II, PAPER – V
AGRICULTURAL GEOGRAPHY (DISCIPLINE CENTRIC ELECTIVE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Develop a comprehensive understanding of agricultural systems of the world and their components like the physical, biological, and social factors that influence agricultural practices and land use patterns.

CO- 2 Demonstrate the knowledge of spatial organization of agricultural activities, including field patterns, farm sizes, and land tenure systems.

CO- 3 Evaluate the processes and practices of the world involved in crop production and management.

CO- 4 Explain different agricultural techniques of the world, such as traditional farming, modern mechanized farming, and precision agriculture.

CO- 5 Present different types of livestock production systems of the world, including extensive grazing, intensive confinement, mixed farming, livestock management, breeding, nutrition, health, and the environmental impacts associated with livestock farming.

CO- 6 Analyze agricultural productivity and its implications for food security. Explain the factors influencing agricultural productivity, such as technological advancements, agricultural inputs, infrastructure, market access, and the challenges of achieving food security at local, national, and global scales.

CO- 7 Critically evaluate Indian government programs, subsidies, incentives aimed at supporting agricultural activities, improving farmers' livelihoods, and promoting sustainable agriculture.

CO- 8 Develop skills in using geographic information systems (GIS) and remote sensing techniques to analyze agricultural landscapes and support land use planning.

CO-9 Effectively communicate agricultural-related information to diverse audiences, including policymakers, stakeholders, and the general public.

Course Content

Paper Code: A110805T	**Paper Title: Agricultural Geography**	**Theory, Discipline Centric Elective**
Unit – I: Nature, Scope, significance, development and approaches of agriculture geography. Development of agricultural technology in plant production, animal production and other agricultural fields. Origin and dispersal of agriculture on the globe, Determinants of agricultural land use.		
Unit – II: Indian Land Reforms and land use policy, cropping pattern. Crop concentration, intensity of cropping, degree of commercialization, diversification and specialization efficiency and productivity, carrying capability of land. The concept of agricultural landscape.		
Unit – III: Determination of crop combination regions, Theories of agricultural location based on several multidimensional factors: Von-Thuenen theory and its recent modification. Methods of delineation of agricultural regions. Whittlesey's classification of agricultural regions. Agricultural regions of the world, their location and characteristics.		
Unit – IV: Agricultural land use and cropping pattern in India. Regional pattern of productivity in India. Green, white and Blue revolutions and their impacts. Food deficit and food surplus regions of India. Specific problems in Indian agriculture and their management and planning. Agricultural policy of India. Contemporary Issues-food, nutrition and hunger, food aid programs. Role of		

irrigation, fertilizers, insecticides, pesticides and technological know-how in environmental degradation, employment in agricultural sector.

Suggested Readings

1. Baylist Smith T.P.: The Ecology of Agricultural System, Cambridge University Press, London, 1987.
2. Gregor, H.P.: Geography of Agriculture, Prentice Hall, B.Y., 1970.
3. Mannion, A.M.: Agriculture and Environmental Change, John Wiley, London, 1971.
4. Morgan, W.B. and Norton, R.J.C.: Agricultural Geography, Methuen, London, 1971.
5. Morgan, W.B. Agricultural in the Third World, A spatial Analysis, West View Press, Boulder, 1978.
6. Sauer, C.O.: Agricultural Origins and Dispersals, M.I.T. Press West View Press Mass, USA, 1969.
7. Singh J. and Dhillon S.S.: Agricultural Geography, Tata McGraw Hill Pub., New Delhi, 1988.
8. Tarrant, J.R.: Agricultural Geography, Wiley, N.Y., 1974.

PG SEMESTER – II, PAPER – VI
RESOURCE GEOGRAPHY (Discipline Centric Elective Paper)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Demonstrate comprehensive understanding of the concepts and principles of resources geography like different types of resources, including natural resources (such as water, minerals, energy, and forests) and human-made resources (such as infrastructure and technology).

CO- 2 Express knowledge of natural resource systems and their characteristics as well as the environmental, economic, and social implications associated with their exploitation, resource depletion, the impacts of resource extraction on ecosystems, and the need for sustainable resource management.

CO- 3 Critically examine the spatial distribution and patterns of resources at different scales, from global to local and the factors influencing resource distribution, such as geological processes, climate, topography, and human activities.

CO- 4 Evaluate resource assessment, planning, governance and the principles and practices of sustainable resource management, including resource conservation, renewable resource development, and the mitigation of environmental impacts.

CO- 5 Explain the concepts of resource efficiency, resource consumption, and resource productivity. Understand the social, economic, and environmental consequences of resource extraction, including issues of resource conflict, environmental degradation, and social inequalities on global level.

CO- 6 Analyze the distribution, availability, and utilization of energy resources, as well as the environmental and socio-economic implications of energy production and consumption.

CO- 7 Apply resource geography knowledge in natural resource planning, land use planning, environmental impact assessment, and sustainable development. Also using geographic information systems (GIS) and remote sensing techniques to assess resource availability, analyze resource conflicts, and support decision-making processes.

CO- 8 Acquire knowledge and skills to effectively communicate resource geography concepts and findings in writing reports, creating visualizations, and presenting their research or analysis in oral and written formats to diverse audiences, including policymakers, stakeholders, and the general public.

Course Content

Paper Code: A110806T	**Paper Title: Resources Geography**	**Theory, Discipline Centric Elective**
Unit – I: Nature, scope and significance of geography of resources. Definition and concept of natural resources. Classification of resources.		
Unit – II: Characteristics of world natural resources: Resource conservation and management with reference to land and forest resource.		
Unit – III: Water Resources-Hydrologic Cycle, fresh-water resources, surface and underground water supplies, problems of water supplies. Marine resources- major fishing grounds of the world, fish distribution and exploitation. India's natural resource: water resource, conservation and management and its utilization		
Unit-IV: Energy Resources-Conventional energy resources of world - coal, petroleum, non – conventional - solar and geothermal energy.		

Books Recommended

1. Burton, I. and Kates, R.W. (1978): Readings in Resource Management and Conservation, McGraw Hill, New York
2. Clark, G. L., Feldman, M.P. and Gertler, M.S. (Eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, Oxford and New York.
3. Ehrlich, P.R., Ehrlich, R.H. and Holdren, J.P. (1998): Eco-science Population, Resources and Development. 2nd edition. Freeman and Company, San Francisco.
4. Sheppard, E. and Treror, I. B. (ed.) (2003): A Companion to Economic Geography, Blackwell Publication, U.K. and USA.
5. McCarty, H.M. and James, B.L. (1976): A Preface to Economic Geography, Prentice Hall, New Jersey.
6. Mitra, A. (2000): Resource Studies; Sridhar Publishers., Kolkata.
7. Ramesh, A. (ed.) (1984): Resource Geography, Heritage Publishers, New Delhi.
8. Singh, J. (2000): Sansadhan Bhoogol, Gyanodaya Prakashan, Gorakhpur
9. Singh, K.N. and Singh, J. (2003): Arthik Bhoogol Ke Mool Tatva, Gyanodaya Prakashan, Gorakhpur.
10. Todaro, M.P. and Smith, S.C. (2004): Economic Development, Pearson Education, (Singapore) Private Ltd.

PG SEMESTER – II, PAPER – VII
REMOTE SENSING AND SURVEYING
(PRACTICAL - ABILITY ENHANCEMENT PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Demonstrate the understanding of the process of image acquisition, including the role of satellite systems, airborne sensors, and ground-based sensors.

CO- 2 Gain knowledge of different types of remote sensing data, such as optical, thermal, and microwave imagery. Understand the properties of digital images, including spatial resolution, spectral resolution, radiometric resolution, and temporal resolution.

CO- 3 Explain different satellite systems, including optical and radar satellites, and their capabilities.

CO- 4 Use airborne and ground-based sensors used in remote sensing, such as LiDAR, hyperspectral sensors, surveying instruments and equipment, such as total stations, global navigation satellite systems (GNSS), and digital levels.

CO- 5 Analyze remote sensing and surveying data using software tools, such as Geographic Information Systems (GIS) and image processing software.

CO- 6 Ability to interpret and extract information from remote sensing images and surveying data to generate accurate and reliable maps and spatial datasets.

CO- 7 Understand the importance of data accuracy, precision, and reliability in mapping and spatial analysis.

CO- 8 Revise the methods for error detection, error correction, and assessment of positional accuracy in remote sensing and surveying data.

Course Content

Paper Code: A110807P	**Paper Title: Remote sensing and Surveying**	**Practical, Ability Enhancement Elective**
Unit – I: Elements of Aerial Photo Interpretation, Satellite Image, and interpretation.		
Unit – II: Digital Image Processing: Definition, Satellite imaginary, structure of digital image, Digital data format, BSQ, BIP, BIL; Advantage of digital image, Hard and soft copy.		
Unit – III: Data Image Enhancement: Methods of contrast enhancement, Linear and non-linear enhancement techniques, Histogram Equalization and Band Rationing.		
Unit – IV: Instrumental Survey: Plain Table, Prismatic Compass, Theodolite		

Books Recommended

1. Campbell, J. B. (2002): Introduction to Remote Sensing. 5th edition. Taylor and Francis, London.
2. Cracknell, A. and Hayes, L. (1990): Remote Sensing Year Book, Taylor and Francis, London.
3. Curran, P.J. (1985): Principles of Remote Sensing, Longman, London.
4. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.
5. Floyd, F. and 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 Private Ltd. New Delhi.
7. Hallert, B. (1960): Photogrammetry, McGraw Hill Book Company Inc., New York.
8. Harry, C.A. (ed.) (1978): Digital Image Processing, IEEE Computer Society, California
9. Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data, Academic Press, New York.
10. Leuder, D.R. (1959): Aerial Photographic Interpretation: Principles and Application. McGraw Hill, New York.
11. Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4th edition. John Wiley and Sons, New York.
12. Nag, P. (ed.) 1992: Thematic Cartography and Remote Sensing, Concept Publishing. Company, New Delhi.
13. Reeves, R.G. (ed.) (1983): Manual of Remote Sensing, Vols. 1 and 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
14. Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology, John Wiley and Sons, New York.
15. Silver, M. and Balmori, D. (eds.) (2003): Mapping in an Age of Digital Media. Wiley- Academy, New York and Chichester.
16. Spurr, R. (1960): Photogrammetry and Photo Interpretation, The Roland Press Company, London.
17. Survey of India, (1973): Photogrammetry, Survey of India, Dehradun.
18. Swain, P.H. and Davis, S.M. (ed.), (1978): Remote Sensing: The Quantitative Approach. McGraw Hill, New York.

PG SEMESTER – II, PAPER – VIII
STATISTICAL METHODS IN GEOGRAPHY
(PRACTICAL - ABILITY ENHANCEMENT PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Develop a comprehensive understanding of fundamental statistical concepts used in geography.

CO- 2 Handle and analyze geographic data, including spatial data visualization, exploratory spatial data analysis (ESDA), and spatial autocorrelation.

CO- 3 Use statistical software commonly used in geography, such as R, Python, or statistical packages like SPSS or SAS for data manipulation, statistical analysis, and geospatial data processing.

CO- 4 Apply statistical methods in various geographical research and analysis.

CO- 5 Design and conduct statistical surveys, analyze spatial patterns and relationships, and perform statistical modeling for geospatial data.

CO- 6 Explore applications in areas such as population studies, urban planning, environmental analysis, and spatial modeling.

CO- 7 Compute and interpret statistical results, draw meaningful conclusions, and communicate findings effectively through maps, graphs, and tables.

CO- 8 Create thematic maps, choropleth maps, heatmaps, and other graphical representations to depict spatial patterns and trends.

CO- 9 Produce statistical methods to solve geographical problems as to identify research questions, formulate hypotheses, select appropriate statistical tests, and interpret results to address specific geographical research problems.

CO- 10 Understand the data confidentiality, data protection, and responsible data management practices as well as understand the importance of ensuring privacy, informed consent, and ethical handling of geospatial data in research and analysis.

Course Content

Paper Code: A110808P	**Paper Title: Statistical Methods in Geography**	**Practical, Ability Enhancement Elective**
Unit – I: Sources and Types of data, Methods of data Collection, Classification and Tabulation of data.		
Unit – II: Geographical representation of Frequency distribution: Histogram, Frequency polygon, frequency curve, Ogive curve.		
Unit – III: Measures of central tendency-Mean, Median and Mode, Mean deviation, Quartile deviation. Standard Deviation		
Unit-IV: Co-efficient of variation, Co-efficient of Correlation, rank Correlation, Chi square test.		

Books Recommended:

1. Monkhouse, F.J. Maps & Diagrams.
2. Robinson, A.H. Elements of Cartography.
3. Singh, R.L., Elements of Practical Geography.
4. Singh, L.R. & Singh, R.N. Map Work and Practical Geography (Eng./Hindi).

5. Sharma, J.P. Prayogatmak Bhoogol Ki Rooprekha (Hindi).
6. Hira Lal, Prayogatmak Bhoogol Ke Adhar (Hindi).
7. Lal, Hira, Matratmak Bhoogol (Hindi).
8. Tiwari, R.C. and Tiwari, Sudha, Abhinav Prayogic Bhoogol.

PG SEMESTER – III, PAPER – I
ENVIRONMENTAL GEOGRAPHY (CORE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO -1 Understand the concepts such as ecosystems, biogeochemical cycles, climate systems, and human-environment interactions.

CO- 2 Gain knowledge of various global environmental issues and challenges such as climate change, biodiversity loss, deforestation, pollution, water scarcity, and resource depletion.

CO- 3 Analyze the principles and practices of natural resource management. the sustainable use and conservation of natural resources, including land, water, forests, and minerals.

CO- 5 Plan strategies for balancing human needs with the long-term health and sustainability of natural systems.

CO- 6 Apply methods for assessing environmental change, including remote sensing, GIS analysis, and field surveys. Also explore the drivers and consequences of environmental change at local, regional, and global scales.

CO- 7 Assess environmental policies and governance mechanisms like international agreements, national regulations, and local initiatives aimed at addressing environmental challenges.

CO- 8 Explore the role of governments, non-governmental organizations, and communities in environmental decision-making and management.

CO- 9 Assess the potential environmental impacts of development projects, policies, and programs. And explore the methods for identifying, evaluating, and mitigating environmental impacts and consider the social and cultural dimensions of impact assessment.

CO- 10 Critically examine the principles of sustainability, including social equity, economic viability, and environmental responsibility. They will study strategies for promoting sustainable development, including sustainable agriculture, renewable energy, waste management, and urban planning.

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Paper Code: A110901T	**Paper Title: Environmental Geography**	**Theory, Core Paper**
Unit – I: Meaning, nature and Scope of environmental geography, approaches and methods in environmental geography, Types of environments, environmental perception. Environment & society, environment and development.		
Unit – II: Concept of ecology and ecosystem, Biosphere as an ecosystem, Abiotic and biotic components of biosphere and ecosystem, Ecological production and energy flow-tropic level, food chain and food web. Ecological pyramids, Bio-geochemical cycles-nitrogen, Hydrological cycle, carbon cycle.		
Unit – III: Environmental hazards: Natural Hazard – Flood, Drought, Landslide, soil erosion earthquake, desertification. Man-made hazards – urbanization, Industrialization, technological hazard, global climatic changes, global warming, greenhouse effect, ozone depletion.		
Unit – IV: Environmental pollution, pollutants, Sources and types of pollution-water soil, air and noise pollution, solid waste disposal, environmental pollution and health Environmental education, Environmental monitoring. Environmental impact analysis. Environmental policies and legislation, Environmental management.		

Books Recommended

1. Anjuneyulu, Y. (2002): Environmental Impact Assessment Methodologies. B. S. Publications, Hyderabad.
2. Anjuneyulu, Y. (2004): Introduction to Environmental Science. B. S. Publications, Hyderabad.
3. Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing Company, New Delhi.
4. Blaikie, P., Cannon, T. and Davis, I. (eds.) (2004): At Risk: Natural Hazards, Peoples Vulnerability and Disasters. Routledge, London.
5. Clarke, J. I., Curson, P., Kayastha, S. L. and Nag, P. (eds.) (1991): Population and Disaster, Basil Blackwell, USA.
6. Gautam, A. (2007): Environmental Geography, Sharda Pustak Bhawan, Allahabad.
7. Huggett, R. J. (1998): Fundamental of Biogeography. Routledge, London.
8. Kayastha, S.L. and Kumra, V.K. (1986): Environmental Studies. Tara Book Agency, Varanasi.

9. Khoshoo, T. N. (1981): Environmental Concerns and Strategies. Ashish Publishing House, New Delhi.
10. Kumra, V.K. (1982): Kanpur City. A Study in Environmental Pollution. Tara Book Agency, Varanasi.
11. Mathur, H. S. (2003): Essentials of Biogeography. Pointer Publication, Jaipur.
12. Nag, P., Kumra, V.K. and Singh, J. (1990): Geography and Environmental Issues at Local, Regional and National Levels. (in 3 vols.), Concept Publishing Company, New Delhi.
13. Odum, E.P. (1975): Ecology. Rowman and Littlefield, Lanham USA.
14. Rajagopalan, R. (2005): Environmental Studies: From Crisis to Cure, Oxford University Press, New Delhi.
15. Reddy, M. A. (2004): Geoinformatics for Environmental Management. B. S. Publishers., Hyderabad.
16. Saxena, K.K. (2004): Environmental Studies. University Book House Private Ltd., Jaipur
17. Saxena, H. M. (1999): Environmental Geography. Rawat Publications., Jaipur and New Delhi.
18. Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.
19. Singh, A.K., Kumra, V.K. and Singh, J. (1986): Forest Resource, Economy and Environment. Concept Publishing. Company, New Delhi.
20. Singh, D.N., Singh, J. and Raju, K.N.P. (eds.) (2003): Water Crisis and Sustainable Management, Tara Book Agency, Varanasi
21. Singh, J. (2001): Paryavaran Evam Samvikas. Gyanodaya Prakashan, Gorakhpur.
22. Singh, O., Nag, P., Kumra, V.K. and Singh, J. (eds.) (1993): Frontier in Environmental Geography. Concept Publishing Company, New Delhi.
23. Singh, O., Kumra, V.K. and Singh, J. (1988): India's Urban Environment. Pollution, Perception and Management. Tara Book Agency, Varanasi.
24. Singh, R. B. (ed.) (1990): Environmental Geography. Heritage Publication, New Delhi.
25. Singh, R. B. (ed.) (1995): Studies in Environment and Development. Rakesh Prakashan, Varanasi.
26. Singh, Rana P.B. (ed.) (1993): Environmental Ethics: Discourses and Cultural Traditions. National Geographical Society of India, BHU, Varanasi.
27. Singh, S. (2006): Environmental Geography. Prayag Pustak Bhawan, Allahabad.
28. Singh, S. (2007): Paryavaran Bhoogol. Prayag Pustak Bhawan, Allahabad.
29. Singh, S. N. (1993): Elements of Environmental Geography and Ecology (in Hindi), Tara Book Agency, Varanasi.
30. Wrigley, N. (1985): Categorical Data Analysis for Geographers and Environmental Scientists. Longman, London.

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PG SEMESTER – III, PAPER – II
POPULATION GEOGRAPHY (CORE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO-1 Demonstrate the understanding of population dynamics, including population growth, distribution, and migration patterns.

CO-2 Analyze demographic data, such as population pyramids, age-sex ratios, fertility rates, mortality rates, migration rates and understand the significance of these indicators in studying population trends and patterns.

CO-3 Evaluate the spatial distribution of populations at different scales, from global to local. Analyze the factors influencing population distribution, such as physical geography, climate, resources, infrastructure, and socio-economic factors and its implications for urbanization, rural-urban migration, and regional development.

CO-4 Critically evaluate the causes and consequences of migration, including economic factors, social factors, political factors, and environmental factors as well as analyze the impacts of migration on origin and destination regions.

CO-5 Examine the demographic transition, population aging, and population policies.

CO-6 Explain the processes of urbanization and rural change and their implications for population distribution and dynamics. Examine the challenges and opportunities associated with urbanization, including urban planning, housing, infrastructure, and social inequalities.

CO-7 Apply population geography knowledge in policy formulation and planning processes. Assess population data and demographic in areas such as healthcare planning, education planning, transportation planning, environmental planning and demographic projections and spatial analysis techniques to inform policy decisions.

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PROGRAM: BA 4 YEAR & M. A. SUBJECT: (GEOGRAPHY)

Course Content

Paper Code: A110902T	**Paper Title: Population Geography**	**Theory, Core Paper**
Unit – I: Concepts, Scope, method, approaches and development of population geography, population geography and demography, sources of population data: their reliability and problems of mapping. Population dynamics of the world: measurements of fertility and mortality, Types, causes, theories and consequences of migration, India's population dynamics.		
Unit – II: Population distribution, density and growth: Theories of population growth-classical and modern. Factors affecting population distribution, world pattern of population distribution and density. Population distribution, density and growth profile of India.		
Unit – III: Concepts of under population, overpopulation, optimum population and population explosion, Demographic transition theory. Population composition: Rural and urban population, urbanization, Age and sex structure, literacy and education, occupational structure, gender issues, population composition of India.		

Suggested Readings:

1. Bogue D.J.: Principles of Demography, John Wiley, N.Y., 1969.
2. Chandana, R.C.: Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, 2000.
3. Clarke, John, I: Population Geography, Pergammon Press, Oxford, 1973.
4. Crook Nigel: Principles of population and Development Pergammon Press, N.Y., 1997.
5. Daugherty Helen, gin, Kenneth C.W. Kemmerer: An Introduction to Population, The Guilford Press, N.Y., London, 1998.
6. Garnier, J.B.: Geography of Population, Longman, London, 1970.
7. Mamoria, C.B. India's Population Problem, Kitab Mahal, New Delhi, 1981.
8. Premi M.K.: India's population Heading Toward Billion B.R. Publishing Corporation, 1991.
9. Srinivasan K. and M. Blass: Population Development Nexus in India: Challenges for the New Millennium. Tata McGraw Hill, New Delhi, 2001.
10. Woods, R: Population Analysis in Geography, Longman, London 1979.

- https://www.youtube.com/watch?v=2jGrkHPHLJc&pp=ygUlcG9wdWxhdGlvbiBnZW9ncmFwaHkgIGUgcGcgcGF0aHNoYWxhIA%3D%3D
- https://www.youtube.com/watch?v=N1p3VrluUfE&pp=ygUlcG9wdWxhdGlvbiBnZW9ncmFwaHkgIGUgcGcgcGF0aHNoYWxhIA%3D%3D
- https://www.youtube.com/watch?v=AF_JQ94rcYc&pp=ygUicG9wdWxhdGlvbiBnZW9ncmFwaHkgZSBwZyBwYXRoc2FsYQ%3D%3D
- https://www.youtube.com/watch?v=t4iPh7evs_w&pp=ygUicG9wdWxhdGlvbiBnZW9ncmFwaHkgZSBwZyBwYXRoc2FsYQ%3D%3D
- https://archive.org/details/populationgeogra0000clar
- https://www.researchgate.net/publication/323640081_Janasankhya_Vuporichoy_Population_Geography
- https://www.iosrjournals.org/iosr-jhss/papers/Vol.%2023%20Issue10/Version-/D2310022527.pdf

PG SEMESTER – III, PAPER – III
REGIONAL PLANNING GEOGRAPHY (CORE PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Demonstrate the Understanding of Regional Planning Concepts, principles of regional development, spatial planning, and regional governance. Also explore the role of regional planning in addressing social, economic, and environmental challenges at the regional scale.

CO- 2 Gain knowledge of regional development processes and dynamics and learn about factors influencing regional disparities, such as economic activities, infrastructure development, population growth, and migration.

CO- 3 Critically evaluate the theories of regional development, including theories of growth poles, agglomeration, and regional innovation systems.

CO- 4 Expertise in regional planning tools and techniques. Such as analyze regional data, conduct spatial analysis, and use geographic information systems (GIS) for regional planning.

CO- 5 Analyze regional development plans and policies like regional development plans at different scales, such as national, state, or provincial plans.

CO- 6 Apply sustainable regional development principles in planning and development processes, promoting regional economic growth, diversification, and innovation.

CO- 7 Plan strategies for promoting sustainable land use, transportation systems, energy planning, and environmental conservation at the regional scale.

CO- 8 Critically evaluate social equity, gender biasness, economic viability, and environmental sustainability in regional planning and development.

Course Content

Paper Code: A110903T	**Paper Title: Regional Planning**	**Theory, Core Paper**
Unit – I: Philosophy and purpose of planning. The development of planning thought, theories of regional development, economic base theory, international trade multipliers, aggregate growth model. The concept of growth centres, growth centre strategy of regional planning, rural economy, core-periphery relationship.		
Unit – II: Concept and types of regions-functional and formal, Uniform and nodal, single purpose and composite regions in the context of planning regional hierarchy. Approaches for the definition of different types of regions and their utility in planning-resource base approach, growth centre approach; basic needs approach and habitat transformation approach.		
Unit – III: Delineation of planning regions. Planning regions of India. Planning process sectoral, temporal and spatial dimensions. Planning for a region's development and multiregional planning in a national context. Indicators of development and measuring levels of regional developments with special reference to India.		
Unit – IV: Regional planning for rural development with special reference to U.P. role of innovation diffusion, infra-structural elements (Irrigation, power, transpiration and communication and marketing) and Industrial in regional planning. Population-resource equilibrium and spatial organization in regional planning. Metropolitan regions in regional planning. Regional planning as development strategy since independence, regional development strategies concentration vs dispersal. Regional plans of India Concepts of multilevel planning decentralized planning. People's participation with the planning process.		

Books Recommended:

1. Singh, O.P. and Pandey, D.C.: Development Planning: Theory and Practice, Gyanodya Prakashan Nainital, 1986.
2. Bhatt, L.S.: Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
3. Freidman, J. and Alonso W. Regional Development Policy: A case Study of Venezuela, MIT Press, Cambridge Mass-1966.
4. Ghosal G.S. and Krishnan G: Regional Disparities in Levels of Socio-Economic Development in Punjab, Vishal Publications, Kurukshetra, 1984.
5. Kuklinski A.R. (Ed): Growth Poles and growth Centres in Regional Planning, Moutonj, The Hague, 1972.
6. Kundu A and Raza M: Indian Economy: The Regional dimension, Spectrum Publishers, New Delhi, 1982.
7. Losch, A: The Economics of Location, University Press, New Haven, 1954.
8. Mishra, R.P.: Regional Planning: Concepts, Techniques and Policies, University of Mysore, Mysore, 1969.
9. Mishra R.P. and Other (Ed): Regional Development-Planning in India: A strategy, Institute of Development Studies, Mysore, 1974

PG SEMESTER – III, PAPER – IV
GEOGRAPHY OF RURAL SETTLEMENTS (DISCIPLINE CENTRIC PAPER)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Demonstrate the understanding world rural settlement patterns like different types of rural settlements, including hamlets, villages, and small towns.

CO- 2 List the factors that influence the location, size, and distribution of rural settlements, such as topography, climate, land use, transportation, and historical development.

CO- 3 Gain knowledge of rural development theories and practices like socio-economic factors that contribute to rural development, including agriculture, rural industries, natural resource management, and rural infrastructure.

CO- 4 Analyze agricultural land use, including world farming systems, crop types, and livestock management.

CO- 5 Explore the drivers of rural change, including technological advancements, demographic shifts, globalization, and Indian government policies. Also examine the impacts of rural change on social, economic, and environmental aspects of rural communities.

CO- 6 Apply spatial analysis techniques to study rural settlements. They will explore geographic information systems (GIS), remote sensing, and spatial modeling tools to analyze rural settlement patterns, land use changes, and spatial relationships.

CO- 7 Critically examine the principles and practices of sustainable rural development as sustainable agriculture, natural resource management, rural planning, and community-based approaches to development.

CO- 8 Plan the strategies for enhancing rural livelihoods, conserving natural resources, and promoting social and economic well-being in rural areas.

CO- 9 Enhance ability to effectively communicate concepts and findings related to the geography of rural settlements.

CO- 10 Develop skills in writing reports, creating visualizations, and presenting their research or analysis in oral and written formats.

Course Content

Paper Code: A110904T	**Paper Title: Geography of Rural Settlements**	**Theory, Discipline Centric Elective**
Unit – I: Nature, Scope, significance, development and approaches of rural settlement geography, Definition and characteristic of rural settlements, human settlement as a system. Rural-urban continuum. Histogenesis of rural settlements; Spatio-temporal dimensions and sequent occupancy. Distribution, size and spacing of rural settlements.		
Unit II: Types, forms and patterns of rural settlements: cause and effect, functional classification of rural settlements of rural settlements, morphogenesis of rural settlements, morphology of rural settlements, Central places and rural service centres: their nature, hierarchy and functions. Service centres as growth points, Rural-urban fringe-structure, characteristics and functions.		
Unit – III: Cultural landscape elements in rural settlements in different geographic environments with special reference to India, house types and their spatial patterns. Origin, evolution, size, socio-spatial structure of Indian villages.		

Unit – IV: Social issues in rural settlements-poverty, housing. deprivation and inequality, Environmental issues in rural settlements water supply, sanitation, drainage and health hazards. Planning of rural settlements with special reference to India.

Suggested Readings:

1. Alam, S.M. et al: Settlement System in India, Oxford and IBP publication Co. New Delhi, 1982.
2. Chisholm M. rural settlements and Land use. John Wiley N.Y. 1967.
3. Grover N. Rural settlements; A Cultural Geographical Analysis; Inter India Publication, Delhi; 1986.
4. Daniel P. and Hopkinson M: the Geography of Settlements, Oliver and Boyd; Edinburg, 1986.
5. Hudson, F.S.: Geography of Settlements, Macdonald and Evans, N.Y. 1976.
6. Vanmali, S: Service Centres in Rural India, B.R. Publication Corporation, New Delhi, 1983.

PG SEMESTER – III, PAPER – V
URBAN GEOGRAPHY (DISCIPLINE CENTRIC PAPER) THEORY

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 Demonstrate the understanding of the processes of urbanization and the characteristics of urban systems.

CO- 2 Analyze the historical development of cities, factors driving urbanization, and the growth and spatial organization of urban areas explore concepts such as urban hierarchy, urban functions, and urban-rural interactions.

CO- 3 Gain knowledge of urban land use patterns and urban planning practices. Understand different types of land use in urban areas, including residential, commercial, industrial, and recreational land use.

CO- 4 Critically evaluate urban planning concepts and approaches, including zoning, land development regulations, transportation planning, and sustainable urban development.

CO- 5 Assess the urban transportation systems, including roads, public transit, and pedestrian infrastructure like urban utilities such as water supply, sewage systems, and energy distribution.

CO- 6 Critically examine the principles and practices of sustainable urban development. Such as sustainable urban design, green infrastructure, and resource-efficient cities.

CO- 7 Explore strategies for promoting sustainable transportation, reducing urban pollution, enhancing urban resilience, and creating inclusive and equitable urban environments.

CO- 8 Develop skills in writing reports, creating visualizations, and presenting their research or analysis in oral and written formats. And also learn to effectively communicate geographical information to diverse audiences, including policymakers, urban planners, and community members.

Course Content

Paper Code: A110905T	**Paper Title: Urban Geography**	**Theory, Discipline Centric Elective**
Unit – I: Meaning, scope and significance of Urban Geography; approaches and recent trends in urban geography; Origin and evolution of urban places in ancient, Medieval and modern period; urban morphology and land use patterns; classical models of urban growth and evolution of functional zones: concentric zone, sectoral and multiple nuclei models.		
Unit – II: Bases and process of urbanization and urban development, urban growth, urban hierarchy and rank size rule, theories of urban growth: Christaller, Losch, Peroux and Boudeville. Urban economic base: Occupational structure and basis and non-basic functions, functional classification, city-region relations and modern urban landscape.		
Unit – III: The urban profile, demographic structure and characteristics of urban population. Movement of population with and beyond corporate limit. City as central place, Umland, Rural-Urban fringe, Urban problems-urban poverty, urban sprawl, slums, transportation, housing, urban pollution, solid waste, urban crime and environmental health.		
Unit- IV: Urban policy and planning, development of medium size towns, planning for new wards, city planning, green belt, garden cities, urban policy, Globalization and urban planning. Special study million towns of U.P.		

BOOKS RECOMMENDED:

1. Berry B.J.L. and Horton F.F.: Geographic Perspectives on Urban Systems, Prentice Hall, Englewood Cliffs, J.J. 1970.
2. Dickinson, R.E. City and Region, Routledge, London, 1964.
3. Gibbs, J.P.: Urban Research Methods, Van Nostrand Co. Princeton, N.J. 1961.
4. Hall P: Urban and Regional Planning, Routledge, London, 1992.
5. Kundu, A: Urban Development and Urban Research in India, Khanna Publication, 1992.
6. Rao, V.L. S.P.: Urbanization in India: Spatial dimensions, Concepts publishing Co. New Delhi.
7. Smailes, A.E.: The Geography of Towns, Hutchinson, London, 1953.
8. Singh O.P. Nagariya Bhoogol, Sharda Pustak Bhawan, Allahabad, 2011.

PG SEMESTER – III, PAPER – V
METHODS AND TECHNIQUES IN RURAL SETTLEMENTS
(GENERIC ELECTIVE PAPER - PRACTICAL)

Course Outcomes

After the completion of this course, Students will be able to –

Course Content

Paper Code: A110906P	**Paper Title: Methods And Techniques in Rural Settlements**	**Practical, Generic Elective**
Part A: METHODS and TECHNIQUES in RURAL SETTLEMENTS		
Unit-I: Spatial Systems: Rural settlement: types and patterns; Typological classification of rural settlements from maps; Analysis of spatial pattern of rural settlements: randomness and spacing indices; Testing of Christaller's theory; Size classification of rural settlements by scatter diagrams;		
Unit-II: Indian context: Rural service centres: identification, indices, hierarchy, classification and ordering; Field-based mapping of village: social morphology, house types and facilities; Planning of Indian village.		
Note: **Practical record (Unit: I & II)** **Viva-Voce examination**		

Books Recommended:

1. Monkhouse, F.J. Maps & Diagrams.
2. Robinson, A.H. Elements of Cartography.
3. Singh, R.L., Elements of Practical Geography.
4. Singh, L.R. & Singh, R.N. Map Work and Practical Geography (Eng./Hindi)
5. Sharma, J.P. Prayogatmak Bhoogol Ki Rooprekha (Hindi)
6. Hira Lal, Prayogatmak Bhoogol Ke Adhar (Hindi)
7. Lal, Hira, Matratmak Bhoogol (Hindi)
8. Tiwari, R.C. and Tiwari, Sudha, Abhinav Prayogic Bhoogol.

PG SEMESTER – III, PAPER – VI
METHODS AND TECHNIQUES OF URBAN GEOGRAPHY
(GENERIC ELECTIVE PAPER - PRACTICAL)

Course Outcomes

After the completion of this course, Students will be able to –

CO- 1 List the strengths and limitations of different research methods and understand how to select and apply appropriate methods to address research questions in urban geography.

CO- 2 Understand the advantages and challenges of each data collection technique and develop skills in designing and conducting data collection activities.

CO- 3 Analyze spatial data using geographic information systems (GIS) software such as spatial interpolation, spatial clustering, and spatial statistics to examine spatial patterns and relationships in urban environments.

CO- 4 Apply remote sensing and image analysis techniques to urban geography research and use of satellite imagery and aerial photographs to analyze urban land use, land cover changes, and urban morphology.

CO- 5 Expert to work with geospatial data and create maps for urban geography research. Such as to access and process spatial data from various sources, including government agencies, research institutions, and online platforms.

CO- 6 Analysis of Big Data in Urban Geography like about the use of social media data, mobile phone data, and other forms of digital data to study urban dynamics and social behaviors.

CO- 7 Enhance ability to effectively communicate research findings in urban geography and effectively communicate complex spatial information to diverse audiences, including researchers, policymakers, and community stakeholders.

Paper Code: A110907P	**Paper Title: Methods And Techniques of Urban Geography**	**Practical, Generic Elective**
Unit-I: Global Perspective: Theoretical models of urban growth: infrastructure, community zone-based study of maps; Functional interpretation of urban morphology and town plan through the ages.		
Unit-II: Functional classification of towns based on occupational data, population size and centrality. Indian Perspective: Structure and growth analysis of Indian cities and conurbations; Determination of urban hierarchy in Indian region; Determination of population density gradient in urban areas; Application of rank-size rule in selected regions of India.		
Note: **Practical record (Unit I & II)** **Viva-Voce examination**		

Books Recommended:

PG SEMESTER IV/ PG SEMESTER II (ONE YEAR PG PROGRAMME)			
A111001R	**MAJOR RESEARCH PROJECT/ DISSERTATION**	**MORPHOMETRIC ANALYSIS AND SOCIO-ECONOMIC SURVEY BASED MASTER THESIS**	**20**

1. Monkhouse, F.J. Maps & Diagrams.
2. Robinson, A.H. Elements of Cartography.
3. Singh, R.L., Elements of Practical Geography.
4. Singh, L.R. & Singh, R.N. Map Work and Practical Geography (Eng./Hindi)
5. Sharma, J.P. Prayogatmak Bhoogol Ki Rooprekha (Hindi)
6. Hira Lal, Prayogatmak Bhoogol Ke Adhar (Hindi)
7. Lal, Hira, Matratmak Bhoogol (Hindi)