



माँ विन्ध्यवासिनी विश्वविद्यालय, मीरजापुर

Maa Vindhya Vasini University, Mirzapur

Website: <http://mvvu.ac.in>.

e-mail : reg.mvvu@gmail.com

DEPARTMENT OF GEOGRAPHY AND GEOINFORMATICS

Faculty of Science & Technology

Maa Vindhya Vasini University, Mirzapur

Semester Based Syllabus and Scheme of Examination (NEP-2020)

(w. e. f. 2025-26)

Geography: M.A./M.Sc. 1st Year (I and II Semester)

Semester	Paper	Total Credits	Total Marks (100)	No. of Lectures
1 st	I-GR101: Geomorphology	4	25+75	60
	II-GR102: Advanced Geography of India	4	25+75	60
	III-GR103: Economic Geography	4	25+75	60
	IV-GR104: Environmental Geography	4	25+75	60
	V-GRP105: Practical Cartography and Field – Cum - Lab Work	4	25+75	120
	Project/Dissertation	4		
	TOTAL	24		
2 nd	I-GR201: Physical Landscape	4	25+75	60
	II-GR202: Hydrology and Oceanography	4	25+75	60
	III-GR203: Geography of Resources	4	25+75	60
	IV-GR204: Basics of Remote Sensing	4	25+75	60
	V-GRP205: Practical Map Projections, Representation of Statistical Data and Aerial Photographs	4	25+75	120
	Project/Dissertation	4	100	I & II Sem. combined
	TOTAL	24		
	GRAND TOTAL	48	1100	

नोट :-

- विद्यार्थी वर्ष के अंत में दोनों सेमेस्टर (प्रथम एवं द्वितीय सेमेस्टर) में की गयी शोध परियोजना का संयुक्त परियोजना (Dissertation) जमा करेगा जिसका मूल्यांकन वर्ष के अंत सुपरवाइजर एवं विद्यालय द्वारा नामित वाह्य परीक्षक द्वारा संयुक्त रूप से 100 अंकों में किया जाएगा। इस प्रकार इस परीक्षा में कुल 08 क्रेडिट होंगे।
- विद्यार्थी प्रथम वर्ष के दोनों सेमेस्टरों में से किसी एक सेमेस्टर में दूसरे संकाय से माइनर इलेक्टिव पेपर का चयन करेगा जो 04 क्रेडिट का होगा एवं उसका मूल्यांकन 100(25+75) अंकों में किया जाएगा।
- इस प्रकार प्रथम वर्ष के दोनों सेमेस्टर मिलाकर कुल 52 क्रेडिट के होंगे। प्रथम वर्ष (प्रथम एवं द्वितीय सेमेस्टर) को मिलाकर कुल पूर्णांक 1100 अंकों का होगा।
- प्रथम सेमेस्टर का प्रायोगिक पेपर GR 105 एवं द्वितीय सेमेस्टर का प्रायोगिक पेपर GR 205 की प्रायोगिक परीक्षाएं आंतरिक (विभागीय) एवं विश्वविद्यालय द्वारा नामित वाह्य परीक्षक की उपस्थिति में विश्वविद्यालय/महाविद्यालय में विभाग द्वारा सम्पन्न कि जायेगी। इसकी परीक्षा सैद्धांतिक प्रश्न पत्र (Theory Paper) के साथ नहीं होगी।

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Geography: M.A./M.Sc. 2nd Year (III & IV Semester)

Semester	Paper	Total Credits	Total Marks (100)	No. of Lectures
3 rd	I-GR301: Climatology	4	25+75	60
	II-GR302: Geo-informatics and Geographic Information System (GIS) Applications	4	25+75	60
	III-GR303: Students are required to opt any one of the following: GR303A: Urban Geography GR303B: Population Geography GR303C: Disaster Management	4	25+75	60
	IV-GR304: Students are required to opt any one of the following: GR304A: Geography of Rural Settlements GR304B: Geography of Tourism GR304C: Industrial Geography	4	25+75	60
	V-GRP305: Practical and Surveying	4	25+75	120
	Project/Dissertation	4		
	TOTAL	24		
4 th	I-GR401: Geographical Thoughts	4	25+75	60
	II-GR402: Research Methods & Techniques	4	25+75	60
	III-GR403: Students are required to opt any one of the following: GR403A: Agricultural Geography GR403B: Transport Geography GR403C: Regional Planning & Development	4	25+75	60
	III-GR404: Students are required to opt any one of the following: GR404A: Geography of Rural Development GR404B: Political Geography GR404C: Population & Development	4	25+75	60
	V- GRP405: Study Tour and Report and Viva- Voce	4	25+75	120
	Project/Dissertation	4	100	III & IV Sem. Combined
	TOTAL	24		

नोट :-

- विद्यार्थी द्वितीय वर्ष के अन्त में दोनो सेमेस्टर (तृतीय एवं चतुर्थ सेमेस्टर) में की गयी शोध परियोजना का संयुक्त (Dissertation) जमा करेगा जिसका मूल्यांन वर्ष के अंत में सुपरवाइजर एवं विश्वविद्यालय द्वारा नामित वाह्य परीक्षक द्वारा संयुक्त रूप से 100 अंको में किया जाएगा। इस प्रकार इस वर्ष के कुल 08 क्रेडिट होंगे।
- इस प्रकार द्वितीय वर्ष के (तृतीय एवं चतुर्थ सेमेस्टर) दोनों सेमेस्टर मिलाकर कुल 48 क्रेडिट होगा। द्वितीय वर्ष(तृतीय एवं चतुर्थ सेमेस्टर) का पूर्णांक 1100 अंकों का होगा।
- चतुर्थ सेमेस्टर में विद्यार्थीयों द्वारा चयनित एलेक्टिव पेपर्स का कोड 400 की संख्या में उनके क्रमांक के जोड़ के आधार पर होगा। यथा—यदि विद्यार्थीयों 5वें क्रमांक के इलेक्टिव पेपर का चयन करता है तो उसका कोड 405 हो जाएगा।

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M.A. /M.Sc. Previous

First Semester

GR 101: Geomorphology

100 Marks (25+75) Total Credit- 4

Unit – I: Meaning and Scope of Geomorphology, Fundamental Concepts, Modern Geomorphologists –J. Hutton, A.N. Strahler, L.C. King and C.A.M. King.

Unit – II: Endogenetic process – Plate tectonic, Mountain Building- Kober, and Arthur Holmes, Volcanicity, Seismicity, Earthquakes, Tsunami.

Unit – III: Morphometric Analysis: Stream order, Drainage frequency, Drainage density, Bifurcation ratio, Hypsometric analysis, Hypsometric curve, Elongation ratio, Sinuosity index: Topographical Sinuosity index, (TSI), Hydraulic Sinuosity index (HSI), Standard Sinuosity Index (SSI).

Unit – IV: Geomorphology in India: Recent trends in Geomorphology, Applied Geomorphology, Regional geomorphology of Indo - Gangetic plain, Rajmahal hills and Malwa Plateau.

Books Recommended:

Ahmed, E. (1985): Geomorphology. Kalyani Publishers, New Delhi.

Bloom, A. L. (1998/ 2001): Geomorphology. 3rd edition Prentice Hall of India, New Delhi.

Chorley, R.J., Schumm, S. A. and Sugden, D. E. (1984): Geomorphology. Methuen and Company Ltd., London.

Dayal, P. (1994): A Text Book of Geomorphology. Kalyani Publishers, New Delhi.

Fairbridge, R.W. (ed.) (1968): Encyclopedia of Geomorphology, Reinhold Book Corporation, New York

Gregory, K.J. and Walling, D.E. (1973): Drainage Basin Form and Process. Edward Arnold, London.

Jog, S. R. (ed.) (1995): Indian Geomorphology (2 vols.). Rawat Publications, Jaipur

Kale, V. and Gupta, A. (2001): Introduction to Geomorphology. Orient Longman, Hyderabad.

King, C.A.M. (1966): Techniques in Geomorphology. Edward Arnold, London.

Pethick, J. (1984): An Introduction to Coastal Geomorphology. Arnold, London. Indian reprint 2000.

Sharma, P. R. (ed.), (1993): Applied Geomorphology in Tropics. Rishi Publications, Varanasi.

Singh, S. (2004): Geomorphology. Prayag Pustak Bhawan, Allahabad.

Sparks, B.W. (1986): Geomorphology. Longmans, London.

Thornbury, W.D. (2005): Principles of Geomorphology. John Wiley and Sons, New York.

Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography- An Outline of Geomorphology. Longman, London.

GR 102: Advanced Geography of India

100 Marks (25+75) Total Credit- 4

Unit – I: India through Geological times, Structure and Relief regions, Drainage, Physiographic division soil types.

Unit – II: Climatic Characteristics, Mechanism of Indian Monsoon, Climatic Regions, Natural Vegetation & Wild life, Vegetation Regions.

Unit - III: Agricultural Characteristics and Trends, Crop Combination regions, Green, White, Blue, and Yellow Revolution.

Unit – IV: Population growth, Trends and Patterns, Distribution, Density & National Population Policy. Industrial region, Transport – Rail, Road and Air.

Books Recommended.

Chapman, G. and Baker, K.M. (eds.) (1992): The Changing Geography of Asia. Routledge, London.

Farmer, B.H. (1983): Introduction to South Asia. Methuen and Company Ltd. and Company Ltd., London.

Ganguly, S. and Neil, DeVotta (eds.) (2003): Understanding Contemporary India. Lynne Rienner Publishers, Boulder and London.

Gole, P. N. (2001): Nature Conservation and Sustainable Development in India. Rawat Publications, Jaipur and New Delhi.

Johnson, B. L. C. (ed.) (2001): Geographical Dictionary of India. Vision Books, New Delhi.

Johnson, B.L.C. (1983): Development in South Asia. Penguin Books, Harmondsworth.

Khullar, D. R. (2006): India. A Comprehensive Geography. Kalyani Publishers., New Delhi.

Krishnan, M. S. (1968): Geology of India and Burma. 4th edition. Higgin Botham Private Ltd., Madras.

Nag, P. and Gupta, S. S. (1992): Geography of India. Concept Publishing. Company, New Delhi.

Nag, P. and G. C. Debnath (2022): An Advanced Geography of India. Bharati Prakashan, Varanasi.

Sharma, T. C. (2003): India: Economic and Commercial Geography. Vikas Publication., New Delhi.

Singh, J. (2003): India: A Comprehensive and Systematic Geography. Gyanodaya Prakashan, Gorakhpur.

Singh, R. L. (ed.) (1971): India. A Regional Geography. National Geographical Society of India, Varanasi.

Spate, O.H.K., Learmonth, A.T.A. and Farmer, B. H. (1979): India and Pakistan. Methuen and Company Ltd. and Company Ltd., London.

Subbarao, B. (1959): The Personality of India. University of Baroda Press, Baroda.

Sukhwil, B.L. (1987): India. Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi.

Tirtha, R. (2002): Geography of India. Rawat Publications., Jaipur and New Delhi.

Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad

Wadia, D. N. (1959): Geology of India. MacMillan and Company, London and Madras. Student edition.

GR 103: Economic Geography

100 Marks (25+75) Total Credit- 4

Unit – I: Meaning, Scope, Evolution and Recent Trends of Economic Geography, Fundamental Concepts. Relation of Economic Geography with Economics and other Branches of Social Sciences.

Unit – II: Classification of Industries: Iron & steel, Petro-Chemical; Elements and. Theories of Industrial Location -Weber, Losch, Industrial Regions and its Structural factors, Industrial Regions of World.

Unit – III: Studies of Selected Industries: Cotton Textile, Sugar and Food Processing Industry.

Unit – IV: Economic Regions and their Salient features, Special Economic Zones (SEZ) of India, 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. (ed) Globalization and Environment, E. Elgas Co. U.K., 2001.

GR 104: Environmental Geography

100 Marks (25+75) Total Credit- 4

Unit – I: Meaning, Scope and Concept of Environmental Geography, Approaches of 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 Ecosystem, Ecological Production and Energy flow-tropic level, Food chains and Food webs. Ecological Pyramids, Bio-geochemical Cycles, Nitrogen Cycle, Oxygen 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, Green House Effect, and Ozone

Depletion. **Unit – IV:** Environmental Pollution: Pollutants, Sources and Types of Pollution – Water, Soil, Air and Noise, Solid Waste Disposal, Environmental Pollution and Health, Environmental education, Environmental monitoring. Environmental impact analysis. Environmental policies and legislation, Environmental management.

Books Recommended

Anjuneyulu, Y. (2002): Environmental Impact Assessment Methodologies. B. S. Publications, Hyderabad.

Anjuneyulu, Y. (2004): Introduction to Environmental Science. B. S. Publications, Hyderabad.

Athavale, R. N. (2003): Water Harvesting and Sustainable Supply in India. Rawat Publications., Jaipur.

Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing Company, New Delhi.

Blaikie, P., Cannon, T. and Davis, I. (eds.) (2004): At Risk: Natural Hazards, Peoples Vulnerability and Disasters. Routledge, London.

Clarke, J. I., Curson, P., Kayastha, S. L. and Nag, P. (eds.) (1991): Population and Disaster. Basil Blackwell, USA.

Gautam, A. (2007): Environmental Geography, Sharda Pustak Bhawan, Allahabad.

Huggett, R. J. (1998): Fundamental of Biogeography. Routledge, London.

Kayastha, S.L. and Kumra, V.K. (1986): Environmental Studies. Tara Book Agency, Varanasi.

Khoshoo, T. N. (1981): Environmental Concerns and Strategies. Ashish Publishing House, New Delhi.

Kumra, V.K. (1982): Kanpur City. A Study in Environmental Pollution. Tara Book Agency, Varanasi.

Mathur, H. S. (2003): Essentials of Biogeography. Pointer Publication, Jaipur.

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.

Odum, E.P. (1975): Ecology. Rowman and Littlefield, Lanham USA.

Rajagopalan, R. (2005): Environmental Studies: From Crisis to Cure, Oxford University Press, New Delhi.

Reddy, M. A. (2004): Geoinformatics for Environmental Management. B. S. Publishers., Hyderabad.

Saxena, K.K. (2004): Environmental Studies. University Book House Private Ltd., Jaipur

Saxena, H. M. (1999): Environmental Geography. Rawat Publications., Jaipur and New Delhi.

Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.

Singh, A.K., Kumra, V.K. and Singh, J. (1986): Forest Resource, Economy and Environment. Concept Publishing Company, New Delhi.

Singh, D.N., Singh, J. and Raju, K.N.P. (eds.) (2003): Water Crisis and Sustainable Management, Tara Book Agency, Varanasi

Singh, J. (2001): *Paryavaran Evam Samvikas*. Gyanodaya Prakashan, Gorakhpur.

Singh, O., Nag, P., Kumra, V.K. and Singh, J. (eds.) (1993): Frontier in Environmental Geography. Concept Publishing Company, New Delhi.

Singh, O., Kumra, V.K. and Singh, J. (1988): India's Urban Environment. Pollution, Perception and Management. Tara Book Agency, Varanasi.

Singh, R. B. (ed.) (1990): Environmental Geography. Heritage Publication, New Delhi.

Singh, R. B. (ed.) (1995): Studies in Environment and Development. Rakesh Prakashan, Varanasi.

Singh, Rana P.B. (ed.) (1993): Environmental Ethics: Discourses and Cultural Traditions. National Geographical Society of India, BHU, Varanasi.

Singh, S. (2006): Environmental Geography. Prayag Pustak Bhawan, Allahabad.

Singh, S. (2007): *Paryavaran Bhoogol*. Prayag Pustak Bhawan, Allahabad

Singh, S. N. (1993): Elements of Environmental Geography and Ecology (in Hindi), Tara Book Agency, Varanasi

Wrigley, N. (1985): Categorical Data Analysis for Geographers and Environmental Scientists, Longman, London.

GRP105: Practical Cartography and Field – Cum - Lab Work

100 Marks (25+75)

Total Credit- 4

Unit – I:

25 Marks

Measures of Central Tendency- Mean, Median and Mode, Mean deviation, Quartile deviation, Measures of Dispersion, Standard Deviation, Co-efficient of Variation, Co-efficient of Correlation, Rank Size Correlation, Chi-square Test.

Unit – II:

25 Marks

Geological Maps and Cross Section Horizontal, Inclined, Unconformable, Folded and Folded strata.

Unit – III:

A. Data collection and its processing: Methods, Sources and Types, Classification, Tabulation and Data processing (With special reference to socio-economic survey and preparation of village/ Ward/town area research report). 15Marks

B. Excursion and report preparation (maximum 2 days).

15Marks

Unit – IV: Practical record and Viva-Voce examination.

(10+10) 20 Marks

Books Recommended:

Monkhouse, F.J. Maps & Diagrams.

Robinson, A.H. Elements of Cartography.

Singh, R.L., Elements of Practical Geography.

Singh, L.R. & Singh, R.N. Map Work and Practical Geography (Eng./Hindi) 5- Sharma, J.P. *Prayogatmak Bhoogol Ki Rooprekha* (Hindi)

Hira Lal, *Prayogatmak Bhoogol Ke Adhar* (Hindi) 7- Lal, Hira, *Matratmak Bhoogol* (Hindi)

Tiwari, R.C. and Tiwari, Sudha, *Abhinav Prayogic Bhoogol*.

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(w. e. f. 2025-26)

M.A. / M.Sc. Previous

Second Semester

GR201: Physical Landscape

100 Marks (25+75) Total Credit- 4

Unit – I: Concept and Types of Physical Landscape, Significance of Geomorphic processes in landforms development, Geological structure, Climatic and Biotic factors in formation of landforms Theories of landform development- W M Davis, W Penck, L C King & M. Morisawa.

Unit – II: Concept of cycle of erosion: Davis and Penck, Interruption in the cyclic and polycyclic relief.

Unit – III: Exogenic process: Concept of gradation, Agents and Processes of Gradation, Causes, Types and Classification of Weathering, Erosional & Depositional processes and Landform- Humid, Arid, Karst, Glacial, Periglacial and Coastal.

Unit - IV: Relief features of Physical landscape, Evolution of slopes and Erosional surfaces, Study of Micro - landforms of Vindhyan regions, Chhota Nagpur Plateau and Chambal basin.

Books Recommended

Bernhard, H. and James, M. A. (1944): Climatology. McGraw Hill Company, New York.

Chorley, R. J. (1995): Atmosphere, Weather and Climate. Methuen and Company Ltd. and Company Ltd., London.

Chow, V. T. (ed.) (1954): Handbook of Applied Hydrology: A Compendium of Water Resources Technology. McGraw Hill, New York.

Critchfield, H. J. (2003): General Climatology. Prentice-Hall of India, New Delhi.

Rai, V.K. (1993): Water Resource Planning and Development, Deep and Deep Publication, New Delhi

Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing Company, New Delhi.

Reddy, J. P. (1988): A Textbook of Hydrology. Laxmi Publication., New Delhi. 4th edition.

Singh, M. B. (1999): Climatology and Hydrology. Tara Book Agency, Varanasi. (In Hindi).

Singh, M. B. (2002): Physical Geography. Tara Book Agency, Varanasi. (In Hindi).

Singh, S. (1998): Geomorphology. Prayag Pustak Bhavan, Allahabad.

Sparks, B.W. (1986): Geomorphology. Longman, London.

Thornbury, W.D. (2005): Principles of Geomorphology. John Wiley and Sons, New York.

Trewartha, G. T. (1980): An Introduction to Climatology. McGraw Hill Student edition, New York.

Ward, R.C. and Robinson, M. (2000): Principles of Hydrology. McGraw Hill, New York.

Weisberg, J. S. (1974): Meteorology. Houghton Mifflin Company, Boston.

Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography- An Outline of Geomorphology. Longmans Green, London

Part A: Hydrology

Unit – I: Meaning, Scope and Concepts, Development of hydrology, Hydrological cycle, Man's influence on the hydrological cycle. Evapotranspiration, Factors affecting evaporation from free water surface and soils.

Unit – II: Soil moisture and its zone, Infiltration, Ground water: Occurrence, storage, Recharge and discharge, Run-off: its sources and components, Factors affecting surface run-off, Principles and determination of water balance and its application in crop production.

Part B: Oceanography

Unit III: Definition of Oceanography, Surface configuration of Ocean floor, Distribution of temperature and salinity of oceans and seas, Relevance of Oceanography in earth and atmospheric Science

Unit IV: Circulation of Oceanic waves, tides and currents, currents of the Atlantic, Pacific and Indian Oceans. Marine Deposits and coral reefs, Ocean as storehouse of resources for the future.

Books Recommended

- Bernhard, H. and James, M. A. (1944): Climatology. McGraw Hill Company, New York.
Chorley, R. J. (1995): Atmosphere, Weather and Climate. Methuen and Company Ltd. and Company Ltd., London.
Chow, V. T. (ed.) (1954): Handbook of Applied Hydrology: A Compendium of Water Resources Technology. McGraw Hill, New York.
Critchfield, H. J. (2003): General Climatology. Prentice-Hall of India, New Delhi.
Rai, V.K. (1993): Water Resource Planning and Development, Deep and Deep Publication, New Delhi
Bilas, R. (1988): Rural Water Resource Utilization and Planning. Concept Publishing Company, New Delhi.
Reddy, J. P. (1988): A Textbook of Hydrology. Laxmi Publication., New Delhi. 4th edition.
Singh, M. B. (1999): Climatology and Hydrology. Tara Book Agency, Varanasi. (In Hindi).
Singh, M. B. (2002): Physical Geography. Tara Book Agency, Varanasi. (In Hindi).
Singh, S. (1998): Geomorphology. Prayag Pustak Bhavan, Allahabad.
Sparks, B.W. (1986): Geomorphology. Longman, London.
Thornbury, W.D. (2005): Principles of Geomorphology. John Wiley and Sons, New York.
Trewartha, G. T. (1980): An Introduction to Climatology. McGraw Hill Student edition, New York.
Ward, R.C. and Robinson, M. (2000): Principles of Hydrology. McGraw Hill, New York.
Weisberg, J. S. (1974): Meteorology. Houghton Mifflin Company, Boston.
Wooldridge, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography- An Outline of Geomorphology. Longmans Green, London
Upadhyaya D.P. and Singh R.A.: Climatology and Hydrology, Vasundhara Publications, Gorakhpur

Jones J.A.A.: Global Hydrology, Process Resources and Environmental Management, Longman, London, 1997.

Todd D.K.: Ground Water Hydrology, John Wiley, New York, 1959.

GR 203: Geography of Resources

100 Marks (25+75) Total Credit- 4

Unit – I: Concept and Scope of Resource Geography, Concept and Types, World Resources distribution and pattern, Land, Water, Mineral and Power resources.

Unit – II: Human resources, Resource Potential, Resource base and its dynamism as related to stages of cultural technological and economic development, population growth and resource scarcity hypothesis, Sustainable development.

Unit – III: Factors of Location of Economic Activities -Physical, Social, Economic and Cultural, Von-Thunen model of agricultural location, Agriculture regions of the world.

Unit-IV: Resource regionalization, world economic development, concept of developed and developing countries, Resource conservation and management, Resource development and international policies.

Books Recommended

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

GR 204: Basics of Remote Sensing

100 Marks (25+75) Total Credit- 4

Unit – I: Remote Sensing - Definition and Scope, Electro-magnetic radiation, Characteristics: interaction with matter, Type of remote sensing and remote sensing platform.

Unit – II: Aerial photos: Types, Scale, resolution, geometric Properties of aerial photos, Stereoscopic parallax, and Relief displacement.

Unit – III: General orbital characteristics of remote sensing satellites, general characteristics of remote sensing sensors, characteristics of raw remote sensing data.

Unit – IV: Elements of image interpretation, image processing techniques, visual and digital, Remote sensing in resource mapping and environmental monitoring. Land use and land cover mapping: a cover study.

Books Recommended

Campbell, J. B. (2002): Introduction to Remote Sensing. 5th edition. Taylor and Francis, London.

Cracknell, A. and Hayes, L. (1990): Remote Sensing Year Book, Taylor and Francis, London.

Curran, P.J. (1985): Principles of Remote Sensing, Longman, London.

Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): Remote Sensing. Indian Academy of Science, Bangalore.

Floyd, F. and Sabins, Jr. (1986): Remote Sensing: Principles and Interpretation, W.H. Freeman, New York.

Guham, P. K. (2003): Remote Sensing for Beginners. Affiliated East-West Press Private Ltd., New Delhi.

Hallert, B. (1960): Photogrammetry, McGraw Hill Book Company Inc., New York.

Harry, C.A. (ed.) (1978): Digital Image Processing, IEEE Computer Society, California

Hord, R.M. (1982): Digital Image Processing of Remotely Sensed Data, Academic Press, New York.

Leuder, D.R. (1959): Aerial Photographic Interpretation: Principles and Application. McGraw Hill, New York.

Lillesand, T.M. and Kiefer, R.W. (2000): Remote Sensing and Image Interpretation. 4th edition. John Wiley and Sons, New York.

Nag, P. (ed.) 1992: Thematic Cartography and Remote Sensing, Concept Publishing. Company, New Delhi.

Reeves, R.G. (ed.) (1983): Manual of Remote Sensing, Vols. 1 and 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.

Siegel, B.S. and Gillespie, R. (1985): Remote Sensing in Geology, John Wiley and Sons, New York.

Silver, M. and Balmori, D. (eds.) (2003): Mapping in an Age of Digital Media. Wiley-Academy, New York and Chichester.

Spurr, R. (1960): Photogrammetry and Photo Interpretation, The Roland Press Company, London.

Survey of India, (1973): Photogrammetry, Survey of India, Dehradun.

Swain, P.H. and Davis, S.M. (ed.), (1978): Remote Sensing: The Quantitative Approach. McGraw Hill, New York.

नाग पृथ्वीश, चंद्रशेखर और जी सी देबनाथ (2022) भौगोलिक विज्ञान, भारती प्रकाशन, वाराणसी

GRP 205: Practical

100 Marks (25+75) Total Credit- 4

Map Projections, Representation of Statistical Data and Aerial Photographs

Unit – I:

20 Marks.

Map Projections: Classification, properties, choice, merits and demerits of map projection. Drawing of the following map projections by using mathematical methods, Bonne's, Polyconic, Gall's, Equatorial cases of Gnomonic, Stereographic and Orthographic projections, Universal Transverse Mercator (U.T.M.), Sinusoidal and Interrupted Sinusoidal and International Projections.

Unit – II:

20 Marks.

Cartographic Representation of Statistical Data: Rainfall Dispersion diagram, Hypsometric curve, Water Balance graph, Locational Quotient, coefficient of Localization and Localization curve.

Unit – III:

20 Marks.

Aerial Photo interpretation & Block diagrams.

Unit – IV:

20 Marks.

Computer: Components and Characteristics, MS Office, Digital cartography and Map making.

Practical record and Viva-voce:

(10+10) 20Marks.

DEPARTMENT OF GEOGRAPHY AND GEOINFORMATICS

Faculty of Science & Technology

Maa Vindhyavasini University, Mirzapur

Semester Based Syllabus and Scheme of Examination (NEP-2020)

(w. e. f. 2025-26)

M.A./M.Sc. Third Semester

Paper I

GR 301: Climatology

100 Marks (25+75) Total Credit- 4

Unit – I: Definition, scope, significance and evolution of climatology; Elements of weather and climate; Relation with meteorology. Composition and structure of Atmosphere; Insolation, process of heating and cooling; heat balance of the earth and atmosphere, Greenhouse effect.

Unit – II: Air Pressure and pressure belts; Atmospheric motion, Force controlling motion of air, vertical motion, Jet stream, Permanent, Seasonal and local wind, cyclone and anticyclone. Concepts, classification, characteristics of air mass and front, Ocean atmospheric interaction-El Nino, Southern Oscillation (ENSO) and La-Nina.

Unit – III: Climatic Classification of Koppen, and Thornthwait, and World climatic region, Climatic changes, Causes and consequences of Climatic change.

Unit – IV: Applied climatology and weather forecasting, Impact of Human civilization on health, food, clothing, agriculture, Mining, industry.

Books Recommended:

Barry R.G. and Chorley R.J.: Atmosphere, Weather and Climate, Routledge, London and New York, 1998.

Critchfield, J.J.: General Climatology, Prentice Hall, New Delhi, 1993. 3- Lal, D.S.: Climatology, Chaitanya Publications, Allahabad, 1986.

Lydolph, P.E.: The Climate of the Earth, Rowman, 1985.

Robinson P.J. and Henderson S: Contemporary Climatology, Henlow, 1999.

Upadhyaya D.P., and Singh R.A.: Climatology and Hydrology, Vasundhara Publication, Gorakhpur, 2000 (Hindi).

Addison H.: Land, water and Flood, Chapman and Hall, London, 1961. 8- Chorley R.J., Water, Earth and Man, Methuen, London, 1967.

Jones J.A.A.: Global Hydrology: Process Resources and Environmental Management, Longman, London, 1997.

Todd, D.K.: Ground Water Hydrology, John Wiley, New York, 1959.

Pedagogy:

Weather and climatic maps and charts are to be made available to the students. Audio-Visual aids to be used for effective teaching.

Students to be taken on a field visit to nearby reservoir. Data pertaining to water table in the local wells in different seasons has to be collected.

M.A./M.Sc. Third Semester

Paper II

GR 302: Geoinformatics and Geographic Information System (GIS)

100 Marks (25+75) Total Credit- 4

Applications Unit – I: Geoinformatics: Concept, meaning, scope, evolution and development. Interrelation between Geoinformatics and Geodesy: Surveying Mapping, Positioning, Navigation, Cartography, Remote Sensing, Photogrammetry, GIS and GPS. Georeferencing, Datum and Applications. GPS-segment, types, surveying techniques, instruments, applications and benefits. Mobile Mapping – concept and use.

Unit II: Geospatial technology, Meaning, Concept and Scope. Data sources – Field information and discrete information. Data types – Spatial and non-spatial, raster and vector. Data acquisition, storage, modelling, analysis, management and NSDI Data Base Management System (DBMS) New Map Policy

Unit III: GIS: Evolution, Meaning, Scope purpose and Application. Basic principle of GIS. GIS Software and Hardware. GIS Data Standards – Concept and Components, Digital Elevation Model (DEM) – Process, Derivatives and Application.

Unit IV: Remote Sensing and GIS integration. GIS project design and planning GIS packages and products GIS and industry, business system, human welfare Application trend of GIS product. Legal and managerial issues in handling geographic data

Books Recommended

- Bonham, Carter, G.F. (1995): Information Systems for Geoscientists – Modelling with GIS, Pergammon, Oxford.
- Burroughs, P.A. and McDonnell, R. (1998): Principles of Geographic Information Systems. Oxford University Press, Oxford.
- Chang, K.T. (2003): Introduction to Geographic Information Systems. Tata McGraw Hill Publications Company, New Delhi.
- Chauniyal, D. D. (2004): Remote Sensing and Geographic Information Systems. (in Hindi). Sharda Pustak Bhawan, Allahabad.
- Demers, M. N. (2000): Fundamentals of Geographic Information Systems. John Wiley and Sons, Singapore.
- ESRI (1993): Understanding GIS. Redlands, USA
- Fraser Taylor, D.R. (1991): Geographic Information Systems. Pergammon Press, Oxford.
- George, J. (2003): Fundamentals of Remote Sensing. Universities Press Private Ltd, Hyderabad.
- Girard, M. C. and Girard, C. M. (2003): Processing of Remote Sensing Data. Oxford and IBH, New Delhi.
- Glen, E. M. and Harold, C. S. (1993): GIS Data Conversion Handbook. Fort Collins, Colorado, GIS Word Inc.
- Goodchild, M.F., Park, B. O. and Steyaert, L. T. (eds.) (1993): Environmental Modelling with GIS. Oxford University Press, Oxford.
- Guptill, S.C., and Morrison, J.L. (1995): Elements of Spatial Data Quality. Elsevier/Pergammon, Oxford.

- Heywood, I. (2003): An Introduction to Geographical Information Systems, 2nd edition, Pearson Publishing Company, Singapore.
- Korte, G. M. (2002): The GIS Book. On Word Press: Thomson Learning, New York and Singapore.
- Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
- Longley, P. and Batty, M. (eds.) (1996): Spatial Analysis: Modelling in a GIS Environment. Geo Information International, Cambridge.
- Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): Geographic Information Systems: Principles, Techniques, Management, Applications, John Wiley and Sons, New York.
- Maguire, D. J., Michael, F. G. and David, W. R. (1999): Geographical Information Systems: Principles and Application. Geo Information International, Vol.2, Longman Publication, New York.
- Martin, D. (1996): Geographic Information Systems: Socioeconomic Implications. Routledge, London.
- Michael, F. G. and Karan, K. K. (ed.) (1990): Introduction to GIS. NCGIA, Santa Barbara, California.
- Nag P. and M. Kudarath (1998): Digital Remote Sensing, Concept Publishing Company, New Delhi.
- Nag, P. (2016 and 2021)) Indian Geospatial Infrastructure. Bharati Prakashan, Varanasi.
- Mishra H.C. (2000) GIS handbook, GIS India, Hyderabad.
- Reddi A. and Y. Hari Shankar (2006) Text Book of Digital Remote Sensing, B.S. Publication, Hyderabad.
- Ralston, B. A. (2002): Developing GIS Solutions with Map Objects and Visual Basic. On Word Press: Thompson Learning, New York and Singapore.
- Reddy, M. A. (2001): Textbook of Remote Sensing and Geographic Information Systems. B.S. Publications., Hyderabad.
- Ripple, W. J. (ed.) (1989): Fundamentals of Geographic Information Systems: A Compendium. ASPRS/ ACSM, Falls Church.
- Siddiqui, M.A. (2005): Introduction to Geographical Information Systems, Sharda Pustak Bhawan, Allahabad.
- Star, J. and Estes, J. (1990): Geographic Information Systems – An Introduction. Prentice-Hall, Englewood Cliffs, New Jersey.
- Worboys, M. F. (1995): GIS: A Computing Perspective. Taylor and Francis, London.
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Paper III

Optional Paper (303): Students are required to opt any One of the following: GR 303A, GR 303B, GR 303C

100 Marks (25+75) Total Credit- 4

GR 303A: Urban Geography

Unit – I: Meaning, Scope, Approaches and Evolution of Urban Geography. Attributes of urban places during ancient, Medieval and Modern period. Origin and Growth of Urban Settlements. The models of Urban Growth: Concentric Zone, Sectoral and Multinuclei.

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 basic and non-basic functions, functional classification, Morphology and land use structure- built up and non-built up, C.B.D. Commercial, residential, industrial and institutional areas, 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 renewal, 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, green belt, garden cities, urban policy, Globalization and urban planning. Special study million towns of U.P.

Suggested Readings:

Berry B.J.L. and Horton F.F.: Geographic Perspectives on Urban Systems, Prentice Hall, Englewood Cliffs, J.J. 1970.

Dickinson, R.E. City and Region, Routledge, London, 1964.

Gibbs, J.P.: Urban Research Methods, Van Nostrand Co. Princeton, N.J. 1961. 4- Hall P: Urban and Regional Planning, Routledge, London, 1992.

Kundu, A: Urban Development and Urban Research in India, Khanna Publication, 1992.

Rao, V.L. S.P.: Urbanization in India: Spatial dimensions, Concepts publishing Co. New Delhi.

Smailes, A.E.: The Geography of Towns, Hutchinson, London, 1953.

Singh O.P. Nagariya Bhoogol, Sharda Pustak Bhawan, Allahabad, 2011.

GR 303B: Population Geography

Unit – I: Concepts, Scope, Method, Approaches and Development of Population Geography, Population Geography and Demography, Source of population data, Population Dynamics: 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.

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.

Unit – IV: Population resource regions of the world and India. Human development index and its components, population policy and population planning with special reference to India. Success and failure of family planning and family welfare programmes. Population growth and environmental consequences.

Suggested Readings:

Bogue D.J.: Principles of Demography, John Wiley, N.Y., 1969.

Chandana, R.C.: Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, 2000.

Clarke, John, I: Population Geography, Pergamon Press, Oxford, 1973.

Crook Nigel: Principles of population and Development Pergamon Press, N.Y., 1997.

Daugherty Helen, gin, Kenneth C.W. Kemmerer: An Introduction to Population, The Guilford Press, N.Y., London, 1998.

Garnier, J.B.: Geography of Population, Longman, London, 1970.

Mamoria, C.B. India's Population Problem, Kitab Mahal, New Delhi, 1981.

Premi M.K.: India's population Heading Toward Billion B.R. Publishing Corporation, 1991.

Srinivasan K. and M. Blass of: Population Development Nexus in India: Challenges for the New Millennium. Tata McGraw Hill, New Delhi, 2001.

Woods, R: Population Analysis in Geography, Longman, London 1979.

Nag, P and G C Debnath (2021) Population Geography, Bharati Prakashan, Varanasi.

GR 303C: Disaster Management

Unit – I: Definition, Meaning and Concept of Disaster and Hazard. Types of Hazards – Natural and man-made. Concept of Disaster Management Concept of Disaster Relief, Resume, Trigger mechanism, Response, Mitigation Risk and Vulnerability,

Unit – II: Natural Disaster – Geological, Water and climate, Environmental Man-Made disaster – Chemical, Industrial, Nuclear, Accident

Unit – III: Biological disaster – Epidemics, Pest – Attack, Cattle epidemic, Food poisoning. Social Response to Hazard-reduction Identification of multiple disaster-prone areas.

Unit – IV: Natural Disaster reduction Management, Decision making policy. Determination of acceptable level of Risk Measures to control and mitigate disaster. Role of NDMA and SDMA.

Books Recommended:

Alexander David (1993): Natural Disaster, London UCL Press.

Benarde Melvin (1972): Race Against Famine: Mumbai, Orient Longmans.

Bhargwa, Gopal (1992) Environmental Challenges and Ecological Disaster: Global perspective, Mittal, New Delhi.

Sharma, Vinod K. (1995): Disaster Management, National Centre for Disaster Management. Indian Institute of Public Administration, New Delhi.

Parasuraman, S. and P.V. Unnikrishnan (2000): India Disaster Report: Towards Policy Initiatives Oxford University Press, New Delhi

World Disaster Report 1997

Hewitt, Kenneth, (1997) Regions at Risk – A Geographical Introduction to Disaster, Longman.

Lodha, R.M. (1997) Environmental Ruins: The Crisis of Survival, Indus Publishing Company, New Delhi.

Paper IV

Optional Paper (304): Students are required to opt any One of the following:

GR 304A, GR 304B, GR 304C

100 Marks (25+75) Total Credit- 4

GR 304A: Geography of Rural Settlements

Unit–I: Nature, Scope, Significance, of Rural Settlement Geography, Definition and Characteristic of Rural Settlements, 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, Morphogenesis and 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:

Alam, S.M. et al: Settlement System in India, Oxford and IBP publication Co. New Delhi, 1982.

Chisholm M. rural settlements and Land use. John Wiley N.Y. 1967.

Grover N. Rural settlements; A Cultural Geographical Analysis; Inter India Publication, Delhi; 1986.

Daniel P. and Hopkinson M: the Geography of Settlements, Oliver and Boyd; Edinburg, 1986.

Hudson, F.S.: Geography of Settlements, Macdonald and Evans, N.Y. 1976.

Vanmali, S: Service Centers in Rural India, B.R. Publication Corporation, New Delhi, 1983.

GR 304B: Geography of Tourism

Unit – I: Definition of tourism, factors influencing tourism-historical, natural, Socio-cultural and economic; motivating factors for pilgrimages, leisure and recreation, elements of tourism, tourism as an industry.

Unit II: Geography of tourism: its spatial affinity, areal and locational dimensions comprising physical, cultural, historical and economic Tourism types-Cultural, eco-ethno-coastal and adventure tourism, national and international tourism. Globalization and tourism.

Unit III: Indian tourism: Regional dimensions of tourist attraction, evolution of tourism, promotion of Tourism. Infrastructure and support system-accommodation and supplementary accommodation, other facilities and amenities. Tourism circuits-short and longer destination agencies and intermediates. Indian hotel industry.

Unit – IV: Impacts of tourism-physical, economic, social and perceptual positive and negative impacts, environmental laws and tourism, Current Trends, spatial patterns and recent changes, role of foreign capital and impact of globalization on tourism.

Suggested Readings:

- 1- Bhatia, A.K. (1996). Tourism: Development principles and Practices, Sterling Pub. New Delhi.
- 2- Chandra, R.H. (1998). Hill Tourism: Planning and Development, Kanishka Pub., New Delhi.
3. Hunter, C and Green H. (1995): Tourism and the Environment: A sustainable Relationship, Routledge, London.
4. Kaur J. (1993). Himalayan pilgrimages and New Tourism, Himalayan Books, New Delhi.
- 5- Milton, D. (1993). Geography of World Tourism, Prentice Hall, N.Y.
- 6- Voase, R. (1995). Tourism: the Human Perspective, Hodder and Stoughton, London.
- 7- Williams, Stephen. (1998). Tourism: Geography, Routledge, London.
- 8- यादव, मार्कण्डेय सिंह. (2011). पर्यटन भूगोल, वैभव लक्ष्मी प्रकाशन, वाराणसी

GR 304C: Industrial Geography

Unit – I: Nature, Scope and recent developments. Elements and factors of location of industries, centralization and decentralization of industrial enterprises, horizontal, vertical and diagonal linkages of Modern Industries.

Unit – II: Theories of Industrial location: Webber, Losch, Isard and Hoover, Modern refinements in the theories of industrial location. Critical review and application of industrial location theories. Distribution and spatial pattern of industries; petro-chemical hardware and software industries. Methods of delineating industrial regions; major industrial regions of the world. Industrial system and industrial regions of India.

Unit III: Methods of measuring the spatial distribution of industries: location quotient, co-efficient of geographic association, index of concentration, coefficient of localization, case studies of application of these methods.

Unit – IV: Environmental problems caused by industries; industrial hazards and occupation health, Role of globalization on industrial sector. Changing industrial policy and industrial policy of India. Industrial planning as an integral part of regional planning.

Suggested Readings:

- 1- Alexander, J.W.; Economic Geography, Prentice Hall, Englewood Cliffs, 1998.
- 2- Alexanderson, C: Geography of Manufacturing, Prentice Hall, Bombay, 1967.
- 3- Hoover, E.M.: The Location and Space Economy, McGraw Hill, N.Y., 1948.
- Isard, W; Methods of Regional Analysis, The Technology Press of M.I.T. & John Wiley & Sons, N.Y., 1956.
- Miller, E: Geography of Manufacturing, Prentice Hall, Englewood Cliffs, N.J., 1962.
- 6- Weber, Alfred: Theory of Location of Industries, Chicago University Press, Chicago.

GRP 305: Practical: Surveying**Marks 100 (25+75) Total Credit-4**

General introduction of surveying based on instruments used;
Plane and Geodetic surveying, Traversing- open and close; Triangulation surveying.

Unit I:**20 Marks****Prismatic Compass surveying**

Radiation or Radial line method; Intersection or Sketch method; Traverse (Open and Closed method); and Resection method.

Unit II:**20 Marks****Dumpy Level/Auto Level surveying**

General introduction about levelling; Simple levelling, Differential levelling, Profile levelling and Reciprocal levelling.

Unit III:**20 Marks****Total Station/ Theodolite surveying**

General introduction about instrument, Triangulation method and Traverse method.

Unit IV:**20 Marks****Global Positioning System (GPS) surveying**

Introduction about GPS surveying and GPS instruments; Types and components of GPS; Rapid Static Positioning technique; Stop-and-Go technique; Kinematic Positioning technique.

Practical Record and Viva-Voce:**(10+10) 20 Marks**

DEPARTMENT OF GEOGRAPHY AND GEOINFORMATICS
Faculty of Science & Technology

Maa Vindhyavasini University, Mirzapur

Semester Based Syllabus and Scheme of Examination (NEP-2020)

(w. e. f. 2025-26)

M.A. / M.Sc. Semester- IV

GR 401: Geographical Thought

100 Marks (25+75) Total Credit- 4

Unit-I: Basic Frame and Concepts: Man-environment interaction: new environmentalism, Concepts: space, place, environment, time and spatial organization, Region and regional typology; culture and cultural landscape.

Unit-II: Modern Approaches: Quantitative revolution and challenges, Contributions of Vidal de la Blache, and Carl Sauer; Humanistic and phenomenological geography: contributions of Yi-Fu Tuan.

Unit-III: Contemporary Trends: Qualitative paradigm, Behavioural revolution: perception and cognition, mental maps; Marxism, Postmodernism; Post structuralism and Post colonialism.

Unit – IV: Indian Geography-Base and Trends: Post-Colonialism and Indian Geography: Gandhi's contribution and Indian Geography, Gaia Theory and links to Indian Literature, Ancient Indian Geography and scientific outlook (e.g. cultural astronomy); Future of Indian geography: problems, perspectives and prospects.

Books Recommended:

Adams, P., Steven, H. and Karel, T. (eds.) (2001): Texture of Place, Exploring Humanistic Geographies University of Minnesota Press, Minneapolis.

Anderson, K. Domosh, M., Pile, s. and Thrift, N. (eds.) (2003): Handbook of Cultural Geography sage Publication London.

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.

Buttimer, A. (1971): Society and Milieu in the French Geographic Tradition. Rand Mc Nelly, Chicago.

Daniels, P., Bradshaw, M., Shaw. D. and Sidway, J. (2000): An Introduction to Human Geography. Issues for the 21st Century. Prentice Hall, London.

Dear, M.J. and Fusty, S. (2002): The Spaces of Post modernity: Readings in Human Geography. Blackwell Publishers, Oxford.

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.

Gayle, G. and Wilmot, c. (eds.) (2003): Geography in America at the Dawn of the 21st Century. Oxford University Press, Oxford and New York.

Harvey, D. (1969): Explanation in Geography, Arnold, London.

Harvey, M.E. and Holly, P.B. (2002): Themes in Geographic Thought, Rawat Publications., Jaipur and New Delhi.'

Hubbard, P., Kitchin, R. Bartley, B. and Fuller, D. (2002): Thinking Geographically: Space, Theory and Contemporary Human Geography. Continuum, London.

Johnston, R, Gregory D, Pratt G, Watts M. and Whatmore S. (2003): The Dictionary of Human Geography. Blackwell Publishers, Oxford.

5th edition.

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. 6th edition, Edward Arnold, London.

Kapur, A. (ed.) (2001) Indian Geography – Voice of Concern. Concept Publishing Company, New Delhi.

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.

Singh, R.L. and Singh, Rana P.B. (eds.) (1990) Literature and Humanistic Geography, National Geographical Society of India, BHU, Varanasi, Publication number 37.

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.

Singh, Rana P.B. (ed.) (1993): Environmental Ethics. National Geographical Society of India, BHU, Varanasi, Publication number 40.

Singh, Rana P.B. (ed.) (1994): The Spirit and Power of Place. National Geographical Society of India, BHU, Varanasi Publication number 41.

Singh, Rana P.B. (2004): Cultural Landscapes and the Lifework. Indica Books, Varanasi.

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.

M.A/M.Sc. Semester- IV

GR 402: Research Methods and Techniques. 100 Marks (25+75) Total Credit- 4

Unit- I: Framework 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:

Ahuja, R. (2001): Research Methods, Rawat Publications Jaipur and New Delhi.

Bhattacharyya, D.K. (2005): Research Methodology, Excel Books, New Delhi.

Blackburn, J. and Holland, J. (eds.) (1998): Who changes? Institutionalizing Participation in Development, IT Publications, London.

Blaxter, L., Ilughes, C. and Tight, M. (1996): How to Research. Open University Press, Buckingham. 5- Crang, Mike 1999. Cultural Geography. Routledge, London.

Daniels, P., Bradshaw, M., et al. (2000): Human Geography: Issues for the 21st Century, Prentice Hall, London, and Pearson Publishers., Singapore, Indian reprint, 2003.

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.

Fisher, P. and Unwin, D., (eds.) (2002) virtual Reality in Geography. Taylor and Francis, London.

Flowerdew, R. and Martin, D. (eds.) (1997): Methods in Human Geography. A Guide for Students Doing a Research Project, Longman, Harlow.

Hay, I. (ed) (2000): Qualitative Research Methods in Human Geography. Oxford University Press, New York.

Henn, M., Mark W., and Nice F. (2006): A Short Introduction to Social Research, vistaar Publications, New Delhi.

Eyles J. and Smith D.M. (1988): Qualitative Methods in Human Geography, Polity Press Dales Brewer, Cambridge.

Kitchin R. and Tate, N., (2001): Conducting Research into Human Geography, Theory, Methodology and Practice, Prentice- Hall London.

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

Paper III Optional Paper (403):

Students are required to opt any One of the following: GR 403A, GR 403B, GR 403C

100 Marks (25+75) Total Credit- 4

GR 403A: Agricultural Geography

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, Determinants of agricultural land use.

Unit – II: 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 Thunen 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 programmes. Role of irrigation, fertilizers, insecticides, pesticides and technological knowhow in environmental degradation, employment in agricultural sector.

Suggested Readings

Baylist Smith T.P.: The Ecology of Agricultural System, Cambridge University Press, London, 1987.

Gregor, H.P.: Geography of Agriculture, Prentice Hall, B.Y., 1970.

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.

Morgan, W.B. Agricultural in the Third World, A spatial Analysis, West View Press, Boulder, 1978.

Sauer, C.O.: Agricultural Origins and Dispersals, M.I.T. Press West View Press Mass, USA, 1969.

Singh J. and Dhillon S.S.: Agricultural Geography, Tata McGraw Hill Pub., New Delhi, 1988.

Tarrant, J.R.: Agricultural Geography, Wiley, N.Y., 1974.

Optional Paper 403B

GR 403B: Transport Geography

Unit – I: Nature, Scope, significance and development of transport geography, evolution of transportation-preindustrial era. 19th and 20th centuries, Factors associated with the development of transport system. Physical, Economic, social, cultural and institutional. Evolution of transport network. Characteristics and relative significance of different modes of transport, Railways, Roads, Airways and waterways.

Unit – II: Accessibility and flow models, network structure, graph theoretic measures, measurement of accessibility, models of network change, Linear programming and gravity models. Theories related to freight rate structure, bases of spatial interaction: complementarity, intervening opportunity, transferability, gravity, potential models of spatial interaction.

Unit – III: Transport system in India, Railways, Roads, airways and waterways, patterns of movement, simple model of interaction, movement geometry. Transport policy and planning, transport development in developing countries.

Unit-IV: Urban transportation-growth and problems. Transport and regional planning, transport and regional planning, transport and environmental degradation, vehicular pollution and congestion, alternative to transport system in Megacities of India, National Highway Development and planning in India.

Suggested Readings:

- 1- Chorley, R.J. and Hagget P: Model in Geography, Methuen & Co London, 1967.
- 2- Hurst, M.E. (Ed): Transportation Geography, McGraw Hill, 1974.
- 3- Hagget P. and Chorley R.J.: Network Analysis, Edward Arnold, London, 1968.
- 4- Hay A.: Transport Economy, Macmillan, London, 1973.
- Hoyle, B.S. (ed) Transport and Development Macmillan, London, 1973
- Raza M. Agrawal Y.P.: Transport Geography of India, Concept, New Delhi, 1985.
- Robinson H. and Bamford G.G.: Geography of Transport, Macdonald & Evans, London, 1978.
- Traffe, E.J. and Gauthier (Jr.) H.L.: Geography of Transportation Prentice Hall, Englewood Cliffs, J.J., 1973.
- White H.P. and Senior M.L.: Transport Geography, Longman, London, 1953.

Optional Paper 403C

GR 403C: Regional Planning and Development

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.

Suggested Readings:

Singh, O.P. and Pandey, D.C.: Development Planning: Theory and Practice, Gyanodya Prakashan Nainital, 1986.

Bhatt, L.S.: Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.

Freidman, J. and Alonso W. Regional Development Policy: A case Study of Venezuela, MIT Press, Cambridge Mass-1966.

Ghosal G.S. and Krishnan G: Regional Disparities in Levels of Socio-Economic Development in Punjab, Vishal Publications, Kurukshetra, 1984.

Kuklinski A.R. (Ed): Growth Poles and growth Centres in Regional Planning, Moutonj, The Hague, 1972.

Kundu A and Raza M: Indian Economy: The Regional dimension, Spectrum Publishers, New Delhi, 1982.

Losch, A: The Economics of Location, University Press, New Haven, 1954.

Mishra, R.P.: Regional Planning: Concepts, Techniques and Policies, University of Mysore, Mysore, 1969.

Mishra, R.P. and Other (Ed): Regional Development-Planning in India: A strategy, Institute of Development Studies, Mysore, 1974

Optional Paper 404: Students are required to opt any One of the following: GR 404A, GR 404B, GR 404C

100 Marks (25+75) Total Credit- 4

GR 404A: Geography of Rural Development

Unit – I: Rural development: A geographical perspective. Theoretical Framework of rural development. Structure and spatial organization of rural settlements. Rural markets and market Centers, Growth point and growth centers. Theories of central places.

Unit – II: Rural-Urban Relationship and their integration. Rural Land use and its problems. Dimensions of rural economy, physical and human resources-their spatial patterns and interrelationships, socio- economic dimensions, infrastructural facilities, socio-cultural organization.

Unit – III: Migrations and their causes Characteristic of rural population, agricultural and its characteristics. Social issues of rural areas- poverty, housing and shelter, deprivation and inequality. Empowerment of women, health care, social tension and underdevelopment.

Unit – IV: Environmental issues-access to environmental infrastructure-water supply, sanitation, drainage, occupational health hazards. Balanced development strategies of India-Failure and success of various schemes sponsored by government for rural development. Government agencies and NGOS, Integrated rural development strategy.

Suggested Readings:

Kuklinski, A.R. (ed.) Grown poles and growth Centers in Regional planning, Moutan, The Hague, 1972.

Kundu A and Raza M; Indian Economy: The regional Dimension, Spectrum Publishers, New Delhi, 1982.

Richardson, H.W.: Regional Economics, Weidenfeld and Nicholson, London, 1969. 4- Clout, H.D.: Rural Geography, Pergammon, Oxford, 1977.

Ram Chandran, H: Village Clusters and Rural Development, Concept publication, New Delhi, 1985.

Rao, E.N.: Strategy for Integrated Rural Development, B.R. Publication Cor. Delhi, 1986. 7-

Sriniwas M.N: Village India, Asia publication House, Bombay, 1968.

Wanmali, S: Service Centers in Rural India, B.R. Publication Cor. Delhi, 1983.

GR 404B: Political Geography

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, Decolonizations, Neocolonialism, federalism and other forms of governance. Global strategic view with particular reference to the ideas of Mahan, Mackinder, Spykeman and De Seversky. 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, Bangladesh and Myanmar. Geopolitical significance of Indian Ocean. SAARC region and India. The changing political map of India.

Suggested Readings:

Alexander, L.M. World Political Patterns, Ran McNally, Chicago, 1963.

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.

Taylor, P: Political Geography, Longman, London, 1985.

Sukhwai, 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.

Prescott, J.R.V.: The Geographical Factors and Boundaries, Aldine, Chicago.

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

GR 404C: Population & Development

UNIT I: Conceptual Frame: Population as resource; Population and development; Population and ecosystem; Demographic transition.

UNIT II: Historical Background and Characteristics: History of human population; Relationship between population, food and energy; Population characteristics: developed and developing countries (case study of India).

UNIT III: Problems and Policies: Optimum population; Over Population & Under Population, Family welfare and planning; Population policies in India.

UNIT IV: Population and Development Conflict: Neo-Malthusian theory; Future perspectives: Growth scenario and relationship with Development. Population problems VS Development.

Books Recommended

Champion, T. (ed.) (1993): Population Matters. Paul Chapman, London.

Ehrlich, P.R. and Ehrlich, A.H. (1996): Eco science: Population, Resources, Environment. 6th edition, W.H. Freeman and Company, San Francisco.

Firor, J. and Jacobsen, J. E. (2003): The Crowded Greenhouse: Population, Climatic Change and Creating a Sustainable World. Universities Press (India) Private. Ltd., Hyderabad.

Haggett, P. (2001): Geography, A Modern Synthesis. 5th edition, Harper and Row, New York.

Hammett, C. (eds.) (1996): Social Geography: A Reader. Arnold, London.

Meadow, D.H., Meadows, D.L., Randers, J. and Behrens, W.W. III (1973): The Limits to Growth. I Report of the Club of Rome. The New American Library, New York.

Meadows, D.H., Meadows, D.L. and Randers, J. (1992): Beyond the Limits. Confronting Global Collapse, Envisioning a Sustainable Future. (A sequel to The Limits to Growth). Chelsea Green Publishers, Post Mills VT, USA.

Mesarovic, M. and Pester, E. (1974): Mankind at the Turning Point. II Report of the Club of Rome. The New American Library, New York.

Middleton, N. and O'Keefe, P. (2001): Redefining Sustainable Development. Pluto Press, London.

Ross, J. A. (ed.) (1982): International Encyclopedia of Population. Free Press, New York.

Sharma, P. R. (ed.) (1991): Perspectives on the Third World Development. Rishi Publications., Varanasi.

Sharma, P. R. (ed.) (1994): Regional Policies and Development in the Third World. Rishi Publications, Varanasi.

Simon, J. L. (1977): The Economics of Population Growth. Princeton University. Press, Princeton.

Thakur, B. (ed.) (2004): Population, Resources and Development. Vol. II, Perspectives in Resource Management in Developing Countries. Concept Publishing. Company, New Delhi.

Tinbergen, J. (1976): RIO. Reshaping the International Order. III Report of the Club of Rome. The New American Library, New York.

U.N.C.E.D. (1987): Our Common Future. UNCED The Centre for Our Common Future, Geneva.

Paper V GRP 405:

Practical Project Work & Study Tour

100 Marks (25+75)

Total Credits- 4

1- Project Work (Related to Optional Paper):

50 Marks

Viva – Voce:

10 Marks

2- Study Tour & Tour Report (Minimum 10 Days):

40 Marks

DEPARTMENT OF GEOGRAPHY AND GEOINFORMATICS
Faculty of Science & Technology
Maa Vindhyavasini University, Mirzapur
Semester Based Syllabus and Scheme of Examination (NEP-2020)
(w. e. f. 2025-26)
In
G E O G R A P H Y

Programme/Classes: M.A./M.Sc.	M.A./M.Sc.: Ist Year	Semester: I & II Semester
SUBJECT: GEOGRAPHY		
COURSE CODE:	COURSE TITLE: FUNDAMENTALS OF REMOTE SENSING AND GIS	
Course Outcome: The course is designed to provide basic knowledge to the students regarding Remote Sensing and GIS with the fundamentals of geospatial tools and technologies.		

Credits: 4	MINOR ELECTIVE	
Max. Marks: 25+75= 100	Min. Passing Marks :40	
Total No. of Lectures-Lecture(L) Tutorials(T)- Tutorials-Practical (P) (in hours per week): L-T-P- 60-0-0		
Unit	Topics	Lectures
I	Basics of Remote Sensing: Definition, Scope, Types and Electromagnetic Radiation (EMR), Platforms and Sensor Types	15
II	Planet and Satellites: Natural and Artificial Satellites, Planet Orbit, Satellites Types, Global Positioning System (GPS), Drone Imaging.	15
III	GIS Data Structures: Definitions, Geo-referencing, Types of Data - Spatial and Non-Spatial, Raster and Vector, Data Structure, Digital Image Processing and Data Analysis, Editing and Output.	15
IV	Interpretation and Application of Remote Sensing and GIS: Land-use/Land Cover, Development and Planning, Natural Resource Monitoring, E-governance	15