Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

As per the Curriculum of National Education Policy

Curriculum Structure and Scheme of Evaluation for M.A./M.Sc. First Year Semester-I

Department of Geography (Autonomous)

Outcome Based Education

Sr. No.	Type of Paper	Paper No.	Name of the Subject	Total Credits
1	Mandatory Theory	HAD275001T	Geomorphology	04
2		HAD275011T	Population Geography	04
3		HAD275021T	Geography of India	04
4	Mandatory Practical	HAD275031P	Practical-1 (Laboratory Course)	02
5	Elective **(Select any one from Basket)**	HBD275041T	Industrial Geography	04
6		HBD275051T	Geography of Water Resources	
7		HBD275061T	Fluvial Geomorphology	
8		HBD275071T	Principles of Remote Sensing	
9	Research Methodology	HRD275081T	Research Methodology in Geography	04
	Total			**22**

Laboratory Course: A Minimum of 30 hours in laboratory activities per credit it required in a semester

***Foundation/ Bridge Course- Introduction of Geography**

1) The bridge course will be taught in the first semester.
2) Any UG Degree holder from any faculty can get admission by completing **'concern subject'** 6 months short term or Bridge Course or Fundamentals course in the department.
3) Upon successful completion of this bridge course students will be awarded a certificate at the university Department/ College level.
4) The Paper "Bridge Course" is a compulsory paper which credits are not included in the degree.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

As per the Curriculum of National Education Policy

Curriculum Structure and Scheme of Evaluation for M.A./MSc. First Year Semester-II

Department of Geography (Autonomous)

Outcome Based Education

Sr. No.	Type of Paper	Paper No.	Name of the Subject	Total Credits
1	Mandatory Theory	HAD275502T	Climatology	04
2		HAD275512T	Settlement Geography	04
3		HAD275522T	Geographical Thought	04
4	Mandatory Practical	HAD275532P	Practical-2 (Laboratory course)	02
5	Elective **(Select any one from Basket)**	HAD275542T	Geography of Transportation and Trade	04
6		HBD275552T	Geography of Health	
7		HBD275562T	Coastal Geomorphology	
8		HBD275572T	Geographical Study of Natural Disaster	
9	On Job Training/ Field Project	HMD275592P	Field Project (Village Survey)	04
	Total			**22**

Laboratory Course: A Minimum of 30 hours in laboratory activities per credit it required in a semester

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

As per the Curriculum of National Education Policy

Curriculum Structure and Scheme of Evaluation for M.A./MSc. Second Year Semester-III

Department of Geography (Autonomous)

Outcome Based Education

Sr. No.	Type of Paper	Paper No.	Name of the Subject	Total Credits
1	Mandatory Theory		Oceanography	04
2			Political Geography	04
3			Geography of Economic Activities	04
4	Mandatory Practical		Practical-3 (Laboratory Course)	02
5	Elective **(Select any one from Basket)**		Cultural Geography	04
6			Urban Geography	
7			Arid Geomorphology	
8			Biogeography	
9	Research Project		Research Project in Geography	04
	Total			**22**

Laboratory Course: A Minimum of 30 hours in laboratory activities per credit it required in a semester

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

As per the Curriculum of National Education Policy

Curriculum Structure and Scheme of Evaluation for M.A./MSc. Second Year Semester-IV

Department of Geography (Autonomous)

Outcome Based Education

Sr. No.	Type of Paper	Paper No.	Name of the Subject	Total Credits
1	Mandatory Theory		Geography of Environment	04
2			Agriculture Geography	04
3			Regional Planning and Development	04
4	Elective **(Select any one from Basket)**		Social Geography	04
5			Glacial Geomorphology	
6			Rural Geography	
7			Principal of GIS Applications	
8	Research Project		Research Project in Geography	06
	Total			**22**

Name of the Program: M.A.II Geography		
Semester III **Theory Paper**	**Name of the Course** **Oceanography**	**Credits: 04**

Course Objectives:

The objectives of the course are to introduce students to the many facets of Oceans, such as the evolution of the oceans, physical and chemical properties of seawater, atmospheric and oceanographic circulation, the fascinating world of marine life, and the characteristics of marine environment and the impact of man on the marine environment.

Course Outcomes:

1. Define the major concepts in oceanography.
2. Describe the oceanic floor.
3. Interpret the properties of seawater.
4. Examine the waves in the oceanic region.
5. Appraise the tides.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to Oceanography:** • Meaning of Oceanography: Definition, nature and scope • Historical background and development of oceanography A) Golden B) Dark C) Modern • Distribution of Sea and Ocean	10	12
II	**The Morphology of the Ocean Bottom:** • Continental Margin: Shelf, Slope and Rise. • Oceanic Ridges • Oceanic Landforms: Abyssal Plains, Seamounts and Guyots. • Oceanic Deep and Trenches	10	12
III	**Properties of Ocean Water:** • Temperature: 1) Source of Heat 2) Distribution of Temperature : Horizontal and Vertical 3) Factor affecting on ocean temperature • Density: 1) Distribution of Density of sea water 2) Controlling factors of Density of Seawater • Salinity: 1) Composition of sea water 2) Sources of Oceanic Salinity 3) Distribution of Salinity 4) Controlling factors of Salinity • Relationship between Density, Temperature and Salinity.	15	12

IV	**Ocean Movements:** • Wave: 1) Formation of Sea Wave 2) Characteristics of Wave: Height, Length, Period, Frequency, Velocity and Steepness. • Tide: 1) Origin of Tide 2) Types of Tide 3) Equilibrium Theory 4) Tidal Effect in Coastal Areas • Current: 1) Origin of Ocean Current 2) Types of Ocean Current 3) Distribution of Ocean Current 4) Indian Monsoon: El Nino, La Nina.	15	12
V	**Ocean Deposits** • Sources and Types of Marine Deposits 1) Terrigenous 2) Volcanic Matter 3) Biotic 4) Abiotic • Classification of Ocean Deposits • Coral Reefs 1) Condition of Coral Growth 2) Types of Coral Reefs 3) Distribution of Coral Reefs.	10	12
Total		**60**	**60**

❖ **Reference Books:**

1. Basu S.K. (2003) (ed): Handbook of Oceanography, Global Vision, Delhi
2. Davis Richard A. (1972): Oceanography, Addition Wesley Publishing Co.
3. Garrison Tom (1999): Oceanography, Brooks/ Cole Wadsworth, New York
4. Garrison Tom (2004): Essentials of Oceanography. Thompson, Australia
5. Grant Gross M. (1982): Oceanography, Prentice hall, Ince, New Jersey
6. King Cuchlain A. M (1962): Oceanography for Geographers (ED) Edward Arnold
7. Sharma &Vatal (1962): Oceanography for Geographers. Chaitanya Publishing House, Allahabad
8. Thurman Harold V. (1985): Introductory Oceanography. Bell & Howell Co. London
9. Weisberg J. and Howard P. (1974): Introductory Oceanography. McGraw Hill, Kogakusha, Tokyo.

❖ **Web Resources:**

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program: M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Political Geography**	**Credits : 04**

Course Objectives:

1. To explore and understand the contemporary developments and emerging trends in the field of political geography. This includes examining the impact of globalization, technology, environmental changes, and shifting geopolitical dynamics on political structures and processes.
2. To provide students with a comprehensive understanding of the concepts of frontiers and boundaries in political geography.
3. To provide students with an in-depth understanding of electoral geography, which examines the spatial aspects of electoral systems, voting behavior, and political representation.

Course Outcomes:

1. Gain a comprehensive understanding of the fundamental concepts, theories, and scope of political geography.
2. Apply various theoretical approaches to the study of political geography, such as Whittlesey's law of landscape approach and Hartshorne's functional approach.
3. Critically assess the strengths and limitations of different theoretical perspectives in explaining political phenomena.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**a) Introduction to Political Geography:** Nature, scope and significance. Recent trend in Political Geography **b) Different Approaches to study the subject:** Whittlesey's law of Landscape approach Hartshorn's Functional approach	15	12
II	**State as a politico-territorial phenomenon:** Territoriality, The State, The Nation, Spatial Factors of the state- Locations, Size, Shape Frontiers – North-West Frontier of India Boundaries Distinction between Frontier and Boundaries	15	12
III	**Electoral Geography** Trend in Electoral Geography Geography of Voter Participation Regional Stability Regional Realignments	10	12

IV	**Global strategic views:** Mahan's Sea Power Concept Mackinder's Heartland Theory Spykman's Rimland Theory	10	12
V	**Political Associations** Regional Multinational Political Systems World Organization Intercontinental Associations Political Regions	10	12
Total		**60**	**60**

Reference Books:

1. Bhagwati, J.N. (ed.): New International Economic Order - The North-South Debate, M.I.T. Press, London, 1976.
2. Dikshit, R.D.: Political Geography: A Contemporary Perspective, Tata McGraw-Hill Publishing Co., New Delhi, 1982 (also latest edition).
3. Glassner M.I.: Political Geography, John Wiley, New York, 1993.
4. Panikkar, K.M. Geographical factors in Indian History. Bharatiya Vidya Bhavan, Bombay 1956.
5. Pounds N.T.: Political Geography Mc Graw Hill, New York, 1972.
6. Prescott, J.R.V.: Political Geography, Methuen & Co., London, 1972.
7. Schwartzberg, J.E.: A Historical Atlas of South Asia, University of Chicago Press, U.S.A. 1993.
8. Short, J.R. : An Introduction to Political Geography, Routledge and Kegan Paul, London, 1982.
9. Taylor P.J (ed.): Political Geography of the 20th Centuary - A Global Analysis. New York, 1993.
10. Taylor, Peter: Political Geography, Longman, London, 1985.
11. William C.H. (ed.): Political Geography of the New World Order Halsted Ben, New York, 1993.

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program: M.A. II Geography		
Semester: III **Theory Paper**	**Name of the Course** **Geography of Economic Activities**	**Credits: 04**

Course Objectives:

1. Introduce the students to the geographical mode of thinking in application to various economic phenomena.
2. Understand the genesis, development, and evolution of Economic Geography as a subfield
3. Obtain an understanding of major forms of economic activity and processes
4. Learn to critically analyze economic issues from a geographical perspective.
5. Understand the concept of economic activity, and factors affecting the location of economic activity. Gain knowledge about different types of Economic activities

Course Outcomes:

1. Explain the importance of environmental, cultural, and other factors in determining economic activities.
2. Explain the concepts of locational analysis, spatial diffusion, and spatial interaction.
3. Explain the alternative paradigms of economic geography.
4. Apply the concepts, methods, and theories to local, regional, and global economic issues.
5. Analyse the location and viability of economic activities in local, regional, and global systems.
6. Evaluate the main global issues confronting the world economy.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**A) Economic Geography:** Definition, nature, and scope Recent trends in Economic Geography **B) Basic Economic processes:** Production, exchange & Consumption Classification of economic Activities and their characteristics Location of Economic activities	10	12
II	**Resources:** Classification of Resources - Renewable & Non-renewable Resources and Environment - Scarcity and Sustainability Conversation of resources and their need	15	12
III	**Industries:** Classification of Industries, Principles of Industrial Location Profit maximization - Least cost location Location theories – Weber & Losch.	10	12

IV	**Trade and Transport:** Major Transport Routes - Land, Water, and Air Routes Models of transportation and transport cost Accessibility and connectivity Trade - National and International	10	12
V	**A) Economic Development:** Spatial and Temporal aspects Measures of economic development – Rostow's and Myrdal's models **B) Economic Development in India:** Regional disparity in economic Development Impact of Green Revolution, Privatization	15	12
Grand Total		**60**	**60**

Reference Books:

1. Alexander J.W. (1976): Economic Geography. Prentice Hall of India. New Delhi.
2. Hartshorne, T.A. and J.W. Alexander (1988) –Economic Geography, Prentice Hall.
3. Berry, Conkling & Ray (1988): Economic Geography Prentice Hall of India New Jersey.
4. Hurst Elliott (1986): Geography of Economic Behaviour. Unwin, London.
5. Johnson R.J. & Taylor D.J. (1989): A world in crisis. Basil-Blackwell, Oxford.
6. Losch (1954): Economics of Location. Yale University Press New York.
7. Redcliff M. (1987): Development & the environmental crisis. Methuen. London.
8. Sinha B.N. (1971): Industrial geography of India
9. Watts H.D. (1987): Industrial Geography, Longman Scientific and Technical New York.
10. Haggett, Peter: Modern Synthesis in Geography.
11. Robinson H & Bamford C. G. (1978): Geography of Transport, Macdonald & Evans USA.
12. Jones & Darkenwald : Economic geography.
13. Fairbridge, R. W. (1968): Encyclopedia of Geomorphology, Reinholdts, New York.

Name of the Program: M.A. II Geography		
Semester: III **Practical Paper**	**Name of the Course** **Practical**	**Credits: 02**

Course Objectives:

1. To understand various techniques in surveying.
2. To analyses the principles and various methodologies involved in surveying.
3. To generate the drawings using advanced surveying equipment & application software.
4. To sensitize the students with advanced surveying equipment.

Course Outcomes:

1. Understanding the survey.
2. Explain the major types of surveying.
3. Apply the methods of survey with the help of various instruments.
4. Understand the Correction Bearing and close of Bodwitch method.
5. Apply the Dumpy level instrument of river cross section.
6. Understanding the sampling methods of data collections of village survey.
7. Preparation of the questionnaires for the village survey.

❖ **Practical / field work list:**

Unit No.	Teaching and learning point	Practical	Mark
I	**Surveying** i) Types of Surveying ii) Use of plane table survey iii) Advantages and disadvantages of plane table survey iv) Equipment's of plane table survey v) Methods of plane table survey	15	10
II	**Dumpy levels Survey** i) Uses of Dumpy levels ii) Equipments of Dumpy level survey iii)Methods of dumpy level Survey ▪ Collimation methods ▪ Rise and Fall methods iv) Advantages and Disadvantages of Dumpy levels	15	10
III	**Prismatic Compass Survey** i) Preparation of Prismatic Compass Survey ii) Methods of Prismatic Compass Survey 1. Intersection Method 2. Open Traverse Method 3. Close Traverse Method iii) Correction Bearing and close of Bodwitch method.	15	10

IV	**Techniques in Agricultural Geography** Crop Combination- J.C. Weaver Method Crop Diversification- Bhatia Method Crop Concentration- Jasbir Singh Method Productivity Index- Enyedi Method	15	10
V	**Journal and Viva**	-	10
	Total	**60**	**50**

Reference Book

1. Arjun Kumbar (1998), Practical Geography, Sumeru Publication, Dombiwali, Thane.
2. Basak, N. N. (1994). Surveying and Levelling. Delhi: Tata McGraw-Hill Education.
3. Bhavikatt, S. S. (2009). Surveying and Levelling. New Delhi: I. K. International.
4. Frank, H., & Althoen, S. C. (1994). Statistics: Concepts and Applications. Cambridge: Cambridge University Press.
5. Hammond, R., & McCullagh, P. (1991). Quantitative Techniques in Geography. Oxford: Clarendon Press.
6. Kanetkar, T. P., & Kulkarni, S.V. (I960). Surveying and Leveling- Part I and II. Pune: A. V. Ghriha Prakashan.
7. Mann, P. S. (2007). Introductory Statistics. New Delhi: John Wiley and Sons.
8. Pacione, M. (1999). Applied Geography: Principles and Practice. London: Routledge.
9. Pijushkanti Saha and Pratha Basu (2010), Advanced Practical Geography, Arunabha Sen, Kolakata
10. Pugh, J. C. (1975). Surveying for Field Scientists. London: Methuen and Co.
11. Robinson, G.M. (1998). Methods and Techniques in Human Geography. Michigan: John Wiley.

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Cultural Geography**	**Credits : 04**

Course Objectives:

1. Understand the diversity of cultures in the world as well as in India.
2. Comprehend the diffusion of various ethnic traits and religions.
3. Understand the relationship between cultures and patterns of living and economic development
4. Familiarize the students with the understanding of society through concepts and social theory, philosophical approaches, and spatial processes.

Course Outcomes:

1. Analyze the basic concepts of cultural Geography.
2. Describe the Cultural Setup and Regions.
3. Classify the Regional Differentiation of Cultural Characteristics
4. Interpret the Cultural Issues.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Nature and Scope:** Definition of Cultural Geography Nature and Scope of Cultural Geography Different approaches of study Culture as an Essential Elements of Geographical Studies Evolution of Culture	10	12
II	**Cultural Setup and Regions** Region Social Diversity, Social Areas, North-South and East-West Socio-Cultural Diversity of India Griffith Taylor's Theory	10	12
III	**Cultural Change:** Cultural Adaptation, Cultural Assimilation, Integration	10	12
IV	**Regional Differentiation of Cultural Characteristics** Cultural Region Tribal Region and their activities Tribes and their cultural activities Cultural reforms	15	12
V	**Issues** Causes of Cultural Problems Cultural problems and migration Demography Social well-being (meaning Patterns, measuring, method) Social justice: equality and welfare	15	12
Grand Total		**60**	**60**

Reference Books:

1. Ahmad, Aijazuddin (1999): Social Geography, Rawat Publication, Jaipur.
2. Blij, H. J. (195); The Earth-an Introduction to its Physical and Human Geography, John Willy & Sons, inc: New York.
3. Broad, Jan O M. & Webb, John W (1973): Geography of Mankind, McGraw Hill Book Co. New York.
4. Cater, Hohn & John, Trevor (1989): Social Geogaphy-an Introduction to Contemporary Issues, Arnold Publishers, New Delhi.
5. Jackson, Peter (1989): Maps of Meaning- An introduction to Cultural Geography, Unwin Hyman and London.
6. Jackson, Richard H & Loyd E. Hudman (1990): Cultural Geography-people, places and environment West Publishing Co. New York.
7. Jones, Emrys & Eyles, John (1977): An introduction to social Geography, Oxford University Press, Oxford.
8. Jorden, Terry G & Rowntree, Lester (1976): The Human Mosaic A Thematic Introduction to culture Geography, Canfield press, sen Francis Co. Harper & Row Publisher, New York.
9. Tripathi, R. S. & Parmar, S.B. Singh: Social and Economic Development in India.
10. Smith, David M (1977): Human Geography – A welfare Approach, Arnold-Hinman, London.
11. Majid Hussain (1994): Human Geography, Rawat Publication, Jaipur.

❖ **Web Resources:**

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Urban Geography**	**Credits : 04**

Course Objectives:

1. Understand the process of urbanization and origin, growth and classification of urban settlements with relevant theories and models.
2. Examine the changing economic base and structure of the contemporary cities.
3. Relate urbanization process and the evolution of urban system.
4. Examine the contemporary urban issues and suggest new urban planning and urban policy perspectives.

Course Outcomes:

1. Define the basic concepts of urban geography.
2. Describe the urban morphological models.
3. Discuss about urban classification.
4. Examine the rural-urban fringe.
5. Investigate the central place and urban hierarchy.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Urbanization - Basic Concepts:** Urban Geography, Urbanization Nature and Scope of Urban Geography Meaning of Urban Settlement Demographical Concept of Urbanization Contemporary factors of Urbanization	10	12
II	**Urban Morphology - Models:** Park and Burgess Model Homer Hoyet Model Harris and Ullman Model Characteristics and Demarcation of CBD	10	12
III	**Urban Classification:** Various Approaches to Classification Urban Functions and its Classification Functional Classification of Towns and Cities by C.D. Harris and H.J. Nelson	10	12
IV	**Rural-Urban Fringe:** Meaning of Rural-Urban Fringe Characteristics of Rural-Urban Fringe Methods of Demarcation of Suburban areas Concepts : Conurbation, Megalopolis, Urban Sprawl	15	12
V	**Central Place and Urban Hierarchy:** Concept - Central Place Christaller's Central Place Theory Rank-size Relationships and Rules Concept – Urban Hierarchy Hierarchy of Urban Settlements	15	12
Total		**60**	**60**

References:

1. Carter, H., (1972): The study of Urban Geography, Edward Arnold, London.
2. Fyfe, N. R. and Kenny, J. T., (2005): The Urban Geography Reader, Routledge.
3. Graham, S. and Marvin, S., (2001): Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, Routledge.
4. Hall, T., (2006): Urban Geography, Taylor and Francis.
5. Kaplan, D. H., Wheeler, J. O. and Holloway, S. R., (2008): Urban Geography, John Wiley.
6. Knox, P. L., and McCarthy, L., (2005): Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
7. Knox, P. L., and Pinch, S., (2006): Urban Social Geography: An Introduction, Prentice-Hall.
8. Pacione, M., (2009): Urban Geography: A Global Perspective, Taylor and Francis.
9. Ramachandran, R., (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
10. Ramachandran, R., (1992): The Study of Urbanisation, Oxford University Press, Delhi

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Arid Geomorphology**	**Credits : 04**

Course Objectives:

1. Introduce students to the fundamental concepts and significance of arid geomorphology.
2. Explore the impact of climate on geomorphic processes in arid environments.
3. Investigate the various landforms typical of arid regions, focusing on their formation and characteristics.
4. Understand the formation and properties of soils and sediments in arid environments.
5. Assess the impact of human activities on arid landscapes.

Course Outcomes:

1. Identify and describe key geomorphic processes in arid environments.
2. Analyze fluvial processes in arid regions, including the formation and significance of ephemeral streams and alluvial fans.
3. Identify and classify erosional landforms such as yardangs, ventifacts, and inselbergs.
4. Analyze the mechanisms of sediment transport by wind and water in arid landscapes.
5. Understand the causes and consequences of desertification and identify strategies for mitigation.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to Arid Geomorphology** Definition and characteristics of arid and semi-arid regions Global distribution and climatic conditions Importance of studying arid geomorphology Evolution of arid geomorphology as a scientific discipline	10	12
II	**Climatic Influences and Processes** Role of climate in shaping arid landscapes Temperature variations, precipitation patterns, and wind dynamics Wind erosion and transportation Formation and types of dunes Loess deposits and desert pavements Role of ephemeral streams and flash floods River systems and alluvial fans Playas and desert lakes	15	12
III	**Landforms of Arid Regions** • **Erosional Landforms** Yardangs, ventifacts, and inselbergs Desert pavements and deflation hollows • **Depositional Landforms** Sand dunes and dune fields Alluvial fans, bajadas, and pediments • **Unique Landforms** Mesas, buttes, and plateaus	10	12

	Badlands and desert varnish		
IV	**Soil and Sediment Characteristics** • **Soil Formation in Arid Regions** Factors influencing soil development Types of soils typical in arid environments (e.g., aridisols) • **Sediment Transport and Deposition** Mechanisms of sediment transport by wind and water Characteristics of arid zone sediments Stratigraphy and sedimentary structures	15	12
V	**Human Interaction and Environmental Concerns** • **Human Impact on Arid Landscapes** Historical and contemporary land use practices Agriculture, urbanization, and mining impacts • **Desertification** Causes and consequences of desertification • **Conservation and Management**	10	12
Grand Total		**60**	**60**

Reference Books:

1. Abrahams, A.D. and Parsons, A.J. (eds.), Geomorpology of Desert Environments Chapman & Hall, London, 1994.
2. Goudie,A and Hegde : Palaeo-geography and Pre-history of Indian Desert, Academic Press, London,1980. .
3. Baumont, P.: Drylands-Environment, Management and Development, Routledge, New York,1993.
4. Bagnold, R.A. The Physics of Blown Sand and Desert Dunes, Methuen, London, 1941.
5. Cook, R.U., Waren, A. and Goudie, A.S. Desert Geomorphology, London, UCL Press, London, 1993.
6. Embleton, C. and Thornes, J. (eds.), Process in Geomorphology, Arnold -Heinemann, New Delhi, 1980.
7. Greeley, R and Iversen, J.D., Wind as a Geological Process. Cambridge University Press, Cambridge, 1985.
8. Lancaster, N: Geomorphology of Desert Dunes Routledge, New York,1995.
9. Livingstone I. and Warren, A. Aeolian Geomorphology ,Adison Wesley, Longman, Essex, 1996.
10. Mckee, E.D. (ed.) A Study of Global Sand Seas, Castel House, Kent, 1980.
11. Nickling, W.G. (ed.) Aeolian Geomorphology. Allen & Unwin, Boston, 1986. Curriculum Development Committee in Geography 106
12. Singhvi, A.K. and Derbyshire, E.(eds.) Palaeo—environmental Reconstruction in Arid Lands, Oxford & IBH, New Delhi, 1999.

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Bio-Geography**	**Credits : 04**

Course Objectives:

1. To provide students with a foundational understanding of the principles, processes, and patterns in bio-geography.
2. To familiarize students with the historical development of bio-geography and key contributors to the field.
3. To explore the ecological and evolutionary processes influencing the distribution of organisms.
4. To analyze the classification and characteristics of major biogeographical regions and understand the factors shaping their biodiversity.

Course Outcomes:

1. Analyse and evaluate the role of ecological and evolutionary processes in shaping biogeographical patterns.
2. Classify and characterize major biogeographical regions and explain the factors influencing their biodiversity.
3. Assess the impact of human activities on biogeographical patterns and propose conservation strategies.
4. Apply theoretical knowledge to real-world scenarios through case studies and practical exercises.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to Bio-geography** Definition and scope of biogeography Historical development of biogeography Branches of biogeography: ecological, historical, and evolutionary Importance of biogeographical studies	10	12
II	**Ecological Biogeography** Abiotic factors: climate, soil, water, and topography Biotic factors: competition, predation, mutualism, and parasitism Concepts of ecological niches and habitat selection Species range and distribution patterns	15	12
III	**Biogeographical Regions** Classification and characteristics of major biogeographical regions Factors influencing regional patterns: climate, topography, geology Analysis of biodiversity hotspots and their conservation significance Human impact on biogeographical regions and its consequences	10	12

IV	**Freshwater and Marine Biogeography** Unique features of freshwater ecosystems and their biogeography Marine biogeography and ocean currents Coral reefs, estuaries, and their biodiversity Conservation issues related to aquatic biogeography	15	12
V	**Human Impact on Bio-geography** Anthropogenic influences on biodiversity and ecosystems Climate change and its effects on biogeographical patterns Habitat destruction, fragmentation, and invasive species Conservation efforts and strategies to mitigate human impact	10	12
Grand Total		**60**	**60**

Reference Books:

1. "Biogeography: An Ecological and Evolutionary Approach" by C. Barry Cox and Peter D. Moore
2. "Island Biogeography: Ecology, Evolution, and Conservation" by Robert J. Whittaker and James H. Brown
3. "Biogeography: A Global Synthesis" by Mark V. Lomolino, Brett R. Riddle, and Robert J. Whittaker
4. "Principles of Terrestrial Ecosystem Ecology" by F. Stuart Chapin III, Pamela A. Matson, and Peter M. Vitousek
5. "Conservation Biogeography" by Richard J. Ladle and Robert J. Whittaker
6. "Global Biogeography" by J.C. Briggs and J.A. Veevers
7. "Biogeography: Introduction to Space, Time, and Life" by Glen M. MacDonald
8. "Biogeography and Evolution in New Zealand" by M. K. Oliver and R. A. F. Seppelt
9. "Biogeography: Space, Time, and Life" by Peter Hovenkamp and Peter J. M. Maas
10. "The Diversity and Biogeography of Mammals" by R. M. Nowak
11. "Biogeography of the Quaternary Molluscs of the Southwestern Atlantic Ocean" by Sergio M. Dillenburg and Fernando L. Dillenburg
12. "Biogeography of the West Indies: Patterns and Perspectives" by Charles A. Woods and Florence E. Sergile
13. "The Biogeography of Host-Parasite Interactions" by Serge Morand and Boris R. Krasnov

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Geography of Environment**	**Credits: 04**

Course Objectives:

1. Students will learn how human, physical and environmental components of the world interact.
2. Able to conduct basic analysis of how environmental change is occurring at different geographic scales.
3. Able to explain the relationships between biosphere, lithosphere, hydrosphere, and atmospheric systems.
4. Students will learn the regional geography of the world, particularly from the perspective of how human, physical and environmental components of the world interact.

Course Outcomes:

1. To educate students in the contents and methods of Geography of Environment as an academic and professional discipline.
2. To understand elements of the environment and acquire knowledge about biodiversity
3. To get knowledge about natural hazards and management
4. To understand the various environmental issues and policies.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction:** Meaning and Scope Basic principles Composition and types of the environment; Ecological principles; Man – environment relationship.	10	12
II	**Ecosystem** Concept and components, Trophic levels, Food chains, and food webs Energy flow in the ecosystem, Circulation of matter in the ecosystem, Biogeochemical cycle, Ecosystem productivity, Ecosystem stability	10	12
III	**Environmental degradation** Extreme events- hazards and disasters (earthquakes, volcanoes, cyclones, floods) Environmental pollution- (air, water, solid waste, soil, and noise Environmental pollution in India Environmental Problems – global warming, ozone depletion, land degradation, and reduction in biodiversity.	10	12
IV	**Environmental Approaches** Concept and approaches Environmental dimension in planning – sustainable development Environmental consciousness, Environmental policy, environmental legislation, Environmental impact assessment, Disaster management	15	12
V	**Environmental management** Management of forest, soil, wildlife, energy and mineral resources, Environmental education, monitoring, and mapping, conservation of natural resources.	15	12
	Total	**60**	**60**

Reference Books:

1. Batel, B.(ed): Management of Environment, Wiby eastern Ltd. New Delhi, 1980.
2. Brij Gopal: Elements of Ecology Centre for Science & Environment: The State of India Environment: A citizen's Report, 1982, 1985, New Delhi.
3. Desh Bandhu (ed.): Environmental Management, Indian Environment Society, New Delhi. Gupta &Gurjar: sustainable Development, Rawat, Jaipur.
4. Kaswan, N.R. : Man and Environment (Hindi), Malik & Co. Jaipur, 1999. Mathur, H.S.: Biogeography
5. Park, C.C: Ecology and Environmental Management, Butterworths, London, 1980.
6. P.D. Sharma: Ecology and Environment, Rastogi, Meerut, 2010.
7. Peter Cotgreave& Irwin Forseth: Introductory Ecology, Blackwell, 2002.
8. Savinder Singh: Geography of Environment, allahbad
9. Singh & Singh (ed.): Geography of Environment, Concept, New Delhi
10. Strahler, A.N.: Geography and Man's Environment, John Willey, New York, 1976.
11. V.K. Srivatava: Paryavaran Bhoogolevm Paristhitiki, Vasundhara, Gorakhpur.

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Agriculture Geography**	**Credits : 04**

Course Objectives:

1. To familiarize the students with the concept, origin, and development of agriculture.
2. To examine the role of agricultural determinants towards changing cropping patterns, intensity, productivity, diversification and specialization. The course further aims to familiarize the students with the application of various theories, models and classification schemes of cropping patterns and productivity.
3. Its objectives are also to discuss environmental, technological and social issues in agricultural sector with special reference to India.

Course Outcomes:

1. Define the basic concepts of agriculture geography.
2. Describe the Land Classification in India.
3. Examine the Agricultural Patterns.
4. Investigate the Problems & Prospects of Agriculture.
5. Interpreter Agricultural Regionalization and Methods.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**A) Introduction to Agricultural Geography:** Nature scope and significance. Different Approaches to study the subject **B) Land use:** General and Agricultural Land use Land use surveys Land Classification in India	10	12
II	**Determinants of Agricultural Patterns:** Relief, climate, soil Land holding, marketing, transport Irrigation Mechanization. Biochemical inputs	10	12
III	**Agricultural Types:** Shifting cultivation Intensive subsistent farming. Mixed farming Plantation agriculture Commercial grain farming	15	12
IV	**Problems & Prospects of Agriculture:** Definition and characteristics of arid and semi-arid regions. Droughts and famines Role of irrigation and dry farming.	10	12

V	**Agricultural Regionalization (Methods):** Classification of Agriculture regions by Derwent Whittlesey Agricultural regions of India. Theory of Agriculture Location by Von Thunen	15	12
Total		**60**	**60**

Reference Books:

1. Aiyer, A.K.Y.N.(1949) – Agricultural and Allied Arts in Vedic India.
2. Grigg. D.G. (1974) – The Agricultural Systems of the world An Evolutionary Approach.
3. Grigg. D.G.(1964) – An Introduction to Agricultural Geography Hutchinson & Co.Ltd.,
4. Illbery, B.W. (1985) – Agricultural Geography, Social & Economic Analysis, Oxford University Press.
5. Morgan. W.B. & S.C. Monton (1971) – Agricultural Geography Methuen, London.
6. Randhawa, M.S. (1980) – An History of Agriculture in India Vols. I, II, III,IV ICAR, New Delhi.
7. Singh. J. and Dhillon S.S. (1994) – Agricultural Geography. Tata McGraw Hill, Publishing Co. Ltd.
8. Symons, Leslie (1970) – Agricultural Geography, G. Belt and Sons Ltd., London.
9. Tarrent, J.R. (1970) – Agricultural Geography, David and Charles, Newton Abbot.
10. Majjid Hussain (2021)- Agriculture Geography, second Edition.

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Regional Planning and Development**	**Credits: 04**

Course Objectives:

1. To understand and evaluate the concept of region in geography and its role and relevance in regional planning;
2. To identify the issues relating to the development of the region through the process of spatial organization of various attributes and their inter relationship.
3. To identify the causes of regional disparities in development, perspectives and policy imperatives.

Course Outcomes:

1. Define the major concepts of regional planning and development. .
2. Classify theories and models of regional planning and development.
3. Solve the regional imbalances in India.
4. Examine the regional planning in India.
5. Investigate the geographical need and feasibility.

❖ **Course Contents:**

Unit	Teaching / Learning Points	Periods	Marks
I	**Basic Concepts:** Concept of Region, Types and hierarchy of regions Concept of Planning, Types of planning Concept of Approach, Different Approaches to Regional planning Concept of Geographical Indication, its relation with Planning Concept of Growth and Development. Indicators of development Measures of regional development	10	12
II	**Theories and Models:** a) Models of economic growth: Rastows stages of economic growth Gunnar Myrdal's concept of internal growth b) Theoretical frame work for regional planning: Central Place Theory Growth Pole Theory	15	12
III	**Regional imbalances in India** Industrial Imbalances Agricultural Imbalances Rural-Urban ratio Imbalances Infrastructural Development and its Imbalances	10	12

IV	**Regional Development in India** Metropolitan planning Rural development planning Tribal area development planning	10	12
V	**Geographical Need and Feasibility** a) Geographical Factors affecting on Planning and Development b) Urgent Needs for Planning and Development Watersheds Solid and Liquid Domestic Wastes Disaster and Hazard Drinking Water and Health Services	15	12
	Total	**60**	**60**

Reference Books:

1. Bhandari S (1992): Transport and Regional Development, Concept Publication, New Delhi
2. Bhat, L. S. (1973): Regional Planning in India, Statistical Publishing Society, Kolkata
3. Chandana, R. C. (2000): Regional Planning - A Comprehensive Text, Kalyani Publishers, Ludhiana
4. Dube K. N. (ed) (1990): Planning and Development in India, Asia Publishing House, New Delhi
5. Friedmann, J Alanso W (1967): Regional Development and planning - A Reader, MIT Press Mass
6. Govt. of India (1986), Regional Plan 2001 - National Capital Region, NCRPB, Ministry of Urban Development, New Delhi
7. Hall P. (1992) Urban and Regional Planning, Routledge, London
8. Mishra R. P (Ed.) (1992): Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Pub. New Delhi.
9. Vaidya B C (eds)(1998): Reading in Transport Geography: A Regional Perspective, Devika Publications, New Delhi

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester IV **Theory Paper**	**Name of the Course** **Social Geography**	**Credits : 04**

Course Objectives:

1. Understand diversity of cultures in the world as well as in India.
2. Comprehend the diffusion of various ethnic traits and religions.
3. Understand the relationship between cultures and pattern of living and economic development
4. Familiarize the students with the understanding of the society through concepts and social theory, philosophical approaches and spatial processes.
5. Examine the process of social region formats in India with the help of social cultural and historical factors;

Course Outcomes:

1. Analyze the basic concepts of Social and cultural Geography.
2. Describe the Socio-Cultural Setup and Regions.
3. Classify the Regional Differentiation of Social and Cultural Characteristics
4. Interpret the Social and Cultural Issues.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Nature and Scope:** Definition of social Geography Nature and Scope of Social Geography Different approaches of study Culture and Society as a Essential Elements of Geographical Studies Evolution of Social Things	10	12
II	**Socio-Cultural Setup and Regions** Region Social Diversity, Social Areas, North-South and East-West Socio-Cultural Diversity of India Griffith Taylor's Theory	10	12
III	**Differential Factor of Socio-Cultural Set-up** Human Race Language Religion Castes Tribes Migration of other activities.	10	12
IV	**Regional Differentiation of Social Characteristics** Social and Cultural Region Tribal Region and their social activities Tribes and their cultural activities Social and Cultural reforms Urban and Rural Difference	15	12

V	**Issues** Causes of Social problems Social problems and migration Demography Human development Index Social well being (meaning Patterns, measuring, method) Social justice : equality and welfare Social problems and migration	15	12
Grand Total		**60**	**60**

Reference Books:

1. Ahmad, Aijazuddin (1999): Social Geography, Rawat Publication, Jaipur.
2. Blij, H. J. (195); The Earth-an Introduction to its Physical and Human Geography, John Willy & Sons, inc: New York.
3. Broad, Jan O M. & Webb, John W (1973): Geography of Mankind, McGraw Hill Book Co. New York.
4. Cater, Hohn & John, Trevor (1989): Social Geogaphy-an Introduction to Contemporary Issues, Arnold Publishers, New Delhi.
5. Jackson, Peter (1989): Maps of Meaning- An introduction to Cultural Geography, Unwin Hyman and London.
6. Jackson, Richard H & Loyd E. Hudman (1990): Cultural Geography-people, places and environment West Publishing Co. New York.
7. Jones, Emrys & Eyles, John (1977): An introduction to social Geography, Oxford University Press, Oxford.
8. Jorden, Terry G & Rowntree, Lester (1976): The Human Mosaic A Thematic Introduction to culture Geography, Canfield press, sen Francis Co. Harper & Row Publisher, New York.
9. Tripathi, R. S. & Parmar, S.B. Singh: Social and Economic Development in India.
10. Smith, David M (1977): Human Geography – A welfare Approach, Arnold-Hinman, London.
11. Majid Hussain (1994): Human Geography, Rawat Publication, Jaipur.

❖ **Web Resources:**

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **GET 14: Glacial Geomorphology**	**Credits : 04**

Course Objectives:

1. Appreciate the contrasting geomorphic processes operating in glacial and periglacial environments.
2. Understand the deformational behavior of ice and the meltwater.
3. Understand the sensitivity of the periglacial environment to heat budget.
4. Understand the impact of human activities on permafrost environment.

Course Outcomes:

1. Define the major concepts in glacial geomorphology.
2. Describe the type of glaciers.
3. Solve the glacial formation and movements.
4. Examine the Erosion by glaciers with landforms.
5. Judge the transportation and deposition by glacial landforms.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Ice Ages and World Glaciation:** Causes of Ice Ages-Pleistocene Glaciation: Onset and retreat direct and indirect effects of Pleistocene Glaciation-glacier regimes: Definition, mass balance and response to climatic changes-glacier ice: physical and thermal properties, glacier flow and internal deformation.	10	12
II	**Erosional Process:** Glacial erosion: ice and meltwater-mechanical and chemical processes of erosion; Development of erosional landforms-morpho dynamics of the features of erosion at or inside glacier margins-glacial permafrost; Super-glacial, englacial, and basal.	10	12
III	**Depositional Process:** Processes-stratified and non-stratified; drifts-morpho dynamics of moraines: Forms of moraines-glaciofluvial and glacio-lacustrine environment; Hazards in glacial environment: glacial surges and glacier dam bursts.	15	12
IV	**Periglacial Processes:** Frozen ground phenomenon: identification, depth variations, Thermal properties, classification and distribution-ground ice: Types and morph dynamics of periglacial processes: Mechanism of frost action, mass wasting, nivation.	15	12
V	**Periglacial landforms;** Frost actions and landforms-mass wasting and landforms Adaptation of human beings to periglacial environment.	10	12
Total		**60**	**60**

Reference Books:

1. Brown, R.J.E., Permafrost in Canada. University of Toronto Press, Toronto, 1970.
2. Carson MA. and Kirkby M.J., Hillslope Form and Process, Cambridge University Press, 1972.
3. Coates, D.R.(ed.), Glacial Geomorphology, State University of New York,1974, New York, 1974.
4. Dixon, J.C. and Abrahams, A.D. (eds.), :Periglacial Geomorphology. John Wiley, New York, 1992. Drewry, D., Glacial Geological Processes, Edward Arnold, London, 1986.
5. Embleton, C. and King, C.A.M., Glacial and Periglacial Geomorphology, Edward Arnold, London, 1968.
6. Embleton, C. and Thormes, J. (eds.), Process in Geopmorphology, Arnold - Hesnemann, New Delhi, 1980.
7. Hails, J.R. (ed.): Applied Geomorphology Elsevier Sci. Amsterdam, 1977.
8. Pewe, T.L.(ed.):. The Periglacial Environment. Mc. Gill- Queen's University Press, Montreal1969.
9. Peterson, W.S.B., The Physics of Glaciers. Pergamon Press, Oxford 1969.
10. Price, L.W., The Periglacial Environment, Permafrost and Man., Commission on College Geography, Resource Paper No. 14, Washington, D.C,1972.
11. Ritter, D.F. Craig, R. and Miller, J.P., Process of Geomorphology. , W.C. Brown Dubuque, 1995.
12. Slymaker, O. (ed.), Steepland Geomorphology., John Wiley, London, 1995.
13. Sugden, D.E. and John, B.S. Glaciers and Landscape. Edward Arnold, London, 1976.
14. Vander Veen, C.J., Fundamentals of Glacier Dynamics., A.A. Balkemma, Rotterdam, 1999.
15. Wright, A.E and Mosley, P.(eds), Ice Ages: Ancient and Modern., Seel House Press, Liverpool,1975

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Rural Geography**	**Credits : 04**

Course Objectives:

1. Understand the growth and evolution of rural settlements.
2. Recognize and analyze the distributions, patterns, morphology and functions of rural settlements.
3. Analyze and suggest rural settlement planning in India.
4. Examine the prevailing social and environmental issues in rural areas of India.

Course Outcomes:

1. Define the basic concepts of rural geography.
2. Describe the types and patterns of rural settlement.
3. Compare the rural morphology and its models
4. Examine the rural landscape and settlements.
5. Investigate of rural central places.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Urbanization - Basic Concepts:** Rural Geography: Rural Population and Settlement Nature and Scope of Rural Geography Site, Situation and Location of Rural Settlements Settlement Size and Shape Evolution of Settlement Rural-Urban Dichotomy Transformation of Villages	15	12
II	**Types and Patterns of Rural Settlements:** Difference between Type and Pattern Types of Settlement: Clustered, Compact and Nucleated Basic Village / Settlement Forms Patterns of Rural Settlement: Rectangular, Circular, Star, Linear Classification of Settlement Functional Classification of Villages	15	12
III	**Rural Morphology - Models:** Morphological Changes Factors Responsible for Dispersion Socio-Spatial Structure, Caste and Segregation of Settlements Index of Dispersion of Settlement by Albert Demangeon Nearest Neighbour Analysis	10	12

IV	**Rural Landscape and Settlements:** Meaning of Village and Surrounding Farmland Von Thunen's Agriculture Landuse Model Economic Rent and Farming Patterns Rural Dwelling: Rural house types, Building material, Size etc	10	12
V	**Rural Central Places:** Concept – Rural Central Place Rural Market Centers Factors affecting on Rural Market Centers Periodic Markets : types, functions, periodicity etc Problems of Rural Market System Rural-Urban Relationship	10	12
Grand Total		**60**	**60**

References:

1. Anand, Subhash.,(2013): Dynamics of Rural Development, Research India Press, Delhi
2. Gilg, A. W., (1985): An Introduction to Rural Geography, Edwin Arnold, London.
3. Krishnamurthy, J.,(2000): Rural Development - Problems and Prospects, RawatPubls., Jaipur
4. Lee, D. A. and Chaudhri, D. P., (eds.)(1983): Rural Development and State, Methuen, London.
5. Misra, R. P., and Sundaram, K. V., (eds.)(1979): Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.
6. Misra, R. P., (ed.), (1985): Rural Development: Capitalist and Socialist Paths, Vol. 1, Concept, New Delhi. Palione, M., (1984): Rural Geography, Harper and Row, London.
7. Ramachandran, H., and Guimaraes, J.P.C., (1991): Integrated Rural Development in Asia– Leaning fromRecent Experience, Concept Publishing, New Delhi.
8. Robb, P.,(1983): Rural South Asia: Linkages, Change and Development, Curzon Press.
9. Singh, R.B., (1985): Geography of Rural Development, Inter India, New Delhi.
10. UNAPDI (1986):Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
11. Wanmali, S., (1992): Rural Infrastructure Settlement Systems and Development of the
1. RegionalEconomy in South India, International Food Policy Research Institute, Washington, D.C.
12. Yugandhar, B. N. and Mukherjee, Neela., (eds.) (1991): Studies in Village India: Issues in Rural Development, Concept Publications. Co., New Delhi.

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Principle of GIS Applications**	**Credits: 04**

Course Objectives:

1. Gain a comprehensive understanding of the principles and concepts underlying Geographic Information Systems (GIS).
2. Foster spatial thinking skills to analyze and interpret spatial patterns and relationships.
3. Explore various sources of spatial data including remote sensing, GPS, and survey
4. Acquire skills in collecting, managing, and processing spatial data with an emphasis on accuracy and reliability.

Course Outcomes:

1. Use GIS software proficiently for spatial analysis, mapping, and data visualization.
2. Apply GIS techniques to address real-world problems and make informed spatial decisions.
3. Design and create effective maps that communicate spatial information clearly and accurately.
4. Evaluate the quality and accuracy of spatial data and make data-driven decisions.
5. Integrate spatial thinking into decision-making processes across various domains.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to GIS** Overview of GIS concepts and its applications. Understanding spatial data and the importance of spatial thinking. Key components of GIS, including hardware, software, data, and people. Introduction to spatial data types and coordinate systems.	15	12
II	**Data Sources and Acquisition:** Types of spatial data sources (remote sensing, GPS, surveys, Data acquisition methods and techniques. Data quality and accuracy considerations. Spatial data storage formats (vector, raster) and their characteristics.	15	12
III	**Spatial Analysis and Modeling:** Basic spatial analysis operations (overlay, buffer, spatial querying). Introduction to spatial modelling concepts. Applications of spatial analysis in different domains (environmental, urban planning, etc.).	10	12

IV	**Cartography and Map Design:** Principles of map design and cartographic representation. Use of color, symbols, and scales in map production. Cartographic design considerations for different purposes (navigation, analysis, communication). Digital mapping techniques and tools.	10	12
V	**GIS Applications in Various Fields:** Applications of GIS in environmental science and natural resource management. GIS in urban planning and infrastructure development. Health GIS: Disease mapping and analysis. GIS in business, marketing, and location-based services.	10	12
Grand Total		**60**	**60**

References:

1. "Geographical Information Systems" by P.C. Sinha
2. "Geoinformatics: A Practical Guide" by T. R. Anil Kumar
3. "Principles of Geographical Information Systems" by N. Sridhar Rao
4. "Remote Sensing and GIS" by Basudeb Bhatta
5. "Geographical Information Systems: Applications in Natural Resource Management" by G. C. Mishra
6. "Introduction to Geographic Information Systems" by Kang-Tsung Chang
7. "Geographic Information Systems: Concepts, Methodologies, Tools, and Applications" edited by Information Resources Management Association
8. "GIS Applications in Agriculture: Nutrient Management for Energy Efficiency" by Surya Prakash Tiwari
9. "Urban and Regional Planning with GIS" by Donald P. Albert
10. "Geographical Information Systems and Science" by Paul A. Longley, Michael F. Goodchild, David J. Maguire, and David W. Rhind

Name of the Program: M.A.II Geography		
Semester III **Theory Paper**	**Name of the Course** **Oceanography**	**Credits: 04**

Course Objectives:

The objectives of the course are to introduce students to the many facets of Oceans, such as the evolution of the oceans, physical and chemical properties of seawater, atmospheric and oceanographic circulation, the fascinating world of marine life, and the characteristics of marine environment and the impact of man on the marine environment.

Course Outcomes:

1. Define the major concepts in oceanography.
2. Describe the oceanic floor.
3. Interpret the properties of seawater.
4. Examine the waves in the oceanic region.
5. Appraise the tides.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to Oceanography:** • Meaning of Oceanography: Definition, nature and scope • Historical background and development of oceanography A) Golden B) Dark C) Modern • Distribution of Sea and Ocean	10	12
II	**The Morphology of the Ocean Bottom:** • Continental Margin: Shelf, Slope and Rise. • Oceanic Ridges • Oceanic Landforms: Abyssal Plains, Seamounts and Guyots. • Oceanic Deep and Trenches	10	12
III	**Properties of Ocean Water:** • Temperature: 1) Source of Heat 2) Distribution of Temperature : Horizontal and Vertical 3) Factor affecting on ocean temperature • Density: 1) Distribution of Density of sea water 2) Controlling factors of Density of Seawater • Salinity: 1) Composition of sea water 2) Sources of Oceanic Salinity 3) Distribution of Salinity 4) Controlling factors of Salinity • Relationship between Density, Temperature and Salinity.	15	12

IV	**Ocean Movements:** • Wave: 1) Formation of Sea Wave 2) Characteristics of Wave: Height, Length, Period, Frequency, Velocity and Steepness. • Tide: 1) Origin of Tide 2) Types of Tide 3) Equilibrium Theory 4) Tidal Effect in Coastal Areas • Current: 1) Origin of Ocean Current 2) Types of Ocean Current 3) Distribution of Ocean Current 4) Indian Monsoon: El Nino, La Nina.	15	12
V	**Ocean Deposits** • Sources and Types of Marine Deposits 1) Terrigenous 2) Volcanic Matter 3) Biotic 4) Abiotic • Classification of Ocean Deposits • Coral Reefs 1) Condition of Coral Growth 2) Types of Coral Reefs 3) Distribution of Coral Reefs.	10	12
Total		**60**	**60**

❖ **Reference Books:**

1. Basu S.K. (2003) (ed): Handbook of Oceanography, Global Vision, Delhi
2. Davis Richard A. (1972): Oceanography, Addition Wesley Publishing Co.
3. Garrison Tom (1999): Oceanography, Brooks/ Cole Wadsworth, New York
4. Garrison Tom (2004): Essentials of Oceanography. Thompson, Australia
5. Grant Gross M. (1982): Oceanography, Prentice hall, Ince, New Jersey
6. King Cuchlain A. M (1962): Oceanography for Geographers (ED) Edward Arnold
7. Sharma &Vatal (1962): Oceanography for Geographers. Chaitanya Publishing House, Allahabad
8. Thurman Harold V. (1985): Introductory Oceanography. Bell & Howell Co. London
9. Weisberg J. and Howard P. (1974): Introductory Oceanography. McGraw Hill, Kogakusha, Tokyo.

❖ **Web Resources:**

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program: M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Political Geography**	**Credits : 04**

Course Objectives:

1. To explore and understand the contemporary developments and emerging trends in the field of political geography. This includes examining the impact of globalization, technology, environmental changes, and shifting geopolitical dynamics on political structures and processes.
2. To provide students with a comprehensive understanding of the concepts of frontiers and boundaries in political geography.
3. To provide students with an in-depth understanding of electoral geography, which examines the spatial aspects of electoral systems, voting behavior, and political representation.

Course Outcomes:

1. Gain a comprehensive understanding of the fundamental concepts, theories, and scope of political geography.
2. Apply various theoretical approaches to the study of political geography, such as Whittlesey's law of landscape approach and Hartshorne's functional approach.
3. Critically assess the strengths and limitations of different theoretical perspectives in explaining political phenomena.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**a) Introduction to Political Geography:** Nature, scope and significance. Recent trend in Political Geography **b) Different Approaches to study the subject:** Whittlesey's law of Landscape approach Hartshorn's Functional approach	15	12
II	**State as a politico-territorial phenomenon:** Territoriality, The State, The Nation, Spatial Factors of the state- Locations, Size, Shape Frontiers – North-West Frontier of India Boundaries Distinction between Frontier and Boundaries	15	12
III	**Electoral Geography** Trend in Electoral Geography Geography of Voter Participation Regional Stability Regional Realignments	10	12

IV	**Global strategic views:** Mahan's Sea Power Concept Mackinder's Heartland Theory Spykman's Rimland Theory	10	12
V	**Political Associations** Regional Multinational Political Systems World Organization Intercontinental Associations Political Regions	10	12
Total		**60**	**60**

Reference Books:

1. Bhagwati, J.N. (ed.): New International Economic Order - The North-South Debate, M.I.T. Press, London, 1976.
2. Dikshit, R.D.: Political Geography: A Contemporary Perspective, Tata McGraw-Hill Publishing Co., New Delhi, 1982 (also latest edition).
3. Glassner M.I.: Political Geography, John Wiley, New York, 1993.
4. Panikkar, K.M. Geographical factors in Indian History. Bharatiya Vidya Bhavan, Bombay 1956.
5. Pounds N.T.: Political Geography Mc Graw Hill, New York, 1972.
6. Prescott, J.R.V.: Political Geography, Methuen & Co., London, 1972.
7. Schwartzberg, J.E.: A Historical Atlas of South Asia, University of Chicago Press, U.S.A. 1993.
8. Short, J.R. : An Introduction to Political Geography, Routledge and Kegan Paul, London, 1982.
9. Taylor P.J (ed.): Political Geography of the 20th Centuary - A Global Analysis. New York, 1993.
10. Taylor, Peter: Political Geography, Longman, London, 1985.
11. William C.H. (ed.): Political Geography of the New World Order Halsted Ben, New York, 1993.

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program: M.A. II Geography		
Semester: III **Theory Paper**	**Name of the Course** **Geography of Economic Activities**	**Credits: 04**

Course Objectives:

1. Introduce the students to the geographical mode of thinking in application to various economic phenomena.
2. Understand the genesis, development, and evolution of Economic Geography as a subfield
3. Obtain an understanding of major forms of economic activity and processes
4. Learn to critically analyze economic issues from a geographical perspective.
5. Understand the concept of economic activity, and factors affecting the location of economic activity. Gain knowledge about different types of Economic activities

Course Outcomes:

1. Explain the importance of environmental, cultural, and other factors in determining economic activities.
2. Explain the concepts of locational analysis, spatial diffusion, and spatial interaction.
3. Explain the alternative paradigms of economic geography.
4. Apply the concepts, methods, and theories to local, regional, and global economic issues.
5. Analyse the location and viability of economic activities in local, regional, and global systems.
6. Evaluate the main global issues confronting the world economy.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**A) Economic Geography:** Definition, nature, and scope Recent trends in Economic Geography **B) Basic Economic processes:** Production, exchange & Consumption Classification of economic Activities and their characteristics Location of Economic activities	10	12
II	**Resources:** Classification of Resources - Renewable & Non-renewable Resources and Environment - Scarcity and Sustainability Conversation of resources and their need	15	12
III	**Industries:** Classification of Industries, Principles of Industrial Location Profit maximization - Least cost location Location theories – Weber & Losch.	10	12

IV	**Trade and Transport:** Major Transport Routes - Land, Water, and Air Routes Models of transportation and transport cost Accessibility and connectivity Trade - National and International	10	12
V	**A) Economic Development:** Spatial and Temporal aspects Measures of economic development – Rostow's and Myrdal's models **B) Economic Development in India:** Regional disparity in economic Development Impact of Green Revolution, Privatization	15	12
Grand Total		**60**	**60**

Reference Books:

1. Alexander J.W. (1976): Economic Geography. Prentice Hall of India. New Delhi.
2. Hartshorne, T.A. and J.W. Alexander (1988) –Economic Geography, Prentice Hall.
3. Berry, Conkling & Ray (1988): Economic Geography Prentice Hall of India New Jersey.
4. Hurst Elliott (1986): Geography of Economic Behaviour. Unwin, London.
5. Johnson R.J. & Taylor D.J. (1989): A world in crisis. Basil-Blackwell, Oxford.
6. Losch (1954): Economics of Location. Yale University Press New York.
7. Redcliff M. (1987): Development & the environmental crisis. Methuen. London.
8. Sinha B.N. (1971): Industrial geography of India
9. Watts H.D. (1987): Industrial Geography, Longman Scientific and Technical New York.
10. Haggett, Peter: Modern Synthesis in Geography.
11. Robinson H & Bamford C. G. (1978): Geography of Transport, Macdonald & Evans USA.
12. Jones & Darkenwald : Economic geography.
13. Fairbridge, R. W. (1968): Encyclopedia of Geomorphology, Reinholdts, New York.

Name of the Program: M.A. II Geography		
Semester: III **Practical Paper**	**Name of the Course** **Practical**	**Credits: 02**

Course Objectives:

1. To understand various techniques in surveying.
2. To analyses the principles and various methodologies involved in surveying.
3. To generate the drawings using advanced surveying equipment & application software.
4. To sensitize the students with advanced surveying equipment.

Course Outcomes:

1. Understanding the survey.
2. Explain the major types of surveying.
3. Apply the methods of survey with the help of various instruments.
4. Understand the Correction Bearing and close of Bodwitch method.
5. Apply the Dumpy level instrument of river cross section.
6. Understanding the sampling methods of data collections of village survey.
7. Preparation of the questionnaires for the village survey.

❖ **Practical / field work list:**

Unit No.	Teaching and learning point	Practical	Mark
I	**Surveying** i) Types of Surveying ii) Use of plane table survey iii) Advantages and disadvantages of plane table survey iv) Equipment's of plane table survey v) Methods of plane table survey	15	10
II	**Dumpy levels Survey** i) Uses of Dumpy levels ii) Equipments of Dumpy level survey iii)Methods of dumpy level Survey ▪ Collimation methods ▪ Rise and Fall methods iv) Advantages and Disadvantages of Dumpy levels	15	10
III	**Prismatic Compass Survey** i) Preparation of Prismatic Compass Survey ii) Methods of Prismatic Compass Survey 1. Intersection Method 2. Open Traverse Method 3. Close Traverse Method iii) Correction Bearing and close of Bodwitch method.	15	10

IV	**Techniques in Agricultural Geography** Crop Combination- J.C. Weaver Method Crop Diversification- Bhatia Method Crop Concentration- Jasbir Singh Method Productivity Index- Enyedi Method	15	10
V	**Journal and Viva**	-	10
	Total	**60**	**50**

Reference Book

1. Arjun Kumbar (1998), Practical Geography, Sumeru Publication, Dombiwali, Thane.
2. Basak, N. N. (1994). Surveying and Levelling. Delhi: Tata McGraw-Hill Education.
3. Bhavikatt, S. S. (2009). Surveying and Levelling. New Delhi: I. K. International.
4. Frank, H., & Althoen, S. C. (1994). Statistics: Concepts and Applications. Cambridge: Cambridge University Press.
5. Hammond, R., & McCullagh, P. (1991). Quantitative Techniques in Geography. Oxford: Clarendon Press.
6. Kanetkar, T. P., & Kulkarni, S.V. (I960). Surveying and Leveling- Part I and II. Pune: A. V. Ghriha Prakashan.
7. Mann, P. S. (2007). Introductory Statistics. New Delhi: John Wiley and Sons.
8. Pacione, M. (1999). Applied Geography: Principles and Practice. London: Routledge.
9. Pijushkanti Saha and Pratha Basu (2010), Advanced Practical Geography, Arunabha Sen, Kolakata
10. Pugh, J. C. (1975). Surveying for Field Scientists. London: Methuen and Co.
11. Robinson, G.M. (1998). Methods and Techniques in Human Geography. Michigan: John Wiley.

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Cultural Geography**	**Credits : 04**

Course Objectives:

1. Understand the diversity of cultures in the world as well as in India.
2. Comprehend the diffusion of various ethnic traits and religions.
3. Understand the relationship between cultures and patterns of living and economic development
4. Familiarize the students with the understanding of society through concepts and social theory, philosophical approaches, and spatial processes.

Course Outcomes:

1. Analyze the basic concepts of cultural Geography.
2. Describe the Cultural Setup and Regions.
3. Classify the Regional Differentiation of Cultural Characteristics
4. Interpret the Cultural Issues.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Nature and Scope:** Definition of Cultural Geography Nature and Scope of Cultural Geography Different approaches of study Culture as an Essential Elements of Geographical Studies Evolution of Culture	10	12
II	**Cultural Setup and Regions** Region Social Diversity, Social Areas, North-South and East-West Socio-Cultural Diversity of India Griffith Taylor's Theory	10	12
III	**Cultural Change:** Cultural Adaptation, Cultural Assimilation, Integration	10	12
IV	**Regional Differentiation of Cultural Characteristics** Cultural Region Tribal Region and their activities Tribes and their cultural activities Cultural reforms	15	12
V	**Issues** Causes of Cultural Problems Cultural problems and migration Demography Social well-being (meaning Patterns, measuring, method) Social justice: equality and welfare	15	12
Grand Total		**60**	**60**

Reference Books:

1. Ahmad, Aijazuddin (1999): Social Geography, Rawat Publication, Jaipur.
2. Blij, H. J. (195); The Earth-an Introduction to its Physical and Human Geography, John Willy & Sons, inc: New York.
3. Broad, Jan O M. & Webb, John W (1973): Geography of Mankind, McGraw Hill Book Co. New York.
4. Cater, Hohn & John, Trevor (1989): Social Geogaphy-an Introduction to Contemporary Issues, Arnold Publishers, New Delhi.
5. Jackson, Peter (1989): Maps of Meaning- An introduction to Cultural Geography, Unwin Hyman and London.
6. Jackson, Richard H & Loyd E. Hudman (1990): Cultural Geography-people, places and environment West Publishing Co. New York.
7. Jones, Emrys & Eyles, John (1977): An introduction to social Geography, Oxford University Press, Oxford.
8. Jorden, Terry G & Rowntree, Lester (1976): The Human Mosaic A Thematic Introduction to culture Geography, Canfield press, sen Francis Co. Harper & Row Publisher, New York.
9. Tripathi, R. S. & Parmar, S.B. Singh: Social and Economic Development in India.
10. Smith, David M (1977): Human Geography – A welfare Approach, Arnold-Hinman, London.
11. Majid Hussain (1994): Human Geography, Rawat Publication, Jaipur.

❖ **Web Resources:**

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Urban Geography**	**Credits : 04**

Course Objectives:

1. Understand the process of urbanization and origin, growth and classification of urban settlements with relevant theories and models.
2. Examine the changing economic base and structure of the contemporary cities.
3. Relate urbanization process and the evolution of urban system.
4. Examine the contemporary urban issues and suggest new urban planning and urban policy perspectives.

Course Outcomes:

1. Define the basic concepts of urban geography.
2. Describe the urban morphological models.
3. Discuss about urban classification.
4. Examine the rural-urban fringe.
5. Investigate the central place and urban hierarchy.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Urbanization - Basic Concepts:** Urban Geography, Urbanization Nature and Scope of Urban Geography Meaning of Urban Settlement Demographical Concept of Urbanization Contemporary factors of Urbanization	10	12
II	**Urban Morphology - Models:** Park and Burgess Model Homer Hoyet Model Harris and Ullman Model Characteristics and Demarcation of CBD	10	12
III	**Urban Classification:** Various Approaches to Classification Urban Functions and its Classification Functional Classification of Towns and Cities by C.D. Harris and H.J. Nelson	10	12
IV	**Rural-Urban Fringe:** Meaning of Rural-Urban Fringe Characteristics of Rural-Urban Fringe Methods of Demarcation of Suburban areas Concepts : Conurbation, Megalopolis, Urban Sprawl	15	12
V	**Central Place and Urban Hierarchy:** Concept - Central Place Christaller's Central Place Theory Rank-size Relationships and Rules Concept – Urban Hierarchy Hierarchy of Urban Settlements	15	12
Total		**60**	**60**

References:

1. Carter, H., (1972): The study of Urban Geography, Edward Arnold, London.
2. Fyfe, N. R. and Kenny, J. T., (2005): The Urban Geography Reader, Routledge.
3. Graham, S. and Marvin, S., (2001): Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, Routledge.
4. Hall, T., (2006): Urban Geography, Taylor and Francis.
5. Kaplan, D. H., Wheeler, J. O. and Holloway, S. R., (2008): Urban Geography, John Wiley.
6. Knox, P. L., and McCarthy, L., (2005): Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
7. Knox, P. L., and Pinch, S., (2006): Urban Social Geography: An Introduction, Prentice-Hall.
8. Pacione, M., (2009): Urban Geography: A Global Perspective, Taylor and Francis.
9. Ramachandran, R., (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi
10. Ramachandran, R., (1992): The Study of Urbanisation, Oxford University Press, Delhi

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Arid Geomorphology**	**Credits : 04**

Course Objectives:

1. Introduce students to the fundamental concepts and significance of arid geomorphology.
2. Explore the impact of climate on geomorphic processes in arid environments.
3. Investigate the various landforms typical of arid regions, focusing on their formation and characteristics.
4. Understand the formation and properties of soils and sediments in arid environments.
5. Assess the impact of human activities on arid landscapes.

Course Outcomes:

1. Identify and describe key geomorphic processes in arid environments.
2. Analyze fluvial processes in arid regions, including the formation and significance of ephemeral streams and alluvial fans.
3. Identify and classify erosional landforms such as yardangs, ventifacts, and inselbergs.
4. Analyze the mechanisms of sediment transport by wind and water in arid landscapes.
5. Understand the causes and consequences of desertification and identify strategies for mitigation.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to Arid Geomorphology** Definition and characteristics of arid and semi-arid regions Global distribution and climatic conditions Importance of studying arid geomorphology Evolution of arid geomorphology as a scientific discipline	10	12
II	**Climatic Influences and Processes** Role of climate in shaping arid landscapes Temperature variations, precipitation patterns, and wind dynamics Wind erosion and transportation Formation and types of dunes Loess deposits and desert pavements Role of ephemeral streams and flash floods River systems and alluvial fans Playas and desert lakes	15	12
III	**Landforms of Arid Regions** • **Erosional Landforms** Yardangs, ventifacts, and inselbergs Desert pavements and deflation hollows • **Depositional Landforms** Sand dunes and dune fields Alluvial fans, bajadas, and pediments • **Unique Landforms** Mesas, buttes, and plateaus	10	12

	Badlands and desert varnish		
IV	**Soil and Sediment Characteristics** • **Soil Formation in Arid Regions** Factors influencing soil development Types of soils typical in arid environments (e.g., aridisols) • **Sediment Transport and Deposition** Mechanisms of sediment transport by wind and water Characteristics of arid zone sediments Stratigraphy and sedimentary structures	15	12
V	**Human Interaction and Environmental Concerns** • **Human Impact on Arid Landscapes** Historical and contemporary land use practices Agriculture, urbanization, and mining impacts • **Desertification** Causes and consequences of desertification • **Conservation and Management**	10	12
Grand Total		**60**	**60**

Reference Books:

1. Abrahams, A.D. and Parsons, A.J. (eds.), Geomorpology of Desert Environments Chapman & Hall, London, 1994.
2. Goudie,A and Hegde : Palaeo-geography and Pre-history of Indian Desert, Academic Press, London,1980. .
3. Baumont, P.: Drylands-Environment, Management and Development, Routledge, New York,1993.
4. Bagnold, R.A. The Physics of Blown Sand and Desert Dunes, Methuen, London, 1941.
5. Cook, R.U., Waren, A. and Goudie, A.S. Desert Geomorphology, London, UCL Press, London, 1993.
6. Embleton, C. and Thornes, J. (eds.), Process in Geomorphology, Arnold -Heinemann, New Delhi, 1980.
7. Greeley, R and Iversen, J.D., Wind as a Geological Process. Cambridge University Press, Cambridge, 1985.
8. Lancaster, N: Geomorphology of Desert Dunes Routledge, New York,1995.
9. Livingstone I. and Warren, A. Aeolian Geomorphology ,Adison Wesley, Longman, Essex, 1996.
10. Mckee, E.D. (ed.) A Study of Global Sand Seas, Castel House, Kent, 1980.
11. Nickling, W.G. (ed.) Aeolian Geomorphology. Allen & Unwin, Boston, 1986. Curriculum Development Committee in Geography 106
12. Singhvi, A.K. and Derbyshire, E.(eds.) Palaeo—environmental Reconstruction in Arid Lands, Oxford & IBH, New Delhi, 1999.

Name of the Program : M.A. II Geography		
Semester III **Theory Paper**	**Name of the Course** **Bio-Geography**	**Credits : 04**

Course Objectives:

1. To provide students with a foundational understanding of the principles, processes, and patterns in bio-geography.
2. To familiarize students with the historical development of bio-geography and key contributors to the field.
3. To explore the ecological and evolutionary processes influencing the distribution of organisms.
4. To analyze the classification and characteristics of major biogeographical regions and understand the factors shaping their biodiversity.

Course Outcomes:

1. Analyse and evaluate the role of ecological and evolutionary processes in shaping biogeographical patterns.
2. Classify and characterize major biogeographical regions and explain the factors influencing their biodiversity.
3. Assess the impact of human activities on biogeographical patterns and propose conservation strategies.
4. Apply theoretical knowledge to real-world scenarios through case studies and practical exercises.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to Bio-geography** Definition and scope of biogeography Historical development of biogeography Branches of biogeography: ecological, historical, and evolutionary Importance of biogeographical studies	10	12
II	**Ecological Biogeography** Abiotic factors: climate, soil, water, and topography Biotic factors: competition, predation, mutualism, and parasitism Concepts of ecological niches and habitat selection Species range and distribution patterns	15	12
III	**Biogeographical Regions** Classification and characteristics of major biogeographical regions Factors influencing regional patterns: climate, topography, geology Analysis of biodiversity hotspots and their conservation significance Human impact on biogeographical regions and its consequences	10	12

IV	**Freshwater and Marine Biogeography** Unique features of freshwater ecosystems and their biogeography Marine biogeography and ocean currents Coral reefs, estuaries, and their biodiversity Conservation issues related to aquatic biogeography	15	12
V	**Human Impact on Bio-geography** Anthropogenic influences on biodiversity and ecosystems Climate change and its effects on biogeographical patterns Habitat destruction, fragmentation, and invasive species Conservation efforts and strategies to mitigate human impact	10	12
Grand Total		**60**	**60**

Reference Books:

1. "Biogeography: An Ecological and Evolutionary Approach" by C. Barry Cox and Peter D. Moore
2. "Island Biogeography: Ecology, Evolution, and Conservation" by Robert J. Whittaker and James H. Brown
3. "Biogeography: A Global Synthesis" by Mark V. Lomolino, Brett R. Riddle, and Robert J. Whittaker
4. "Principles of Terrestrial Ecosystem Ecology" by F. Stuart Chapin III, Pamela A. Matson, and Peter M. Vitousek
5. "Conservation Biogeography" by Richard J. Ladle and Robert J. Whittaker
6. "Global Biogeography" by J.C. Briggs and J.A. Veevers
7. "Biogeography: Introduction to Space, Time, and Life" by Glen M. MacDonald
8. "Biogeography and Evolution in New Zealand" by M. K. Oliver and R. A. F. Seppelt
9. "Biogeography: Space, Time, and Life" by Peter Hovenkamp and Peter J. M. Maas
10. "The Diversity and Biogeography of Mammals" by R. M. Nowak
11. "Biogeography of the Quaternary Molluscs of the Southwestern Atlantic Ocean" by Sergio M. Dillenburg and Fernando L. Dillenburg
12. "Biogeography of the West Indies: Patterns and Perspectives" by Charles A. Woods and Florence E. Sergile
13. "The Biogeography of Host-Parasite Interactions" by Serge Morand and Boris R. Krasnov

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Geography of Environment**	**Credits: 04**

Course Objectives:

1. Students will learn how human, physical and environmental components of the world interact.
2. Able to conduct basic analysis of how environmental change is occurring at different geographic scales.
3. Able to explain the relationships between biosphere, lithosphere, hydrosphere, and atmospheric systems.
4. Students will learn the regional geography of the world, particularly from the perspective of how human, physical and environmental components of the world interact.

Course Outcomes:

1. To educate students in the contents and methods of Geography of Environment as an academic and professional discipline.
2. To understand elements of the environment and acquire knowledge about biodiversity
3. To get knowledge about natural hazards and management
4. To understand the various environmental issues and policies.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction:** Meaning and Scope Basic principles Composition and types of the environment; Ecological principles; Man – environment relationship.	10	12
II	**Ecosystem** Concept and components, Trophic levels, Food chains, and food webs Energy flow in the ecosystem, Circulation of matter in the ecosystem, Biogeochemical cycle, Ecosystem productivity, Ecosystem stability	10	12
III	**Environmental degradation** Extreme events- hazards and disasters (earthquakes, volcanoes, cyclones, floods) Environmental pollution- (air, water, solid waste, soil, and noise Environmental pollution in India Environmental Problems – global warming, ozone depletion, land degradation, and reduction in biodiversity.	10	12
IV	**Environmental Approaches** Concept and approaches Environmental dimension in planning – sustainable development Environmental consciousness, Environmental policy, environmental legislation, Environmental impact assessment, Disaster management	15	12
V	**Environmental management** Management of forest, soil, wildlife, energy and mineral resources, Environmental education, monitoring, and mapping, conservation of natural resources.	15	12
	Total	**60**	**60**

Reference Books:

1. Batel, B.(ed): Management of Environment, Wiby eastern Ltd. New Delhi, 1980.
2. Brij Gopal: Elements of Ecology Centre for Science & Environment: The State of India Environment: A citizen's Report, 1982, 1985, New Delhi.
3. Desh Bandhu (ed.): Environmental Management, Indian Environment Society, New Delhi. Gupta &Gurjar: sustainable Development, Rawat, Jaipur.
4. Kaswan, N.R. : Man and Environment (Hindi), Malik & Co. Jaipur, 1999. Mathur, H.S.: Biogeography
5. Park, C.C: Ecology and Environmental Management, Butterworths, London, 1980.
6. P.D. Sharma: Ecology and Environment, Rastogi, Meerut, 2010.
7. Peter Cotgreave& Irwin Forseth: Introductory Ecology, Blackwell, 2002.
8. Savinder Singh: Geography of Environment, allahbad
9. Singh & Singh (ed.): Geography of Environment, Concept, New Delhi
10. Strahler, A.N.: Geography and Man's Environment, John Willey, New York, 1976.
11. V.K. Srivatava: Paryavaran Bhoogolevm Paristhitiki, Vasundhara, Gorakhpur.

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Agriculture Geography**	**Credits : 04**

Course Objectives:

1. To familiarize the students with the concept, origin, and development of agriculture.
2. To examine the role of agricultural determinants towards changing cropping patterns, intensity, productivity, diversification and specialization. The course further aims to familiarize the students with the application of various theories, models and classification schemes of cropping patterns and productivity.
3. Its objectives are also to discuss environmental, technological and social issues in agricultural sector with special reference to India.

Course Outcomes:

1. Define the basic concepts of agriculture geography.
2. Describe the Land Classification in India.
3. Examine the Agricultural Patterns.
4. Investigate the Problems & Prospects of Agriculture.
5. Interpreter Agricultural Regionalization and Methods.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**A) Introduction to Agricultural Geography:** Nature scope and significance. Different Approaches to study the subject **B) Land use:** General and Agricultural Land use Land use surveys Land Classification in India	10	12
II	**Determinants of Agricultural Patterns:** Relief, climate, soil Land holding, marketing, transport Irrigation Mechanization. Biochemical inputs	10	12
III	**Agricultural Types:** Shifting cultivation Intensive subsistent farming. Mixed farming Plantation agriculture Commercial grain farming	15	12
IV	**Problems & Prospects of Agriculture:** Definition and characteristics of arid and semi-arid regions. Droughts and famines Role of irrigation and dry farming.	10	12

V	**Agricultural Regionalization (Methods):** Classification of Agriculture regions by Derwent Whittlesey Agricultural regions of India. Theory of Agriculture Location by Von Thunen	15	12
Total		**60**	**60**

Reference Books:

1. Aiyer, A.K.Y.N.(1949) – Agricultural and Allied Arts in Vedic India.
2. Grigg. D.G. (1974) – The Agricultural Systems of the world An Evolutionary Approach.
3. Grigg. D.G.(1964) – An Introduction to Agricultural Geography Hutchinson & Co.Ltd.,
4. Illbery, B.W. (1985) – Agricultural Geography, Social & Economic Analysis, Oxford University Press.
5. Morgan. W.B. & S.C. Monton (1971) – Agricultural Geography Methuen, London.
6. Randhawa, M.S. (1980) – An History of Agriculture in India Vols. I, II, III,IV ICAR, New Delhi.
7. Singh. J. and Dhillon S.S. (1994) – Agricultural Geography. Tata McGraw Hill, Publishing Co. Ltd.
8. Symons, Leslie (1970) – Agricultural Geography, G. Belt and Sons Ltd., London.
9. Tarrent, J.R. (1970) – Agricultural Geography, David and Charles, Newton Abbot.
10. Majjid Hussain (2021)- Agriculture Geography, second Edition.

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Regional Planning and Development**	**Credits: 04**

Course Objectives:

1. To understand and evaluate the concept of region in geography and its role and relevance in regional planning;
2. To identify the issues relating to the development of the region through the process of spatial organization of various attributes and their inter relationship.
3. To identify the causes of regional disparities in development, perspectives and policy imperatives.

Course Outcomes:

1. Define the major concepts of regional planning and development. .
2. Classify theories and models of regional planning and development.
3. Solve the regional imbalances in India.
4. Examine the regional planning in India.
5. Investigate the geographical need and feasibility.

❖ **Course Contents:**

Unit	Teaching / Learning Points	Periods	Marks
I	**Basic Concepts:** Concept of Region, Types and hierarchy of regions Concept of Planning, Types of planning Concept of Approach, Different Approaches to Regional planning Concept of Geographical Indication, its relation with Planning Concept of Growth and Development. Indicators of development Measures of regional development	10	12
II	**Theories and Models:** a) Models of economic growth: Rastows stages of economic growth Gunnar Myrdal's concept of internal growth b) Theoretical frame work for regional planning: Central Place Theory Growth Pole Theory	15	12
III	**Regional imbalances in India** Industrial Imbalances Agricultural Imbalances Rural-Urban ratio Imbalances Infrastructural Development and its Imbalances	10	12

IV	**Regional Development in India** Metropolitan planning Rural development planning Tribal area development planning	10	12
V	**Geographical Need and Feasibility** a) Geographical Factors affecting on Planning and Development b) Urgent Needs for Planning and Development Watersheds Solid and Liquid Domestic Wastes Disaster and Hazard Drinking Water and Health Services	15	12
	Total	**60**	**60**

Reference Books:

1. Bhandari S (1992): Transport and Regional Development, Concept Publication, New Delhi
2. Bhat, L. S. (1973): Regional Planning in India, Statistical Publishing Society, Kolkata
3. Chandana, R. C. (2000): Regional Planning - A Comprehensive Text, Kalyani Publishers, Ludhiana
4. Dube K. N. (ed) (1990): Planning and Development in India, Asia Publishing House, New Delhi
5. Friedmann, J Alanso W (1967): Regional Development and planning - A Reader, MIT Press Mass
6. Govt. of India (1986), Regional Plan 2001 - National Capital Region, NCRPB, Ministry of Urban Development, New Delhi
7. Hall P. (1992) Urban and Regional Planning, Routledge, London
8. Mishra R. P (Ed.) (1992): Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Pub. New Delhi.
9. Vaidya B C (eds)(1998): Reading in Transport Geography: A Regional Perspective, Devika Publications, New Delhi

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester IV **Theory Paper**	**Name of the Course** **Social Geography**	**Credits : 04**

Course Objectives:

1. Understand diversity of cultures in the world as well as in India.
2. Comprehend the diffusion of various ethnic traits and religions.
3. Understand the relationship between cultures and pattern of living and economic development
4. Familiarize the students with the understanding of the society through concepts and social theory, philosophical approaches and spatial processes.
5. Examine the process of social region formats in India with the help of social cultural and historical factors;

Course Outcomes:

1. Analyze the basic concepts of Social and cultural Geography.
2. Describe the Socio-Cultural Setup and Regions.
3. Classify the Regional Differentiation of Social and Cultural Characteristics
4. Interpret the Social and Cultural Issues.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Nature and Scope:** Definition of social Geography Nature and Scope of Social Geography Different approaches of study Culture and Society as a Essential Elements of Geographical Studies Evolution of Social Things	10	12
II	**Socio-Cultural Setup and Regions** Region Social Diversity, Social Areas, North-South and East-West Socio-Cultural Diversity of India Griffith Taylor's Theory	10	12
III	**Differential Factor of Socio-Cultural Set-up** Human Race Language Religion Castes Tribes Migration of other activities.	10	12
IV	**Regional Differentiation of Social Characteristics** Social and Cultural Region Tribal Region and their social activities Tribes and their cultural activities Social and Cultural reforms Urban and Rural Difference	15	12

V	**Issues** Causes of Social problems Social problems and migration Demography Human development Index Social well being (meaning Patterns, measuring, method) Social justice : equality and welfare Social problems and migration	15	12
Grand Total		**60**	**60**

Reference Books:

1. Ahmad, Aijazuddin (1999): Social Geography, Rawat Publication, Jaipur.
2. Blij, H. J. (195); The Earth-an Introduction to its Physical and Human Geography, John Willy & Sons, inc: New York.
3. Broad, Jan O M. & Webb, John W (1973): Geography of Mankind, McGraw Hill Book Co. New York.
4. Cater, Hohn & John, Trevor (1989): Social Geogaphy-an Introduction to Contemporary Issues, Arnold Publishers, New Delhi.
5. Jackson, Peter (1989): Maps of Meaning- An introduction to Cultural Geography, Unwin Hyman and London.
6. Jackson, Richard H & Loyd E. Hudman (1990): Cultural Geography-people, places and environment West Publishing Co. New York.
7. Jones, Emrys & Eyles, John (1977): An introduction to social Geography, Oxford University Press, Oxford.
8. Jorden, Terry G & Rowntree, Lester (1976): The Human Mosaic A Thematic Introduction to culture Geography, Canfield press, sen Francis Co. Harper & Row Publisher, New York.
9. Tripathi, R. S. & Parmar, S.B. Singh: Social and Economic Development in India.
10. Smith, David M (1977): Human Geography – A welfare Approach, Arnold-Hinman, London.
11. Majid Hussain (1994): Human Geography, Rawat Publication, Jaipur.

❖ **Web Resources:**

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Glacial Geomorphology**	**Credits : 04**

Course Objectives:

1. Appreciate the contrasting geomorphic processes operating in glacial and periglacial environments.
2. Understand the deformational behavior of ice and the meltwater.
3. Understand the sensitivity of the periglacial environment to heat budget.
4. Understand the impact of human activities on permafrost environment.

Course Outcomes:

1. Define the major concepts in glacial geomorphology.
2. Describe the type of glaciers.
3. Solve the glacial formation and movements.
4. Examine the Erosion by glaciers with landforms.
5. Judge the transportation and deposition by glacial landforms.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Ice Ages and World Glaciation:** Causes of Ice Ages-Pleistocene Glaciation: Onset and retreat direct and indirect effects of Pleistocene Glaciation-glacier regimes: Definition, mass balance and response to climatic changes-glacier ice: physical and thermal properties, glacier flow and internal deformation.	10	12
II	**Erosional Process:** Glacial erosion: ice and meltwater-mechanical and chemical processes of erosion; Development of erosional landforms-morpho dynamics of the features of erosion at or inside glacier margins-glacial permafrost; Super-glacial, englacial, and basal.	10	12
III	**Depositional Process:** Processes-stratified and non-stratified; drifts-morpho dynamics of moraines: Forms of moraines-glaciofluvial and glacio-lacustrine environment; Hazards in glacial environment: glacial surges and glacier dam bursts.	15	12
IV	**Periglacial Processes:** Frozen ground phenomenon: identification, depth variations, Thermal properties, classification and distribution-ground ice: Types and morph dynamics of periglacial processes: Mechanism of frost action, mass wasting, nivation.	15	12
V	**Periglacial landforms;** Frost actions and landforms-mass wasting and landforms Adaptation of human beings to periglacial environment.	10	12
Total		**60**	**60**

Reference Books:

1. Brown, R.J.E., Permafrost in Canada. University of Toronto Press, Toronto, 1970.
2. Carson MA. and Kirkby M.J., Hillslope Form and Process, Cambridge University Press, 1972.
3. Coates, D.R.(ed.), Glacial Geomorphology, State University of New York,1974, New York, 1974.
4. Dixon, J.C. and Abrahams, A.D. (eds.), :Periglacial Geomorphology. John Wiley, New York, 1992. Drewry, D., Glacial Geological Processes, Edward Arnold, London, 1986.
5. Embleton, C. and King, C.A.M., Glacial and Periglacial Geomorphology, Edward Arnold, London, 1968.
6. Embleton, C. and Thormes, J. (eds.), Process in Geopmorphology, Arnold - Hesnemann, New Delhi, 1980.
7. Hails, J.R. (ed.): Applied Geomorphology Elsevier Sci. Amsterdam, 1977.
8. Pewe, T.L.(ed.):. The Periglacial Environment. Mc. Gill- Queen's University Press, Montreal1969.
9. Peterson, W.S.B., The Physics of Glaciers. Pergamon Press, Oxford 1969.
10. Price, L.W., The Periglacial Environment, Permafrost and Man., Commission on College Geography, Resource Paper No. 14, Washington, D.C,1972.
11. Ritter, D.F. Craig, R. and Miller, J.P., Process of Geomorphology. , W.C. Brown Dubuque, 1995.
12. Slymaker, O. (ed.), Steepland Geomorphology., John Wiley, London, 1995.
13. Sugden, D.E. and John, B.S. Glaciers and Landscape. Edward Arnold, London, 1976.
14. Vander Veen, C.J., Fundamentals of Glacier Dynamics., A.A. Balkemma, Rotterdam, 1999.
15. Wright, A.E and Mosley, P.(eds), Ice Ages: Ancient and Modern., Seel House Press, Liverpool,1975

Web Resources:

1. www.wikipedia.org
2. www.encyclopedia.com
3. http://jgesnet.com

Name of the Program : M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Rural Geography**	**Credits : 04**

Course Objectives:

1. Understand the growth and evolution of rural settlements.
2. Recognize and analyze the distributions, patterns, morphology and functions of rural settlements.
3. Analyze and suggest rural settlement planning in India.
4. Examine the prevailing social and environmental issues in rural areas of India.

Course Outcomes:

1. Define the basic concepts of rural geography.
2. Describe the types and patterns of rural settlement.
3. Compare the rural morphology and its models
4. Examine the rural landscape and settlements.
5. Investigate of rural central places.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Urbanization - Basic Concepts:** Rural Geography: Rural Population and Settlement Nature and Scope of Rural Geography Site, Situation and Location of Rural Settlements Settlement Size and Shape Evolution of Settlement Rural-Urban Dichotomy Transformation of Villages	15	12
II	**Types and Patterns of Rural Settlements:** Difference between Type and Pattern Types of Settlement: Clustered, Compact and Nucleated Basic Village / Settlement Forms Patterns of Rural Settlement: Rectangular, Circular, Star, Linear Classification of Settlement Functional Classification of Villages	15	12
III	**Rural Morphology - Models:** Morphological Changes Factors Responsible for Dispersion Socio-Spatial Structure, Caste and Segregation of Settlements Index of Dispersion of Settlement by Albert Demangeon Nearest Neighbour Analysis	10	12

IV	**Rural Landscape and Settlements:** Meaning of Village and Surrounding Farmland Von Thunen's Agriculture Landuse Model Economic Rent and Farming Patterns Rural Dwelling: Rural house types, Building material, Size etc	10	12
V	**Rural Central Places:** Concept – Rural Central Place Rural Market Centers Factors affecting on Rural Market Centers Periodic Markets : types, functions, periodicity etc Problems of Rural Market System Rural-Urban Relationship	10	12
Grand Total		**60**	**60**

References:

1. Anand, Subhash.,(2013): Dynamics of Rural Development, Research India Press, Delhi
2. Gilg, A. W., (1985): An Introduction to Rural Geography, Edwin Arnold, London.
3. Krishnamurthy, J.,(2000): Rural Development - Problems and Prospects, RawatPubls., Jaipur
4. Lee, D. A. and Chaudhri, D. P., (eds.)(1983): Rural Development and State, Methuen, London.
5. Misra, R. P., and Sundaram, K. V., (eds.)(1979): Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.
6. Misra, R. P., (ed.), (1985): Rural Development: Capitalist and Socialist Paths, Vol. 1, Concept, New Delhi. Palione, M., (1984): Rural Geography, Harper and Row, London.
7. Ramachandran, H., and Guimaraes, J.P.C., (1991): Integrated Rural Development in Asia– Leaning fromRecent Experience, Concept Publishing, New Delhi.
8. Robb, P.,(1983): Rural South Asia: Linkages, Change and Development, Curzon Press.
9. Singh, R.B., (1985): Geography of Rural Development, Inter India, New Delhi.
10. UNAPDI (1986):Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
11. Wanmali, S., (1992): Rural Infrastructure Settlement Systems and Development of the
1. RegionalEconomy in South India, International Food Policy Research Institute, Washington, D.C.
12. Yugandhar, B. N. and Mukherjee, Neela., (eds.) (1991): Studies in Village India: Issues in Rural Development, Concept Publications. Co., New Delhi.

Name of the Program: M.A. II Geography		
Semester: IV **Theory Paper**	**Name of the Course** **Principle of GIS Applications**	**Credits: 04**

Course Objectives:

1. Gain a comprehensive understanding of the principles and concepts underlying Geographic Information Systems (GIS).
2. Foster spatial thinking skills to analyze and interpret spatial patterns and relationships.
3. Explore various sources of spatial data including remote sensing, GPS, and survey
4. Acquire skills in collecting, managing, and processing spatial data with an emphasis on accuracy and reliability.

Course Outcomes:

1. Use GIS software proficiently for spatial analysis, mapping, and data visualization.
2. Apply GIS techniques to address real-world problems and make informed spatial decisions.
3. Design and create effective maps that communicate spatial information clearly and accurately.
4. Evaluate the quality and accuracy of spatial data and make data-driven decisions.
5. Integrate spatial thinking into decision-making processes across various domains.

Course Contents:

Unit	Teaching / Learning Points	Periods	Marks
I	**Introduction to GIS** Overview of GIS concepts and its applications. Understanding spatial data and the importance of spatial thinking. Key components of GIS, including hardware, software, data, and people. Introduction to spatial data types and coordinate systems.	15	12
II	**Data Sources and Acquisition:** Types of spatial data sources (remote sensing, GPS, surveys, Data acquisition methods and techniques. Data quality and accuracy considerations. Spatial data storage formats (vector, raster) and their characteristics.	15	12
III	**Spatial Analysis and Modeling:** Basic spatial analysis operations (overlay, buffer, spatial querying). Introduction to spatial modelling concepts. Applications of spatial analysis in different domains (environmental, urban planning, etc.).	10	12

IV	**Cartography and Map Design:** Principles of map design and cartographic representation. Use of color, symbols, and scales in map production. Cartographic design considerations for different purposes (navigation, analysis, communication). Digital mapping techniques and tools.	10	12
V	**GIS Applications in Various Fields:** Applications of GIS in environmental science and natural resource management. GIS in urban planning and infrastructure development. Health GIS: Disease mapping and analysis. GIS in business, marketing, and location-based services.	10	12
Grand Total		**60**	**60**

References:

1. "Geographical Information Systems" by P.C. Sinha
2. "Geoinformatics: A Practical Guide" by T. R. Anil Kumar
3. "Principles of Geographical Information Systems" by N. Sridhar Rao
4. "Remote Sensing and GIS" by Basudeb Bhatta
5. "Geographical Information Systems: Applications in Natural Resource Management" by G. C. Mishra
6. "Introduction to Geographic Information Systems" by Kang-Tsung Chang
7. "Geographic Information Systems: Concepts, Methodologies, Tools, and Applications" edited by Information Resources Management Association
8. "GIS Applications in Agriculture: Nutrient Management for Energy Efficiency" by Surya Prakash Tiwari
9. "Urban and Regional Planning with GIS" by Donald P. Albert
10. "Geographical Information Systems and Science" by Paul A. Longley, Michael F. Goodchild, David J. Maguire, and David W. Rhind