M.A./ M.SC. (GEOGRAPHY)
SCHEME OF EXAMINATIONS
(July 2014)

Semester and Course No.	Nomenclature	Max. Marks	Hours of Teaching per week
SEMESTER I			
COURSE-I	Geomorphology	100	6 Hours
COURSE-II	Climatology	100	6 Hours
COURSE-III	Human Geography	100	6 Hours
COURSE-IV	Cartography	100	6 Hours
SEMESTER-II			
COURSE-V	Spatial Patterns of Economic Activities	100	6 Hours
COURSE-VI	Population Geography	100	6 Hours
COURSE-VII	Bio-geography	100	6 Hours
COURSE-VIII	Geographic Information System	100	6 Hours
SEMESTER-III			
COURSE-IX	Regional Planning	100	6 Hours
COURSE-X	Quantitative Techniques in Geography	100	6 Hours
COURSE-XI	History of Geographical Thought	100	6 Hours
COURSE-XII	Field Survey	100	6 Hours
SEMESTER-IV			
COURSE-XIII	Geography of Himachal Pradesh	100	6 Hours
COURSE-XIV	Cultural Geography	100	6 Hours
COURSE-XV	Geography of Well-being with Special Reference to India	100	6 Hours
COURSE-XVI	Remote Sensing Techniques	100	6 Hours
	Total	**1600**	**96 Hours**

COURSE-I GEOMORPHOLOGY

Max.Marks: 100
(Theory 80+ I.A. 20 marks)

Unit I

- Definition, nature and scope of geomorphology. Approaches to and methods of geomorphological analysis.
- Some fundamental concepts in geomorphology**:** geological structure and landforms, uniformitarianism, characteristic assemblages of landforms, sequential changes in landforms, climatic geomorphology.

Unit II

- Structural geomorphology: Characteristics and topographic expression of fault and fold structures.
- Mountain and mountain building theories by Suess and Argan, Kober and Holmes. Plate tectonics and mountain building.
- Forces of crustal instability: Isostasy, plate tectonics, and vulcanicity

Unit III

- Meaning, causes, types and geomorphic significance of weathering and mass-movement.
- Concept of Hill-slope development approaches to slope studies, slope elements.
- Theories of slope evolution: Slope decline theory by Davis, Slope replacement by Penck and parallel retreat by King.

Unit IV

- Fluvial, Periglacial, Glacial, and Eolian processes and landforms.
- Meaning of denudation chronology and erosion surfaces, Peneplain concept.

Unit V

- Meaning and types of drainage systems and patterns.
- Concept of river capture.
- Concept of Applied geomorphology: Geomorphology and Harzard management, Geomorphology and Urbanization, Geomorphology and hydrology.
- Concept of Anthropogenic geomorphology: Man and mass-movement, man and river processes, man and coastal processes.

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings:

1. Bloom, A.L. (1979) Geomorphology, New Delhi: Prentice Hall of India Pvt. Ltd.
2. Dayal,P. (1995) A Textbook of Geomorphology, Patna: Shukla Book Depot.
3. Embleton, C. and King, C.A.M. (1975) Glacial Geomorphology, London: Edward Arnold.
4. Fairbridge, R.W. (1968) **Encyclopedia of Geomorphology**, New York: Reinholds.
5. Morisawa, M (1968) Streams, New York: McGraw Hill.
6. Pitty, A.F. (1982) The Nature of Geomorphology, New York:Methuen.
7. Rice, R.J. (1990) Fundamentals of Geomorphology, London: ELBSL.
8. Schumn, S. (1977) The Fluvial System, New York: John Wiley and Sons.
9. Sharma, Anurag (1993) Ecology of Landslide Damages, Jaipur: Pointer Publishers.
10. Sharma, H.S.(ed.) (1980) Perspectives in Geomorphology, New Delhi: Concept.
11. Sharma, V.K. (1986) Geomorphology, New Delhi: Tata McGraw Hill.
12. Singh, Savindra (1998) Geomorphology, Allahabad: Prayag Pustak Bhawan.
13. Small, R.J. (1978) The Study of Landforms, Cambridge: Cambridge University.
14. Sparks, B.W. (1960) Geomorphology, London: Longman.
15. Strahler, A.N. (1992) Physical Geography, New York: John Wiley and Sons.
16. Thornbury, W.D. (1969) Principles of Geomorphology, New York: John Wiley and Sons.

COURSE-II CLIMATOLOGY

Maximum Marks:100
(Theory 80 + I.A. 20 marks)

Unit-I

Compositional and thermal structure of the atmosphere, Insolation: Solar source, heat balance of the earth, green house effect and global warming, vertical and horizontal distribution of temperature,

Unit-II

Atmospheric motion: Forces controlling motion of air, vertical motion and verticity, local winds, jet stream, general circulation in the atmosphere; Atmospheric moisture: humidity, evaporation, condensation, precipitation: formation, types, acid rain, world pattern of precipitation

Unit-III

Tropical, temperate and high latitude weather systems- concept of air masses and atmospheric disturbances, ocean atmospheric interaction- El Nino, southern oscillation (ENSO) and La Nina, monsoon winds, norwesters and cyclones, Tropical and Temperate phenomena, climate of India and its controls: Eastern disturbances.

Unit – IV

Climatic classification of Keepen, and Thornthwaite, Major climates of the world-tropical, temperate, desert and mountain climate.

Unit-V

Climatic Changes: Ozone Depletion; Global Warming: Strengthening of Greenhouse effect; Evidences and Possible causes of global warming; Environmental impacts of global warming and societys' response.

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings

1. Barry, R.G. and Chorley P.J., Atmosphere, Weather and Climate, Routledge, London and New York, 1998.
2. Critchfield, J.H.: General Climatology, Prentice Hall, India, New Delhi, 1993.
3. Das, P.K.: Monsoons National Book Trust, New Delhi, 1987.
4. Fein, J.S. and Stephens, P.N.: Monsoons, Wiley Inter-science, 1987.
5. India Met, Deptt.: Climatological Tables of Observatories in India, govt. of India, 1968.
6. Lal. D.S.: Climatology, Chaitanya Publications, Allahabad, 1986.
7. Lydolph, P.E.: The Climate of the Earth, Rowman, 1985.
8. Menon, P.A.: Out Weather, N.B.T., New Delhi, 1989.
9. Oliver, J.E. and John J. Hidore. 2002. Climatology- An Atmospheric Science (2nd Ed.) Pearson Education (Low Price Edition).
10. Peterson, s.: Introduction to Meteorology, McGraw Hill Book, London, 1969.
11. Robinson, P.J. and Henderson S.: Contemporary Climatology, Henow, 1999.
12. Thompson, R.D. and Perry, A (ed.): Applied Climatology, Principles and Practice, Rourtledge, London 1997.

COURSE –III: HUMAN GEOGRAPHY

Max. Marks: 100
(Theory 80 + I.A. 20 marks)

UNIT-I

HUMAN GEOGRAPHY: CHANGING SCALES OF EXPERIENCE

- Human Geography versus Human Ecology, Subject Matter of Human Geography, Human Geography through the corridors of time.
- Pre capitalist worlds: Classification of Human Societies; The rise and spread of capitalism: Defining capitalism, organized capitalism and disorganisation of capitalism.

UNIT-II

SETTLEMENT, GLOBALIZATION AND CHANGING CULTURE

- Defining Cities in Social Context, Origin and Growth of Urbanization in India.
- Concept of Globalization, Cultural globalization, Impact of globalization with reference to Indian culture.

UNIT-III

POPULATION AND FOOD SUUPLY

- Demographic transformations: Growth of world population, Demographic transition model and Emergence of second demographic transition, Population Ageing and its Impacts.
- Population Growth and Food Supply, Globalization and Food Regimes, Future challenges for the supply of food.

UNIT-IV

GEOPOLITICAL TRADITIONS AND STATES

- Organic Theory of State, Heartland and Rimland Theories, German Geopolitics, Policy of Containment
- Concept of State, Nation and Nation-States, Demarcation of Boundaries, its classification and Frontiers.

UNIT-V

ALTERNATIVE GEOGRAPHIES OF GLOBAL DEVELOPMENT AND INEQUALITY

- Geography and Third world Development, Conceptions of Development-the Modernization and Dependency School
- Theories, Practices and Subjects of Development, Indicators of Development, Uneven development and Globalization, Sustainable Development: Concept, components and its realization in Indian context.

Note: The paper would be set from the syllabus covering the full content. Ten questions, two from each unit, are to be framed. Candidates will have to attempt five questions, one from each unit. All questions will carry equal marks.

Books Recommended:

Bergwan, Edward E (1995). Human Geography: Culture, Connections and Landscape, Prentice-Hall, New Jersey.

Carr, M. (1987). Patterns, Process and Change in Human Geography. MacMillan Education, London.

Cloke, P., Crang, P. and Goodwin, M (1999). Introducing Human Geographies. Arnold, London.

Daniels, P., Bradshaw, M., Shaw, D and Sidaway, J. (2001). Human Geography: Issues for the 21st Century. Pearson, Delhi.

DeBlij H.J. (1996). Human Geography, Culture, Society and Space. John Wiley, New York.

Fellmah, J.L. (1997).Human Geography- Landscapes of Human Activities. Brown and Benchman Pub., U.S.A.

Johnston, R.J. (1994).Dictionary of Human Geography. Balckwell, Oxford.

Majid Husain. (2002). Human Geography. Rawat Publications.

McBride, P.J.(1996).Human Geography Systems, Patterns and Change. Nelson, U.K. and Canada.

Michael, Can (1997). New Patterns: Process and Change in Human Geography, Nelson.

Paper IV: Cartography

100 Marks

Division of Marks:

(i)	A written paper of 3 hours duration In the departmental lab	50 Marks
(ii)	Practical record book	20 Marks
(iii)	Viva-voce	10 Marks
(iv)	Internal Assessment	20 Marks

UNIT-I

Nature and history of cartography
Types of data and symbols'
Cartographic design & generalization

UNIT-II

Mapping physical phenomena:

(i) Depiction of relief: contour method, spot heights and layer shading
(ii) Profiles: Serial, longitudinal, transverse, superimposed, composite and projected.
(iii) Methods of slope analysis: Wentworth, Smith, and Robinson.
(iv) Representation of climatic data: Hythergraphs, Climograph, Windrose Diagram.

UNIT-III

Mapping Social Phenomena: Distribution of population, density, growth, age & sex composition, urbanisation, literacy and occupational composition.

UNIT-IV

Mapping Economic data: Land use, Cropping pattern and irrigation, employment, traffic flow and accessibility

Note: (i) The question paper in this course will consists of EIGHT questions covering the entire syllabus. Candidates will be asked to attempt any FOUR questions. All questions will be of equal marks.

(ii) The examination of this paper will be conducted in the department by an external examiner who will be assisted by an internal examiner who would generally be the course teacher. The external examiner will be appointed by the Vice Chancellor out of a penal of five experts submitted to him in this regard by the Chairman of the Department.

(iii) The external examiner who will set the question paper in assistance with internal examiner shall have the freedom to decide the nature of questions (whether MCQ type or otherwise) to be put in the question paper covering the entire syllabus

BOOKS RECOMMENDED

1. Keats, J.S. (1973): Cartographic Design and production Longman, London
2. Monkhouse, F.J. and H.R. Wilkinson (1967) Maps and Diagrams, B.T. Publications Pvt. Ltd., Delhi 1989.
3. Raisz Erwin (1962): Principles of Cartography, McGraw Hill, New York.
4. Misra R.P. and A. Ramesh (1989): Fundamentals of Cartography, Concept Publishing Company New Delhi.
5. Singh L.R. and R.N. Singh (1975): Map work and Practical Geography, Central Book Depot, Allahabad.
6. Singh R.L. (1979): Elements of Practical Geography, Kalyani Publishers, new Delhi.
7. John Compbell (1991):Map Use and Analysis, WCB Dubuque.
8. Dent Borden D. (1990): Cartography, Thematic Map Design, Wim.C. Brown Publishers.
9. Kraak, M.J. and Ferjan Ormeling (2003): Cartography, Visualization of Geospatial Data, Pearson Education Limited, Patparganj, Delhi, India.
10. Robinson, Arthur and et.al.(2005): Elements of Cartography, John Wiley and Sons, New York.

COURSE-V: SPATIAL PATTERN OF ECONOMIC ACTIVITY

Max. Marks: 100
(Theory 80 + I.A. 20 marks)

UNIT-I

NATURE OF ECONOMIC ACTIVITY

- Types of Economic Activity
- Geographical Configuration of World trade
- Open World Trading System: Merits & Demerits.

UNIT-II

LOCATION AND LAND USE

- Central Place Theory: Christaller's Model
- Agricultural Land Use: Von Thunen's Model
- Industrial location: Weber's Model
- Modifications to Central Place Theory and the rank size rule
- The internal structure of the City

UNIT-III

TRANSPORT AND MOVEMENT

- Transport routes and networks
- Transport costs and modes
- Movement in space: the gravity model
- Movement in Space overtime: Diffusion (Hagerstand Model)

UNIT-IV

ECONOMIC GROWTH

- The Sector Model
- Rostow's Stage Model
- Polarized Development: Models of Myrdal, Hirschman and Friedmann

UNIT-V

ECONOMIC DEVELOPMENT IN INDIA

- Regional Disparities in the levels of Development
- Impact of Green Revolution on Indian economy and Environment
- Need for New Green Revolution

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings

1. Abler, R., Adams, J.S., and Gould, P., Spatial Organization (Prentice Hall, 1991).
2. Berry, B.J.L. Corkling, E.C., Ray, D.M., The Geography of Economic System Prentice Hall, 1976.
3. Broadford, M.G. and Kent, W.A., Human Geography: Theories and their Application, Oxford University Press, 1977.
4. Haggeett, P., Locational Analysis in Human Geography, Arnold, 1965.
5. Losen, A, The Economics of Location, Yale University Press, 1954.

Paper VI: POPULATION GEOGRAPHY

100 Marks

Distribution of Marks:
Theory Paper 80 Marks
Internal Assessment: 20 Marks

UNIT-I

(i) Nature and Scope of population geography.
(ii) Sources of population data; their quality and reliability.
(iii) Major theories of population: Malthusian perspective and Marxist perspective, Demographic transition theory.

UNIT-II

Concept, determinants & world pattern of the following attributes of population:

(i) Density and distribution
(ii) Growth
(iii) Literacy

UNIT-III

Concepts, determinants and patterns in India of the following attributes of population:

(i) Age & Sex Composition
(ii) Occupational composition
(iii) Urbanisation

UNIT-IV

(i) Migration, types, determinants and consequences
(ii) Laws of migration: Revernsteir's and Lee's laws of migration.
(iii) International migration pattern.

UNIT-V

(i) Population and resources: Concepts of optimum population over population and under population.
(ii) Population policy: Concept, Population Policy of India.
(iii) A comparative study of population problems and policies of following countries:

- (i) USA
- (ii) Japan
- (iii) China
- (iv) India

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

BOOKS RECOMMENDED

1. Beaufeu Garnier,J. (1966): Geography of Population, Longman, London.
2. Brooks, S. (1977): The World Population Today (Ethnodemographic Processes), USSR Academy of Sciences; Moscow.
3. Chandna, R.C. (2000): Geography of Population Concepts Determinants and Patterns, Kalyani Publishers, New Delhi:
4. Clarke, John, I (1972): Population Geography, Pergamon Press, New York.
5. Charles B. Nam & Susn G. Philliber (1984): Population A Basic Orientation, Prentice Hall, New Jersey.
6. Demko, G.J and Others (Eds) (1971): Population Geography- A Reader, McGraw-Hill Books Co. New York.
7. Ghosh, B.N. (1985): Fundamentals of Population Geography, Sterling Publishers Private Limited, New Delhi.
8. Jones, H.R. (1981): A Population Geography, Harper and Row London.
9. Petrov, V. (1985): India: Spotlight of population, Progress Publishers, Moscow.
10. Trewartha, G.T. (1969): A Geography of Population: World Patterns, Wiley, New York.
11. Trewartha, G.T. (1972): The Less Developed Realm- A Geography of its population, Pergamon Press, New York.
12. Trewartha, G.T. (1978): The More Developed Realm- A Geography of its population, Pergamon Press, New York.
13. Weeks, John R. (1978): Population, An Introduction to Concepts and Issues, Wadsworth Publishing Company, Belmont, California.
14. Woods R.I. (1979): Population Analysis in Geography, Longman, London.
15. Zelinsky, W. (1970): A Prologue to population, Prentice Hall, London.

COURSE-VII BIO GEOGRAPHY

Max. Marks: 100
(Theory 80 + I.A.20 marks)

Unit I

- Concept, field and significance of biogeography. Approaches to bio-geographical studies
- Basic concepts in biogeography: Environment, Habitat, ecological niches
- Ecosystem: Concept, properties, components, types and functioning.
- Food chain and Food web.

Unit II

- Soil system: Definition, function, components and characteristics; Soil Profiles.
- Biomes: Meaning and major forest biomes of the world.
- Biodiversity: Meaning, types and importance of biodiversity, Biodiversity loss, Causes of biodiversity loss, Biodiversity hot spots

Unit III

- The characteristics and evolution of living things: Lamarck and Darwin views of evolution, Factors affecting distribution of organisms.
- Extinctions of species and their global concern.
- Island biogeography.

Unit IV

- General characteristics of plants and animals. Animals and plants in relation to man.
- Plant association and succession.
- Animals and plants dispersals.

Unit V

- Field of phytogeography and zoogeography.
- Taxonomic, Climatic, and Raunkiaer's classification of plants.
- A study of world floristic regions and zoogeographical realms.

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings:

1. Chapman, J.L. and Reiss, M.J. (1997) Ecology, London: Cambridge University Press.
2. Cox, C.D. and Moore, P.D. (1993) Biogeography: An Ecological and Evolutionary Approach, Blackwell.
3. Hoyt, J.B. (1992) Man and the Earth, USA: Prentice.
4. Huggett, R.J. (1998) Fundamental of Biogeography, London: Routledge.
5. Illies, J. (1974) Introduction to Zoogeography, London: Macmillan
6. Lapedes, D.N. ed. (1974) Encyclopedia of Environment Science, London: McGraw Hill.
7. Mathur, H.S. (1988) Essentials of Biogeography, Jaipur: Pointer Publishers.
8. Pears, N. (1985) Basic Biogeography, London: Longman.
9. Robinson, H. (1978) Biogeography, London: The English Language Book Society.
10. Simmon, I.G. (1974) Biogeography, Natural and Cultural, London: Longman.
11. Singh, Svindra (1991) Environmental Geography, Allahabad Prayag Pustak Bhawan.

Paper VIII: Geographic Information System

Max. Marks: 100 Marks

Division of Marks:

(ii)	A written paper of 3 hours duration in the departmental lab	50 Marks
(iii)	Practical record book	20 Marks
(iv)	Viva-voce	10 Marks
(v)	Internal Assessment	20 Marks

UNIT-I

Geographical Informations Systems (GIS): Definitions, Sub-systems and components of GIS, History of GIS, Potential of GIS, Approaches to the study of GIS: GIS as an Academic Discipline, GIS as a branch of Information Technology and GIS as a Spatial Data Institution and its societal implications, Major application areas of GIS.

UNIT-II

GIS data types: Spatial and attribute data, Spatial data models-Raster and vector, Raster data format- tessellated data structure, Vector data formats-topologic data structure and CAD data structure, Vector and Raster-advantages and disadvantages, Spatial data relationships-topology in GIS.

UNIT-III

Georeferencing, geoid and ellipsoid, global and local datum. Sources of Spatial and Non-spatial data, data input techniques, database generation, editing and errors Spatial data analysis- retrieval, reclassification, topological overlay techniques, region transformations, neighbourhood operations and connectivity functions, global positioning system.

UNIT-IV

GIS Issues: Interoperability and open GIS, Spatial data warehouses and metadata, National geospatial data infrastructure and Indian initiatives, Internet GIS and issues in the development of Internet GIS.

UNIT-IV

Practical Exercises: Georeferencing SOI toposheets and Administrative Maps of Himachal Pradesh, Raster Subset, Vectorization- Generation of data base on ArcGIS software, Preparation of Base map, socio-demographic and economic data mapping and other exercises given by course teacher.

Note: (i) The question paper in this course will be divided into three parts. Part-I will consist of 20 multiple choice type/ true or false/ very small answer type questions carrying 0.5 mark each. Part 2 will consist of 10 small answer type questions of 2 marks each. Part 3 will consist of 4 choice based descriptive questions each from all units and carrying 5 marks each. Students will have to answer 4 questions selecting 1 from each unit.

(ii) The examination of this paper will be conducted in the department by an external examiner who will be assisted by an internal examiner who would generally be the course teacher. The external examiner will be appointed by the Vice-Chancellor out of a penal of FIVE experts submitted to him by the Chairman of the Department.

(iii) The external examiner who will set the question paper in assistance with the internal examiner shall have the freedom to decide the nature of questions (whether MCQ type or otherwise) to be put in the question paper. The question paper, however, will cover the entire syllabus.

Books Recommended

C.P. Lo and Albert K.W. Yeung (2002): Concepts and Techniques of Geographic Information System, Prentice-Hall of India Private Limited, New Delhi.

Ian-Haybood *et.al.* (2002): An Introduction to Geographical Information System.

Kang-tsung Chang (2002): Geographic Information System, Tata-McGraw Hill, New Delhi.

Keith C. Clarke (1997): Getting Started with Geographic Information Systems, Prentice Hall, New Jersey.

Michael N. Demers (2000): Fundamentals of Geographic information Systems, John Wiley and Sons, Inc, New York.

Paul, A. Longley et.al. ( ): Geographic Information Systems and Science, John Wiley and Sons Ltd. New York.

Peter A. Burrough and Rachael A. McDonnell (1998): Principles of Geographic Information Systems, Oxford University Press

COURSE-IX REGIONAL PLANNING

Max. Marks: 100
(Theory 80 + I.A. 20 marks)

UNIT-I

BASIC CONCEPTS AND HISTORICAL DEVELOPMENT

- Regional Planning: Concept, Nature and scope, Aims and objectives,
- Rationale of Regional Planning, Principles of Regional planning
- Historical Development: Regional Planning in the Developed World, Regional Planning in Less Developed World

UNIT-II

GEOGRPAHY AND REGIONAL PLANNING

- Background and Philosophical Base.
- Role of Geography in Regional Planning
- Methodology: Design Method, Regional Method.
- Techniques of Regional Planning: Analytical technique, Procedural techniques

UNIT-III

REGIONS FOR PLANNING

- Concept of Regions: Delineation and variables. Natural Unit Watershed
- Types of Regions
- Planning Region: Concept and Characteristics
- Hierarchy of Planning Region
- Need and Importance of Planning Region
- Principle, Criterion and Method for Planning Region.
- Planning Regions of India: Detailed study of Chandersekhar's Planning Regions

UNIT-IV

SURVEYS AND METHODS FOR PLANNING

- Concept and Functions of Surveys
- Types of surveys: Regional and Diagnostic survey
- Remote Sensing and its application in Planning
- Geographic Information System as a tool for Planning

UNIT-V

REGIONAL PLANNING IN INDIA

- Regional Planning in India in Retrospect.
- Problems and Prospects of Regional Planning.
- Detailed Study of Damodar Valley Corporation (DVC) and NCR Delhi

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Books Recommended:

1. Abler, R.et.al.: Spatial Organisation: The Geographer's View of the World, Prentice Hall, Englewood Cliffs, N.J., 1971.
2. Bhat, L.S.: Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
3. Bhat, L.S. et.al.: Micro-Level Planning: A Case Study of Karnal Area, Haryana, K.B. Publications, New Delhi, 1976.
4. Chandna, R.C. 2000. Regional Planning- A Comprehensive Text, Ludhiana: Kalyani Publishers.
5. Choreley, R.J. and Haggett, P.: Models in Geography, Methuen, London, 1967.
6. Christaller, W. Central Places in Southern Germany, Translated by C.W. Baskin, Prentice Hall, Englewood Cliff, New Jersey, 1966.
7. Friedmann, J. and Alonso, W., Regional Development Policy- A Case Study of Venezuela, M.I.T. Press Cambridge, Mass, 1966.
8. Friedmann, J. and Alonso, W.: Regional Development and Planning- A Reader, M.I.T. press, Cambridge, Mass, 1967.
9. Glikson, Arthur: Regional Planning and Development, Netherlands Universities foundation for International Co-operation, London, 1955.
10. Gosal, G.S. and Krishan, G.: Regional Disparities in Levels of Socio-Economic Development in Punjab, Vishal Publications, Kurukshetra, 1984.
11. Government of India, Planning Commission: Third Five Year Plan, Chapter on Regional Imbalances in Devleopment, New Delhi, 1961.
12. Indian Council of Social Science Research: Survey of Research in Geography, Popular Prakashn, Bombay, 1992.
13. Johnson, E.A.J.: The Organisation of Space in Devleoping Countries, Harvard University Press, Cambridge, 1970.
14. Kuklinski, A.R.(ed): Growth Poles and Growth Centres in Regional Planning, Mouton, The Hague, 1972.
15. Kundu, A. and Raza, Moonis: Indian Economy- The Regional Dimension, Spectrum Publishers, new Delhi, 1982.
16. Losch, A.: The Economics of location, University Press, Yale, New Haven, 1954.
17. Misra, R.P.: Regional Planning: Concepts, Techniques and Policies, University of Mysore, Mysore, 1969.
18. Misra, R.P. and Others (editors): Regional Development Planning in India- A Strategy, Institute of Development Studies, Mysore, 1974.
19. Mitra, A. : Levels of Regional Development, Census of India, Vol.I, Part IA (I) and (ii), New Delhi, 1965.
20. Myrdal, G.: Economic Theory and Under-Development Regions, Gerald Duckworth, London, 1957.
21. Nangia Sudesh, Delhi Metropolitan Region Rajesh Publication, Delhi, 1976.
22. Richardson,, H.W.: Regional Economics, Weidenfeld and Nicolson, London, 1969.
23. Sundaram, K.V. (ed.): Geography and Planning, Essays in Honour of V.L.S. Prakasa Rao, Concept Publishing Co., New Delhi, 1985.
24. Tarlok Singh India's Development Experience, McMillan new Delhi, India, 1974.
25. Raza Moonis (editor) Regional Development Heritage Publishers, Delhi, 1988.
26. Misra, R.P. et.Al. Multi-Level Planning, Heritage Publishers, Delhi, 1980.

Paper X: Quantitative Techniques in Geography

Max. Marks: 100
(Theory 80 + I.A. 20 marks)

UNIT-I

Measures of Central tendency: Mean, median and mode. Measures of Central locations in spatial situation: Mean centre, median point, point of minimum aggregate travel distance.

UNIT-II

Measures of dispersion: Mean deviation, standard deviation, coefficient of variation, index of spatial dispersion, median distance, standard distance, Lorenz curve and nearest neighbour analysis.

UNIT-III

Probability: Classical and relative frequency approaches to probability, calculation of probability: Law of addition, law of multiplication. Probability distributions: normal and binormal. Sampling: Basic concept, sampling frame, different sampling designs.

UNIT-IV

Measuring the strength of relationship: Scatter diagram, Spearman's rank correlation, Karl Pearson's product movement correlation coefficient, co-efficient of variation and determination.

UNIT-V

Regression analysis: Fitting a regression line by semi-averages and least square methods, coefficient of regression; residual from regression; analysis of variance (ANOVA)

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

BOOKS RECOMMENDED

1. Cole, John P. and Cuchlaine a. M. King (1968): Quantitative Geography, Technique3s and Theories in Geography, John Wiley and Sons Ltd., London.
2. Taylor, Peter J. (1977): Quantitative Methods in Geography, An Introduction to Spatial Analysis. Hougton Miffin Company, Boston, USA.
3. Hammond, R. and Patrik McCullagh (1974): Quantitative Methods in Geography, Clarendon Press, Oxford.
4. Smith, David M. (1975): Patterns in Human Geography, An introduction to Numerical Methods, Crane Russak & Company, Inc New York.
5. Frank Harry and Steven C. Althoen (1994): Statistics Concepts and Applications, Cambridge University Press.
6. Gulot, S.K. ( ): Statistical Methods
7. Elhance, D.N. (1972): Fundamentals of Statistics, Kitab Mahal, Allahabad.

COURSE-XI HISTORY OF GEOGRAPHIC THOUGHT

Max.Marks: 100
(Theory 80+I.A. 20 marks)

Unit I

- The field of geography and characteristics of geographical work.
- Place of geography in the classification of sciences.
- Geography as a social and natural sciences. Geography as the study of distribution, man-nature relationship, spatial interaction and areal differentiation.

Unit II

- Contribution to geographic thought by the Greeks and Romans.
- Geography in the middle ages.
- The age of exploration and the impact of discoveries.
- Contributions of Varenius, Immanuel Kant, Humboldt and Ritter to geographic thought.

Unit III

- Development of geographic thought in Germany, France, Britain and America.
- Dualism in geography.
- Regional Geography: Concept, attributes and classification of regions.
- Significance, need, features and types of models in geography.

Unit IV

- Meaning, nature, approaches and realm of historical geography**.** Role of time and genesis in geography**.** Major areas of temporal explanation in geography**.**
- Role of evolutionary biology in geographic thought.
- Meaning, need and constructing of scientific explanation; routes of scientific explanation (inductive/deductive)

Unit V

- Paradigms in geography
- Positivism
- Behavioural geography
- Postmodernism

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings:

1. Ali, S. Muzzaffar (1966), The Geography of Puranas, Delhi: Peoples Publishing House.
2. Dikinson, R.E. (1969), The Maker of modern Geography, London.
3. Dikshit, R.D. (1994), The Art and Science of Geography, new Delhi: Prentice Hall of India Pvt. Ltd.
4. Dikshit, R.D. (1997) Geographical Thought, New Delhi: Prentice Hall of India, Pvt. Ltd.
5. Gauld, J.R. (1980), An Introduction to Behavioural Geography, Oxford.
6. Hartshorene, R. (1939) Nature of Geography, Pennsylvannia: AAAG
7. Harvey, David (1989) Explanation in Geography, London: Edward Arnold
8. Hussain, Majid (1995) Evolution of Geographical Thought, Jaipur: Rawat Publications.
9. James, P.E. (1972) All Possible World, New York: John Wiley.
10. Minshull, R. (1970) The Changing Nature of Geography, London: Hutchinson University Library

COURSE XII: FIELD SURVEY

100 Marks

Division of Marks:

(i)	Written paper	40 Marks
(ii)	Field Report	30 Marks
(iii)	Viva-Voce	10 Marks
(iv)	Internal Assessment	20 Marks

Note: Students would be taught the following topics in the class in order to make them aware of the tools and techniques before going to the field:

UNIT-I

Geographic Field Methods and Techniques

- Role of Field methods and techniques in modern Geographical research (Physical & Socio-economic)
- Historical development of Field investigation: Travelogue, sketches, photographs
- The structure of Modern Field Research
- Training in Field Geography
- Geographic Field Instruction

UNIT-II

Maps and Instruments

- Base Map for Field Survey
- Use topographic maps, Aerial photographs and Satellite Imageries for Field Survey
- Use of Brunton Compass and Abney Level
- Global Positioning System (GPS)
- Selection of Mapping Techniques

UNIT-III

Procedures for Geographical Field Survey

- Methods of Data collection : Primary/ Secondary
- Observation Method
- Census and Sampling
- Questionnaire Design, Inventory Design
- Administration of the questionnaire
- Tabulation of Data

UNIT-IV

Field Research Design & Report Writing

- Basic Phases of Field Research Design
- The Problem Statement
- Hypothesis Formulation
- Project Timing and Management
- Importance of Research Design
- Mechanics of writing a report

Writing of Field Report:

Field trip to the selected station (s) shall be compulsory to all the students. They will make study of physico-cultural milieu of the selected station (s) through personal observations and questionnaire/ schedule methods. On the basis of data collected from the field the students shall prepare a field report on the allotted subject/ topic and will make use of tables, figures and photo-plates.

Note (i) The evaluation of the report shall be jointly done by an external examiner and by an internal examiner who would generally be the course teacher. The external examiner will be appointed by the Vice-Chancellor out of a penal of FIVE experts submitted to him by the Chairman of the Department.

(ii) There shall be written paper of 40 marks in the department laboratory and the question paper in this course will consist of short answer type of questions covering the entire syllabus. All questions will be of equal marks

(iii) The examination of this paper will be conducted in the department by an external examiner who will be assisted by an internal examiner who would generally be the course teacher. The external examiner will be appointed by the Vice-Chancellor out of a penal of FIVE experts submitted to him by the Chairman of the Department.

(iv) The external examiner who will set the question paper in assistance with the internal examiner shall have the freedom to decide the nature of questions (whether MCQ type or otherwise) to be put in the question paper. The question paper, however, will cover the entire syllabus.

Suggested Readings:

1. Lunsbury J.F. and Aldrich, F.T (1979) Introduction to Geographic Field Methods and Techniques, Charles E. Mercill Publishing Company, Columbus.
2. Association of American Geographer (1965) Field Training in Geography, Technical Paper No.1.
3. Anderson, Janathan et.al. 91970) Thesis and Assignment Writing, Wiley Eastern United , New Delhi.
4. Panneerselvam, R. (2004) Research Methodology, Prentice Hall of India Pvt. Limited, New Delhi.
5. Kothari, C.R. (2004) Research Methodology, New Age International (P) Limited Publishers, New Delhi.

COURSE-XIII: GEOGRAPHY OF HIMACHAL PRADESH

Max. Marks: 100
(Theory 80 + I.A. 20 marks)

UNIT-I

Physical Setting

- Relief
- Drainage
- Climate
- Natural Vegetation
- Mineral Resources

UNIT-II

Emergence of Himachal Pradesh

- Pre Independence Period, Princely States
- Independence to period of Re-organisation (1947-1966)
- Modern Himachal Pradesh
- Regions of Himachal Pradesh: Criteria for Regionalisation

UNIT-III

Cultural Setting

- Population: Distribution, Density, Sex Ratio, Literacy, Cultural Region
- Agriculture
- Horticulture: Significance, Horticulture zones
- Urbanisation

UNIT-IV

Socio-Economic Development

- Industries: Structure, Distribution,
- Health: Spatio-Temporal Development .
- Education: Distribution and development
- Hydro Power Generation: Potentials and Development.
- Tourism: Types & Destinations

UNIT-V

Problems, Prospects and Policies

- Problems & Prospects: Physical, Economic, Social, Environmental
- Natural Hazards and Disasters: Earthquake, Floods, Cloudburst, Snow Avalanches
- Policies: Forest Policy, Industrial Policy, Tourism Policy

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings:

1. Ahmad, Enayat (1991) Geography of the Himalaya, Kalyani Publisher, Ludhiana &New Delhi.
2. Joshi, K.L (1984) Geography of Himachal Pradesh, National Book Trust of India, New Delhi.
3. Jreat, Manoj (2006) Geography of Himachal Pradesh, Indus Publishing Company, New Delhi.
4. Singh, R.L. (1992) India, A Regional Geography, National Geographical Society of India, Varanasi.
5. Spate, O.H.K and Learmonth, A.T.A. (1960) India & Pakistan. A General and Regional Geography, Methuen and Company
6. State of Environment Report- Himachal Pradesh (2000), State Council for Science, Technology & Environment, Kasumpti, Shimla.

COURSE-XIV CULTURAL GEOGRAPHY

Max. Marks: 100
(Theory 80 + I.A. 20 marks)

UNIT-I

- The concept of culture. Components of culture, cultural traits, complexes and systems. Meaning and nature of cultural geography.
- Basic cultural processes. Functional concepts and interlocking relationships. Man-environment relations as changeable.
- Themes in cultural geography: Cultural regions, cultural diffusion, cultural ecology, cultural integration and cultural landscapes.

UNIT-II

- Linguistic cultural regions, language patterns in India, linguistic diffusion, linguistic ecology, linguistic cultural integration, and linguistic landscapes.
- Religious cultural regions, Major religions of the world, religious diffusion, religious ecology, cultural integration in religion, religious landscapes.
- Agricultural world: Agricultural regions, agricultural diffusion, agricultural ecology, cultural integration in agriculture, agricultural landscapes.

UNIT-III

- Concept of folk Geography, folk culture region, folk culture diffusion, folk ecology, folk architecture in the cultural landscape, folk dwelling, features of houses, house types.
- Concept of Popular Culture, popular culture regions, cultural diffusion in popular culture, the ecology of popular culture. Landscape in popular culture.
- Concept of Ethnic Geography, ethnic cultural regions, cultural diffusion and ethnic groups, cultural ecology and ethnicity, cultural integration and ethnicity, ethnic landscapes.

UNIT-IV

- Meaning scope and approaches of settlement geography, Human settlement system. Significance of settlement studies, Place names versus settlements. Types and pattern of settlements. Causes of diverse types of rural settlements.
- Urban culture regions, cultural diffusion in the city, cultural ecology of the city, cultural integration of the city, urban landscapes.

UNIT-V

- Behavioral geography as a sub-field of cultural geography.
- A general account of cultural geography of the Himalayas.
- Humankind as a geomorphic and biotic agent.

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings:

1. Jackson, W.A.D. (1986) The shaping of Our World, New York: John Wiley and Sons.
2. Jorden, T.G. and Rowntree, L. (1990) The Human Mosaic, New York: Harper and Row.
3. Karan, P.P. (1984) "A Cultural Geography of Himalaya", in ed. Eidt, R.C. Singh, R.B. and Singh, K.N. ed., Man Culture and Settlement, New Delhi: Kalyani Publishers, pp.24-30.
4. Mitra, Asok, Mukherjee S. and Bose, R. (1980) Indian Cities, New Delhi: Abhinay Publications.
5. Rubenstein, J.M. (1989) The Cultural Landscape, Columbus: Merrill Pub. Com.
6. Singh,R.L. (1993) India: A Regional Geography, Varanasi: National Geographical Society of India.
7. Singh, R.L. and Singh, K.N. (1975) Readings in Rural Settlement Geography, Varanasi: NGSI.
8. Spencer, J.E. and Thomas, W.L. (1978) Introduction to Cultural Geography, New York: John Wiley and Sons.
9. Stoddart, R.H. Wishart, D.J. and Blouct, B.W. (1989) Human Geography: People, Places and Cultures, New Jersey: Prentice Hall.
10. Wagner, P.L. and Mikesell, M.W. (1962) Readings in Cultural Geography, Chicago: The University of Chicago Press.

Course-XV: Geography of Well-being with Special Reference to India

Max Marks: 100
(Theory Paper: 80; Internal Assessment: 20)
Time: 3 Hrs.

Unit-I

Welfare Approach-Social Well Being, Quality of Life and Human Development

- Welfare Geography: Concept of social well-being, development and approaches to the study of human welfare.
- Quality of Life: Concept and measurement, Meaning of Standard of Living, Human Development Index (HDI): Concept and Indicators, Regional Pattern of HDI in India.

Unit-II

Education as Factor in Social Well Being

- Indicators of Educational Development in India and their data sources.
- Structure of Education in Independent India, Regional patterns of educational development; Enrolment and Dropouts with reference to School Education at State level.
- Financing Education and Education Policy in India.

Unit-III

Health as a Factor in Social Well Being

- Indicators of Health Development in India and their sources
- Health care Infrastructural Development in India since independence and its organizational Structure
- Health Policy and Programmes in Independent India

Unit-IV

Poverty and Hunger as Expression of Poor State of Social Well Being

- Poverty: Defined by United Nations, Planning Commission of India and Other Agencies, Causes, Impact and Measures of poverty in India.
- Measurement, characteristics and Regional Variations in Hunger and Human Poverty in India-Indian State Hunger Index (ISHI).
- Spatial Pattern of BPL Households in India.

Unit-V

Public Distribution System and Food Policy

- Public Distribution System: History and Effectiveness, Food Security in India, Indicators of Food Security and Indian food Policy and its political aspects.

Note: The paper would be set from the syllabus covering the full content. The question paper in this course will be divided into three parts. Part-1 will consist of Twenty multiple choice type/true or false/ very small answer type questions carrying **1 Mark** each. Part 2 will consist of Ten small answer type questions of **2 marks** each. Part 3 will consist of 10 descriptive questions, two from each unit are to be framed, out of which candidates will have to attempt five questions selecting one from each unit. Each question carries **8 marks**.

Suggested Readings:

Coates, B.E., R.J. Johnston and P.L. Knox (1977). Geography and Inequality, Oxford University Press, London.

D.M. Smith (1977).Where the Grass is Greener: Geographical Perspectives on Inequality, Penguin, Haemonds worth.

D.M.Smith (1973). The Geography of Social Well-being in the United States. McGraw- Hill, New York.

David M.Smith (1977). Human Geography: A Welfare Approach, Arnold Heinemann.

Draze, Jean and Amartaya Sen (2002). India: Development and Participation, OUP, New Delhi.

Dreze Jean and Amartya Sen (1996).Economic Development and Social Opportunity, Oxford University Press, New Delhi.

National Nutrition Monitoring Bureau (2000).Dynamic Database on Diet and Nutrition, National Institute & Nutrition, Hyderabad.

Planning Commission of India Reports.

Sen, Amartya & Drze Jean (1966). Indian Development: Selected Regional Perspectives, Oxford University Press.

Uma Kapila (2007). India's Economic Development Since 1947(ed). Academic Foundation.

COURSE XVI REMOTE SENSING TECHNIQUES

Maximum Marks: 100

(Practical)

Unit-I

History of remote sensing: Development of aerial photography (pre-1960 period); Development of satellite-based remote sensing (post-1960 period); Remote Sensing in India.

Unit-II

Basic principles of remote sensing; electromagnetic energy; energy source; energy and radiation principles; energy interactions in the atmosphere and with earth surface features; spectral reflectance; spectral signatures; methods of recording spectral reflectances (photographic and digital), Remote Sensing Systems (classification)

Unit-III

Air photos and photogrammetry: Elements of photographic system-types, scales and ground coverage, resolution, radiometric characteristics, films, filters, aerial cameras, photograph geometry (vertical)

Vertical aerial photogrammetry: relief displacement, image parallax, stereoscopic viewing and measurements.

Aerial photographic interpretation: elements of aerial photographic interpretation- shape, size, pattern, tone, texture, shadows and site

Unit-IV

Satellite Remote Sensing: RS Satellites- Polar sun-synchronous, geo-stationary; satellite platforms- LANDSAT, SPOT, IRS, INSAT, Principles and geometry of scanners and CCD arrays; Satellite RS data products: Imageries, computer compatible media (CCTs, CDs, Floppies etc.), MSS, TM, SPOT-PLA, SPOT-MLA, LISS-I, LISS-II, LISS-III

Unit-V

Digital Image Processing: Digital image and grey scale images; Analog-to-Digital (A to D) conversion; image rectification and restoration; image enhancement, contrast manipulation, rationing; image classification: Supervised classification approach-minimum distance to means classification, parallelepiped classification, maximum likelihood classification; unsupervised classification approach

Notes for paper setter and the students:

(1) Maximum marks for the course would be 100.

(2) 100 marks for the course would be divided as follows:

(a) Written examination	50 marks
(b) Record book	20 marks
(c) Viva Voce	10 marks
(d) Internal assessment	20 marks

(3) Written examination would be of 3 hours duration and would be conducted in the Department.

(4) Paper for the written examination shall be made by the external examiner in assistance with the internal examiner (who generally would be the course teacher)

(5) External examiner would be appointed by the VC/PVC out of a panel of four university teachers supplied by the Department Chairman in consultation with the course teacher.

(6) Record book would be evaluated by the external examiner.

(7) Viva voce would be conducted by the external examiner and would pertain to the complete contents of the syllabus.

(8) Internal assessment would be given by the course teacher on the basis of lecture attendance and classroom performance. Internal Assessment marks would be decided by the course teacher and be added to the marks obtained by the student at the time of practical examination.

(9) Paper for the written examination would be set jointly by the external and internal examiners. Paper would comprise two parts. Part one would have two long answer type questions, each question carrying 10 marks. Part two of the paper would contain 40 objective type questions covering the full content of the syllabus each carrying one mark. Questions in this part would be multiple choice, true/false and short answer type.

(10) Answer books would be evaluated jointly by external and internal examiners on the day of examination.

Suggested Readings:

1. American Society of Photogrammetry: Manual of Remote Sensing ASP, Falls Church, V.A., 1983.
2. Barrett E.C and L.F. Curtis: Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Compbell J.: Introduction to remote Sensing, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing, Longman, London, 1985.
5. Gibson, Paul J. 2000. Introductory Remote Sensing- Principles and Concepts. London & New York: Routledge.
6. Hord R.M. : Digital Image Processing of Remotely Sensed Data, Academic, New York, 1989.
7. Jensen, John R. 1996. Introductory Digital Image Processing- A Remote Sensing Perspective (2^{nd} Ed.). Upper Saddle River, New Jersey: Prentice Hall.
8. Juder D.: Aerial Photography Interpretation: Principles and Application, McGraw Hill, New York, 1959.
9. Pratt W.K. Digital Image Processing, Wiley, New York, 1978.
10. Rao D.P. (eds.): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
11. Thomas M. Lilesand and Ralph W.Kefer, Remote Sensing and Image Interpretation, John Wiley & Sons, New York, 1994.
12. Jensen, John R. 1996