

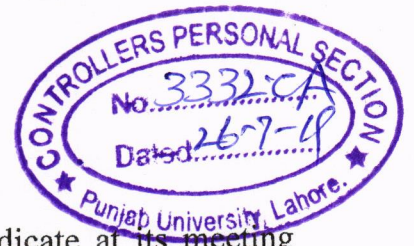
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UNIVERSITY OF THE PUNJAB

NOTIFICATION



No. D/ 4954 /Acad., Dated: 24-7- /2019. The Syndicate at its meeting held on 04-05-2019 has approved the recommendations of the Academic Council made at its meeting dated 20-12-2018 regarding approval of the revised Curriculum of M.Sc. (Geography) Part-I & II under Annual System for Affiliated Colleges with effect from the Academic Session, 2019 and onwards.

Revised Curriculum of M.Sc. (Geography) Part-I & II under Annual System for Affiliated Colleges is attached herewith as Annexure-'A'.

Admin. Block,
Quaid-i-Azam Campus,
Lahore.


Sd/-
Dr. Muhammad Khalid Khan
Registrar

Copy of the above is forwarded to the following for information and necessary action:-

1. The Dean, Faculty of Sciences
2. The Chairman, Department of Geography
3. The Principals of Affiliated Colleges
- ✓ 4. The Controller of Examinations
5. The Director, Quality Enhancement Cell
6. The Secretary to the Vice-Chancellor
7. The Secretary to the Registrar
8. Admin. Officer (Statutes)
9. Assistant (Syllabus)


Assistant Registrar (Academic)
for Registrar


Des


28/07/19

ACS-II


DGS

Annexure-A'

**REVISED COURSE OF READING
AND
OUTLINES OF TESTS**

**M.Sc. Geography Part-I & Part-II,
2019-2024 & onward**

**Department of Geography
University of the Punjab
Quaid-i-Azam Campus
Lahore**

**REVISED CURRICULUM OF M.Sc. GEOGRAPHY PART-I & Part-II Annual System for
Affiliated Colleges, w.e.f. Session 2018-2020 and Onward**

**M.Sc. Geography Part-I
Introduction**

The examination shall consist of Five written papers and Practical examination. The allocation of marks shall be as under:

Theory:		Marks
Paper I	Geographic Thought	80
Paper II	Environmental Geography	80
Paper III	Geomorphology	80
Paper IV	Climatology & Oceanography	80
Paper V	Quantitative and Research Methods	80
Total:		<u>400</u>

The distribution of marks for Practical examination shall be as under:

Map Work and Practical

I.	Principles of Cartography	50	
II.	Surveying	50	
	i. Theory	25	
	ii. Surveying (Practical)	25	
III.	Lab. Work	50	
IV.	Record & Viva-Voce	50	
	iii. Record (Surveying)	25	
	iv. Record (Lab. Work)	25	
Total:		<u>200</u>	
Total:			<u>600</u>

M.Sc. PART-I EXAMINATION Syllabi and Courses of Reading

Paper I: Geography: Traditions & Concepts

- I. Development of Geographic Thoughts through History**
 - i. A general survey of the geographical work of Greeks and Romans
 - ii. Muslim contribution to Geographic Thought.
 - iii. European Renaissance
 - iv. Geographic Thought in the Humboldt and Ritter era
 - v. Ideas of Ratzel and Vidal de la Blache and their influence on European and American Geographic Thought.
- II. Development of a Scientific Geography**
 - i. Scientific geographic approach as suggested by W.M Davis, E.C Semple, H. H Barrows and Carl O. Sauer
 - ii. The establishment of geographic paradigms, concepts, ideas, theories and laws and methodology
 - iii. The development and use of quantitative techniques
- III. Population Geography**
 - i. Factors of Population Growth
 - ii. Components of Change
 - iii. Population Structure
 - iv. The Demographic Transition
 - v. World distribution of Population
 - vi. Over Population threats
- IV. Migration**
 - i. Factors, Characteristics and Patterns of Migration
 - ii. Internal Migration
 - iii. Interregional Migration
 - iv. International Migration
- V. Origin and Diffusion of Culture**
 - i. Origin and Diffusion of Folk Customs
 - ii. Original and Diffusion of Popular Culture
 - iii. Geographic patterns of culture
- VI. Languages of the World**
 - i. Classifying Languages
 - ii. World Distribution of Languages
 - iii. Indo-European Languages
- VII. Religions of the World**
 - i. Origins of Religions
 - ii. Global Distribution
 - iii. Diffusion of Religions
 - iv. Regional conflict.
- VIII. Ethnicity**
 - i. Ethnicities and Nationalities
 - ii. Ethnic Conflicts
 - iii. Ethnic Diversity in the World
 - iv. Factors of Ethnic Cleansing
 - v. Ethnic Cleansing in the World
- IX. Political Geography**
 - i. Politics, Geography and Political Geography

- ii. State as a Politico-Territorial Phenomenon
- iii. State, Nation and the Nation-State
- iv. Geography of World Politics and International Relations
- v. Geopolitics of uneven Development and Globalization of Capital
- X. Human Development**
 - i. Development Indicators, Economic Indicators, Social Indicators, Health Indicators
 - ii. Development through Trade
 - iii. Impacts of development Indicator
- XI. Agriculture Geography**
 - i. Factors effecting Agricultural
 - ii. Subsistence Agriculture and population growth
 - iii. Commercial Agriculture and Market Forces
 - iv. Sustainable Agriculture
 - v. Types and Distribution of Agriculture
- XII. Industrial Geography**
 - i. Factors of Industrial locations.
 - ii. The Industrial Revolution
 - iii. Industrial Theories
 - iv. Distribution of Industries
- XIII. Urban Patterns**
 - i. Models of Internal Structure of Cities
 - ii. Social Area Analysis
 - iii. World Urban Patterns
 - iv. Settlement Theories
 - v. Patterns within urban areas.
- XIV. Conserving and Re-using Resources**
 - i. Renewable Resources
 - ii. Recycling Resources
 - iii. Sustainability
- XV. Environment Challenges**
 - i. Factors of Climate & Environmental Change
 - ii. Climatic changes
 - iii. Global environmental patterns
 - iv. Environmental hazards and risk management
- XVI. Tourism and Recreation**
 - i. The historical development of the Geography of Tourism and Recreation
 - ii. The demand for tourism and recreation
 - iii. The supply for tourism and recreation
 - iv. The impact of tourism and recreation
 - a) Socio-economic impacts
 - b) Physical-environmental impacts
- XVII. Patterns and Process of Health & Diseases**
 - i. Global pattern in health and diseases
 - ii. Models in medical geography
 - iii. Recent issues and developments
- XVIII. Development in Geographical Techniques**
 - i. Automated cartography
 - ii. GIS
 - iii. Remote Sensing
 - iv. GPS & Leveling

Books Recommended

- Ahmad, K. S. (1964). *Geography through the Ages. Pakistan Geographical Review.*
- Ahmad, N. (1947). *Muslim Contribution to Geography.* Lahore: Muhammad Ashraf Kashmiri bazaar.
- Blif, H. J. (1971). *Geography, Regions and Concepts.* U.S.A: John Wiley and Sons, Inc..
- Board, C. et. al. (1969). *Progress in Geography.* London: Edward Arnold Publishers Ltd.
- Brown, E. H. (1980). *Geography: Yesterday and Tomorrow.* London: Oxford University Press.
- Chorley, R. J. (1973). *Directions in Geography.* London: Methuen and Co. Ltd. London.
- Dickinson, R. E. (1969). *The Makers of Modern Geography.* New York: Frederick A. Praegar Inc.
- Dickinson, R. E., and Howardth, C.J.R. (1933). *The making of Geography.* New York: Clarendon Press.
- Dikshit, R. D. (2001). *Political Geography: The Spatiality of Politics.* (3rd ed.). New Delhi: Tata McGraw-Hill Publishing Company Limited.
- Dikshit R. K. (1998). *Geographical Thought.* India: Prentice Hall.
- Freeman, T. W. (1961). *Hundred Years of Geography.* London: Gerald Duckworth.
- Getis, Fellman. (2005). *Human Geography Landscape of Human Activities.* (8th ed.). New York: Mc.Graw Hill Higher Education.
- Hagett, P. (1978). *Geography a Modern Synthesis.* (3rd ed.).New York: Harper & Row.
- Hartshorne, R. (1949). *The Nature of Geography.* New York: N.T. Association of American Geographers.
- Hartshorne, R. (1951). *Perspective on the Nature of Geography.* New York: Rand McNally.
- Harvey, D. (1973). *Explanation in Geography.* London: Edward Arnold Publishers, Ltd.
- Harvey, Milton E., and Holley, B. P.(ed.). (1981). *Themes in Geographic Thought.* London: room Helm.
- De Blij. H. J . (2003). *Human Geography Cultural Society and Space.*(5th ed.). New York: John Wiley & Sons.
- James, P. B., and Jones, F.C.(1964). *American Geography: Inventory and Prospect, Syracuse.* Syracuse: University Press.
- James, P. E. (1959). *New Viewpoints in Geography.* Washington: The Council.
- James, P. E. and Martin, G.J. (1993). *All Possible Words : A History of Geographical Ideas.* New York: John Wiley and Sons.
- Kimble, G. H. T. (1938). *Geography in the middle Ages.* London: Methuen and Co. Ltd.
- Knox Paul L. (2001). *Human Geography Place and Region in Global context.*(2nd ed.).New Jersey: Prentice Hall.
- Richard P. (1998). *Modern Geographical Thought.* London: Blackwell Publishers.
- Rubenstein James M.(2010).*Contemporary Human Geography.* New Delhi: PHI Learning Private Limited.
- Spilhaus, M.W. (1935). *The Background of Geography.* London: George G. Harraper and Co. Ltd.
- Taylor, G. (1960). *Geography in the Twentieth Century.* London: Methuen.
- Wayne, K.D. (1981). *The Conceptual Revolution in Geography.* London: University of London Press Ltd.

Paper II: Environmental Geography

- I. Introduction**
 - i. Scope of the subject:
 - ii. Its importance, nature of environments
- II. Principles of Ecosystems**
 - i. The Structure of Ecosystems
 - ii. Ecosystem Functions
 - iii. Photosynthesis and Respiration
 - iv. Environmental Problems and the Principles of Ecology
- III. Energy in the Ecosystems**
 - i. Energy and Entropy
 - ii. The Earth's Energy Budget
 - iii. Ecosystem Energy Budgets
 - iv. Energy Flow Through the Ecosystem
- IV. Material Cycles**
 - i. Chemicals in Ecosphere
 - ii. The Hydrological Cycle
 - iii. The Atmosphere Cycles
 - iv. Lithospheric Cycles
 - v. Nutrient Cycles
- V. Energy: Sources and Uses**
 - i. Energy Sources
 - ii. Major Categories of Energy Users
 - iii. Energy Alternatives for the Future: Petroleum, Natural Gas, Solar Energy, Atomic Energy, Hydroelectric Power, Geothermal energy, Other sources of Energy
- VI. Soil Resources**
 - i. Soil characteristics, soil and ground water, recharge of ground water, aeration, soil biota, soil classification soil fertility and its renewal, soil erosion, use and misuse of soil management and conservation.
- VII. Mineral and Water Resources**
 - i. Mineral Resources and Reserves
 - ii. Water Resources: hydrological cycle, conflicts in the uses of water by urban rural, agricultural, power, industrial and recreational agencies. Problems created by shortage/excess of water. Water pollution and water treatment by industries, water conservation
- VIII. Water Pollution**
 - i. Types of Water Pollutants
 - ii. Sources of Water Pollution
 - iii. The Impact of Water Pollution on Human Health, Animals and Plants
 - iv. Water Pollution Control and Treatment
- IX. Air Pollution and their Sources**
 - i. The Properties of air Pollutants
 - ii. The Sources of Air Pollution
 - iii. The Factors of Air Pollution
 - iv. The effects of Air Pollution on Human Health
 - v. The Effects of Air Pollution on Material, Animals and Plants
 - vi. The Effects of Air Pollution on Ecosystem
 - vii. The Effects of Air Pollution on Climate

X. Land use and Land misuse

- i. Soil
- ii. Soil Conservation
- iii. Land as a Resource
- iv. Land Disposal of Waste: Solid waste, Hazardous waste, Radioactive waste

XI. Noise Pollution

- i. The Nature of Sound
- ii. Sources of Noise
- iii. The Effects of Noise

XII. Major Biotic regions

- i. Tundra, Boreal forests, deciduous forests, grass lands, deserts, Mediterranean, Tropical, Savannas, Temperate biotic regions.

XIII. Major Environmental hazards and Problems

- i. Global Warming
- ii. Earth Quake
- iii. Floods
- iv. Deforestation
- v. Population Growth
- vi. Soil Erosion
- vii. Environmental Pollution

Books Recommended

- Briggs, D. & Courtney, F.(1989). *Agriculture and Environment: The Physical Geography of temperate Agricultural Systems*. Singapore: Longman.
- Buchman, Harry O.(1960). *The Nature and Properties of Soils*. New York: Macmillan.
- Bunting, B. T. (1967). *The Geography of Soil*. London: Hutchinson University Library.
- Cornelius T. T. & Harold. (1992). *Environmental Education*. New York: John Wiley.
- Eyre, S. R.(1968). *Vegetation and Soils*. London: Edward Arnold.
- Hamm, R. L. & Nason.(1964). *An Ecological Approach to Conservation*. Minneapolis: Burgess Publishing Co.
- Kuiper, E. (1965). *Water Resources Development Planning Engineering and Economics*. London: Butterworths.
- Kupchella, C. E; & Hyland, M. C. (1989). *Environmental Science: Living Within the system of Nature*. New Jersey: Prentice Hall.
- Miller, C. E.(1972). *Fundamentals of Soil Sciences*. (2nd ed.). New York: John Wiley.
- Nebl, B. J. & Wright, R. T. (1998). *Environmental Science :The Way the world Works*. New Jersey: Prentice Hall.
- O'Hare, G. (1992). *Soils, Vegetation, and Ecosystems*. London: Oliver & Boyd.
- Odum, Eugene P. (1992). *Fundamentals of Ecology*. London :Sauders.
- Simmons I.G.(1981). *The Ecology of Natural Resources*. London: Edward Arnol.
- Trivedi, P. R. & Raj, G.(1992). *Concepts in Environment*. New Delhi: Akashdeep.
- Trudgill, S. T. (1977). *Soil and Vegetation Systems*. Oxford: Clarendon Press.
- Wellburn, A. (1994). *Air Pollution and Climate Change: The Biological Impact*. Singapore: Longman.
- White, I. D., Mottershead & Harrison, S. J. (1992). *Environmental System: An Introductory Text*. London: Chapman & Hall.

Paper III: Geomorphology

- I. Introduction**
 - i. Definition and Scope
 - ii. Development of Science of Geomorphology
 - iii. Muslims Contribution to the Science of Geomorphology
- II. Models of Landform Development**
 - i. Structural Landforms
 - ii. Weathering Landforms
 - iii. Erosional Landforms
 - iv. Depositional Landforms
- III. Geomorphic Process**
 - i. Endogenetic Processes
 - ii. Exogenic Processes
 - iii. Extraterrestrial Processes
- IV. Weathering**
 - i. Physical Weathering
 - ii. Chemical Weathering
 - iii. Biological Weathering
- V. Mass Wasting**
 - i. Slow Flowage Type
 - ii. Rapid Flowage Type
 - iii. Subsidence
- VI. Glacier**
 - i. Genesis and Motion
 - ii. Classification
 - iii. Nourishment and Wastage
 - iv. Erosional and Deposition Landforms
- VII. Fluvial Processes**
 - i. Fluvial Cycle
 - ii. Rejuvenation
 - iii. Idealized Fluvial Cycle
 - iv. Complications of the Fluvial Cycle
 - v. Drainage Pattern
- VIII. Arid Cycle and Eolian Landforms**
 - i. Forms of Wind Erosion
 - ii. Wind Transportation
 - iii. Wind Deposition
- IX. Karst Topography**
 - i. Development of Karst Landscape
 - ii. Characteristic of Karst Features
- X. Quantitative Geomorphology**
 - i. Methods of Geomorphological Investigation
 - ii. Morphometric Analysis
 - iii. Material Properties
 - iv. Process and Evolution
- XI. GIS and RS Applications**
 - i. Data Acquisition
 - ii. Digital Terrain Modelling
 - iii. Feature Extraction

Books Recommended

- Aronoff, S. (1995). *Geographic Information Systems: A Management Perspective*. (4th ed.). Ottawa: Wdl Publications.
- Cotton, C.A. (1949). *Geomorphology An Introduction to the Study of Landform*. New York.: John Wiley.
- Drwry S. A. (1990). *A Guide to Remote Sensing and Image Processing*. New York: University Press.
- Englen, O. D. V. (1942). *Geomorphology*. New York: Macmillan.
- John, R. J. (1996). *Introduction to Digital Image Processing*. New York: Prentice Hall.
- Lobeck, A. K. (1939). *Geomorphology*. New York: Macmillan.
- Paul J. Curran. (1985). *Principles of Remote Sensing*. London: Longman Group Ltd.
- Sparks, B. W. (1986) *Geomorphology*, Longman: London.
- Steers, J. A. (1964). *Unstable Earth*. London: Methuen & Co.
- Thomas, M. Lillesand & Ralph W. K. (2004). *Remote Sensing and Image Interpretation*. New York: John Wiley & Sons Inc.
- Thornsbury, W. D. (1983). *Principles of Geomorphology*. New York: John Wiley.
- Wooldrige S. W. (1966). *An Outline of Geomorphology: Physical Basis of Geography*. London: Longman.

Paper IV: Climatology and Oceanography

I. Climatology

- i. Development of the science of Climatology, Definition and Scope, study methods, climatic data, collection, presentation and analysis
- ii. Elements and factors of climate, structure and composition of atmosphere, insulation, temperature, pressure and winds; air masses and fronts; precipitation, storms, cyclones, tornadoes and thunderstorm
- iii. Classification of climates; a critical study of the Koppen, Miller and Thornthwaite classification of major climates; climatic types; their characteristic features and geographical distribution
- iv. Climatic changes and variability
- v. Principles of micro-climatology and its application in Pakistan
- vi. Applied climatology and its application in Pakistan. Intentional weather modification
- vii. Introduction to climate modeling, climate modeling and parameterization, atmospheric general circulation modeling, sensitivity experiments and applications. Future prospects
- viii. Climate and climatic regions of Pakistan

II. Oceanography

- i. Origin of oceans and seas
- ii. Floor of oceans - Characteristic features of the ocean basins
- iii. Temperature, salinity distribution, cause and effects
- iv. Ocean floor deposits, their characteristics and classification
- v. Ocean circulation: Waves, currents and tides, their nature, causes and effects

Books Recommended

- Barry, R. (1998). *Atmosphere, Weather and Climate* (7th ed.). London: Clays St. Davis.
- Byers, H. R. (1993). *General Meteorology*. New York: McGraw Hill.
- Critchfield, H.J. (1991). *General Climatology*. New Delhi: Prentice Hall.
- Diwan, A. P; & Arora, D. K. (1995). *Origin of Ocean*. New Delhi: Anmol Publisher.
- Graedel, T. (1995). *Atmosphere, Climate and Change*. New York: Scientific American Library
- Haurwitz, B; & Austin, J. (1944). *Climatology*. New York. McGraw Hill.
- Johnson H. (1996). *An Introduction to Oceanography*.
- Kendrew, W.G. (1959). *Climatology*. (3rd ed.). University Press Oxford.
- Lamb, H. (1992). *Climate History and the Modern World*. London: Methuen & Co. Ltd.
- MacIeven. J.F. (1991). *Fundamentals of Weather and Climate*. London: Chapman & Hall.
- Miller, A. (2001). *Climatology*. New York: Methuen.
- Murry. (2000). *The Ocean*. New York: McGraw Hill.
- Oliver, J. (1981). *Climatology: Selected applications*. USA: Edward Arnold.
- Petterson, S. (1951). *Introduction to Meteorology*. New York: McGraw Hill.
- Sellers, A; & Henderson, A. (1986). *Contemporary Climatology*. London: Longman.
- Shamshad, K.M. (1988). *The Meteorology of Pakistan*. Karachi: Royal Book Co.
- Shapley, H, (1960). *Climatic change: Evidence, causes & effects*. Harward University Press Cambridge.
- Strahler, A. N. (1998). *Elements of physical geography*. New York. John Wiley.
- Stringer, E.T. (1989). *Foundation of Climatology*. New Delhi: Surjeet Publishers.

- Thompson, R. (1997). *Applied climatology, Principles and Practice*. Canada: Routledge.
- Trenberth, K. (1992). *Climate System Modeling*. New York: McGraw Hill.
- Trewartha, G.T. (1965). *An Introduction to Climate*. New York: McGraw Hill.
- Whyte, I. (1995). *Climatic Change and Human Society*. London: Arnold Division.

Paper V: Quantitative and Research Methods

- I. Introduction**
 - i. Statistical Methods and the Geographers
 - ii. The nature of Geographical Data and Measurement Scales
 - iii. The Mathematical Basis of Statistics
- II. The Collection and Presentation of Data**
 - i. Methods of Data collection
 - ii. Major problems in collection of Data
 - iii. Presentation of Data: Tabulation, Frequency Distribution, Histogram, Frequency Polygon, Frequency Curve, Ogive, Bar charts and pictograms
- III. Summarizing Data**
 - i. Measures of Central Tendency : Arithmetic Mean, Median, Mode, Quantiles
 - ii. Measures of Dispersion : Range, Semi Interquartile Range, Mean Deviation, Standard Deviation, Standard Score
 - iii. Measures of Variability : Relative Variability, Coefficient of Variation.
 - iv. The Lorenz Curve
 - v. The Gibbs Martin Index of diversification
 - vi. The Ternary Diagram
- IV. Time Series**
 - i. Graphs.
 - ii. Growth and decline
 - iii. Index numbers
 - iv. Logarithmic Scales
 - v. Trends and fluctuations
 - vi. Trend lines by least-squares method
 - vii. Trend lines for exponential (i.e.,) logarithmic series
- V. Correlation**
 - i. The product moment correlation coefficient(r)
 - ii. Spearman's rank correlation coefficient (r_s)
 - iii. The correlation matrix.
- VI. Regression**
 - i. Dependent and independent variables
 - ii. Scattergrams, regression lines and residuals
 - iii. Interpolation, prediction and explanation
 - iv. Methods of constructing regression lines
- VII. Introduction to Research.**
 - i. Meaning, definitions and scope of research
 - ii. Methods of research
 - iii. Objectives and purposes of research
 - iv. Application of research method in geography
 - v. Advanced research in geography
- VIII. Research Problem**
 - i. Selection
 - ii. Sources
 - iii. Characteristics/Criteria
 - iv. Statement of problem

- IX. Review of Related Literature**
 - i. Definition, purpose and scope
 - ii. Preparation
 - iii. Sources
 - iv. Abstracting
 - v. Reporting
- X. Research Hypothesis or Question**
 - i. Definition and purpose
 - ii. Characteristics
 - iii. Types of hypotheses
 - iv. Stating the hypothesis/question
- XI. Research Plan and Objectives**
 - i. Formulation of research plan or research design
 - ii. Formulating research objection
- XII. Sampling**
 - i. Definition and purpose
 - ii. Types/Techniques of sampling
 - iii. Sampling techniques and geographic research
- XIII. Research instruments**
 - i. Purpose of research instruments
 - ii. Characteristic of research instruments
 - iii. Types of research instrument
 - a. Questionnaire
 - b. Interviews
 - c. Observation
 - d. Documents
 - e. Tests
 - f. Important tools for geographic research
- XIV. Collection and Analysis of Data**
 - i. Data collection
 - ii. Tabulation of data
 - iii. Data analysis
 - iv. Statistical techniques and data analysis
 - v. Data collection and analysis in geographic research
- XV. Presentation of Data**
 - i. Tables
 - ii. Graphs
 - iii. Maps
 - iv. New trends in scientific visualization
- XVI. Writing Research Proposal and Report**
 - i. General rules for writing and typing
 - ii. Format and style
 - iii. Types of research reports
 - iv. Evaluation of research report
 - v. Theses and dissertation
 - vi. Journal's articles
 - vii. Paper read at professional meetings

Recommended Books

- (2004) Educational research: Competencies for analysis and application (5thed.), New York: Macmillan Publishing.
- Ackerman, E. A. (1958). *Geography as a fundamental research discipline*. Chicago: University of Chicago Press.
- Best, J.W. (2003). *Research in education*. New Delhi: Prince Hall.
- Creswell, J.W. (2009). *Research design: A qualitative, quantitative mixed method approaches* (3rd ed.). New York: Sage Publications.
- Croxton, F.E; & Cowden, D.J. (1955). *Applied general statistics*. London: Isaac Pitman.
- Densombe, M. (2003). *The Good research guide: For small scale social research projects* (2nd ed.), Phila Delphia: Open University Press.
- Ebdon, D. (1977). *Statistics in Geography*. Oxford, UK: Basil Blackwell.
- Gay L. R. (1992). *Educational research, Competencies for analysis and applications* (5th ed.). Islamabad. National Book Foundation.
- Gee, W. (1950). *Social science research method*. New York: Appleton Century Crofts, Inc.
- Gomes, B. (2010). *Research methods in geography*. London: Willey – Blackwell.
- Gomez, B. (2010). *Research methods in geography*. London. John Wiley Publications.
- Gregory, S. (1973). *Statistical methods and the geographers*. London: Longman.
- Hammond, R.E. (1978). *Quantitative techniques in geography*. Oxford: Clarendon Press.
- Hartshorne, R. (1992). *Perspective on the nature of geography*. London: John Murray.
- Hoggart, K; Lees, L; & Davies, A. (2002). *Researching human geography*. London: Arnold Publishers.
- Huff, D. (1973). *How to lie with statistics*. Hammonds-worth, Penguin.
- James, P. E; & Jones, C.F. (1954). *American Geography*. Syracuse: Inventory & Prospects, University Press.
- James, P.E. (1997). *New viewpoints in geography*. Washington: National Council for the Social Studies.
- John W. B; & James V. K. (2003). *Research in Education* (7th ed.). New Delhi: Prentice Hall Private Ltd.
- Kourtizen, S.G. (2009). *Qualitative research: Challenging the orthodoxies in standard Academic Discourse*. New York: Tylor & Francis.
- Kumar, C.R. (2010). *Research Methodology*. New Delhi: APH Publishing Corporation.
- Montelo, D. R. (2006). *An introduction to scientific research methods in geography*. London: Sage Publications.
- Montelo, D. R. (2006). *An introduction to scientific research methods in geography*. New York: Sage publications.
- Narasimha Murthy, K. L. (1992). *Research in geography: A survey* (1st ed.). New Delhi: Ashish Publishing House.
- Norcliffe, G. B. (1977). *Inferential statistics for geographers*. London: Hutchins.
- Ogden, E. (2002). *Research proposals: A Guide to success*. New York: Academic Press.
- Plate, R.S. (1959). *Field Study in American Geography*. Illinois: University Press Chicago.
- Taylor, P.J. (1977). *Quantitative methods in geography*. Boston: Houghton Mifflin.
- Therese L. B. (1999). *Doing social research* (3rd ed.). Boston: McGraw Hill.

- Uwe Flick, L. (2009). *An introduction to Qualitative Research*. (4th ed.). London: SAGE publications.
- Walker. (1963). *The Nature of scientific thought*. New Jersey: Prentice Hall.
- Wright. (1951). *Aids to geographical research*. NewYork: Columbia University Press.
- Young, P. V. (1956). *Scientific social surveys & researches*. New York: Prentice Hall.

Map Work and Practical (200)

I. Principles of Cartography (50)

- i. **Introduction:**
 - a. Introduction to Cartography
 - b. Nature of Cartography
 - c. History of Cartography
- ii. **Basic Geodesy**
 - a. Spherical, Ellipsoidal and Geoidal Earth
 - b. Geographical Coordinates
 - c. Properties of the Graticule
 - d. Geodetic position determination
- iii. **Map Projections**
 - a. Merits and demerits of commonly used Map Projections (Conformed, Equal Area, Azimutual and Polyconic projections)
- iv. **Scale, Reference and Coordinate Systems**
 - a. Map Scale
- v. **Reference Systems**
 - a. Coordinate Systems
 - b. Datum
- vi. **Cartographic Symbols**
 - a. Symbol types and graphic variables,
 - b. The symbolization problem.
 - c. Symbolizing graphic features
- vii. **Mapping statistical surfaces**
 - a. Form, Dimension and colour, Texture
 - b. Classification and generalization
- viii. **Lettering**
 - a. Native of typography
 - b. Lettering methods
 - c. Types and type characteristics
 - d. Photo lettering and automatic Control lettering
- ix. **Map Reading**
- x. **Map Design**
 - a. General Design problems
 - b. Principles of Cartographic design
 - c. Design of map symbols
- xi. **Basic procedure and designing of the following maps**
 - a. Thematic, Topographic, Climatic, Economic, Population, Settlements, Urban Morphology
- xii. **Map Production**
 - a. Form of map output
 - b. Construction material
 - c. Output options
 - d. Composing separations
 - e. Proofing

II. Surveying (50)

i. Theory (25)

- a. Plane Table Surveying: General description, instruments, procedure, methods of plane tabling, advantages and disadvantages of plane-table surveying, errors in plane table surveying, two point problems, three points problems.
- b. Compass Survey: General description, bearing, compass traverses (open and close). Calculation of included angles – calculated bearings plotting from the true north - adjustment of errors-compass sketch surveys-fixing new station-combined traverses and sketch surveys.
- c. Leveling: General description kinds of levels, adjustments in levels-contours by clinometer-Tangent scale clinometers use with Plane Table laying out of contours – leveling, procedure of leveling, methods of calculating reduced levels. Profiles, longitudinal leveling, cross sectional leveling- accuracy required in leveling operation. Advantage and source of errors in leveling procedure.
- d. Triangulation Surveys: Theodolite : Types of Theodolites, parts of Theodolite, use of Theodolite, adjustments of the instrument. Measurement of horizontal and vertical angles: Measurement of base line. Triangulation surveys. Filling in of detailing with plane-table in triangulation surveys. Finding out height of inaccessible objects.
- e. GPS Surveying: Introduction, Types of GPS, Performance and Errors, Techniques and Use and Applications

ii. Practical (25)

- a. The field work in surveying will be based on the above instruments. The students will be required to carry out advanced exercise on surveying, plane table exercises, prismatic compass exercises, leveling exercises and theodolite exercises.

III. Lab. Work (50)

- i. Advanced exercises on scales
- ii. Enlargement and Reduction of maps
- iii. Representation of Relief Advanced Exercises on Contouring, section drawing and intervisibility
- iv. Drawing of the following class of Projections:
 - a. Cylindrical
 - b. Pseudocylindrical
 - c. Conical
 - d. Pseudoconical
 - e. Ploy conic
 - f. International
 - g. Azimuthal (zenithal)
 - Perspective
 - Non perspective
- v. Importance of maps as basis of Geographical studies, study of topographic maps

IV. Record / Viva Voce (50)

- i. Surveying (25)
- ii. Lab. Work (25)

Each student shall submit record of all the Practical Work one week before the commencement of the Practical examination. The work of the candidates shall be examined individually.

Books Recommended

- Ahmad, Q. S. (1963). *Simple map projections*. Lahore: Publishers United.
- Bygot, J. (1960). *An introduction to map work & practical Geography*. London: Tutorial Press.
- Bygott, J. (1957). *An introduction to map work & practical geography*. London: University Tutorial Press.
- Debenham, F. (1937). *Exercises in cartography*. London: Black Blackie & Sons.
- Erwin, R. (1967). *General cartography*. New York: McGraw Hill.
- Garnet, A. (1935). *Geographical interpretation of topographical Maps*. London.
- Keats, J. S. (1973). *Cartographic design and production*. London: Longman.
- Kraak, M. J; & Ormelling, F. J. (1996). *Cartography: Visualization of spatial data*. Harlow: Longman.
- Lawrence, G. R. P. (1971). *Cartographic Methods*. London: Methuen & Co.
- Monkhouse F. J; & Wilkinson, H. R. (1978). *Maps and diagrams*. London: Methuen & Co.
- Robinson, A. N. (2004). *Elements of cartography*. New York: John Wiley.
- Steers, J. A. (1961). *An introduction to the study of map projections*. London: University of Press London.
- Threlfall, H. (1946). *A text book on surveying and leveling map*. London Charles, Riffin.
- Usil, G.W; & Hearn, G. (1947). *Practical surveying*. London: Technical press.

M.Sc. Geography Part-II

Introduction

The examination shall consist of Five written papers and Practical examination. The allocation of marks shall be as follows:

Theory (five papers)	400 (80 marks for each paper)
Practical	200
Total:	600

Theory

Paper VI	Pakistan	80
Paper V II	Fundamentals of GIS	80
Paper V III	Elective I (Regional Geography)	80
Paper IX	Elective II	80
Paper X	Elective III	80
Total:		400

The distribution of marks for Practical examination shall be as follow:

I.	Digital Cartography	100
	i. Practical	50
	ii. Record & Viva Voce	50
II.	Field Study/ Survey and its Presentation	100
	i. Report	75
	ii. Viva Voce	25

The students shall carry out field survey on any one of the following fields:

- a. Socio Economic Survey (Urban, Urban Tourism, Rural Settlements, Transportation, Industrial, Population & Land Use).
- b. Physical Survey (Landforms, Soils, Hydrological & Snow).

Each student shall be required to collect data/information pertaining to his/her topic in a selected area/region, tabulate the data and write report on it.

Theory

Paper VI, VII shall be compulsory. The students shall offer any One of the following papers from Elective Courses VIII-XXIII and ONE paper on Regional study option i-Xiii.

Elective Courses

Paper VI	Pakistan
Paper VII	Fundamentals of GIS
Paper VIII	Principles of Remote Sensing
Paper IX	Political Geography
Paper X	Conservation of Resources
Paper XI	Hydro Geography
Paper XII	Rural Settlement Geography
Paper XIII	Cultural Geography
Paper XIV	Transportation Geography
Paper XV	Economic & Commercial Geography
Paper XVI	Pleistocene Geomorphology
Paper XVII	Regional Planning & Development
Paper XVIII	Population Geography
Paper XIX	Urban Geography & Planning
Paper XX	Agricultural Geography
Paper XXI	Geography of Manufacturing
Paper XXII	Tourism Geography
Paper XXIII	Medical Geography

Paper XXIV Regional Study

The students will study any ONE of the following options:

- i. Eastern Asia China, Japan & Korea
- ii. S. West Asia
- iii. South East Asia
- iv. South Asia
- v. Europe
- vi. Central Asia
- vii. North America
- viii. Africa
- ix. Australia
- x. South America
- xi. Russia
- xii. Geography of the Muslim World
- xiii. China

Note: The Chairman will notify the number of options that shall be offered during the course of study depending on the facilities available in the Department.

THESIS: 160 marks (in lieu of Two Elective papers VIII to XXIII). Only those candidates will be allowed to opt for the research that have either obtained First Division in the Bachelor's degree examination, or who have passed the Part-I M.Sc. Geography examination in the first attempt securing at least 65 percent marks in aggregate.

Paper VI: Pakistan

I. Emergence of Pakistan and its role in the Muslim World

II. Physical Environments

- i. Landforms and soils
- ii. Drainage
- iii. Climate and climatic regions
- iv. Natural vegetations

III. Resource Base

- i. Land and Water
 - a. Land resources
 - b. Water resources: Irrigation and irrigation problems, waterlogging and salinity and reclamation of land
 - c. Soil erosion
 - d. Agricultural methods – problems and development Land Management
 - e. Distribution of main crops and cropping pattern
 - f. Pastoral resources

IV. Power resources

- i. Fossil fuels
 - a. Oil
 - b. Natural gas
 - c. Coal
- ii. Non-Fossil fuels
 - a. Hydro-electric powers
 - b. Nuclear power
- iii. Role of Power Resources in the Economic Development
- iv. Mineral Resources
- v. Forest Resources
- vi. Fisheries

V. Industries

- i. Industrial development
- ii. Industries
 - a. Factory industries
 - b. Cottage industries

The industries shall be studied with reference to size class, location in relation to raw material, fuel resources, market, transportation and politico-economic factors

VI. Population

- i. Growth of population and its distribution
- ii. Age and sex composition
- iii. Movements of population
- iv. Urban and rural population-distribution in size class towns and settlements
- v. Occupational structure
- vi. Food resources and its relation to population growth

VII. Transportation and its development

- i. Comparative evaluation
- ii. Transport types and their evolution
- iii. Suitability and efficiency of various means of transport

VIII. Trade

- i. Foreign
- ii. Inter-Regional

IX. Pakistan and World relations

Books Recommended

- Akhtar, S. M. (1963). *Economics of Pakistan*. Lahore: Publishers United.
- Ali, M. A. (1967). *The Emergence of Pakistan*. New York: Columbia University Press.
- Andrus, M. (1958). *Economy of Pakistan*. Oxford: Karachi University Press.
- Callard, K. (1955). *Pakistan: a Political study*. London: Allan.
- *Chronology of Pakistan*. G.O.P. Karachi: Manager of Publications.
- Davis, K. (1951). *Population of India and Pakistan*. New York: Princeton.
- Directory of Economic. (1966). *Minerals of Pakistan*. G.O.P.
- *Economic Survey of Pakistan*. (2011). Finance Division, Economics Advisor's Wing. Various issues, Islamabad: G.O.P.
- Howard. (1924). *Crop Production in India: A Critical survey of its problems*, Oxford: University Press.
- *Irrigation Dept: Annual reports*. Institute of Irrigation & Research, Lahore: G.O.P.
- Kureshy, K. U. (1977). *Geography of Pakistan*. Oxford University Press, Karachi.
- Ministry of Home Kashmir Affairs: *Census of Pakistan Population (1951, 1961 1972)*. Karachi: Manager of Publications. G.O.P.
- Mushtaq, A. (1959). *The Economy of Pakistan*. Karachi: Pakistan Publishing House.
- *Pakistan Economic Commission*. (1972). Karachi: Manager of Publications. G.O.P..
- *Planning Commission: I-Five Year Plans*. G.O.P.
- Qureshi, I. H. (1965). *The Struggle for Pakistan*. Karachi: University of Karachi.
- Qureshi, I.H. (1956). *The Pakistan Way of Life*, London: Harisman.
- Spate O. H. K. (1957). *India and Pakistan*. London: Methuen & Co.
- Tayyeb, A. (1966). *Pakistan : A Political Geography*. London: Oxford University Press.
- Wadia, D. N. (1957). *Geology of India*. London: Macmillan.
- WAPDA. *General Report of Hydrology and Climatology*. Lahore: Faridkot House.
- Weekes, R. V. (1964). *Pakistan*. New Jersey: D. Van Nostrad..
- Wilcox, W. A. (1963). *Pakistan*. New York: Columbia University Press.

Paper VII: Fundamentals of Geographical Information System

- I. **Introduction to GIS**
 - i. Definition
 - ii. Components of GIS
- II. **Spatial Data**
 - i. Introduction
 - ii. Types
 - iii. Sources
- III. **GIS Data Structures**
 - i. Introduction
 - ii. Digital file structures: Simple lists, Ordered Sequential Files, Indexed Files
 - iii. Digital database structures for Managing Data: Hierarchical Data Structures, Network systems, Relational Database Management Systems
 - iv. GIS Data Models for Multiple Coverages: Raster Models, Compact storing of Raster Data, Vector Models, Compacting Vector Data Models, Hybrid and Integrated Systems
- IV. **Spatial Data Modeling**
 - i. Introduction
 - ii. Spatial data models
 - iii. Spatial data structures
 - iv. Modeling surfaces
 - v. Modeling networks
 - vi. Modeling third and fourth dimensions
- V. **Attribute Data Management:**
 - i. Introduction
 - ii. Creating a database
 - iii. Integrating database
 - iv. Development in database
 - v. GIS database applications
- VI. **Spatial Data Input and Editing**
 - i. Introduction
 - ii. Methods of Data Input
 - iii. Data Editing
 - iv. The Importance of Editing GIS Database
 - v. Detecting and Editing Errors
 - vi. Projection Changes
 - vii. Edge Matching
 - viii. Conflation and Rubber Sheeting
 - ix. Integrated databases
- VII. **Spatial Analysis: Techniques of spatial analysis**
- VIII. **GIS Output**
 - i. Display of Analysis
 - ii. Cartographic output
 - iii. Map design controls
 - iv. Nontraditional Cartographic output
 - v. Technology and GIS output
- IX. **GIS Project Design and Management**
 - i. Introduction
 - ii. Problem identification

- iii. Designing a data model
- iv. Project management
- v. Implementation problems
- vi. Project evaluation

Books Recommended

- Environmental Systems Research Institute (ESRI). (1993). *Understanding GIS: The ARC/INFO method*. New York: John Wiley & Sons.
- Found, W. C. (1971). *A theoretical approach to rural land-use patterns*. London: Edward Arnold.
- Garnett, A. (1945). *The interpretation of topographical maps*, London. Ltd. George G. Harrap & Co.
- Huxhold, W. E. (1991). *An Introduction to Urban Geographic Information Systems*. New York: Oxford University Press.
- Johson, et al. (1992). *Geographic Information System and Mapping*. USA: American Society for Testing and Materials.
- Lillesand, T. M; & Kiefer, R. W. (1994). *Remote Sensing and Image Interpretation*. New York: John Wiley & Sons.
- Lo, C. P. (1976). *Geographical Applications of Aerial Photography*. New York: Crane Russak.
- Lyon, J. G. & McCarthy, J. (1995). *Wetland and Environmental Applications of GIS*. USA: CRC Press Inc.
- Masser, I. & Blackmore, M. (1991). *Handling Geographic Information*. London: Longman.
- Mather, A. S. (1986). *Land Use*. London: Longman.
- Mather, P. M. (1993). *Geographical Information Handling - Research and Application*. New York: John Wiley & Sons.
- Peuquet, D. J. & Marble, D. F. (1990). *Introductory Readings in Geographic Information Systems*. London: Taylor & Francis.
- Rhind, D. W; Googchild, M. F; & Maguire, D. J. (1991). *Geographical Information Systems: Principles and Applications*. UK: Longman Group.
- Rhind, D. W; Googchild, M. F; & Maguire, D. J. (1991). *Geographical Information Systems: Principles and Applications*. UK: Longman Group.
- Scholten, H. J; & Stillwell, C. H. (1990). *Geographic Information Systems for Urban and Regional Planning*. Kulwer Academic Publications.

Paper VIII: Principles of Remote Sensing

- I. Introduction to Remote Sensing
 - i. Introduction
 - ii. Definition
 - iii. History
 - iv. Types of Remote Sensing: Passive and Active
 - v. Aircraft versus Satellite
 - vi. Weather Satellite
 - vii. Observations of the Earth Surface
 - viii. Communication and Data Collection System

- II. Energy Sources and Interaction**
 - i. Introduction
 - ii. Energy sources and radiations principles
 - iii. Energy interaction in the Atmosphere
 - iv. Energy interaction with Earth surface features
 - v. Data Acquisition and interpretation
 - vi. Reference data
 - vii. Characteristics of Remote Sensing Systems
 - viii. Arial Photography
- III. Satellite Sensor Systems**
 - i. Photographic Systems
 - ii. Television Cameras
 - iii. Scanning Radiometers
 - iv. Imaging Radar
- IV. Resolution and Scale**
 - i. Spectral Resolution
 - ii. Spatial Resolution
 - iii. Temporal Resolution
 - iv. Radiometric Resolution
 - v. Pixel Resolution
 - vi. Scale determination: Dimensions of the Image, Swath size
- V. Ground Data Collection**
 - i. Visible and Infrared
 - ii. Longer Wavelengths
 - iii. Airborne Data Collection
- VI. Multispectral, Thermal and Hyper spectral Scanning**
 - i. Introduction
 - ii. Multispectral Scanning
 - iii. Thermal Scanning
 - iv. Thermal Radiation Principles
 - v. Interpreting Thermal Scanning Imagery
 - vi. Imaging Spectrometry
- VII. Satellite Systems**
 - i. Introduction
 - ii. Geostationary Weather Satellites
 - iii. Polar Orbiting Weather Satellites
 - iv. Heat Capacity Mapping Mission
 - v. Landsat
 - vi. SPOT
 - vii. Seasat
 - viii. NASA Space Shuttle
- VIII. Digital Image Processing**
 - i. Introduction
 - ii. Image Rectification and Restoration
 - iii. Image Enhancement
 - iv. Contrast Manipulation
 - v. Spatial Feature Manipulation
 - vi. Multi-Image Manipulation
 - vii. Image Classification: Supervised and Unsupervised Classification
 - viii. Classification Accuracy Assessment
 - ix. Data Merging and GIS Integration
- IX. Microwave Sensing**

- i. Introduction
 - ii. SLAR System
 - iii. Geometric Characteristics of SLAR Imagery
 - iv. Interpretation of SLAR Imagery
 - v. ERS (Experimental Radar Remote Sensing From Space
 - vi. Radarsat
 - vii. Space borne Radar System
- X. Application of Remote Sensing**
- i. Land Cover Mapping
 - ii. Land use change monitoring
 - iii. Urban expansion Mapping
 - iv. Environmental Monitoring
 - v. Cadastral Mapping

Book Recommended

- Bhatia, S. C. (2008). *Fundamentals of Remote Sensing*. New Delhi: Atlantic Publishers.
- Campbell, J. B. (2002). *Introduction to Remote Sensing*. (3rd ed.). New York: The Guilford Press.
- Chen, C. H. (2007). *Signal & image processing for remote sensing*. USA: Tylor & Francis.
- Cracknell, A. P. (2007). *Introduction to Remote Sensing*, (2nd ed.). New York: CRC Press.
- Eracknell, A. P. (2007). *Introduction is Remote Sensing*. (2nd ed.). New York: CRC Press.
- Gibson, P. J. (2000). *Introductory Remote Sensing: Principles and concepts*. New York: Tylor & Francis.
- Jensen, J. (2000). *Remote Sensing of the Environment: An Earth Resources Perspective*. Amazon Publishers.
- Lillesand, T. M: & Kiefer, R. W. (2004). *Remote Sensing and Image Interpretation*. (5th ed.). New York: John Willey and Sons.
- Liu, J. G; & Mason, P. J. (2009). *Essential image Processing. A GIS for Remote Sensing*. New York: Jhon Willey & Sons.
- Mather P. M; & Tso, B. (2009). *Classification Methods for Remote. Sensed Data*. USA: Taylor & Francis.
- Mather, P M (2004). *Computer Processing of Remotely Sensed Images* (3rd ed.). John Wiley and Sons, New York
- Plaza, A. J. (2007). *High performance compiling in Remote Sensing*. New York, Chapman & Hall / CRC.
- Sabins, F. F. (1996). *Remote Sensing: Principles and Interpretation* (3rd ed.,). New York: W H Freeman & Co.

Paper IX: Political Geography

- I. Nature and objectives of Political Geography, Definition and development of political geographic thought**
- II. A critical examination of the following**
 - i. Concept of environmental relationship in political geography
 - ii. The concept of geopolitics its development and short-comings (special reference may be made to the views of Karl Ritter. Freidrich Ratzel, Rudolf Kjellen, Vidal de la Blache, Jean Brunhes, Alfred Thayer Mahan, Sir Halford MacKinder, Karl Haushofer, Nicholas J. Spykman and Alexander de Surversky)
 - iii. National deterministic theories of Germans and French possibilities
- III. State as a Politico-geographic Phenomenon**
 - i. Concept of the state and its classification. Chief political-geographic characteristics of states
 - ii. Hierarchy of political area
 - iii. Frontiers and boundaries: their concepts, functions and classification.
 - iv. Core areas, ecumenical area and capitals
- IV. Approaches and forces in the politico geographic study of state**
 - i. A critical examination of the following approaches
 - a. Simple descriptive approach
 - b. Historical approach
 - c. Morphological approach
 - d. Functional approach
 - ii. Forces affecting the internal functioning of a state
 - a. Centrifugal forces
 - b. Integrating factors
 - iii. Factors affecting the external relations of a state
 - a. Territorial considerations
 - b. Economics factors
 - c. Political relations
 - d. Strategic consideration
 - e. Ideological and cultural factors
- V. A study of the foreign relations of the following states in relation to the above factors**
 - i. U.S.A
 - ii. U.K
 - iii. Russia
 - iv. China
- VI. A detailed political geographical study of Pakistan**
- VII. World Organization**
 - i. United Nations
 - ii. Analysis of the World Political Patterns in terms of their economic, strategic, ideological and cultural relationships with special consideration of British Commonwealth, European Common Market, North Atlantic Treaty organization, South East Asia Treaty Organization Central Treaty Organization and the Arab League.

Books Recommended

- Alexander, D. M. (1963). *World Political Patterns*. Chicago: Rand McMally.
- Blij, H. J. (1967). *Systematic Political Geography*. New York: John Wiley.
- Bowman, I. (1928). *The New World Problems in Political Geography*. New York: Ginn.
- C. L. (1958). *Geography and World Politics*. New Jersey: Prentice Hall.
- Cohen, S. B. (1975). *Geography and Politics in World Divided*. New York: Random House.
- Goblet, Y. M. (1956). *Political Geography and the World Map*. Fredrick A. New York: Praeger.
- Moodie, A. E. (1949). *Geography Behind Politics*. London: Huntington's University Library.
- Saul, R. (1963). *Politics in Southern Asia*. London: Macmillan.
- Weigert, H. W. (1957). *Principles of Political Geography*. New York,: Appleton.

Paper X: Conservation of Resources

- I. **Scope of the subject:** its importance, problems created by the expanding population; advancing technology, increasing standings of living and greater demand for space and goods thereof. Relation of subject to other disciplines.
- II. **Agricultural Resources**
Agriculture and man. Types of agriculture, agricultural land use and cropping pattern. Efficiency of agriculture, problems relating to agricultural land. Agricultural regions of the work
- III. **Animal Resources**
Ranching and pasture, problems of overgrazing, carrying capacity of land, recent changes in ranching brought about by scientific agriculture feedlots and custom feeding, modern range management.
- IV. **Problems of Human Population**
Population distribution in different ecosystems, and different societies (with different technical skill), rate of growth of population. Relationship between man, his skills and natural resources. Rural land planning in developed and developing countries. Differences in interpretation of resources. Control of population size, dangers of over population.

Books Recommended

- Caurtnary, P. P. (1965). *Plantation Agricultural*. London: G. Bell.
- Laut, P. (1968). *Agricultural Geography*. Melbourne: Nelson.
- Leakey, C. L. A. (1977). *Food Crops of the Lowland Tropics*. London: Oxford University Press.
- Steila, D. (1976). *The Geography of Soils Formation, Distribution and Management*. Englewood: Cliffs Prentice Hall.
- Symons, L. (1965). *Agricultural Geography*. New York: Frederic A Preager.
- Tempany, H. (1958). *Tropical Agriculture*. London: Longman.
- Webster, C. C. (1966). *Agriculture in the Tropics*. London: Long man.

Paper XI: Hydro Geography

- I. Introduction**
 - i. Definition and Scope
 - ii. Development of Hydro Geography
 - iii. Muslim's Contribution
- II. Hydrological Cycle and Water Balance**
 - i. Water Reservoirs
 - ii. Hydrological Cycle
 - iii. Water Balance
- III. Precipitation and Rainfall**
 - i. Forms of Precipitation
 - ii. Rainfall Data and its measurement
 - iii. Evaporation and Transpiration
 - iv. Synoptic Meteorology of Rain
 - v. Space time Characteristics of Rainfall
 - vi. Statistical Analysis and Cartographic Representation of Rain Fall Data
 - vii. Geographical Distribution of Rainfall
- IV. Runoff**
 - i. Factor affecting the Runoff
 - ii. Runoff Cycle and Phases of Runoff
 - iii. Measurement of Runoff
- V. Ground Water**
 - i. Occurrence Origin and Discharge of Ground Water
 - ii. Ground Water Reservoirs
 - iii. Water Table Water Logging and Salinity
 - iv. Porosity Permeability and Transmission
 - v. Ground Water Movement
- VI. Floods**
 - i. Causes and Seasonal Distribution of Floods
 - ii. Flood Protection and Planning
 - iii. Geographical Distribution of Floods
- VII. Glacial Water**
 - i. Glacial Nourishment and Wattage
 - ii. Glacial Runoff
 - iii. Glacial Flow
 - iv. Response of Glacier to Climatic Changes
- VIII. Droughts**
 - i. Extent and Distribution of Droughts
 - ii. Drought Severity, Frequency and Duration
 - iii. Hydrological Relations in Draughts
- IX. Lakes**
 - i. Origin and Diversity
 - ii. Hydrological Cycle and Water Balance Lakes
 - iii. Geographical Distribution
- X. Water Pollution**
 - i. Classification of Water Pollutants
 - ii. Extent and Distribution of Water Pollutants
 - iii. Effects of Water Pollution on Fauna and Flora

XI. Quantitative Hydro Geography

- i. Basis Concepts
- ii. Areal Aspects of Drainage Basins

XII. GIS and RS Application

- i. RS-based Hydrological Data Acquisition
- ii. GIS-base Hydrological Mapping

Books Recommended

- Aronoff, S. (1995). *Geographic Information System: A management perspective* (4th ed.). Ottawa, Canada: Wdl Publications
- Chow, V. T. (1964). *A Handbook of Applied Hydrology*. New York: McGraw Hill.
- Curran P. J. (1985). *Principles of Remote Sensing*. Longman Group Ltd.
- Drwry S. A. (1990). *A Guide to Remote Sensing and Image Processing*. Press Oxford.
- Hill, E. S. (1966). *Arid Lands*. London: Methuen & Co.
- Hutchinson, G. E. (1960). *A Treatise on Limnology*. London Chapman Hall Ltd..
- John. R. J. (1996). *Introduction to Digital Image Processing*. Prentice Hall.
- Lillesand T. M; & Kiefer R. W. (2004). *Remote sensing and image interpretation*. John Wiley & Sons Inc.
- Meinzer, O. E. (1942). *Hydrology*. New York: McGraw Hill.
- Steel, E.W. (1966). *Water Supply and Sewerage*. (4th ed.). New York: McGraw Hill.
- Strahler, A.N. (1963). *The Earth Sciences*. New York: Harper & Row.
- Todd, D. E. (1959) *Ground water*. New York: John Wiley.
- Tolm, C. F. (1937). *Ground water*, New York: McGraw Hill.
- Water Resources Use and Management – Proceedings of a Symposium held at Canberra, Cambridge University Press London.
- Wisner, C. O. (1959). *Hydrology*. New York: John Wiley.

Paper XII: Settlement Geography

- I. Introduction: Geographical Approaches to Settlement Geography
- II. Geographic Bases of rural settlements
- III. Cultural bases of rural settlements
- IV. Spatial Patterns and classification of rural settlements
- V. Location of settlements-Central and new Central place
- VI. Architecture and Housing
- VII. Rural Land Use Patterns
- VIII. Population and Social Organization
- IX. Pioneer Settlement, Planning and pre-development

Books Recommended

- Blache, D. L. (1926). *Principles of Human Geography*. English Ed.
- Blaut, J. M. (1969). *Rural Landscapes of the New Western*. New York: Prentice Hall.
- Chisholm, M. (1967). *Rural Settlement and Land Use*. New York: John Wiley.
- Christaller, W. (1966). *Central Places in Southern Germany*. N New York: Prentice-Hall.
- Hart, J. F. (1998). *Rural Landscapes of the Western World*. Prentice Hall.
- Kariel, H.G; & Kariel, P. E. (1972). *Explorations in Social Geography*. Wesley : Addison.
- McGaugh, M. (1977). *A Geography of Population and Settlement*. Brown.
- Rapport, A. (1969). *Hourse Form and Culture*. New Jersey: Englewood Cliff, Prentice-Hall.
- Sauer, C. O. (1952). *Agricultural Origin & Dispersals*. New York: American Geographical Society.
- Spencer, J. E; & Thomas, W. L. (1969). *Cultural Geography*. New York: John Wiley.
- Takes, H. P. (1958). *Physical Planning in connection with land reclamation and improvement*. International Institute for Land Reclamation and Improvement.
- Taylor, R; & Jones, A. B. (1964). *Rural Life and Urbanized Society*. New York: Oxford University Press.
- Trewartha, G. T. (1967). *Physical Elements of Geography*, (5th ed.). New York: McGraw Hill.

Paper XIII: Cultural Geography

- I. **Introduction**
 - i. Definition of Culture & Cultural Geography, Scope of Cultural Geography & its relationship with other Disciplines
- II. **Basic themes of cultural geography**
 - i. Cultural Ecology
 - ii. Cultural Diffusion
 - iii. Cultural Regions/Area
 - iv. Cultural Integration
 - v. Cultural Landscape
- III. **Cultural History**
 - i. Paleolithic Age: Hunting & Gathering Culture
 - ii. Neolithic Age: Agricultural World Revolution
 - iii. Industrial Revolution & Urbanization
 - iv. Detailed Study of Stages of Social Cultural Change
- IV. **Geo-Cultural Study of the following**
 - i. Religion
 - ii. Language
 - iii. Rural & Urban Communities
- V. **Study of Pakistani Culture**
 - i. History, Present Patterns and Future Prospects
- VI. **Current issues**
 - i. Terrorism, Green Politics, Globalization, Human rights Revolution of Information, Gender Geography and Cultural problems

Books Recommended

- Blij, H. J. (2000). *Human Geography*. Canada: John Wiley & Sons, Inc.
- Carter, G. F. (1964). *Man and the Land: A Cultural Geography*. New York: Halt.
- Fellmann, G. G. (1995). *Human Geography Landscapes of Human Activities*. WCB Publishers.
- Forde, C. D. (1963). *Habitat, Economy and Society*. London: Methuen & Co.
- James, M. R. (1998). *The Cultural Landscape An Introduction to Human Geography*. Merrill Publishing Co.
- James, P. E. (1964). *One World Divided*. , New York: Blaisdel Publishing Co.
- Johnston, R. J. (1996). *Geographies of Global Change*. Blackwell Publishers Inc.
- Leighly, J. (1965). *Land and Life*. Barkley: University of California Press.
- Quddus, S. A. (1989). *The Cultural Patterns of Pakistan*. Lahore: Ferozesons (Pvt.) Ltd.
- Sauer, C. O. (1952). *Agricultural Origins and Dispersal*. New York: American Geographical Society.
- Terry, G. J; & Lester, R. (2000). *Human Mosaic*. New York: Harper Collins Publishers.
- Wagner, (1959). *Readings in Cultural Geography*. Chicago: University of Chicago Press.
- Wheeler, M. (1962). *Indus Civilization*. University Press Cambridge.
- White, L. A. (1959). *Evolution of Culture*. New York: McGraw Hill.

Paper XIV: Transportation Geography

- I. Basic concepts of Transportation Geography**
 - i. Definition, Growth and Scope of Transportation Geography.
 - ii. Theory of Transportation.
- II. Spatial Variations in Transportation Costs**
 - i. Location of Transportation Routes and Networks
 - ii. The Structure of Transportation Costs.
 - iii. Transportation Costs and the Location of Economic Activity.
 - iv. Transportation Improvements and their Spatial Impact.
- III. Transportation Network Analysis: (Study & application of the following)**
 - i. Aggregate Measures
 - a. Graph Theoretic Concepts: Non-Ratio Measures, (cyclomatic Number, Diameter), Ratio Measures (Alpha, Beta, Gamma, Eta, Pi, Theta, Jota).
 - b. Measures of Individual Elements of Transportation Network: Associated Number, connectivity Dispersion, Accessibility, and circuitry.
 - c. Measures of Nodal Accessibility:
 - ii. Nodal Accessibility
 - iii. The Shortest Path Matrix
 - iv. Network as Valued Graph
 - v. Graph Theory Interpretation of Hierarchies.
- IV. Linkage Importance in a Regional Highway Network**
- V. Design and Performance of Network**
 - i. Costs and Benefits in Path Design.
 - ii. Traveling Salesman Problem.
 - iii. Other Minimum Distance Networks.
 - iv. The Best Path in a Network.
- VI. The Best Path on Irregular Surfaces**
- VII. Other Irregular Surfaces and Isochrones**
- VIII. Flow Analysis**
 - i. Concepts and Methods in Flow Analysis.
 - ii. Gravity Model :
 - a. Basic Gravity Model.
 - b. Gravity Model and Traffic
 - c. Gravity Model and Hinterland Analysis.
 - d. Gravity Model and Potential Maps.
 - e. Jilman's Triade.
 - f. Weakness of the Gravity Model.
- IX. Model Systems:**
 - i. Characteristics and Comparison of the following Model System:
 - a. Rail Road.
 - b. Motor Transport.
 - c. Water Ways.
 - d. Air Transport.
 - e. Pipe Lines.
- X. Transportation Planning in Developing Countries :**
 - i. The Need for Comprehensive Planning & Analysis
 - a. System Approach.
 - b. Comprehensive Planning.
 - c. Pricing Policies.

- ii. Transport-Alternatives Evaluation Model :
 - a. Regional Consumption, Incomes, Prices.
 - b. Aggregate Demand, Production and Growth.
 - c. Input-Output Relationship.
 - d. Investment and Capacity.
 - e. Transportation Sector.

Books Recommended

- Cole; & King. (1968). *Quantitative Geography*. London: John Wiley & Sons.
- Edward, J. T. (1996). *Geography of Transportation*. New Jersey: Prentice Hall.
- Haggette, P. A. D. (1965). *Locational Analysis in Human Geography*. London: Edward Arnold.
- Haggette, P; & Chorley, J.(1969). *Network Analysis in Geography*.
- Kasky, K. J. (1963). *Structure of Transportation Networks*.
- Michael, E. & Eliot, H. (1974). *Transportation Geography*. New York: McGraw Hill ,
- Peter, E. L. (1972) *Location in space: a theoretical approach to economic geography*.
- Ronald, G. (1971). *Spatial Organization*. New Jersey: Prentice Hall.

Paper XV: Economic and Commercial Geography

- I. Introduction**
 - i. Definition
 - ii. Scope
 - iii. Approaches to Study
 - iv. Branches of Economic Geography
 - v. Relationship with other Branches of the Geography
- II. Economic Activities**
 - i. Classification
 - ii. General Distribution
- III. Production and Consumption**
 - i. Producer and Consumer
 - ii. Decision Making
 - iii. Man Against Nature
 - iv. Comparative Advantage
 - v. Perception
- IV. Historical Evolution of World Economic Systems**
 - i. Medieval Feudal Economics
 - ii. Industrial Revolution
 - iii. Economic Benefits From Colonialism
 - iv. Modern World System
- V. Various Types of Economics**
 - i. Subsistence
 - a. Primitive
 1. Gathering
 2. Hunting
 3. Cultivation
 - b. Intensive
 1. Farming
 2. Gathering
 - ii. Commercial
 - a. Grain Farming
 - b. Mediterranean Agriculture
 - c. Livestock Farming
 - d. Fishing
 - e. Dairying and Mixed Farming
- VI. World Population and Urbanism**
 - i. Geographic Distribution of Population
 - ii. Population Characteristics its Growth and Structure
 - iii. The Demographic Transition
 - iv. Population Density
 - v. Overpopulation
 - vi. The Future Population
 - vii. The Malthusian Dilemma
- VII. Agriculture, Forestry and Fishing**
 - i. Conditions of Agriculture
 - ii. The Physical Constraints on Agriculture
 - iii. Land Factors in Agriculture
 - iv. Agricultural Systems
 - v. Problem and Policies in Agriculture

- vi. The Economic Status of Farmer Scarcity and Abundance
- vii. Types of Agriculture and their Distribution
- viii. The Roles of Selected Commodities (Wheat, Rice, Sugarcane, Cotton, etc.)
- VIII. Minerals and Mining**
 - i. Economic Factors in Mining
 - ii. Metalliferous Minerals
 - iii. Mineralized Regions
 - iv. The Size of the Reserves
 - v. The Non-metalliferous Minerals
 - vi. Water as a Resource
- IX. Fuel and Power**
 - i. Forms of Power
 - ii. The Solid Fuels
 - iii. Oil and Natural Gas
 - iv. Non-Exhaustible Sources of Energy
- X. The Structure and Location of Industry**
 - i. Industrial Location Theory
 - ii. Factors of Industrial Location
 - iii. Locational Analysis of Selected Industries
 - a. Iron and Steel
 - b. Cotton Textile
 - c. Petroleum Refinery Industry
 - iv. Industrial Regions
- XI. Trade and Services Functions**
 - i. Tertiary Activities
 - ii. Distribution of Services
 - iii. Service Industries and Central Place Theory
- XII. Transport and Trade**
 - i. Characteristics of Transport System
 - ii. Networks
 - iii. Modes of Transport
 - iv. International Trade and Specialization
 - v. Multilateral and Bilateral Trade
 - vi. Free Trade Areas and Common Markets
 - vii. Balance of Trade
 - viii. Terms of Trade
 - ix. The Pattern of Trade

Books Recommended

- Alexander, J. W. (1963). *Economic Geography*, New Jersey: Prentice Hall.
- Alexanderson, G. (1947). *Geography of Manufacturing*. Englewood: Cliffs.
- Alnwick, H. (1981). *A Geography of Commodities*. London: Harrap.
- Boesch, H. (1964). *A Geography of World Economy*. Princeton : D. Van Nostrand.
- Boyee, R. R. (1947). *The Basic of Economic Geography*. New York: Holt, Rinehart & Winston.
- Carlson, A. S. (1956). *Economic Geography of Industrial Materials*. New York: Reinhold Publishing Corporation.
- Fryer, D.W. (1965). *World Economic Development*, New York: McGraw Hill.

- Hartshorne, T. A. & Alexander, J. W. (1988). *Economic Geography*. New York: Prentice Hall, Inc. Englewood Cliffs.
- Highsmith, R. M. (1963). *Geography of Commodity Production*. Philadelphia: Lippincott.
- Hodder, B.W; & Bogar, L. (1974). *Economic Geography*. London: Methuen & Co.
- Hover, E. M. (1948). *The Location of Economic Activity* Hill New York: McGrawHill.
- Jarrett, H. R. (1969). *A Geography of Manufacturing*. London: MacDonald & Evans Ltd.
- Jones, C. F. & Darkenwald. (1965). *Economic Geography*. New York: Macmillan.
- Khan, F. (1977). *An Introduction to Economic Geography* Karachi: Sir Syed Academy.
- London, C. E. (1939). *Industrial Geography*. New York: Prentice Hall.
- Miller; & Willard. (1962). *A Geography of Manufacturing*. Englewood: Cliffs, Prentice Hall.
- Norman, P. (1981). *Success in Economic Geography*. London: John Murray Ltd.
- Pounds, N. J. G. (1959). *The Geography of Iron and Steel*. Prentice Hall, London.
- Royen, W. V. (1953). *Fundamentals of Economic Geography*. Englewood: Cliffs, Prentice-Hall.
- Royen, W. V. (1954). *Atlas of the World's Resources, Agriculture Resources of the world*. New York: Prentice Hall.
- Sadhukhamn S. K. (1986). *Economic Geography, An Appraisal of Resources*. New Delhi: S. Chand & Co. Ltd.
- Smith, J. R. (1955). *Industrial and Commercial Geography*. Henry Holt.
- Thoman, C; & Yeats. (1988). *The Geography of Economic Activity*. USA: McGraw Hill Inc.
- Thomas, H. G. (1955). *Using the World's Wealth*. London: Ginn & Co.
- Thomas, R. S. (1965). *The Geography of Economic Activity*. New York: McGraw Hill.
- White, C. L. & Griffin. (1964). *World Economic Geography*, Blement: Wardsworth.
- Zimmerman, E. (1951). *World Resources and Industries*. New York: Henry Holt.

Paper XVI: Pleistocene Geomorphology

- I. Pleistocene period in general. Major characteristics of climate and landforms. Glacial, inter-glacial and stadial.
- II. Pleistocene of Pakistan. Major glacial and Periglacial zones. Climate and geomorphological processes and material produced.
- III. Landforms and their characteristics in relation of lithology.
- IV. Chronology of landform development. Problems of boulder conglomerate and loess. Correlation: Potwar and Himalayas etc.
- V. Pleistocene approach and advent of man and human culture, major areas of settlement and associated problems. Deforestation, erosion and bad land topography. National problem of land utilization.

Books Recommended

- Embleton, C; & King C. A. M. (1968). *Glacial & Periglacial Geomorphology*. New York: Edward Arnold, John Wiley.
- Flint, R.F. (1957). *Glacial & Pleistocene Geology*. New York: John Wiley.
- Patterson. (1962). *Soan the Paleolith of Pakistan*. Lahore: G.O.P.

Paper XVII: Regional Planning and Development

- I. Principles and Scope of Planning and Development.**
 - i. Planning : A Geographer's View
 - ii. Planning Processes
 - iii. Planning as an Activity
 - iv. Objectives in Planning
 - v. Objectives of Regional Development Efforts
- II. Implications of Regional Development**
 - i. Defining Regions
 - ii. Regional Hierarchy and Classification
 - iii. Regionalism or Administrative Boundaries?
 - iv. Determining Regional Boundaries
 - v. Factors contributing to Uniformities and Disparities in Regions
 - vi. Types of Development Regions
 - vii. The Problem of Regional Growth
 - viii. Locational Theory and Regional Growth
 - ix. Criteria for the Choice of Regional Projects
- III. Resources and Planning**
 - i. The Resource Base
 - ii. Resource Evaluation
 - iii. Utilization of Resources for Planning and Development
- IV. Urban and Regional Planning**
 - i. Urban Growth Patterns
 - ii. Impact of Industrialization
 - iii. Phenomenon of Urban Spread
 - iv. Planning for Cities and City Regions
- V. Rural Planning**
 - i. Agricultural Planning and Rural Development
 - ii. The Human Factor in Agricultural Development
 - iii. Agrovilles and New Rural Settlements
- VI. Examples of Urban/Rural/Regional Planning with Special Reference to Pakistan**
 - i. Las-Bela Mekran Region
 - ii. Kulu Region
 - iii. Multan-Bahawalpur Region
 - iv. Sargodha Region
 - v. Barani Region
- VII.** Students shall be required to choose a region and develop conceptual hierarchy and planning models for the region. The report shall accompany all regional data with a master regional plan.

Books Recommended

- Birmingham, W; & Ford, A. G. (1966). *Planning and Growth in Rich and Poor Countries*. London: George Allen and Unwin Ltd.
- Cox, K. R. (1979). *Location and Public Problems*. New York: Basil Black-Well, Oxford.
- Frey, H. (1999). *Designing the City, Towards a more sustainable urban form*.
- Goodall, B; & Kirby, A. (1979). *Resources and Planning Pergamon Press*. New York: Ltd. Oxford.
- Hall, P. (1989). *Urban and Regional Planning* (2nd ed.). London: Allen & Unwin.
- Hancock, J. (1978). *Urban Development & Planning*. London: Basil Blackwell.

- Hudson, R. & Lewis, J. R. (1982). *Regional Planning in Europe*. London: Pion Ltd.
- Keeble, L. (1969). *Principles & Practice of Town & country Planning*. London: The Estate Gazette Ltd.
- Mc Loughlin, B. J. (1969). *Urban and Regional Planning: A System Approach*. London: Faber & Faber.
- Weitz, R. (1965). *Rural Planning in Developing Countries*. London: Routledge & Kegan Paul.

Paper XVIII: **Population Geography**

- I. **Nature and Scope of Population Geography**
 - i. Historical outline of World Population growth
 - ii. Importance and Development of Population Geography
 - iii. Different views and theories
 - iv. Relations of the subject to other disciplines
- II. **World Distribution of Population**
 - i. Diversity of distribution
 - ii. Factors influencing population distribution physical factors, cultural and technological factors, temporal and political factors
- III. **Measures of Population Distribution**
 - i. Advantages and disadvantages of arithmetic density
 - ii. Physiological and economic densities of population
 - iii. Measures of central tendency of population distribution
 - iv. Measures of population dispersion and potential
- IV. **Population Composition**
 - i. Urban and rural character
 - ii. Biological characteristics
 - iii. Cultural characteristics
- V. **Components of Population Growth**
 - i. Patterns and trends of fertility
 - ii. Patterns and trends of mortality
 - iii. Causes and consequences of migration
- VI. **Problems of Population Data**
 - i. Sources of population data
 - ii. Methods of Census, vital registration and sample surveys
 - iii. Major errors and omissions in population data
- VII. **Population Analysis**
 - i. Analysis of fertility
 - ii. Analysis of mortality
 - iii. Analysis of migration

Books Recommended

- Barclay, G. W. (1958). *Techniques of Population Analysis*. New York: John Wiley & sons.
- Barrette, J; & Louw, M. (1962). *International Aspects of Overpopulation*, London: Macmillan.
- Clarke, J. I. (1965). *Population Geography* Oxford: Pergamon Press.
- Demko, G. J; & Rose H. M; & Schnell, G. A. (1970). *Population Geography*. New York: A Reader, McGraw Hill Book Company.
- Garnier, J. B. (1966). *Geography of Population*. London: Longman.
- Glass, D.V. (1967). *Population: Politics and Movements in Europe*. London: Frank Cass & Co.
- Heer, D. M. (1968). *Readings on Population*. Englewood: Cliffs Prentice Hall, Inc.
- Matras, J. (1977). *Introduction to Population: A Sociological Approach*. Englewood: Cliffs, Prentice Hall Inc.
- Zelinsky, W. (1966). *A Prologue to Population Geography*. Englewood: Cliffs, Prentice Hall, Inc.

Paper XIX: Urban Geography and Planning

- I. Origin of towns. Site and situation. Process of urbanization in the world. Urban function, economic base of urban centers. Formal and functional classification of towns; towns as central place; urban hinterland. Urban structure-different theories; hierarchy of settlements-city size distribution, rank size, law of primate city; urban expansion, metropolitan decentralization, rural urban fringe-urban social life.
- II. Concept and principles of Planning. History of Town Planning-ancient and medieval Modern Planning-urban development urban renewal neighborhood planning.
- III. A study of the process of urbanization in Pakistan.

Books Recommended

- Dickinson, R. E. (1952). *City Region and Regionalism*. London: Routledge.
- Gist, N.P; & Halbert. (1950). *Urban Society*. New York: Thomas, Crowell Co.
- Golany, G. (1976). *New Town Planning, Principles and Practices*. New York: John Wiley & Sons Inc.
- Jackson. (1966). *Surveys for Town Country Planning*. London: Hutchinson University Library.
- Keeble, L. (1969). *Principles and Practice of Town and Country Planning*. London: The Estate Gazette.
- Mayer, H. M; & Kohn, C. F. (1959). *Readings in Urban Geography*. Chicago: University of Chicago Press.
- Smailes, A. E. (1966). *The Geography of Towns*. London: Hutchinson and Co.

Paper XX: Agricultural Geography

- i. **Introduction to Agricultural Geography**
 - i. Introduction
 - ii. Nature and Scope
 - iii. The Origins and Development of Agriculture
 - iv. Theoretical aspects of Geographical Location relevant to agriculture
- ii. **Approaches to the Study of Agriculture in Geography**
 - i. Introduction
 - ii. Approaches: Commodity, Regional, deterministic, systematic
- iii. **Factors Influencing Agricultural Patterns**
 - i. Physical Factors: The Terrain, Climate, Soil, Water Resources
 - ii. Socio-Economic Factors: Technological, Population, Cultural, Infrastructure
 - iii. Land, Labor and Capital
 - iv. Government and Regional Policies
- iv. **Models in Agricultural Geography**
 - i. The Nature and Need of Models
 - ii. Classification of Models
 - iii. Models of agricultural activity
 - a. Economic Models
 - b. Descriptive Models

- v. **Agricultural Regions: Concepts and Techniques**
 - i. Concept and Methodology
 - ii. Techniques: Normative, Empirical, Single Element, Statistical
 - iii. Methods of Agricultural Regionalization
 - iv. Data Classification and Distribution
 - v. Agricultural Types
 - vi. Agricultural systems of the World
- vi. **Field Studies and Surveys**
 - i. Land Use Survey: Techniques of Land use survey
 - ii. Land Capability Survey
 - iii. Land Suitability evaluation Survey
 - iv. Land Classification

Books Recommended

- Bowler, I. R. (1979). *Government and Agriculture. A spatial perspective*. London: Longman
- Bowler, I. R. (1985). *Agriculture under the Common Agricultural Policy*. Manchester: University Press.
- Bowler, I. R. (1992). *The industrialization of Agriculture. The Geography of Agriculture in Developed Market Economies*. New York: John Wiley & Sons.
- Briggs, D. J; & Courtney, F. M. (1989). *Agriculture and Environment*. Singapore: Longman.
- Dube, R. S. (1987). *Agricultural Geography: Issues and Applications*. New Delhi: Gian Publishing House.
- Grigg, D. (1984). *An Introduction to Agricultural Geography*. London: Hutchinson.
- Ilbery, B. W. (1985). *Agricultural Geography. A social and economic analysis*. New York: Oxford University press.
- Munton, R. J. C; & Morgan, W. B. (1971). *Agricultural Geography*. Cambridge: Methuen & Co.
- Newbury, P. A. R. (1999). *Agricultural Geography*. London: Longman.
- Rhind, D; & Hudson, R. (1980). *Land use*. London: Methuen and Co.
- Shukla, L. (1991). *Readings in Agricultural Geography*. Jaipur: Scientific Publisher.
- Singh, J; & Dhillon, S. S. (1984). *Agricultural Geography*. New Delhi: Tata McGraw-Hill.
- Symons, L. (1967). *Agricultural Geography*. New York: Frederick.

Paper XXI: Geography of Manufacturing

- I. Introduction to Geography of Manufacturing**
 - i. Definitions and concepts, and organization
 - ii. Classification of industrial activities
- II. Historical Development of Industrial Activity**
 - i. From industrial revolution to green paradigm
 - ii. Modern trends in manufacturing
- III. Industrial Location**
 - i. Approaches to location dynamics
 - ii. Location factors
 - iii. Location models
 - iv. Location theories
- IV. Geographical Analysis of Selected Industries**
 - i. Light industries (Cotton textiles, sugar industry)
 - ii. Heavy industries (Iron and steel, petro chemicals, cement)
- V. Modern Issues in Manufacturing**
 - i. Patterns of international production and the industrialization process
 - ii. De industrialization
 - iii. Industry and environmental problems
 - iv. Industrial planning and management

Recommended Books

- Alexanderson, G. (1967). *Geography of Manufacturing*. Englewood Cliffs: Prentice Hall, Publications.
- Altaf, Z. (1988). *Entrepreneurship in the Third World Risk and Uncertainty in Industry in Pakistan*. London: Croom Helm, Ltd.
- Aziz, S. (1969). *Industrial Location Policy in Pakistan*. (1st ed.). Karachi: National Publishing House Ltd.
- Chapman, K; & Walker, D. F. (1991). *Industrial Location* (2nd ed.). New York: Wiley Eastern Ltd.
- Emery, J. S; & Shaw, J. H. (1968). *Cities and Industries* (1st ed.). Milton: Jacaranda Press.
- Hayter, R. (1962). *The Dynamics of Industrial Location*. New York: John Wiley & Sons.
- Miller, E. W (1962). *A Geography of Manufacturing*. Englewood Cliffs: Prentice Hall Publications.
- Smith, D.M. (1981). *Industrial Location*. (2nd ed.), New York: John Wiley & Sons.
- Smith, T. R; & Phillips, M. O. (1961). *Industrial and Commercial Geography* (4th ed.). London: Constable & Company, Ltd.
- United Nations (1962). *Industrial Districts – The Physical Planning of Industrial Estates*, Department of Economic and Social Affairs New York.
- United, N. (1966). *Industrial Estates: Policies, Plans and Progress*. New York: Department of Economic and Social Affairs.
- Watts, H.D. (1987). *Industrial Geography* (1st ed.). London: Longman Scientific and Technical.

Paper XXII: Tourism Geography

- I. Introduction to Tourism Geography**
 - i. Definitions, themes, concepts, nature and scope of tourism geography
 - ii. The Historical Development of the Geography of Tourism and Recreation
 - iii. The status of Tourism Geography
- II. Modern Tourism and Recreation**
 - i. The demand for Tourism and Recreation
 - ii. The supply for Tourism and Recreation
 - iii. The impact of Tourism and Recreation
 - a. Socio-Economic Impacts
 - b. Physical-Environmental Impacts
- III. Resources and Tourism**
 - i. Trends and themes in the use of tourism resources
 - ii. Natures as recreational resource
 - a. Urban tourism
 - b. Rural tourism
 - c. Coastal and resort tourism
- IV. The Tourism Geography of World**
 - i. Patterns and processes of world tourism
 - ii. Factors influencing tourism
 - iii. Tourism & recreation in Pakistan
- V. Tourism and Recreation Planning and Policy**
 - i. Planning and management of tourism and recreation
 - ii. Principles processes and planning models
 - iii. Approaches to tourism planning
 - iv. Assessment and monitoring
 - v. Tourism policy initiatives and decision-making
 - vi. Sustainable development and tourism geography

Recommended Books

- Brunt, P; & Page, S. J. (2001). *Tourism an Modern Synthesis* (1st ed.). London: Thomson learning
- Davidson, R; & Maitland, R. (1997). *Tourism Destinations* (1st ed.). London: Hodder and Stoughton.
- Hall, C. M; & Page, S. J. (1999). *The Geography of Tourism and Recreation* (1st ed.). London: Routledge.
- Herbert, D. (1995) *Heritage, Tourism and Society* (1st ed.). London: Mansell Publishing Ltd.
- Hudman, L; & Jackson, R. (1998). *Geography of Travel and Tourism* (3rd ed.). Delmar London: Publishers.
- Jafari, J. (2000). *Encyclopedia of Tourism* (1st ed.). London: Routledge.
- Sidhu, S.S. (1995). *New Horizons in travel and Tourism* (1st ed.). New Delhi: Har-Anand Publications.
- Vellas, F; & Bechercl, L. (1995) *International Tourism* (1st ed.). London: Macmillan Business.
- Wahab, S; & Pigram, J. J. (1997). *Tourism, Development and Growth* (1st ed.). London: Routledge.

- Williams, A. M; & Shaw, G. (1994). *Critical Issues in Tourism* (1st ed.). Cornwall: Black Well Publishers.
- Williams, S. (1998). *Tourism Geography* (1st ed.). London: Routledge.

Paper XXIII: Medical Geography

- I. Introduction to Medical Geography**
 - i. Definitions, themes, concepts, Nature & scope of Medical Geography
 - ii. The Historical Development of Medical Geography
 - iii. The status of Medical Geography
- II. Factors inflecting the Patterns of Health & Disease**
 - i. Geographical Factors
 - ii. Physical Factors / Environmental Factors
 - iii. Cultural Factors
 - iv. Socio – Economic & Political Factors
- III. Patterns & Processes of Health & Disease**
 - i. Spatial variations in health & welfare patterns
 - ii. Role of Geography in exploring the impacts of diseases
 - iii. Models in Medical Geography
 - a. Epidemiological Transition
 - b. Health & inequalities
 - c. Inverse care law
 - iv. Global Patterns of health & Disease
 - v. Global Eradication of disease
- IV. Progress in Medical Geography**
 - i. Recent Issues & Developments in Medical Geography
 - ii. GIS, Remote Sensing & Health studies
 - iii. Changing Societies & future Health care
 - iv. Geography, Health care & Planning

Recommended Books

- Izhar, F. (2004). *Geography & Health: A study in medical Geography*. New Delhi: A.P.H. Publishing corporation.
- Leninan, J; & Fletcher, W.W. (1976). *Health & the Environment* (1st ed.). Glasgow: Blacker & Sons Ltd.
- Lloyd, J. (2002). *Health & welfare*. London: Holder & Stoughton.

Paper XXIV: Regional Study

Regional study of Paper XVIII option 1 to 13 shall be carried out under the following heads:

- I. Politico-historic background**
- II. Environmental setting**
- III. Resource Base**
 - i. Land and water resources
 - ii. Minerals and mineral fuels Industries
- IV. Special features and problems of the region**
- V. Role of the region in the world**
- VI. Detailed Regional study**

I. Digital Cartography (100)

Spatial Analysis and Digital Image Processes (Practical).

- Quantitative Revolution and Digital Cartography
- Introduction to Visualization, Visualization Process, Visualization Strategies.
- Statistical and Visual Foundation
- Principles of Symbolization
- Principles of Color, Tri-Simulate(chromatic Model, Intensity, Hue and Saturation
- Map Design Process
- Mapping Techniques
- Cognitive, Social and Ethical Issues in Cartography and spatial data visualization
- Internet Mapping
- 3D Modeling
- Map Animation
- Virtual Reality
- Paradigm shift: 2D to 3D representation, (i.e. Digital Earth & Google Earth)
- Electronic Atlases and Multimedia Cartography
- Final Presentations

i)

ii) Lab Outline and Practical

iii)

iv) Exploration of visualization tools in digital environment, Thematic Mapping, Designing of point/nodes, line/arcs and area features/polygon symbols, Exercise: Color formation and Conversion (RGB, CMYK, IHS), Assignment: Cartographic Design and Reproduction (Example: Topographic Mapping), Mono, Bivariate and multivariate thematic Mapping, Assignment: War and Propaganda Maps, Map Server Application, Perspective Viewing, Multi-layer Draping and Fly Through, assignment.

v)

Assignments

Exploration of visualization tools in digital environment

Thematic Mapping both Raster/ Vector

Designing of point/node, line/arc and area feature/polygon symbols

Exercise: Color formation and Conversion (RGB, CMYK, IHS)

Assignment: Cartographic Design and Reproduction (Example: Topographic Mapping)

Mono, Bivariate and multivariate thematic Mapping

Assignment: War and Propaganda Maps
Map Server Application
Perspective Viewing, Multi-layer Draping and Fly Through
3D Visualisation Assignment and Seminar

vi) Books Recommended:

- Aronoff, S. (2004) "Geographic Information Systems: A Management Perspective", WDL Publications, Ottawa, Fifth edition.
- Kraak, M.J & Ormeling, F. (2004), "Cartography: Visualization of Spatial Data". Addison Wesley Longman. Second Edition.
- Chang, Krang-tung, (2002) "Introduction to Geographic Information Systems" McGraw Hill.
- Ed Madej (2001) "Cartographic Design Using Arc View GIS", One Word Press, USA.
- ITC (2000) "Principles of Geographic Information Systems" ITC Educational Textbook Series, Enschede, The Netherlands.

II. Field study/Survey and its Presentation (100)

The students shall carry out field survey on any one of the following fields:

- i. **Socio Economic Survey**
 - a. Urban
 - b. Rural Settlements
 - c. Transportation
 - d. Industrial
 - e. Population
 - f. Land Use
- ii. **Physical Survey**
 - a. Landforms
 - b. Soils
 - c. Hydrological & Snow

Each student shall be required to collect data/information pertaining to his/her topic in a selected area/region, tabulate the data and write report on it.

Books Recommended

- Black, J. A; & Champion, D. J. (1967). *Methods and Issues in Social Research*, New York: John Wiley.
- Boyce, J; & Ferretti, J. (1984). *Field Work in Geography*. Cambridge University Press.
- Bruce, M. (1989). *Geography and Resource Analysis*, Longman New York.
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