

**DEPARTMENT OF GEOGRAPHY**  
**FACULTY OF NATURAL SCIENCES**  
**JAMIA MILLIA ISLAMIA**  
**NEW DELHI – 110 025**

**(A Central University by an Act of Parliament)**



---

**M.A./M.Sc. Geography**

---

**Syllabus (w.e.f. 2015-2016)**

---

### SEMESTER - I

Paper	Code	Title	Credits	
Paper - I	GGM-101	Advanced Geomorphology	4	CC
Paper - II	GGM-102	Resource and Economic Geography	4	CC
Paper - III	GGM-103	Regional Geography of India	4	CC
Practical – I	GGM-104	Cartographic Methods	2	CC
Practical - II	GGM-105	Quantitative Methods in Geography	2	CC
Theory Paper - I	GGM-106	Hydrology and Water Resources	4	CB

### SEMESTER – II

Paper	Code	Title	Credits	
Paper - IV	GGM-201	Remote Sensing, GIS and GPS	4	CC
Paper - V	GGM-202	Climatology and Oceanography	4	CC
Paper - VI	GGM-203	Evolution of Modern Geographical Thought	4	CC
Practical - III	GGM-204	Remote Sensing and Image Processing	2	CC
Practical - IV	GGM-205	Socio-Economic Survey	2	CC
Paper	GGM-206	Land Surveying and GPS	4	SEC
Theory Paper - II	GGM-207	Human Ecology	4	CB

### SEMESTER - III

Paper	Code	Title	Credits	
Paper - VII	GGM-301	Social Geography	4	CC
Paper - VIII	GGM-302	Urban Geography	4	CC
Paper - IX	GGM-303	Agriculture Geography	4	CC
Practical V	GGM-304	Geographical Information Systems	2	CC
Practical VI	GGM-305	DIP Training	2	CC
Theory Paper - III	GGM-306	Political Geography	4	CB
Practical	GGM-307	Advance Statistical Methods	2	AECC
Practical	GGM-308	Digital Cartography	2	AECC

**SEMESTER - IV**

<b>Paper</b>	<b>Code</b>	<b>Title</b>	<b>Credits</b>	
<b>Paper - X</b>	GGM-401	Regional Development and Planning	4	CC
<b>Paper - XI</b>	GGM-402	Population Geography	4	CC
	Any One of the following:			
<b>Paper - XII</b>	GGM-403(A)	Geography of Urban Environment	4	CC
	GGM-403(B)	Geography of Health and Well-Being	4	CC
	GGM-403(C)	Geography of Rural Development	4	CC
	GGM-403(D)	Land Evaluation	4	CC
	GGM-403(E)	Gender Geography	4	CC
	GGM-403(F)	Geography of Crimes	4	CC
<b>Practical VIII</b>	GGM-404	Project	4	CC
<b>Theory Paper - IV</b>	GGM-405	Watershed Management	4	CB

**GRAND TOTAL**

<b>Semester</b>	<b>Core Course (CC)</b>			<b>Choice Based (CB)</b>	<b>Skill Enhancement (SEC)</b>	<b>Ability Enhancement (AECC)</b>	<b>Total Papers</b>	<b>Credits</b>
	<b>Theory</b>	<b>Practical</b>	<b>Total</b>					
<b>I</b>	03	02	05	01	-	-	06	20
<b>II</b>	03	02	05	01	01	-	07	24
<b>III</b>	03	02	05	01	-	01	07	24
<b>IV</b>	03	01	04	01	-	-	05	20
<b>Total Papers</b>	12	07	19	04	01	01	25	-
<b>Total Credits</b>	<b>48</b>	<b>16</b>	<b>64</b>	<b>16</b>	<b>04</b>	<b>04</b>	<b>-</b>	<b>88</b>

**SEMESTER- I**  
**ADVANCED GEOMORPHOLOGY**  
**Paper - I (GGM-101)**

**Credits: 4**

**UNIT I: FUNDAMENTAL CONCEPTS**

Fundamental concepts in Geomorphology: Concept of time and space; Concept of morphogenetic regions; Concept of dynamic equilibrium; Models in Geomorphology; Recent trends in Geomorphology.

**UNIT II: EVOLUTION OF LANDFORMS**

Significance of geological structures, climatic factors and the geomorphic processes in the evolution of landforms; Interruption in the evolution of landforms: Tectonic, climatic and base level changes; Slope Form, Processes and Evolution.

**UNIT III: GEOMORPHIC PROCESSES AND LANDFORMS**

Drainage basin as geomorphic unit; Morphometric Laws; Morphometric analysis; Denudation and Morpho chronology; Soil erosion and its measurement.

Fluvial : Evolution of river valley; Glacial : Glaciations & Forms.

Aeolian : Evolution of arid landscapes ; Coastal Geomorphology : Recession of shorelines and evolution of coastal landforms

**UNIT IV: APPLIED GEOMORPHOLOGY**

Geomorphic hazards and mitigation; Geomorphology and Soils; Geomorphology in mineral and Groundwater prospecting; watershed management.

**Books Recommended:**

1. Dury, G.H. Ed. 1966. Essays in Geomorphology. Heinmann Educational Books Ltd., London.
2. Fairbridge, R.W. 1968. (ed.). Encyclopedia of Geomorphology. Rein-hold Book Corp., New York.
3. Garner, H.F. 1974. The Origin of Landscape : A Synthesis of Geomorphology. Oxford Univ. Press, New York.
4. Jhon, R. Hails. 1977. Applied Geomorphology, Elsevier.

5. Way, D. 1978. Terrain Analysis: A Guide to Site Selection using Aerial Photo Interpretation. Dowden, Hutchinson & Ross, Stroudsburg.
6. Dayal, P. 2015. Text-Book of Geomorphology, Shukla Book Depot, Patna.
7. Gabler R.E, Peterson. J.F., Trapasso, L.M. 2009. Essentials of Physical Geography Brooks/Cole Cengage Learning.
8. Kale, V. and Gupta, A., 2004. Elements of Geomorphology. Oxford University press, Calcutta.
9. Strahler, A.H., 2013(6<sup>th</sup> edition). Introducing Physical Geography. Wiley Pub.
10. Thornbury, W.D., 1991. Principles of Geomorphology, Wiley Eastern Ltd., New Delhi
11. Worcester, P.C. 1969. Text Book of Geomorphology. East West Press, New Delhi.
12. Savindra Singh. Fundamental Concepts in Geomorphology. Prayag Pustak Bhawan, Allahabad.
13. Gautam, A. 2015. Geomorphology. Sharda Pustak Bhawan.
14. Hugget, R.J. 2011. Fundamentals of Geomorphology. Routledge Pub.
15. Harvey, 2012. A. Introducing Geomorphology: A Guide to Landforms and Processes

**RESOURCE AND ECONOMIC GEOGRAPHY**  
**Paper - II (GGM-102)**

**Credits: 4**

**UNIT I: FUNDAMENTAL CONCEPTS**

Definitions and Scope of Economic Geography: its place in Human Geography, Development of the discipline after Second World War with special reference to New Economic Geography (NEG)

**UNIT II: THEORIES AND MODELS**

- A) Agricultural Land Use – Ricardian Rent theory, Von Thunen’s rent theory with modern interpretations.
- B) Basic concepts in location problems; Demand, Scale, Agglomeration and Time dimension in Economic location; Locational Models of Weber and Isard
- C) Christaller’s Central Place Theory and modifications by Losch

**UNIT III: RESOURCE BASE OF THE ECONOMY**

Resource base of the Economy; Concept of Resources, Classification of Resources; Factors of Resource Creation; Resources and Environment – scarcity and sustainability, conservation of resources; Sectors of the Economy: agriculture, manufacturing and tertiary activities.

**UNIT IV: TRADE AND EXCHANGE**

Concepts of trade and exchange – opportunity costs, absolute, comparative and competitive advantage; Movements of capital and labour; Core-periphery concept in trade; Commodities in world trade; Trade Blocs; The Information Economy – Spatial and transportation implications of e-commerce.

**Books Recommended**

1. Conkling, E. C. and Yeates, M. 1976. Man’s Economic Environment. McGraw – Hill Book Company, New York.
2. Friedmann, J. and Alonso, W. 1964. Regional Development and Planning: A Reader. The M.I.T Press, Cambridge.
3. Gore, C. 1984. Regions in Question: Space, Development Theory and Regional Policy. Methuen, London.
4. Hartshorne, T. A. and Alexander, J. W. 1988. Economic Geography. Prentice Hall, New Delhi
5. Hurst, E. M. 1972. The Geography of Economic Behaviour: An Introduction. Duxbury Press, California

6. Peat, W.N. and Constant, J. A. 1972. Zimmermann's World Resources and Industries. Harper and Row Publishers, London
7. Wheeler, J.O, Muller, O. M, Thrall, G.I. and Timothy, J. F. 1998. Economic Geography. John Wiley and Sons Inc., New York.
8. Hussain, M. 2008. Models in Geography. Rawat Publications.
9. Gautam, A. 2015. Geography of Resources: Exploitation Conservation And Management. Sharda Pustak Bhawan.
10. Gautam, A. 2015. Advanced Economic Geography. Sharda Pustak Bhawan.

**REGIONAL GEOGRAPHY OF INDIA**  
**Paper: III (GGM-103)**

**Credits: 4**

**UNIT I: REGION AND REGIONALIZATION**

India as a Geographical Unit; Concept of Region: Scheme of Regionalization : O.H.K. Spate and R.L. Singh, Agro-climatic Regions, Watershed as a Planning Region.

**UNIT II: GEOGRAPHY OF INDO-GANGETIC PLAIN**

Introduction to Indo-Gangetic Plain; Upper Ganga, Middle Ganga and Lower Ganga Plains: Physiography, Drainage, Climate, Soil; Population and Economy

**UNIT III: GEOGRAPHY OF HIMALAYAS**

Introduction to Himalayas; A Regional Study of Himalayas: Physiography, Drainage, Climate, Soil, Natural Vegetation, Population and Economy

**UNIT IV: GEOGRAPHY OF PENINSULAR INDIA**

Introduction to Peninsular India; A Geographical account of Chotanagpur and Deccan plateau: Physiography, Drainage, Climate, Soil; Population and Economy

**Books Recommended**

1. Deshpande C.D. 1992. Indian-A Regional Interpretation. Northern Book Centre, New Delhi.
2. Farmer, B.H. 1983. An Introduction to South Asia. Methuen, London, 1983.
3. Govt. of India: India-Reference Annual, 2001 Pub. Div., New Delhi.
4. Govt. of India: National Atlas of India. NATMO Publication, Calcutta.
5. Govt. of India: The Gazetteer of India. Vol. I & III Publication Division.
6. Learmonth A.T.A et.al. 1982(ed.) Man and land of South Asia. Concept Pub.
7. Mitra, A. 1967. Levels of Regional Development of India. Census of India, Vol. I, Part I-A (i) and (ii), New Delhi.
8. Routray, J.K. 1993. Geography of Regional Disparity. Asian Institute of Technology, Bangkok.
9. Shafi, M. 2000. Geography of South Asia. McMillan & Co., Calcutta.
10. Singh, R.L. 1971(ed). India A Regional Geography. National Geographical Society, Varanasi.
11. Spate, O.H.K. and Learmonth A.T.A. 1967. India and Pakistan – Land, People and Economy Methuen & Co., London.



12. Valdiya, K.S. 1998. Dynamic Himalaya. University Press, Hyderabad.
13. Singh, Gopal. 1988. Geography of India. Atma Ram Pub., Delhi.
14. Tirth Ram. 1996. Geography of India. Rawat Pub., Jaipur.
15. Gopal Krishnan, R. 1996. Geography of India. Jawahar Pub. & Dist., New Delhi.
16. Gautam, A. 2015. Advanced Geography of India.. Sharda Pustak Bhawan.
17. Chand, M., Puri, V. K. 2011. Regional Planning in India. Allied Publishers Limited.

**Practical – I (GGM-104)**  
**CARTOGRAPHIC METHODS**

**Credits: 2**

**UNIT I: FUNDAMENTALS OF CARTOGRAPHY**

Maps and their significance; Classification of maps; Theory of communication; Elements of maps: Generalization, Symbolization and Classification; Techniques of mapping: dot, choropleth, isopleths and diagraphmatic; Principles of map designing.

**UNIT II: RELIEF MAPPING**

Relative relief: GH Smith and Robinsons methods; Morphometric Analysis: Drainage Density, Stream order, Elongation ratio, Circularity ratio, Bifurcation ratio.

**UNIT III: MAPPING OF SOCIO-ECONOMIC DATA**

Population Density; Rural – Urban population; Patterns of irrigation, Location of Industries; Cartograms

**UNIT IV: APPLIED CARTOGRAPHY**

**Any one of following:**

1. Topographic mapping
2. Tourist mapping
3. Service and utility mapping

**Note:** Students will have to prepare a set of ten maps on selected theme

**Books Recommended:**

1. Dickinson.G.C. 1968. Statistical Mapping and Presentation of Statistics. Arnold, London
2. Lawrence. G.R.P. 1971. Cartographic Methods. Methuen , London
3. Monkhouse. F.J and Wilkinson.H.R. 1972. Maps and Diagrams. Methuen , London
4. Misra. R.P.1969. Fundamentals of Cartography. Prasaranga. University of Mysore, Mysore.
5. Raisz.E. 1962. Principles of Cartography. McGraw Hill, New York.
6. Robinson.A.H. 1978. Elements of Cartography. John Wiley, New York.

**QUANTITATIVE METHODS IN GEOGRAPHY**  
**Practical -II (GGM -105)**

**Credits: 2**

**UNIT I: MEASURES OF GEOGRAPHICAL PATTERNS**

Nearest Neighbour Analysis; Gini's Co-efficient; Lorenz curves; Location quotient; Rank size rule.

**UNIT II: NETWORK ANALYSIS**

Indices of transport network efficiency; Compositing the indices of transport network efficiency; Indices of nodal accessibility; Local degree – Road Local degree – Rail. Weighed road capacity and tortoursrity ratio; Compositing the indices of nodal accessibility.

**UNIT III: METHODS OF PREDICTIONS AND LEVELS OF MEASUREMENT**

Levels of measurement; Methods of sampling; Simple linear regression analysis; Plotting of regression line; Plotting of absolute and relative residuals; Explanation of residuals plotted on the maps.

**UNIT IV: MEASURES OF DISPARITIES AND POTENTIAL MODELS**

Gravity and potential models; Delimitation of hinterlands; Combinational analysis of Weaver,S.M.Rafiulla's method, Measures of Disparities: Kendall's ranking method. .

**Books Recommended:**

1. Berry, B.J.L. and Marble, D.R. (ed.). 1968. Spatial Analysis: A Reader in Statistical Geography. Prentice Hall, New York.
2. Cole, J.P. and Kind, C.A.M. 1968. Quantitative Geography. John Wiley Pub., New York.
3. Ibrahim, R. 1984. Market Centers and Regional Development. B.R. Publisher, New Delhi.
4. Mahmood, A. 1986. Statistical Methods in Geographic Studies. Rajesh Publishers, New Delhi.
5. Smith, D.M. 1975. Patterns in Human Geography. Penguin Books, England.
6. Maurice, Yeats. 1974. An Introduction to Quantitative Analysis in Human Geography. McGraw Hill, New York.
7. Peter Hagget, Andrew. D. Cliff and Allen Frey. 1977. Locational Methods. Vol. 1 and 11. Edward Arnold, London.

**CHOICE BASED PAPER(CB)  
HYDROLOGY AND WATER RESOURCES  
Paper - I (GGM-106)**

**Credits: 4**

**UNIT I: INTRODUCTION**

Definition and scope of Hydrology, Hydrological cycle, Structure and properties of water, inventory of earth's water resources, quality and quantity of available water, Water as a cyclic resource.

**UNIT II: SURFACE WATER DYNAMICS**

Surface water: sources and factors affecting quality and quantity; Precipitation: forms and factors; Interception: factors; Runoff: sources and factors affecting runoff; Evaporation: measurement and factors; Evapotranspiration: control and factors.

**UNIT III: GROUND WATER DYNAMICS**

Ground water: Characteristics of stream flow, Darcy's Law, permeability, Infiltration, Ground water storage, Ground water aquifers in different rock systems, movement and discharge.

**UNIT IV: WATER RESOURCE PROBLEMS**

Environmental influences on water resources; sectoral demands for water; urban water supply; water management; water harvesting; water pollution and control.

**SUGGESTED READINGS:**

1. Timothy, Davie. 2003. Fundamentals of Hydrology. Routledge, Taylor and Francis Group, U.K.
2. Todd, D.K. 2009. Groundwater Hydrology. John Wiley & Sons Inc.
3. Mahajan, G. 1989. Evaluation and Development of Groundwater. Ashish Publishing House, New Delhi.
4. Karanth, K.R.C. 1988. Ground Water: Exploration, Assessment and Development. Tata-Mcgraw Hill, New Delhi.
5. Andrew D. Ward and Stanley Trimble. 2004(2<sup>nd</sup> edition). Environmental Hydrology. Lewis Publishers.

6. Wright. R.T and Nebel. B.J. 2002(8<sup>th</sup> Edition). Environmental Science: Toward a Sustainable Future. Prentice Hall India Ltd.
7. Vijay P. Singh. 1995. Environmental Hydrology. Kluwer Academic Publications, The Netherlands.
8. Subramaniam V. 2002. Text Book of Environmental Science. Narosa Publishing House, Delhi.
9. Santhosh Kumar Garg. 2007. Hydrology and Water Resources Engineering. Khanna Publishers, Delhi.
10. Patra, K.C. 2004. Hydrology and Water Resources Engineering. Narosa Publications, New Delhi.
11. Viessmann, Warren., Lewis, Gary. 2002(5<sup>th</sup> edition) Introduction to Hydrology. Prentice Hall.
12. Hendriks Martin. 2010. Introduction to Hydrology. Oxford University Press, London.
13. Raghunath H.M.2006. Hydrology: Principles, Analysis and Design. New Age International Publishers , Mysore.

## SEMESTER II

### REMOTE SENSING, GIS AND GPS Paper – IV (GGM- 201)

**Credits: 4**

#### **UNIT I: BASICS OF REMOTE SENSING**

Stages in Remote Sensing data acquisition; Physics of Remote Sensing; Electro Magnetic Spectrum (EMS); EMR and its interaction with atmosphere and earth surface features.

#### **UNIT II: REMOTE SENSING PLATFORMS, SENSORS, AND SATELLITE SERIES**

Platforms: Types and their orbital characteristics; Sensors types: active and passive; Sensors systems: whiskbroom and push broom; Satellite series: IRS, SPOT, IKONOS and Quick bird.

#### **UNIT III: DIGITAL IMAGE PROCESSING**

Digital data formats; Image Restoration: geometric radiometric corrections and filtering. Image Enhancement: linear and non linear contrast stretch; Band combinations; Image Classifications: supervised and unsupervised.

#### **UNIT IV: GEOGRAPHIC INFORMATION SYSTEM AND GLOBAL POSITIONING SYSTEM**

Components of GIS; Data Structures; Data Base Management System (DBMS); Data Models; spatial data analysis and applications; Fundamentals of GPS; Segments of GPS; GPS Applications.

#### **Books Recommended:**

1. Lillesand T.M and Keifer R.W. 2008(6<sup>th</sup> edition). Remote Sensing and Image Interpretation. John Wiley and Sons, New York.
2. Joseph George. 2005(2<sup>nd</sup> edition), Fundamentals of Remote Sensing. University Press. Hyderabad
3. Sabins, F.F. 1986. Remote Sensing: Principles and Interpretation. Freeman, New York
4. Rashid S.M. and Mazhar A.K. 1993. Dictionary of Remote Sensing. Manak Publishing House, Delhi
5. Delhi
6. Lo, C.P.and Yeung AKW. 2006(2<sup>nd</sup> edition). Concepts and Techniques of GIS, Prentice – Hall of India, New Delhi.
7. Masood, A.S . 2006. Introduction to GIS, Allahabad.
8. Fazal S. and Rahman A. 2007. GIS Terminology. New Age International Publishings, New Delhi
9. Leick. A. 2003(2<sup>nd</sup> edition). GPS Satellite Surveying. John Wiley and Sons, New York.
10. N.K.Agarwal. 2004. Essentials of GPS, Spatial Network Pvt. Ltd.

11. Campbell, J.B. 1996(2<sup>nd</sup> edition). Introduction to Remote Sensing. Taylor and Francis, London.
12. Curran, P. 1985. Principles of Remote Sensing. Longman, London.
13. Sabins, J.F.F. 1997. Remote Sensing: Principles and Interpretation. W.H. Freeman & Co., NewYork.
14. Jenson, J.R. 2013. Remote Sensing and Environment. Pearson India.
15. Kumar, S. 2005. Basics of Remote Sensing and GIS. Laxmi Pub.

# CLIMATOLOGY AND OCEANOGRAPHY

**Paper: V (GGM-202)**

**Credits: 4**

## **UNIT 1: GENERAL CLIMATOLOGY**

Meaning, scope and objectives of climatology and its relations with meteorology. Structure and composition of the atmosphere. Heat budget and insolation. Atmospheric equilibrium, air masses and fronts. Atmospheric disturbances: cyclones, tornadoes and water spouts. Classification of climate by Trewartha, Koppen and Thornthwaite.

## **UNIT 2: APPLIED CLIMATOLOGY**

Climate and biosphere. Climate and human environment: agricultural and industrial. Climate, urbanization and urban planning. Weather forecasting and recent trends in climatology. Air pollution, global warming and climatic change. Micro climates.

## **UNIT 3: GENERAL OCEANOGRAPHY**

Meaning, scope and objectives of oceanography. Submarine topography and configuration of Pacific, Atlantic and Indian ocean floors. Ocean temperature and salinity. Ocean dynamics: currents, tides, tsunamis and El Niño. Ocean deposits. Coral reefs.

## **UNIT 4: APPLIED OCEANOGRAPHY**

Ocean routes and world economics. Marine resources and their conservation. Marine Pollution and ocean dumping. Global warming and transgression of seas. Remote sensing in oceanographic studies. Laws of the sea.

### **Books Recommended :**

1. Barry, R.G. and Chorley R.J. 2009(9th edition). Atmosphere Weather and climate, Routledge
2. Barret, E.C. 1974. Climatology from Satellites. Methuen London.
3. Critchfield, J.H. 1983(4th edition). General Climatology. Phi Learning Pub.
4. Davis, R.J.A. 1986. Oceanography-An Introduction of the Marine Environment. Win C. Brown, Iowa.
5. Griffiths, J.F. 1976. Applied climatology. Oxford press, New York.
6. Hobbs, J.E. 1996. Applied Climatology. Oxford University Press.
7. Huntington, E. and S.S. Visser. 1922. Climatic Changes. Yale University Press.



8. Hussain, T. and Tahir, M. 2012. Climatology. Jawahar, New Delhi.
9. Hussain, T. and Tahir, M. 2012. Oceanography. Jawahar, New Delhi.
10. Kings, C.A.M. 1969. An Introduction to Oceanography. McGraw, New York.
11. Lamb, H.H. 1991. Climate : Present, Past and Future. Vol.1&2. Routledge.
12. Siddhartha, K. 2013. Oceanography-A Brief Introduction, Kisalya Pub., New Delhi.
13. Singh, S. 2013. Physical Geography. Prayag Pub., Allahabad.
14. Treewartha, G.T. and Horn, L.A., 1980(5<sup>th</sup> edition). Introduction to Climate, International Studies.
15. Trujillo, A.P., Thurnman, H.V. 2016. Essentials of Oceanography, Prentice Hall.
16. Trujillo, A.P., Thurnman, H.V. 2010(10th Edition). Introductory Oceanography. Prentice Hall.
17. Weyl, P.K. 1970. Oceanography-An Introduction of the Marine Environment, John Wiley and Sons, London.

## **EVOLUTION OF MODERN GEOGRAPHICAL THOUGHT**

### **PAPER: VI (GGM-203)**

**Credits: 4**

#### **UNIT: I GENESIS OF GEOGRAPHICAL THOUGHT**

Ancient Geography Contributions of Greek, Roman and Arab Geographers. Impact of voyages; Discoveries and Renaissance on Geographical Thought. Foundation of Scientific Geography (Contributions of Varenus and Kant).

#### **UNIT: II EVOLUTION OF MODERN GEOGRAPHICAL THOUGHT – I**

Classical period of modern geography contributions (Humboldt and Ritter) and Darwin's impact on Geography; Contributions of Ratzel and Blache; Shifting viewpoints in Geography during the latter half of Nineteenth Century.

#### **UNIT: III EVOLUTION OF MODERN GEOGRAPHICAL THOUGHT-II**

The debate between Determinist and Possibilists; Geography as science of relationships and as science of distributions. Geography as Chorological science and as Morphology of Landscape.

#### **UNIT: IV CONTEMPORARY GEOGRAPHY POST SECOND WORLD WAR**

Exceptionalism and the Schaefer-Hartshorne debate, Positivism and its reactions (behavioral and radical approaches). Post modernism and feminist Geography.

#### **Books Recommended:**

1. Dickinson. 1969. The Maker's of Modern Geography. Routledge and Kegan Paul, London.
2. Hartshorne. R. 1939. The Nature of Geography. Association of American Geographers, Lancaster, Pennsylvania.
3. Hartshorne.R. 1959. Perspective on the Nature of Geography. Rand McNally and company, Chicago.
4. Harvey, D. 1991. The Condition of Post Modernity: An Enquiry into the Origins of Cultural Change. Wiley-Blackwell, Oxford.
5. Husain, M. 2002. Evolution of Geographic Thought (also in hindi). Rawat Publications, Jaipur.
6. Sing, J. 1988. Bhaugolik Chenta ka karam vikas. Gyanodaya. Gorakhpur.
7. Peet, R. 1998. Modern Geographical Thought. Blackwell, Oxford.
8. Adhikari, S. 2015. Fundamentals of Geographical Thought. India Orient Blackswan.
9. Dikshit, R.D. Geographical Thought. 1997. PHI Learning Pvt. Ltd., New Delhi.
10. Martin G.J. 2005. All Possible World. OUP, USA.
11. Cresswell, T. 2012. Geographical Thought: A Critical Introduction. Wiley Pub.
12. Lalita Rana. 2008. Geographical Thought: A Systematic Record Of Evolution. Concept Publishing Company.
13. Arild Holt-Jensen. 2009(2<sup>nd</sup> edition). Geography: History and Concepts. Sage Pub.

## **REMOTE SENSING AND IMAGE PROCESSING**

### **Practical - III (GGM -204)**

**Credits: 2**

#### **UNIT I : REMOTE SENSING AND IMAGE INTERPRETATION**

Referencing layout and indent of Landsat TM and IRS imageries; Identification of objects / features on multiband imageries; Detection of defined objects/features; Preparation of Image interpretation keys; Interpretation, classification using aerial photographs

#### **UNIT II : DIGITAL IMAGE PROCESSING**

Digital Images: User Interface with Image Processing Software: Image Registration: Image to map and Image to Image; Selection of training sets; Image Classification: Supervised and Unsupervised classification

#### **UNIT III : MAPPING GEOMOGRAPHIC FEATURES**

Geomographic mapping using aerial photographs and satellite imageries; Morphometric analysis: Drainage density, Stream order; Channel change.

#### **UNIT IV : URBAN LAND USE / LAND COVER MAPPING**

Urban Land use/Land cover classification of Chandigarh / Delhi/ Bangalore / Mumbai / Hyderabad / Kolkata/ Varanasi using IRS data

#### **Books Recommended:**

1. K K Rampal. 1999. Handbook of Aerial Photography and Interpretation. South Asia Books
2. Dickinson, G.C. 1979. Maps and Aerial Photographs. Arnold – Heinemann, New Delhi.
3. Lillisand,T., Keifer, Ralph W., Chipman, J. 2011. Remote Sensing and Image Interpretation. John Wiley Pub., New York
4. Lindgren, D.T. 2010. Land Use Planning and Remote Sensing. Springer.
5. Miller, V.C., 1961. Photogeology. McGraw Hill, New York.
6. NRSA, Data User Handbook, Hyderabad.
7. Sabins, Floyd F. 2007. Remote Sensing : Principles and Interpretation, Waveland Pr Inc.
8. Siegal, B.S. and AR Gillespie, 1980, Remote Sensing in Geology, Wiley, New York.
9. Townshend, J.R.G. 1981. Terrain Analysis and Remote Sensing, HarperCollins Publishers
10. Way, D.S. 1978, Terrain Analysis : A Guide to Site selection using Aerial Photo Interpretation. Dowden, Hutchinson & Ross Pub.

**SOCIO- ECONOMIC SURVEY**  
**Practical- IV (GGM -205)**

**Credits: 2**

**UNIT- I**

Procurement of a topographic map of 1:50,000 to 1:25,000 scale to study the settlements selected in its regional setting.

**UNIT- II**

Collection of demographic, social & economic data of the village/town from Census Reports to study the temporal changes in the profile of such characteristics. Procurement of a cadastral map of the village/town for field mapping of the features of land-use and land quality.

Procurement/preparation of the settlement-site map through rapid survey to map the residential, commercial, recreational (Parks, Playgrounds), educational, religious and other prominent features.

**UNIT -III**

Selection of sampling site, defining sampling size, and conducting socio-economic survey at households level with a self- structured questionnaire and supplementing the information by personal observations and perceptions.

**UNIT- IV**

Based on results of the land-use and socio-economic survey of the households, preparation of a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.

**Books Recommended:**

1. Gregory, S. 1980. Statistical methods and the Geographer. Longman, London.
2. Mahmood, A. 2008. Statistical Methods in Geographical Studies. Rajesh Pub., New Delhi.
3. Ibrahim, R. 1992. Socio-Economic Profile of Mewat. Radha Publishers, New Delhi.
4. Robinson, A.H., et.al. 1995(6<sup>th</sup> edition). Elements of Cartography. John Wiley , New York.
5. Raisz, E. 1962. Principles of Cartography. Mc Graw Hill, New York.

**Skill Enhancement Course (SEC)**  
**LAND SURVEYING AND GPS**  
**(GGM-206)**

**Credits: 4**

**Unit-I: Theory and Principles**

Surveying: Definition, classification, objectives, principles; Plane and geodetic surveys;  
Triangulation: Principles, base line measurement, extension of the base.

**Unit-II: Field Work**

Levelling by Dumpy level; Resection: (Two point and Three point problem) by Plane Table;  
Horizontal and Inclined Range Determination by Telescopic alidade; Triangulation by Theodolite

**Unit-III: GPS Theory**

Overview of Global Positioning System; GPS: Receivers, Satellite Constellations, Segments,  
Antennas, Signal Codes and errors; Accuracy of GPS measurements; Application of GPS

**Unit-IV: Field Work**

GPS Surveying and Mapping: Field Exercises using Hand Held GPS

**Books Recommended:**

1. Aylmer Johnson. 2004. Plane and Geodetic Surveying. CRC Press.
2. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
3. Gupta K.K. and Tyagi, V. C., 1992: Working with Map, Survey of India, DST, New Delhi.

**CHOICE BASED PAPER (CB)**  
**Human Ecology**  
**Paper II(GGM-207)**

**Credits: 4**

**UNIT I: INTRODUCTION**

Human Ecology: Evolution & Development; Key Concepts: Anthropocentrism, cultural lag; Environmental ethics and institutions.

**UNIT II: HUMANS AND ENVIRONMENT**

Humans and the Biosphere: Co-evolution and co-adaptation of human system and ecosystems; Resources and technologies; Environment and consumerism: Problems and consequences; Geographies of hunger and health.

**UNIT III: HUMANS AND BIOPHYSICAL SYSTEM**

Humans as persons and agents of larger social system; Human population: size, growth and biophysical carrying capacity of Earth; Ecosystem: components and functions; Energy Flow: Food chain , Food Web and Trophic Levels; Material Cycles: Nitrogen and Carbon.

**UNIT IV: GLOBAL CHANGE ADAPTATION**

Environmental Adaptations and behavioral changes; Environmental crises and Management: Eco regional and watershed management strategies; Landscapes restoration and conservation of biodiversity.

**Books Recommended:**

1. Dieter Steiner and Marcus Nauser (ed.). 1993. Human Ecology. Routledge.
2. Ehrlich, P.R, Ehrlich, A.H. and Holdren, J.P. 2000(Revised). Human Ecology. W.H.Freeman & Co. San Franchisco
3. George Theodorson (ed.). 1961. Studies in Human Ecology. Harper & Row, New York.
4. Quinn, J.A. 1971. Human Ecology (2<sup>nd</sup> Edition). Archon Books, New York.
5. Odum, E.P. 2004. Fundamentals of Ecology. Cengage Learning, New York.
6. Arumugam, N. 2014. Concepts of Ecology. Saras Publication, Delhi.
7. Robert Ezra Park. 2003. Human Communities: The City and Human Ecology. Freeman Press.
8. Lovett G.M., Jones C., Turns M.G., Weather K.C. 2005. Ecosystem Function in Heterogenous Landscapes. Springer.

9. Pushpam Kumar, Reddy B. Sudhakar. 2007. Ecology and Human Well Being. Sage Publication.
10. Vladimir F. Krapivin., Costas A. Varotsos. 2005. Biogeochemical Cycles in Globalization and Sustainable Development. Springer.