

**DEPARTMENT
OF
GEOGRAPHY**

**PROGRAMME: M.Sc. GEOGRAPHY
COURSE CURRICULUM
(CHOICE BASED CREDIT SYSTEM)**

ACADEMIC SESSION: 2017-18 and onwards



**CENTRAL UNIVERSITY OF HARYANA
MAHENDERGARH-123031**

Master of Science in Geography (*Comprehensive structure*)

1. Core Course (CC)

(Exclusive for Geography students)

Sl.No.	Course code	Course title	L	S	P	Credit
1.	SEE GEO 1 1 01 C 4105	Geomorphology	4	1	0	5
2.	SEE GEO 1 1 02 C 4105	Climatology	4	1	0	5
3.	SEE GEO 1 1 03 C 4105	Population and Settlement Geography	4	1	0	5
4.	SEE GEO 1 1 04 C 2114	Practical I: Practical Geography: Cartographic methods- Conventional	2	1	2	4
5.	SEE GEO 1 2 05 C 4105	Geographical Thought	4	1	0	5
6.	SEE GEO 1 2 06 C 4105	Hydrology and Oceanography	4	1	0	5
7.	SEE GEO 1 2 07 C 4105	Statistical methods in Geography	4	1	0	5
8.	SEE GEO 1 2 08 C 2114	Practical II: Practical Geography: Cartographic methods- Modern	2	1	2	4
9.	SEE GEO 1 2 09 C 1012	Research methodology, Field work and Report writing (Socio-Economic aspect)	1	0	2	2
10.	SEE GEO 1 3 10 C 4105	Geography of India	4	1	0	5
11.	SEE GEO 1 3 11 C 4105	Regional Development and Planning	4	1	0	5
12.	SEE GEO 1 3 12 C 4105	Geography of Central Places	4	1	0	5
13.	SEE GEO 1 3 13 C 2114	Geoinformatics	2	1	2	4
14.	SEE GEO 1 3 14 C 1012	Research Methodology, Field work and report writing (Physical aspect)	1	0	2	2

3. Discipline Centric Elective Courses (DCEC)

(Offered to the students of Geography)

Sl. No.	Course code	Course title	L	S	P	Credit
1.	SEE GEO 1 2 01 DCEC 4105	Economic Geography	4	1	0	5
2.	SEE GEO 1 2 02 DCEC 4105	Soil Geography	4	1	0	5
3.	SEE GEO 1 3 03 DCEC 4105	Environmental Geography	4	1	0	5
4.	SEE GEO 1 3 04 DCEC 4105	Political Geography	4	1	0	5
5.	SEE GEO 1 4 05 DCEC 3104	Demographic Methods	3	1	0	4
6.	SEE GEO 1 4 06 DCEC 3104	Natural hazard and disaster management	3	1	0	4

2. Generic Elective Course (GEC)

(Offered to other departments)

Sl.No.	Course code	Course title	L	S	P	Credit
1.	SEE GEO 1 1 01 GE 3104	Population and Development	3	1	0	4
2.	SEE GEO 1 1 02 GE 3104	Elements of Physical Geography	3	1	0	4

3.	SEE GEO 1 1 03 GE 2114	Introduction to Cartography	2	1	2	4
4.	SEE GEO 1 3 04 GE 3104	Fundamentals of Human Geography	3	1	0	4
5.	SEE GEO 1 3 05 GE 3104	Geography of India	3	1	0	4

4. Skill Enhancement Elective Course (Compulsory and exclusively for Geography students)

S. No.	Course code	Course title	L	S	D	V	Credit
1.	SEE GEO 1 4 01 SEEC 228416	Field Based Dissertation (including viva voce)	2	2	8	4	16
2.	SEE GEO 1 4 02 SEEC	Self-Study Course	-	-	-	-	

OR

S. No.	Course code	Course title	L	S	D	V	Credit
1.	SEE GEO 1 4 01 SEEC 4212624	Field Based Dissertation (including viva voce)	4	2	12	6	24

- **Note: L: Lecture; S: seminar; P: Practical; D: Dissertation; V: Viva Voce**
- **Core Course (CC)**
(Exclusive for Geography students)
- **Generic Elective Course (GEC)**
(Offered to other departments)
- **Discipline Centric Elective Courses (DCEC)**
(Offered to the students from Geography and other departments)
- **Skill Enhancement Elective Course (SEEC)**
(Exclusively for Geography students)

Master of Science in Geography (*Semester-wise structure*)

Semester I

S. No	Course code	Course title	L	S	P	Credit
1.	SEE GEO 1 1 01 C 4105	Geomorphology	4	1	0	5
2.	SEE GEO 1 1 02 C 4105	Climatology	4	1	0	5
3.	SEE GEO 1 1 03 C 4105	Population and Settlement Geography	4	1	0	5
4.	SEE GEO 1 1 04 C 2114	Practical I: Practical Geography: Cartographic methods- Conventional	2	1	2	4
5.	To be taken from other department by Geography student					4
Generic Elective Course (GEC) (offered to other departments)						
6.	SEE GEO 1 1 01 GE 3104	Population and Development	3	1	0	4
7.	SEE GEO 1 1 02 GE 3104	Elements of Physical Geography	3	1	0	4
8.	SEE GEO 1 1 03 GE 3104	Introduction to Cartography	3	1	0	4
Total Credits 23						

Note: Course s. no. 6,7 and 8 are exclusively for other departments.

Semester II

S. No.	Course code	Course title	L	S	P	Credit
1.	SEE GEO 1 2 05 C 4105	Geographical Thought	4	1	0	5
2.	SEE GEO 1 2 06 C 4105	Hydrology and Oceanography	4	1	0	5
3.	SEE GEO 1 2 07 C 4105	Statistical methods in Geography	4	1	0	5
4.	SEE GEO 1 2 08 C 2114	Practical II: Practical Geography: Cartographic methods- Modern	2	1	2	4
5.	SEE GEO 1 2 09 C 1012	Research Methodology, Field work and Report writing (Socio-Economic aspect)	1	0	2	2
6.	Any one of the following DCEC courses					
	SEE GEO 1 2 01 DCEC 4105	Economic Geography	4	1	0	5
	SEE GEO 1 2 02 DCEC 4105	Soil Geography	4	1	0	5
Total Credits 26						

Semester III

S.No	Course code	Course title	L	S	P	Credit	
1.	SEE GEO 1 3 10 C 4105	Geography of India	4	1	0	5	
2.	SEE GEO 1 3 11 C 4105	Regional Development and Planning	4	1	0	5	
3.	SEE GEO 1 3 12 C 4105	Geography of Central Places	4	1	0	5	
4.	SEE GEO 1 3 13 C 2114	Geoinformatics	2	1	2	4	
5.	SEE GEO 1 3 14 C 1012	Research Methodology, Field work and Report writing (Physical aspect)	1	0	2	2	
6.	Any one of the following DCEC courses						
	SEE GEO 1 3 03 DCEC 4105	Environmental Geography	4	1	0	5	
	SEE GEO 1 3 04 DCEC 4105	Political Geography	4	1	0	5	
7.	To be taken from other department						4
Generic Elective Course (GEC) (offered to other departments)							
8.	SEE GEO 1 3 04 GE 3104	Fundamentals of Human Geography	3	1	0	4	
9.	SEE GEO 1 3 05 GE 3104	Geography of India	3	1	0	4	
						Total Credits 30	

Note: Course s. no. 8 and 9 are exclusively for other departments.

Semester IV

Skill Enhancement Elective Course (Compulsory and exclusively for Geography students)

S. No.	Course code	Course title	L	S	D	V	Credit
1.	SEE GEO 1 4 01 SEEC 228416	Field Based Dissertation (including viva voce)	2	2	8	4	16
2.	SEE GEO 1 4 02 SEEC	Self-Study Course	-	-	-	-	
	Two of the DCEC courses						
			L	S	P		Credit
3.	SEE GEO 1 4 05 DCEC 3104	Demographic Methods	3	1	0		4
4.	SEE GEO 1 4 06 DCEC 3104	Natural hazard and disaster management	3	1	0		4
						Total Credit 24	

OR

S. No.	Course code	Course title	L	S	D	V	Credit
1.	SEE GEO 1 4 01 SEEC 4212624	Field Based Dissertation (including viva voce)	4	2	12	6	24

Total Credits of M.Sc. Geography Programme: 23+26+30+24 = 103

M.Sc. Geography, Semester-I
Course Title- Geomorphology
Course Code- SEE GEO 1 1 01 C 4105

Credit - 5

Course Outline

Unit I

Concepts and Approaches: Fundamental Concepts, Concepts of time: cyclic, graded and steady state, concept of morphogenetic regions, concept of dynamic equilibrium, approaches in geomorphology, Systems in geomorphology, Models in geomorphology, recent trends in geomorphology

Unit II

Internal structure of earth, Origin of Continent and ocean- Tetrahedral Hypothesis, Continental drift hypothesis, Continental drift theory, Plate Tectonic and Sea floor Spreading, Concept of Isostasy, Geosyncline, Rocks

Unit III

Endogenetic forces and Exogenetic forces: Fold, Fault Weathering, Cycle of Erosion and Mass Movements, Dynamics of fluvial, glacial, aeolian, marine, and karst processes; Landforms: Climatic, Tectonic, Erosional and depositional Landforms

Unit IV

Theories of Hill slope evolution, Regional Geomorphology: Study of any two region of India, Applied Geomorphology: nature and objectives, geomorphic hazards and mitigation measures, Application of geomorphological knowledge in mining, constructions and other human activities

Recommended Readings:

1. Bloom, A.L. (1992): *Geomorphology*, Second Edition, Prentice Hall of India, New Delhi.
2. Chorley, R.J. (1972): *Spatial Analysis in Geomorphology*, Methuen, London.
3. Cooke, R.U. and Doornkamp, J.C. (1974): *Geomorphology in Environmental Management—An Introduction*, Clarendon Press, Oxford.
4. Dayal, P. (1990): *A Text Book of Geomorphology*, Shukla Book Depot, Patna.
5. Dury, G.H. (1959): *The Face of the Earth*, Penguin, Harmondsworth.
6. Fairbridge, R.W. (1968): *Encyclopedia of Geomorphology*, Reinholdts, New York.
7. Husain, M. (2002): *Fundamentals of Physical Geography*, Second Edition, Rawat Publications, Jaipur.
8. McKnight, T. L. (1987): *Physical Geography: A Landscape Appreciation*, Second Edition, Prentice Hall, New Jersey.
9. Olliver, C.D. (1979): *Weathering*, Longman, London.
10. Pitty, A.F. (1971): *Introduction to Geomorphology*, Methuen, London.
11. Sharma, H.S. (ed.) (1980): *Perspectives in Geomorphology*, Concept, New Delhi.
12. Singh, S. (1993): *Physical Geography*, Prayag Pustak Bhawan, Allahabad.

13. Singh, S. (1998): **Geomorphology**, Prayag Pustak Bhawan, Allahabad.
14. Skinner, B.J. & Porter, S.C. (1995): **The Dynamic Earth**, John Wiley, New York.
15. Sparks, B.W. (1960): **Geomorphology**, Longman, London.
16. Stoddart, D.R. (ed.) (1996): **Process and Form in Geomorphology**, Routledge, New York.
17. Strahler, A.H. and Strahler, A.N. (2006): **Modern Physical Geography**, Fourth Edition, Willey-India, New Delhi.
18. Strahler, A.N. (1988): **Earth Sciences**, Harper & Row, New Delhi.
19. Thornbury, W.D. (1991): **Principles of Geomorphology**, (Indian Reprint), John Wiley, New Delhi
20. Wooldridge, S.W. and Morgan, R.S. (1991): **An Outline of Geomorphology**, Orient Longmans, Calcutta.

M.Sc. Geography Semester - I
Course Title- Climatology
Course Code- SEE GEO 1 1 02 C 4105

Credit - 5

Course Outline

Unit I

Nature and Scope of Climatology, Climatic elements – atmospheric structure, temperature, pressure, moisture: forms of condensation and precipitation, general atmospheric circulations and processes, jet stream.

Unit II

Weather system and disturbances – Concept of atmospheric stability, Air mass, fronts, Cyclones, Tornados; Ocean atmospheric interaction- El Nino, ENSO, Monsoon winds (case study of India).

Unit III

Global climate system – Approaches to climatic classification; Classification of Koppen, and Thornthwaite, Major climates of the world – tropical, Temperate and polar. Study of micro and macro climatic region (with special reference to India)

Unit IV

Climatic changes – evidences, causes, global warming and its Impact, Oozon depletion and its impact, Acid rain and its impact, Sea level change and its impact, Concept of Heat Island, Indian Expedition to Arctic and Antarctica- their study and its effect on Indian Climate, Study of climate in relation to Agriculture, Industry, Housing, Transport, Health and Forest (with special reference to India)

Recommended Readings:

1. Menon, P.A. (1989), **Our Weather**, N.B.T., New Delhi.

2. Das, P.K. (1987), **Monsoons**, National Book Trust, New Delhi.
3. Fein, J.S. and Stephens, P.N. (1987), **Monsoons**, Wiley, London.
4. Peterson, S. (1969), **Introduction to Meteorology**, McGraw Hill Book, London.
5. Thompson, R.D. and Perry, A. (ed.) (1997), **Applied Climatology: Principles and Practice**, Routledge, London.
6. Barry, R.G. and Chorely, R.J., (2004), **Atmosphere, Weather and Climate**, Methuen, London.
7. Bhutani S., (2000), **Our Atmosphere**, Kalyanai Publishers, New Delhi.
8. Critchfield, H.J. (1987), **Climatology**, Prentice Hall, New Delhi.
9. Griffith, J.F. and Driscell, D.M. (1982), **Survey of Climatology**, Charles Merrill, New York.
10. Lal, D.S. (1993), **Climatology**, Chaitanya Publishing House, Allahabad.
11. Riehl, H. (1968), **Introduction to Atmosphere**, McGraw Hill, New York.
12. Robinson, P.J. and Sellers, H. (1986), **Contemporary Climatology**, Longman, London.
13. Trewartha, G.T. (Latest edition) **Introduction to Climate**, McGraw Hill, New York.

M.Sc. Geography Semester - I
Course Title- Population and Settlement Geography
Course Code- SEE GEO 1 1 03 C 4105

Credit - 5

Course Outline

Unit I

Concepts, scope and methodology of population geography; Sources of population data with particular reference to India; Population Profile of World and India: Population Distribution and Characteristic, Population policy: developed and developing countries, India's population policy; Concept of Human Development

Unit II

Theories and Dynamics of Population: Pre-Malthus, Malthusian and Modern Theories; Measurement, theories, trend and pattern of Fertility, Mortality and Migration
 Population issues- Population and Resource, Population and Environment

Unit III

Evolution, size and growth of human settlements: Theories of evolution of settlements; size, distribution, spatial and temporal trends in size and growth of settlements.
 Distribution Pattern: Spatial distribution pattern of settlements: Theoretical models and empirical findings.

Unit IV

Settlement Structure: Physical characteristics of internal structure and external form, theories explaining internal morphological structure of cities; empirical and theoretical models explaining the functional classification of towns & villages; functional classification of urban centres, functional typology of villages, functional landscape, functional structure of towns in India. Land use (principles and theories of land use) in urban and rural setting: house types and building materials, environmental, soci-economic/cultural factors influencing the dynamics of settlement structure.

Recommended Readings for population:

1. Beaujen- Garnier, J. (1966): ***Geography of Population***, Longman, London
2. Bhende, A. and Kanitkar, T. (2006): ***Principles of Population Studies***, latest Edition, Himalaya Publishing House, Mumbai.
3. Bilasborrow, R.E. and Daniel H. (1999): ***Population and Deforestation in the Humid Tropics***, International Union for the Scientific Study of Population, Belgium.
4. Bogue, D.J. (1969): ***Principles in Demography***, John Wiley, New York.
5. Bose, A. *et al.* (1974): ***Population in India's Development (1947-2000)***, Vikas Publishing House, New Delhi.
6. Chandana, R.C. (2008): ***Geography of Population: Concepts, Determination and Patterns***, latest edition, Kalyani Publishers, New Delhi.
7. Clarke, J.I. (1992): ***Population Geography***, Second Edition, Pergamon Press, Oxford England.
8. Crook, N. (1997): ***Principles of Population and Development***, Pergamon, New York.
9. Daugherty, H.G., Kenneth C.W.K. (1998): ***An Introduction to Population*** (Second Edition), The Guilford Press, New York, London.
10. Garnier, B.J. (1970): ***Geography of Population***, Longman, London.
11. Mamoria C.B. (1981): ***India's Population Problems***, Kitab Mahal, New Delhi.
12. Mitra, A. (1978): ***India's Population: Aspects of Quality and Control***. Vol. I & II, Abhinav Publications, New Delhi.
13. Premi M.K. (1991): ***India's Population: Heading Towards a Billion***, B.R. Publishing, New Delhi.

Suggested Reading for settlement

1. Ambrose, Peter (1970): ***Concepts in Geography*** Vol.-I Settlement Pattern, Longman
2. Baskin, C., (Translator)(1966): ***Central Places in Southern Germany***, Prentice-Hall Inc. Englewood Cliffs New Jersey. Originally written by C.W. Christaller in German with title Die Zentralen Orte Suddeutsch land in 1933.
3. Census of India (1961): ***House types and Settlement Patterns of Villages in India***, GOI, New Delhi
4. Haggett, Peter, Andrew D. Cliff and Allen Frey (editor) (1979): ***Locational Models***, Arnold Heinemann
5. King, Leslie, J. (1986): ***Central Place Theory***, Saga Publications, New Delhi

6. Mayer, M. Harold and Clyde F. Kohn (editors) (1967): **Readings in Urban Geography**, Central Book Depot, Allahabad
7. Mitra, Asok, Mukherjee S and Bose R. (1980): **Indian Cities**, Abhinav Publications, New Delhi
9. Nangia, Sudesh (1976): **Delhi Metropolitan Region**, K.B. Publications, New Delhi
10. Prakasa, Rao, V.L.S. (1983): **Urbanisation in India; Spatial Dimensions**, Concept Publishing Co., New Delhi
11. Ramachandran, R. (1992): **Urbanisation and Urban Systems in India**, Oxford University Press, New Delhi
12. Singh R.L. and Kashi Nath Singh (editors) (1975): **Readings in Rural Settlement Geography**, National Geographical Society of India, Varanasi
13. Srinivasan, K. and M. Vlassoff, (editors) (2001): **Population-Development Nexus in India: Challenges for the New Millennium**, Tata McGraw-Hill Publishing Co. Ltd., New Delhi
14. Ucko, M.J., Ruth Tringham and G.W. Dimbleby (editors) (1972): **Man, Settlement and Urbanism**, Duckworth
15. United Nations Centre for Human Settlements (HABITAT) (1996): **An Urbanising World, Global Report on Human Settlements**, Oxford University Press for HABITAT

M.Sc. Geography Semester - I

**Course Title: Practical I: Practical Geography: Cartographic methods-
Conventional**

Course code- SEE GEO 1 1 04 C 2114

Credit - 4

Course Outline

Unit I

Toposheet Interpretation: Basic information on Topographical sheets, Preliminary information, Conventional Signs, Interpretation of Relief, Drainage, Settlements, Land-use, Vegetation and Transport network on Toposheets.

Unit II

Map Projections: general principles, classification. Drawing graticules on the following projections by graphical and mathematical methods: Cylindrical projection- Simple and Equal Area Projection, Mercator Projection, Conical Projection with one and two standard parallel, Gnomonic Projection and Orthographic Projection

Mapping: Quantitative, Qualitative-print, line, area and volume-size, location and direction of symbols-selection of class intervals and choropleth and isopleth maps.

Unit III

Morphometric Analysis of Drainage basin- its geographical significance; Basin morphometry of fluviially originated drainage basin

Linear Aspects: Stream ordering based on Horton and Strahler, Bifurcation ratio

Areal Aspects: Geometry of basin shape, Basin Perimeter, Length and Area, Stream frequency and Drainage density.

Unit IV

Relief Aspects: Hypsometric analysis- Hypsometric curve and Integral Hypsometric curve, Clinographic analysis, Altimetric analysis,

Slope Analysis- Average Slope (Wentworth's method), Relative Relief (Smith's method), Dissection Index,

Profile Analysis - Longitudinal profile

Recommended Readings:

1. Chorley R.J., (Ed.), (1972): **Spatial Analysis in Geomorphology**, Harper & Row.
2. Doornkamp, J.C. and King, C.A.M. (1971): **Numerical Analysis in Geomorphology: An Introduction**, Arnold, London.
3. Ishtiaq, M. (1989): **Practical Geography**, Heritage Publishers, New Delhi.
4. Khan, Md. Z.A. (1998): **Text Book of Practical Geography**, Concept, New Delhi.
5. Khullar, D.R. (2001): **Essentials of Practical Geography**, Second Edition, New Academic Publishing, Jalandhar.
6. Mayer, L. (1990): **Introduction to Quantitative Geomorphology**, Prentice Hall, New Jersey.
7. Misra, R.P. and Ramesh, A. (1989): **Fundamentals of Cartography**, Revised and Enlarged Edition, Concept, New Delhi.
8. Monkhouse, F.J. and Wilkinson, H.R. (1980): **Maps and Diagrams**, B. I. Publications, Bombay.
9. Morisawa, M. (1983): **Geomorphological Laboratory Manual**, John Wiley, New York.
10. Pal, S.K. (1998): **Statistics for Geoscientists: Techniques and Application**, Concept, New Delhi.
11. Robinson, A.H. *et al.* (2004): **Elements of Cartography**, Sixth Edition, Wiley-India, New Delhi.
12. Sarkar, A. (2008): **Practical Geography: A Systematic Approach**, Orient Blackswan, Kolkata.
13. Sharma, J.P. (1996): **Prayogik Bhoogol**, Rastogi Publications, Meerut.

14. Singh, R.L. (1979): *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
15. Singh, Savindra (1997): *Geomorphology*, Prayag Pustak Bhawan, Allahabad.
16. Sparks, B.W. (1982): *Geomorphology*, Second Edition, Longman.
17. Upton, W.B. (1970): *Landforms and Topographic Maps*, John Wiley, New York.
18. Yadav, H.L. (2002): *Prayogatamak Bhoogol Ke Aadhar*, Radha Publications, New Delhi.

M.Sc. Geography Semester I
Course Title- Population and Development
Course code- SEE GEO 1 1 01 GE 3104

Credit - 4

Course Outline

Unit I

Conceptual Frame: Population as resource; Population and development: a debate; Population and ecosystem; Demographic transition.

Unit II

Historical Background and Characteristics: History of human population; Relationship between population, food and energy; Debate on The Limits to Growth; Population characteristics: developed and developing countries (case study of India).

Unit III

Problems and Policies: Optimum population; Family welfare and planning; Population policies in developed and developing countries (case study of India).

Unit IV

Population-Development Conflict: Concepts of rich and poor worlds and their global perspectives; Neo-Malthusian theory; Future perspectives: Growth scenario and relationship with development.

Recommended Readings:

1. Champion, T. (ed.) (1993): **Population Matters**. Paul Chapman, London.
2. Ehrlich, P.R. and Ehrlich, A.H. (1996): **Eco-science: Population, Resources and Environment.**, W.H. Freeman and Company, San Francisco.
3. Firor, J. and Jacobsen, J. E. (2003): **The Crowded Greenhouse: Population, Climatic Change and Creating a Sustainable World**. Universities Press, Hyderabad.
4. Haggett, P. (2001): **Geography, A Modern Synthesis**. Harper & Row, New York.
5. Hammett, C. (eds.) (1996): *Social Geography: A Reader*, Arnold, London.
6. Meadow, D.H., Meadows D.L., Randers J., and Behrens W.W. III. (1973): **The Limits to Growth. I Report of the Club of Rome**. The New American Library, New York.

7. Meadows, D.H., Meadows, D.L. and Randers, J. (1992): **Beyond the Limits -Confronting Global Collapse, Envisioning a Sustainable Future. (A sequel to The Limits to Growth)**. Chelsea Green Publishers, Post Mills VT, USA.
8. Mesarovic, M. and Pester, E. (1974): **Mankind at the Turning Point. II Report of the Club of Rome**. The New American Library, New York.
9. Middleton, N. and O'Keefe, P. (2001): **Redefining Sustainable Development**, Pluto Press, London.
10. Ross, J. A. (ed.) (1982): **International Encyclopaedia of Population**, Free Press, New York.
11. Sharma, P.R. (ed.) (1991): **Perspectives on the Third World Development**. Rishi Publications., Varanasi.
12. Simon, J.L. (1977): **The Economics of Population Growth**, Princeton University Press, Princeton.
13. Thakur, B. (ed.) (2004): **Population, Resources and Development**. Vol. II, Perspectives in Resource Management in Developing Countries. Concept, New Delhi.
14. Tinbergen, J. (1976): **RIO. Reshaping the International Order. III Report of the Club of Rome**. The New American Library, New York.

M.Sc. Geography Semester I
Course Title- Elements of Physical Geography
Course code- SEE GEO 1 1 02 GE 3104

Credit - 4

Course Outline

Unit I

The nature and scope of physical geography; Inter-relationship of physical Geography with other branches of earth sciences, Geological Time scale, Earth interior, Isostasy, Wegner's theory of continental drift; plate tectonic

Unit II

Earthquake, Volcano, weathering, cycle of erosion, Land forms (erosional and depositional)- Fluvial, Arid, Glacial and Karst

Unit III

Composition and structure of the atmosphere, Heat budget, planetary winds, Types of precipitation and rainfall pattern, Front, Cyclone- tropical and temperate

Unit IV

Surface configuration of ocean floor-continental shelf, slope, abyssal plain, ridge and trenches, Relief of Atlantic, Pacific and Indian Ocean, Salinity, Currents, Coral reefs

Recommended Readings:

Physical Geography

1. Dayal, P. (1996): **A Text book of Geomorphology**. Shukla Book depot, Patna
2. Dury, G.H. (1980): **The Face of the Earth**, Penguins
3. Ernst, W.G.(2000): **Earth systems - Process and Issues**. Cambridge University Press
4. ICSSR (1983): **A Survey of Research in Physical Geography**. Concept, New Delhi
5. Kale V. and Gupta, A. (2001): **Element of Geomorphology**, Oxford University Press, Calcutta
6. Monkhouse, F.J.(1960): **Principles of Physical Geography**. Hodder and Stoughton, London.
7. Pitty. A.(1974): **Introduction to Geomorphology**, Methuen, London
8. Sharma, H.S.(1987): **Tropical Geomorphology**, Concept, New Delhi
9. Singh,S. (1998): **Geomorphology**, Prayag Pustakalaya, Allahabad
10. Small, R.J.(1985): **The Study of Landforms**, Mc.Graw Hill, New York
11. Sparks, B.W. (1960): **Geomorphology**, Longmans, London
12. Steers, J.A.(1964): **The Unstable Earth. Some recent views in geography**, Kalyani Publishers, New Delhi
13. Strahler, A.N.(1973): **Environmental Geo-Science**, Hamilton Publishing, Santa Barbara
14. Strahler, A.N. and Strahler, A.H.(1992): **Modern Physical Geography**; John Wiley & Sons, Revised edition
15. Summerfield, M.A.(1991): **Global Geomorphology**, Longman
16. Thornbury, W.D.(1969): **Principles of Geomorphology**, Wiley Eastern
17. Wooldridge, S.W. and Morgan, R.S. (1959): **The Physical Basis of Geography - An Outline of Geomorphology**, Longman Green & Co., London
18. Wooldrige, S.W. (1956): **The Geographer as Scientist**. Thomas Nelson and Sons Ltd., London

Climatology

1. Barry, R.G. & Chorley, R.J. Atmosphere(1998): **Weather and Climate**, Routledge
2. Critchfield, H (1975): **General Climatology**, Prentice-Hall, New York
3. Das, P.K.(1968): **The Monsoons**, National Book Trust, New Delhi
4. Lydolph, Paul, E. (1985): **The Climate of the Earth**, Rowman and Allanheld, Totowa, N.J.
5. Mather, J.R. (1974): **Climatology**, McGraw-Hill, New York
6. Patterson, S. (1969): **Introduction of Meteorology**, McGraw-Hill Book Co., London
7. Stringer, E.T. (1982): **Foundation of Climatology**, Surjeet Publications, Delhi
8. Trewartha, G.T. (1980): **An Introduction to Climate**, International Students edition , McGraw Hill, New York

Oceanography

1. Anikouchine, W.A. and Sternberg, R.W.(1973): **The World Oceans - An Introduction to Oceanography**, Englewood Cliffs, N.J.
2. Grald, S. (1980): **General Oceanography - An Introduction**, John Wiley & Sons, New York
3. Garrison, T.(1998): **Oceanography**. Wadsworth.com. USA
4. King, C.A.M.(1972): **Beaches and Coasts**, E. Arnold, London

5. King, C.A.M(1975): **Oceanography for Geographers** E. Arnold, London
6. Sharma, R.C. and Vatel M. (1970): **Oceanography for Geographers**, Chetnya Publishing House, Allahabad
7. Shepard, F.P. (1948): **Submarine Geology**, Harper & Sons, New York
8. Thurman, H.B. (1984): **Introductory Oceanography**, Charles Webber E. Merrill Publishing Co.
9. Weisberg, J. and Howard(1976): **Introductory Oceanography**, McGraw-Hill Book Co., New York, 1976

M.Sc. Geography Semester I
Course Title – Introduction to Cartography
Course code- SEE GEO 1 1 03 GE 2114

Credit - 4

Course Outline

Unit I

The nature and scope of cartography; Scale: Types of Scale; Map - types of maps. Methods of showing relief; Representation of different landforms by contours; Representation of temperature, pressure and rainfall data.

Unit II

Study of Survey of India topographical maps- classification and scale: Interpretation of S0I topo-sheets of a hilly and a plain area of India in respect of relief, drainage, settlement and communication pattern; Field work: Select any area near the Institution; collect topo-sheets of the area-1: 50,000 scale; Visit the area and identify the landforms, settlements, land use features and compare the same with the topo-sheets. Draw sketches and maps of the selected area.

Unit III

Map Projections: general principles, classification. Drawing graticules on the following projections by graphical and mathematical methods: Simple Cylindrical projection, Cylindrical Equal Area Projection, Mercator Projection, Conical Projection with one standard parallel, Conical projection with two standard parallels, Gnomonic Projection and Orthographic Projection

Unit IV

Types of cartographic symbols and their uses: Points (dots, proportional circles and spheres), Line, (isopleths and flow lines), Areas (Choropleth); Use of line and bargraphs for representing population, agriculture, industry and transport data; Representation of population (distribution, density, growth etc.)

Recommended Readings:

1. Misra, R.P. and Ramesh, A.(1986): **Fundamentals of Cartography**, McMillan Co., New Delhi
2. Pal, S.K.(1998): **Statistics for Geoscientists — Techniques and Applications**, Concept, New Delhi
3. Robinson, A.H. et al.(1995): **Elements of Cartography**, John Wiley & Sons, U.S.A.
4. Sarkar A. K.(1997): **Practical Geography: A Systematic Approach**, Oriental Longman, Calcutta
5. Singh, R.L. and Dutt, P.K.(1979): **Elements of Practical Geography**, Kalyani Publishers, New Delhi
6. Monkhouse, F.J. & Wilkinson, H.R.(1994): **Maps and Diagrams**, Methuen, London
7. Singh, R.L.: **Elements of Practical Geography**, Kalyani Pub., New Delhi.
8. Steers, J.A.: **Map Projections**, University of London Press, London.
9. Khan, Z.A.(1998): **Text Book of Practical Geography**, Concept, New Delhi

M.Sc. Geography Semester II
Course Title- Geographical Thought
Course code- SEE GEO 1 2 05 C 4105

Credit - 5

Course Outline

Unit I

Evolution of Geographic Thought: Changing paradigms – Environmentalism, Possibilism, areal differentiation, spatial organisation

Unit II

Theory in Geography: structure, nature, type and applications in geography; human-environment interactions. Philosophical debates in Contemporary Geography: Critical understanding of positivism, behaviouralism, Marxism, Structuralism, post-structuralism and post-modernism.

Unit III

Methods in Geographical Analysis: Epistemology of geography, critical assessment and debates on quantitative, qualitative, field and cartographic methods in geography

Unit IV

Future of Geography: changing nature, concepts, approaches and methodologies of geography in a Globalising World, Progress and Contributions in Indian Geography

Recommended Readings:

1. Bhaskar, R. (1978): **A Realist Theory of Science**, Hassocks, Sussex.
2. Bhaskar, R. (1989): **Reclaiming Reality: A Critical Introduction to Contemporary Philosophy**, Verso, London.
3. Bunge, W. (1966): **Theoretical Geography**. Lund Studies in Geography, Series C., no.1, Lund, Sweden.
4. Buttner, A. and Seamon, D. (ed.) (1980): **The Human Experience of Space and Place**, Croonhelm, London.
5. Castree, R., Rogers A. and Sherman D. (2005): **Questioning Geography: Fundamental Debates**. Blackwell, Oxford.
6. Clifford, N.J. (2002): **The Future of Geography: when the whole is less than the sum of its parts**, Geoforum, Vol. 33, 431-436.
7. Cresswell, T. (2014): **Geographic Thought: A Critical Introduction**, Blackwell, New York.
8. Dikshit, R.D. (2010): **Geographical Thought**, Prentice-Hall, New Delhi.
9. Haggett, P. and Cliff, A.D. and Frey, A. (1977): **Locational Analysis in Human Geography**, Arnold, London.
10. Hartshorne R. (1939): **The Nature of Geography**, AAG, New York.
11. Harvey, D. (1969): **Explanation in Geography**. Arnold, London.
12. Harvey, D. (1973): **Social Justice and the City**, John Hopkins University, Baltimore.
13. Holt-Jensen A. (1999): **Geography- History and Concepts**, Sage, London.

14. Johnston, R., Gregory D., Pratt G., Watts, M. and Whatmore, S. (2009): **The Dictionary of Human Geography**, Blackwell, New York.
15. Johnston, R.J. and Sidaway, J.D. (2004): **Geography and Geographers**, Arnold, London.
16. Peet, R. (1998): **Modern Geographical Thought**, Wiley-Blackwell, New York

M.Sc. Geography Semester - II
Course Title- Hydrology and Oceanography
Course code- SEE GEO 1 2 06 C 4105

Credit - 5

Course Outline

Unit I

Bases of Hydrology: Meaning, scope, approach; Hydrological cycle; Man's influence on the hydrological cycle; Precipitation: types, characteristics and measurements; Interception; Evaporation: factors affecting evaporation from free water surface and soil; Evapotranspiration: estimation and its control, Water and Its Disposition. Soil moisture and its zones; Infiltration; Groundwater: occurrence, storage, recharge and discharge;

Unit II

Runoff: its sources and components, factors affecting runoff; River regimes; floods and droughts; Hydrograph: components and separation, water balance: measures and time-space characteristics, Water Resource Problems: water demand and supply, water quality, interstate water disputes, institutional and financial constraints, eco-hydrological consequences of environmental degradation, Water Resource Management: social and institutional considerations.

Unit III

Introduction: Nature and scope of oceanography; Plate Tectonics and Ocean, Major topographic features of ocean basins: continental shelf, slope, ridge and deeps, abyssal plains; submarine canyons; configuration of ocean floors of Indian Ocean and Atlantic Ocean, Marine Sediments; Salinity, Physical and chemical properties of ocean water.

Unit IV

Oceanic processes: Interlink between atmospheric and ocean; Upper and Deep ocean circulation; currents, waves, tides and tsunami, Oceanic life and Resources: types of Organisms; coral reefs - origin and distribution, Major Marine Environments: Coastal: estuaries, deltas; Deep sea environment; Marine Resources: Food, Mineral and Energy

Recommended Readings:

For Hydrology

1. Abbas, B.M. (1982): **The Ganges Water Dispute**, Vikas Publishing House, New Delhi.
2. Aggarwal, A. (1991): **Floods, Floodplains and Environmental Myths**, Centre for Science and Environment, New Delhi.
3. Andrew, D.W. and Stanley, T. (2004): **Environmental Hydrology**, 2nd edition, CRC Press, Allahabad.
4. Bhattacharya, S.K. (1988): **Urban Domestic Water Supply in Developing Countries**, CBS Publishers & Distributors, Delhi.
5. Bilas, R. (1988): **Rural Water Resource Utilization and Planning**. Concept, New Delhi.
6. Brutsaert, W. (2005): **Hydrology: An Introduction**, Cambridge University Press.
7. Davie, T. (2008): **Fundamentals of Hydrology**, Routledge, London.
8. Karanth, K.R. (1988): **Ground Water: Exploration, Assessment and Development**, Tata-McGraw Hill, New Delhi.
9. Mahajan, G. (1989): **Evaluation and Development of Groundwater**, Ashish Publishing House, New Delhi.
10. Palanisami, K. (1984): **Integrated Water Management: The Determinants of Canal Water Distribution in India: A Micro Analysis**, Aricole, New Delhi.
11. Rai, V.K. (1993): **Water Resource Planning and Development**, Deep & Deep Publication, New Delhi
12. Ramaswamy, C. (1985): **Review of floods in India during the past 75 years: A Perspective**. Indian National Science Academy, New Delhi.
13. Rao, K.L. (1982): **India's Water Wealth**, 2nd edition, Orient Longman, Delhi.
14. Reddy, J.P. (1988): **A Textbook of Hydrology**. Laxmi Publication, New Delhi.
15. Singh, M.B. (1999): **Climatology and Hydrology**. Tara Book Agency, Varanasi. (In Hindi).
16. Singh, V.P. (1995): **Environmental Hydrology**, Kluwar Academic Publications, The Netherlands.
17. Todd, D.K. (1980): **Groundwater Hydrology**. John Wiley, New York.
18. Ward, R.C. and Robinson, M. (2000): **Principles of Hydrology**. McGraw Hill, New York.
19. Warren Viessman Jr. and Gary L. Lewis, (2002): **Introduction to Hydrology**, Prentice Hall, New York

Recommended Readings:

For Oceanography

1. Davis, R.J.A. (1986): **Oceanography - An Introduction to the Marine Environment**, C. Brown, Iowa.
2. Denny, M. (2008): **How the Ocean Works: An introduction to Oceanography**, Princeton University Press, New Jersey.
3. Duxbury, C.A and Duxbury, B. (1996): **An Introduction to the world's Oceans**, 2nd Edition, C. Brown, Iowa.
4. Garrison, T. (1995): **Essentials of Oceanography**, Wards worth, London.
5. Garrison, T. (2001): **Oceanography - An Introduction to Marine Science**, Cole Pacific Grove, USA.

6. Gross, M. Grant (1987): **Oceanography: A View of the Earth**, Prantice - Hall Inc. New Jersey.
7. Kennel, J.P. (1982): **Marine Geology**, Prentice Hall, New Jersey.
8. Kerhsaw, S. (2004): **Oceanography: An Earth Science Perspective**, Routledge, London.
9. Sharma, R.C. (1985): **The Oceans**, Rajesh Publications, New Delhi.
10. Sharma, R.C. and Vatal, V. (1986): **Oceanography for Geographers**, Chatanaya Publishing, Allahabad.
11. Shepart, F. (1969): **The Earth beneath the Sea**, Athneum, New York.
12. Sieboldt, E. and W.H. Berger (1994): **The Sea Floor**, 2nd ed., Freeman, New York.
13. Stopmmel, H. (1987): **A View of the Sea**, Princeton University Press, New Jersey.
14. Ummerkutty, A.N.P. (1985): **Science of the Oceans and Human Life**, NBT, New Delhi.
15. Von, A.W.S. (1962): **An Introduction to Physical Oceanography**, Addison, New York.

M.Sc. Geography Semester II
Course Title – Statistical Methods in Geography
Course code- SEE GEO 1 2 07 C 4105

Credit - 5

Course Outline

Unit I

Geography and Statistics; Significance of Statistics in geographical studies; Types of Data; levels of data measurement. Sampling: basic concepts, sample units and design, sampling frame and procedures, standard error and sample size, testing the adequacy of samples.

Unit II

Measures of Central Tendency and their significance; Centographic techniques: mean centre, median centre and standard distance.

Measures of dispersion and concentration: Range, quartile deviation, mean deviation, standard deviation; coefficient of variation, Lorenz Curve and Gini's Coefficient; location Quotient.

Unit III

Bivariate Analysis: Forms of relation and measuring the strength of association and relation-construction and meanings of scatter diagram; Spearman's Rank Difference and Karl Pearson's Product Moment Correlation Coefficients

Unit IV

Regression analysis: regression equations, construction of regression line-interpolation, prediction, explanation; residual-statistical tests of significance of the estimates; computation of residuals and mapping.

Hypothesis Testing: Needs and types of hypotheses-goodness of fit and significance and confidence levels-parametric and non-parametric procedures: contingency tables, Chi-square test, t-test, Mann-Whitney U test, Analysis of Variance (ANOVA)

Basic principles and elements of Factor Analysis and principal component analysis

Recommended Readings:

1. David, U. (1981): *Introductory Spatial Analysis*, Methuen, London.
2. Ebdon, D. (1983): *Statistics in Geography: A Practical Approach*, Blackwell, London.
3. Gregory, S. (1978): *Statistical Methods and the Geographer* (4th Edition), Longman, London.
4. Gregory, S. (1978): *Statistical Methods and the Geographer*, Longman, London.
5. Gupta, S.P. (2010): *Statistical Methods*, Sultan Chand and Sons, Latest Edition.
6. Haggett, P., Andrew D. C., & Allan F. (1977): *Location Methods*, Vols. I and II, Edward Arnold, London.
7. Hammond, R. and McCullagh, P.S. (1974), *Quantitative Techniques in Geography: An Introduction*, Clarendon Press, Oxford.
8. John P. Cole and Cuchlaine, King, A. M. (1968): *Quantitative Geography*, Wiley, London.
9. Johnston R. J. (1973): *Multivariate Statistical Analysis in Geography*, Longman, London.
10. Mathews, J.A. (1987): *Quantitative and Statistical Approaches to Geography*, Practical Manual, Pergamon, Oxford.
11. Pal, S.K. (1998): *Statistics for Geoscientists; Techniques and Applications*, Concept Publishing, New Delhi.
12. Peter J. T. (1977): *Quantitative Methods in Geography*, Houghton Mifflin, Boston.
13. Smith, D. M. (1975): *Patterns in Human Geography*, Penguin, Harmondsworth.
14. Yeates, Mauris (1974): *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, New York.

M.Sc. Geography Semester II

**Course Title- Practical II: Practical Geography: Cartographic Methods-
Modern**

Course code- SEE GEO 1 2 08 C 2114)

Credit - 4

Course Outline

Unit I

Introduction to computer: Components of Computer - Hardware and Software); Use of Computers in Geography. Introduction to MS-Excel : Drawing of line graph, Bar Diagram, Pie diagram, Scatter diagram, (changes from colour to different shade patterns, placement of Legend, different weight to X and Y coordinates, Placement of Headings and Sub-headings, Font Size, Style, Bold and Italics.

Unit-II

Morphometric Analysis of Drainage basin-Computer based (with the help of any software)

Unit-III

Thematic Cartography: Physical and Socio-economic; Creation of spatial database and application using GIS, Remote sensing and Computer cartography.

Unit IV

Regional Synthesis and characterization of the observed spatial patterns for predictive purposes, Preparation of spatial models; cartography for environmental education and planning

Recommended Readings:

1. American Society of Photogrammetry(1983): **Manual of Remote Sensing**. ASP, Falls Church, V.A.
2. Aronoff S. (1989): **Geographic Information Systems: A Management Perspective**, DDL Publication, Ottawa
3. Barrett E.C and L.F. Curtis(1992): **Fundamentals of Remote Sensing and Air Photo Interpretation**, Mcmillan, New York
4. Burrough P.A .(1986): **Principles of Geographic Information Systems for Land Resource Assessment**, Oxford University Press, New York.1986.
5. Campbell J.(1989): **Introduction to Remote Sensing**, Guilford, New York
6. Curran, Paul J.(1985): **Principles of Remote Sensing**, Longman, London
7. David Unwin (1981): **Introductory Spatial Analysis**, Methuen, London
8. Fraser Taylor D.R.(1991): **Geographic information Systems**. Pergaman Press, Oxford
9. Gregory, S.(1978): **Statistical Methods and the Geographer**, Longman, London
10. Hammond R and P.S. McCullagh(1974): **Quantitative Techniques in Geography: An Introduction**, Clarendan Press, Oxford
11. Hord R.M.(1989): **Digital Image Processing of Remotely Sensed Data**, Academic, New York.
12. John P.Cole and Cuchlaine A. M. King(1968): **Quantitative Geography**, John Wiley, London
13. Johnston R. J.(1973): **Multivariate Statistical Analysis in Geography**, Longman, London
14. Luder D.(1959): **Aerial Photography Interpretation: Principles and Application**, McGraw Hill, New York
15. Maquire D. J. M.F. Goodchild and D. W. Rhind (eds.)(1991): **Geographic information Systems: Principles and Application**. Taylor & Francis, Washington
16. Mark S Monmonier .(1982): **Computer-assisted Cartography**. Prentice-Hall, Englewood Cliff, New Jersey
17. Peuquet D.J. and D.F. Marble(1990): **Introductory Reading in Geographic Information Systems**. Taylor & Francis, Washington
18. Pratt W.K. (1978): **Digital Image Processing**. Wiley, New York
19. Rao D.P. (eds.)(1998): **Remote Sensing for Earth Resources**, Association of Exploration Geophysists, Hyderabad

20. Star J and J. Estes (1994): **Geographic Information Systems: An Introduction**.
Prentice-Hall, Englewood Cliff, New Jersey
21. Yeats, Maurice (1974): **An Introduction to Quantitative Analysis in Human Geography**, McGraw Hill, New York

For data analysis

1. Etheridge, D. (2010): *Excel Data Analysis*, Wiley, New York
2. Field, A. (2013): *Discovering Statistics using IBM SPSS Statistics*, Sage Publication.
3. http://www.pearsonhighered.com/george/SPSS_21_Step_by_Step_Answers_to_Selected_Exercises.pdf
4. Khullar, D.R. (2001): *Essentials of Practical Geography*, Second Edition, New Academic Publishing Co., Jalandhar.
5. Landau, S. and Everitt B.S. (2004): *A Handbook of Statistical Analyses using SPSS*, Chapman & Hall, London
6. Linoff, G.S. (2007): *Data Analysis Using SQL and Excel*, Wiley, New York
7. Sharma, J.P. (1996): *Prayogik Bhoogol*, Rastogi Publications, Meerut.
8. Singh, R.L. (1979): *Elements of Practical Geography*, Kalyani Publishers, New Delhi.

M.Sc. Geography Semester II

**Course Title- Research Methodology, Field work and Report writing
(Socio-Economic aspect)**

Course code- SEE GEO 1 2 09 C 1012

Credit - 2

Course Outline

Unit I

Introduction to research in Geography: Concept and significance of research in geography; Philosophy and methods; Naturalism and anti-naturalism; realism and idealism; Scientific Research; Inductive and deductive approaches.

Unit II

Research design; Formulation of research problem; Development and testing of hypothesis; Techniques of data collection; Sampling and field survey.
Qualitative research: Qualitative research design; Case study; Ethnography; Phenomenology and participatory research. Ethics in scientific research.

Unit III

Data Processing: Students are required to learn data analysis using any software preferably SPSS (Statistical Package for Social Sciences). They are expected to learn statistical methods and techniques through computer.

SPSS: Introduction, managing Data, frequencies and cross tabulation, Graphs, Central Tendencies, Measures of Distribution, Measures of Asymmetry, Estimation and Hypothesis Testing, Statistical Dependence, Correlation and Regression, Data Analysis and Interpretation.

Unit IV

Field survey and report writing: Procure a topographic map of 1:50,000 or 1:25,000 scale to study the settlements selected in its regional setting; Collect demographic, social & economic data of the village/town from Census Reports to study the temporal changes in the profile of such characteristics.

Procure a cadastral map of the village/town for field mapping of the features of land-use and land quality. Procure/prepare the settlement-site map through rapid survey to map the residential, commercial, recreational (parks, playgrounds), educational, religious and other prominent features.

Conduct a socio-economic survey of the households with a structured questionnaire/schedule. Supplement the information by personal observations and perceptions. Based on results of the land-use and socio-economic enquiry of the households, prepare a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.

Recommended Readings:

For Research Methodology

1. Ahuja, R. (2001): **Research Methods**, Rawat, New Delhi.
2. Bhattacharyya, D. K. (2005): **Research Methodology**, Excel Books, New Delhi
3. Blackburn, J. and Holland, J. (ed.) (1998): **Who Changes? Institutionalising Participation in Development**. IT Publications, London.
4. Blaxter, L., Hughes, C. and Tight, M. (1996): **How to Research**. Open University Press, Buckingham.
5. Crang, Mike 1999. **Cultural Geography**. Routledge, London.
6. Daniels, P., Bradshaw, M., et al. (2000): **Human Geography: Issues for the 21st Century**. Prentice Hall, London, Indian reprint, 2003.
7. Denzin, N. K. and Lincoln, Y.S., (eds.) (2000): **Handbook of Qualitative Research**, Sage London.
8. Dikshit, R. D. (2003): **The Art and Science of Geography: Integrated Readings**. Prentice-Hall, New Delhi.
9. Dorling, D. and Simpson, L. (ed.) (1999): **Statistics in Society**. Edward Arnold, London.
10. Eyles J. and Smith D. M. (1988): **Qualitative Methods in Human Geography**, Polity Press, Cambridge.
11. Fisher, P. and Unwin, D., (ed.) (2002): **Virtual Reality in Geography**. Taylor & Francis, London.
12. Flowerdew, R. and Martin, D. (ed.) (1997): **Methods in Human Geography: A Guide for Students Doing a Research Project**. Longman, Harlow.
13. Gomez, B. and Jones, J. P. III (2010): **Research Methods in Geography: A Critical Introduction**, John Wiley, New York.
14. Goudie, A. (Ed) (2004): **Encyclopedia of Geomorphology**, Routledge, London.
15. Gregory, D., Johnston, R., Pratt, G., Watts, M. and Whatmore, S. (2009): **The Dictionary of Human Geography**, Wiley-Blackwell, Singapore.

16. Hay, I. (ed.) (2000): **Qualitative Research Methods in Human Geography**. Oxford University Press, New York.
17. Henn, M., Mark W., and Nick F. (2006): **A Short Introduction to Social Research**, Vistaar Publications, New Delhi.
18. Kitchin, R. and Fuller, D., (2003): **The Academic's Guide to Publishing**, Vistaar Publications, New Delhi
19. Kitchin, R. and Tate, N., (2001): **Conducting Research into Human Geography. Theory, Methodology and Practice**. Prentice-Hall, London.
20. Kothari, C.R. (2012): **Research Methodology, Methods and Techniques**, New Age international publishers, New Delhi
21. Limb, M. (2001): **Qualitative Methodologies for Geographers: Issue and Debates**. Edward Arnold, London.
22. Lofland, J. and Lofland, L.H. (1995): **Analysing Social Setting. A Guide to Qualitative Observation and Analysis**. Wadsworth, Belmont, CA.
23. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): **Geographic Information Systems: Principles, Techniques, Management, Applications**. John Wiley, New York.
24. Mikkelsen, B. (2005): **Methods for Development Work and Research: A New Guide for Practitioners**. Sage, London.
25. Montello, D. and Sutton, P. (2013): **An Introduction to Scientific Research Methods in Geography and Environmental Studies**, Sage, London.
26. Warf, B. (Ed.) (2006): **Encyclopedia of Human Geography**, Sage Publications, London.

For Data Processing

1. Field, A. (2013): **Discovering Statistics using IBM SPSS Statistics**, Sage Publication.
2. http://www.pearsonhighered.com/george/SPSS_21_Step_by_Step_Answers_to_Selected_Exercises.pdf

M.Sc. Geography Semester II

Course Title- Economic Geography

Course code- SEE GEO 1 2 01 DCEC 4105

Credit - 5

Course Outline

Unit I

Scope, content and recent trends in economic geography, relation of economic geography with economics and other branches of social sciences, Location of economic activities and spatial organization of economics, Classification of economies; sectors of economy (primary, secondary and tertiary).

Unit - II

Factors of location of economic activities: physical, social, economic and cultural; Concept and techniques of delimitation of agricultural regions, crop combination and diversification, Von Thunen's model and its modifications.

Models of Natural Resources Process: Zimmermann's Primitive and Advance Models of natural resource process, Kirk's Decision Model, Brookfield System Model.

Unit - III

Classification of industries; Resource based and footloose industries, Theories of industrial location-Weber, Losch and Isard; Case studies of selected industries Iron and Steel, Aluminum, Chemical, Oil refining and Petrochemical, Engineering, Textile etc.

Unit - IV

Modes of transportation and transport cost; accessibility and connectivity: international, inter and intraregional; comparative cost advantages. Typology of markets, market network in rural societies, market system in urban economy, role of market in the development of trade and commerce, Economic development of India

Recommended Readings:

1. Berry J.L.(1967): **Geography of Market Centres and Retail Distribution**, Prentice Hall , New York
2. Chatterjee, S.P. (1984): **Economic Geography of Asia**, Allied Book Agency, Calcutta
3. Chorley, R.J. and Haggett, P. (ed.)(1969): **Network Analysis in Geography**, Arnold
4. Dreze, J. and Sen, A.(1996): **India-Economic Development and Social Opportunity**, Oxford University Press, New Delhi
5. Eckarsley, R.(ed.)(1995): **Markets, the State and the Environment**, McMillan, London
6. Garnier. B.J. and Delobez (1979): **A Geography of Marketing**, Longman, London
7. Hamilton, F.E.I.(1974): **Spatial Perspectives on Industrial Organisation and Decision Making**, John Wiley, New York
8. Hamilton, I. (ed.) (1992): **Resources and Industry**, Oxford University Press, New York
9. Hurst E (1974): **Transport Geography-Comments and Readings**, Mc Graw Hill, New York
10. Morgan, WB and Munton R.J.C.(1977): **Agricultural Geography**, Methuen, London
11. Pachuri, R.K. (1977): **Energy and Economic Development in India**, Praeger, New York
12. Robertson, D. (ed.)(2001): **Globalization and Environment**, E. Elgar Co., U.K.
13. Rostow, W.W.(1960): **The Stages of Economic Growth**, Cambridge University Press, London
14. Singh J. and Dhillon. S. S.(1984): **Agricultural Geography**, McGraw Hill, India, New Delhi
15. Symons. L.(1972): **Agricultural Geography**, Bell and Sons, London
16. Wheeler, J.O. et. al.(1995): **Economic Geography**, John Wiley, New York

M.Sc. Geography Semester II
Course Title – Soil Geography
Course code- SEE GEO 1 2 02 DCEC 4105

Credit – 5

Course Outline

Unit I

Introduction to soil geography and pedology, factors and Processes of soil formation and development; Soil Profile; Soil catena, podzolization, laterisation, calcification and gleezation and salinization

Unit II

Soil organisms, Physical and Chemical properties of soils

Unit III

Genetic and Taxonomic classification of soils, their characteristics and world patterns. Land capability classification, Evaluation of land and soil: Parametric and non-parametric systems, soil survey

Unit IV

Soil problems and management: Soil erosion and degradation. integrated soil and water management; Methods of Soil reclamation, quality enhancement and management

Recommended Readings:

1. Backman, H.O and Brady, N.C. (1960): *The Nature and Properties of Soils*, McMillan, New York.
2. Basile, R.M. (1971): *A Geography of Soils*, William C. Brown, Dubuque, Ia.
3. Bennet, Hugh H. (1981): *Soil Conservation*, McGraw Hill, New York.
4. Bunting, B.T. (1973): *The Geography of Soils*, Hutchinson, London.
5. Clarke, G.R. (1957): *Study of the Soil in the Field*, Oxford University Press, Oxford.
6. De, N.K. and Ghos, P. (1993): *India: A Study in Soil Geography*, Sribhumi Publishing Co., Calcutta.
7. Foth, H.D. and Turk, L.M. (1972): *Fundamentals of Soil Science*, John Wiley, New York.
8. Gardiner, J. S. (1977), *Physical Geography*, Harper's College Press, New York.
9. Rajan, G.S.V. and Rao G.H.G. (1978): *Studies on Soils of India*, Vikas, New Delhi.
10. Khan T.O. (2013): *Soil: Principles, Properties and Management*, Springer, New York
11. McBride, M.B. (1999): *Environmental Chemistry of Soils*, Oxford University Press, New York.
12. Mcknight, T.L. (1987): *Physical Geography: A Landscape Appreciation (2nd Ed.)*, Prentice Hall, Englewood Cliffs, N.J.
13. Nye, P.H. and Greene, D.J. (1960): *The Soil under Shifting Cultivation* Commonwealth Bureau of Soil Science, Technical Communication, No. 51; Harpender, England.
14. Raychoudhuri, S.P. (1958): *Soils of India*, ICAR, New Delhi.
15. Russell, E.J. (1961): *Soil Conditions and Plant Growth*, Wiley, New York.
16. Steila, D. (1976): *The Geogrophy of Soils*, Prentice Hall, New Jersey.

M.Sc. Geography Semester - III
Course Title- Geography of India
Course code- SEE GEO 1 3 10 C 4105

Credit - 5

Course Outline

Unit I

Introduction: Geological structure and Physiographic Regions, Drainage Systems, Climatic Characteristics, Natural Vegetation and Soil

Unit II

Agriculture: nature, problems and prospects; Infrastructure: irrigation, power, fertiliser, HYV seeds and farm technology; Green revolution and its socio-economic and ecological implications; Recent trends in agriculture
Industry: New industrial policy: Globalisation and liberalisation; Industrial complexes and industrial regions

Unit III

Growth, distribution and density of population; Population characteristics and composition (Literacy, Sex, Age, work structure, etc.); Population problems and policies

Unit IV

Contemporary Issues: Environmental Pollution and degradation, Regional Disparities in regional Development, globalization and Indian Economy, Development of transport and Information technology and its impact on society and economy

Recommended Books:

1. Centre for Science & Environment (1988): *State of India's, Environment*, New Delhi.
2. Deshpande, C.D. (1992): *India: A Regional Interpretation*, ICSSR & Northern Book Centre, New Delhi.
3. Dreze, J. & Sen A. (ed.) (1996): *India's Economic Development and Social Opportunity*, Oxford University Press, New Delhi.
4. Gautam, A. (2009): *Advanced Geography of India*, Second Edition, Sharada Pustak Bhawan, Allahabad.
5. Husain, M. (2008): *Geography of India*, Tata McGraw-Hill, New Delhi.
6. Khullar, D.R. (2006): *India: A Comprehensive Geography*, Kalyani Pub., New Delhi.
7. Kundu A. and Raza, M. (1982): *Indian Economy: The Regional Dimension*. Spectrum Publishers, New Delhi.
8. Robinson, F. (1989): *The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives*, Cambridge University Press, London.
9. Singh R.L. (ed.) (1971): *India-A Regional Geography*, National Geographical Society of India, Varanasi.
10. Spate, O.H.K. & Learmonth, A.T.A. (1967): *India & Pakistan*, Methuen, London.
11. Tirtha R. & Krishan, G. (1996): *Emerging India*, Rawat, Jaipur.

12. Tiwari, R.C. (2010): *Geography of India*, Prayag Pustak Bhawan, Allahabad

M.Sc. Geography Semester - III
Course Title - Regional Development and Planning
Course code- SEE GEO 1 3 11 C 4105

Credit - 5

Course Outline

Unit I

Fundamentals: Concept, nature and scope of Regional Planning; Different approaches to regional planning; Planning regions: concept and types; Planning regions of India; Regional policies in India

Unit II

Conceptual Outlook: Regional planning and national development; Economic development and regional development; Regional economic complexes; Inter-regional and intra-regional functional interactions; Regional disparities in India

Unit III

Approaches: Approaches to integrated regional planning at different levels: local, regional and national; Multi-level planning in India: State, District and Block level planning; Planning for tribal, agricultural, industrial and urban (metropolitan) regions

Unit IV

Development Perspective: Service and market centres planning; Growth centre and regional development with reference to India and France; Decentralised planning: themes and issues; Regional Planning: Development Strategies in the 21st century

Recommended Readings:

1. Bhatt, L.S. (1972): **Regional Planning in India**, Statistical Publishing Society, Calcutta.
2. Bhatt, L.S. et al. (ed.) (1982): **Regional Inequalities in India**, Society for the study of Regional Disparities, New Delhi.
3. Blunder. J. et al. (1973): **Regional Analysis and Development**, Harper & Row, London.
4. Chand, M. and Puri, V.K. (1985): **Regional Planning in India**, Allied Pub., New Delhi.
5. Chandna, R.C. (2000): **Regional Planning: A Comprehensive Text**, Kalyani Publishers, New Delhi.
6. Chaudhuri, J.R. (2001): **An Introduction to Development and Regional Planning with special reference to India**, Orient Longman, Hyderabad.
7. Coates, B.R. and Johnston R.J. (1977): **Geography and Inequality**, Oxford University Press, Oxford.

8. Cowen, M.P. and Shenton, R.W. (1996): **Doctrines of Development**, Routledge, London.
9. Doyle, T. and McEachern, D. (1998): **Environment and Politics**, Routledge, London.
10. Friedmann, J. (1992): **Empowerment: The Politics of Alternative Development**, Blackwell, Cambridge MA.
11. Friedmann, J. and Alonso, W. (ed.) (1973): **Regional Development and Planning**, MIT Press, Cambridge Massachusetts.
12. Hettne, B.; Inotai, A. and Sunkel, O. (ed.) (1999–2000): **Studies in the New Regionalism**, Vol. I-V, Macmillan Press, London.
13. Isard, W. (1960): **Methods of Regional Analysis**, MIT Press, Cambridge, MA.
14. Kane, M. and William M.K.T. (2007): **Concept Mapping for Planning and Evaluation**, Sage, London.
15. Kuklinski, A.R. (1972): **Growth Poles and Growth Centres in Regional Planning**, Mouton and Co., Paris.
16. Kuklinski, A.R. (ed.) (1975): **Regional Development and Planning: International Perspective**, Sijthoff-Leydor.
17. Leys, C. (1996): **The Rise and Fall of Development Theory**, Indian University Press, Bloomington.
18. Mahapatra, A.C. and Pathak, C.R. (eds.) (2003): **Economic liberalisation and Regional Disparities in India. Special Focus on the North Eastern Region**, Star Publishing House, Shillong.
19. Misra, R.P. (ed.) (1992): **Regional Planning: Concepts, Techniques, Policies and Case Studies**, 2nd edition. Concept, New Delhi.
20. Misra, R.P. and Natraj, V.K. (1978): **Regional Planning and National Development**, Vikas, New Delhi.
21. Misra, R.P., Sundaram, K. V. and Pradasa Rao, V.L.S. (1976): **Regional Development Planning in India**, Vikas Publishers, New Delhi.
22. Moseley, M.J., (1974): **Growth Centres in Spatial Planning**, Pergamon Press, Oxford.
23. Närman, A. and Karunanayake, K. (eds.) (2002): **Towards a New Regional and Local Development Research Agenda**, Dept. of Geography, Göteborg University (Sweden), series B, No.100.
24. Norgaard, R.B. (1994): **Development Betrayed. The End of Progress and a Co-evolutionary Re-visioning of the Future**, Routledge, London.
25. Pathak, C.R. (2003): **Spatial Structure and Processes of Development in India**, Regional Science Association, Kolkata.
26. Raza, M. (1988): **Regional Development**, Heritage, New Delhi.
27. Sanyal, B.M. (2001): **Decentralised Planning: Themes and Issues**, Concept, New Delhi.
28. Sen, A. (1999): **Development as Freedom**, Oxford University Press, Oxford.
29. Sen, A. and Dreze, J. (ed.) (1996): **Indian Development: Selected Regional Perspectives**, Oxford University Press, Oxford.
30. Sharma, P.V., Rao, V.L.S., and Pathak, C.R. (ed.) (2000): **Sustainable Regional Development (with special reference to Andhra Pradesh)**, Regional Science Association, Kolkata.

31. Smith, D. and Närman, A. (ed.) (1999): **Development Theory and Practice: Current Perspectives on Development and Development Co-operation**, Longman, London.
32. Stöhr, W.B. and Taylor, D.F.R. (eds.) (1981): **Development from Above and Below? The Dialectics of Regional Planning in Developing Countries**, John Wiley, Chichester.
33. Sundaram, K.V. (1997): **Decentralized Multilevel Planning: Principles and Practice (Asian and African Experiences)**, Concept, New Delhi.
34. Sundaram, K.V. (2004): **The Trodden Path: Essays on Regional and Micro Level Planning**, Anaunya Publications, New Delhi.
35. Sundram, K.V. (1977), **Urban and Regional Planning in India**, Vikas Publishig House, New Delhi.
36. Toye, J. (1987): **Dilemmas of Development. Reflections on the Counterrevolution in Development Theory and Policy**, Blackwell, Oxford.
37. Verhelst, T. (1990): **No Life without Roots - Culture and Development**, Zed Books, London.
38. World Bank (2000): **Entering the 21st Century. World Development Report**, Oxford University Press, Oxford.
39. Yugandhar, B N. and Mukherjee, A. (ed.) (1991): **Readings in De-centralised Planning (with special reference to District Planning)**, vol. I & II, Concept, New Delhi.

M.Sc. Geography Semester - III
Course Title- Geography of Central Places
Course code- SEE GEO 1 3 12 C 4105

Credit - 5

Course Outline

Unit I

Genesis: Concept of Central Places, attributes; and principles of central places, process of formation of central places. Geographical foundations of Central Places: Locational arrangement of nodes, spacing, dispersion and localisation, clustering and competition, Economies of agglomeration.

Unit - II

Central Place Functions: Nature of central functions, locational pattern of functions within a central place region; hierarchy of nodal centres based on functions and size.

Unit - III

Measurement of Centrality and Hierarchy: The scale of functional hierarchy; Methods of measurement of centrality and hierarchy (like central score, central tendency, population threshold, and graph theoretical techniques); hierarchy of settlements based on hierarchy of functions.

Unit - IV

Central Place and Region: Factors affecting delimitation of central place region (like commutation, communication, flow of goods and services etc.), forms of interaction and analysis of gradient.

Central Place theories and central place system; Basic concepts classical and modern; central place theory viz a viz other location theories; Central place system: case studies of metropolitan cities.

Recommended Readings:

1. Baskin, C.W, (Translator)(1966) : **Central Places in Southern Germany**, Prentice-Hall Inc. Englewood Cliffs New Jersey. Originally written by C.W. Christaller in German with title Die Zentralen Orte Suddeutsch Land in 1933.
2. Bird(1977): **Centrality and Cities**, Routedledge and Keagan Paul, London
3. Dogan, M. and John D. K (ed.)(1988):**The Metropolis Era**. Vol 2 Mega Cities, Sage Publications, New Delhi
4. Haggett, P, Andrew D. et.al. (eds) (1979): **Locational Models**, Arnold Heinemann
5. Hugh, M.(1984): **City Form and Natural Process**, Croom Helm, London
6. King, L. J.(1986): **Central Place Theory**, Saga Publications, New Delhi
7. Lefebvre, H.(1996): **Writings on Cities**, translated and edited by Eleonore Kofman and Elizabeth Lebas, Blackwell Publishers, U.K
8. Mishra, R.P. and K. Mishra(1998): **Million Cities of India; Growth Dynamics, Internal Structure, Quality of Life and Planning Perspectives**, Sustainable Development Foundation, India Vol I and II
9. Mitra, A., Mukherjee S and Bose R.(1980): **Indian Cities**, Abhinav Publications, New Delhi
10. Nangia S. and Sukhadeo T.(2000): **Slum in a Metropolis**, The Living Environment, Shipra, New Delhi
11. Nangia, S. (1976): **Delhi Metropolitan Region**, K.B. Publications, New Delhi
12. Prakasa, Rao, V.L.S.(1983) : **Urbanisation in India; Spatial Dimensions**, Concept Publishing Co., New Delhi
13. Qazi, Ahmad (1965): **Indian Cities, Characteristics and Correlates**, University of Chicago, U.S.A.
14. Ramachandran, R.(1992): **Urbanisation and Urban Systems in India**, Oxford University Press, New Delhi
15. United Nations Centre for Human Settlements (HABITAT)(1996): **An Urbanising World**, Global Report on Human Settlements, Oxford University Press for HABITAT

M.Sc. Geography Semester - III
Course Title- Geoinformatics
Course code- SEE GEO 1 3 13 C 2114

Credit - 4

Course Outline

Unit I

Fundamentals: Remote sensing: definition and scope; Electro-magnetic radiation, Remote sensing regions and bands; Spectral signature; Types of remote sensing

Unit II

Aerial Photographs and Satellite Imagery.: Aerial photos: types, scale, resolution; Geometric properties of aerial photos; Stereoscopy; Stereoscopic parallax; Relief displacement, General orbital characteristics of remote sensing satellites; General characteristics of remote sensing sensors; Characteristics of MSS, HRV, LISS; Characteristics of raw remote sensing data

Unit III

Interpretation and Application: Elements of image interpretation; Image processing techniques: Visual and digital; Remote sensing data: pre-processing operations, enhancements and classifications; Application of Remote Sensing

Unit IV

GIS: Definition, and Components, Geographical data: types and characteristics; Spherical and plane coordinate systems in GIS; geo-referencing, Digital representation of geographic data: Data structure, spatial data model, raster and vector models; GIS data standards: concepts and components; Integration of Remote sensing and GIS; GIS project design and planning methodologies; GIS data base management systems; Applications of GIS

Recommended Readings:

1. Girard, M.C. and Girard, C.M. (2003): **Processing of Remote Sensing Data**. Oxford, New Delhi.
2. Bhatta, B. (2010), **Remote Sensing and GIS**, Oxford University Press, New Delhi.
3. Bonham, Carter G.F. (1995): **Information Systems for Geoscientists – Modelling with GIS**. Pergamon, Oxford.
4. Burrough, P.A. and McDonnell, R. (1998): **Principles of Geographic Information Systems**. Oxford University Press, Oxford.
5. Campbell, J. B. (2002): **Introduction to Remote Sensing**. Taylor & Francis, London.
6. Chang, K.T. (2003): **Introduction to Geographic Information Systems**. Tata McGraw Hill, New Delhi.
7. Chauniyal, D.D. (2004): **Remote Sensing and Geographic Information Systems**. (in Hindi). Sharda Pustak Bhawan, Allahabad.
8. Cracknell, A. and Hayes, L. (1990): **Remote Sensing Year Book**, Taylor & Francis, London.
9. Curran, P.J. (1985): **Principles of Remote Sensing**, Longman, London.

10. Deekshatulu, B.L. and Rajan, Y.S. (ed.) (1984): **Remote Sensing**. Indian Academy of Science, Bangalore.
11. Demers, M.N. (2000): **Fundamentals of Geographic Information Systems**. John Wiley, Singapore.
12. ESRI (1993): **Understanding GIS**. Redlands, USA
13. Floyd, F. and Sabins, Jr. (1986): **Remote Sensing: Principles and Interpretation**, W.H. Freeman, New York.
14. Fraser Taylor, D.R. (1991): **Geographic Information Systems**. Pergamon Press, Oxford.
15. George, J. (2003): **Fundamentals of Remote Sensing**. Universities Press, Hyderabad.
16. Glen, E.M. and Harold, C.S. (1993): **GIS Data Conversion Handbook**. Fort Collins, Colorado.
17. Goodchild, M.F.; Park, B.O. and Steyaert, L.T. (ed.) (1993): **Environmental Modelling with GIS**. Oxford University Press, Oxford.
18. Guham, P.K. (2003): **Remote Sensing for Beginners**. Affiliated East-West Press, New Delhi.
19. Guptill, S.C., and Morrison, J.L. (1995): **Elements of Spatial Data Quality**. Elsevier, Oxford.
20. Hallert, B. (1960): **Photogrammetry**, McGraw Hill, New York
21. Harry, C.A. (ed.) (1978): **Digital Image Processing**, IEEE Computer Society, California.
22. Heywood, I. (2003): **An Introduction to Geographical Information Systems**. 2nd edition, Pearson, Singapore.
23. Hord, R.M. (1982): **Digital Image Processing of Remotely Sensed Data**, Academic Press, New York.
24. Leuder, D.R. (1959): **Aerial Photographic Interpretation: Principles and Application**. McGraw Hill, New York.
25. Lillesand, T.M. and Kiefer, R.W. (2000): **Remote Sensing and Image Interpretation**. John Wiley, New York.
26. Lo, C.P. and Yeung, A.K.W. (2002): **Concepts and Techniques of Geographic Information Systems**. Prentice Hall, New Delhi.
27. Longley, P. and Batty, M. (eds.) (1996): **Spatial Analysis: Modelling in a GIS Environment**. Geo-Information International, Cambridge.
28. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): **Geographic Information Systems. Principles, Techniques, Management, Applications**. John Wiley, New York.
29. Maguirre, D.J.; Michael F.G. and David W. R. (1999): **Geographical Information Systems: Principles and Application**. Geo Information International, Vol. 2, Longman Publication, New York.
30. Martin, D. (1996): **Geographic Information Systems: Socio-economic Implications**. Routledge, London.
31. Michael F. G. and Karan K.K. (ed.) (1990): **Introduction to GIS**. NCGIA, Santa Barbara, California.
32. Nag, P. (ed.) 1992: **Thematic Cartography and Remote Sensing**, Concept, New Delhi.

33. Ralston, B. A. (2002): **Developing GIS Solutions with Map Objects and Visual Basic**, Thompson Learning, Singapore.
34. Reddy, M.A. (2001): **Textbook of Remote Sensing and Geographic Information Systems**. B. S. Publications., Hyderabad.
35. Reeves, R.G. (ed.) (1983): **Manual of Remote Sensing**, Vols. 1 & 2, American Society of Photogrammetry and Remote Sensing, Falls Church, Virginia.
36. Ripple, W. J. (ed.) (1989): **Fundamentals of Geographic Information Systems: A Compendium**. ASPRS/ ACSM, Falls Church.
37. Siddiqui, M.A. (2005): **Introduction to Geographical Information Systems**, Sharda Pustak Bhawan, Allahabad. (in Hindi)
38. Siegel, B.S. and Gillespie, R. (1985): **Remote Sensing in Geology**, John Wiley, New York.
39. Silver, M. and Balmori, D. (eds.) (2003): **Mapping in an Age of Digital Media**. Wiley, New York.
40. Spurr, R. (1960): **Photogrammetry and Photo Interpretation**, Roland Press, London.
41. Star, J. and Estes, J. (1990): **Geographic Information Systems – An Introduction**. Prentice-Hall, New Jersey.
42. Survey of India, (1973): **Photogrammetry**, Survey of India, Dehradun.
43. Swain, P.H. and Davis, S.M. (ed.), (1978): **Remote Sensing: The Quantitative Approach**. McGraw Hill, New York.
44. Worboys, M.F. (1995): **GIS: A Computing Perspective**. Taylor & Francis, London.

M.Sc. Geography Semester - III

**Course Title– Research Methodology, Field work and report writing
(Physical aspect)**

Course code- SEE GEO 1 3 14 C 1012

Credit – 2

Course Outline

Unit I

Trace the prominent features of the area to be surveyed. Identify salient landform features of the selected area on a topographical sheet.

Unit - II

Identify the landforms on the surface, while in the field. Also note the agents of erosion, transportation and deposition associated with the landforms.

Unit - III

Identify and classify the biodiversity in the area (Flora & Fauna).

Unit - IV

Observe the relationship of various landforms, flora and fauna with land-use, settlement structure and life style of people. Based on observations of the above characteristics,

prepare a field survey report. The report need to be supplemented with maps, sketches, photographs etc.

Recommended Readings:

1. Ahuja, R. (2001): **Research Methods**, Rawat, New Delhi.
2. Bhattacharyya, D. K. (2005): **Research Methodology**, Excel Books, New Delhi
3. Blackburn, J. and Holland, J. (ed.) (1998): **Who Changes? Institutionalising Participation in Development**. IT Publications, London.
4. Blaxter, L., Hughes, C. and Tight, M. (1996): **How to Research**. Open University Press, Buckingham.
5. Denzin, N. K. and Lincoln, Y.S., (eds.) (2000): **Handbook of Qualitative Research**, Sage London.
6. Dikshit, R. D. (2003): **The Art and Science of Geography: Integrated Readings**. Prentice-Hall, New Delhi.
7. Dorling, D. and Simpson, L. (ed.) (1999): **Statistics in Society**. Edward Arnold, London.
8. Eyles J. and Smith D. M. (1988): **Qualitative Methods in Human Geography**, Polity Press, Cambridge.
9. Fisher, P. and Unwin, D., (ed.) (2002): **Virtual Reality in Geography**. Taylor & Francis, London.
10. Gomez, B. and Jones, J. P. III (2010): **Research Methods in Geography: A Critical Introduction**, John Wiley, New York.
11. Goudie, A. (Ed) (2004): **Encyclopedia of Geomorphology**, Routledge, London.
12. Gregory, D., Johnston, R., Pratt, G., Watts, M. and Whatmore, S. (2009): **The Dictionary of Human Geography**, Wiley-Blackwell, Singapore.
13. Hay, I. (ed.) (2000): **Qualitative Research Methods in Human Geography**. Oxford University Press, New York.
14. Henn, M., Mark W., and Nick F. (2006): **A Short Introduction to Social Research**, Vistaar Publications, New Delhi.
15. Kitchin, R. and Fuller, D., (2003): **The Academic's Guide to Publishing**, Vistaar Publications, New Delhi
16. Kothari, C.R. (2012): **Research Methodology, Methods and Techniques**, New Age international publishers, New Delhi
17. Limb, M. (2001): **Qualitative Methodologies for Geographers: Issue and Debates**. Edward Arnold, London.
18. Lofland, J. and Lofland, L.H. (1995): **Analysing Social Setting. A Guide to Qualitative Observation and Analysis**. Wadsworth, Belmont, CA.
19. Longley, P., Goodchild, M.F., Maguire, D. and Rhind, D. (1999): **Geographic Information Systems: Principles, Techniques, Management, Applications**. John Wiley, New York.
20. Mikkelsen, B. (2005): **Methods for Development Work and Research: A New Guide for Practitioners**. Sage, London.
21. Montello, D. and Sutton, P. (2013): **An Introduction to Scientific Research Methods in Geography and Environmental Studies**, Sage, London.

22. Warf, B. (Ed.) (2006): **Encyclopedia of Human Geography**, Sage Publications, London.

M.Sc. Geography Semester - III
Course Title- Environmental Geography
Course code- SEE GEO 1 3 03 DCEC 4105

Credit - 5

Course Outline

Unit I

The Environment: Meaning of environment; Structure and types of environment, Components of environment, Geography and environment, Man and nature, Environment and resources.

Unit II

Man – Environment Relationships: Approaches to the study – environmental deterministic approach, teleological approach, possibilistic approach, economic deterministic approach, ecological approach; Environment and man; Man's interaction with the environment
Biogeochemical cycles - the hydrological cycle, the carbon cycle, the oxygen cycle, the nitrogen cycle, the phosphorous cycle and the sediment cycle.

Unit III

Ecological systems: Ecological concepts (meaning and definitions). Ecosystem concepts and Components; Ecosystem – form and functions, food chain, food web, trophic level; ecological niche

Unit IV

Zoogeography and Zoogeographical realms, Palaeo-botanical and Palaeo-climatological records of environmental change in India, National Forest Policy of India; Conservation of Biotic Resources.

Recommended Readings:

1. Chandna, R.C., (1998): **Environmental Awareness**, Kalyani Publishers, New Delhi.
2. Cunningham, W.P. and Cunningham, M.A. (2016): **Environmental Science, A global Concern**, Mc Graw Hill Education, New Delhi
3. Gaur, S., and Chandrashekhar, T. (2006): **Global Environmental Crisis**, Book Enclave, Jaipur.
4. Gupta, P.D. (2003) **Environmental Issues for the 21st Century**, Mittal Publications, New Delhi.
5. Morris, D., Freeland, J., Hinchliff, S., Smith, S. (ed.), (2003) **Changing Environments**, Pd. John Wiley and Sons Ltd., The Open University, U.K.
6. Park, C.C. (1980): **Ecology and Environmental Management**, Butterworths, London.
7. Radha, S., and Sankhyan, A.S., (ed.), (2004): **Environmental Challenges of the 21st Century**, Deep Publications, New Delhi.

8. Rasure, K.A., (2007): **Environment and Sustainable Development**, Serials Publications, New Delhi.
9. Saxena, H.M. (2006): **Environmental Studies**, Rawat Publications, Jaipur.
10. Singh, S. (1991): **Environmental Geography**, Prayag Publication, Allahabad.
11. Strahler, A.N., and Strahler, A.M. (1997): **Geography and Man's Environment**, John Wiley and Sons, New York.
12. Taj, B., Murphy, P. and Rana, P.S. (2007): **Environmental Impact Assessment**, An Indo – Australian Perspective, Bookwell New Delhi.
13. Verma, S. B. and Shiva, K.S.,(ed.) (2005): **Environmental Protection and Development**, Deep Publications, New Delhi.

M.Sc. Geography Semester - III
Course Title– Political Geography
Course code- SEE GEO 1 3 04 DCEC 4105

Credit – 5

Course Outline

Unit I

Meaning, Scope and Methodology of Political Geography: Definition, Nature and Scope of Political Geography; Functional Approach and Unified Field Theory; Space, Territory and State; Elements of State, Laws of spatial growth of State.

Unit II

Frontiers and Boundaries: Concepts and Classifications, Continental and Maritime Boundaries, Case studies of South Asia, Europe and Africa; Nation and State; Meaning, Definition and Nation building process of India; Political and administrative framework and its hierarchical relationship to unitary and federal forms of governance.

Unit III

Geopolitics and Geostrategy: Principal Components and Exponents, Global Geopolitical and Geostrategic Pattern, Changing Perspectives and perceptions of a World Order.

Unit IV

Political geography of contemporary India with special reference to: The changing political map of India, centripetal & centrifugal forces; stability & instability; Interstate issues (like water disputes & riparian claims) and conflict resolutions insurgency in border states; Emergence of New States; Federal India: Unity in Diversity.

Recommended Readings:

1. Alexander, L.M. (1963): **World Political Patterns** Ran McNally, Chicago
2. Bhagwati, J.N. (ed.)(1976): **New International Economic Order - The North-South Debate**, M.I.T. Press, London

3. De Blij, H. J. and Glassner, Martin(1968): **Systematic Political Geography**, John Wiley, New York
4. Deshpande C.D.(1992): **India-A Regional Interpretation**, Northern Book Centre, New Delhi.
5. Panikkar K. M.(1959): **Geographical Factors in Indian History**: 2 vols. Asia Publishing House, Bombay
6. Dikshit, R.D.(1999): **Political geography: A Century of progress**, Sage, New Delhi
7. Dikshit, R.D. (1996): **Political Geography: A Contemporary Perspective**. Tata McGraw Hill, New Delhi
8. Dikshit, R.D. (1982): **Political Geography: A Contemporary Perspective**, Tata McGraw-Hill Publishing Co., New Delhi
9. Fisher Charles A.(1968): **Essays in Political Geography**, Methuen, London
10. Glassner M.I.(1993): **Political Geography**, John Wiley, New York
11. John R. Short(1982): **An introduction to Political Geography** Routledge, London
12. Moddie, A.E : **Geography Behind Politics** Hutchinson, London, Latest edition.
13. Panikkar, K.M.(1956): **Geographical factors in Indian History**. Bharatiya Vidya Bhavan, Bombay
14. Pounds N.J.G.(1972): **Political Geography**. McGraw Hill, New York
15. Prescott, J.R.V.(1972): **Political Geography**, Methuen & Co., London
16. Prescott. J.R.V.: **The Geography of Frontiers and Boundaries**, Aldine, Chicago.
17. Schwartzberg, J.E.(1993): **A Historical Atlas of South Asia**, University of Chicago Press, U.S.A.
18. Short, J.R. (1982): **An Introduction to Political Geography**, Routledge and Kegan Paul, London.
19. Sukhwal, B.L.(1968): **Modern Political Geography of India**, Sterling Publishers, New Delhi.
20. Taylor P.J (ed.)(1993): **Political Geography of the 20th Century - A Global Analysis**. New York
21. Taylor, Peter(1985): **Political Geography**, Longman, London
22. William C.H. (ed.)(1993): **Political Geography of the New World Order**, Halsted Ben, New York

M.Sc. Geography Semester - III
Course Title- Fundamentals of Human Geography
Course code- SEE GEO 1 3 04 GE 3104

Credit - 4

Course Outline

Unit I

Nature and scope of human geography, Branches of human geography, Concepts of man-environment relationship- determinism, possibilism and probabilism; dichotomy in Physical and Human Geography; primitive life-style of mankind and subsequent migration

Unit – II

Division of Mankind: spatial distribution, physical and social profile of racial groups, ethnic groups, tribal groups and religious groups in the world and in India; early economic activities of mankind: food gathering, hunting, fishing, and vegiculture, shifting cultivation.

Unit – III

Human Adaptation to the environment: (i) cold region—Eskimo; (ii) hot region Bushman, Beduin; (iii) Plateau—Gonds, Masai, (iv) Mountain — Gujjars, nomads, (v) regions of recurrent floods, droughts and other natural hazards; Adaptation in modern society-agricultural, urban and metropolitan;

Unit - IV

Distribution of population; world distribution pattern - physical, economic and social factors influencing spatial distribution; concepts of over population, under population and optimum population, Zero population growth, Migration—internal and international, Population conflicts and conflict resolution in developed and developing world. Population theories: Classical and Modern

Recommended Readings:

1. Bergwan, Edward E (1995): **Human Geography**, Culture, Connections and Landscape, Prentice-Hall, New Jersey
2. Carr, M.(1987): **Patterns, Process and change in Human Geography**. MacMillan Education, London
3. Fellman, J.L.(1997): **Human Geography—Landscapes of Human Activities**. Brown and Benchman Pub., U.S.A.
4. DeBlij H.J.(1996): **Human Geography, Culture, Society and Space**, John Wiley, New York
5. Johnston, R.J. (1994): Dictionary of Human Geography Blackwell, Oxford
6. Mc Bride, P.J.(1996): **Human Geography Systems, Patterns and Change**, Nelson, U.K. and Canada
7. Michael, Can(1997): **New Patterns: Process and Change in Human Geography**, Nelson
8. Rubenstein, J.H. and Bacon R.S.(1990): **The Cultural Landscape — an Introduction to Human geography**. Prenice Hall, India, New Delhi
9. Singh, K.N. (1992): **People of India, An introduction** Seagull Books
10. Spate O.H.K. and Learmonth A.T.A.(1968): **India and Pakistan** Methuen, London

M.Sc. Geography Semester - III
Course Title- Geography of India
Course code- SEE GEO 1 3 05 GE 3104

Credit - 4

Course Outline

Unit I

Introduction: Geological structure and Physiographic Regions, Drainage Systems, Climatic Characteristics, Natural Vegetation and Soil

Unit II

Agriculture: nature, problems and prospects; Infrastructure: irrigation, power, fertilizer; Green revolution and its socio-economic and ecological implications; Recent trends in agriculture

Industry: Industrial complexes and industrial regions, New industrial policy

Unit III

Population: Growth, distribution and composition (Literacy, Sex, Age, work structure, etc.); Population problems and policies

Unit IV

Development of transport and Information technology, Contemporary Issues: Environmental Pollution and degradation, Regional Disparities in regional Development, globalization and Indian Economy

Recommended Books:

1. Centre for Science & Environment (1988): *State of India's, Environment*, New Delhi.
2. Deshpande, C.D. (1992): *India: A Regional Interpretation*, ICSSR & Northern Book Centre, New Delhi.
3. Dreze, J. & Sen A. (ed.) (1996): *India's Economic Development and Social Opportunity*, Oxford University Press, New Delhi.
4. Gautam, A. (2009): *Advanced Geography of India*, Second Edition, Sharada Pustak Bhawan, Allahabad.
5. Husain, M. (2008): *Geography of India*, Tata McGraw-Hill, New Delhi.
6. Khullar, D.R. (2006): *India: A Comprehensive Geography*, Kalyani Pub., New Delhi.
7. Kundu A. and Raza, M. (1982): *Indian Economy: The Regional Dimension*. Spectrum Publishers, New Delhi.
8. Robinson, F. (1989): *The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives*, Cambridge University Press, London.
9. Singh R.L. (ed.) (1971): *India-A Regional Geography*, National Geographical Society of India, Varanasi.
10. Spate, O.H.K. & Learmonth, A.T.A. (1967): *India & Pakistan*, Methuen, London.
11. Tirtha R. & Krishan, G. (1996): *Emerging India*, Rawat, Jaipur.
12. Tiwari, R.C. (2010): *Geography of India*, Prayag Pustak Bhawan, Allahabad

M.Sc. Geography Semester - IV
Course Title- Demographic Methods
Course code- SEE GEO 1 4 05 DCEC 3104

Credit - 4

Course Outline

Unit I

Definition and scope of demography; Basic concepts and measures: universe and variables, rates and ratios; Demographic data sources: Census, Vital, Sample and United Nation

Unit II

Quality of Data; Basic measures of Fertility and Mortality

Unit III

Standardization of Rates and Ratios; Nuptiality analysis; Population projection

Unit IV

Demographic models and Model life tables; Evaluation of Programmes

Recommended Readings:

1. Bogue, D. (1969): **Principles of demography**, John Wiley and sons, New York
2. Bongaarts, J. (1978): **A framework for analyzing the proximate determinants of fertility**, Population and Development review, John Wiley and sons, New York
3. Brass, W. (1971): 'On the scale of mortality,' in Brass, W. (ed.), Biological aspects of Demography, Taylor and Francis, London
4. Caldwell, J.C. (1976): **Towards a restatement of demographic transition theory**, Population and Development review, John Wiley and sons, New York
5. Chandrasekar C. and Deming, W.E. (1949): **On a method of estimating birth and death rates and the extent of registration**, Journal of the American statistical association, USA
6. Chiang, C.L. (1974): **Life tables and Mortality analysis**, Geneva, WHO
7. Coale, A.J. (1971): **Age pattern of marriage**, Population studies, Taylor and Francis, UK
8. Coale, A.J. and Demeny, P. (1966): **Regional model life tables and stable population**, Princeton University Press, NJ
9. Davis, K. and Blake, J. (1956): **Social structure and fertility: an analytical framework**, Economic development and cultural change
10. Hobcraft, J.N. (1992): **Fertility pattern and child survival**, Population bulletin, United Nation
11. Kuczynski, R.R. (1935): **The measurement of population growth; methods and results**, Sidgwick and Jackson, London
12. Malthus, T.R. (1797) (1967): **Population: The first essay with a foreword by Kenneth E. Boulding**, Ann Arbor: University of Michigan Press
13. Notestein, F.W. (1945): **Population: The long view in Schultz, T.W. (ed.) Food for the world**, Chicago University Press, Chicago
14. Srinivasan, K. (1998): **Basic demographic techniques and applications**, Sage Publications, New Delhi

M.Sc. Geography Semester - IV
Course Title– Natural Hazard and Disaster Management
Course code- SEE GEO 1 4 06 DCEC 3104

Credit – 4

Course Outline

Unit I

Concept of Hazards, Risk, Vulnerability and Disaster. Types of Hazards: Natural (Tectonic Hazards – Earthquakes and Volcanoes; Hydrological Hazards – Floods and Droughts.

Unit II

Regional Dimension of Natural Hazards: Occurrence and Trends. (Tectonic Hazards – Earthquakes and Volcanoes; Hydrological Hazards – Floods and Droughts.

Unit III

Disaster Losses and Impact – Displacements, Livelihood. Economy and Infrastructure, and Health.

Unit IV

Mitigation and Management: Plans and Policies. Role of Remote Sensing, GIS and GPS in Disaster Management

Recommended Readings:

15. Allan, S., Adam, B. and Carter, C. (ed.), (2000): **Environmental Risks and the Media**, Routledge, London
16. Ambala-Bertrand, J.M. (1993): **Political Economy of Large Natural Disasters: With Special Reference to Developing Countries**, Clarendon Press, Oxford
17. Blaikie, P., Cannon, T., Davis, I. (1994): **At Risk: Natural Hazards, People's Vulnerability, and Disasters**, Routledge, London
18. Burton, I., Kates, R.W. and White, G.F., (1993): **Environment as Hazards**, 2nd edition, Guilford Press, New York
19. Godschalk, D.R. et al. (1999): **Natural Hazard Mitigation Recasting Disaster Policy and Planning**, Island Press, Washington, D.C.
20. Hewitt, K., (1997): **Regions of Risk: A Geographical Introduction to Disasters**, Longman, London
21. Hood, C. and Jones, D.K.C. (ed.): (1996), **Accident and Design: Contemporary Debates in Risk Management**, UCL Press, London
22. Kasperson, J.X., Kasperson, R.E. and Turner, B.L. (1995): **Regions at Risk: Comparisons of Threatened Environments**, United Nation University Press, Tokyo
23. Paraswamam, S. and Unikrishnan, P.V. (2013): **India Disaster Report**, Oxford University Press, New Delhi
24. Quarantelli, E.L. (ed.) (1998): **What is a Disaster? Perspective on the Question**, Routledge, London

25. Schneid, T. and Collins, L. (1998): **Disaster Management and Preparedness**, Lewis Publishers, Washington DC.
26. Schneider, S.K. (1995): **Flirting with Disaster: Public Management in Crisis Situations**, M.E. Sharpe, New York
27. Smith, K. (1996): **Environmental Hazards; Assessing Risk and Reducing Disaster**, Routledge, London

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