

**Shivaji University, Kolhapur**  
**Department of Geography**  
(Faculty of Science)  
*Academic Flexibility*



*Revised Syllabus*  
*of*  
**M.A./M.Sc. Geography**  
(*Credit Based Semester System*)

*Implemented From....*

**June, 2012 Onwards**

**Title of the Course:** M.A./M.Sc. Geography

**Year of Implementation:** New syllabus will be implemented from June 2012 onwards

**Eligibility of Course:**

Admission will be open to candidates passing B.A./B.Sc. degree in Geography from Shivaji University or any other statutory university.

**Selection Procedure:**

In the selection procedure 50% weightage will be given to entrance examination conducted by Shivaji University, Kolhapur and remaining 50% weightage will be given to the aggregate marks obtained at B.A./B.Sc. examination. The merit list of eligible candidates will be displayed on Shivaji University web site: [www.unishivaji.ac.in](http://www.unishivaji.ac.in)

**Medium of Instruction:** English

**Student Strength:**

**M.A/M.Sc.- I:** Total Seats - 50 (including reservation as per the Govt. of Maharashtra)

**M.A/M.Sc.- II:** Total Seats - 50 (including reservation as per the Govt. of Maharashtra)

**Course Duration:**

The M.A./M.Sc course duration is of two years comprising of four semesters, each semester spanning for 6 months of minimum 120 working days.

**Period of Course:**

**Semester I & III** - June to November

**Semester II & IV**- December to May

**Preamble:**

Total semesters – 04 (two semester per year)

Total theory papers – 16 (per semester – 04)

Total practical papers – 08 (per semester – 02)

**Teaching Faculties:**

Head of the Department: Prof. K.C. Ramotra

Teaching Staff: Professor - 01, Assistant Professor - 09

**Non-Teaching Staff:**

Clerk - 01, Lab. Assistant - 01, Lab. Attendant - 01, Peon - 01

**Total Marks/Credit for M.A./M.Sc. Geography Degree:**

Nature of Paper	Marks	Credit
Theory papers	1600	64
Practical papers	800	32
Total	2400	96

**Shivaji University, Kolhapur**  
**Department of Geography**

(Revised Syllabus Introduced from June, 2012)

**M.A./M.Sc. Geography Course Structure (Credit Based Semester System)**

**Semester - I**

<u>Paper Type</u>	<u>Paper No.</u>	<u>Title</u>
Theory (Core)	GCT-101:	Principles of Geomorphology
	GCT-102:	Principles of Climatology
	GCT-103:	Economic Geography
	GCT-104:	Geography of Population and Development
Practical	GCP-101:	Landforms Analysis & Surveying
	GCP-102:	Analysis of Climatic Data

**Semester - II**

<u>Paper Type</u>	<u>Paper No.</u>	<u>Title</u>
Theory (Core)	GCT-205:	Advanced Geomorphology
	GCT-206:	Applied Climatology
	GCT-207:	Geography of India
	GCT-208:	Social and Cultural Geography
Practical	GCP-203:	Statistical Techniques in Geography
	GCP-204:	Analysis of Socio-Economic Data

**Semester - III**

<u>Paper Type</u>	<u>Paper No.</u>	<u>Title</u>
Theory (Core)	GCT-309:	Regional Planning and Development
	GCT-310:	Fundamentals and Applications of Remote Sensing
<b>(Optional)</b>	GOT-301:	Environmental Geography
		or
	GOT-302:	Geography of Tourism
	GOT-303:	Surveying, Cartography & GIS
		or
	GOT-304:	Political Geography
Practical	GCP-305:	Photogrammetry, Remote Sensing and GIS
	GCP-306:	Quantitative Techniques & Computer Applications in Geography

**Semester - IV**

<u>Paper Type</u>	<u>Paper No.</u>	<u>Title</u>
Theory (Core)	GCT-411:	Development of Geographical Thought
	GCT-412:	Geohydrology & Oceanography
<b>(Optional)</b>	GOT-405:	Agricultural Geography
		or
	GOT-406:	Settlement Geography
	GOT-407:	Biogeography
		or
	GOT-408:	Medical Geography
Project	GCP-407:	Research Methodology and Study Tour Report Writing
	GCP-408:	Project

\*GCT = Geography-Core-Theory; GCP = Geography-Core-Practical; GOT = Geography-Optional-Theory

**Note:**

1. Each paper (Theory & Practical) will be of 4 credits (100 marks).
2. Each Semester consists of 4 Theory & 2 Practical papers (24 credit)
3. Number at the beginning/end of each unit of all papers (Theory & Practical) indicates tentative number of lectures to be delivered on respective topics of Theory paper or exercises to be conducted in case of Practical.
4. At the end of Semester-III, concerned department will allocate guide/supervisor to the students for their project work in Semester-IV.

**Weekly Workload:**

Paper Type	Number of papers/ Semester	Lecture hours /paper/week	Total workload (hours/week)
Theory	04	04	16
Practical/Project	02	06	12
<b>Total</b>	06	10	28

**Scheme of Examination:**

Paper Type	Internal Marks	Final Exam Marks	Total Marks
Theory	20	80	100
Practical	20	80	100
Project	50	50	100

**Note:**

1. Internal marks (Theory = 20 marks): Class Test: 10 Marks & Assignment/Seminar: 10 marks
2. Internal marks (Practical = 20 marks): Practical Assessment: 10 marks & Assignment: 10 marks
3. Internal marks (Project = 50 marks): Project/Tour Report: 30 marks & Seminar: 20 marks

**Nature of Question Paper in Final Exam (Theory):**

Question No.	Type of Question	Number of Questions to be Asked	Number of Questions to be Answered	Marks per Question	Total Marks
Q1.	Objective type (MCQ)	16	16	01	16
Q2.	Short Answer (Definition type)	04	04	04	16
Q3.	Short Notes (Descriptive type)	03	02	08	16
Q4.	Long Answer/ Essay type	02	01	16	16
Q5.	Long Answer/ Essay type	02	01	16	16
<b>Total = 05</b>	--	--	--	--	<b>80</b>

**Nature of Question Paper in Final Exam (Practical):**

Question No.	Type of Question	Marks per Question	Total Marks
Q1 to Q4	Practical/Lab Assessment	15	60
Q5.	Practical Assignment (External)	10	10
Q6.	Viva-voce (External)	10	10
<b>Total = 06</b>	--	--	<b>80</b>

**Nature of Question Paper in Final Exam (Project):**

Question No.	Type of Question	Marks per Question	Total Marks
Q1 to Q4	Practical/Lab Assessment	10	40
Q5.	Viva-voce (External)	10	10
<b>Total = 05</b>	--	--	<b>50</b>

**Equivalence in Accordance with Titles and Contents of Papers (for revised syllabus):**

<b>Sr. No.</b>	<b>Title of Old Paper</b>	<b>Title of New Paper</b>
1.	Paper –I : Geomorphology - I	GCT-101: Principles of Geomorphology
2.	Paper –II: Climatology - I	GCT-102: Principles of Climatology
3.	Paper –V: Geomorphology -II	GCT-205: Advanced Geomorphology
4.	Paper –VI: Climatology -II	GCT-206: Applied Climatology
5.	Paper –XI: Regional Development & Planning in India	GCT-309: Regional Planning & Development
6.	Paper–XIV: Remote sensing application in Geography	GCT-310: Fundamentals and Applications of Remote Sensing
7.	Paper –XIII: Development of Modern Geography	GCT-410: Development of Geographical Thoughts
8.	Pr.-V: Quantitative Techniques in Geography Pr.-VI: Computer Applications in Geography	GCP-306: Quantitative Techniques & Computer Applications in Geography
9.	Pr.-VIII: Field Studies and Project work.	GCP-408: Project

**GCT-101: Principles of Geomorphology**

**Unit-1:**

Meaning nature and scope of geomorphology, Development of geomorphic thought, a brief review of fundamental concepts of geomorphology: Principle of Uniformitarianism, Contribution of Hutton, Gilbert, Dutton, and Davis. (15)

**Unit-2:**

Evolution of Continents and ocean basins: Continental drift theory of Taylor, Continental Drift theory of Wegener, Theory of Plate Tectonics. (15)

**Unit-3:**

Factors controlling landform development: Endogenetic and Exogenetic forces, Denudational processes, Weathering, Erosion and Mass wasting. (15)

**Unit-4:**

Mountain building activities, Geosynclinal theory of Kober, Holms Convectional current theory, Theory of Isostasy. (15)

**References:**

1. Allaby, Michael (2008): Oxford Dictionary of Earth Science, Oxford University Press, New York.
2. Bloom, A.L. (1991): Geomorphology, 2nd Ed Englewood Cliffs, M.J. Prentice Hall.
3. Chorley, R.J. Schumm, S.A. & Sugden, D.E. (1985): Geomorphology, Methuen & Co. Ltd., London, New York.
4. Brierley, G.J. & Fryirs, K.A. (2005): Geomorphology and River Management, Blackwell Publishing, Oxford UK.
5. Briggs, K. (1985): Physical Geography Process and System, Hodder and Stoughton, London.
6. Christopherson, R.W. (1995): Elemental Geosystems: A Foundation in Physical Geography, Prentice Hall Englewood Cliffs, New Jersey.
7. Cook, R.U. & Doornkamp, J.C. (1974): Geomorphology in Environmental Management, an Introduction. Clarendon Press. Oxford.
8. Dayal, P. (1996): A Textbook of Geomorphology, Shukla Book Depot, Patna.
9. Fairbridge, R.W., ed. (1968): Encyclopaedia of Geomorphology Reinhold, New York.
10. Hart, M.G. (1986): Geomorphology Pure and Applied, George Allen and Unwin, London.
11. Leopold, L.B. Wolman, M.G. & Miller, J.P. (1964): Fluvial Processes in Geomorphology, W.H. Freeman, San Francisco.
12. Lobeck, A.K. (1939): Geomorphology, McGraw Hill, New York. .
13. Moor, W.G. (1949): A Dictionary of Geography, Penguin Books, England.
14. Morgan, R.S. & Wooldridge S.W (1959): Outline of Geomorphology the Physical basis of Geography, Longmans Green, London.
15. Robinson, Harry (1969): Morphology and Landscape, University Tutorial Press Ltd. London.
16. Singh, Savindra (1998): Geomorphology, Prayag Pustak Bhavan, Allahabad.
17. Singh, Savindra (1991): Environmental Geography, Prayag Pustak Bhavan, Allahabad.
18. Spark, B. W. (1986): Geomorphology, Longman, London.
19. Strahler, A.N (1969): Physical Geography. John Wiley & Sons Inc., New York.
20. Thomas, M.F. (1974): Tropical Geomorphology, Macmillan, London.
21. Thornbury, W.D. (1969): Principles of Geomorphology, Wiley Eastern Ltd. New Delhi.
22. Wadia, D.N. (1993): Geology of India, Tata McGraw Hill Edition, New Delhi.
23. Worcester, P. G. (1948): Textbook of Geomorphology, Princeton, D. Van, Norstrand.

## GCT-102: Principles of Climatology

### Unit-1:

Introduction to Climatology: Nature and Scope, Basis of Modern Climatology, Composition and Structure of Atmosphere, Insolation and terrestrial heat balance, Daily Temperature change, Distribution of Temperature – Vertical & Horizontal. (15)

### Unit-2:

Moisture in the Atmosphere: Changes of state, Humidity, Humidity measurements, Stability and Instability of atmosphere, Condensation, Major and minor forms of condensation, Precipitation - types and forms. (15)

### Unit-3:

Motion in the Atmosphere: Air Pressure, Factors influencing Air motion, Pressure belts & Planetary winds, Mechanism of Monsoon, Local and variable winds. (15)

### Unit-4:

Air Masses and Atmospheric Disturbances: Characteristics and Types of Air Masses, Polar front Theory, Fronts and Frontogenesis, Tropical Cyclones, Anticyclones, Thunderstorms, Tornadoes, Hurricanes, Water spouts; Weather Forecasting, Satellites in weather forecasting (15)

### References:

1. Byers R.H. : "General Meteorology" McGraw Hill BKCo New York 1974
2. Pettersons : "Introduction to Meteorology" -----,----- 1969
3. Miller A., et. al. 1983; "Elements of Meteorology", Merrill, Columbus.
4. Sellers W.D : "Physical Climatology" University of Chicago Press. 1965
5. Trewartha G.T: An Introduction to climate "McGraw Hill BK Co. New York. 1968.
6. Das P. K. : The Mansoon, Prayag pustak Bhavan, Allahabad.
7. Shastri Rama: Weather and Weather Forecasting, Ministry & Information NBT Delhi.
8. Lal D. S.: Climatology. Prayag pustak Bhavan, Allahabad.
9. Ramashatri: Weather & Weather forecasting, Ministry of Information & Broadcasting.
10. Savindra Sing (2000): Climatology, Prayag Pustak Bhavan, Allahabad.
11. Mather J. R. (1975): Climatology : Fundamentals & Applications. Mc Gray Hills Book Co., New York.
12. Hobbs J.E. (1980): Applied Climatology, Butterworth, London.
13. Critchfield,H.J, 2004 : Principles of Climatology; Prentice Hall, London.
14. Lutgens, F.K & Tarbuck, E.J (5th Ed): The Atmosphere – an introduction to meteorology. Prentice Hall, New Jersey.
15. Oliver J. E. (1973): Climate & Mans Environment, John Wiley & Sons; New York.

**GCT-103: Economic Geography**

**Unit-1:**

Definition, Nature and scope; Fundamentals of economic geography; Approaches to the study of economic geography; Basis of economic processes: Production, exchange & consumption. Classification of economic activities—economies of scale. (15)

**Unit-2:**

Definition & Importance of manufacturing – Concept of growth and development of Industrial geography, Principles of Industrial Location – Profit maximization - Least cost location –Substitution –Interdependence – Territorial production complexes - Factors of Industrial Location – Weber & Losch, Rostows model, Industrial policy in India. (15)

**Unit-3:**

Renewable & Non-renewable energy resources, World energy situation; Sources of Energy: Coal, Oil, Natural gas and Nuclear energy, OPEC-energy crisis. (10)

**Unit-4:**

Modes of transportation - Characteristics and relative significance of modes of transportation, Accessibility and connectivity; Interregional and Intraregional: Ullman's triad- Complementarily- Intervening Opportunity- Transferability. Globalization, Regional Trade blocks EEC, EFTA, & WTO. Ricardo's Classical Theory. (20)

**References:**

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



## GCT-104: Geography of Population and Development

### Unit-1: Concepts (15)

Meaning, nature, scope and significance of population geography; Sources of population data; Factors influencing population distribution and density; Population distribution patterns- world and India; Population composition-demographic, sociocultural, economic.

### Unit-2: Population Processes (20)

Fertility-measures and methods of estimations, and spatio-temporal variations; Mortality-measures and methods of estimation; Migration-measures and methods of estimations; Urbanization-issues, perspectives and policies.

### Unit-3: Population Theories (10)

Theories of population growth: Malthus, Neo-Malthusian, Marx, Demographic Transition Model; Migration theories: Ravenstein and Everette Lee; Epidemiological Transition.

### Unit-4: Population Development and Policies (15)

Population as resource, population and development debate, population as ecosystem, Limits to Growth, Population resource region, Human development, gender equity; Population Policies-perspectives from developed and developing world, National Population Policy of India.

### References:

1. Barrett H.R.(1992): Population Geography, Oliver and Boyd Longman House, Harlow.
2. Bhende A., Kanitkar T. (2006): Principles of Population Studies, Himalaya Publishing House, Bombay. 18th revised.
3. Birdsall N., Kelley A.C., Sinding S. (2003): Population Matters: Demographic Change, Economic Growth and Poverty in Developing Countries. Oxford University Press.
4. Bruce Newbold, K. (2010): Population Geography: Tools and Issues. Rowman & Littlefield Publishers, Inc., UK.
5. Clark, J. I. (1972): Population Geography. Pergamon Press, Oxford.
6. Crispin J., Jegede J. (2000): Population, Resource and Development. Harpercollins Education; 2nd edition.
7. Chandana, R.C. (1984): Geography of Population, Kalyani Publisher, Ludhiana.
8. Dyson T. (2010): Population and Development: Demographic Transition. Zed Books Ltd.; 1<sup>st</sup> edition.
9. Ehrlich, P.R. and Ehrlich, A.H. (1996): Ecoscience: Population, Resources, Environment. 6<sup>th</sup> edition, W.H. Freeman and Company, San Francisco.
10. Gould WTS. (2009): Population and Development: Routledge Perspective on Development. Routledge: 1<sup>st</sup> edition.
11. Garnier, J.B. (1976): Geography of Population, Longman Group Ltd., London.
12. George, J.Demlo et.al. (1970): Population Geography: A Reader, McGraw Hill Book Co. New York.
13. Hausier, Philip M & Duncan (Eds.) (1959): The Study of Population, University Press, Chicago.
14. Davis K. (1951): Population of India and Pakistan, Princeton University Press, Princeton.

15. 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.
16. 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.
17. Newell C. (1990): *Methods and Models in Demography.* The Guilford Press; 1st edition.
18. Pacione M. (2011): *Population Geography: Progress and Prospects.* Routledge; Reissue edition.
19. Peters G.L., Larkin R.P. (2008): *Population Geography: Problems, Concepts and Prospects.* 9<sup>th</sup> edition. Dubuque, IA: Kendall Hunt Publishing.
20. Preston S., Heuveline P., Guillot M. (2000): *Demography: Measuring and Modeling Population Processes.* Wiley-Blackwell; 1<sup>st</sup> edition.
21. Rowland DT. (2003): *Demographic Methods and Concepts.* Oxford University Press, USA.
22. Swanson DA., Siegel JS. (2004): *Methods and Materials of Demography.* Emerald Group Publishing; 2<sup>nd</sup> edition.
23. Smith, T.L (1960): *Fundamental of Population Studies.* Lipineott, London.
24. Srinivasan, K, and Vlassoff, M. (2001): *Population Development Nexus in India: Challenges for the New Millennium.* Tata McGraw Hill, New Delhi.
25. Trewartha, G.T. (1959): *A Geography of Population-World Patterns.* John Wiley & Sons Inc. New York.
26. Todaro MP, Smith S. (2011): *Economic Development.* 11<sup>th</sup> edition Printice Hall.
27. United Nation Development Program (UNDP) (2012): *Human Development Reports (1990-2012)* <http://hdr.undp.org/en/>.
28. Weeks JR. (2004): *Population: An Introduction to Concepts and Issues.* Wadsworth Publishing; 9<sup>th</sup> edition.
29. Woods, R. (1979): *Population Analysis in Geography.* Longman, London.
30. Zelinsky, M. et. al. (1970) : *Geography and Crowding World,* Oxford University Press New York.
31. Zelinsky, W (1966): *A Prologue of Population Geography,* Prentice Hall Inc, M.J.

**Semester-I**

**GCP-101: Landforms Analysis & Surveying**

**Unit-1:**

A) Methods of Representation of Relief: i) Pictorial ii) Mathematical. B) Maps- i) Definition: ii) Types of maps iii) Indexing of Topographical sheets. Identification & Mapping of Landforms from Topographical Maps I) Ridge ii) Saddle iii) Col. iv) Pass v) Spur; vi) Plateau vii) Escarpment viii) Cliff ix) Waterfall x) River Terraces xi) U-shaped Valley xii) V shaped Valley. (15)

**Unit-2:**

A) Identification & Mapping of drainage patterns: I) Dendritic; ii) Trellis; iii) Radial Drainage Patterns. B) Calculation of Bifurcation Ratio & Drainage density. Identification & Mapping of Slopes: i) Steep & ii) Uniform; iii) Gentle; iv) Concave v) Convex Slope; vi) Terraced Slopes. (15)

**Unit-3:**

Profiles: i) Super-imposed; ii) Projected; iii) Composite iv) Transverse Profile; v) Longitudinal Profile. Gradient & Slope: Significance of slope determination. A) Calculation of Gradient. B) i) Calculation of Scale of slope; ii) Methods of average slope determination: a) G.H.Smith's method of slope Analysis; b) Wentworth's Method. (15)

**Unit-4:**

Surveying: (A) Definitions, uses of surveying, classification of surveying. (B) Surveying and Preparation of Contour map, Cadastral map using (i) Theodolite, (ii) Total Station. (15)

**Reference:**

1. Davis, Peter, (1974): Science in Geography Data Description & Presentation, Vol.3, Oxford University Press, London.
2. Hanwell, J.D. & Newson, M.D. (1973): Macmillan Education Ltd., London.
3. Mishra, R.P. (1973): Elements of Cartography. Prasaranga, University of Mysore.
4. Monkhouse, F.JR & Wilkinson, H.R: Maps and Diagrams, Mathwn & Company, London.
5. Robinson, A.H & Sale R.D.: Elements of Cartography. Johns House & Sons, London.
6. Sing R. L. (1996) : Map Work & Practical Geography, Central Book Dept. Allahabad.
7. Singh & Kanaujia (1973) : Map Work & Practical Geography, Central Book Dept. Allahabad.
8. N. N. Basak (1994): Surveying and Leveling, Tata McGraw Hill Publishing Company LTD., New Delhi.

**GCP-102: Analysis of Climatic Data**

**Unit-1:**

Nature and sources of climatic data, Indian daily weather report and its format, Reproduction of weather details by Weather Signs & symbols. Reading and interpretation of weather maps of representative seasons. Analysis of upper air data-Tephigram (Temperature Height diagram). (15)

**Unit-2:**

Simple and compound & Octagonal wind rose. Interpolation of isotherms, isobars, & Isohytes. Comfort diagrams- Climographs. Hythergraph. Climatograph. (10)

**Unit-3:**

Line Graphs, Preparation of trend graphs- moving averages, semi-Average line, water budget, and its graphical analysis. (10)

**Unit-4:**

Dispersion graphs: Temperature and rainfall dispersion Diagram; Central tendency of climatic Data: calculation and interpretation; Spatial correlation of climatic variables: Graphical analysis. Erogographs (Crop Calendar). (25)

**References:**

1. Ashish sarakar: Practical Geography A systematic approach. Orient Longman Limited, Kolkatta.
2. Critchfield: Principles of Climatology.
3. Lawrence,G.R.P.: Cartographic methods.Mathur co., London
4. Mather J.R. (1974) Climatology, Fundamentals and applications. Mc Grew Hill Book co., New York
5. Monkhouse, F.J.R and: Maps and Diagrams, Wilkinson, H.R. Methuen and Co. London.
6. R.L.singh &Rana p.B.Singh: Element of Practical Geography. Kalyani Pub. New Delhi (1999).
7. Trewartha G.T.: An Introduction to climate McGraw – Hill Book Co. New York.

**Semester-II**

**GCT-205: Advanced Geomorphology**

**Unit-1:**

Tectonism and geomorphology, Earth's interior and its source of knowledge, Earthquakes, Volcanoes and associated features, folding and faulting. (15)

**Unit-2:**

Dynamic agencies of denudation and their work: Fluvial, Glacial, Coastal, Aeolian and Karst topography, Morphogenetic regions. (15)

**Unit-3:**

Denudation Chronology: Meaning and concept, Cycle of Erosion-Geographical Cycle of Davis, Penck's model of cycle of erosion. Hill Slope development, views of W.M. Davis, Walther Penck, Allen Wood and L.C. King. (20)

**Unit-4:**

Applied Geomorphology, Anthropogenic Geomorphology, Environmental Geomorphology and recent trends in Geomorphology. (10)

**Reference:**

1. Allaby, Michael (2008): Oxford Dictionary of Earth Science, Oxford University Press, New York.
2. Bloom, A.L. (1991): Geomorphology, 2nd Ed Englewood Cliffs, M.J. Prentice Hall.
3. Chorley, R.J. Schumm, S.A. & Sugden, D.E. (1985): Geomorphology, Methuen & Co. Ltd., London, New York.
4. Brierley, G.J. & Fryirs, K.A. (2005): Geomorphology and River Management, Blackwell Publishing, Oxford UK.
5. Briggs, K. (1985): Physical Geography Process and System, Hodder and Stoughton, London.
6. Christopherson, R.W. (1995): Elemental Geosystems: A Foundation in Physical Geography, Prentice Hall Englewood Cliffs, New Jersey.
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8. Dayal, P. (1996): A Textbook of Geomorphology, Shukla Book Depot, Patna.
9. Fairbridge, R.W., ed. (1968): Encyclopaedia of Geomorphology Reinhold, New York.
10. Hart, M.G. (1986): Geomorphology Pure and Applied, George Allen and Unwin, London.
11. Leopold, L.B. Wolman, M.G. & Miller, J.P. (1964): Fluvial Processes in Geomorphology, W.H. Freeman, San Francisco.
12. Lobeck, A.K. (1939): Geomorphology, McGraw Hill, New York. .
13. Moor, W.G. (1949): A Dictionary of Geography, Penguin Books, England.
14. Morgan, R.S. & Wooldridge S.W (1959): Outline of Geomorphology the Physical basis of Geography, Longmans Green, London.
15. Robinson, Harry (1969): Morphology and Landscape, University Tutorial Press Ltd. London.
16. Singh, Savindra (1998): Geomorphology, Prayag Pustak Bhavan, Allahabad.
17. Singh, Savindra (1991): Environmental Geography, Prayag Pustak Bhavan, Allahabad.
18. Spark, B. W. (1986): Geomorphology, Longman, London.
19. Strahler, A.N (1969): Physical Geography. John Wiley & Sons Inc., New York.
20. Thomas, M.F. (1974): Tropical Geomorphology, Macmillan, London.
21. Thornbury, W.D. (1969): Principles of Geomorphology, Wiley Eastern Ltd. New Delhi.
22. Wadia, D.N. (1993): Geology of India, Tata McGraw Hill Edition, New Delhi.
23. Worcester, P. G. (1948): Textbook of Geomorphology, Princeton, D. Van, Norstrand.

**GCT-206: Applied Climatology**

**Unit-1:**

Regional Climatology: Characteristics of Climatic Regions, Approaches to Climatic Classification, Classification of Climate according to Koppen & Thornthwaite, (15)

**Unit-2:**

Agroclimatology: Climate and Crop distribution, Climate and Crop yields, Droughts, Irrigation scheduling, Agroclimatic regions of India. (15)

**Unit-3:**

Applied and Physiological climatology: Physiological responses, Biometeorological indexes, Climate and health, Climate and Clothing, Climate and Architecture, Acclimatization, Urban climate and Urban heat island. (15)

**Unit-4:**

Paleoclimatology and Climate Change: Paleoclimatic data, Evidences for climatic change- Geochronology, Natural causes of climatic change, Theories of Climatic change; Global climate change, Global warming and greenhouse effect, Air Pollution, Acid Precipitation, Ozone layer depletion. (15)

**Reference:**

1. Critchfield H.J,2004: "General Climatology" Prentice Hall London.
2. Boucher. 1975; Global Climates, Halstead Press, New York.
3. Oliver J.E. (1973): "Climate & Man's Environment-An Introduction to Applied Climatology", John Wiley & Sons., New York.
4. Lutgens, F.K & Tarbuck, E.J (5th Ed): The Atmosphere – an introduction to meteorology. Prentice Hall, New Jersey.
5. Miller, G.T (Jr.)(9th Ed): "Living In the Environment "Wadsworth Publishing Co. New York.
6. Savinder Singh (1999) Physical Geography, Prayag Pustak Bhavan, Allahabad.
7. Mamoria C.B. Agricultural Geography of India.
8. Hobbs J.E. (1980) : Applied Climatology, Butterworth, London
9. Lal D. S.: Climatology. Prayag pustak Bhavan, Allahabad.
10. Mather, J.R. (1974): "Climatology – Fundamentals & Application" McGraw Hill Book Co., New York.

**GCT-207: Geography of India**

**Unit-1:**

India – Location & space relations, Physiography – Structure, relief, divisions, Natural drainage system, Problems and prospects of Interlinking of rivers, Climate– Climatic types & regional variations, Natural vegetation– Forest types and distribution. (15)

**Unit-2:**

Irrigation, Agriculture & live stock in India, Green and White Revolution, Problems of Agricultural Development, Soil types and conservation in India. (15)

**Unit-3:**

Mineral & Power resources. Development of Iron, Mica, Coal, Petroleum. Industrial regions of India. Transport and communication systems in India – Roads, Railways, Air Ways and Inland Waterways, Major ports & Sea routes. (20)

**Unit-4:**

Population- Distribution and Density, Growth and Problems. (10)

**Reference:**

1. Chapman, G. and Baker, K.M. (eds.) (1992): The Changing Geography of Asia. Routledge, London.
2. Farmer, B.H. (1983): Introduction to South Asia. Methuen and Company Ltd. and Company Ltd., London.
3. Gole, P. N. (2001): Nature Conservation and Sustainable Development in India. Rawat publications, Jaipur and New Delhi.
4. Johnson, B.L.C. (1983): Development in South Asia. Penguin Books, Harmondsworth.
5. Khullar, D. R. (2006): India. A Comprehensive Geography. Kalyani Publishers., New Delhi.
6. Krishnan, M. S. (1968): Geology of India and Burma. 4<sup>th</sup> edition. Higgin Bothams Private. Ltd., Madras.
7. Nag, P. and Gupta S. S. (1992): Geography of India. Concept Publishing. Company, New Delhi.
8. Sharma, T. C. (2003): India: Economic and Commercial Geography. Vikas Publication., New Delhi.
9. Singh, J. (2003): India: A Comprehensive and Systematic Geography. Gyanodaya Prakashan, Gorakhpur.
10. Singh, R. L. (ed.) (1971): India. A Regional Geography. National Geographical Society of India, Varanasi.
11. Spate, O.H.K., Learmonth, A.T.A. and Farmer, B. H. (1979): India and Pakistan. Methuen and Company Ltd. and Company Ltd., London.
12. Subbarao, B. (1959): The Personality of India. University of Baroda Press, Baroda.
13. Sukhwai, B.L. (1987): India. Economic Resource Base and Contemporary Political Patterns. Sterling Publication, New Delhi.
14. Tiwari, R. C. (2007): Geography of India, Prayag Pustak Bhawan, Allahabad
15. Wadia, D. N. (1959): Geology of India. MacMillan and Company, London and Madras. Student edition.

**GCT-208: Social and Cultural Geography**

**Unit-1:**

Philosophical bases of Social and Cultural Geography. Definition, scope, and significance of Social and Cultural Geography. (10)

**Unit-2:**

Concept of Dialects and ethnicity. Distribution of Religion, Caste, Tribe, Language in India. Concept of social areas, North-South-Socio-Cultural diversity of India and Kinship pattern, Processes of Social changes: Modernization, Sanskritization and Globalization. (15)

**Unit-3:**

Concept of culture, culture areas and culture regions, Cultural hearths and cultural diffusion, World Culture Realms. Concept of race, Griffith Taylor and C.S. Coon's Theories of distribution of races of mankind in the world. Basis of racial classification and their physical characteristics. Races of India. (20)

**Unit-4:**

Concept of social Justice and fair society, Equality and welfare, social development and well-being. Indicators for measurement, Levels of well-being in India, Spatial patterns of status of women in India. (15)

**References:**

1. Ahmad, Aijazuddin (1999): Social Geography, Rawat Publications, Jaipur.
2. Blij, H.J. (1995): The earth-An introduction to its Physical and Human Geography, John Wiley & Sons, inc; New York.
3. Broad, Jan O.M. & Webb, John W (1973): A Geography of mankind, McGraw Hill Book Co. New York.
4. Cater, Hohn & Jones, Trevor (1989): Social Geography-An Introduction to Contemporary Issues, Arnold Publishers, New Delhi.
5. Jackson, Peter (1989): Maps of meaning- An Introduction to cultural Geography, Unwin Hyman, and London.
6. Jackson, Richard H. & Loyd E. Hudman (1990): Cultural Geography-People, Places and Environment West publishing co., New York.
7. Jones, Emrys & Eyles, John (1977): An Introduction to social Geography, Oxford University Press, Oxford.
8. Jordan, Terry G. & Rowntree, Lester (1976): The Human Mosaic-A Thematic Introduction to Cultural Geography, Canfield press, sen Francis Co., Harper & Row Publisher, New York.
9. Tripathi, R.S. & Parmar, S.B. Singh: Social and Economic Development in India, Ashish Publishing House New Delhi, PP 451-454.
10. Smith, David M. (1977): Human Geography- A Welfare approach, Arnold-Hinmann, London.
11. Hussain, Majid (1994): Human Geography, Rawat Publications, Jaipur.
12. Singh, Joginder ( ): Sanskritization in India.
13. Soffer, David E. (ed.) (1980): An Exploration of India: Geographical Perspectives on Society and Culture, Cornell Uni. Press, New York.



**Semester-II**

**GCP-203: Statistical Techniques in Geography**

**Unit-1:**

Definition of Statistics, Importance & use of statistical techniques in geography. Frequency Distribution- Histogram, Polygon, O give curve, Cumulative percentage curve. (10)

**Unit-2:**

Measures of central Tendency: Calculation of mean, median, mode, quartile from grouped and ungrouped data. Measure of dispersion: Absolute measurements, Mean deviation, Quartile deviation, and Standard deviation. (20)

**Unit-3:**

Relative measurements-Coefficient of mean Deviation, coefficient of quartile deviation, Coefficient of variations, Index variability and relative variability. Skews: Karl Personas and Bowley's methods. (10)

**Unit-4:**

Correlation Analysis: Karl Pearson's Product moment correlation coefficient- Spearman's rank order. Significance of 't' Test on correlation- coefficients. Time series: Moving average, Least square method and drawing of line of best fit. (20)

**Reference:**

1. Cole, J.P. & King, C.A.M. (1968): Quantitative Techniques in Geography. John Wiley & sons Inc. New York.
2. Elhance, D.N. (1972): Fundamentals of statistics, Kitab Mahal, Allahabad.
3. Gregory, S.(1968): Statistical methods and the geographer. Longman, London.
4. Gupta, C.B.(1978); An introduction to statistical Methods, Vikas Pub.House, New Delhi.
5. Hoel P.G.: Elementary Statistics, Wiley, New York.
6. King, L.J. (1991): statistical Analysis in geography. Prentice Hall, Englewood Cliff N.J.
7. Hemawati: Statistical Methods for Geographers.
8. Singh R. L.: Elements of Practical Geography.

**GCP-204: Analysis of Socio-Economic Data**

**Unit-1:**

1. Choropleth maps: Mapping of Socio-Economic Phenomena. (4)
2. Dot method & its relevance to distribution maps. (4)
3. Flow line charts & maps of transport flows. (3)

**Unit-2:**

1. Maps with proportional circles. (3)
2. Maps with divided proportional circles. (3)
3. Maps with proportional spheres. (3)

**Unit-3:**

1. Compound pyramid. (3)
2. Superimposed Pyramid. (3)
3. Triangular graph- tri-linear relationship among three variables. (4)

**Unit-4:**

1. Cumulative graph. (4)
2. Deviational graph. (4)
3. Scatter diagram (4)
4. Logarithmic & Semi-logarithmic graphs. (5)

**References:**

1. Lawrence, G.R.P. (1973): Cartographic methods, Methuen & Co. London.
2. Mishra, R.P. (1982): Fundamentals of cartography, Prasaranga, University of Mysore.
3. Monkhouse, F.J.R & Wilkinson, H.R: Maps & diagrams, Methuen & company, London.
4. Raisz, Erwin: Principles of cartography, McGraw – hill Book Co., New York.
5. Robinson A.H. & Sale R.D. Element of Cartography, John House & Sons Ltd., London.
6. Singh R. L.: Elements of Practical Geography.

**GCT-309: Regional Planning and Development**

**Unit-1:**

Region-Concept, types and hierarchy of regions - planning- concept and types. Role of Geography in Planning, Concept of development, Choice of Indicators, Measurement of Regional Development. Regional Disparities in India. (15)

**Unit-2:**

Spread and Backwash concept. Core and Periphery concept. Central Place Theory. Growth pole and Growth Foci Approach. (15)

**Unit-3:**

Policies and Experiences of Regional planning in India. Micro- level planning , Multy-level Planning, Regional development planning and strategies in developed and Developing countries with special reference to National Capital Region (NCR), Damodar Valley Corporation (India), Tennessee Valley Authority (USA). (15)

**Unit-4:**

Planning in India- Rural and Urban Planning. Planning for Tribal area, Hilly area, Command area, and Drought-prone area Development. (15)

**References:**

1. Alden, J. and Morgan, (1974): Regional Planning: A Comprehensive View, Leonard Hill Books, Beds.
2. Adrill, J. (1974): New Citizens Guide to Town and Country Planning, Charies knight and Company Ltd. London.
3. Chand, M. & Puri, V. (1983): Regional Planning in India, Allied Publishers Ltd., New Delhi.
4. Chandra, R.C. (2000): Regional Planning and Development, Kalyani Publishers, Ludhiana.
5. Cook. P. (1983): Theories of Planning and Spatial Development, Hutchinson & Company Ltd. London.
6. Diamond, D. (ed) (1982): Regional Disparities and Regional Policies, Pergamon Press, Oxford.
7. Dickinson R.E. (1964): City and Region: A Geographical Interpretation. Routledge and Keagan Paul.
8. Friedman, J. & Alonson W. (1964): Regional Development and Planning. MIT Press. Cambridge.
9. Galasson, John (1974): An Introduction to Regional Planning Hutchinson. Educational London.
10. Hilborot, J.G.M (1971): Regional Planning. Rotterdam University Press, Rotterdam.
11. Misra, R.P. Sundaram K.V. & Rao, V.L.S. Prakasa (1974): Regional Development Planning In India.
12. Misra, R.P. (1992): Regional Planning. Concept Publishing Company. New Delhi.
13. Reddi, K. V. (1988): Rural Development in India, Himalaya Pub, Mumbai.
14. Singh, R.L.(2008): Fundamentals of Human Geography, Sharada Pustak Bhawan, Allahabad.
15. Sundran, K.V. (1977): Urban and Regional Planning in India, Vikas Publishing, New Delhi.
16. Swawy, M.C.K., Bhaskara, R. Hegde, V.M. (eds.) (2008): Urban Planning and Development at Cross Roads, BC Books for Change, Bangalore.
17. Whynnes, Charles & Hammand (1979): Elements of Human Geography, George Aflen & Unwin, London.

**Semester-III**

**GCT-310: Fundamentals and Applications of Remote Sensing**

**Unit-1: Introduction & Principles of Remote Sensing (20)**

Definition and scope of remote sensing; History and development of remote sensing technology; Electromagnetic radiation (EMR) and electromagnetic spectrum; EMR interaction with atmosphere and earth surface; Atmospheric window and spectral reflectance curve; Resolutions in remote sensing; Types of remote sensing; Principles and applications of optical, thermal & microwave remote sensing; Introduction to hyper-spectral remote sensing.

**Unit-2: Aerial Photography (12)**

Aerial photographs: types, scale, & resolution; Types of aerial cameras and photographic films; Geometry of aerial photographs; Flight planning; Impact of season, time, & topography on aerial photographs; Parallax, relief displacement, and orthophotos.

**Unit-3: Satellite Remote Sensing (14)**

Satellite: types and their characteristics; Types of Sensor; Orbital and sensor characteristics of major earth resource satellites: LANDSAT, SPOT, IRS, & Quickbird; Recent developments of Indian remote sensing satellite programme; Environmental, meteorological & communicational satellites.

**Unit-4: Image Interpretation & Applications of Remote Sensing in Geography (14)**

Elements of visual image interpretation; Aerial photos vs. satellite imagery; Application of remote sensing in (a) Land use/ land cover mapping, (b) Landform analysis, (c) Resource evaluation, (d) Natural hazards assessment, and (e) Urban & regional planning.

**References:**

**Books:**

1. **Aber, J.S.**, Marzloff, I., and Ries, J. (2010): *Small-Format Aerial Photography: Principles, Techniques and Geoscience Applications*, Elsevier, Amsterdam, 268pp.
2. **Campbell, J.B.**, and Wynne, R.H. (2011): *Introduction to Remote Sensing (5th Ed.)*, Guilford Press, New York, 667pp.
3. **Jensen, J.R.** (2006): *Remote Sensing of the Environment: An Earth Resource Perspective (2nd Ed.)*, Prentice Hall, New Jersey, 608pp.
4. **Konecny, G.** (2003): *Geoinformation: Remote sensing, Photogrammetry and Geographic Information Systems*, Taylor & Francis, London, 266pp.
5. **Lillesand, T.M.**, Kiefer, R.W., and Chipman, J.W. (2007): *Remote Sensing and Image Interpretation (6th Ed.)*. Wiley, New Jersey, 804pp.
6. **Morgan, D.**, and Falkner, E. (2001): *Aerial Mapping: Methods and Applications (2nd Ed.)*, CRC Press, Boca Raton, Florida, 216pp.
7. **Quattrochi, D.A.**, and Goodchild, M.F. (1997): *Scale in Remote Sensing and GIS*, CRC Press, Boca Raton, Florida, 432pp.
8. **Reddy, M.A.** (2008): *Textbook of Remote Sensing and Geographical Information System (3rd Ed.)*, BS Publications, Hyderabad, 476pp.
9. **Sabins, F.F.** (2007): *Remote Sensing: Principles and Interpretation (3rd Ed.)*, Waveland Press, Long Grove, Illinois, 512pp.

10. **Schowengerdt, R.A. (2006):** *Remote Sensing: Models and Methods for Image Processing (3rd Ed.)*, Elsevier, Amsterdam, 560pp.
11. **Wolf, P., DeWitt, B., Wilkinson, B. (2012):** *Elements of Photogrammetry with Application in GIS (4th Ed.)*, McGraw-Hill, New York, 640pp.

**Journals:**

1. *Remote Sensing of Environment*
2. *ASPRS Photogrammetric Engineering and Remote Sensing*
3. *IJPRS Journal of Photogrammetry and Remote Sensing*
4. *International Journal of Remote Sensing*
5. *IEEE Transactions on Geosciences and Remote Sensing*
6. *IEEE Letters on Geosciences and Remote Sensing*
7. *Journal of the Indian Society of Remote Sensing*

**Websites:**

1. *Indian Space Research Organisation (ISRO), India: <http://www.isro.org>*
2. *National Remote Sensing Centre (NRSC), India: <http://www.nrsc.gov.in>*
3. *National Aeronautics and Space Administration (NASA), USA: <http://www.nasa.gov>*
4. *National Oceanic and Atmospheric Administration (NOAA), USA: <http://www.noaa.gov>*
5. *United States Geological Survey (USGS), USA: <http://www.usgs.gov>*
6. *International Society for Photogrammetry and Remote Sensing (ISPRS): <http://www.isprs.org>*
7. *Wikimapia: <http://www.wikimapia.org>*
8. *Bhuvan: <http://www.bhuvan.nrsc.gov.in>*

**GOT-301: Environmental Geography**

**Unit-I:**

Concept of Environment: Major elements of Environment; Functioning of Environmental systems: role of biotic and abiotic elements; Biodiversity: meaning, biological evolution, interaction between species; Environmental factors influencing biodiversity. (15)

**Unit-II:**

Terrestrial and Aquatic ecosystems - location, types and characteristics; Energy flow in an ecosystem; Ecological pyramids and food chains; Succession, restoration and simplification of ecosystem; Ecosystem stability: risk, conservation and management; Biogeochemical cycles. (15)

**Unit-III:**

Natural hazards: earthquakes, volcanoes, tsunami, tropical cyclones, droughts, floods, famines; Forest fires: distribution, causes and consequences; Disaster management in Maharashtra and India. (15)

**Unit-IV:**

Conservation and management of environment; Concept of sustainable development; Sustaining living resources; Conservation of wildlife and biological diversity; Land degradation and noise pollution; Environment impact assessment; Environmental issues and policies in India. (15)

**References:**

1. Abbott, P.L: Natural Disasters. McGraw-Hill, London.
2. Botkin, D.B., Keller, E.A. (2007): Environmental science: Earth as a Living Planet. John Wiley and Sons, New York.
3. Cunningham, W. Cunningham, Mary: Environmental Science: A Global Concern (2010). MacGraw-Hill, London.
4. Government of India (2010): Status of Environment Report. New Delhi.
5. Keller, E.A, Vecchio, D.E.de: Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall, New York.
6. Marsh, W.M., Grossa, J. (2005): Environmental Geography: Science, land use, and Earth Systems. John Wiley, New York.
7. McKinney, M.L., Schoch, R.M. (2003): Environmental science: Systems and Solutions. Jones & Bartlett Learning, 2003.
8. Miller, G.T, Spoolman, Scott (2011): Environmental Science. Brooks Cloe, London.
9. Raven, P.H, Berg, L.R, Hassenzahl, D.M Peter: Environment. John Wiley, New Delhi.
10. Savinder Singh (1991): Environmental Geography. Prayag Pustak Bhavan, Allahabad.
11. Wright, R.T., Nebel, B.J. (2005): Environmental science: Toward a sustainable future. Pearson/Prentice Hall, New Jersey.
12. <http://www.pbs.org/wnet/savageearth/>

**GOT-302: Geography of Tourism**

**Unit-1:**

Concept of leisure and Tourism; Nature, scope, Significance and types of Tourism; Geography of Tourism; Geographical basis of Tourism; Resources for Tourism; Infrastructure for Tourism: Transportation, Accommodation, and basic Infrastructure. (15)

**Unit-2:**

Impact of tourism: Physical, Economical and Social cultural impacts; Concept of Ecotourism and sustainable tourism; New trends in Tourism; Globalisation and tourism. (15)

**Unit-3:**

Tourism planning and development: concept and issues, Tourism Policy Issues; strategic tourism planning; Development of tourism in India and Maharashtra. (15)

**Unit-4:**

Tourism marketing: Marketing concepts; Marketing in Tourism - The Tourist product-Segmentation- A priori Segmentation. Tourism circuits, Tourism promotions. (15)

**References:**

1. Bhatia A.K. (1978): Tourism in India. Sterling pub. New Delhi.
2. Burkarl, A.J. (1974): Tourism, Past, present and future Heineman London.
3. Gearing Charles, E. (1976): Planning for Tourism development Praeger Pub, New York
4. Lawbon, F & Bauet B. (1977): Tourism and recreation Development mass, CBI pub.
5. Lundberg, D.E. (1996): The Tourist Business cehners Books. Internationa, Boston.
6. Robinson H. (1976): A Geography of Tourism. Mac Donald and Evans Ltd; London.
7. Douglas Pearce (1981): Topics in Applied Geography, Tourist Development. Longman london New York.

## GOT-303: Surveying, Cartography & GIS

### Unit-1: Surveying & Map Projection (14)

The Earth: its shape and size; Datum and co-ordinate systems; Geographical co-ordinate, Projected co-ordinate and grid system; Choice and classification of map projections; Curvature of the Earth and its effect on surveying; Trigonometrical surveying; Calculation of height & distance.

### Unit-2: Global Positioning System (12)

Introduction to GPS; Types of GPS; GPS satellite; data receiver and control points; Differential GPS; Sources of GPS errors; Application of GPS in surveying, mapping and navigation.

### Unit-3: Cartography (12)

History and Development of Cartography; Sources of cartographic data; Scale: types & importance; Cartographic methods and techniques for preparation of maps and diagrams; General maps: types and applications; Thematic maps: types and applications.

### Unit-4: Geographic Information System (22)

Definition and scope of GIS; Components and elements of GIS; Nature of geographic data: spatial and attribute data, raster and vector data; Integration of GIS, remote sensing and GPS data, GIS data quality: errors, policies; Concept of geo-database; Spatial analysis: raster based and vector based, advantages and disadvantages; Data interpolation methods; Topographic representation models: Digital Elevation Model (DEM) & Triangulated Irregular Network (TIN); Applications of GIS.

### References:

1. **Bolstad, P. (2007):** *GIS Fundamentals: A First Text on Geographic Information Systems (3rd Ed.)*, Eider Press, 620pp.
2. **Brewer, C. (2005):** *Designing Better Maps: A Guide for GIS Users*, ESRI Press, 220pp.
3. **Demers, M.N. (2008):** *Fundamentals of Geographical Information Systems (4th Ed.)*, Wiley, 443pp.
4. **Dent, B., Torguson, J., and Hodler, T. (2008):** *Cartography: Thematic Map Design (6th Ed.)*, McGraw-Hill, 368pp.
5. **Diggelen, F. (2009):** *A-GPS: Assisted GPS, GNSS, and SBAS*, Artech House, Norwood, MA, USA, 400pp.
6. **El-Rabbany, A. (2002):** *Introduction to GPS: the Global Positioning System*, Artech House, Norwood, MA, USA, 194pp.
7. **Ghilani, C.D., and Wolf, P.R. (2011):** *Elementary Surveying: An Introduction to Geomatics (13th Ed.)*, Prentice hall, 984pp.
8. **Heywood, I., Cornelius, S., and Carver, S. (2011):** *An Introduction to Geographical Information System (4th Ed.)*, Prentice hall, 446pp.
9. **Hofmann-Wellenhof, B., and Moritz, H. (2006):** *Physical Geodesy (2nd Ed.)*, springer, 420pp.
10. **Iliffe, J., and Lott, R. (2008):** *Datums and Map Projections for Remote sensing, GIS, and Surveying (2nd Ed.)*, Whittles Publishing, 192pp.
11. **Kaplan, E.D., and Hegarty, C.J. (2006):** *Understanding GPS: Principles and Applications (2nd Ed.)*, Artech house, Norwood, MA, USA, 724pp.



12. **Kavanagh, B.F. (2008):** *Surveying: Principles and Applications (8th Ed.)*, Prentice hall, 816pp.
13. **Kimerling, J., Buckley, A.R., Muehrcke, P.C., and Muehrcke, J.O. (2011):** *Map Use: Reading, Analysis, Interpretation (7th Ed.)*, ESRI Press, 620pp.
14. **Krygier, J., and Wood, D. (2011):** *Making Maps: A Visual Guide to Map Design for GIS (2nd Ed.)*, The Guilford Press, New York, 256pp.
15. **Lo, C.P., and Yeung, A.K.W. (2006):** *Concepts and Techniques of Geographic Information Systems (2nd Ed.)*, Prentice hall, 544pp.
16. **Longley, P.A., Goodchild, M., Maguire, D.J., and Rhind, D.W. (2010):** *Geographic Information Systems and Science (3rd Ed.)*, wiley, Chichester, UK, 560pp.
17. **Misra, R.P., and Ramesh, A. (1999):** *Fundamentals of Cartography*, Concept Publishing, New Delhi.
18. **Nathanson, J.A., Lanzafama, M., and Kissam, P. (2010):** *Surveying Fundamentals and Practices (6th Ed.)*, Prentice Hall, 360pp.
19. **Reddy, M.A. (2008):** *Textbook of Remote Sensing and Geographical Information System (3rd Ed.)*, BS Publications, Hyderabad, 476pp.
20. **Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J., and Guptill, S.C. (1995):** *Elements of Cartography (6th Ed.)*, Wiley, New York, 688pp.
21. **Sarkar, A. (2009):** *Practical Geography: A Systematic Approach*, Orient BlackSwan, Hyderabad, India, 408pp.
22. **Singh, R.L., and Singh, R.P.B. (1993):** *Elements of Practical Geography*, Kalyani Publishers, New Delhi, India.
23. **Slocum, T.A., McMaster, R.B., Kessler, F.C., and Howard, H.H. (2008):** *Thematic Cartography and Geovisualization (3rd Ed.)*, Prentice Hall, 576pp.
24. **Taylor, G., and Blewitt, G. (2006):** *Intelligent Positioning: GIS-GPS Unification*, Wiley, Chichester, UK, 194pp.

**GOT-304: Political Geography**

**Unit-1:**

Definition, Nature, Scope and Significance, Approaches to Political Geography, Elements of Political Geography–Location: absolute, vicinal, maritime, size and shape, Natural resources- Food, Minerals and Power resources, Population–Race, religion and language. (15)

**Unit-2:**

Concept of State, Nation and Nation-State. Federalism, Frontiers and boundaries, Classification of boundaries, Core and periphery relations. (15)

**Unit-3:**

Concepts of Ecopolitics, Geopolitics, Geo-strategic Views: Heartland and Rimland. Mahan theory. (15)

**Unit-4:**

Political pattern of Asia, Geopolitical Conflicts – Indo- Pakistan and Indo – China, Reorganisation on Indian state, Interstate conflicts in India, Internal security Threats (15)

**References:**

1. Adhikari S., 1997: Political Geography, Rawat Pub. Jaipur.
2. Blij De H.J., 1972: Systematic Political Geography . Wiley, New York.
3. Cohen S.B., 1973: Geography and Politics in a divided world. Oxford, New York.
4. Cox K. (): Political geography: Territory, State and Society, Blackwell Publishers Ltd, 108, Cowely Road, Oxford, UK.
5. Dixit R. D., 1982: Political Geography. Tata McGraw Hill New Delhi.
6. Dwivedi R.L., 1996: Political Geography. Chaitanya Prakashan Allahabad.
7. Fahrer C., Glassner M. (2001): Political geography, Wiley.
8. Moor R., 1981: Modern Political Geography. McMillan, London.
9. Pounds N.G., 1972: Political Geography. McGraw Hill, London.
10. Taylor P. (1998): Political Geography, Prentice Hall.
11. Valkenberg S.U. & Stoz C., 1963: Elements of Political Geography. Prentice Hall of India, New Delhi.

**GCP-305: Photogrammetry, Remote Sensing and GIS**

- 1) Indexing of aerial photographs.
- 2) Introduction to vertical aerial photographs and its geometry.
- 3) Introduction to stereoscopes
  - i) Orientation & construction of 3-D model under Pocket stereoscope.
  - ii) Orientation & construction of 3-D model under Mirror stereoscope.
  - iii) Stereoscopic Vision test
- 4) Determination of scale
  - i) By establishing relationship between Photo distance and Ground distance
  - ii) By establishing relationship between Photo distance and Map distance
  - iii) By establishing relationship between Focal length and Flying height
  - iv) Determination of Average Scale of Vertical Aerial Photograph
- 5) Relief Displacement
  - i) Calculation of Relief Displacement
  - ii) Object height determination from relief Displacement
- 6) Parallax
  - i) Introduction to Parallax bar
  - ii) Object height determination from Parallax
- 7) Calculation of Photo coverage Area
- 8) Visual Interpretation and Mapping of Aerial photographs
  - i) Land use/ Land cover mapping
- 9) Annotations of Satellite image
- 10) Visual and Digital interpretation of satellite image
  - i) Land use and Land cover mapping
- 11) Introduction to GPS
- 12) Introduction to GIS software

**References:**

1. Agarwal, C.S. and Garg, P.K. 2000. *Textbook of Remote Sensing in Natural Resources Monitoring and Management*. New Delhi: Wheeler Publishing.
2. Avery, T.E. 1985. *Interpretation of aerial Photographs*. Minneapolis, Minnesota: Burgess Publishing Company.
3. Bakker, Wim H., et al. 2001. *Principles of Remote Sensing – An Introductory Textbook*. Enschede, The Netherlands: ITC.
4. Banerjee, R.K. and Banerjee, B. 2000. *Remote Sensing for Regional Development*. New Delhi: Concept Publishing Company.
5. Campbell, James B. 1996. *Introduction to Remote Sensing (Second Edition)*. London: Taylor & Francis.
6. Colwell, Robert N. (ed.) 1983. *Manual of Remote Sensing, Second Edition, Volume 1 and 2*. Falls Church, Virginia: American Society of Photogrammetry.
7. Gibson, Paul J. (2000). *Introductory Remote Sensing – Principles and Concepts*. Routledge.
8. Jensen, John R. 2000. *Remote Sensing of the Environment – An Earth Resource Perspective*. Pearson Education (First Indian Edition, 2003).
9. Hord, R. Michael I. 1986. *Remote Sensing – Methods and Applications*. (A Wiley-Interscience Publication). New York: John Wiley & Sons.
10. Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. 2004. *Remote Sensing and Image Interpretation (5th Ed.)*. Wiley. (Wiley Student Edition).
11. Miller, V.C. 1961. *Photogeology*. New York: McGraw-Hill, Book Company, Inc.
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**Semester-III**

**GCP-306: Quantitative Techniques & Computer Applications in Geography**

**Unit-1: Probability Distribution (12)**

Probability; Law of multiplication; Probability distribution: binomial distribution, normal probability distribution; properties of normal curve.

**Unit-2: Bi-variate Distribution and Correlation (18)**

Scatter diagrams; Regression lines and residuals; Product moment correlation and Spearman's rank correlation; Frequency distribution; Lorenz curve; Ternary diagram; Weaver's combination index.

**Unit-3: Geographic Data and Digital Mapping (18)**

Geographic data: data types and data structure; Number system: binary, octal, decimal and hexadecimal; Introduction to MS office: word, excel, and power point; Hardwares and softwares for preparation of maps and graphs; Representation of geographic data: histogram, bar graph, line graph, scatter diagram, pie diagram, and trend line.

**Unit-4: Computation of Statistical Parameters (12)**

Numerical data handling using computer; Measures of central tendency: average, median, mode, and weighted mean; Measures of position: quartiles, deciles, and percentiles; Measures of variation: range, variance, and standard deviation; Co-relation coefficient.

**References:**

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2. **Dale, N.**, and Lewis, J. (2002): *Computer Science Illuminated*, Jones and Bartlett Publishers, Sudbury, MA, USA, 656pp.
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19. **Sarkar, A. (2009):** *Practical Geography: A Systematic Approach*, Orient BlackSwan, Hyderabad, India, 408pp.
20. **Ulrich, L.A. (2003):** *How to Do Everything with Microsoft Office 2003*, McGraw-Hill/Osborne, Emeryville, California, USA, 456pp.
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22. **Walkenbach, J., Tyson, H., Wempen, F., Prague, C.N., Groh, M.R., Aitken, P.G., Irwin, M.R., Powell, G., and Bucki, L.A. (2007):** *Office 2007 Bible*, Wiley, Indianapolis, Indiana, USA, 1224pp.

**Semester-IV**

**GCT-411: Development of Geographical Thought**

**Unit-1:**

Philosophy of Geography, General nature of geographic knowledge during the ancient and medieval period. Explanation, relevance and Development of the discipline. (15)

**Unit-2:**

Founders of Modern Geography – i) Alexander Von Humboldt, ii) Carl Ritter, iii) Friedrich Ratzel iv) Vidal de la Blache, v) Ellen Churchill Sample, vi) Richard Hartshorne. (15)

**Unit-3:**

Dualism in Geography: Physical and Human Geography, Systematic and Regional Geography, Concept of Determinism and Possibilism, Areal Differentiation, Spatial Organization, Patterns and Processes, Explanation in Geography, Quantitative Revolution. (15)

**Unit-4:**

Approaches in Geography- Positivism, humanism, radicalism, Behaviouralism and Post modernism. Paradigms in Geography, Recent trends in Geography. (15)

**References:**

1. Abler, Adams, J. & Gould, P. (1971): Spatial Organization. The Geographer's View of the World, Prentice Hall, New Jersey.
2. Adhikari, Sudeepta(1972): Fundamentals of Geographic Thought, Chaitanya Publishing House, Allahabad.
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12. Dixit, R.D. (1999): Development of Geographic, Thought Longmans India Limited.
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22. Hartshorne R. (1954): *Comment on Exceptionalism in Geography*, *Annals, Association of American Geographers*, 44:103-90
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25. Johnston, R.J., Gregory, D., Smith, D.M. (Ed)(1986): *The Dictionary of Huma Geography*, Blackwell.
26. Johnston R. J. & Sidaway, J. D. (2004): *Geography and Geographers*, 6<sup>th</sup> Edition, Edward Arnold, London
27. Lefebvre, H. (1991): *The Production of Space*, Blackwell (Translated By D. Nicholson- Smith).
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30. Peet, R. (1977): *Radical Geography - Alternative View Points on Contemporary Social Issue*. Methuen & Co. Ltd. London.
31. Peet R. And Thirft, N. (Eds.): *New Models in Geography*, Vo.I &II Unwin Hyman.
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33. Peet, R. (1985): *The Social Origin of Environmental Determinism*, *Annal of Association of American Geographers*, 75:309-83.
34. Peet, R. (Ed) (1977): *Radical Geography: Alternative Viewpoints on Contemporary, Social Issues*: Methues, London.
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37. Shaefer, F.K. (1953): *Exceptionalism in Geography: A Methodological Examination*, *Annals Association of American Geographers*, 43: 226-49.
38. Singh, R.L. (2008): *Fundamentals of Human Geography*, Sharada Pustak Bhawan, Allahabad.
39. Soja, E.W. (1977): *Postmodern Geographies*, Rawat Publications, Jaipur.
40. Unwin, T. (1992): *The Place of Geography*, Longman, UK.



## GCT-412: Geohydrology & Oceanography

### Unit-1: Groundwater & Basin Hydrology (14)

Surface & subsurface water resources; Hydrological cycle; Groundwater: occurrence, movement and management; Groundwater regimes in India and Maharashtra; Hydrological characteristics of aquifers; Basin hydrology: precipitation, evaporation and infiltration process; Unit hydrograph.

### Unit-2: Applied Geohydrology (12)

Water Pollution; Problems related to water use: salinity, alkalinity and water logging; Fresh and salt water relationship in coastal and inland areas; Conservation and planning for the development of water resources; Watersheds and Wetlands in India.

### Unit-3: Geological Oceanography (14)

Origin and evolution of ocean basins: theory of plate tectonics and seafloor spreading; Topography of the ocean floor: continental shelf, slope, rise, submarine channels, hills, ridges, trenches and abyssal plains; Bottom relief of Pacific, Atlantic and Indian Ocean; Origin and evolution of island arcs; Estuarine & coastal processes and landforms.

### Unit-4: Physical, Chemical and Biological Oceanography (20)

Air-sea interaction and ocean circulation: currents, waves and tides; Currents of Pacific, Atlantic, & Indian Ocean; Properties of oceanic water: chemical composition, salinity, temperature, and density; Origin and growth of coral reefs; Ocean deposits: origin, type and distribution; Thermohaline circulation and the oceanic conveyor belt. Ocean and global environment: El Nino and Sea level changes; Oceanic regions & Marine resources; Marine pollution.

### References:

1. **Cech, T.V. (2009):** *Principles of Water Resources: History, Development, Management, and Policy (3rd Ed.)*, Wiley, Hoboken, New Jersey, 576pp.
2. **Chow, V.T., Maidment, D.R., and Mays, L.W. (1988):** *Applied Hydrology*, McGraw-Hill, New York, 540pp.
3. **Christopherson, R.W. (2012):** *Geosystems: An Introduction to Physical Geography (8th Ed.)*, Prentice Hall, New Jersey, 693pp.
4. **Davis, R., and Fitzgerald, D. (2003):** *Beaches and Coasts*, Wiley-Blackwell, Hoboken, New Jersey, 432pp.
5. **Day, T. (2008):** *Oceans (Rev. Ed.)*, Facts on File, New York, 337pp.
6. **Fitts, C.R. (2002):** *Groundwater Science*, Academic Press, 450pp.
7. **Garrison, T. (2009):** *Essentials of Oceanography (5th Ed.)*, Brooks/Cole, Belmont, California, 463pp.
8. **Han, D. (2010):** *Concise Hydrology*, Dawai Han and Ventus Publishing, 145pp.
9. **Pinder, G.F., and Celia, M.A. (2006):** *Subsurface Hydrology*, Wiley, Hoboken, New Jersey, 485pp.
10. **Pinet, P.R. (2009):** *Invitation to Oceanography (5th Ed.)*, Jones and Bartlett Publishers, Sudbury, Massachusetts, 609pp.
11. **Raghunath, H.M. (2006):** *Hydrology: Principles, analysis and Design (2nd Ed.)*, New age International, New Delhi, 477pp.

12. **Schwartz, F.W.**, and Zhang, H. (2002): *Fundamentals of Ground Water*, Wiley, Hoboken, New Jersey, 592pp.
13. **Skinner, B.J.**, and Murck, B.W. (2011): *The Blue Planet: An Introduction to Earth System Science (3rd Ed.)*, Wiley, Hoboken, New Jersey, pp. 221-319.
14. **Sverdrup, K.**, and Armbrus, V. (2008): *Introduction to the World's Oceans (10th Ed.)*, McGraw-Hill, New York, 528pp.
15. **Trujillo, A.P.**, and Thurman, H.V. (2010): *Essentials to Oceanography (10th Ed.)*, Prentice Hall, New Jersey, 576pp.
16. **Viessman, W.**, and Lewis, G.L. (2002): *Introduction to Hydrology (5th Ed.)*, Prentice Hall, New Jersey, 612pp.

**GOT-405: Agricultural Geography**

**Unit-1:**

Definition, Nature & scope of Agricultural Geography; Origin and dispersion of Agriculture; Approaches to the study of Agricultural Geography. (15)

**Unit-2:**

Determinants of Agricultural Patterns-Physical, economic and Technological; Agricultural systems - Location, distribution, types & characteristics of agriculture. (15)

**Unit-3:**

Concept & Techniques of delimitation of Agricultural Regions-Crop Combination, Crop Diversification; Measurement of Agricultural Productivity, Agricultural Efficiency and Levels of Agricultural development; Agricultural landuse theory- Von Thunen's and Jonnason's theory; spatial diffusion Process. (15)

**Unit-4:**

Agricultural Revolution in India (Green, White etc.) -Nature, Socio-economic constraints in the adoption, performance, Problems & prospects. Landuse survey, Land classification and land capability, Dryland Agriculture, Food Security, Agricultural Policies in India. (15)

**References:**

1. Brown, L.R. (1990): The Changing World Food Prospects - The Nineties and Beyond. World Watch Institute, Washington D.C., 1990.
2. Dyson, T.(1996): Population and Food - Global Trends and Future Prospects. Routledge, London, 1996.
3. Gregory, H.F (1970): Geography of Agriculture: Themes in Research. Prentice-Hall, Englewood Cliff. London.
4. Ilbury, B.W. (1983): Agricultural Geography. Oxford University Press, London.
5. Bhatt, M.S (ed.) 2004: Poverty and Food Security in India Problems and Policies. Akkar Books, New Delhi.
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10. Bhatia B.M. (1977): Poverty Agriculture & Economic Growth, Vikas New Delhi.
11. Chorley, R. & Haggett P (1971): Socio-Economics Models in Geography, Methuen, London.
12. Grigg, D.B. (1973): The Agricultural systems of The World, Cambridge University Press.
13. Hagerstrand, T (1968): Innovation Diffusion as a spatial process, University of Chicago Press.
14. Hussain, M. (1999): Systematic Agricultural Geography, Rawat publications, Jaipur.(India)
15. Shafi M. (1983): Agricultural Productivity and Regional Imbalances a Study of Uttar Pradesh, Concept, New Delhi.
16. Symon, L. (1968): Agricultural Geography, London.

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18. Sharma, T.C., Coutinho, O. (1989): *Green Revolution Gaps: A Geographical Analysis*, Indian Council of Social Science Research, New Delhi.

**GOT-406: Settlement Geography**

**Unit-1: Fundamentals of Settlement Geography (10)**

Introduction to Settlement Geography-Meaning, Nature, Scope and Significance; Origin, evolution and growth of human settlements; definition and types of settlements; site, situation and locational factors.

**Unit-2: Geography of Rural Settlements (15)**

Meaning, nature and scope of rural settlement geography; approaches to rural settlement geography; evolution and growth of rural settlements and their causes; siting and location of rural settlements; distribution, spacing and nature of dispersion; morphology of rural settlements; rural-service centers-nature, hierarchy, service area and interaction; Indian villages-evolution and multiplicity, regional characteristics, morphology, transformation and planning of Indian villages, Rural housing policies and challenges.

**Unit-3: Geography of Urban Settlements (20)**

Meaning, nature and scope of urban settlement geography; origin and evolution of urban settlements and their causes; siting, situation and location of urban settlements; changing characteristics of urban settlements (both industrial and pre-industrial); Functions and functional classification of urban settlements; size and spacing of cities: rank-size rule, law of primate city, urban hierarchies; urban problems-environmental issues, urban poverty, slums, transportation, housing, crime, Urban housing policies and challenges.

**Unit-4: Theories and Models in Settlement Geography (15)**

Theories of Burgess, Hoyt, Harris and Ullman, Mann and White, Christaller.

**References:**

1. Carter H. (1975): The study of urban geography. Edward Arnold, London.
2. David P., Hopkinson M. (1983): The Geography of Settlements, Oliver & Boyd; 2nd Revised edition.
3. Deniel P. (2002): Geography of Settlements. Rawat Publications, Jaipur and New Delhi.
4. Gosh S. (1998): Introduction to Settlement Geography. Orient Longman.
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7. Johnston J.H. (1974): Urban Geography, Pergoman Press, Oxford.
8. Johnston R, .J. (1984): City & Society. Unwin, London.
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23. Singh, R.L. and Singh, Rana P.B., (eds.) (1979): *Place of Small Towns in India*. National Geographical Society of India, Varanasi,
24. Singh, R.L., Singh, K.N and Singh Rana P.B., (eds.) (1976): *Geographic Dimensions of Rural Settlements*. National Geographical Society of India, Varanasi.
25. Wood M. (2005): *Rural Geography: Processes, Responses and Experiences of Rural Restructuring*. Sage Publication, London.
26. Yeates & Garner (1971): *Readings in Urban Geography. The North American City*. Harper & Row. New York.

**GOT-407: Biogeography**

**Unit-1:**

Biogeography: Nature, Scope & Significance, Elements of Biogeography Plant & Animal Classification, Basis of Classification taxonomic & Ecological, Geographical basis of plant classification. (15)

**Unit-2:**

Biogeographic Process, evolution, adoption, speciation, extinction, succession, colonisation and dispersal. Habitats, plant animal association, biomes types and Biodiversity in India. (15)

**Unit-3:**

Introduction to plant geography, influencing factors on plants, classification of soil distribution of forests in world. (15)

**Unit-4:**

Introduction to Zoogeography, Review of evolutionary principles, Zoogeographic regions, Species invasions and biotic homogenization, environmental control on animals. (15)

**References:**

1. Barry C. (1977): Biogeography – An ecological & evolutionary Approach, Oxford.
2. Cole M.M. (1975): Recent developments in Biogeography, Longman, London.
3. Danserau P. (1957): Biogeography- An Ecological perspective, Renold Press, New York.
4. Darlington P.J. (1957): Zoogeography – Methew, New York.
5. Furley P.A, & Newly W.N.(1983): Geography of the Biosphere : Butter Worth, London.
6. Joy T.V. (1997); Biogeography – study of plants in the ecosphere.
7. Mathur H.S. (1986): Elements of Biogeography, Pointer Jaipur.
8. Martin C. (1975): Plant Geography. Methuen, London.
9. Muller P. (1986): Biogeography; Harper & Row, New York.
10. New big in M.I. (1986): Plant & Animal Geography : Methuen, London.
11. Pears N. (1985): Basic Biogeography, Longman, London.
12. Watts, d. (1971): Principles of Biogeography, McMillan, London.
13. Simmms T. G.: Biogeography, Natural & Cultural, Arnold & Heinemann, London.

**GCT-408: Medical Geography**

**Unit-1:**

Medical Geography: Nature, Scope and Significance; Environmental influence on health; Relationship between socio – cultural factors & health. (15)

**Unit-2:**

Human health in India; Indicators of health: changes in birth, death rates & infant mortality rates, life Expectancy, changes in sex ratio, literacy and population growth, population control; Nutrition: mal & under nutrition – causes & consequences. (15)

**Unit-3:**

Disease classification & distribution: T.B., Cancer, Leprosy, Pneumonia, Aids, Cholera; Cholera Disease diffusion model. (10)

**Unit-4:**

Development of health care system in India with special reference to Maharashtra; Study of present health care systems: Deficiencies & problems of efficiency enhancement; Health care problems in India: Urban & rural differences with special reference to Maharashtra. (20)

**References:**

1. Woods E.J. (1983): Social Geography of Medicine & health, CroonHelm London.
2. Learmonth ATA (1978): Patterns of Disease & Hunger, V Parid Chorles, London.
3. Hussain Majid (1994): Medical Geography, Anmol pub. New Delhi.
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7. Pyle G.F. (1979): Applied Medical Geography John wifey washington.
8. Shannon G.W. & Dever G.E.A. (1974): Health care Delivery McGraw Hill New York.



**Semester-IV**

**GCP-407: Research Methodology and Study Tour Report Writing**

**Part A: Research Methodology**

**Unit-1:**

Meaning, Objectives and Types of research, Research approaches, Significance of research, Selection of research topic and study area, Research processes, Research problem, Research design.

**Unit-II:**

Sources of Data, Methods of Data Collection, Processing and Analysis of Data, Sampling Techniques and Fundamentals, Construction of Hypothesis and their testing, Review of Literature, Quotations, Footnotes, References/Bibliography.

**Part B: Study Tour Report Writing**

**References:**

1. Archer J.E. & Dalton, T.H. (1968): The fields work in Geography, E.t. Batsford Ltd.,London.
2. Haring, Lloyed (1975): Scientific Geographic Research WC.Brow Company USA.
3. Johnes, P.A. (2008): Field Work in Geography, Longman.
4. Kothari, C.R. (1996): Research Methodology, Vishwas Prakashan, New Delhi
5. Mishra, R.P. (1991): Research Methodology in Geography, concept pub. New Delhi.

**\*Scheme of Evaluation: (out of 100)**

**Part A: (50 marks)**

Written Test on Research Methodology: 50 Marks

**Part B: (50 marks)**

- i) Internal Assessment: 20 Marks
- ii) Evaluation of Study Tour Report: 30 Marks

**Semester-IV**

**GCP-408: Project (100 marks)**

Students are required to select an exploratory topic of geographical importance based on empirical evidences of literature. They are expected to carryout fieldwork & generate primary data, analyze it & prepare a Project Report to submit at the time of examination.

**References:**

1. Archer J.E. & dalton T.H. (1968): The fields work in Geography, E.t. Batsford Ltd.,London.
2. Haring, Lloyed (1975): Scientific Geographic Research WC.Brow Company USA.
3. Johnes, P.A. (2008): Field Work in Geography, Longman.
4. Kothari C.R.(1996): Research Methodology, Vishwas Prakashan, New Delhi
5. Misra R.P. (1991): Research Methodology in Geography, concept pub. New Delhi.

**Scheme of Evaluation: (out of 100)**

- a) Written test: 50 Marks
- b) Evaluation of Project Report/Dissertation: 30 Marks
- c) Viva-Voce (Internal): 20 Marks