

# UNIVERSITY OF MUMBAI



**Revised Syllabus for the M.A. & M.Sc.  
Program: M.A. & M.Sc.  
Course: Geography  
(Semester I & II)**

(As per Choice based Credit System  
with effect from the academic year 2016–2017)

**Choice Based Credit System Syllabus, 2016-17**

- Total No. of Credits offered: 96
- Electives offered in a particular academic year in each group could vary.
- Semester is 15 weeks duration. Credits are defined for a semester

**Semester I: Core Courses from Parent Department (Four Courses)**

<b>Subject Code (326)</b>	<b>Course Title</b>	<b>Credits</b>	<b>No. of Hours</b>
101	Principles of Geomorphology	4+2*= 6	60+60+ 120
102	Principles of Climatology	4+2*= 6	60+60+ 120
103	Perspectives in Human Geography	4+2*= 6	60+60+ 120
104	Spatial Organisation of Economic Activities	4+2*= 6	60+60+ 120
105	<b>*Practical components based on 101 and 102</b> Tools and Techniques of Spatial Analysis - I	*	60+60+ 120
106	<b>*Practical components based on 103 and 104</b> Tools and Techniques of Spatial Analysis- II	*	60+60+ 120
Total		24	720

**Semester II: Core Courses from Parent Department (Four Courses)**

<b>Subject Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>No. of Hours</b>
201	Oceanography and Hydrology	4+2*= 6	60+60+ 120
202	Geoinformatics	4+2*= 6	60+60+ 120
203	Socio-cultural and Political Geography	4+2*= 6	60+60+ 120
204	Urban Geography	4+2*= 6	60+60+ 120
205	<b>*Practical components based on 201 and 202</b> Tools and Techniques of Spatial Analysis - III	*	60+60+ 120
206	<b>*Practical components based on 203 and 204</b> Tools and Techniques of Spatial Analysis- IV	*	60+60+ 120
Total		24	720

**Note:** Theory papers and practical components for core and elective papers will be examined by external and internal examiners.

## Semester I

### 101: Principles of Geomorphology

No. of Credits: 4 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. **Unit - I** (15 hours)
  - 1.1 Nature, scope and content of Geomorphology
  - 1.2 Geological Evolution of Earth and Geological time scale
  - 1.3 Development of geomorphic thought, Catastrophism, Uniformitarianism, Neocatastrophism
  
2. **Unit - II** (15 hours)
  - 2.1 Earth's interior: Structure and composition.
  - 2.2 Continental Drift Theory - Sea floor spreading - Plate Tectonics
  - 2.3 Geosynclines: Geosynclinal Theory of Kober, Holmes' Convection Current Theory  
Theories of Isostasy
  - 2.4 Endogenetic movements- types, consequences (earthquakes and volcanoes) and landforms
  
3. **Unit - III** (15 hours)
  - 3.1 Fluvial Geomorphic system: processes and resulting landforms
  - 3.2 Glacial Geomorphic system: geomorphic processes and features
  - 3.3 Karst landscape: development and processes
  - 3.4 Aeolian Geomorphic system: processes and landforms
  - 3.5 Coastal Geomorphic system: processes and landforms
  
4. **Unit - IV** (15 hours)
  - 4.1 Landscape evolution – Davisian Model of Cycle of Erosion, Penck's Concept of Cycle of Erosion
  - 4.2 Slope development and related theories

#### **References:**

1. Anherf, F., (1996), 'Introduction to Geomorphology', Arnold, London, Sydney, Auckland
2. Bloom, A. L. (2002), 'Geomorphology: A Systematic Analysis of Late Cenozoic Landforms', Pearson Education Pvt. Ltd., and Singapore.
3. Christopherson, R.W. (1994), 'Geosystems : An Introduction to Physical Geography', Macmillan College publishing Company, New York.
4. Dayal, P. (1990), 'A Textbook of Geomorphology', Shukla Book Depot, Patna.
5. Engeln, O. D. Von (1944), 'Geomorphology', The Macmillan Company, New York.

6. Fairbridge R. W. (1968) (ed.), 'Encyclopaedia of Geomorphology', Reinhold, New York.
7. Mitchell, C. E. (1973), 'Terrain Evaluation', Longmans, London.
8. Ritter, D.F., Kochel, R.C., Miller, J.R. (1995), 'Process Geomorphology', Wim. C. Brown Publishers, Chicago.
9. Sparks, B.W. (1988), 'An Introduction to Geomorphology', Longman, London.
10. Strahler A. (1996), 'Physical Geography: Science and System of the Human Environment', John Willey, New York.
11. Thornberry, W.D. (1998), 'Principles of Geomorphology', New Age International Press, New Delhi.
12. Steers, J.A. (2000), 'The Unstable Earth: some recent views in geomorphology', Methuen and co., London.

## **Semester I**

### **102: Principles of Climatology**

No. of Credits: 4 Contact Hours 60 + Notional Hours 60= Total hours 120

- 1. Unit – I** **(15 hours)**
  - 1.1 Nature and scope of Climatology
  - 1.2 Relationship of Climatology with Meteorology
  - 1.3 Structure and composition of Atmosphere
  - 1.4 Weather elements and climatic controls
- 2. Unit – II** **(15 hours)**
  - 2.1 Insolation and heat Budget of the Earth
  - 2.2 Temperature - Vertical, horizontal and seasonal variations
  - 2.3 Processes of heat energy transfer
  - 2.4 Inversion of temperature
- 3. Unit – III** **(15 hours)**
  - 3.1 Atmospheric pressure – vertical and horizontal distribution
  - 3.2 General Circulation of atmosphere
  - 3.3 Types of winds – Geostrophic, Gradient and local winds
  - 3.4 Modern views about Extra terrestrial wind system, Tricellular meridional circulation, Jet stream
  - 3.5 Origin of Monsoon: Classical and Recent views
- 4. Unit – IV** **(15 hours)**
  - 4.1 Air masses: Origin, classification, types
  - 4.2 Fronts: frontogenesis and frontolysis – classification of fronts
  - 4.3 Tropical and Extra-tropical cyclones: formation and impact
  - 4.4 Climatic Classification: Koppen and Thornthwaite, concept of water balance  
Problems and prospects

**References:**

1. Barry, R.S. & Chorley, R.J. (1971): Atmosphere, Weather and Climate, ELBS, Methuen & Co. Ltd., U.S.A.
2. Griffiths, J.F.(1966): Applied Climatology-An Introduction, Oxford University Press, London.
3. Lal, D.S.(1997):Climatology, Sharda Pustak Bhawan, Allahabad.
4. Mather, J. R.(1974): Climatology: Fundamentals and Applications, McGraw Hill Book Co. New York.
5. McBoyle, G.(1973): Climate in Review, Houghton Mifflin Co., Boston.
6. Subrahmanyam, V.P.(ed)(1983):Contribution to Indian Geography, Heritage Publishers, New Delhi , a) Vol. III - General Climatology b) Vol. IV- Applied Climatology
7. Harp, H.J. and Trinidade, O.D. (eds) (1990): Climate and Development, Springer Verlag, U.S.A.
8. Oliver, J.E. and Hidose, J.J. (1984): Climatology - An Introduction, Charles and Merrill, U.S.A.
9. Robinson, P.J. and Hendersen-Sellers, A.(1999): Contemporary Climatology, Pearson Education, London

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## **Semester I**

### **103: Perspectives in Human Geography**

No. of Credits: 4 Contact Hours 60 + Notional Hours 60= Total hours 120

#### **1. Changing Perspectives in Human geography (16 hours)**

- 1.1 Environmentalism- Possibilism-Neo-Possibilism - Areal differentiation
- 1.2 Post-fifty conceptualisation of Geographic Space-Perception studies- Locational analysis- Quantification- General systems theory: appraisal and criticism
- 1.3 Behaviouralism – Perception of environment- Humanistic Geography- Sense of place -Landscape studies - Emergence of welfare approach and its social relevance
- 1.4 Post 1980s trends - Radicalizing process in Geography- neo-Marxist interpretations and extensions- Neohumanism and other contemporary theorisations

#### **2. Evolution of Human Societies :Dynamics of rural and urban societies (15 hours)**

- 2.1 Evolution of Human Societies – Economic, Political and Cultural Transformation
- 2.2 Rural society: caste hierarchy, segregation in rural settlement – rural social morphology – critical understanding of Agricultural Landuse theory - Contemporary Indian rural society
- 2.3 Urban society – Various models of urban morphology - Hierarchy of urban settlements- Application of Central Place theory and settlement hierarchy - Indian examples – Contemporary urban society -stratification and occupational divergence- residential segregation-Urban Heterogeneity and cosmopolitanism
- 2.4 Evolution tribal societies – characteristics – spatial distribution – Indian Examples

#### **3. Interaction of human societies-Socio-Cultural identities- patterns and landscapes (15 hours)**

- 3.1 Emergence and development of early cultural hearth – cultural diffusion, isolation and segregation
- 3.2 Racial groups– biological divergence-blending-process of assimilation – behavioural and structural- acculturation
- 3.3 Evolution of language – diffusion over space – evolution of linguistic provinces – relevant issues – language as basis of nation and states- Linguistic division in India
- 3.4 Religion– contemporary dynamics – spatial pattern of major religions- Role of religion in the formation of nation-states
- 3.5 Implications of race, religion, language and ethnicity- Contestation, conflicts and negotiations

#### **4. Dynamics of Population Change : Patterns, Processes and spatial distribution (14 hours)**

**4.1** Components of Population Change – fertility, mortality and associated patterns - Demographic characteristics - developing and developed countries

**4.2** Population Growth – Attitudes and Interpretations – Malthusian, Neo-Malthusianism and Marxist viewpoint – Club of Rome - Critical Understanding of Demographic transition theory – concept of Demographic dividend

**4.3** Population, Resources and Spatial Pattern of Development - Optimum population, over population and under population – Recent World Views

**4.4** Migration- early and subsequent migration – scales of migration – mechanism and laws – major theories - Typology of migration – Political, cultural and economic dimensions - Contemporary Trends in migration

#### **References:**

1. Aitken, S and Valentine, G. (2006), Approaches to Human geography, Sage.
  2. Johnston, R.J., Gregory D. Pratt G. and Watts M., (2005, 5<sup>th</sup> ed.), the Dictionary of Human Geography, Blackwell.
  3. Kitchin R., Thrift, N, (eds.) (2009), The International Encyclopedia of Human Geography, Elsevier.
  4. Benko,G. and Strohmayr, U. (2004), Human Geography, a History for the 21<sup>st</sup> Century,Arnold, London.
  5. Cloke, P., Crang, P., Goodwin, M., (2004), Envisioning Human Geographies, Arnold.
  6. Cloke, P. and Johnston, R.,(eds.), (2005), Spaces of Geographical Thought, Deconstructing Human Geography's Binaries, Sage.
  7. Atkinson, D., Jackson, P., Sibley, D. and Washbourne, N. (eds.) (2005), Cultural Geography:A Critical Geography of Key Concepts, Tauris, I.B.
  8. Norton William, (2002), Human Geography, Oxford, 4<sup>th</sup> edition
  9. Barnes, T. and Gregory, D., 1997, Reading Human geography, Arnold.
  10. Smith, D. M. (1977): Human Geography, A Welfare Approach, Arnold
  11. Peet, R. (ed) (1987): Radical Geography, Maroufa Press, Rawat, New Delhi, 2003
  12. Ambrose, P. G. (1969): Analytical Human Geography, Longman, London
  13. De Blij, H. J. (1986): Human Geography, John Wiley & Sons, New York.
  14. Vivello, F. R. (1978): Cultural Anthropology, McGraw Hill, USA.
  15. Peet R. and Thrift, N. (eds) (1989): New Models in Geography, Vol. I & II, Unwin Hyman.
  16. Ahmed, A. (1999). Social Geography, Rawat Publication, New Delhi.
  17. Massey, D, Alien, J, P, Jarre, P (eds) (1999): Human Geography Today, Cambridge Polity Press.
  18. Fellman, J (1997): Landscape of Human Activities, Brown and Benchmatic Pub.
  19. Coates, B.E., Johnston, R.J. Knox, (1977): Geography and Inequality, Oxford University Press
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## **Semester I**

### **Paper 104: Spatial Organisation of Economic activities**

Maximum No. of Credits: **4** Maximum no. of lectures including continuous assessment: **60**

**1. Organisation of an economy as a dynamic spatio-social system: Basic concepts  
(15 hours)**

**1.1** Economic organization and spatial change- Spatial division of labour and Interdependence

**1.2** Geographic fixity and mobility- typology of distance-Spatial interaction and diffusion

**1.3** Typology of Space - Absolute and Relative – Time and space convergence  
Production of economic space

**2. Spatial Organisation of World Economy (15 hours)**

**2.1** Economic organization of the pre-colonial world - Rise of the Core Economies – industrial revolution in Europe

**2.2** Colonialism and Geographies of inequities and uneven development –neocolonialism and structuration of world economy as core, periphery and semi-periphery

**2.3** Flexibilisation of Production – Role of international Institutions like World Bank, IMF, UNCTAD

**2.4** Evolution and Growth of Multinational Companies - Patterns and Processes of Globalisation

**3. Organisation of Production: Agriculture and Industry - Global Patterns and Trends  
(15 hours)**

**3.1** Agricultural Patterns-World Agricultural Regions – Theory of Agricultural Landuse and Critique - Technology, modernization and structuring of agrarian regions in colonial and post-colonial periods

**3.2** Crisis of agriculture- Aspects of Food security and world patterns of hunger

**3.3** World Industrial Regions – Factors and processes Influencing Location of industries – critical assessment of theories of industrial location

**3.4** Globalisation and shifting location of industries - New Industrial Regions- EPZs and SEZs- South east and East Asian economies



#### **4. Spatio-social organization of production –Transport, Trade and Services: Global Patterns and trends (15 hours)**

**4.1** Organisation of transport - Bases of Spatial Interaction – Theoretical Perspectives on Transport and inter-regional interactions - Role of transport cost- nodes-places, networks and flows- spatio-social accessibility – Indian Examples

**4.2** International trade theory- classical, neo-classical and Marxist Perspectives - Critical review – Globalisation and changing structure and composition of International trade – GATT & WTO

**4.3** Logic of Regional Integrations- Types and levels - Significance of regional integration as a strategy for the periphery - Case Studies - EU, OPEC, ASEAN, SAARC, BRICS

**4.4** New Economic Activities and Globalisation : Finance and Service Industry- The Forth Industrial Revolution

#### **References:**

1. Knox Paul, Agnew John and McCarthy Linda, (2008): The Geography of the World Economy, Hodder Education, UK.
2. Sheppard Eric and Barnes Trevor J., (eds.) (2000): A Companion to Economic Geography, Blackwell, Massachusetts.
3. Wood Andrew and Roberts Susan, (2011): Economic Geography- Places, network and flows, Routledge, London and New York.
- 4 Bryson John, Henry Nick, Keeble David and Martin Ron, (eds.) (1999): The Economic Geography Reader- Producing and Consuming Global Capitalism, John Wiley and Sons Ltd.,New York.
5. Hartshorn A. Truman and Alexander W. John, Third edition, (2010): Economic Geography, PHI Learning Private Ltd., New Delhi
4. Liemt van Gijbsbert, (eds.) (1992): Industry on the move- Causes and consequences of International Relocation in the Manufacturing Industry, International Labour Office, Geneva.
5. Harrington J.W. and Warf Barney, (1995): Industrial Location- Principle, Practice and Policy, Routledge, London and New York.
6. Rodrigue Jean-Paul, Comtois Claude and Slack Brian, (2006): The Geography of Transport System, Routledge, London and New York.
7. Harrington J.W. and Warf Barney, (1995): Industrial Location- Principle, Practice and Policy, Routledge, London and New York.
8. Berry, B. J. L. et. Al. (1976): Geography of Economic Systems, Prentice Hall, Englewood Cliff.
9. Boyce, R. D. (1974): Bases of Economic Geography, Holt, Rinehart and Winston, New York
10. Conkling, E. C. & Yeates, M. (1976): Man's Economic Environment, McGraw Hill, London.
11. Hodder, B. W. and Lee, R. (1974): Economic Geography, Field of Geography Series, Methuen & Co. Ltd, London.
12. Hussain Majid (ed.), (1993): Perspectives in Economic Geography, Vols. 1-6,Anmol Publication, New Delhi.
13. Cole, J. P., (1983): Geography of World Affairs, Butterworths, London.

14. Lloyd, P. E. and Dicken, P. (1972): Location in Space, Harper & Row, San Francisco.
15. Lowe Moryadas, (1975): The Geography of Movement, Houghton Mifflin & Co.
16. Smith, D. M (1971): Industrial Geography: An Economic Geographic Analysis, John Wiley & Sons.
17. Tarrant, J. R. (1974): Agricultural Geography, Problems in Modern Geography Series, John Wiley & Sons.
18. Willbanks, Thomas J (1980): Location and Well- Being, An Introduction to Economic Geography, Harper & Row, San Francisco.

## **Semester I**

### **Tools and Techniques of Spatial Analysis I**

**(Based on Theory Papers: 101 -102)**

No. of Credits **4** Hours of Practical experience **60+** Notional Hours **60**

#### **1. Techniques of Geomorphic Analysis (20 hours)**

##### **A. Drawing Profiles:**

- i. Longitudinal
- ii. Composite and Projected

##### **B. Methods of Slope Analysis:**

- i. Wentworth's method of average slope determination
- ii. Robison's method of slope analysis'
- iii. G. H. Smith's method of slope analysis
- iv. Construction of Block Diagram

##### **C. Altimetric Analysis:**

- i. Ring contour method
- ii. Highest grid-cell elevation method

#### **2. Advance topographical Map Interpretation: (20 hours)**

Interpretation of Indian and foreign topographical Maps: Aspects of Physical and Human Environment(OS, USGS and SOI)

#### **3. Techniques of Climatic Data Analysis (20 hours)**

1. Rainfall dispersion diagrams
2. Wind roses
3. Water surplus-deficiency graphs
4. Climatograph
5. Climograph: Hyther graph, Taylor's climograph

6. Index of aridity and index of moisture
7. Isopleth Maps

**References:**

1. King, C. A. M. (1978): Techniques in Geomorphology, Edward Arnold, London.
2. Miller, A.A. (1966): The Skin of the Earth, Methuen, London.
3. Monkhouse, F.J. and Wilkinson, H.R. (1971): Maps and Diagrams, Methuen, London.
4. Cole, J.R and King , C.A.M. (1968): Quantitative Geography, John Wiley And Sons, London.
5. Goudie, A. (1981): Geomorphological Techniques, George Alien And Unwin, London.
6. Hammond, R. And McCullagh, P.S. (1974): Quantitative Techniques in Geography: An Introduction, Oxford University Press, London.
- Mahmood Aslam (1977): Statistical Methods in Geographical Studies, Rejesh Publication, New Delhi.
7. Singh, Gopal (2001): Map Work and Practical Geography, Vikas Publishing House Pvt. Ltd.
8. Singh, L.R. (2011): Fundamentals of Practical Geography, Sharda Pustak Bhavan, Allahabad.
9. Singh, R.L. and Singh, R. B. (2004): Elements of Practical Geography, Kalyani Publishers, New Delhi – Ludhiana.

## **Semester I**

### **Tools and Techniques of Spatial Analysis II**

**(Based on Theory Papers: 103 -104)**

No. of Credits: 4 Practical Hours 60 + Notional Hours 60= Total hours 120

#### **1. Statistical Techniques**

##### **1.1 Measures of Central Tendency (24 hours)**

- a) Measures of central tendency: mean centre, weighted mean centre, median centre
- b) Z score – different applications and interpretations.

##### **1.2. Network Analysis:**

- a) Topological graphs -Connectivity- Calculations of Alpha, Beta and Gamma Indices.
- b) Mapping of relative accessibility and connectivity – Matrices- point of minimum Aggregate travel distance

#### **2. Nature and application of spatial data: (20 hours)**

- 2.1 Sources of data – Primary and secondary
- 2.2 Data types – qualitative and quantitative Spatial data and Aspatial
- 2.3 Scales of measurement of data: Nominal, Ordinal, Interval and Ratio – Symbolization and Representation – Interpretation and Relationships.
- 2.4 Designing a questionnaire

#### **3. Computer processing of geographical data (16 hours)**

- 3.1 Symbolisation, Preparation of matrix
- 3.2 Diagrammatic Representation.
- 3.3 Compilation of data
- 3.4 Computation of data: qualitative and quantitative data based on descriptive statistical measures application of computer programmes.

#### **References:**

1. Robinson, A. H. and Others (1995): Elements of Cartography, VI Edition, John Wiley & Sons, New York.
2. Anson, R. W. and Ormeling, F. J., (Ed.) (1993): Basic Cartography for Students and Technicians, Vol.I, International Cartographic Association and Elsevier Applied Science Publishers, London.
3. Dickinson, G. C. (1977) Statistical Mapping and the Presentation of Statistics, Edward Arnold Ltd., London.
4. Monkhouse, F. J. and H. R. Wilkinson, (1971): Maps and Diagrams, Methuen & Co. Ltd., London.
5. Hodgkiss, A. G. (1970): Maps for Books and Theses, David and Charles Publishers Ltd., London.
6. Misra R. P. and A. Ramesh, (1969): Fundamentals of Cartography, Prasaranga, University of Mysore

7. Young, P. V. and Schmid, C. F. (1979) : Scientific Social Surveys and Research, ntice Hall, New Delhi.
- 8 . Mahmood Aslam (1977), Statistical Methods in Geographical Studies, Rajesh Publication, New Delhi.
9. Hammond,R. and McCullagh,P.S. (1974), Quantitative Techniques in Geography: An Introduction, Oxford University Press, London.
10. Yeates, M (1974), An Introduction to Quantitative Analysis in Human Geography, McGraw Hill Book Co., New York.
11. Cole, J. P. and King, C. A. M., (1968), Quantitative Geography, John Wiley and Sons, London.
12. Fotheringham,A.S., Brunsdon, C., Charlton,M ,(2000) Quantitative Geography: Perspectives on Spatial Data Analysis, Sage Publication Ltd, London,
- 13 . Baily,T.C., and Gatrell, A. C, (1995), Interactive Spatial Data Analysis, Prentice Hall, London
14. Griffith ,D. A. , Layne, L.J.,(2002) A Casebook for Spatial Statistical Data Analysis: A Compilation of Analyses of Different Thematic Data Sets , Amazon.com
15. Wicox, P.R. (2003), Applying Contemporary Statistical Techniques, Academic Press, Amsterdam
16. Crang M. and Cook, I. 2007, Doing Ethnographies, Sage.

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## Semester II

### 201: Oceanography and Hydrology

No. of Credits: 4 Teaching Hours 60 + Notional Hours 60= Total hours 120

- 1. Fundamental Concepts in Oceanography (15 hours)**
  - 1.1 Definition, nature and scope of oceanography
  - 1.2 Age and origin of oceans, and ocean morphology.
  - 1.3 Distribution of temperature, salinity and density of oceans.
  
- 2. Ocean Currents and Resources (15 hours)**
  - 2.1 Ocean currents: Atlantic, Pacific and Indian Oceans.
  - 2.2 waves and tsunamis, tides.
  - 2.3 Marine sediments and deposits
  - 2.4 Food and mineral resources of the sea.
  
- 3. Introduction to Hydrology (15 hours)**
  - 3.1 Hydrological cycle, Factors affecting movement of water, Patterns of movement
  - 3.2 Water Budget, World water Resources,
  - 3.3 World Water Balance, Global Freshwater Resources,
  - 3.4 History of Hydrology
  
- 4. Watershed, Its Characteristics and Evaporation Process (15 hours)**
  - 4.1 Topographic and Effective Watershed
  - 4.2 Physiographic characteristics of a Watershed- Geometric & Drainage Network
  - 4.3 Agro-Pedo Geological Characteristics – Soil Cover, Soil type, Geology
  - 4.4 Meteorological Factors influencing Evaporation- Physical Factors involved in Evaporation Process.

#### References:

1. Agarwal A. and Narain, S. (1997), "Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting System", CSE, New Delhi.
2. Andre Musy (2011) Hydrology a Science of Nature, Science Publishers, New Hampshire.
2. Centre for Science and Environment (2002), "Citizens Report", New Delhi.
3. Charlu, T.G.K. and Dutt, D. K. (1982), "Ground Water Development in India" Rural Electrification Corporation, New Delhi.
4. Chorley, R. J. (1967), "Water, Earth and Man", Methuen, London.
5. Chorley, R. J. (1969), "Introduction to Physical Hydrology", Methuen, London.
6. Elizabeth M. Shaw (1994) Hydrology in Practice, Taylor & Francis e-Library Publication New Hampshire.
7. Jones, J. A. (1997), "Global Hydrology : Processes, Resources and Water Management", Longman, London.
8. Lvovich, M.I., (2010), Climatology, Hydrology, Glaciology, John Wiley and

Sons, London

9. Mather, J. R. (1984), "Water Resources : Distribution, Use and Management", John Wiley, Maryland.
10. Singh, R. A. and Singh, S. R. (1972), "Water Management: Principles and Practices", Tara Publication, Varanasi.
11. Subramanya K (2014) Engineering Hydrology, Mc Graw Hill Publication, New Delhi.
12. Todd, D. K. ((1959), "Ground Water Hydrology", John Wiley, New York.
13. Stewart, R. H. (2008). *Introduction to Physical Oceanography*.
14. Garrison, T. (2012). *Essentials of Oceanography* (Sixth Edit). Brooks/Cole, Cengage Learning.
15. Singh, S. (2014). *Oceanography*. Allahabad: Pravalika Publications.
16. Rao, K. L. (1979), "India's Water Wealth", Orient Longman, New Delhi.

## **Semester II**

### **202: Geoinformatics**

No. of Credits: **4** Teaching Hours **60** + Notional Hours **60**= Total hours **120**

#### **1. Unit – I (15 hours)**

**1.1** Fundamentals of Remote Sensing: Definition and Concept, Process of Remote Sensing, Development of remote sensing – Global and Indian

**1.2** Electromagnetic Spectrum: Definition and Concept, interactions with atmosphere and earth's surface, Atmospheric window, Black body

**1.3** Spectral Reflectance Curve: Concept, curves for land, water bodies/oceans, vegetation In Optical, IR, Thermal and Microwave bands

**1.4** Fundamentals of aerial photography: Concept of stereoscopy and photogrammetry, geometric types of aerial photographs, photographic scale, measurements of distance, area and height, relief displacement, stereoscopic parallax, flight planning.

#### **2. Unit – II (15 hours)**

**2.1** Platforms and Orbits: types of platforms, types of orbits

**2.2** Sensing of electromagnetic energy: Measurement of radiance, conversion of radiance to digital number

**2.3** Resolutions and Sensors: Types of resolutions, Remote Sensors and types based on resolutions and sources of illumination, overview of space borne sensors.

**2.4** Visual Image Interpretation: Image display and color composites, elements of visual image interpretation

#### **3. Unit – III (15 hours)**

**3.1** Fundamentals of Databases: Data storage, basic file structures, types of database, advantages of database, spatial and non-spatial databases, scales of measurement, Entity – Relationship Model, SQL,

**3.2** Geographic Information System: Definition, concept, components, functions and applications.

**3.3** Spatial Data Models: Vector and Raster, Vector representation (point, line, area and TIN), Concepts of arc, node, vertices and topology.

**3.4** Coordinate Reference Systems: Geographic and Projected, Map Projections and Datum for GIS data.



#### **4. Unit – IV**

**(15 hours)**

**4.1** Vector-based spatial analysis: single layer operations (extraction and proximity) and multilayer operations (overlay operations),

**4.2** Raster-based spatial analysis: Georeferencing, Spatial Interpolation and raster generation, raster reclassification, arithmetic, relational and logical operations

**4.3** Global Positioning System: Segments of satellite-based positioning systems, main systems – NAVSTAR, GLONASS, Galileo and Indian GPS

**4.4** Principles of positioning: Positional Accuracies, Relative Positioning, errors and sources

#### **Reference Books:**

1. Agrawal, N.K.(2006), Essentials of GPS (Second Edition), Book Selection Centre, Hyderabad
2. American Society of Photogrammetry (1983): Manual of Remote Sensing, ASP Palis Church, V.A.
3. Barrett, E.G. and Curtis, L.F. (1992): Fundamentals of Remote Sensing in Air Photo-interpretation, McMillan, New York. 7.
4. Bernhardsen, Tor (2002): Geographical Information Systems: An Introduction, Third Edition, John Wiley & Sons, Inc., New York.
5. Burrough, Peter A and McDonnell, R.A. (1998): Principles of Geographical Information Systems, Oxford University Press, Mumbai.
6. Campbell. J. (1989): Introduction to Remote Sensing, Guilford, New York.
7. Clarke, Keith C. (1998): Getting Started with Geographic Information Systems, Prentice-Hall Series in Geogl. Info. Science, Prentice-Hall, Inc. N.J.
8. Curran, Paul, J, (1988): Principles of Remote Sensing, Longman, London.
9. Heywood, I.et al (2002): An Introduction to Geological Systems, Pearson Education Limited, New Delhi.
10. Iliffe, J.C (2006), Datums and Map Projections for Remote Sensing, GIS and Surveying, Whittles Publishing, New York.
11. Jonson. R. J. (2003): Remote Sensing of the Environment-An Earth Resources Perspective, Pearson Education Series in Geographical Information Science, Keith C. Clarke (Series editor) Pearson Educators Private Limited. (Singapore), New Delhi.
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15. Pickles, John (2006), The Social Implications of geographic Information Systems, Rawat Publications, Jaipur.
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17. Shekar, S and Chawla, S, (2009), Spatial Databases: A Tour, Pearson Education, Delhi.
18. Tempfli, T. K., Kerle, N., Huuremema, G.C., and Janssen, L.L.F (2009), Principles of Remote Sensing, ITC, Netherlands.



## Semester II

### 203: Socio-Cultural and Political Geography

No. of Credits: 4 Contact Hours 60 + Notional Hours 60= Total hours 120

#### 1. Social and cultural Geography – Major Perceptions (15 Hours)

- 1.1 Evolution and development of Social Geography – Major Trends and Approaches- Critical Perspective and Associated Theoretical Developments
- 1.2 Emergence of cultural Geography as a major branch - Traditional cultural geography – New cultural geography -linguistic and literary studies, Semiotic analysis and ‘space’ theories - critical social theory
- 1.3 Human activities and spatial patterns - Production of socio-cultural space – factors, forces and processes – Resultant socio-spatial structures - A temporal scale

#### 2. Marginalisation and exclusion (15 Hours)

- 2.1 Social inequality and Social stratification - the ‘difference’ between ‘self’ and ‘other’ – social execution of ‘difference’ and exclusion – religious and ethnic identities
- 2.2 Imagining local, regional and national identities- multicultural spaces – cultural pluralism and identity politics in India.
- 2.3 Spaces of contestations and conflicts - Poverty and Living in Ghettos and slums in globalizing cities- Gentrification, displacement and right to city – SEZ s in India- Issues of right to livelihood.

#### 3. Gender and Geography (15 Hours)

- 3.1 Body as place- private and public domains- Role of Patriarchy – State – Capitalist production.
- 3.2 Space-society perspective- Structuring of sexuality and construction of gender identity – role of socio-cultural forces and processes- stigmas and taboos – resultant gendered spaces-Indian examples – globalization and repositioning of gender
- 3.3 Spatiality of sex ratios – intra-regional and inter-regional – specific examples of India and China - feminization of labour and status of women workers – experiences from the global periphery.
- 3.4 Women and human development status – Human rights and legal space for women, Glass Ceiling- Indian context.

#### 4. Spatial Dynamics of Political Processes (15 Hours)

- 4.1 Concepts and images of territoriality, state, nation and nation- state - colonialism and post-colonial context
- 4.2 Theoretical perspectives on global political structure- critical analysis of heart land and rim land theories - Relevance of World Systems approach- Core-periphery structure
- 4.3 Boundary and Frontier concepts- Terrestrial and maritime context- Processes of boundary formation- cultural and ethnic identities.
- 4.4 Dynamics of electoral politics- Indian context - Globalisation and contemporary geopolitics - Politics of resources – oil resources and West Asia – water Resources and South Asia

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1. Peet, R. (1998), *Modern Geographical Thought*, Blackwell
2. Peet, R. and Thrift, N. (eds.) (2002), *New Models in Geography*, Unwin Hyman.
3. Barnes Trevor and Gregory Derek, (eds.) (1997): *Reading Human Geography- The Poetic and Politics of Inquiry*, Arnold, London.
4. Daniels Stephen and Lee Roger, (eds.) (1996): *Exploring Human Geography- A Reader*, Arnold, London.
5. Cloke, P. and Johnston, R., (eds.), (2005), *Spaces of Geographical Thought, Deconstructing Human Geography's Binaries*, Sage.
5. Aitken, S and Valentine, G. (2006), *Approaches to Human geography*, Sage.
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10. Dear J. Michael and Flusty Steven, (eds.) (2002): *The Spaces of Post Modernity*, Blackwell, Massachusetts.
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13. Cloke, P., Crang, P., Goodwin, M.,(2004), *Envisioning Human Geographies*, Arnold.
14. Cloke Paul, Crang Philip and Goodwin Mark, (eds.) (1999): *Introducing Human Geographies*, Arnold, London.
15. Banerjee-Guha, S. (2004), *Space, Society and Geography*, Rawat, New Delhi.
16. Banerjee- Guha Swapna: *Space, Spatiality, Human Geography and Social Science: Politics of the production of Space*, Published in *Transaction Institute of Indian Geographers*, Vol.33, No.1, Winter 2011, pp 3-22, Pune.
17. Cloke Paul, Cook Ian, Crang Philp, Goodwin Mark, Painter Joe and Philo Chris, (2004): *Practising Human Geography*, Sage, London.
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## **Semester II**

### **Paper 204: Urban Geography**

No. of Credits: 4 Teaching Hours 60 + Notional Hours 60= Total hours 120

#### **1. Urbanisation Process and Urban Systems**

**(15 Hours)**

- 1.1 The bases of urbanisation- Demographic, economic and social aspects- Origins of the cities- Urbanisation Trends – urban fringe, urban sprawl and suburbanisation
- 1.2 Urban Landuse – various approaches – Classical, Neo-classical approaches - Human Ecology, land economics, activity systems
- 1.3 Urban location of economic activities – Urban morphology and landuse- Critical perspective
- 1.4 Urban System- Evolution, growth and organisation - Primacy, hierarchy and balance – urban functions and Town classification

#### **2. Urbanisation Process, Capitalism and development**

**(15 Hours)**

- 2.1 Capitalism and urban development - Urbanisation in the industrialised world -Political economy of urbanisation.
- 2.2 Urbanisation in the Third World - Concept of peripheral urbanisation - Salient characteristics- slums and Urban poverty- Capitalism and urban development - Urbanisation in the industrialised world
- 2.3 Colonial and post-colonial structure – Concepts of dualism and urban economic base in Third World Cities
- 2.4 Theoretical Perspectives on role of Cities in regional and national development – cumulative Causation- Core and Periphery and growth pole theory - Top-down and bottom-up approach of urban and regional Planning

#### **3. Perspectives on Urban Planning with Special Reference to India (15 Hours)**

- 3.1 Indian experience of urban planning through 5 Year Plans – First Five Year Plan To Sixth Five Year Plan - Primate urban structure and associated problems – growth poles – policies of decongestion, decentralisation and planned towns – successes and failures , Indian Urban and Housing Policies
- 3.2 Changing Perspective on city planning – Seventh, Eighth and Ninth Five Year Plan – Intersection of global processes – Flexibilised urban economy – Changing Economic Base and International Capital - Informalisation and Feminisation of urban economy
- 3.3 Recentralisation – international capital and formation of global city - Processes and patterns of urban renewal- Crisis in urban space- Gentrification and other Emerging issues.
- 3.4 Global city and global city-region – new regionalism - transformation of the peri-urban regions of the Global South

#### **4 Understanding the Urban Transformation with Special Reference to Mumbai Metropolitan Region (15 Hours )**

- 4.1 Gentrification in the Mill-land of Mumbai and the plight of the textile workers
- 4.2 Slum redevelopment in Mumbai- the case of Dharavi
- 4.3 Issues of urban planning and environment in Vasai- Virar Subregion
- 4.4 Mumbai a reclaimed city and challenges in urban planning.
- 4.5 The Planned City of New Mumbai: A Critical Perspective

#### **Reference Books:**

1. Carter, H (1972): The Study of Urban Geography, Edward Arnold.
2. A. Latham, D. McCormack, K. McNamara, D. McNeill (2009): Key Concepts in Geography, Sage.
2. Knox, P.L. and Taylor. P.J.(1995): World Cities in a World System, Cambridge University Press, U.K.
3. Harvey, D.(1973): Social Justice and the City, Arnold
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6. Sassen, S. (1991): The Global City, Princeton University Press.
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9. Short, J. R. (1996): The Urban Order, Basil Blackwell.
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11. King A. D. (1990): Global Cities, Rutledge.
12. Simmonds, R. and Hack, G. (2000): Global City Regions, Spon Press.
13. Markusen, A.R., et al. (1991): Second Tier Cities- Rapid Growth beyond the Metropolis, University of Minnesota Press.
14. Allen J. Scott (ed.), (2001): Global City Regions, Trends, Theory & Policy, Oxford University Press.
15. David Harvey (1985): The Urbanization of Capital, John Hopkins University Press.
16. Edward Soja (2000): Postmetropolis, Critical Studies of cities and Regions, Blackwell Publisher Ltd.
17. G. P. Chapman, A.K. Dutt and R.W. Bradnock (ed.) (1999): Urban growth & Development in Asia, Vol.2: Living in the Cities, Ashgate Publishing Ltd.
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19. Edgar Pieterse, (2008), City Futures- Confronting the Crisis of Urban development, Zed Books, London.

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## Semester II

### Tools and Techniques of Spatial Analysis III

(Based on Theory Papers: 201-202)

No. of Credits: 4 (Practical Hours 60+ Notional Hours 60)

#### 1. Unit – I (Hours 25)

- 1.1 Aerial Photography: Construction of stereo vision, Photo Interpretation and preparation of photo map, Determination and application of scale for distance, area and Determination height. Image Interpretation, Conjunctive use of Map, Aerial Photographs and Satellite Imagery
- 1.2 Georeferencing: Map to map, image to map and assigning projection and choosing datum
- 1.3 Digitization: preparation of vector layers, vector editing, linking of spatial and attribute data.
- 1.4 Thematic mapping techniques: symbolization, labelling, representation of quantitative data, vector layer classification.

#### 2. Unit – II (Hours 15)

- 2.1 Vector overlay, buffer, extraction
- 2.2 Point in polygon, line in polygon,
- 2.3 Data retrieval – Attribute and Spatial query
- 2.4 Map Layout and Design

#### 3. Unit – III (Hours 20)

- 3.1 Spatial Interpolation and raster reclassification
- 3.2 Application of Raster calculator
- 3.3 Drainage Network Analysis
- 3.4 GPS Survey

#### Reference Books:

1. Bhatta, Basudeb, (2008), Remote Sensing and GIS, Oxford University Press.
2. Jones, C. B., (1997), Geographical Information Systems and Computer Cartography, Addison, Wesley Longman Ltd., U.K.
3. Albrecht J. (2007), Key Concepts and Techniques in GIS, Sage.
4. Kemp Karen (ed.), (2008), Encyclopedia in Geographical Information Science, Sage.
5. Huxhold, W.E., (1991), An Introduction to Urban Geographical Information systems, Oxford University Press, New York.
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11. Vallentine G. Clifford N. (2010), Key Methods in Geography, Sage. 10

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22. Verrtappen, H. Th., (1977): Remote Sensing in Geomorphology, Elsevier Scientific Publication Company, Amsterdam.
23. Warrin, R. Philipson (1997): Manual of Photographic Interpretations, American Society for Photogrammetry and Remote Sensing, Maryland, U.S.A.

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## Semester II

### Tools and Techniques of Spatial Analysis IV

Based on Theory Papers: (203-204)

No. of Credits: 4 (Hours of doing Practicals 60+ Notional Hours 60)

- 1. Settlement Hierarchy and population studies: (25 Hours)**
  - 1.1 Settlement Hierarchy**
    - a. Nearest neighbour analysis
    - b. Population and functional – rank- size rule – application and interpretation - degree of primacy - Construction- Interpretation – application of triangular graph
  - 1.2 Application of Statistical and Cartographic Techniques:**
    - a. Choropleth, Isopleths Dot map and Population Pyramids
    - b. Diagrammatic Representation: One, Two and Three Dimensional-Construction and Interpretation
- 2. Mental Maps and diagrams (15 Hours)**
  - 2.1** Typology of distance and direction of space- Construction of Maps
  - 2.2** Imagining Place and space: Perception – mapping and interpretation.
  - 2.3** Interpreting political context of maps, cartographic techniques, diagrams, pictures and cartoons.
- 3. Statistical Techniques to understand the spatial pattern (20 Hours)**
  - 3.1** Index of concentration: location quotient and concentration.
  - 3.2** Index of similarity and dissimilarity and inequality- Construction and applicability of Lorenz curve- Interpretations
  - 3.3** Calculation of Ginni's co-efficient of concentration

#### References:

1. Gregory, S. (1971): Statistical Methods and Geographer, Longman, London.
2. King, C. A. M. (1978): Techniques in Geomorphology, Edward Arnold, London.
3. Taylor, Peter J. (1977): Quantitative Methods in Geography, Houghton and Mifflin co., Boston
4. Monkhouse. F.J. and Wilkinson, H.R. (1971): Maps and Diagrams, Methuen, London
5. Cole, J.R and King , C.A.M. (1968): Quantitative Geography, John Wiley And Sons, London.
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9. Yeates, M, (1974): An Introduction to Quantitative Analysis in Human Geography, McGraw Hill Book Co., New York.
10. Mahmood Aslam, (1977): Statistical Methods in Geographical Studies, Rejesh Publication, New Delhi.
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19. Cloke, P., Cook, I, Crang, P., et.al. (2004), Practising Human Geography, Sage.

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**Annexure I**

**Department of Geography**

**University of Mumbai**

**Two Year Degree Course of M. A./M.Sc. in Geography**

**As per Choice Based Credit System (CBCS)  
(With effect from the academic year 2016-2017)**

**Question Paper Pattern for Semester I and II**

**Theory Paper:** 100 marks for each paper (Total papers 4)

**Internal examination:** Total marks 40 (in each theory paper)

**External examination:** Total marks 60 (in each theory paper)

- i) Total no. of questions to be framed for theory paper in external examination: 6; 15 marks each.
- ii) Out of the 6 questions, students are required to attempt **any four** questions.

**Practical Paper:** 100 marks for each paper (Total papers 2)

**I & II End Semester Question Paper in Practicals-**

**A: External examination:** Total Marks- **100**

i) Students are expected to attempt **total four** questions of **20 marks** each i.e. **80 marks**

ii) Marks for Journal – **10**

iii) Marks for Viva-voice - **10**

iv) **All questions are compulsory**

v) Questions would correspond with number of major modules in the respective practical Course syllabus.

External Examiner be invited for conducting Practicals and paper setting and assessment of Theory and Practicals

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