

UNIVERSITY OF MUMBAI

No. UG/117 of 2016-17

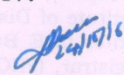
CIRCULAR:-

A reference is invited to the Syllabi relating to the M.A/M.Sc. degree programme vide this office Circular No. UG/33 of 2013-14 , dated 17th May, 2013 and the Head, University Department of Geography and the Principals of affiliated Colleges in Arts and Science are hereby informed that the recommendation made by Board of Studies in Geography at its meeting held on 2nd June 2016 has been accepted by the Academic Council at its meeting held on 24th June, 2016 vide item No. 4.89 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for (Sem. I & II) of M.A/M.Sc. degree programme in the course of Geography, which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

MUMBAI – 400 032

October, 2016

To,


(Dr.M.A.Khan)
REGISTRAR

The Head, University Department of Geography and the Principals of affiliated Colleges in Arts and Science.

A.C/4.89/24/06/2016

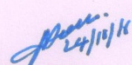
No. UG/117-A of 2016-17

MUMBAI-400 032

25th October, 2016

Copy forwarded with compliments for information to:-

- 1) The Dean, Faculty of Arts and Science.
- 2) The Chairperson, Board of Studies in Geography,
- 3) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
- 4) The Director, Board of College and University Development,
- 5) The Controller of Examinations,
- 6) The Co-Ordinator, University Computerization Centre.


(Dr.M.A.Khan)
REGISTRAR

P.T.O.

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)

Subject Code (326)	Course Title	Credits	No. of Hours
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	*Practical components based on 101 and 102 Tools and Techniques of Spatial Analysis - I	*	60+60+ 120
106	*Practical components based on 103 and 104 Tools and Techniques of Spatial Analysis- II	*	60+60+ 120
Total		24	720

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

Subject Code	Course Title	Credits	No. of Hours
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	*Practical components based on 201 and 202 Tools and Techniques of Spatial Analysis - III	*	60+60+ 120
206	*Practical components based on 203 and 204 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. Anheer, 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', Wm. 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 Wiley, 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 Trinidad, 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

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, 5th 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 Strohmayer, U. (2004), Human Geography, a History for the 21st 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, 4th 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 Gijbert, (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, Haughton 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.
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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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17. Shekar, S and Chawla, S, (2009), Spatial Databases: A Tour, Pearson Education, Delhi.
18. Tempfli, T. K., Kerle, N., Huurememan, 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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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.
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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.
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7. Clarke, D. (1982): Urban Geography: An Introductory Guide, Groom Helm.
8. Marcuse, P. and Kempen, R.V. (eds.),(2000): Globalizing Cities: A New Spatial Order, Blackwell,
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- 10 Smith, N. (1996): The New Urban Frontier, Rutledge
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.
- 6. Pickles, J., (1995), Ground Truth: The social Implications of Geographical Information Systems, The Guilford Press, New York.
- 7. Martin D., (1996), Geographical Information Systems: Socio-economic Applications, 2nd edition, Routledge, London, New York.
- 8. Morraine S. (1998), GIS Solutions in Natural Resource Management: Balancing The Technical-Political Equations, Onward Press, London.
- 9. Fazal Sahab, (2008), GIS Basics, New Age International Publishers Ltd, New Delhi
- 10. Petersen, G.N., (2009), GIS Cartography- A Guide to Effective Map Design, Taylor and Francis Group.
- 11. Vallentine G. Clifford N. (2010), Key Methods in Geography, Sage. 10

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13. Chrisman, Nicholas (1997), Exploring Geographic Information Systems, John Wiley and Sons Inc, New York
14. Hard, R.M. (1989): Digital Image Processing of Remotely Sensed data, Academic Press, New York.
15. Lo, C.P (1986): Applied Remote Sensing, Longman, Scientific and Technical, Harlow, Essex.
16. Lunder, D. (1959): Aerial Photography Interpretation: Principles and Applications, McGrawHill, New York.
17. McCoy, Roger M. (2006), Field methods in Remote Sensing, Rawat Publications, Jaipur.
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19. Rao, D.P. (eds.)(1988): Remote Sensing for Earth Resources, Association of Exploration Geologist, Hyderabad.
20. Sabins, F. (1982): Remote Sensing: Principles and Applications, Freeman and Co., New York.
21. Spencer, John (2003) Global Positioning System: A Field Guide for the Social Scientists, Blackwell Publishing, Malden, USA.
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.
6. Goudie, A. (1981): Geomorphological Techniques, George Alien And Unwin, London.
8. Hammond, R. And McCullagh, P.S., (1974): Quantitative Techniques in Geography: An Introduction, Oxford University Press, London.
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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12. Ebdon, David, (1985): Statistics in Geography: A Practical Approach , Wiley-Blackwell, New York.

13. Fotheringham, A.S., Brunson, C., Charlton, M. : (2000) Quantitative Geography: Perspectives on Spatial Data Analysis, Sage Publication Ltd, London,
14. Baily, T.C., and Gatrell, A. C, (1995): Interactive Spatial Data Analysis, Prentice Hall, London
15. 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
16. Chen, Y.Q. and Lee Y.C., (ed.) (2003): Geographical Data Acquisition , New York
17. Vallentine G. Clifford N. (2010), Key Methods in Geography, Sage.
- 18.. Delyser D., Herbert S., Aitken S. (eds.) (2010), The Sage Handbook of Qualitative Research, Sage.
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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UNIVERSITY OF MUMBAI



Revised Syllabus for the M.A. & M.Sc.

Program: M.A. & M.Sc.

Course: Geography

(Semester III)

(As per Choice based Credit System
with effect from the academic year 2017 2018)

Choice Based Credit System Syllabus, 2017-18

Total No. of Credits offered: 100

Electives offered in a particular academic year in each group could vary.

Semester is 15 weeks duration. Credits are defined for a semester

University of Mumbai
M.A./ M.Sc. Geography Syllabus Based on Choice Based Credit System (CBCS)
w.e.f. Academic Year 2017-2018
Semester III

Subject Code	Course Title	Credits	No. of Hours
301	Research Methodology in Geography	6	60+60+ 120
302 A- Physical Group select any one paper	1. Tropical Geomorphology 2. Fluvial Geomorphology 3. Introduction to Hydrology 4. Climatology of Tropics 5. Geography of Climate change with special reference to India 6. Theoretical and Applied Geomorphology	6	60+60+ 120
303 B Human Group select any one paper	1. Geography of South Asia with Special Reference to India 2. Population Geography 3. Geography of Transport 4. Geography of Trade 5. Geography of Services with Special reference to India 6. Geography of Tourism and Recreation 7. Geography and Crime 8. Gender Geography 9. Geography of Tribes with Special reference to India 10. Industrial Geography 11. Geopolitics and International Relations	6	60+60+ 120
304	Tools and Techniques of Spatial Analysis V	6	120
305	Tools and Techniques of Spatial Analysis-VI	6	120
Total		30	720

University of Mumbai
M.A./ M.Sc. Geography Syllabus Based on Choice Based Credit System (CBCS)
w.e.f. Academic Year 2017-2018
Semester III
Paper 301: Research Methodology in Geography
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

- 1. Introduction to Research Methodology (15 Contact Hours)**
 - 1.1. Defining research- Methods of research types, significance of geographical research, research ethics
 - 1.2. Scientific method in geographical studies, inductive and deductive, basic elements and attributes, Scale of research: Macro, Meso, Micro Problem formulation and identification.
 - 1.3. Review of Literature: Significance and sources of literature review
 - 1.4. Research Design: meaning, stages, characteristics and significance of research design
- 2. Research Hypothesis and Sampling (15 Contact Hours)**
 - 2.1. Meaning of Hypothesis, relevance and types of hypothesis
 - 2.2. Identification of problem and hypothesis: Problem identification, statement of hypothesis, testing of hypothesis, generalization
 - 2.3. Sampling: Meaning and importance, types of sampling
 - 2.4. Selection of sample and size of sample
- 3. Nature and Analysis of Geographical Data (15 Contact Hours)**
 - 3.1. Nature and type of Geographical data, significance of spatial and temporal data in geographical studies
 - 3.2. Levels of measurements: Nominal, Ordinal, Ratio and Interval
 - 3.3. Methods and sources of geographical data collection: conventional and modern; limitations of secondary data and need for data generation, collection of primary data: questionnaires and schedules, field work, sample surveys and their significance
 - 3.4. Geographic Data analysis: Qualitative, Quantitative and Advanced techniques of geographic data processing and analysis, geographical matrix and its significance in analysis of Geography data
- 4. Scientific Report Writing (15 Contact Hours)**
 - 4.1. Introduction- aim and objectives, data and methodology
 - 4.2. Data analysis, result, conclusion
 - 4.3. Referencing system, weblography and bibliography.
 - 4.4. Plagiarism, design, concept of impact factor, citation, DOI

References:

- 1) . Karlekar Shrikant and Kale Mohan (2005): Statistical analysis of Geographical data, Dimond publication
- 2) Burt, J.E. and Barber, G.M.(1996): Elementary statistics for Geographers, The Guilford press, New York.
- 3) Clark, W.A.V. and Hosking, P.C(1986): Statistical Methods for Geographers, John Wiley & Sons, New York.
- 4) Dickinson, G.C.(1977): Statistical Mapping and presentation of statistics, Edward Arnold limited London.
- 5) Ebdon David (1989): Statistical for Geographers
- 6) Geoge Joseph (2003): Fundamental of Remote Sensing, Universities Press, Hyderabad.
- 7) Gregory, S.(1963) : Statistical Methods and Geographer Longman Group Ltd; London
- 8) Kanetkar T. P. & Kulkarni S.V. (1986):. Surveying & leveling, Vidyarthi Griha Prakshan, Pune
- 9) Keates, J.S.(1973) : Cartographic design and production 2nd Edn;. Longman group

Limited, London.

- 10) Keates, J.S.(1996) : Understanding Maps, 2ndEdn; Longman group limited, London.
- 11) King, (1975): Statistical Geography
- 12) Maling .H. (1973) : Co ordinates systems and map projections, George Philip, London.
- 13) Maslov A. V.Gordeev A. V. Batrakov Yu. G. (1984) : Geodetic surveying, Mir Publishers, Moscow
- 14) Monmonier, Mark S.(1982): Computer Assisted Cartography: Principals & prospects, Pprentice Hall, Inc, London.
- 15) Norcliff, G.B.(1982) Inferential Statistics for Geographers Hutchinson, London.
- 16) Norcliffe G. B. (1977): Inferential statistics for Geographers (Hutchinson, London)
- 17) P. A. Burrough and R.A. McDonnell (2000): Principle of Geographical Information System, Oxford
- 18) Richardus P., Adler Ron K (1972) : Map projections, North Holland publ. Co. Amsterdam
- 19) Robinson, A.H.et al.(1985): Elements of Cartography, Vol.VI, John Wiley and Sons, New York.
- 20) Rogerson P. A. (2001): Statistics for Geography (SAGE pub., London, New Delhi}
- 21) Shaw G and Wheller D. (1985): Statistical techniques in geographical analysis. John Wiley and sons,
- 22) Singh & Kanauja : Map work and Practical Geography.
- 23) Sumner G J (1978): Mathematics for physical geographers. Edward Arnols
- 24) Taylor, P.J.(1977): Quantitative Methods in Geography. HoughtonMifflim Company, Boston University Press.
- 25) V. Natarajan P., Adler Ron K.: Advanced Surveying, B. 1 Publ. Bombay
- 26) Watson, G. and McGraw, D.(1980): Statistical Inquiry, John Wiley and sons, New York.
- 27) Yeates, M. (1974). An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.
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- 29) Jones, Christopher (1997): Geographical Information System and computer Cartography, Addison Wesley Longman Limited, England.
- 30) Wicox, R.R.(2003) : Applying Contemporary Statistical Techniques Academic press, Amsterdam.
- 31) Wilsons, A.G. & Bennet, R.J.(1985): Mathematical Methods In Human Geography And Planning, John Wiley & Sons, New York.

University of Mumbai
M.A./ M.Sc. Geography Syllabus Based on Choice Based Credit System (CBCS)
W.e.f. Academic Year 2017-2018
Semester III

Paper: 302 A 1 - Tropical Geomorphology

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Tropical Environment

(Contact Hours 15)

- 1.1 Tropical Region: Definition and characteristics of tropical region, nature, scope and development of tropical geomorphology, Concept of morphogenetic region.
- 1.2 Major Controls on tropical landscape: Tectonic processes, climate, anthropogenic activities.
- 1.3 Geomorphic processes in tropics: Weathering, mass wasting and exogenetic processes
- 1.4 Quaternary inheritance in tropical landscape: Effect of climate change on coasts (sea level change), mountains (Pleistocene glaciation), fluvial systems.

2. Landform Assemblages in Tropics

(Contact Hours 15)

- 2.1 Structural Landforms in Tropical areas: Precambrian shield, mountain chains, volcanos,
- 2.2 Formation and distribution of Doms, Bornhardts and Tors in tropical areas.
- 2.3 Planation surfaces: etchplain, peneplain, pediplain and inselbergs
- 2.4: Structural landforms in tropical part of India with special reference to Deccan Plateaus; planation surfaces in India.

3. Weathering and Slopes

(Contact Hours 15)

- 3.1 Weathering process and factors of deep weathering profiles; products of weathering.
- 3.2 Duricrusts and types: laterite, calcrete, silcrete processes of formation, profiles and landforms.
- 3.3 Slope processes and development in humid tropics: hill slopes, pediments and gullies
- 3.4 Mass wasting processes and types

4. Exogenic Processes and typical forms in Humid and Arid Tropics (Contact Hours 15)

- 4.1 Fluvial Processes: Nature of fluvial processes tropics, fluvial landscapes in tropics river terraces, flood plains, alluvial fans
- 4.2 Coastal Processes: Nature of coastal processes in tropics and typical coastal landforms in tropics Mangroves and Mudflats, Corals, Deltas.
- 4.3 Glacial processes in tropical highlands:
- 4.4 Aeolian Processes in tropical areas: Badland Morphogenesis,

References:

- 1. Birot, P. (1968): Cycle of Erosion in Different Climates, B. T. Batsford, London.
- 2. Bloom, A.L. (2002): Geomorphology: A Systematic analysis of late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
- 3. Bombay Geographical Association (1970-71): Geddes Memorial Volume: Maratha Lands, Bombay.
- 4. Dikshit, K.R., Kale, V.S., and Kaul, M.N. (1994): India Geomorphological Diversity, Rawat, Jaipur.
- 5. Douglas, J. and Spencer, I. (1985): Environmental Change and Tropical Geomorphology, George Allen and Unwin, London.
- 6. Faniran, A. and Jeje, L.K. (1983): Humid Tropical Geomorphology, Longman, London.
- 7. Garner, H.F. (1974): Origin of Landscapes A synthesis in Geomorphology, Oxford University Press, New Delhi.
- 8. Huggett, R. (2007): Fundamentals of Geomorphology, Routledge, London.
- 9. Jog, S.R. (ed.) (1995): Indian Geomorphology, vols. I and II Rawat, Jaipur.
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M.A./ M.Sc. Geography Syllabus Based on Choice Based Credit System (CBCS)
W.e.f. Academic Year 2017-2018
Semester III
Paper: 302 A 2- Fluvial Geomorphology

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Drainage Basin (Contact Hours 15)

- 1.1 Fluvial Geomorphology: Introduction, scope and nature
- 1.2 Drainage basin basic geomorphic unit, hierarchy of drainage basins; Drainage basin development theories by Glock (1932), Horton (1945)
- 1.3 Morphometric analysis of drainage network and related laws of drainage network composition
- 1.4 Drainage patterns and factors controlling the patterns

2. Hydraulics of channel flow (Contact Hours 15)

- 2.1 Types of open channel flow: Laminar-Turbulent, subcritical-supercritical, flow mechanism, Reynold and Froude numbers
- 2.2 Concept of stream carrying capacity and competence, stream power and specific energy, stream energy.
- 2.3 Flow resistance: mean velocity, Chezy equation and Manning formula; Forms of channel resistance
- 2.4 Sediment transport critical tractive force, lift concept

3. Channel forms and processes (Contact Hours 15)

- 3.1 Stream types: based on structure, time and flow duration; stream classification systems by Schumm and Rosgen
- 3.2 Channel patterns: straight, meandering (pools and riffles), braided and anastomosing
- 3.3 Hydraulic geometry: at a station and downstream; Channel cross section - flow characteristics, isovel pattern.
- 3.4 Longitudinal profile of river: concept of grade and graded profile, dynamic equilibrium, rejuvenation

4. Rivers in Past and present (Contact Hours 15)

- 4.1 Fluvial deposition and landforms examples from India
- 4.2 Fluvial erosion and landforms - examples from India
- 4.3 River metamorphosis and Quaternary fluvial systems
- 4.4 River channel management and restoration

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Web References

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M.A./ M.Sc. Geography Syllabus Based on Choice Based Credit System (CBCS)
W.e.f. Academic Year 2017-2018
Semester III
Paper:302 A 3-Introduction to Hydrology

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction (Contact Hours 15)

- 1.1 Definition, Scope and content, Importance of Hydrology, Status of India's Water Resources
- 1.2 Precipitation: Mean Rainfall Over a Drainage basin, Characteristics of Rain-storm
- 1.3 Mean rainfall over a Drainage basin-Depth Area Duration Relationship
- 1.4 Concept of return period, IDF curve

2. Hydrographs (Contact Hours 15)

- 2.1 Introduction, Factors Affecting Runoff Hydrographs, Components of a Hydrograph, Effective Rainfall
- 2.2 Unit Hydrograph: Isolated storm, Concept of S curve, Application of Unit Hydrograph, Use and Limitations of Unit Hydrograph
- 2.3 SCS Dimensionless Unit Hydrograph, PMP Curve, Distribution Graph

3. Surface Run-off (Contact Hours 15)

- 3.1 Rainfall-Runoff Process, Factors affecting on Runoff, Evaporation Losses, Infiltration Process
- 3.2 Concepts related to runoff, Catchment characteristics, Basic concepts, Rainfall runoff Correlation, Runoff process, Runoff Coefficient
- 3.3 SCS-CN Method and Runoff Volume, Methods for estimating runoff from a Catchment, Current Status of SCS-CN method
- 3.4 Hydrological Modeling: Types, Introduction to HEC-HMS

4. Ground Water (Contact Hours 15)

- 4.1 Introduction- Definition, Occurrence of Ground water, Zones of Underground water, Types of Aquifers
- 4.2 Wells: Cavity formation in Open Wells, Types of tube wells, Recharge
- 4.3 Springs: Formation and types of springs, Well, Sea water Intrusion
- 4.4 Groundwater Resources of India: Groundwater monitoring network in India

References:

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- 2. Butler S.C.(1957): Engineering Hydrology , Prentice Hall Inc., USA,
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W.e.f. Academic Year 2017-2018
Semester III
Paper: 302 A 4 - Climatology of the Tropics

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction (Contact hours15)

- 1.1. Concept of Tropical Climate and tropical boundaries.
- 1.2. Importance of tropical climate.
- 1.3. Role of tropics in the general circulation of atmosphere- driving forces-jet streams and their influence.
- 1.4. Heat budget of the tropics.

2. Atmospheric conditions of Tropics (Contact hours15)

- 2.1. Atmospheric stability and instability
- 2.2. Air masses and fronts
- 2.3. Classification and characteristics of air masses
- 2.4. Air masses over tropical region

3. Indices of climate in Tropics (Contact hours15)

- 3.1. Atmospheric and oceanic oscillations on various time scales
- 3.2. Climate variability of tropical weather systems and their relationship with different oscillations.
- 3.3. Genesis of monsoon-distributional characteristics and variability of monsoon.
- 3.4. Classification of tropical climate- Climatic types in Tropics based on schemes of Koppen Thornthwaite and Penman.

4. Tropical Disturbances (Contact hours15)

- 4.1. Cyclones, thunderstorms, tornadoes their characteristics
- 4.2. Frequencies and paths of disturbances
- 4.3. Cyclones in Bay of Bengal and Arabian Sea
- 4.4. Impacts of cyclones

References:

- 1) Garbell, M.A.(1947): Tropical and Equatorial Meteorology, Sir Isaac Pitman and Sons Ltd, U.S.
- 2) Lockwood, J.G. (1974): World Climatology, an Environmental Approach, Edward-Arnold, U.K.
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W.e.f. Academic Year 2017-2018
Semester III
Paper: 302 A 5- Geography of Climate Change with special reference to India

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction (Contact Hours 15)

- 1.1. Climatic change through geological time
- 1.2. Causes of climate change External causes,
- 1.3 Causes of climate change Internal causes
- 1.4. Evidences and indicators of climate change

2. Global warming (Contact Hours 15)

- 2.1 Meaning and historical perspective on global warming
- 2.2 Causes of global warming
- 2.3 Consequences of global warming on natural systems.
- 2.4 Consequences of global warming on anthropologic activities.

3. Issues and measures related to climate change (Contact Hours 15)

- 3.1 Initiatives at global level
- 3.2 Role of global players IPCC, UNFCCC Kyoto Protocol
- 3.3 Carbon credits definition, carbon markets, Clean Development Mechanism
- 3.4. Carbon footprint methods of calculating and reduction

4. India: Impacts of climate change (Contact Hours 15)

- 4.1. Impacts of climate change on India
- 4.2. India's approach to climate change- Global and National levels
- 4.3. Government initiatives to take climate change
- 4.4 Public participation to mitigate climate change.

References:

- 1. Derbyshire, E, (2010): Geomorphology and Climate, John Wiley and Sons, London
- 2. Khan, MZA et al. (2011): Global Climate Change: Causes and Consequences, Rawat publication, Jaipur
- 3. Lomborg B, (2010): Smart Solutions to Climate Change, Rawat Publication, Jaipur
- 4. Singh, S, and Mohan, K.S (2012): Climate Change: An Asian Perspective, Rawat publication, Jaipur
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University of Mumbai
M.A./M.Sc. Geography Syllabus based on Choice Based Credit System
w.e.f. academic year 2017-18
Semester III
Paper: 302 A 6 - Theoretical and Applied Geomorphology
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

- 1 Conceptual Geomorphology (Contact Hours 15)**
 - 1.1. History and development of Geomorphology Hutton to Horton, Horton to Strahler-Hack; Space and time in Geomorphology, Time cyclic, graded and steady, Spatial scale micro, meso and macro.
 - 1.2. Fundamental Concepts, theories and fieldwork (field-based experiments) in Geomorphology,
 - 1.3. Types of geomorphic systems (morphologic and cascading system); General System Theory.
 - 1.4. Concept of equilibrium, types of equilibria; complex response and geomorphic thresholds
- 2. Geologic Time and Tectonics in Geomorphology (Contact Hours 15)**
 - 2.1 Quaternary geomorphology: Quaternary period and its importance in geological time, quaternary stratigraphic sequences and their importance in earth sciences, quaternary glaciation and related changes.
 - 2.2 Tectonic geomorphology: Introduction to tectonic geomorphology, establishing time in landscape, dating methods; geomorphic and quantitative markers tectonic processes.
 - 2.3 Seismotectonics of Indian plate: Tectonics of Indian plate, characteristics of seismogenic regions of India, seismic hazard and vulnerability assessment; seismic microzonation initiatives in India.
 - 2.4 Regional geomorphology of Maharashtra: Geologic structure and geomorphic setup of Maharashtra -polycyclic landscape, drainage patterns, characteristic fluvial and coastal landscape of Maharashtra - major landforms with examples.
- 3. Applied Geomorphology (Resource geomorphology) (Contact Hours 15)**
 - 3.1 Nature, Scope and Definition of Applied Geomorphology, relationship with Resource Geomorphology
 - 3.2 Landform evolution by geomorphological agencies, namely fluvial and glacier
 - 3.3 Soil evolution, form, and sustainable development of soil and water resources of India
 - 3.4 Remote sensing and GIS application on Applied Geomorphology
- 4. Applied Geomorphology(Geomorphology of Hazards) (Contact Hours 15)**
 - 4.1 Landform evolution by mass movement processes, classification, slope failures
 - 4.2 Definition, causes and management of Hazards on the landscape
 - 4.3 Geomorphic hazards-Landslides, Floods and Tsunami
 - 4.4 Geomorphology and its application in hazard management in agriculture, urbanization and mineral exploration.

References:

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W.e.f. Academic Year 2017-2018
Semester III

Paper: 303 B 1- Geography of South Asia with special reference to India

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Physiography of South Asia **(Contact Hours 15)**

- 1.1 Geological Evolution-Relief , topographic characteristic features
- 1.2 Drainage - major river systems spatial pattern of water distribution
- 1.3 Climate factors and processes responsible for shaping climate - pattern and regional variations
- 1.4 Soil and Vegetation interrelation and regional variations

2. Historical Context- Organisation of Society **(Contact Hours 15)**

- 2.1 Pre-colonial societies and cultural evolution - Historical Background of Colonisation Impact on social, cultural and political organisation of society
- 2.2 Partition and emergence of independent nation state- Consequences, conflicts and identity politics - Regional Dynamics- Differences and Shared Characteristics
- 2.3 Demographic characteristics language, religion, race - Patterns of Migration assimilation and segregation -contestations and cultural politics
- 2.5 Social, cultural and political institutions their role in shaping identities of people and national identities

3. Organisation of Economy **(Contact Hours 15)**

- 3.1 Agricultural development in South Asia- Colonial and post-colonial trends- Globalisation and status of agriculture status of small and marginal farmers - issues of corporatisation
- 3.2 Industrialization- Genesis and trends New economic policy- Globalisation - Role of the MNCs - Growth of services and finance New economic activities and transformation of economic base
- 3.3 Urbanisation and economic growth- Contemporary urban systems- Globalising cities- Global capital regions and the urban crisis
- 3.4 Trade relations intra-regional patterns and associations SAPTA success and failure

4. Geo-politics, intra-regional relations and Development **(Contact Hours 15)**

- 4.1 The Challenge of regionalism Intra and Inter-regional interaction conflicting Frontiers and border states - Geopolitics of resources like water , land and maritime resources Issues of Terrorism
- 4.2 Regional cooperation - SAARC prospects and challenges Critical assessment of role of India
- 4.3 new inter-regional coalitions and its impact on South Asian Intra-regional interaction AIDB / CPEC / BRICS
- 4.4 Politics of development and resources - Status of development - contemporary modes of governance - Quality of life and index of socio-economic well-being Regional variations

References:

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13. Bjorkman, (1987): The Changing Division of Labour in South Asia, Manohar, New Delhi
14. Schwartzberg, J.E. (ed.), (1978): A Historical Atlas of South Asia, University of Chicago Press, Chicago.
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Semester III

Paper: 303 B 2- Population Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Geographical context of Population (Contact Hours 15)

- 1.1 Population in environment, economy and society- People as players- Acts of knowledge- Positions.
- 1.2 Changing approaches to Population Geography- - Contemporary trends
- 1.3 Population- Demographic characteristics- reproduction, health, and education challenges for developed and developing countries.
- 1.4 Critical review of population growth theories and models demographic transition and demographic divided critic.

2. Space, environment and place interrelations (Contact Hours 15)

- 2.1. Concentration of people in space Density variations and impact Rural and urban dimensions
- 2.2. Population- resource relations Capitalist mode of production
- 2.3 Livelihood responses- Role of technology- nature of economy and environmental aspects.
- 2.4 Issues of degradation displacement placelessness- Indian examples.

3. Population and Social Relations (Contact Hours 15)

- 3.1 People, society and culture - Early migration and evolution of cultural hearths
- 3.2. People as social groups- Ethnicity, race, caste, religion and language identity issue
- 3.3 Dimension of gender and related aspects Relevant examples.
- 3.4. People and economy- Population as a resource- Economic and occupational characteristics Spatial patterns- Changing status of labour -Recent trends.

4. Migration and mobility (Contact Hours 15)

- 4.1 Factors, processes and typology Contemporary trends in developed and developing countries Rural and urban dimensions
- 4.2 Population, Social organization and governance people as communities and citizens people's rights and protection in contemporary societies
- 4.3 Population dynamics and development processes Population as social capital Status of developed and developing countries.
- 4.4 Study of any of the community space in Mumbai Socio-cultural , Economic and Political context

References:

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2. Zelinsky, W (1965): A Prologue to Population Geography, Prentice Hall, London.
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Hill, New York

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Semester III

Paper: 303 B 3- Geography of Transport

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Spatial Context of Transport (Contact Hours 15)

- 1.1 Interdependence and social production of mobility conditions nodes, networks and flows as spatially constituted and space forming structures- Typologies and Characteristics- Role of Distance.
- 1.2 Evolution of contemporary transport systems and transport modes technological advances and modernisation Global trends in colonial and post-colonial periods.
- 1.3 Globalisation and dynamics of spaces of production and consumption- Time and space convergence and uneven geography of transport, accessibility and mobilization.
- 1.4 Emerging Themes and Approaches to Geography of Transportation
Relevance of transport geography in planning and development.

2. Transport cost as a variable in locational theory (Contact Hours 15)

- 2.1 Factors influencing transport cost- Comparative cost structures major modes and systems of transportation - Role of public and private sectors - State policies and institutional regulations
- 2.2 Location of routes and efficiency of networks- Structuring of nodal hierarchy- Competition and complementarity between modes of transportation and networks- Examples from developed and developing countries.
- 2.3 Critical review of locational theory and role of transport cost - Structural properties of transport networks - Relevance and applicability of graph theory measures Relevance of Evolutionary models
- 2.4 Spatial interaction and gravity models- Agglomeration-urbanisation and transport development- Growth of transportation and diffusion process Hagerstrand's model
A critical review.

3. Contemporary Dynamics of International and Regional Transportation

(Contact Hours 15)

- 3.1 New International Division of Labour- MNCs and Changing patterns of International Trade
Commodity flows and multi-modal transport chains
- 3.2 Commodity Chains and freight transportation flexibility and structuring of freight distribution systems - typologies of the network strategies
- 3.3 Rapid Urbanisation in the Global South Changing urban economic base, land use and urban structures consequent dynamics of uneven transport development.
- 3.4 Transport and environmental impact - Intermodal and intra-modal patterns and levels of energy consumption- adoption of alternative fuels environmental impact assessment sustainable transport systems

4. Geography of Transport in India

(Contact Hours 15)

- 4.1 The colonial transport systems and regional patterns metropolitan dominance and the core-periphery imbalance - broad patterns of rail, road, water and air transportation

- 4.2 Institutional transport regimes and transport planning Privatisation and liberalization-
Changed policy perspective- Role of Global players - Implications of
JNNURM in Indian cities.
- 4.3 Development of private motorized road transport Construction of flyovers and free-ways
The Industrial corridors and issues of flouting of scale and bypassing development
- 4.4 Issues of Transport Development in Mumbai and MMR.

Reference Books:

1. Rodrigue Jean-Paul, et.al. (2006): The Geography of Transport Systems, Routledge.
2. Black, W.(2003): Transportation: A Geographical Analysis, New York, Guilford.
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Semester III

Paper: 303 B 4 - Geography of Trade

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Geographical bases of trade (Contact Hours 15)

- 1.1 Social production of spaces and flows of exchange -
Geographical division of labour and dynamics of interdependence.
- 1.2 Origins and forms of exchange in simpler societies - Indian trade in colonial period.
- 1.3 Comparative cost advantages and doctrine of free trade- Classical, neo-
Classical theories of international trade- A critical review.
- 1.4 Trade barriers and terms of trade- Bi-lateral and multi-lateral trade relations -
Typology and significance of trade integrations.

2. Spatial dynamics of International trade (Contact Hours 15)

- 2.1 Expansion of capital and trade in post-industrial revolution periods- structuring of spaces of unequal exchange and dependency.
- 2.2 Fordist regime and international trade - post-war trends Bretton Woods System and Role of IMF, World Bank, UNCTAD and GATT- Terms of trade of the third world countries.
- 2.3 Policies of import substitution and export promotion Structuring of world economy as core and periphery- Placing India.
- 2.4 Flexible accumulation and globalization- Restructuring of production spaces- role of MNCs -
Changing patterns and composition of international trade flows.

3. Globalisation and Restructuration of International Trade (Contact Hours 15)

- 3.1 WTO Regime Strategies of TRIPS, TRIMs and the trade issues of the Global South.
- 3.2 Globalisation and Neo-liberal regime of trade- Impact on environment and livelihood resources in India- Global food chains.
- 3.3 Finance capitalism and international trade in services Out sourcing and service exports growth in the semi-periphery and periphery India s competitive advantage.
- 3.4 Cultural turn of global economy, production of spaces and flows of consumption- Growth of trade in experiences World Tourism, recreation and leisure, tourism as well as culinary products and services.

4. Contemporary Trade Integrations and India s Trade relations: (Contact Hours 15)

- 4.1 SAFTA and India s trade relations with neighbouring SAARC countries.
- 4.2 One Belt-One Road (OBOR), North-South Transport Corridor, India-China Trade relations
- 4.3 Trans-Pacific Partnership and India-US trade relations.
- 4.4 EU-India Free Trade Agreement (FTA), BREXIT and its impact on Indian Economy.

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Semester III

Paper: 303 B 5- Geography of Services with special reference to India

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Geography of Services (Contact Hours 15)

- 1.1. Evolution of Contemporary World Economy Globalisation of Production Systems- Growth of Service Industry Uneven development.
- 1.2. Definition and Typology of Services Interrelation with production and consumption- Time and Space Convergence- Compression
- 1.3. Theories and Conceptualisation- A Critical Review: Fischer-Clark hypothesis; Fuchs model of inter-sectoral shift in employment, Gemmell's extension of Fuchs' model, Howell's notion on service encapsulation
- 1.4. National and global stimuli to growth of services; Service outsourcing- benefits and drawbacks Limits to service export growth in periphery.

2. Trends and patterns of Geography of Services (Contact Hours 15)

- 2.1. International trade in services- Transnational Investment Patterns- agglomeration and new business service concentration- Research and Development
- 2.2. Internationalisation of Services Networks- Flows and Spatial structures- Sectoral Trends in Retailing, Tourism, Finance and Banking
- 2.3. Internationalisation of services- Sectoral trends in transport, telecommunication and media.
- 2.4. Internationalisation of services- Sectoral trends in Social and Community services- Health, Education and Culture

3. Outsourcing of Services in the Global South (Contact Hours 15)

- 3.1. Spatial dynamics of Business Processing Outsourcing in the Global South- corporate structures, specialization and locations Patterns in Latin America, Asia and Africa.
- 3.2. Growth of India's service industry sectoral trends, product composition and regional pattern, Globalisation of services.
- 3.3. IT sector and Business Process outsourcing in India India's Competitive advantage and growth trends, Corporate Structure and flexible mode of production- Role of unorganized sector- gender dimensions.
- 3.4. Spatial Dynamics of the IT sector De-industrialisation- Growth of Mega city, InfoTech Parks and Real Estate Sector- Interrelations- Growth in the Peri-urban regions.

4. Tertiarisation and its implications (Contact Hours 15)

- 4.1. Process of Tertiarisation in India, Deindustrialisation and shifting cities, Urban redevelopment and slums
- 4.2. New forms of consumption and production of social spaces in Indian cities, Rise of Middle class, Gated cities, Malls.
- 4.3. Service Industry and spatio-social restructuring in the urban and peri-urban regions of the mega cities, Special reference to MMR

- 4.4. Informal services in Mumbai: Space- place interface and socio-economic placement A case study of any one: a) Sales persons in malls, b) Domestic helps c) Street Hawkers and Vendors d) Barbers and Cobblers on the street.

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Semester III

Paper: 303 B 6- Geography of Tourism and Recreation

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction

(Contact Hours 15)

- 1.1. **Importance of tourism:** Definition, scope and contents of Geography of Tourism
- 1.2. **Types and Forms of Tourism:** Nature, characteristic. Components of tourism and its characteristics.
- 1.3. **Regions of tourism and tourism growth :** Flow of tourists- domestic and international, growth pattern of tourism
- 1.4. **International Organizations and Tourism:** Role of International tourism organizations in promoting international movement (UNWTO , WTTC, TAAI, IATO, IATA, ITC)

2. Tourism Products:

(Contact Hours 15)

- 2.1. **Definition,** Concept and classification and types of tourism products.
- 2.2. **Natural Resources:** Wildlife Sanctuaries, National Parks and Natural Reserves in India; Hill Stations, Beaches and Islands,
- 2.3. **Heritage Tourism:** Meaning, types, Management and Organizations, (Museum, Art Galleries and Libraries)
- 2.4. **Pilgrimage Destinations:** Meaning, types, Management and Organizations World and India in particular- locational attributes- flow of pilgrims

3. Tourism impact analysis and sustainable measures: (carrying capacity and strategic measures)

(Contact Hours 15)

- 3.1. **Environmental impacts:** Natural features - Caves, lakes, wildlife, Islands & beaches, hills & mountains, bird sanctuaries.
- 3.2. **Economic impacts:** types of impact at Global, national and regional level and measures undertaken
- 3.3. **Social cultural impacts:** Host and Guest relationship, interaction and societal changes- measures, Unification of culture.
- 3.4. **Political impacts:** Strategic planning and control measures and International, National and regional levels.

4. Research Approach and Methodology in Tourism Geography (Contact Hours 15)

- 4.1. **Importance of tourism research:** Approaches, Methodology and Techniques of Analyses in Geography of Tourism
- 4.2. **Map Reading:** Location absolute and relative; date and time - International Date Line, time zones and calculation of time and time differences.
- 4.4. **Tourism Information System (TIS):** Basic Information - Matrix of Tourism - Tourist Places, Accessibility, Nature of Tourism, Tourism Services and Products
- 4.4. **Spatial Perspectives of Tourism Development:** Conceptual Framework of Models and perspectives of spatial Analysis

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Semester III
Paper:303 B 7- Geography and Crime

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

- 1. Introduction (Contact Hours 15)**
 - 1.1. Concept, Definition and typologies of crimes
 - 1.2. Theological Bases: Dynamics of value system, ethics and institutional regulations to prevent crime.
 - 1.3. Dynamics and spatial dimensions of crime.
 - 1.4. Theories of crime and space- Anomie, Cultural transmission, crowding; labeling and conflict theory.

- 2. Areas of Crime / Crime Areas (Contact Hours 15)**
 - 2.1. Locales of crime open, built and deserted environment.
 - 2.2. Nature of Crime, place of crime, crime target and criminal
 - 2.3. Patterns of crime in world and India.
 - 2.4. Gender and crime nature of crime, target group

- 3. Crime and Regulations (Contact Hours 15)**
 - 3.1. Crime and Role of International organizations
 - 3.2. Crime, Justice and the State
 - 3.3. Crime and Societal regulations
 - 3.4. Spatial gaps in regulation of crimes

- 4. Crime in Mumbai (Contact Hours 15)**
 - 4.1. Nature of Crimes in Mumbai- factors responsible
 - 4.2. Spatial distribution and location of crimes
 - 4.3. Role of administration in crime detection and control
 - 4.4. Spatial gaps in regulation of crimes and preventive measures

References:

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2. Clinard Marshall B. and Abbott, D. J. (1973), Crime in Developing Countries: A Comparative Perspective, Wiley International, 1973.
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Semester III

Paper: 303 B 8- Gender Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Positioning of gender in Geography (Contact Hours 15)

- 1.1 Gender as a socio-spatial construct- Sex-gender system- role of patriarchy - Femininities and masculinities spatial and temporal dimensions evolution of gender space in India
- 1.2 Production of gendered spaces and differentiation - Complexities of race, caste, religion and class - Capitalist system and gender division of labour
- 1.3 Gender theories- Radical, Marxist, Poststructural - Cultural turn and Feminist politics.
- 1.4 Review of Feminist geographies diverse trends - Analysis of gender in subfields of Geography

2 Gender and Development in Space and Society (Contact Hours 15)

- 2.1 Colonial and Neo-colonial context- Transnationalism postcoloniality and the politics of representation - Gender and Globalisation Gender dimensions of development - the contemporary global patterns
- 2.2 Demographic variables Spatial dynamics of age and sex-ratio, fertility, mortality, reproductive health and poverty
- 2.3 Social and cultural aspects- Female literacy, education, health and social wellbeing- Regional patterns in India
- 2.4 Differential access and control over resources- Environment, technology, livelihood - Regional context of gender in India

3. Gender and Development in Space and Economy (Contact Hours 15)

- 3.1 Evolution of world economy and new international division of labour - Women workers in Global South feminisation of labour- trends and implications Urban and rural context
- 3.2 Spatio-sectoral dynamics of women workforce in India Colonial and neo-colonial context.
- 3.3 Gender and globalisation gender of globalisation - feminist political engagements
- 3.4 Critical geographies and the uses of sexuality - Sex tourism, flesh trade and political economy of growth

4. Political Economy of Gender: Planning, Women s rights and Equality (Contact Hours 15)

- 4.1 Gender budgeting and planning strategies- Role of the State, global institutions and NGO sector- strategies of gender advocacy
- 4.2 Globalisation and politics of women s movements South Asian Context
- 4.3 Gender empowerment through Five Year Plans in India- Regional imbalances- Women s Rights and feminist movements in India
- 4.4 Gender development and empowerment- Regional trends, spatio-social gaps in India politics of women empowerment - microfinance and micro-credits critical assessment women empowerment, violence and backlash

Reference Books:

- 1. McDowell Linda, (1999): Gender, Identity and Place, Polity Press, U.K.
- 2. Raju, Saraswati. and Bagchi, Dipika. (1998): Women and Work in South Asia: Regional Patterns and Perspectives, Routledge, U.K. and U.S.A.

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Semester III

Paper: 303 B 9- Geography of Tribes with special reference to India

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

- 1. Introduction (Contact Hours 15)**
 - 1.1. Tribes and tribal communities - a historical perspective
 - 1.2. Contemporary global distribution of tribes
 - 1.3. Geographical environment of tribal settlements
 - 1.4. Tribal society, culture and economy

- 2. Tribes of India (Contact Hours 15)**
 - 2.1. Origin and Historical perspective of Tribes in India
 - 2.2. Demography of Indian Tribes
 - 2.3. Tribal Ethnicity in India
 - 2.4. Development of socio-politico- economy of tribes in India

- 3. Spatial distribution, concentration and economy of tribes in India (Contact Hours 15)**
 - 3.1. Tribes of Himalayan region
 - 3.2. Tribes of Central India
 - 3.3. Tribes of Western India
 - 3.4. Tribes of Southern India
 - 3.5. Tribes of Indian islands

- 4. Tribal Development Programmes in India (Contact Hours 15)**
 - 4.1. Need for Tribal Development Programmes in India
 - 4.2. Study of scheduled and non scheduled tribes of India
 - 4.3. Tribal Development Programmes in India
 - 4.4. Impact of Tribal Development Programmes in India

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1. Ghurye, G.S. (1963): Tribes in Maharashtra. Popular Prakashan, Bombay
2. Vidyarthi, L. P and Rai B. K. (1985): The Tribal Culture of India. Concept Publishing, New Delhi,
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Semester III

Paper: 303 B 10- Industrial Geography

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

1. Industrialisation- Space and Geography (Contact Hours 15)

- 1.1. Meaning, Nature and Scope of Industrial Geography
- 1.2. Factors and processes in industrial location Fordist and Post- Fordist Form
- 1.3. Technological changes and their impact on the factors - A temporal Review.
- 1.4. International division of labour and Changing perspectives in industrial location.

2. Industrial Location Theories - (Contact Hours 15)

- 2.1 Theories and models of industrial location and growth
- 2.2 Critique of industrial location theories.
- 2.3 Industrial linkages and industrial regions - Growth and decline of industrial regions and industries
- 2.4 Nature of industries and territorial division of labour - Patterns in national space.

3. Industrial structure and organization (Contact Hours 15)

- 3.1 Models of growth of firms - Characteristics of industrial development in various political systems
- 3.2 Patterns in international space - Mobility of capital and restructuring of world Industrial space
- 3.3 Models of corporate growth - Vertical and horizontal integration
- 3.4 Transnational corporations, industrial development and the new international division of labour.

4. Industrialisation in India (Contact Hours 15)

- 4.1 Historical review of Indian industrialisation since 1947 Evolution of industrial regions in India Select Case Study
- 4.2 Inter-industry linkage -Role of small scale and cottage industries.
- 4.3 Multinational corporations and India's industrial scenario -Impact on economy, society and environment.
- 4.4 Problems of industrial development - Contemporary scenario - Inter-regional disparities - Issue of dispersal and regional development - Role of MNCs - Role of State

References:

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- 2. Bale, J. (1981): The Location of Manufacturing Industry, Oliver and Boyde, (2nd ed.)
- 3. Hamilton, F.E.I. (1974): Spatial Perspectives on Industrial Organisation and Decision Making, John Wiley.
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Paper: 303 B 11- Geopolitics and International Relations

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

1. Introduction to Political Geography (Contact hours 15)

- 1.1 Relevance of Space in political Geography Concept of Territoriality claims over land, water and air as territories - contestations
- 1.2 Sovereignty - State as geographical and political unit theories of state formation - Concept of nation-states Territorial state and international Relations
- 1.3 Region as a base of international politics characterisation of regionalism Trends in Post World War II Period
- 1.4 Understanding the concepts of Geopolitics Geo-political structure and Geostrategy

2. Theories of Geopolitics application and critique (Contact hours 15)

- 2.1 Heartland Theory (Halford J. Mackinder), Sea Power (Alfred Thayer Mahan), Rimland Theory (Nicholas J. Spykman), Theory of Air Power Supremacy (Alexander Seversky),
- 2.2 German Geopolitik, Functional Approach to Political Geography (Richard Hartshorne), Stephen B. Jones (Unified Field Theory)
- 2.3 Critical Geopolitics - modern Geopolitics - Post-Modern Geopolitics -
- 2.4 Geography of Power and Conflict traditional praxis of power nation-states to non-nation-state praxis role and influence of multinational Corporations and other non-state agencies in policy

3. Geopolitics and Spatial Approach (Contact hours 15)

- 3.1. Contemporary trends in geopolitics - Integration treaties and alliance patterns Significance of North-North North- South and South-South treaties in political and economic integration Critical assessment of EEC, OECD, etc. - beyond EEC BREXIT and aftermath
- 3.2 Geopolitics of war - World tension zones
- 3.3 Geography of international terrorism - Contemporary examples.
- 3.4 Politics of the environment global environmental issues Claims and counterclaims Global North and Global South - water as a disputed territory

4. Contemporary International Relations (Contact hours 15)

- 4.1 Post-1990s transitions in World Economy and International Relations
- 4.2 Global North versus Global South - Emergence of Global South as a pressure group in International politics Role of China - BRICS, BIMSETC
- 4.3 Recent changes in international political economy globalisation and neoliberalism impact on international relations
- 4.4 Clashing Civilisation or Cultural hybridisation - religion, ethnicity and identity politics the future

References:

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3. De Blij. H.J. (1967): Systematic Political Geography, John Wiley and Sons.
4. Jackson, W. A. D. (1964): Politics and Geographic Relationships, Prentice Hall.
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12. Johnston, R J. (1982): Geography and the State, MacMillan
13. Norris, R. E. and Haring, L.L. (1980); Political Geography, Bell and Howell.
14. Painter Joe and Alex Jeffrey (2009) Political Geography an Introduction to Space and Power, Sage, London.
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Practical Paper 304: Tools and techniques of Spatial Analysis- V
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60 = Total Hours 120

1. **Quantitative Techniques for Spatial Analysis using SPSS** (Contact Hours 20)
 - 1.1. **Inferential statistics:** Introduction; Hypothesis Testing - Chi square test, T-test applications; Analysis of variance (ANOVA).
 - 1.2. **Time Series Analysis-** growth and decline- index numbers- logarithmic scale- trend line by least square method
2. **Quantitative Techniques for Spatial Analysis using SPSS** (Contact Hours 20)
 - 2.1. **Correlation:** Types of correlation; Methods of correlation- Spearman s rank correlation and Karl Pearson s coefficient of correlation; Partial Correlation.
 - 2.2. **Regression:** Introduction; Dependent and independent variables; scatter-gram- regression lines and residuals; construction of regression lines; least square method, Regression residuals: mapping and interpretation.
3. **Environmental Indicators** (Contact Hours 15)
 - 3.1. **Noise Pollution:** Introduction; Use of sound measuring device; temporal and spatial variation mapping based on primary data.
 - 3.2. **Water Pollution:** Introduction; identification, techniques used, temporal and spatial variation mapping based on primary data.
4. **Study Tour, Field Survey and Field Report.** (Contact Hours 5)

References:

1. Hilton, P. et.al (2012): SPSS Explained, Rutledge, London.
2. Berry, B.J.L. and Marble, D.F. (1968): Spatial Analysis A Reader in Statistical Geography, Prentice Hall, Englewood Cliffs, New Jersey.
3. Levin, J. (1973): Elementary Statistics in Social Research, Harper and Row, New York
4. Yeates, W.M.(1974): An Introduction to Quantative Analysis in Human Geography, McGraw Hill, New York.
5. Norcliff, G.B.(1982): Inferential Statistics for Geographers, Hutchinson, London.
6. Cressie, N.(1991): Statistics for Spatial Data, John Wiley and Sons, New York
7. Ganesh, A.(2006): GPS Principles and Applications, Satish Series Publishing Houses
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26. Coates, B.E.et.al.(1977): Geography and inequality, Oxford University Press
27. Wong, Cecilia, (2006): Indicators for Urban and Regional Planning, Routledge
28. Berry, B.J.L.(1968): Spatial Analysis- A reader in statistical Geography, Prentice Hall, New Jersey
29. Levin, J.(1973): Elementary Statistics in Social Research, Harper and Row, New York
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31. Hammond, R. and McCullagh, P.S.(1974): Quantitative Techniques in Geography: An Introduction, Oxford University Press London
32. Crang, M. and Cook, I.(2007): Doing Ethographies, Sage
33. Cope, M. and Elwood, S.(2009): Quantitative GIS, Sage
34. Vallentine G., Clifford N. (2010): Key Methods in Geography, Sage
35. Robinson, A.H. (1984): Elements of Cartography, 5th Edition, John Wiley and Sons, New York
36. 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.
37. Marther, Paul M.(1976): Computers in Geography; A Practical Approach, Basil Blackwell, Hampshire
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Practical Paper 305: Tools and techniques of Spatial Analysis- VI

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60 = Total Hours 120

1. S.O.I. Topographical maps (Contact hours 25)

1.1. Introduction Index to sheet- Scales- Conventional signs and symbols

1.2. Study and interpretation of topographical maps with reference to:

- i) Glacial; Fluvial, Aeolian and Coastal landforms
- ii) Drainage pattern
- iii) Land-use
- iv) Settlement
- v) Transport and Communication

1.3. Study and interpretation of O.S sheets and USGS maps and Land-use.

2. Thematic Maps (Contact Hours 15)

2.1. Thematic maps: Physical - Interpretation of NATMO thematic maps.

2.2. Thematic maps: Socio-Cultural - Interpretation of NATMO thematic maps.

2.3. Thematic maps: Economic - Interpretation of NATMO thematic maps.

3. Spatial Analysis in Development Studies (Contact Hours 20)

3.1. Measuring Development- Choice and relevance of indicators

3.2. Methods of measurement- Rank, Quartile and Z score methods.

3.3. Identification of levels of Development- Mapping and interpretation of Levels of development.

References:

- 1. Mitra, A.(1961):Levels of Regional Development, Census of India 1961
- 2. Kundu, A.(1975): Construction of Composite Indices for Regionalisation: An enquiry into the Methods of Analysis, Geographical Review of India, Vol. 37, No.1, March 1975
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15. Brown, M.F. and Thompson, R.Y. (1970): Map Reading and Interpretation, Longman, London
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20. Yeates, M. (1974): An Introduction to Quantitative Analysis in Human Geography, McGraw Hill Book Co., New York

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 2017-2018)**

Examination pattern for Semester III

Semester III:

- a) Theory Paper:** 100 marks for each paper (Total theory papers 3)
 - i) Internal examination:** Total marks 40 (in each theory paper)
 - ii) External examination:** Total marks 60 (in each theory paper) Duration: 2 ^{1/2} Hours
- 1) Total number of questions to be framed for theory paper in external examination is 6 of 15 marks each.
 - 2) Out of total 6 questions, students are required to attempt **any four** questions.
- b) Practical Paper:** 100 marks for each paper (Total 2 practical)
 - 1) Out of total 100 marks in each practical, 80 marks for practical examination, 10 marks for journal writing and 10 marks for viva.
 - 2) No of questions would correspond with number of major modules in the respective practical Course syllabus.
- c) Marking system:**
 - i) Total marks for theory: 300 (6 Credits *3 theory papers =18 credits)
 - ii) Total marks for practical: 200 (6 credits *2 practical = 12 credits)
 - iii) **Grand Total for Semester III= 500 marks : 30 credits**

UNIVERSITY OF MUMBAI



Revised Syllabus for the M.A. & M.Sc.

Program: M.A. & M.Sc.

Course: Geography

(Semester IV)

(As per Choice based Credit System
with effect from the academic year 2017 2018)

Choice Based Credit System Syllabus, 2017-18

Total No. of Credits offered: 100

Electives offered in a particular academic year in each group could vary.

Semester is 15 weeks duration. Credits are defined for a semester

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Subject Code	Course Title	Credits	No. of Hours
401:A	Compulsory Skill/ Enhancement Based Paper (any one) 1. Digital Image Processing 2. Thematic Cartography 3. Application of Remote Sensing Techniques in Geographical Studies 4. Advanced Quantitative Techniques in Geography 5. Introduction to Programming Using Python 6. Geoinformatics for Urban and Regional Planning 7. Computer Cartography 8. Geographical Information System and Geographic Knowledge System 9. Geoinformatics and Health Care 10. Geospatial Technologies and Management	6	60+60+120
402: B	Interdisciplinary/Cross-disciplinary paper (any one) 1. Coastal Geomorphology 2. Micro-climatology 3. Geographical Perspective in Ocean Development 4. Geography of Water Resource Management 5. Geography of Soils with special reference to Tropics 6. Plant Geography with special reference to Tropics 7. Ecology and Environment 8. Spatial Perspectives in Environmental Planning and Management. 9. Maritime Studies with special reference to India 10. Geography of Contemporary Agricultural with special reference to India 11. Regional Planning and Development 12. Social Geography 13. Cultural Geography 14. Historical geography 15. Geography of Exclusion 16. Geography of Work Spaces 17. Geography of Media and Communications 18. Electoral Geography with special reference to India 19. Geography of Resources 20. Geography of Energy Resources 21. Geography of Hazards and Disaster Management 22. Globalizing Megacities with special reference to MMR 23. Geography of Knowledge and Power 24. Geography of Marketing and Consumption 25. Theoretical Geography 26. Development of Modern Geography	6	60+60+120
403	Dissertation	10	

Group III	(Data -based study on any branch of Geography)		100+100= 200
Total		22	

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Semester IV
Paper: 401 A 1- Digital Image Processing
No. of Credits: 6 Teaching Hours: 60 + Notional Hours: 60= Total hours: 120

1: Introduction to Digital Image

(Contact Hours 15)

- 1.1 Digital image data: Spectral reflectance and radiance, brightness value and digital number, signal to noise ratio, spectral sensitivity.
- 1.2 Vector data formats: binary and decimal numerical systems, data types ASCII, Binary, TIGER.
- 1.3 Raster data structures: header, data and trailer files, raster data compression types
Lossless compressions: cell-by-cell encoding, Run-length encoding, Quad Tree; Lossy compressions JPEG, MrSID, PNG.
- 1.4 Formats of Digital Images: Band Interleaved by Pixel, Band Interleaved by Line, Band Sequential.

2: Digital image preprocessing /Types of errors and methods of correction

(Contact Hours 15)

- 2.1 Sensor errors and corrections: random pixels, line/column dropouts, line start problem; correction methods: line (pixel) replacement, line average, adjusted line average.
- 2.2 Atmospheric errors and corrections: Absolute and relative corrections, de-hazing, normalisation within scene and between dates, Conversion of Digital Number to reflectance, reflectance to radiance, noise removal.
- 2.3 Geometric errors and corrections: types of errors - systematic, unsystematic corrections
Georeferencing, registration (image to image), ortho-rectification, true ortho-rectification.
- 2.4 Re sampling techniques: Nearest Neighbour, Bilinear Interpolation, Cubic Convolution.

3: Image Enhancements and Transformations

(Contact Hours 15)

- 3.1 Radiometric enhancements (Contrast stretching, histogram equalization, histogram matching, piece wise stretching).
- 3.2 Spatial enhancements: Convolutions, High pass, low pass and band pass filters, edge detection and edge enhancement filters.
- 3.3 Spectral enhancements: ratio images, Principal Component Analysis, Tasselled Cap, Change detection.
- 3.4 Image Indices: SAVI, NDSII, LWM, NDWI, NDMI.

4: Image Classification, Level of Classification.

(Contact Hours 15)

- 4.1 Supervised classification: training sites, ground truthing, classifiers Minimum Distance to Mean, Mahalanobis distance, Maximum likelihood.
- 4.2 Accuracy assessment, covariance matrix, feature space
- 4.3 Unsupervised classification: ISODATA, regrouping, iterations.
- 4.4 Image differencing with classified images.

References:

- 1. Cambell, J. B. (2002): 'Introduction to Remote Sensing', Taylor & Francis, UK.
- 2. Duda, R. O. and Hart, P. E. (1973): Pattern Classification and Scene Analysis

Wiley, New York.

3. Gibson, P. J. (2000): 'Introduction to Remote Sensing - Digital Image Processing and Applications', Routledge - Taylor & Francis.
4. Gibson, P. J. (2000): 'Introduction to Remote Sensing - Principles and Concepts', Routledge - Taylor & Francis.
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13. Umbaugh, S. E. (2005): [Computer Imaging: Digital Image Analysis and Processing](#), The CRC Press, Boca Raton, FL, January.
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15. IEEE: Transactions on Image Processing
16. IEEE: Transactions on Neural Networks
17. IEEE: Transactions on Geoscience and Remote Sensing
18. Photogrammetric Engineering and Remote Sensing
19. International Journal of Remote Sensing.

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Paper 401 A 2- Thematic Cartography
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Thematic Cartography (Contact Hours 15)

1.1 Historical perspective - Conceptual, technological and institutional changes from post World War-I period

1.2 History of Cartography in India: past, present and future developments

1.3 Conceptual bases of Cartography: map as miniature model of reality.

1.4 Elements of Cartography, Changing role of maps

2. Acquisition of data for mapping (Contact Hours 15)

2.1 Nature and sources of data

2.2 Sources of Data: Conventional

2.3. Sources of Data: Contemporary

2.4. Various GIS databases - Internet and World Wide Web.

3. Data processing and representation (Contact Hours 15)

3.1. Characteristics of data and levels of measurement

3.2. Concept of statistical surface, Statistical diagrams and maps interrelation.

3.3 Basic statistical and cartographic techniques of representing different features in thematic Maps.

4. Production of maps: (Contact Hours 15)

4.1 Techniques - Characteristics of map image -Drawing instruments, equipment and base materials

4.2. Map projections: properties and Choice, Map design and layout, principles of visualisation, visual variables.

4.3. Computer cartography and automation: development of digital computers

4.4. Geographical Information Systems - Nature, structure and components of GIS database Applications in cartography

Reference Books:

1. Crone, G. R. (1968): Maps and their Makers: An Introduction to the History of Cartography, Hutchinson University Library, London.
2. Cuff, D. J. and M.T. Mattson (1982): Thematic Maps: Their design and Production, Methuen and Company, New York.
3. Dickinson, G.C. (1977): Statistical Mapping and Presentation of Statistics, Edward Arnold limited, London.
4. Heywood, Ian et al (1998) .An Introduction to Geographical Information Systems, Addison Wesley Longman, Limited, England.
5. Keates. J S (1973): Cartographic Design and Production, 2 ndedn., Longman Group Limited, London.
6. Keates, J.S. (1996): Understanding Maps, 2na Edn., Longman Group Limited, London.
7. Kraak, Menno-Jan and FerjanOrmeling (1996), Cartography Visualization of Spatial Data, Addison Wesley Longman Limited, England.

8. McDonnell, P. W. Jr. (1979): Introduction to Map Projections, Marcel Dekker, Inc New York and Basel.
9. Monmonier, Mark S. (1982), Computer-Assisted Cartography Principles and Prospects, Prentice-Hall, Inc, London
10. Robinson, A.H. et al. (1995): Elements of Cartography, Vol.VI, John Wiley & Sons, New York.
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Paper: 401 A 3-Applications of Remote Sensing Techniques in Geographical Studies
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Application of Remote sensing

(Contact Hours 15)

- 1.1 Land Use/Land Cover and Wetland Mapping
- 1.2 Agriculture and Soil Mapping Applications
- 1.3 Water Resources Applications
- 1.4 Urban Planning Applications

2. Hyperspectral Remote sensing

(Contact Hours 15)

- 2.1 Hyperspectral Imaging: Hyperspectral Concepts, data collection systems, normalization, Calibration techniques,
- 2.2 Data processing techniques; N-dimensional scatter plots, special angle mapping, Spectral Mixture analysis, Spectral Matching, Mixture tuned matched filtering
- 2.3 Classification techniques, airborne and space borne Hyperspectral sensors
- 2.4 Hyper-spectral satellite systems: Sensors, orbit characteristics, description of satellite Systems, data processing aspects, applications.

3. Aerial photography:

(Contact Hours 15)

- 3.1 Introduction to aerial camera, factors affecting image quality,
- 3.2 Types of aerial photographs Photographic resolution and radiometric Characteristics.
- 3.3 Fundamentals of photogrammetry: Introduction and definition Simple geometry of
- 3.4 Vertical aerial photograph Relief and tilt displacement Stereoscopy, parallax Equation; flight planning Scale and height determination.

4 Principles and fundamentals of aerial photo interpretation (Contact Hours 15)

- 4.1 Image analysis Elements, Fundamentals of satellite images analysis: Types of Imagery, Visual image analysis, digital image analysis
- 4.2 Basic principles of thermal and microwave remote sensing.

Reference Books

- 1. Jenson, R.J. (2003): Remote Sensing of the Environment- An Earth Resources Perspective, Pearson Education Series
- 2. American Society of Photogrammetry (1983): Manual of Remote Sensing, ASP Falls Church, V.A.
- 3. Barrett, E.C. and Curtis, L.F.(1992): Fundamentals of Remote Sensing in Air Photo-interpretation, McMillan, New York.
- 4. Campbell, J. (1989): Introduction to Remote Sensing, Guilford, New York.
- 5. Curran, Paul, J. (1988): Principles of Remote Sensing, Longman, London.
- 6. Hard, R.M. (1989): Digital Image Processing of Remotely Sensed data, Academic Press, New York.
- 7 George Joseph,2005):Fundamentals of Remote Sensing , Universities press (India) Private Limited, Hyderabad.
- 8 Lillesand. T.M. and Kiefer R.W.(2002): Remote Sensing and Image Interpretation, John Wiley and sons Inc., New York.
- 9 Paul Curran P.J.,(2004) Principles of Remote Sensing , Longman, RLBS, 2003.

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Paper: 402 A 4 -Advanced Quantitative Techniques in Geography
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Scientific method in Geographical Explanation (Contact Hour 15)

- 1.1 What is explanation routes to explanation
- 1.2 Methods in geography
- 1.3 Data analysis in geography
- 1.4 Nature and characteristics of geographical data

2. Spatial Data Analysis (Contact Hour 15)

- 2.1 Defining Spatial sub disciplines- nature of spatial data- Obtaining spatial data data quality
- 2.2 Exploratory spatial data analysis conceptual models visualization methods numerical methods
- 2.3 Hypothesis testing and spatial auto correlation testing mean of the spatial data test of bivariate associations chi-square tests for contingency tables
- 2.4 Modelling Spatial Data a. descriptive model - model for representing spatial variations Hierarchical Bayesian models b. Explanatory models - classical approach econometric approach- applications of linear modelling of spatial data

3 Spatial applications of test results (Contact Hour 15)

- 3.1 Regression analysis
- 3.2 Analysis of variance- One way and two way ANOVA
- 3.3 ANCOVA
- 3.4 MANCOVA

4 Multivariate techniques of analysis and synthesis (Contact Hour 15)

- 4.1 Factor analysis: basic concepts, Derivation of factors and their labelling, Interpretation of factor extracts
- 4.2 Derivation of factor scores, Mapping and Interpretation of the scores
- 4.3 Cluster analysis: basic concepts, Derivation of clusters, Interpretation of cluster results
- 4.4 Mapping of clusters, Interpretation of the cluster maps

References:

- 1. Burt, J. E. and Barber, G.M. (1996): Elementary Statistics for Geographers , The Guilford Press, New York.
- 2. Clark, W.A.V. and Hosking, P.C. (1986): Statistical Methods for Geographers , John Wiley and Sons, New York.
- 3. Ebdon, D. (1977): Statistics in Geography , Basil Blackwell, London.53
- 4. Gregory, S. (1963): Statistical Methods and the Geographer , Longman Group Ltd., London.
- 5 Haining Robert (2003) Spatial Data Analysis: Theory and practice, Cambridge University Press, Cambridge

6. Killen, J. (1983): *Mathematical Programming Methods for Geographers* and Croom Helm, London.
7. Levin, J. (1973), *Elementary Statistics in Social Research* , Harper & Row, New York.
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Semester IV

Paper: 401 A 5- Introduction to programming using Python
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Programming and Python (Contact Hours 15)

- 1.1 The way of the program: Development of Python, Low-level language, Interpreter and Compiler, Types of errors, Formal and natural languages, The first Python program, Debugging, Python 2 / 3 differences [Reading Chapter 1 from [1]]
- 1.2 Variables, expressions and statements: Values and types, variables, variable names and keywords, operators and operands, expressions and statements, order of operations, string operations, comments, interactive mode and script mode. [Reading: Chapter 2 from [1]]
- 1.3 Conditional statements: Boolean expressions, Logical operators, Conditional execution, Chained and nested conditionals, [Reading: Chapter 5 from [1]]
- 1.4 Function: Definition, Parameters and arguments, Global and local variables, Composition and recursion, [Reading: Chapter 3 and 6 from [1]]. Iterations: While and for loop, break statement. [Reading: Chapter 7 from [1]].

2. Data Structures (Contact Hours 15)

- 2.1 Introduction to PYQGIS: Python console in QGIS, Using PyQGIS in scripts. Reading: [Chapter 1 from [3]].
- 2.2 Python Data Structures: Strings, Dictionaries, Tuple and Lists [Reading: Chapter 8, 10, 11, and 12 from [1]].
- 2.3 File Handling: Reading and writing in files. [Reading: Chapter 14 from [1]].
- 2.4 Classes and Objects: Objects and object-oriented programming, Classes, Operators overloading, Polymorphism, Inheritance. [Reading: Chapter 15, 17, and 18 from [1]].

3. Vector Data Processing with Python (Contact Hours 15)

- 3.1 Reading and writing vector data with OGR: Introduction to OGR, Reading vector data : accessing specific features, and displaying data, writing vector data: Creating new data sources and new fields, Updating existing data. [Reading: Chapter 3 from [2]]
- 3.2 Filtering data with OGR: Attribute filters, Spatial filters, Using SQL to create temporary layers. [Reading: Chapter 5 from [2]].
- 3.3 Manipulating geometries with OGR: Working with points, lines, and polygons. [Reading: Chapter 6 from [2]].
- 3.4 Using spatial reference systems: OSR and pyproj. [Reading: Chapter 8 from [2]].

4. Raster Data Processing with Python (Contact Hours 15)

- 4.1 Reading and writing raster data with GDAL: Introduction to GDAL, Reading writing and Resampling raster data with GDAL. [Reading: Chapter 9 from [2]].
- 4.2 Working with raster data: Ground control points, Converting pixel coordinates, Histograms, Attribute tables, Virtual raster format. [Reading: Chapter 10 from [2]].
- 4.3 Map algebra with NumPy and SciPy [Reading: Chapter 11 from [2]].
- 4.4 Visualizing data with Matplotlib: Introduction to Matplotlib, Plotting vector data, Plotting raster data, Plotting 3D data. [Reading: Chapter 13 from [2]].

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9. Building a Basic GUI in Python with Tkinter and wxPython <http://sebsauvage.net/python/gui/>
10. Tkinter Python Interface to Tcl/Tk <https://docs.python.org/2/library/tkinter.html>
11. Python Scripting (PyQGIS) <http://www.qgistutorials.com/en/index.html>
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Semester IV

Paper: 401 A 6- Geoinformatics for Urban and Regional Planning
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Urban Planning (Contact Hours 15)

- 1.1 GIS in Urban Planning: Urban Planning stages and system, basic concepts and principles, GIS for decision support in urban planning and management.
- 1.2 Urban spatial data: scales of data (city-level, building level data), required attributes and types of remote sensing data, urban data updation with remote sensing techniques.
- 1.3 Spatial Database Organization for Urban Planning: Land record information, cadastral maps, development plans, master plans, GPS surveys, remote sensing data.
- 1.4 Integration of data from different sources: data warehousing, Web GIS, cloud computing and big data. Spatial data validation.

2. Geoinformatics and Urban Planning (Contact Hours 15)

- 2.1 Network Analysis: optimum route analysis, for planning of transpiration lines, pipelines and cables. location-allocation function distribution of facilities
- 2.2 Proximity Analysis, Nearest neighbor analysis, spatial autocorrelation, spatial interpolation.
- 2.3 Satellite image classification and change detection: urban landuse-landcover, levels of details of classification and types of images.
- 2.4 Site suitability analysis Spatial Multi-criteria Analysis for introducing new facilities, identification of suitable sites.

3. Urban challenges and Application of Geoinformatics (Contact Hours 15)

- 3.1 Land valuation: defining criteria for land value determination with GIS, gaps between actual and official value of land, mapping changes in land values and infrastructure, GIS modeling and simulation of various scenarios.
- 3.2 Urban housing: types of housing, standard of housing, vertical and horizontal expansion and related issues, building height determination digital aerial photographs, LIDAR data.
- 3.3 Urban safety and security: distribution of police stations and crimes; distribution of fire stations and population density, road connectivity.
- 3.4 Prediction of urban landuse-land cover :Marchov chain, regression model using remote sensing data; 3 D city modeling, E-governance and GIS.

4 Regional Planning and Geoinformatics (Contact Hours 15)

- 4.1 Regional Planning: Definition, objectives, scope and related issues, scale of planning, types of regions, delineation of regions , industrial , agro-climatic and city regions, special zones and corridors.
- 4.2 Tools of regional planning: spatial scale of planning, need for large, medium and small scale maps and images. Challenges of data integration.
- 4.3 Data sources and platforms : Digital data in public domain, National digital data portals, BHUVAN.

4.4 Regional planning in India: industrial regions, agro-climatic regions and city regions in India Case studies.

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Semester IV

401:A 7- Computer Cartography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. An overview of development of digital computer systems (Contact Hours 15)

- 1.1 Progressive and adaptation of hardware and software for handling and display of spatial data
- 1.2 Principles of mapping: fundamental attributes of maps
- 1.3 Elements of map design and layout, scale, techniques of representation and Symbolization.
- 1.4 Map projections: properties and choice , Map as medium of communication

2. Data source and Basic analytic Geometry (Contact Hours 15)

- 2.1. Sources of data for mapping: traditional and modern sources -Integration of data from different sources
- 2.2. Cartesian coordinates, vector matrices
- 2.3. Spatial data structures, topology building, file structures, graphs and trees
- 2.4. Basic statistical techniques for processing and organisation of data Conversion into mappable form.

3. Data conversion and preprocessing (Contact Hours 15)

- 3.1. Conversion of spatial data into digital form
Characteristics of digital data, line and area encoding
- 3.2. Vector and raster formats: their implications for input, processing and storage
- 3.3. Manual, semi-automated and automated procedures for input of spatial data.

4. Processing, classification and trends (Contact Hours 15)

- 4.1. Processing and output of spatial data, computer assisted procedures for representation of point, line and area data
- 4.2. Linking of attribute data with corresponding objects
- 4.3. Recent trends in computer cartography -Impact of Geographical Information System
- 4.4. Dynamic and animated maps, three dimensional analytic geometry
Internet Web-based cartography Future potentials

References:

- 1. Clarke, K. C. (1998) : Analytical and Computer Cartography, Pearson Educational Company, New Jersey.
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Semester IV
Paper 401 A 8- Geo-informatics and Health Care
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Health care and Geoinformatics (Contact Hours 15)

- 1.1 Insight and scope of healthcare in Geoinformatics environment
- 1.2 Health care planning and Geo-Information, Global health policy
- 1.3 Spatial and non-spatial factors
- 1.4 Role of GIS and Remote Sensing for health care planners

2. Geoinformatics and database for health care (Contact Hours 15)

- 2.1 GIS data base for diseases- : spatial and non-spatial
- 2.2 Remote Sensing as a source for health related information
- 2.3 Vector and raster data for health care , techniques for analysis
- 2.4 GIS model for healthcare accessibility plume model , star model

3. GIS, healthcare, , technologies and surveillance (Contact Hours 15)

- 3.1 Public health and geo-information system
- 3.2. Health care and GIS and GPS
- 3.3 Socio-demographic determinants and GIS initiatives
- 3.4. GIS and spatial Epidemiology

4. GIS applications for health care (Contact Hours 15)

- 4.1. GIS and environmental risk factor analysis
- 4.2. Spatio-temporal approach and spatial statistics for creation of habitat suitability
- 4.3 Geoinformatics as a decision support system for prevention of epidemic disease
- 4.4. Web-based GIS for control of communicable diseases

References:

- 1.Bracken, I, and Webster, C,(1990):Information Technology, Geography and Planning, Routledge, London and New York
- 2.Pickles, John (Ed.) (1995): Ground Truth : The Social Implications of Geographical Information Systems, The Guilford Press, New York.
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Paper: 401 A 9- Geo-spatial Technologies and Management
No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Geospatial Technology: (Contact Hours 15)

- 1.1. Organisation and management of geospatial data, spatial data infrastructure, important geospatial technologies
- 1.2. Coordinates and coordinate systems, Datums and geodetic systems, Coordinate transformations
- 1.3. Datums and geodetic systems
- 1.4. Introducing the Global Positioning System, GPS signals and data

2. Photogrammetry and Remote Sensing (Contact Hours 15)

- 2.1. Definition and scope, history of Photogrammetry and Remote Sensing
- 2.2. Principle, Remote Sensing, data acquisition, Remote Sensing data analysis Methods and systematic organisation
- 2.3. Advantages and limitations
- 2.4. Digital Image processing

3. Geographic Information Systems (Contact Hours 15)

- 3.1. Geographic Information Systems (GIS) and science,
- 3.2. Geographic Information Systems, Geographic data structures, data validity and organisation
- 3.3. Geospatial data analytical techniques
- 3.4. Spatial data modelling, management

4. Applications of Geospatial Technology (Contact Hours 15)

- 4.1. Strategy for testing, evaluation and implementation- examples
- 4.2. Social and institutional context
- 4.3. Approaches to geographic measurement, contemporary techniques with examples
- 4.4. Geospatial technology for spatial decision support system and management

References:

1. Reddy, A. Textbook of Remote Sensing and Geographical Information Systems, B.S. Publication.
2. Demers, M. Fundamentals of GIS , John Wiley & Sons Inc.
3. Goodchild. M.F, et.al.:Environmental Modeling with GIS
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Semester IV
Paper - 402: B1- Coastal Geomorphology

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Morphodynamics of coastal systems (Contact Hours 15)

- 1.1 Meaning, Nature and Content of coastal geomorphology
- 1.2 Models in coastal geomorphology, feedback, thresholds and equilibrium
- 1.3 Coastal classification schemes of Johnson, Shephard; Hayes (1979), and Darlymple, Zaitlin and Boyd (1992).
- 1.4 Paleoenvironmental analysis and dating coastal landforms

2. Coastal processes (Contact Hours 15)

- 2.1 Ocean waves: Types, characteristics, propagation, refraction, and reflection; wave spectrum.
- 2.2 Wave induced near-shore currents and sediment movement.
- 2.3 Tides: Types and tide generating forces; tidal theories, tidal characteristics in open coasts, bays and estuaries.
- 2.4 Sea level variations: Causes and consequences; Pre-Quaternary and Quaternary, isostatic adjustments and present sea level trends.

3. Coastal morphology (Contact Hours 15)

- 3.1 Morphology of rocky coasts: Morphodynamic evolution of cliff and platform, polygenetic rocky coasts and the role of inheritance.
- 3.2 Morphology of sandy coasts: Changes in beach platform and profile, dune building phases, beach-dune interaction.
- 3.3 Morphology of muddy coasts: Morphodynamic evolution of tidal flats and salt marshes, tidal inlets and their role in sedimentation.
- 3.4 Morphology of deltaic and estuarine coasts: Morphodynamic evolution of deltas and estuaries, delta-front processes and estuarine hydrodynamics and their role in deltaic-estuarine sedimentation.

4. Anthropogenic impacts on coasts (Contact Hours 15)

- 4.1 Coastal erosion prevention structures: Classification and impacts.
- 4.2 Coastal pollution and saltwater incursion: Sources and management
- 4.3 Dune encroachment: Types and impacts.
- 4.4 Integrated coastal management plan: Implementation, monitoring and evaluation; Coastal Regulation Zones; Coastal reclamation and effects with special reference to Mumbai.

References:

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2. Bird, E.C.F. (1984): Coasts An Introduction to Coastal Geomorphology, Australian National University Press, Canberra.
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Paper: 402 B 2- Micro Climatology

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Microclimatology: (Contact Hours 15)

- 1.1 Definition, scope and content
- 1.2 Relevance in applied climatology

2. Factors affecting microclimate - Physical: (Contact Hours 15)

- 2.1 Elevation, slope and aspect
- 2.2 Proximity to water body
- 2.3 Types of climate: mountain, valley, coastal - Indian examples.

3. Impact of vegetation: (Contact Hours 15)

- 3.1 Variations in light, temperature, humidity, wind, rainfall
- 3.2 Microclimatic conditions of forests, grasslands, barren areas

4. Climate and man: (Contact Hours 15)

- 4.1 Urban areas urban temperatures heat island causes and effects, changes in humidity, precipitation, wind environments
- 4.2 Industrial centres pollution and its impact Issues and problems
- 4.3 Climatic approach to housing design - Surface and building materials and their impact
- 4.4 House-types in relation to climate

References:

- 1. Mather, J.R. (1974): Climatology: Fundamentals and Applications, McCraw Hill Book Co., U.S.A.
- 2. Matthews, W. H., Kellogg, W., Robinson, G.D. (1971): Man's Impact on Climate, M.I.T. Press Design Dept. U.S.A.
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- 5. Geiger, R. (1966): The Climate near the ground, Harvard University Press, Cambridge.
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Semester IV

Paper: 402 B 3 - Geographical Perspective on Ocean Development

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction (Contact 15 Hours)

- 1.1 History of oceanography, Origin of earth's atmosphere and ocean
- 1.2 Morphology of Ocean basin- Pacific, Atlantic, Indian
- 1.3. Oceanic sediments-types and distribution
- 1.4. Ocean as a resource- fresh water ecology, fisheries, minerals, transport,

2. Ocean-Atmospheric system (Contact 15 Hours)

- 2.1. Energy transfer mechanisms, World energy balance
- 2.2. Circulation in major oceans: surface, subsurface and deep water circulation
- 2.3. Tides and waves: Types of tidal patterns, Tidal theory, Wave dynamics: Origin and characteristics
- 2.4. El-Nino, South Oscillation, L-Nina and their impacts

3. Biotic and Abiotic Environment of Ocean (Contact 15 Hours)

- 3.1. Biotic ocean resources: Flora and Fauna
- 3.2. Ecological factors of productivity- Horizontal and vertical distribution
- 3.3. Energy resource: Tidal, thermal, Fossil fuel
- 3.4. Human impact of ocean environment: Overfishing- Pollution of oceanic waters- causes and impact - measures

4. Significance of Ocean (Contact 15 Hours)

- 4.1. Laws of sea: Territorial waters, exclusive economic zone, international waters, islands: continental and oceanic, their significance
- 4.2. Problems associated with island ecosystems
- 4.3. Geological and strategic importance of Oceans with special reference to Indian Ocean
- 4.4. Strategic and economic significance of Indian Ocean Islands

References:

- 1. Allan P Trujillo and Harold V Thurman (2012): Essentials of Oceanography, PHI learning Private Limited, New Delhi
- 2. Bhatt, J.J. (1978): Exploring the Planet Ocean, D. Von Nostrand Co., New York.
- 3. Birla Economic Research Foundation, Economic Research Division (1992): The Oceans, allied Publishers Ltd., New Delhi.
- 4. Chandra, S. and others (eds.) (1993): The Indian Ocean and its Islands: Strategic, Scientific and Historical Perspectives, Sage Publications, New Delhi.
- 5. Couper, A.D. (1972): Geography of Sea Transport, Hutchinson University Library, London.
- 6. Sharma, R.C. (ed) (1985): The Oceans: Realities and Prospects, Rajesh Publications, New Delhi.
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9. Rajgopalan, R. (ed)(1996): Voices for Oceans, A Report to the Independent World Commission on the Oceans, International Ocean Institute, Operational Centre, Madras, India.
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Semester IV
Paper: 402 B4-Geography of Water Resources Management

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

- 1. Introduction (Contact Hours 15)**
 - 1.1. Water as a resource to human society- changing perspective in uses of water.
 - 1.2. Source of water: hydrological cycle-catchment area of river basin methods of water storage
 - 1.3. Human interference and climatic disturbances
 - 1.4. Effects of droughts and floods-losses
- 2. Water Availability and Water situation (Contact Hours 15)**
 - 2.1. Water uses in rural areas and associated problems
 - 2.2. Water uses in urban areas and associated problems
 - 2.3. Contemporary water wars Global and Indian context- water politics in Maharashtra-
 - 2.4. Right to water - role of Government and NGO s in mitigating water conditions
- 3. Water Resource Management in India (Contact Hours 15)**
 - 3.1. Need and methods for conservation of water resources
 - 3.2. Water Future: Challenges and Strategies Development I India
 - 3.3. National water Policy- Integrated water resource development Action Plan
 - 3.4. Urban Hydrological cycle, urban surface runoff models: Management and Quality Models.
- 4. Application of Advanced Geographical Techniques for Water resources management and Development (Contact Hours 15)**
 - 4.1. Spectral properties of water- Geoinformatics based site selection for river valley Projects, surface water harvesting structures: check dam, Nala bunds, subsurface dykes etc.
 - 4.2. Application of remote sensing in hydro geomorphological interpretation for Ground water exploration, Water Quality monitoring through remote sensing.
 - 4.3. Urban Hydrological cycle, urban surface runoff models: Management and Quality Models. GIS applications in water resources development and management.
 - 4.4. Flood and Drought hazard assessment and risk analysis using RS and GIS

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Semester IV

Paper: 402 B 5 - Geography of Soils with Special Reference to Tropics

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Pedology: (Contact hours 15)

- 1.1 Scope and content
- 1.2 Significance in geographical studies
- 1.3 Multidisciplinary nature
- 1.4 Relevance in environmental geomorphology

2. Process of Soil formation: (Contact hours 15)

- 2.1 Soil formers - Physical: parent rock, time, topography and climate
- 2.2 Role of biotic factors
- 2.3 Soil profile - idealized profile - soil profile of tropical soils
- 2.4 Concept of soil catena

3. Properties, characteristics and constituents of soils: (Contact hours 15)

- 3.1 Texture, structure, pore space, bulk density, tilth
- 3.2 Soil constituents - organic and inorganic matter, soil organisms, soil air and water
- 3.3-Soil fertility in tropics - nutrients, soil capability, suitability and productivity

4. Conservation and management of tropical soils: (Contact hours 15)

- 4.1 Soil degradation and erosion - causes and consequences
- 4.2 Methods of conservation
- 4.3 Trends in farming techniques Vermiculture , organic fertilizers, bio-pesticides, drip Irrigation.

References:

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Semester IV
Paper: 402 B 6-Plant Geography with Special Reference to Tropics

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Plant Geography as a discipline: (Contact Hours 15)

- 1.1 Evolution as a discipline, scope and content
- 1.2 Links with other disciplines
- 1.3 Relevance to Geography
- 1.4 Recent trends and need for phytogeographical research

2. Tropical vegetation (Contact Hours 15)

- 2.1 Distinguishing characteristics
- 2.2 Indigenous and exotic flora
- 2.3 Bio-diversity of the tropics

3. Major plant formations of the tropics: (Contact Hours 15)

- 3.1 Terrestrial - forests, grasslands, deserts
- 3.2 Marine and aquatic mangroves, coastal
- 3.3 Vegetation types of India

4. Conservation and Management of tropical vegetation: (Contact Hours 15)

- 4.1 Degradation and depletion of tropical vegetation
- 4.2 Need for conservation and management
- 4.3 Methods - protected area network effectiveness
- 4.4 Green belts and zones in urban areas

References:

- 1. Akin, W.E. (1991): Global patterns Climate, vegetation soils, University of Oklahoma Press, U.S.A.
- 2. Ewusie, J.Y. (1980): Elements of Tropical Ecology, Heinemann Educational Books Inc. London.
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Semester IV
Paper: 402 B-7 Ecology and Environment

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1.Ecology: Concepts and Applications (Contact Hours 15)

- 1.1. Introduction to ecology: overview
- 1.2 Nutrient Cycling: Phosphorus, Nitrogen and carbon.
- 1.3 Energy Energy flows tropic levels- energy pyramids.
- 1.4 Life on land and water: Importance of Solar energy and Ocean water- Terrestrial and aquatic ecosystem of tropical/temperate/polar/ hot desert tropical/temperate/polar ocean/ lakes and ponds (any one from land and water each)

2 Environmental degradation (Contact Hours 15)

- 2.1. Factors responsible and consequences nature induced (one example from each related to tectonic / atmospheric/ oceanic)
- 2.2. Factors responsible and consequences - human induced primary/secondary/tertiary activities (any one example from each activity)
- 2.3. Global environmental problems.
- 2.4. Local environmental problems with special reference to Mumbai Metropolitan Region

3 Environmental Conservation and Sustainability (Contact Hours 15)

- 3.1. Need ecological equilibrium- stability- environmental sustainability
- 3.2. Principles of Environmental conservation
- 3.3. Global efforts for Environmental conservation
- 3.4. Role of Indian government towards Environmental conservation

4. Environmental Research: (Contact Hours 15)

- 4.1. Concept, objectives and scope.
- 4.2. Review of literature and research methodology
- 4.3. Study area: Focus on any one major environmental problem of area selected.
- 4.4. Findings, limitations, suggestions.

References:

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2. Basu, D. (ed.) (1995): Environment and Ecology - The Global Challenge, Printwell, Jaipur.
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Semester IV

Paper - 402 B 8- Spatial Perspectives in Environmental Planning and Management

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Environmental planning and management: (Contact Hours 15)

- 1.1 Principles of environmental management - Protective, Adaptive, Integrative
- 1.2 Importance of environmental planning and management eco-friendly, soft technology
- 1.3 Environment Management System EMS standards: ISO

2. Institutional arrangements for conservation of resources: (Contact Hours 15)

- 2.1 Government policies and agencies
- 2.2 International organizations and Legislation
- 2.3 Protocols, treaties, conventions

3. Environmental Impact Assessment: (Contact Hours 15)

- 3.1 Aims and objectives
- 3.2 Basic concepts and framework of EIA
- 3.3 Methods of EIA
- 3.4 Merits and demerits

4. Environmental Planning and Environmental Protection in India: (Contact Hours 15)

- 4.1 Constitutional and legislative measures and their implementation
- 4.2 Environmental Policy environmental dimension in 5 year plans
- 4.3 Environmental education and awareness

References:

- 1. Adams, W.M.(2001): Green Development: Environment and Sustainability in the Third World, Routledge, London.
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Semester IV

Paper: 402 B 9- Maritime Studies with Special Reference to India

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Marine environment and resources: (Contact Hours 15)

- 1.1 Factors influencing the marine environment
- 1.2 Habitats within oceans horizontal and vertical ecosystems
- 1.3 Living and non-living marine resources exploitation and conservation
- 1.4 Pollution causes, sources and impact

2. Legislative framework: (Contact Hours 15)

- 2.1 Maritime laws, conventions and treaties with special reference to India
- 2.2 Problems and issues in implementation

3. Maritime security: (Contact Hours 15)

- 3.1 Threats and concerns
- 3.2 Disasters and their management

4. Maritime trade of India: (Contact Hours 15)

- 4.1 Ancient and historical linkages
- 4.2 Impacts, influences and interchanges
- 4.3 Present linkages
- 4.4 Ports of India past, present and future prospects

References:

- 1. Chandra, Moti. (1977): Trade and Trade Routes in Ancient India, Abhinav Publications New Delhi.
- 2. Maritime Heritage Series Maritime History Society, Mumbai.
- 3. Admiral ArunPrakash (Retd) (2009): The Indian Ocean- A Zone of Conflict, in Lt.
- 4. Col. Harjeet Singh (Retd.) Ed. South Asia Defence and Strategic Year Book, Pentagon Press, New Delhi.
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Semester IV
Paper -402: B 10 - Geography of Contemporary Agriculture

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Nature and Scope of Agriculture and its Geographical Structure (Contact Hours 15)

- 1.1. Global overview of Agriculture- Importance of Agriculture
- 1.2. Factors influencing agriculture agriculture areas of specialization - regional analysis
- 1.3. Impact of climate change on agricultural productivity- analysis with reference to major crop Area; Food insecurity - droughts and floods.
- 1.4. Dispersal of Agriculture Processes and Impact

2. Changing Perspective in Agriculture Teaching Hours (Contact Hours 15)

- 2.1. Colonialisation and exploitative structuring of agricultural regimes in the colonial world.
- 2.2. Export orientation agricultural production and dependency of the colonial countries on the Colonies;
- 2.3 Green Revolution- Need for Green Revolution- Production Performance -Problems In The Spread of Green Revolution- Effects of Green Revolution
- 2.4 Agricultural Innovation- New Methods of Cultivation- Cooperative Farming, Contract Farming, Corporate Farming, Precision Farming etc.

3. Contemporary Globalization in Agro-marketing (Contact Hours 15)

- 3.1. Globalization and Agriculture- Agricultural Competitiveness
- 3.2. Globalization and Changing Structure of Agribusiness- Structural Adjustment And Agricultural Export
- 3.3. Functioning Of Futuristic Commodity Markets, Food Supply Chains and FDI in Agro Marketing
- 3.4. WTO and Mobilization of Farmers' Protest at the Global Level

4. Agricultural Sustainability (Contact Hours 15)

- 4.1. Concept and Need for sustainable agriculture- Crisis in Indian Agriculture- falling prices of agricultural commodities, increasing debts, issues of intellectual property rights and patterns of farmers suicides.
- 4.2. Measures and its efficacy undertaken at Global level towards agricultural sustainability
- 4.3 Measures and its efficacy taken at National towards agricultural sustainability
- 4.4. Measures and its efficacy taken at State and Local level towards agricultural Sustainability

References:

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Semester IV
Paper: 402 B 11- Geography of Regional Planning and Development

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Regional Planning and Development (Contact Hours 15)

- 1.1. Concept of region, types of region: physical, cultural, economic, administrative and planning region.
- 1.2. Relevance of regional concept in planning and development
- 1.3. Need for regional planning, regional disparity, factors responsible: physical, historical, socio-economic and political
- 1.4. Indicators of development- measurement of levels of development.

2. Regional problems and planning strategies (Contact Hours 15)

- 2.1. Identification of regional problems
- 2.2. Regional development strategies
- 2.3. Implementation of policies and plans
- 2.4. Efficacy of regional plans.

3. Regional hierarchy and Planning for Development (Contact Hours 15)

- 3.1. Concept of regional hierarchy
- 3.2. Need of regional hierarchy for planning and development
- 3.3. Applicability of spatial models to regional development
- 3.4. Changing perspectives in regional planning and current status in India.

4. Regional Development in Maharashtra Contact Hours 15

- 4.1. Introduction physical regions resource regions and cultural regions
- 4.2. Connectivity and regional development- factors influencing
- 4.3. Levels of regional development in Maharashtra- regional disparity-factors responsible.
- 4.4. Regional development strategies and its efficacy in Maharashtra.

References:

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2. Ardill, J.(1974): New Citizen's Guide to Town and Country Planning, Charles Knight and Company Ltd. London.
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Semester IV
Paper: 402 B 12- Social Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Society and Space: Perspective and approach (Contact Hours 15)

- 1.1. Key concepts in social thought and their relevance in social geography
- 1.2 Evolution of perspective in social geography.
- 1.3 Social relations, Spatial diversity and differentiation
- 1.4 Social processes and spatial form- Spatiality of society and economy.

2. Social groups, social identity and space (Contact Hours 15)

- 2.1 Social groups - Primary and secondary groups- Interaction, Processes and patterns of socialisation and segregation
- 2.2 Ethnicity, language and religion as basic parameters- social class- spatiality of social identity.
- 2.3 Towards a social geography of India Social differentiation and regional formations Caste and clan territories - Tribes and spatial variations.
- 2.4 Concept of social well-being - Indicators of social and economic well-being - Spatial pattern of well-being with special reference to India- age and gender as factors.

3. Social stratification and Urban Social Order (Contact Hours 15)

- 3.1 Social stratification and Urban Social Order- Urban space and polarisation in post-industrial cities-Globalisation and rise of network society.
- 3.2 Social geography of Contemporary Third World Cities- Impact of globalization-
- 3.3 Fragmentation, segregation and crisis of local and global Modernity- Post-modernity and related issues.
- 3.4 Concept of Social planning and politics of space- concept of social justice- Planning with a welfare approach - People's participation.

4. In Depth Study of any one of the following concepts (Contact Hours 15)

- 4.1 Slums Ethnic/ religious /linguistic identity and negotiation of economic and political space in Mumbai
- 4.2 Social spaces in Geography post graduate class
- 4.3 Reproduction, sexuality and contemporary gender issues- Role of media.
- 4.4 Malls as inclusive and/or exclusive spaces.

References:

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Semester IV
Paper: 402 B 13 -Cultural Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Evolution and growth of cultural geography (Contact Hours 15)

- 1.1. Evolution and growth of Cultural Geography
- 1.2. Significance of a spatial perspective in cultural studies
- 1.3. Attributes of culture- spatio-social context
- 1.4. Contemporary approaches- Cultural Turn in Geography

2. Culture Hearths (Contact Hours 15)

- 2.1. Evolution of culture hearths
- 2.2. Culture realms and regions
- 2.3. Early migration and interaction in culture realms
- 2.4. Convergence and divergence processes and Cultural changes.

3. Ethnicity, Language and Identity (Contact Hours 15)

- 3.1. Race and ethnicity - People as racial groups, classification and distribution, racial regions , process of acculturation.
- 3.2. Caste and structuring of cultural space in India- Identity politics based on caste
- 3.3. Cultural Geography of language, Language as a basis of nations and states - Language and Dialects. Diversity of language groups in India
- 3.4. Evolution of linguistic states -Cohesion and integration - Relevant issues.

4. Culture, Knowledge and Production of Space (Contact Hours 15)

- 4.1. Geography of religion , evolution of major world religions- Spatial spread
- 4.2. Religion and colonialism, role of religion in the formation of nations and states, Culture and religion.
- 4.3. Major and minor religious groups in India, distribution and spatial attributes, Multi- religious Diversity
- 4.4. Culture- Knowledge and politics in India -Contemporary issues- Political economy of culture , Patterns of dominance and dependence , India as a land of multiculture.

References:

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Semester IV
Paper: 402 B 14- Historical Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

I Spatial bases of History- Evolution (Contact Hours 15)

- 1.1 Time space convergence - History as an aspect of geographical explanation.
- 1.2 Theory and Methodology in Historical Geography
- 1.3 Evolution of Civilisation, society culture - Origin and diffusion of technology
- 1.4 Society and space in ancient civilisations: selected examples.

2.Spatial organisation of medieval economy (Contact Hours 15)

- 2.1 Agriculture and society during feudalism - Growth of feudal towns and mercantile capital
Discovery and explorations.
- 2.2 Transition from feudalism to capitalism -Mercantile capitalist period.
- 2.3 Industrial growth and industrial revolution - Growth of towns and cities
- 2.4 Emergence of colonial spatial organisation -Spatial shift and changing spatial order
Transformation of settlement and urban systems

3. Indian urban history: A critical perspective (Contact Hours 15)

- 3.1 Towns in ancient India - Trade and commerce
- 3.2 Nature of spatial economic organisation - Urban growth in medieval India - Role of urban centres in regional and national economy.
- 3.3 Historical geography of the western coast of India- Pre-colonial economy and society -
- 3.4 Spatial organisation of the economy during Maratha Period - Space, society and economy during colonial period.

4. Urban history of Mumbai (Contact Hours 15)

- 4.1 Space and Society-Rise and fall of ancient trade centres - Pre- British relations
- 4.2 Colonial spatial organisation and emergence of Bombay Growth of a Colonial City
- 4.3 Evolution of Mumbai as an Industrial city Bi-polarity and the production of social space of Mumbai
- 4.4 The case study of heritage landscapes and the native communities of Mumbai: Any one
 - a. The Fort and the Market Area: The dual city.
 - b. Fishing hamlets and the Fishing community;
 - c. The ancient temples, caves and the sculpture;
 - d. Mill land and the industrial community of Mumbai

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Semester IV
Paper - 402: B 15 Geography of Exclusion

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Genesis of Process and act of exclusion (Contact Hours 15)

- 1.1 Envisioning differences between Self and Others feelings and their parameters-their grounding into place and space.
- 1.2 Alternative perspectives on the self- Theoretical approaches- Freudian psycho-analysis; Object relations theory; abjection- Relevance of the generalized Other ; Cultural representations of people and things- as constituted by places and space.
- 1.3 Images of differences- Stereotypes and their construction signifying Defiled Other interpreting Colour, disease, nature Verbal and visual images rooted in culture.
- 1.4 Border crossings contestation of boundaries- Boundary maintenance and social organization; Pollution, discrepancy and small group boundaries Boundary enforcement- inversions and reversals.

2. Mapping the Pure and the Defiled (Contact Hours 15)

- 2.1 Colonisation- Expansion of the European empires and mapping of the colonized as the Defiled Others Imaginative geographies of landscapes, architectural forms, paintings, advertisements and exhibitions depiction of residual population and places
- 2.2 Bounding Space Purification and Control Structuration theory and Spatial theory-Spatial purification as a key feature in organizing Social Space- The form of purified space and Exclusionary Space- Space and Social control.
- 2.3 Spaces of Exclusion and emplacement of power relations- Home as heaven as against a socially stratified space.
- 2.4 Locality and Otherness; National identities and alien others. Geopolitics and purified identities.

3. Knowledge, Power and Exclusion (Contact Hours 15)

- 3.1 The exclusion of Geographies- people, spaces and exclusion of knowledge Knowledge and Power Interrelations Production of Knowledge as a form of social practice- Differential power among practitioners.
- 3.2 Compartmentalization - Specializations of knowledge Monopolies and Control; Hierarchical structuring of knowledge and power in academia- Exclusion of folk knowledge.
- 3.3 Lost knowledge- Rejected knowledge and Forms of exclusion- deindustrialization and exclusion of the knowledge base and employment of workers Illustrative cases
- 3.4 Gender- politics and Power Production gendered spaces- Patriarchy and power relations- Social control Forms, patterns and terrains of Exclusion; Sexual violence, Control of resources, Property ownership, Control of body and reproduction, Political representations and participatory decision making.

4. Exclusion in India: Interpretations of Identities, Knowledge and Power Interrelations (Contact Hours 15)

- 1.1 Religion;
- 1.2 Caste,
- 1.3 Class,
- 1.4 Gender

References:

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2. Murdoch Jonathan, (2006):, Post-structuralist Geography, Sage
3. Sharp Joanne, (2009): Geographies of Postcolonialism Spaces of Power and representation , Sage.
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Semester IV
Paper- 404 B 16 - Geography of Work Spaces

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Spatial context of Work, Workers and labour (Contact Hours 15)

- 1.1 Spatial divisions of labour and Social Relations Relevance of Geography of Work spaces.
- 1.2 Evolution of World economy restructuring capitalist mode of production-Comparison between Fordist and Post- Fordist Regimes flexibilising labour markets and economic spaces
- 1.3 Typology, Similarities and differences between work, workers, skills and management, wages and work-places and spaces- Situating labour in the capitalist production process.
- 1.4 Employment relations in the workplace- Problem of labour control and reproduction social regulation institutional framework- Segmented labour markets workers and workplaces.

2. Labour in an Interdependent World- Placing, Spacing and Scaling (Contact Hours 15)

- 2.1 Interdependence, porosity and permeability of workplace - Place-boundness of workers.
- 2.2 Territoriality of production- uneven and casual interrelations -Types of structure and links- Place, agglomeration and economic growth-
- 2.3 Worker- employer nexus- Local social relationships- Place and class identity and class action of workers.
- 2.4 Contextualising place and space interface of labour multiscalar connections Significance of scale and its social construct re/scaling and its implications- Geography of worker politics.

3. Agency of Labour and Organizing in Place (Contact Hours 15)

- 3.1 Replacing labour- mechanisms of labour control Hegemonic regime and scaling Role of the State- Illustrations from the Global South
- 3.2 Agency of labour and organizing in place- workers and local coalitions labour working in place with others From progressive to regressive localism- back again
- 3.3 Displacing labour labour migration- a geographical strategy- Economic- socio-cultural and political consequences
- 3.4 Up-scaling worker action- Transcending the local: national unionism- New internationalism-boarderless solidarity problems and prospects- Beyond workers-social movement politics- Progressive translocalism.

4. Indian Context (Contact Hours 15)

- 4.1 Workers and workplaces in India- A historical perspective- Growth of modern industry- Constraints- Bi-polarity and segmentation of labour markets- Regional disparity.
- 4.2 Globalisation- Deindustrialisation- Growth of Service Sector in India- Changing nature of work and workspaces in Indian metropolitan economies- Any one case study a. Textile Industry in Mumbai and Malegaon; b. Automobile Industry in Gurgaon Delhi; c. IT industry in Pune/ Bangalore; d. Tiffin carriers of Mumbai
- 4.3 Work spaces and Gender dimensions Any one case study Women workers in a. Garment export industry; b. Electronic Industry; c. Women in Indian Civil Services; d. Vegetable selling in streets
- 4.4 Informal Work places in Dharavi/ Shivajinagar- Baiganwadi/ Bharatnagar- Kismatnagar- in Mumbai

References:

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Semester IV
Paper 404 B 17 - Geography of Media and Communication

No. of Credits: 6- Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction

(Contact Hours 15)

- 1.1 Basic concepts, components and definition
- 1.2 Evolution and growth of media and communication: A historical perspective
- 1.3 Significance of Media and Communication for society and nation (welfare society, imbibing ethical values through folk stories (malgudi days) /dance/music/songs (kirtan/bhajan/powda/ovi) , educating in science and technology for economic activities etc.
- 1.4 Precautionary component of media and communication

2 Contemporary methods of media and communication and its significance

(Contact Hours 15)

- 2.1 Types, spatial distribution of ownership, services (users) and regulations
(*satellite types- weather phenomena/ agriculture/ forest/ Landuse change;
* radio; **telephone/mobile; *** internet; / patent/cost of services.
- 2.2 Role in governance, defence and economy
- 2.3 Significance in disaster mitigation and management
- 2.4 Importance in planning and sustainable development

3 Topologies of communication flows:

(Contact Hours 15)

- 3.1 Topologies of communication- network theory and geography- central places in network theory- a space of flows and power relations.
- 3.2 Boundaries in communication-media networks
- 3.3 Print and Electronic media their role in structuring of power relation- case Study
- 3.4 Role of Bollywood in structuring place and space identities across the Globe.

4 Geography of media and communication in environmental conservation:

(Contact Hours 15)

- 4.1 Tourism sector- wild life sanctuaries- bird sanctuary- jungle safari- eco-parks-
- 4.2 Agriculture Programmes for farmers - news awareness
- 4.3 Forest protection prevention of illegal activities
- 4.4 Water resources- identifying polluted areas and sources of pollution

References:

1. Adams Paul. C., (2009): Geographies of Media and Communications , Wiley-Blackwell.
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Semester IV
Paper: 402 B 18 - Electoral Geography with special reference to India

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Spatio-temporal Context of Electoral Processes (Contact Hours 15)

- 1.1 Conceptualising Citizenship- Enlightenment, liberalism and democracy; Diffusion of democracy and citizenship- nature and typologies; Spaces and levels of citizenship
- 1.2 Defining electoral constituencies- structuration and delimitation- geographical bases- Representation systems and Political mobilization- Social production of electoral space.
- 1.3 Power structures, administrative hierarchies and delimitation of electoral constituencies; Fluidity, distortion and bias- Gerrymandering and malapportionment
- 1.4 Electoral Geographies - Development of thoughts, contemporary approaches: From Mapping of Voters Behaviour to Geographies of Representation

2. Electoral Geographies: the World View and Indian Experience (Contact Hours 15)

- 2.1 Electoral processes and voting behavior in the Globalised North and Globalising South: Case studies of USA, Great Britain, South Asian nation-states
- 2.2 Evolution of India's Electoral Space in Post-Independence Phase Indian constitution, citizenship, electoral mechanism and voting rights.
- 2.3 Centre-State relationship- array of Linguistic States and union Territories Size factor- Politics of electoral seats - North-South and east-west divide- Boundary issues.
- 2.4 India's Political Space Centrist, right and left wing party rule- from single party to the coalition governments Rise of regional political parties: Pre and post- emergency trends.

3. Production of India's Electoral Spaces: Regional and local dimensions

(Contact Hours 15)

- 3.1 Identity politics and embeddedness of electoral spaces- Role of religion, caste, language and gender.
- 3.2 Reservation policies and spatiality of reserved electoral constituencies across the Indian states- Caste and Gender dimensions
- 3.3 democratisation - regional imbalances - insurgency, militancy and challenging electoral spaces- North Eastern and Central Indian States.
- 3.4 Spatial dynamics of urbanisation, migration and class differentiation Electoral spaces in Indian mega cities globalisation, denationalisation and impact on psyche of urban voters

4. Voting Behaviour and Geographies of Representation in India: A Multi-scalar analysis.

(Contact Hours 15)

- 4.1 Spatio-social analysis of election results, the post 1990 trends: Electoral Issues and voting behavior in Parliamentary and assembly elections Illustrations from select Indian states
- 4.2 Issues of Local elections and voting patterns Rural- urban context: the case of Maharashtra and Mumbai
- 4.3 Pre and Post-election poll surveys and prediction of voting behavior Vote-seat Proportions- Recent illustrations - A Critical Analysis.
- 4.5 Tools and techniques of electoral Geography: Typology and nature and sources of data -Use of maps, Application of quantitative analysis and Geo-informatics.

References:

- 1. Agnew, John. (1996): Mapping politics: how context counts in electoral geography. Political Geography, Volume 15, Issue 2, pp. 129-146. Elsevier: London, United Kingdom.
- 2. Painter Joe and Jeffrey Alex, (2009): Political Geography An Introduction to Space and Power, Sage, Los Angeles.

3. Dikshit, S. K. (1993): Electoral Geography of India, VishwavidyalayaPrakashan Varanasi.
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10. Jones, Martin, et.al. (2006): Democracy, participation and citizenship . In An Introduction to Political Geography: Space, Place and Politics, Second Edition, pp. 137-157. Routledge: New York.
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Semester IV
Paper: 402 B 19- Geography of Resources

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Resources - Links and Flows among Environment, Economy and Society (Contact Hours 15)

- 1.1 Resource definitions - Changing perceptions - socio-spatial and political ecology perspective
- 1.2 Typology of Resources- Characteristics and interrelations- Scarcity and potentiality-
- 1.3 Resources as inputs Organization in economy and society- a historical perspective
- 1.4 Resource ownership and control- across diverse value systems and culture Role of market and the State - resource governance.

2. Resources, People and Development: Theoretical Framework (Contact Hours 15)

- 2.1 Resource organisation in pre-industrial society- Colonisation, trade and resource transfer.
- 2.2 Industrialisation, urbanization and growth- Classical and neoclassical approaches to resource organization.
- 2.3 Organised capitalism and stages of economic development -advances in technology, transport and communication
- 2.3 Structuring of spatial fixity and resource transfer- carrying capacity - Limits to growth.

3. Contemporary Patterns of Resource Distribution and Exploitation (Contact Hours 15)

- 3.1 Expansion of international capital - Globalisation- MNCs and restructuring of production - Gaps and imbalances
- 3.2 Issues and challenges in distribution and use of key resource types - Land / forests / water / energy/ minerals / ocean resources.
- 3.3 Related dynamics - implications on resource ownership, accessibility and patterns of livelihood
- 3.4 Resource organization - Structuring of world economy as core and periphery- imbalances in resource use

4. Resources Development Choices and Emerging Issues (Contact Hours 15)

- 4.1 Resource depletion, degradation and emerging crisis- Desertification, deforestation and losses in bio-diversity.
- 4.2 Politics of global warming - Increasing water scarcity and conflicts Indian examples
- 4.3 Energy crisis Issues of sharing, alternate sources- Resource conservation and creation. Challenges for the Global South .
- 4.4 Sustainable development and conservation of resources- Critical Perspective- Emergence of global environmentalism

References:

- 1. Mather, A.S. and Chapman, K. (1995): Environmental Resources, Longman Scientific and Technical, London.
- 2. Harper, C.L. (2001): Environment and Society, Human Perspectives on Environmental Issues, Prentice Hall, New Jersey.
- 3. Adams, W. M. (1990): Green Development, Environment and Sustainability in the Third World, Routledge, London.

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5. Hampel, L.C. (1996): Environmental Governance, the Global Challenge, Island Press, Washington D.C.
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Semester IV
Paper: 402 B 20- Geography of Energy Resources

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Role of energy in society and economy and space (Contact Hours 15)

- 1.1 Sources of energy - Definition, and typology conventional and non-conventional- Changing perspective
- 1.2 Energy systems Evolution- Role of capital, technology, power structure trade links.
- 1.3 Commercial energy systems- structural components- Environmental, economic and spatio-social context.
- 1.4 Dynamics of energy and development- Aspects of mobilization, security and social well being

2. Production, Transfer and trading of energy resources (Contact Hours 15)

- 2.1 Uneven distribution and localization of energy resources- production and consumption of major types- multiscale, spatio-social gaps
- 2.2 Organisation of energy production and flows Variation in volume and direction Examples of Conventional and non conventional energy resources-
- 2.3 Structuring of production and consumption spaces- footloose capital and Spatial fixity- Role of MNCs, and the State- WTO and the trade blocks.
- 2.4 Environmental and spatio-social implications- Energy profiles of the Global North and the South

3. Energy crisis (Contact Hours 15)

- 3.1 Localisation impact - dominance and dependence- Sectoral links
- 3.2 Energy resources- capitalist development- conflicting demands- contestation in space- displacement and deprivation
- 3.3 Environmental concerns- pollution and global climate change- Carbon credits and trading- dilemma of the Global south
- 3.4 Energy security -Policies of conservation, renewal and sustainable use of energy

4. State of energy and power sector in India (Contact Hours 15)

- 4.1 Resource types and evolution of energy systems - Impact of urban and industrial growth
- 4.2 Regional dimensions - Privatisation of energy production and power supply
- 4.3 Energy profile and security issues- Gaps in resource mobilisation
- 4.4 Critical issues of governance -Availability and use of sustainable energy resources Future trends.

Reference Books:

1. Chapman, J. D. (1989): Geography and Energy .Commercial Energy Systems and National Policies, Longman Scientific and Technical
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Semester IV
Paper 402: B 21 - Geography of Hazards and Disaster Management

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Fundamentals of Disaster (Contact Hours 15)

- 1.1 Understanding Disasters, Definition & Terminology of Disasters, Causation of disasters
- 1.2 Understanding Natural Disasters Types, Causes and Effects
- 1.3 Understanding Man-Made Disasters Types, Causes and Impacts
- 1.4 Risk Assessment and Vulnerability Analysis

2. Environmental Hazards and Disasters. (Contact Hours 15)

- 2.1. Concept of Environmental Hazards, Environmental Risk and Environmental Disasters.
- 2.2. Human ecology geography and its application in geographical research in hazards and disasters.
- 2.3. Different approaches and relation with human ecology
- 2.4. Landscape Approach, - Ecosystem Approach, - Perception approach

3. Environmental Hazards & Disasters: Typology, Mitigation and Preparedness (Contact Hours 15)

- 3.1 Natural hazards and Disasters - Natural Disaster Reduction & Management
- 3.2 Man induced hazards & Disasters, Social Aspect, Economic Aspect
- 3.3. Prediction of Hazards & Disasters, Measures, Use of Technology in Disaster Management
- 3.4. Disaster Management- An integrated approach for disaster preparedness, mitigation & awareness

4. Disaster Management Perspective: India and World (Contact Hours 15)

- 4.1. Disaster Management in India, Global Perspective on Disaster Management
- 4.2. A regional survey of Cyclonic Disaster, Disaster in Hills, Urban Disaster with reference to India.
- 4.3. Environmental policies and programmes in India- Institutions, Environmental Legislations in India, Awareness, Conservation Movement, Education and training
- 4.4. Integrating Disaster Management and Development, Gender Perspective in Disaster Management

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Paper: 402 B 22- Globalising Mega Cities with special reference to MMR

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Introduction to Globalising Mega Cities

(Contact Hours 15)

- 1.1 Trend of metropolitan urbanisation in advanced countries Meaning and Concept of New Centralism - Globalisation - emergence of megacities Megacities as engines of Growth
- 1.2 From World Cities to Global cities Overview of paradigmatic shift - Global city in global system - Global urban hierarchy Command and Control functions - Case studies of Global Cities from Global North
- 1.3 Megacities Advanced economic activities and urban transformation urban restructuring - built environment - local and global connections - Megacities as site and place
- 1.4 Global city making and Global South policy shifts Neoliberalism New urban policies Global cities different perspectives

2. New Regionalism and consequent urbanisation

(Contact Hours 15)

- 2.1 Emergence of Mega-city regions and new regionalism Global urban regions concepts and salient characteristics Global city region making Urban Regeneration processes in Global North and Global South
- 2.2 Spatial restructuring in Mega city-regions - structure, processes and Patterns with special reference to Global South Case studies of Mumbai, Johannesburg, Sao Paulo and Shanghai
- 2.3 Urban planning experiments and visions smart city / edge city / SEZ / EPZ / entertainment legitimisation and deregulations and urban space - neoliberal urban governance cities for profit not for people
- 2.4 Consequences land conversions and changing landuse - spatial and social polarisation heterogeneity economic and cultural shocks formal or informal urbanism

3. Mumbai as megacity

(Contact Hours 15)

- 3.1 Transition from Colonial city to global/globalising city spatio-temporal changes characteristic features issues in socio-economic and spatial organisation
- 3.2 Changing demography and patterns of socio-economic configuration inclusion and exclusion
- 3.3 Deindustrialisation and reindustrialisation - Urban Planning visions shifting policies and perspectives and associated spatial, economic and social development Transforming Mumbai visions verses implementation Critical assessment of JNNURM and AMRUT
- 3.4 Resultant urban space in Mumbai contestations and conflicts right to the city exclusion and polarisation

4. MMR global/globalising urban region

(Contact Hours 15)

- 4.1 Placement of MMR vis-a-vis Mumbai in regional development context review of linkages between the Mumbai and MMR Planning perspectives on MMR Draft regional development plan 1972 and 1998 success and failure
- 4.2 Neoliberal planning perspectives and policies spatial restructuring land conversions and legitimisation logic of regional planning and development
- 4.3 Impact on economy, culture, society and environment - status of towns and cities in inner and outer peripheries transformation of rural hinterlands consequences and issues of development Future development Draft regional development plan 2016
- 4.4 Case study of SEZ at Uran, NAINA, Kharghar, Entertainment Hub at Marve, Madh and Manori , Pen and Alibaug Tehsil

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Paper: 402 B 23- Geography of Knowledge and Power

No. of Credits: 6- Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Evolution of Geography of Knowledge and Power- A Critical Perspective
(Contact Hours 15)

- 1.1 Imagined Geographies as knowledge forming process- Imagining body as space- imagining differences- Euro-centrism in production of knowledge regimes textualities of the world.
- 1.2 Orientalism as a subordinated ontology of knowledge and structuration of colonial power regimes- Differentiated discourses of the Orient- Critique.
- 1.3 European Enlightenment- separation of man and nature development of science and technology- academia and colonialism- Racism and Social Darwinism an apology to Imperial capitalism
- 1.4 Travellers tales and Exhibitioning World Distorted singular reconstruction of the diverse multiculturalism of the Orient- Fractures in the representations.

2. Landscapes of Power and Power in Landscapes **(Contact Hours 15)**

- 2.1 Conceptualising power in landscapes Gazes of power and establishing knowledge of power through gazing the colonial landscapes- interpretations by Foucault- a Critical appraisal.
- 2.2 Geographers contribution towards cartography and maps as the creation of Abstract Spaces and strengthening imperial powers Lefebvres concept on production of space and control of social reproduction- Colonial landscape, work and the body- Landscapes as homes.
- 2.3 Decolonisation process- Dialectics of knowledge transfer Motivations for a third alternative power structure- Tricontinentalism- Hybrid identities- the non-alignment movement; pan Africanism; Arab-nationalism as examples.
- 2.4 The New World Order- led by the USA- Marshall plan and Reconstruction of European economies Containment of the USSR- Modernisation and structuring of the Three Worlds.

3. Globalisation, Regulation Approach and the Politics of Scale **(Contact Hours 15)**

- 3.1 Contextualising Scale Internationalisation and destatisation The Regulation Approach- Separation of State and Capital- Aspatial context of regulation
- 3.2 Geographic division of labour Scale division of labour- The movement of Capital through successive stages of fixity and movement Beyond Internationalisation
- 3.3 Conceptualising relational space- Typologies-embodiment of action- actors contextualization- embeddedness of space in social practice- Relationality and geographical knowledge.
- 3.4 Scalar confusion- flows and relational links Actor-network theory- Emergence-From actors to network Associated actions- Network space- Territorialisations of social

relations

4. Globalisation- Cultural Imperialism

(Contact Hours 15)

- 4.1 Placing question of Scale A discourse of the diverse economy Cultural Imperialism- Consuming the Other Illustrations- Film; Fashion; Tourism
- 4.2 Geographies of Cultural Imperialism and Power Geometry Representation- Subjectivity and Power- Speaking for others ; Geographies of Understanding- Relevance of Hybrid identities.
- 4.3 Postcolonial Feminism- exploitations by patriarchy; global economic systems; race; class and caste Comparative significance of Geographic and culture specific situated knowledge
- 4.4 Dis/ Ordering Space The Case of Food- Spaces of Fast food- Spaces of slow food Networks and flows actors and action spaces- Spaces of Consumption - Risk and Relationality.

References:

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Semester IV
Paper: 402 B 24 -Geography of Marketing and Consumption

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Marketing and consumption Interrelations (Contact Hours 15)

- 1.1 Conceptualisation: Embeddedness Spatialities, Socialities, Subjectivities and Identities- Typologies Networks and flows, Inclusion and exclusion.
- 1.2 Evolution of modern marketing and consumption- Fordist and Post-Fordist forms and patterns Trends in Global north and south.
- 1.3 Theories of marketing and Consumption A Critical Review.
- 1.4 Marketing Geography and Geographies of Consumption- emerging areas of research and trends.

2. Spatio- Social Context (Contact Hours 15)

- 2.1 Space-Place and scale production of spaces and sites of marketing and consumption - Economic, political, social cultural dimensions- Typologies of sites and forms.
- 2.2 Segmented spaces of marketing and consumption Urban and rural, Formal and informal, Ethnic and community spaces, Mass and Niche spaces; Virtual, cyber-spaces.
- 2.3 Spaces of conspicuous and inconspicuous consumption- Holidays, Leisure and consumption of spaces- Deprivation and exclusion from consumption.
- 2.4 Display and Identity Formation in Marketing and consumption, aspects of positionality, embodiment and emplacement House and body as sites of consumption - Placing consuming identities-

3. Connections (Contact Hours 15)

- 3.1 Interdependency of spaces of work and consumption in the era of globalization-Role of the State, MNCs and Supranational Institutions - Commodity chains: the global, regional and local context.
- 3.2 Producer and buyer led commodity and service chains - typologies - Commodity circuits Actor-network structuration- Politics and Connectivities in marketing and consumption.
- 3.3 Structures, links and organization global commodity Chains- Examples of Nike and Wal-Mart- FDI policy and Retail trade in India.
- 3.4 Agribusiness and food bazaars as spaces of consumption Co-existence of weekly markets, street selling, green grocery shops and Malls in Indian cities

4. Commercial Cultures and Moralities: (Contact Hours 15)

- 4.1 Time and Space convergence, distanciation and compression- cultural imperialism and consumption -Americanisation of commercial spaces McDonaldisation of culinary cultures.
- 4.2 Creolization and hybridity of commercial cultures- a multiscalarphenomena- Spread of

Punjabi Dhabas, Udipi Restaurants and Chinese Food outlets Fusion in Indian music and dance.

- 4.3 Contradictions and moralities of Consumption - Tourism and Recreation and Commodification of Culture; Consumption of spaces in Goa- Networks and Spaces of Sex trade in Nepal.
- 4.4 Experiencing a mall in Mumbai; Inclusion and exclusion experiencing street food in slums of Mumbai

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Paper: 402 B 25- Theoretical Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Geographical discourse (Contact Hours 15)

- 1.1 Social construction of the discipline - Geography as a situated knowledge
Dichotomy and Exceptionalism - Areal differentiation, fragmentation and coherence.
- 1.2 Places of theory and geographical interest - Kuhn: paradigms and scientific revolutions- Foucault: truth and power - Habermas: power, knowledge and truth
Theory and practice in geography.
- 1.3 Geography and society - Classical context and non-formal age - Advent of classical formal geography. - Cartography and exploration.
- 1.4 Institutionalised geography - Emergence of geography as an academic formal discipline.

2. Geography as an empirical analytical science (Contact Hours 15)

- 2.1 Analytical and phenomenological approaches in Geography
- 2.2 Systems and process- Logical positivism - Process and form in physical geography
- 2.3 Environment and regional geography -
- 2.4 Behaviorialism in geography - Approaches to systematic human geography.

3. Philosophy and Methodology (Contact Hours 15)

- 3.1 Significance of philosophy and its placement- Methodology and explanation systematic studies
- 3.2 Theory building in geography- Explanation, relevance and social origins of concern
- 3.3 Geography as historical- hermeneutic science - Phenomenology and geography
coexistence of naturalism and historicity - dialectics and geography
- 3.4 Spatiality and Time - Dialectic of space and time geography Time-space and area
Social construction of space and time - Towards a humanistic geography.

4. Geography and the production of knowledge (Contact Hours 15)

- 4.1 Radical geography and a structuralist alternative
- 4.2 Reality and realism in geography - Ideology and ethics
- 4.4 Post-structuralism and relational Space contributions by Lefebvre, Castells, Harvey
- 4.4 Geography as a critical science - Towards a critical geography.

References:

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Paper: 402 B 26- Development of Modern Geography

No. of Credits: 6 Teaching Hours 60 + Notional Hours 60= Total hours 120

1. Development in Modern Geographical Thought (Contact Hours 15)

- 1.1. Philosophy of geography Evolution of early modern geography environmentalism, possibilism, neo-possibilism - Growth of geography as a spatial science quantitative revolution critical appraisal
- 1.2 Positivism in geography - Explanation and search for scientific routes - Existentialism phenomenology and humanistic geography
- 1.3 Welfare approaches in geography - Radical geography inductive, deductive and critical approaches
- 1.4 Marxism and Marxist geography -Political economic perspective in geography quantitative versus qualitative newer resources in research - ethnography and social research

2. New perspectives on Environment, Region and Geopolitics (Contact Hours 15)

- 2.1 Reality, process and the dialectical relation between man and environment contemporary models of environment and resources Resource management and natural hazards -Modern environmentalist concepts and challenges.
- 2.2 Reconstructing regional geography - New models of regional change - Economic, social and cultural dimensions Regional versus spatial controversy - New Regionalism
- 2.3 Regions and political life - Civil society, political systems and territorialisation of Power theoretical explanation international relations and regional cooperation - recent theories and praxis liberal and neoliberal dimensions
- 2.4 New models of geopolitical change - Post-cold war democracy and human rights UNCHR and politics of human rights in the era of globalisation - conventions, treaties and agreements

3. Gender Geography (Contact Hours 15)

- 3.1 Feminist geography and the concept of gender
- 3.2 Place, space identity and gender Production of gendered spaces and differentiation
- 3.3 Gender theories- Radical, Marxist, Poststructural- Cultural turn and Feminist politics.
- 3.4 Gender, nation and international relations- Globalisation and geographies of gender

4. Post-colonial and Postmodern Geography (Contact Hours 15)

- 4.1 Geography in the era of globalisation Globalisation, nationalisation or anti-globalisation trends theorising BREXIT
- 4.2 Crisis of modernity poststructuralism postmodernism and postmodern geographies
- 4.3 Deconstruction - creative destruction towards newer theoretical consolidations
- 4.4 Contemporary pedagogies and research frontiers in Geography

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Semester IV

Paper: 403 Group 3 Practical Based Dissertation Credit 10

(Data -based study on any branch of Geography)

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
2017-2018)

Examination pattern for Semester IV

Semester IV:

- a) **Theory Paper:** 100 marks for each paper (Total theory papers 2)
 - i) **Internal examination:** Total marks 40 (in each theory paper)
 - ii) **External examination:** Total marks 60 (in each theory paper) Duration: 2 ¹/₂ Hours
 - 1) Total number of questions to be framed for theory paper in external examination is 6 of 15 marks each.
 - 2) Out of total 6 questions, students are required to attempt **any four** questions.
- b) **Dissertation:** 100 marks
 - 1) Out of total 100 marks 20 marks for internal assessment and 80 marks by external examiner i.e. 60 marks for assessment and 20 marks for viva voce examination on dissertation.
- c) **Marking system:**
 - 1) Total marks for theory: 200 (6 Credits *2 theory papers =12 credits)
 - 2) Total marks for practical: 100 (10 credits* 1 dissertation = 10 credits)
 - 3) **Grand Total for Semester IV= 300 marks : 22 credits**