P. G. Department of Geography

Syllabus – 2020

M. A./ M. Sc. in Geography

(Admission Session: 2020-21)

Fakir Mohan University
Nuapadhi, Balasore – 756 089, Odisha

Syllabus of M. A./ M. Sc. in Geography (2020 -2022 batch)

COURSE STRUCTURE

Paper Code	Title	Paper Type	Credit Hours	Marks [Internal + End Term]
FIRST SEMESTER				
GG-101	Geomorphology	THEORY	4	100 [20+80]
GG-102	Bio Geography and Environmental Geography	THEORY	4	100 [20+80]
GG-103	Economic geography	THEORY	4	100 [20+80]
GG-104	Human Geography: Basic Concepts and Theories	THEORY	4	100 [20+80]
GG-105	Regional Geography of India	THEORY	4	100 [20+80]
GG-106	Quantitative Geography (Practical)	PRACTICAL	4	100
SECOND SEMESTER				
GG-201	Climatology, Oceanography, Hydrology	THEORY	4	100 [20+80]
GG-202	Modern Geographical Thought	THEORY	4	100 [20+80]
GG-203	Basics of RS and GIS	THEORY	4	100 [20+80]
GG-204	Social and Cultural Geography	THEORY	4	100 [20+80]
GG-205	Advanced Cartography (Practical)	PRACTICAL	8	100
THIRD SEMESTER				
GG-300	Fakir Mohan Studies	THEORY	0	Grade Only
GG-301	Population and Settlement Geography	THEORY	4	100 [20+80]
GG-302	Research Methodology: Theory and practice	THEORY	4	100 [20+80]
GG-303	Politics, Regions and Planning in Geography	THEORY	4	100 [20+80]
GG-304 (CBCS)	Environmental Geography: Towards Sustainability	THEORY	4	100 [20+80]
GG-305	Survey (Practical)	PRACTICAL	8	100
FOURTH SEMESTER				
GG-401 (A/ B/ C)	Special Paper I	THEORY	4	100 [20+80]
GG-402 (A/ B/ C)	Special Paper II	THEORY	4	100 [20+80]
GG-403 (A/ B/ C)	Special Paper II	THEORY	4	100 [20+80]
GG-404	Computer Applications in Geography (Practical)	PRACTICAL	4	100
GG-405	Dissertation (Project)	PROJECT	8	100
Total			**96**	**2100**

SPECIALIZATION OFFERED

Specialization/ Special Paper	(A) Urban and Regional Planning	(B) Remote Sensing and GIS	(C) Population Geography
GG-401 (A/ B/ C)	Urban Development and Planning	Advanced Cartography	Population Studies, Society and Demographic Data
GG-402 (A/ B/ C)	Development of Urban Community and Planning	Remote Sensing and Applications	Fertility, Mortality and Population Policies
GG-403 (A/ B/ C)	Regional Development and Planning	GIS and Applications	Migration, Urbanization and Development

MARKING PATTERN

PAPER TYPE	THEORY	PRACTICAL	DISSERTATION
Internal Marks (Exam Pattern)	20 (Written, Presentation & Home Assignment)	00	00
End Term Marks (Exam Pattern)	80 (Written)	100 (Experiment, Record, Presentation, Viva-Voce)	100 (Report, Presentation and Viva-Voce)
Total Marks/ Paper	**100**	**100**	**100**

VALUE-ADDED/ ADD-ON COURSES

A student of M. A./ M. Sc. in Geography shall undertake one or more value-added courses of 2 – 4 credits each offered by the University and an online course of up to 4 credits under the MOOC platform, preferably during the 2^{nd}/ 3^{rd} semester, the performance of which may be reflected in the final grade sheet issued by the University or in a separate report card issued for the purpose by the competent authority. Fees towards enrollment and examination of such courses has to be borne by the concerned candidate.

SELF SYUDY

25% of each unit of a theory paper is earmarked for self-study by students as per UGC directives. For completion of the portion in a particular semester, the course teacher is required to take one/ two introductory classes in the beginning, one/ two summarizing classes at the end and few doubt clearing classes in between, if required. Students are required to make presentation on selected topics from the self-study section, which will be used as a part of the internal evaluation of the candidate. The portion earmarked for self-study has been underlined in the syllabus.

FIRST SEMESTER

GG-101: Geomorphology

Learning Objectives: *The objective of the course is to familiarize the students with the need for understanding of geomorphology with reference to certain fundamental concepts, focusing on the unity of geomorphology in the earth materials and the processes with or without an element of time.*

Pre-Requisites: *Knowledge of Physical geography, various geographic landforms*

Teaching Scheme: *Regular classroom lectures with use of ICT tools*

Course Outcome: *At the end of the course, the student is expected to*

i. *Explain basic principles for development of landforms through time on the earth's surface.*
ii. *Make an initial of geomorphological fieldwork.*
iii. *Learn the techniques of geomorphological analysis*

Unit I: Geomorphology: Concepts and Theories [12 Hours]
Meaning & Definition of Geomorphology; Fundamental principles of Geomorphology by Thornbury; Doctrine of Isostasy- concept of Airy and Pratt & Heiskenen; Mountain building Theories: Concepts of Kober, Holmes and Daly; Cycle of Erosion: Davis and Penk Models.

Unit II: Earth's interior and Earth movement [12 Hours]
Evolution of earth and earth's internal structure, composition and characteristics; Continental Drift Theory by Wegner, Sea floor spreading and Plate tectonic; Earthquake and Volcanism: Seismology & Plutonism.

Unit III: Geomorphic Process and landforms [12 Hours]
Slope Development: Elements, Classification, Approaches and Models of Slope evolution (L. C. King and Wood); Concept and process of gradation: Weathering, Mass Wasting, Erosion; Geomorphic Landforms: Fluvial, Glacial, Aeolian, Marine and Karst.

Unit IV: Applied geomorphology [12 Hours]
Concept and scope of Applied Geomorphology; Anthropogenic Geomorphology - Humans as Geomorphic Agents; Applied Geomorphology in Planning and Development; Geomorphology in Hazard Management (Flood, Landslide and Subsidence); Quantitative Geomorphology; Applications of Remote Sensing and GIS techniques in Geomorphology

Suggested Readings:

Bloom, A.L. (2003): Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice Hall, Upper Saddle River, New Jersey

Chorley, R.J. and Kennedy, B.A. (1971): Physical Geography: A Systems Approach, Prentice Hall, Upper Saddle River, New Jersey.

Dayal P. (1995) A Text Book of Geomorphology 2nd Edition., Sukla Book/Dept. Patna.

Huggett, R (2006): Fundamentals of Geomorphology, Routledge, London.

Kale, V.S. and Gupta, A. (2001). Introduction to Geomorphology, Orient Longman Ltd., Hyderabad:

Knighton, D. (1998): Fluvial Forms and Processes: A New Perspective, Arnold, London: 385p.

Sharma, V.K. : Process in Geomorphology (Mc Graw Hill).

Singh, Savindra (2011): Geomorphology, Prayag Pustak Pblications, Allahabad.

Strahler A. H and Strahler, A. N. (1992) : Modern Physical Geography, John Wiley, New York

Thornbury, W.D. (1969): Principles of Geomorphology, Wiley Eastern Limited, New Delhi.

GG-102: Biogeography and Environmental Geography

***Objectives**: The basic objective of the course is to familiarize the students about distribution of species, factors and basic principles, and to make them understand the concept of environment from different perspectives, besides sensitizing the learners about major environmental problems.*

***Pre-requisites**: Basics awareness of biota and knowledge of environment and its components*

***Teaching scheme:** Regular interactive face-to-face classroom teaching with use of ICT tools as per requirement supported by group projects and presentation by students. Besides the class room teachings, the course expects the students must reads the provided materials and participate in guided-class room reflections regularly.*

***Course Outcomes:** in the successful completion of the course, student will be able to*

i. *Critically evaluate the patterns of life forms and its corelates*
ii. *Understand the environment from different perspectives and various ecological processes.*
iii. *Recognize the values of biodiversity and other natural resources.*
iv. *Comprehend major environmental problems and relevant management strategies.*
v. *Get an idea about natural hazards and disasters and their management.*

Unit I: Basics of Biogeography [12 Hours]

Development of Biogeography: Special reference to Alexander von Humboldt; Species Area relationship; Ecological Niche; Ecology vs. History; Alpha and Beta diversity; Dispersal and Vicariance; Patterns, process, and geographic modes of Speciation; Biomes and Hotspots.

Unit II: Biogeographic Patterns and Dynamics [12 Hours]

Bio-geographical regions of the world; Insular Biotas: Island Biogeography; Ecosystem fragmentation; Invasive Species and Climate Change; Domestication and agricultural origins, Biogeography of human infectious disease; Anthropocene and dynamics.

Unit III: Understanding the Ecosystem and Environment [14 Hours]

Concept and Scope of Environmental Geography; Ecosystem: Definition, Types, Structure and Components; Concepts of Food Chain, Food Web, Ecological Pyramid, Energy Flow and Biogeochemical Cycles - Carbon, Nitrogen and Oxygen cycles; Biodiversity: Definition, Level, Values and Conservation; Natural Resources: Concept and Types; Human Environment and its behavioural classification – Geographical, Operational, Perceptual and Behavioural.

Unit IV: Environmental Degradation [14 Hours]

Concept and Types of Environmental Pollution and Pollutants; Status of Environmental Pollution in India with focus on Air Pollution and its effect on Health in Delhi NCR; Major Environmental Problems - Climate Change, Global Warming, Ozone Depletion, Acid Rain and Desertification; Environmental Movements in India – *Chipko, Appiko and Narmada Bachao Andolan*; Concepts of Environmental Hazards, Disasters and Disaster Management.

Suggested Readings:

Ackerly, D.D., Loarie, S.R., Cornwell, W.K., Weiss, S.B., Hamilton, H., Branciforte, R. and Kraft, N.J.B., 2010. The geography of climate change: implications for conservation biogeography. *Diversity and Distributions*, 16 (3): 476-487.

Castree, N., Demeritt, D., Liverman, D., & Rhoads, B. (Eds.). (2013). *A Companion to Environmental Geography*. Wiley-Blackwell.

English, P. W., & Mayfield, R. C. (Eds.). (1972). *Man, Space and Environment: Concepts in Contemporary Human Geography*. Oxford Univ Press.
Fitzpatrick, B.M., Fordyce, J.A. and Gavrilets, S., (2009). Pattern, process and geographic modes of speciation. Journal of evolutionary biology, 22(11), pp.2342-2347.
Goel, P. K., & Kumar, A. (2001). *Industry Environment and Pollution*. ABD Publishers, Jaipur.
Goudie, A. (2018). *The Human Impact on the Natural Environment – Past, Present and Future*. Wiley-Blackwell.
Jorge V. Crisci et al. (2009). Darwin, historical biogeography, and the importance of overcoming binary opposites. *Journal of Biogeography* 36: 1027-1032.
Lomolino, M.V. et al. (2004). Foundations of Biogeography.
Mark V. Lomolino. (2001). Ecology's most general, yet protean pattern: the species-area relationship. Journal of Biogeography 27: 17-26.
Mittermeier, R. A., Will R. Turner, Frank W. Larsen, Thomas M. Brooks, and Claude Gascon. (2011). Global biodiversity conservation: the critical role of hotspots. Biodiversity Hotspots: 3-22.
Moseley, W. G., Perramond, P., Hapke, H. M., & Laris, P. (2014). *An Introduction to Human-Environment Geography: Local Dynamics and Global Processes*. Wiley-Blackwell.
Rana, S. V. S. (2013). *Essentials of Ecology and Environmental Science* (5th ed.). PHI Learning.
Richardson, D.M. and Whittaker, R.J., 2010. Conservation biogeography–foundations, concepts and challenges. *Diversity and Distributions*, 16 (3): 313-320.
Rizwan, S. A., Nongkynrih, B., & Gupta, S. K. (2013). Air pollution in Delhi: Its Magnitude and Effects on Health. *Indian Journal of Community Medicine*, 38(1): 4–8.
Saxena, H. M. (2017). *Environmental Geography* (3rd ed.). Rawat Publications.
Singh, S. (2010). *Environmental Geography*. Prayag Pustak Bhawan, Allahbad.

GG-103: Economic Geography

***Objectives**: To provide an overview of spatial and structural dimension of economic activities*

***Pre-requisites**: Basic knowledge on economic activities*

***Teaching Scheme:** Class room teaching, guided-reflections and students-led discussions of books and research papers. The department may arrange field local visits to familiarize dimensions of economic systems and activities.*

***Course Outcomes:** In the successful completion of the course, student will get insights into major economic systems, global changes and consequences.*

Unit I: Introduction [12 Hours]

Nature and scope of Economic geography; Approaches to Economic Geography: Commercial and Regional, Spatial Analysis, Marxist Political Economy, Cultural and Institutional Perspective; Factors affecting spatial organization of economic activities (Primary, Secondary, Tertiary, Quaternary, Quinary).

Unit II: Agricultural Systems [12 Hours]

Agricultural Systems of the World; Cropping Patterns, Crop Association, Crop Diversification; Von Thunen's models of Agricultural Land Use; Regional variation in Agricultural Productivity: Determinants and Measures; Factors influencing Agricultural Patterns: Physical and Non-physical.

Unit III: Industrial Systems [12 Hours]

Theories of Industrial locations: Weber, Losch, Pred and Smith; Impacts of Globalization on Manufacturing Sectors in Less Developed Countries; Measure and Indices of Connectivity and Accessibility.

Unit IV: Changes and Consequences **[12 Hours]**

Perspectives on Globalization and Liberalization: Impacts of MNCs on Host Regions; Sustainable Agricultural Development in Less Developed Worlds: Economy vs Ecology; Processes of De-industrialization in Developed Economies and Rise of Service Sectors.

Suggested Readings:

Alexander J.W. (1974) Economic Geography, Printice Hall, New Jersey.

D. Kaur. (2016). Cropping pattern and agricultural productivity. In Economic Geography, Vol. 1, eds H.S. Sharam and M.H. Qureshi. New Delhi: Oxford University Press.

Danny Mackinnon and Andrew Cumbers. 2015. Introduction to Economic Geography. Routledge.

H.M. Saxena, (2013). Economic geography. Rawat, Jaipur.

J. Singh and S.S. Dhillon. (1994). Agricultural geography. New Delhi: Tata McGraw-Hill Publishing Company Limited.

James M. Rubenstein. (2010). Contemporary Human geography. PHI Learning Private Limited, New Delhi.

Knowles, R and J. Wareing. (1976). Economic and social geography. Rupa Publications India Pvt Ltd, New Delhi.

Neil M. Coe, P.F. Kelley, W.C. Henry and Yeung. (2019). Economic Geography- A Contemporary Introduction Wiley-Blackwell, UK.

GG-104 Human Geography: Basic Concepts and Theories

Objectives*: To expose the foundations, basic approaches and theories of human geography*

Pre-requisites*: Awareness of human geography*

Teaching Scheme: *Class room lectures, guided readings and assignments*

Course Outcomes: *In the successful completion of the course, student will able to critically articulate the concepts, approaches and its applications.*

Unit I: Introducing Human geography **[12 Hours]**

Emergence and Growth of Human Geography as a Branch of Knowledge; Contemporary Relevance of Human Geography in the Realm of Social Sciences; Current Approaches in Human Geography.

Unit II: Thinking Geographically **[12 Hours]**

Space: Distribution of Features; Properties of Distribution: Density, Concentration and Patterns; Time; Scale: Local to Global; Distance: Absolute and Relative; Places: Unique Locations; Regions: Unique Areas.

Unit III: Theory, Models and Explanations in Human Geography **[14 Hours]**

Need of Scientific Methods in Human Geography: Attempts to Become Science; Development of Theory in Human Geography: (i) Use of Ideographic and Nomothetic Approaches, and (ii) Use of Inductive and Deductive Approach; Application of Normative and Behavioral Theory; Models in Human Geography: Iconic, Analog and Symbolic Models; Classifying Models: Deterministic and Probabilistic Models.

Unit IV: Geographic Diversity, Conflicts and Development **[12 Hours]**

Diffusion of Religions; Preserving Endangered Languages; Race Differs from Ethnicity; Ethnic Cleaning; Measures of Human Development; Realms and Regions of Human Development: Developed and Less Developed World.

Suggested Readings:

Chorley, R. J. and P. Haggett. (1967). Socio-Economic Models in Geography. London: Methuen & Co Ltd.

James M. Rubenstein. (2010). Contemporary Human geography. PHI Learning Private Limited, New Delhi.

Knowles, R and J. Wareing. (1976). Economic and social geography. Rupa Pub. India Pvt Ltd.

Goh Cheng Leong and G.C. Morgan. (1982). Human and Economic geography. Oxford university press, Oxford Ox2 6DP.

Husain, M. (2004). Human geography. Jaipur, Rawat Publication.

Steven Graves. (2017). Introduction to Human Geography: A Disciplinary Approach. Department of Geography. 2nd Edition. California State University, Northridge.

David Dorrell and Joseph P. Henderson. (2018). Introduction to Human Geography. University of System of Georgia. University of North Georgia, University Press, Blue Ridge.

Stuart C. Aitken. And Gill Valentine. (2014). Approaches to Human Geography: Philosophies, Theories, People and Practices. Sage Publishing.

GG-105: Regional Geography of India

***Objectives**: To introduce India as a geographical entity- its physical diversity, people, resources and contemporary issues.*

***Pre-requisites**: Basic understandings of 'unity in diversity' with special reference to India*

***Teaching Scheme:** Classroom lectures, seminar presentations and participation in group discussions.*

***Course Outcome:** In the successful completion of the course, student will able to comprehend regional personalities of India and dynamics shaping its regions.*

Unit I: Physical Basis [12 Hours]

Geological Basis of India: Distribution Major Rock Systems; Physiographic Divisions of India: Geomorphic Characteristics; Himalayan And Peninsular Drainage Systems: Evolution and Orientation; Factors Influencing Indian Climate; Mechanism of Indian Monsoon; Climatic Regions of India: Stamp's and Trewartha's Climatic Regions; Major Soil Types and Natural Vegetations.

Unit II: Peopling [12 Hours]

Trans-Continental Migration and Routes of Early Incursion into India; Geographical Features/Factors Behind India's History and Culture; Size of India's Population; Growth, Distribution and Density: A Regional Approach; Population Composition: Racial/ Ethnic, Age, Sex, Linguistic.

Unit III: Resources and Economy [12 Hours]

Ground Water Provinces (R. L. Singh); Regional Distribution of Irrigation Types: Tank, Wells & Tube Wells Canals; Distribution of Major Livestock; Fisheries: Fresh and Marine; Ferrous and Non-Ferrous Mineral Belts; Agricultural Regions of India; Salient Features of Foreign Trade of India.

Unit IV: Contemporary Issues [12 Hours]

Land Degradation and Desertification; Urban Flooding; Agrarian Relations in India; Status of Food Security; The Challenge of Evergreen Revolution; Community Conserved Areas for Preservation of Forest and Wildlife; Common Property Resources.

Suggested Readings:

Sharma, H.S. (2016). Land Resources. In Economic Geography, Vol. 1, eds H.S. Sharam and M.H. Qureshi. Oxford University Press.
Khullar D.R. (2011). India a comprehensive geography. Kalyan Publication.
Spate, O.H.K. and A.T. Learnmonth. (1968). India- A General and Regional Geography. Methuen.
R.L. Singh. (2016). India: A regional geography. National Geographical Society of India, Varanasi.
Butola, B.S. (Eds.) (2016). Agrarian Relations in India. In Economic Geography, Vol. 1. H.S. Sharama and M.H. Qureshi. Oxford University Press.
Deshpande, C.D. (1992). India- A Regional Interpretation. ICSSR and Northern Book Centre.

GG-106: Quantitative Geography (Practical)

Objectives: *This course is designed to make the student learn different statistical techniques, their computation, interpretation and use in geographical studies.*

Pre-requisite: *Basic knowledge of data and fundamental mathematical operations*

Teaching Scheme: *Classroom teaching involving explanation of the basic theoretical aspects, followed by practical exercises separately designed for each statistical method/ concept. The laboratory classes will be based on both manual and computer-based calculations and informal data collection, if required.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Have learnt important statistical skills and their applicability in Geography.*
ii. *Be able to make a choice of appropriate statistical method for a particular analysis.*
iii. *Carry out various statistical processes and interpret the results.*

(A) Experiments

1. Graphical representation of Frequency Distribution: Histogram, Bar-diagram, Frequency Polygon, Ogive and Pie-chart
2. Measures of Central Tendency and its characteristics: Arithmetic Mean, Geometric Mean, Harmonic Mean, Median and Mode
3. Measures of Dispersion: Range, Quartile Deviation and Standard Deviation
4. Measures of Skewness and Kurtosis
5. Measures of Location: Quartile, Decile and Percentile.
6. Moving Average
7. Arithmetic and Exponential Growth Rates
8. Correlation Analysis - Pearson and Spearman Coefficients
9. Linear Regression Analysis
10. Non-Parametric Test (Chi-square Test and Man-Whitney U Test)

(B) Practical Record, Seminar and Viva-Voce (20%)

Suggested References:

Cole, J. P., & King, C. A. M. (1968). *Quantitative Geography*. John Wiley

Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2000). *Quantitative Geography: Perspectives on Spatial Data Analysis*. Sage.

Gupta, S. P. (2018). *Statistical Methods*. Sultan Chand & Sons

Khan, M. Z. A. (1998). *Text Book of Practical Geography*. Concept Publishing Company, New Delhi

Mahmood, A. (1999). *Statistical Methods in Geographical Studies*. Rajesh

Matthews, J. A. (1981). *Quantitative and Statistical Approaches to Geography - A Practical Manual*. Pergamon

Pillai, R. S. N., & Bhagavathi (2019): Statistics: Theory and Practice, Sultan Chand & Sons

Saha**,** P., & Basu, P. (2013). *Advanced Practical Geography*. Books & Allied Ltd

Sarkar, A. (2000). *Practical Geography: A Systematic Approach*. Orient Black Swan

Singh, R. L., & Singh, R. P. B. (2014). *Elements of Practical Geography*. Kalyani Publishers

SECOND SEMESTER

GG-201: Climatology, Oceanography & Hydrology

Learning Objectives: *The objectives of the course are to introduce students to the many facets of weather and Climate and its application in different fields of study. Also, this paper aims at making students understanding Hydrology and Oceanography.*

Pre-Requisites: *Knowledge of weather and climate, hydrology & Oceanography*

Teaching Scheme: *Weather and climatic charts be made available to the students to explain weather conditions. Detailed charts and maps showing oceanic relief, currents and circulation of oceanic water be used for teaching along with Audio Visual aids.*

Subject Outcome: *At the end of the course, the student is expected to*

i. *Understand the dynamics of climate and related theories.*
ii. *Understand the relation between climatology and other disciplines*
iii. *Describe how components of the water cycle are influenced by human activities.*
iv. *Extract information about the bottom relief of oceans at regional level (Bay of Bengal) and understand the marine resources and their economic significance.*

Unit I: Climatology: Concepts of Weather and Climate [12 Hours]
Nature & Scope of Climatology and its Relationship with Meteorology; Fundamental Principles of Climatology; Insolation: Meaning and Definition, Mechanism of Solar Radiation, Distribution of Insolation; Heat Budget of Earth and Atmosphere; Air Pressure and Atmospheric Circulation: Pressure Belts and Wind Circulation

Unit II: Applied Climatology [12 Hours]
Approaches and Techniques of Weather Forecasting: Short, Medium and Long Range; Climate and Agriculture: Agroclimatology – Water Budget and Crop Calendar; Climate and Settlements: Urban Climatology – Urban Heat Island; Climate and Health: Bioclimatology – Human Comfort and Health Aspects.

Unit III: Hydrology [12 Hours]
Rock Properties Effecting Ground Water: Porosity and Permeability; Vertical Distribution of Ground Water; Zone of Aeration and Zone of Saturation; Geologic Formation as Aquifers; Types of Aquifers; Springs; Ground Water Table Fluctuations and Its Causative Factors, Environmental Impacts.

Unit IV: Oceanography [12 Hours]
Definition and Meaning of Oceanography; Foundation of Modern Oceanography; Contribution of Oceanographers in the Subject; Post-War Oceanography, Modern Trends; Bottom Topography of Bay of Bengal: Characteristics and Evolution; Waves and Tides: Genetic Classification and Models of Formation; Marine Resource: Types, Extraction Methods and Economic Significance; Marine and Coastal Area Management Policies - EEZ, CRZ, ICZM

Suggested Readings:

Ackerman, S.A. and Knox, J.A. (2012): Meteorology: Understanding the Atmosphere, Jones & Bartlett Learning, London

Atkinson, B. W. (Ed.) (1981): Dynamical Meteorology: An Introductory Selection, Methuen, London

Barry, R.G. and Chorley, R.J. (2003): Atmosphere, Weather and Climate, Routledge, London

Byers, H. R. (1974): General Meteorology, McGraw-Hill Book Company, New York

Chandrasekar, A. (2010): Basics of Atmospheric Science, PHI Learning Pvt. Ltd., New Delhi

Critchfield, H. J. (2004) General Climatology; PrenticeHall of India Private Ltd., New Delhi, 4 th Edition

Gupta L S(2000): Jalvayu Vigyan, Hindi Madhyam Karyanvay Nidishalya, Delhi Vishwa Vidhyalaya, Delhi

Houghton, J. (2002): Physics of Atmosphere, Cambridge University Press, Cambridge

Mcllveen, R. (2010): Fundamentals of Weather and Climate, Oxford University Press, Oxford

Rayner, J.N. (2001): Dynamic Climatology - Basis in Mathematics and Physics, Blackwell Publishers Ltd., Oxford

Rohli, R.V. and Vega, A. J. (2012): Climatology, Jones & Bartlett Learning, London Thompson, R. D. (1998): Atmospheric Pressures and Systems, Routledge, London

Singh, S (2009): Climatology, Prayag Pustak Bhawan, Allahabad

Trewartha G. T. and Horne L. H., 1980: An Introduction to Climate, McGraw-Hill.

Brooks, K.N., Ffolliott, P.F., Gregersen, H.M and DeBano, F.B. (2003). Hydrology and the Management of Watersheds, 3rd edition, WileyBlackwell, Chichester.

Brutsaert, W. (2005): Hydrology: An Introduction, Cambridge University Press, Cambridge.

Carter, R.W.G. (1988): Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines, Academic Press, London.

Chow, V.T. (1988): Applied Hydrology, McGrawHill Education, New York.

Dingman, S.L. (2002): Physical Hydrology, 2nd edition, Prentice Hall, Englewood Cliffs Garrison, T.S. (2015). Oceanography: an invitation to marine science. Massachusetts: Cengage Learning.

Pethick, J.S. (1984). An introduction to coastal geomorphology. London: Department of Geography, University of Hull.

Sharma, R.C., and Vatal, M. (1962). Oceanography for geographers. Allahabad: Chaitanya Publishing.

Talley, L.D. (2011). Descriptive physical oceanography: an introduction. Massachusetts: Academic Press.

GG-202: Modern Geographical Thought

Objectives: *To expose the students with perspectives, philosophy and recent debates modern and contemporary geography*

Pre-requisites: *Understanding on the contributions of pre-modern geographers*

Teaching Scheme: *Power-point presentation and discussion-oriented teachings*

Course Outcomes:

i. *Will motivate students to think geography critically*
ii. *Spatial knowledge co-creation*
iii. *Students will be able to depict the applications of modern geographical approaches*

Unit I: Geography, A Science [12 Hours]

Geography's Genealogies: rereading pre-modern geography; Pioneering Scientific Geographers: Humboldt, Ritter, Ratzel, EC Semple, Huntington; The Schaefer-Hartshorne Debate: from regional exceptionalism to generalization and theory; Geography's Narratives and Intellectual History: on writings, mappings, fieldwork.

Unit II: Geography in the 20th Century **[12 Hours]**

Anarchist Thought in Geography- Kropotkin and Reclus; Development of Cultural School (Sauer) and regional school (Hartshorne), Geography as Areal Differentiation; Growth of Dualisms- regional vs. systematic, physical vs. human; Impact of Positivism, Quantitative Revolution and Logical Positivism.

Unit III: A few Relevant Themes **[12 Hours]**

Spatial Sciences: growth, achievement, critics; Idiographic or Nomothetic Science; Subjectivity or Objectivity: Concept and application; Realism; Social Construction: conceptual understandings; Reflexivity: concept.

Unit IV: Critical Geography **[12 Hours]**

Phenomenology, Humanistic Geography, Radicalism; Neo-determinism; Behaviouralism; Neo-environmentalism; Structuralism; Post-structuralism; Modernism; Post-modernism; The Gender Question.

Suggested readings:

Agnew, John A. and Livingstone, David N. (2011). The Sage handbook of Geographical Knowledge. Sage.

Board, C et.al. (1970). Progress in Geography. Vol. 1-8. Edward Arnold.

Bunge, W. (1962). Theoretical Geography. The Royal University of Lund.

Chorley, R. J. and Haggett, P. (1967). Models in Geography. Methun.

Cresswell, Tim. (2012) Geographic Thought: A Critical Introduction. Wiley Blackwell.

Dikshit, R. D. (1994): The Art and Science of Geography. Prentice Hall India.

Dikshit, R. D. (2003). Geographical Thought -A Contextual History of Ideas. Prentice Hall India.

Freedman, Jane. (2001). Feminism. Rawat.

Giddens, A. (1979). Central Problem in Social Theory: Action, Structure and Contradiction in Social Analysis. McMillan.

Gould, J. R. (1980). An Introduction to Behavioural Geography. Oxford.

Hartshrone, R. (1939). The Nature of Geography. AAG Lancaster.

Hartshrone, R. (1959). Perspectives on the Nature of Geography. Rand McNally.

Harvey, D. (1969). Explanations in Geography. Edward Arnold.

Harvey, D. (1989). The Condition of Post Modernity. Blackwell.

Holt-Jensen, A. (2001). Geography: History and Concept. Paul Chapman.

James, P. E. (1972). All Possible Worlds: A History of Geographical Ideas.

Johnston, R. J. (1988). The Future of Geography. Edward Arnold.

Kuhn, T. S. (1962). The Structure of Scientific Revolution.

Lefebvre, H. (1991): The Production of Space. Blackwell. (French Edition, 1974)

Peet, R. (1998). Modern Geographical Thought. Rawat.

Peet, R. and Thrift, N. (Eds.). (2002). New Models in Geography. Vol.2. Unwin Hyman.

Sauer, C. O. (1963). Land and Life. University of California.

GG-203: Remote Sensing and Geographical Information System

Learning Objectives: *The objectives of the course include making an understanding of remote sensing, GIS and GPS technologies and their potential applications, developing basic skills to interpret remote sensing images for various applications in geography and basic skills to use GIS for various applications in geography.*

Pre-requisites: *Knowledge of cartography, satellite, arial photography & GPS*

Teaching Scheme: *Classroom teaching with use of ICT tools, especially GIS and RS software*

Course Outcomes: *At the end of the course, the student is expected to have a basic understanding of remote sensing, aerial photographs, GIS analysis and image processing.*

Unit-I: Remote Sensing & Arial Photography [12 Hours]

Remote Sensing: Meaning and Definitions; Historical Development, Advantages and Limitations of Remote Sensing; Energy Sources, Radiation Principles, EM Radiation and EM Spectrum; Electromagnetic Energy: Interaction Mechanism with Atmosphere and Earth Surfaces, Spectral Signatures of Earth Surface Features; Arial Photographs: Concepts, Elements and Characteristics.

Unit-II: Image Processing [12 Hours]

Concepts of Satellite, Sensors and Platforms; Concept of Resolution: Spatial, Spectral and Radiometric; Elements of Image Processing-Visual and Digital Image Analyses; Image Classification: Supervised and Unsupervised Classification; Concept and Principles of Active and Passive Remote Sensing, Thermal and Microwave Remote Sensing.

Unit-III: Basics of GIS [12 Hours]

Geographical Information System (GIS): Meaning, Definitions and Scope of GIS; Concepts of Projection, Datum and Spheroid, Mean Sea Level, Orthometric Height, Geoid Models; GIS and Remote Sensing Integration; Components of GIS: Hardware, Software, Data, People and Methods; Emerging Trends in GIS; Geographic Objects: Point, Line and Polygon; Nature of Geographic Data: Spatial and Attribute Data; Concept of Vector and Raster Based Models; Georeferencing.

Unit-IV: Introduction to GPS and Applications [12 Hours]

Global Positioning System: Meaning, History of GPS, GNSS Systems around the World; GPS Satellites Constellations, Segments of GPS, Applications of GPS; Spatial Interpolation and Surface Models; TIN, DEM; Concept of DBMS and Web GIS.

Suggested Readings:

Albretcht, J. (2007): Key Concepts & Techniques in GIS, SAGE Publications Ltd., London

Bhatta, B. (2011): Remote Sensing and GIS, 2ND edn. Oxford

Campbell, J.B. et. Al. (2011): Introduction to Remote Sensing. 5th edn. Guilford Press.

Fazal, S. (2008): GIS Basics, New Age International (P) Limited, Publishers, New Delhi

Lillesand, Thomas M. et. al. (2017) Remote Sensing and Image Interpretation. Wiley India, New Delhi.

Lo,C. P.and Yeung A. W.: Concepts and Techniques of Geographical Information Systems, Harvey, F. (2008): A Primer of GIS: Fundamental Geographic and Cartographic Concepts, The Guilford Press, New York

Haywood, Ian, Cornelius, Sarah & Carver, Steve (any edition), 'An Introduction to Geographical Information Systems', Prentice Hall, Pearson Education, U.K

Joseph, G and jeganathan, C. (2018): Fundamentals of Remote Sensing 3rd Edn. Universities Press, India

Nath Sandhu. (2015): An Introduction to Remote Sensing, Koross Press, London.

Sabins, F.F. (2008): Remote Sensing: Principles and Interpretation, Waveland Press Inc., Illinoi

Sahu, K.C. (2007): Textbook of Remote Sensing and Geographical Information Systems, Atlantic Publishers, New Delhi

Shekhar, S. and Xiong, H. (eds.) (2008): Encyclopaedia of GIS, Springer, New York

Weng, Qihao(2010): – Remote Sensing and GIS Integration: Theories, Methods and Applications,McGraw Hill.

GG-204: Social and Cultural Geography

Objective: *To introduce the role of socio-cultural factors fostering spatial patterns that inherited in socio-cultural life and relations; with special reference to Indian context*

Prerequisite: *Basic exposures to human geography/any social sciences*

Teaching Scheme: *Regular classroom lectures with use of ICT tools as and when required.*
Course Outcomes*: The course will be sensitized students on social and cultural dimensions of life and the course will also orient students to carryout socially relevant research and endeavors in further studies and trajectories respectively.*

Unit I: Themes in Social Geography [12 Hours]
Nature and Development of Social Geography: The Anglo-American School; Social Geography in The Realms of Social Sciences; Social Space; Social Structure and Process; Social Segregation; Social Justice and Social Wellbeing.

Unit II: Towards the Social Geography of India [12 Hours]
Geographical Bases of Social Formations; Tribal Social Formation; Social Differentiation and Region Formation: Evidences from *Sadasa Mahajanapadas;* Social Diversity and Plurality in India: Geographical Interpretation; Social Transformations: Changes and Challenges in Contemporary India.

Unit III: Themes in Cultural Geography [12 Hours]
Definition and Elements of Culture; Cultural Traits, Cultural Taboos, Cultural Hearth; Diffusion of Culture: Geographical Aspects; Culture Areas; Cultural Landscape; Cultural Regions: Formal, Functional, And Vernacular; Cultural Interaction: Assimilation and Acculturation.

Unit IV: Geographic Patterns of Culture [12 Hours]
Classifying Language: Language Families, Language Branch and Language Group; Dialect: A Regional Variation of a Language; Multilingual States and Lingua Franca; Ethnicity; Religion: Ethnic Religions and Universalizing Religions; Origin and Diffusion of Folk Culture and Popular Culture; Environmental Impacts of Popular Culture.

Suggested Readings:

Ahmad, A. (1999). Social Geography, Rawat, Jaipur,
Eyles, John (1979). An Introduction to Social Geography, Oxford, OUP.
Harvey, David. (1978). Social Justice and the City, Edward, London.
Jackson P. and Smith S.J. (1986). Exploring Social Geography, George Allen and Unwin.
Jackson, R. H. & Loyd E. Hudman. (1990). Cultural Geography-People, Places and Environment West.
Joe Anderson. (2009). Understanding Cultural Geography, Places and Traces, Routledge, New York.
Johnston R.J. et al. (1981). Dictionary of Human Geography Blackwell, New York.
Jones, Emrys (ed). (1995). Readings in Social Geography, Oxford, London.
Jordan, and Rowntree, L: The Human Mosaic. (1979). A Thematic Introduction to Cultural Geography, Harper Collins Publishers, New York.
Patricia L Price, Tim Oakes (Eds). (2008). The Cultural Geography Reader, Routledge, New York.
Sopher, D.E. (1980). Exploration of India: Geographical Perspectives on Society and Culture, Longman, London.
Spencer J.E. and Thomas, William L. (1969). Cultural Geography, John Wiley & Sons, New York.
Srinivas, M.N. (1986). India: Social Structure, Hindustan, Delhi.
Subba Rao: Personality of India. (1958). Pre and Proto Historic Foundation of India and Pakistan, M.S. University Baroda, Vadodara.
Thapar, Romila. (1997). A History of India, Vol. 1, Penguin, Hammondsworth.
Wagner, P.L. and Mikesell, M.W. (eds) (1962). Readings in Cultural Geography, Chicago.

GG-205: Advanced Cartography (Practical)

Objective: *To impart training on the art and science of map making and inculcating interpretational skills and techniques*

Pre-requisite: *Basic awareness/information/interest on maps*

Teaching Scheme: *training on the use of different cartographic tools and equipment in the cartographic laboratory.*

Course Outcomes*: On completion of the course, students will able to:*

i. Understand the rationales of map projection, types and properties
ii. Acquire the skills to draw map projections, thematic maps and graphs, including applications
iii. Learn the cartographic techniques for graphical presentation of data
iv. Integrate analytical skills to interpret physical and social attributes from toposheets.

(A) Map projection

1. Bonne projection
2. Mercator projection
3. Gnomonic projection

(B) Thematic maps

1. Isopleth and Choropleth
2. Chorochromatic
3. Choroschematic
4. Flow map

(C) Graphs

1. Climograph
2. Hythergraph
3. Ergograph

(D) Interpretation of toposheets

1. Morphometric analysis of river basins
2. Analysis of social attributes

(E) Practical Record, Seminar and Viva-Voce (20%)

Suggested Readings

Mishra R.P. Ramesh. A (2000): Fundamentals of Cartography. Concept Publishing Company, New Delhi

Sarkar, A. (1997): Practical Geography: A Systematic Approach, Orient BlackSwan Ltd. Hyderabad.

Singh. R.L and Singh. R.P.B. (2010): Elements of Practical Geography. Kalyani Pub. New Delhi.

Robinson, A.H., et. Al. (2009): Elements of Cartography. 6th edn. John Wiley & Son, New York.

Saha, P. and Basu, P. (2013): Advanced Practical Geography. Book & allied Ltd. Kolkata.

Hammond, R. and McCullagh, P.S. (1987): Quantitative techniques in Geography: An Introduction, OPU Oxford

THIRD SEMESTER

CBCS PAPER AND FAKIR MOHAN STUDIES

In the third semester, each student has to opt for one paper offered by other regular P. G. Departments of the University, under the Choice Based Credit System (CBCS). Besides, a student has to take the compulsory non-credit course on *Fakir Mohan Studies* as a part of the programme.

GG-300: Fakir Mohan Studies (Non-Credit Course)

The syllabus of the paper has been framed by the P. G. Department of Language and Literature, which will be shared before commencement of the classes.

GG-301: Population and Settlement Geography

Objectives: *This course intends to imparts the basic understandings of the human settlements and orient the students towards population geography as a specialized field of geographical analysis and introduce the learners about the importance and basic components of population analysis and various techniques and methods used in it.*

Pre-requisite: *Basic knowledge of human settlements and its environments, society and fundamental statistics.*

Teaching Scheme: *Regular interactive face-to-face classroom teaching with use of ICT tools as per requirement and numerical exercise for better explanation of important techniques. Besides class room teachings, occasional field visits may be arranged by the department to familiarize the dimensions of human settlements.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Be able to critically evaluate the distribution, determinants and emerging patterns of human settlements*
ii. *Get an idea about development of Population Geography and its relevance.*
iii. *Know about the major sources of population data and current demographic scenario of the World and India.*
iv. *Understand the importance of studying population distribution, fertility, mortality and migration and their basic measures.*

Unit I: Population Composition and Data [14 Hours]

Development of Population Geography, its Scope and Relationship with other disciplines; Source of Population Data: Census, Vital Registration and Sample Survey; Distribution and Density of World Population and Factors affecting it; Methods of Studying Population Composition and Distribution: Map (Choropleth Map, Dot Map, Line Map), Graphical (Age-Sex Pyramid, Lorenz Curve) and Statistical (Growth Rate, Density, Sex Ratio, Dependency Ratio, Percent Urban); Structure and Composition of Population in India - Growth, Density, Sex Ratio, Age Structure and Literacy.

Unit II: Population Growth and Theories [14 Hours]

Components of Population Analysis; Fertility: Concepts, Determinants, Implications and Basic Measures; Mortality: Concepts, Determinants, Implications and Basic Measures; Migration: Concept, Types, Determinants and Consequences; Population Theories: Malthusian and Demographic Transition Theories; Population-Resource Linkages and Concepts of Over, Under and Optimum Population; Population Policies in India with special reference to National Population Policy (NPP) 2000.

Unit III: Human Settlement **[12 Hours]**

Development of Settlement Geography; Site and Situation; Classification of Settlements: (i) Dispersed and Nucleated (Finch & Triwartha's Scheme), (ii) Rural, Rurban, Suburb and Urban; Rural House Types and Architectural Styles: Factors Influencing Regional Variation in Rural India.

Unit IV: Urban Settlement **[12 Hours]**

Theory of Origin of Towns: Lewies Mumford; Classification of Urban Settlements; Urban Systems: The Law of Primate City and Rank Size Rule; Models of Internal Structure of the City: Burgess, Hoyt, Harris And Ullman; Urban Patterns in Less Developed Countries: Precolonial Cities, Colonial Cities and Cities since Independence.

Suggested Readings:

Bhende, A., & Kanitkar, T. (2011). *Principles of Population Studies* (21st ed.). Himalaya Publishing House Pvt. Ltd.

Chandana, R. C. (2009). *Geography of Population: Concepts Determinants & Patterns* (8th ed.). Kalyani Publishers.

Clarke, G. I. (1987). *Population Geography* (2nd ed.). Pergamon Press.

Dorrell, D., Henderson, J., Lindley, T. & Connor, G. (Eds.) (2019). *Introduction to Human Geography* (2nd ed.). Geological Sciences and Geography Open Textbooks.

Ghosh, B. N. (1987). *Fundamentals of Population Geography*. Sterling Publishers Pvt Ltd.

Ghosh, Sumita. (1998). Settlement Geography, Orient Longman, Hyderabad.

Goh Cheng Leong and G.C. Morgan. (1982). Human and Economic geography. Oxford university press, Oxford Ox2 6DP.

Hassan, M. I. (2020). *Population Geography: A Systematic Exposition*. Routledge India.

Hudson, F.S. (1970). A Geography of Settlements, Macdonald and Evans Ltd.

Rubenstein, J. M. (2010). Contemporary Human geography. PHI Learning Private Limited, New Delhi.

Kirk H. Stone. (1965). The Development of a Focus for the Geography of Settlement. *Economic Geography*. 41 (4): 346-355.

Knowles, R and J. Wareing. (1976). Economic and social geography. Rupa Publications India Pvt Ltd, New Delhi.

Pathak, K. B., & Ram, F. (2013). *Techniques of Demographic Analysis*. Himalaya Publishing House Pvt. Ltd.

Singh R. L., Singh Kashi N., Singh, Rana P. B. (1975). Readings in Rural Settlement Geography, National Geographical Society of India,

Singh, R.Y. (2003). Geography of Settlements, Rawat, Jaipur.

Srinivasan, K. (1997). *Basic Demographic Techniques and Applications*. Sage Publications.

GG-302: Research Methodology: Theory and Practice

***Objectives**: To introduce meaningful and professional research- logical and rational explanations, and processes of research writings*

***Pre-Requisites:** Students need to have knowledge on logic of inquiry, take part in dialoguing; and identifying and resolving a problem*

***Teaching Scheme:** Interactive classroom teaching, small field visits, and learning report writing*

Course Outcomes:

i. *connecting theories with research*
ii. *students will be able to understand the impact of researcher and subject on each step of the research process*
iii. *ethics is the most integral feature of the research design*
iv. *students will be able to learn critical analysis of scholarly literature for effective report writing*

Unit I: Introducing Research and Methodology [12 Hours]

Nature of Geographic Research and Geographic Perspectives; Spatial Thinking and Geographic Questions; Research: A way of thinking; Research Issues and Significance of Research; Research Methods vs. Methodology; Research Processes; Research Scale: Unit of Analysis

Unit II: Research Design [12 Hours]

Research Design: Concept and Types; Defining Research Problem; Review of Literature: Conduct Background Research; Research Questions; Research Objectives; Hypothesis Testing; Choice of Indicators.

Unit III: Logic of Enquiry [12 Hours]

Quantitative Methods: Sampling Design, Survey, Questionnaire/ Schedule; Qualitative Methods: Ethnography- Participant and Non-participant Observation; Focus Group Discussion; Interview Methods; Research Ethics; Plagiarism.

Unit IV: Research Writing [12 Hours]

Data Analysis; Data Interpretation; Editing, Classification and Tabulation; Structure of Research Writing; Prepare a Research Proposal; Writing a Research Report; References and Bibliography; Annexure and Appendix; Methods of Communicating Research.

Suggested Readings:

Amedeo; D. (1971). An Introduction to Scientific Reasoning in Geography. John Wiley.

Bunge, W. (1962). Theoretical Geography. Lund Studies in Geography. The Royal University of Lund.

Chorley, R.J. and Haggett, P. (1967). Models in Geography. Methuen.

Dawson, Catherine. (2002). Practical Research Methods: A user friendly guide to mastering research. Howtobooks.

Dikshit, R.D. (1994). The Art and Science of Geography. Prentice Hall India.

Harvey, D. (1969). Explanations in Geography. Edward Arnold.

Kothari, C.R. (2004). Research Methodology: Methods and Techniques. New Age.

Krishnan, G. and Singh, Nina. (2017). Researching Geography. Routledge.

Kumar, Ranjit. (2011). Research Methodology: A step-by-step guide for beginners. Sage.

Sjoberg, Gideon and Nett, Roger. (2009). A methodology for social research. Rawat.

GG-303: Politics, Regions and Planning in Geography

Objectives: *To elucidate the strategic importance of geographical location in politics at global, national, regional and local levels; and to introduce the basics of regional planning regional development.*

Pre-Requisites: *Basic ideas and awareness on political and regional institutions and development processes*

Teaching Scheme: *Besides the lectures, regular readings on provided course materials and their reflection*

Course Outcome:

i. *Politics of space and geography*
ii. *Understanding issues connected with regional backwardness, disparities and development*

Unit I: Concepts and Theories of Political Geography [14 Hours]

Development of Political Geography; Basic Elements of Political Geography: Territory, Population, Governance; Frontiers and Boundaries; Concept of Nation, State, and Nation-State; Concept of Organic State- Ratzel; Geopolitics: Theories of Heartland and Rimland; Regional Organizations of Cooperation (SAARC, ASEAN); Neopolitics of World Natural Resources.

Unit II: Geopolitical Perspectives in India [12 Hours]

India and Her Neighbors from Geopolitical Perspective; Geopolitical Significance of The Indian Ocean as a Zone of Peace, Problems and Prospects; Geography of Voting; Geographic Influences on Voting Pattern; Geography of Representation; Gerrymandering; Politics of Displacement: With Reference to Dams and Special Economic Zones.

Unit III: Conceptualizing Region [12 Hours]

Region: Concept, Typology and Relevance; Regionalization: Delineating the Regions; Regionalism: Concept; Regional Development: Concept, Indicators; Regional Planning: Rationale, Types, Objectives; Approaches to Planning: Sectoral and Spatial Planning; Multi-Regional and Multi-Level Planning in India.

Unit IV: Regional Development [12 Hours]

Sector Theory; Rostow's Stage Theory; Central Place Theory; Polarization and Trickle-Down Theory of Hirschman; Dependency Theory of Underdevelopment; Global Economic Blocks; Planning Regions of India; Policies and Programs for Regional Development: Development of Backward Regions, Industrial Location, Urban Growth.

Suggested readings:

Adhikari, S. (1997). Political Geography, Rawat.

Agnew, J. (Eds.). (1997). Political Geography: A Reader. Arnold.

Bhatt, L.S. (1972). Regional Planning in India. Statistical Publishing Society.

Blij, Harm de. (1970). Political Geography.

Chand, M and Puri, V.K. (1983). Regional Planning in India. Allied Publication.

Chorley, RJ and Haggett, P. (1967). Models in Geography. Methuen.

Dikshit, R.D. (1999). Political Geography-A Century of Progress. Sage.

Gopalakrishnan, R. (2001). Geography of India. Jawahar. 2001

Mackinder, H.J. "The Geographical Pivot of History". Geographical Journal, 23.

Misra R.P. et. al. (Eds.). (1974). Regional Development Planning in India. Vikas.

Pacione, M. (Eds.). (1985). Progress in Political Geography. Routledge.

Raza, Moonis. (1988). Regional Development. Heritage.

Rengasamy S. Regional Planning- IV Regional Growth Theories. Madurai Institute of Social Sciences.

Singh, C.P. (1994). Contributions to Indian Geography-13, Reading in Political Geography. Heritage.

Slowe, P. (1990). Geography and Political Power. Routledge.

Sundram, K. V. (1977). Urban and Regional Planning in India. Vikas Publishig House Pvt Ltd.

GG-304: Environmental Geography: Towards Sustainability (CBCS)

Objectives: *This course intends to apprise the non-geography students of the University, on the concept of environment from a geographical perespective and to sensitize them about major domains of environmental geography.*

Pre-requisite: *Basic knowledge of environment and its components*

Teaching Scheme: *Regular interactive classroom teaching with use of ICT tools as per requirement.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Understand the features of various spheres of earth and human-environment interface.*
ii. *Comprehend major environmental challenges of the earth.*
iii. *Understand the issues of environmental conservation, management and environmental legislation.*

Unit I: Basics Concepts [12 Hours]

Environmental Geography: Concept and Importance; Environment and Interactions among the spheres of the earth: Atmosphere, Hydrosphere, Lithosphere, Biosphere and Noosphere; Interdependency and interrelation between the components of Ecosystem: Abiotic & Biotic; Biogeographic Realms; Environmental risk and vulnerability.

Unit II: Human-Environment Interface [12 Hours]

Human ecological adaptations: (i) Cold region- Eskimo, (ii) Hot region- Bushman, (iii) Plateau- Gonds, (iv) Mountain- Gujjars; Land use and land cover changes: Implication of human interferences; Ecosystem services: impacts of environmental degradation on indigenous communities; Urban water crises: depletion and contamination; Climate resilient agriculture.

Unit III: Environmental Challenges [12 Hours]

Climate change; Global warming and Sea level rise; Ozone depletion; Acid rain; Urban Heat Island; Depletion of Biodiversity; Desertification; Salinization; Extreme weather and climate events; Environment-induced displacement and rehabilitation problems.

Unit IV: Conservation, Environmental Legislations and Management [12 Hours]

Traditional knowledge for conservation, Environmental Movements in India; Urban forestry: ecological function of green belt; Importance of Bio fertilizers and Bio pesticides; Role of environmental NGOs and pressure groups in conservations; Salient features and objectives of selected environmental legislations in India: Coastal Zone Notification 2019; Plastic Waste Management Rule 2016; Participatory Forest Management: Joint Forest Management and Community Conserved Areas.

Suggested Readings:

Barry, R. and Chorley, R. (2003). *Atmosphere, weather and climate* (eighth edition). London: Routledge.

Benjamin, B., & Maes. J. (2017). Mapping Ecosystem Services. Pensoft Publishers. Sofia.

Gartland, Lisa Mummery. (2008). Heat Islands: Understanding and Mitigating Heat in Urban Areas. Routledge.

Government of India. (2016). Plastic Waste Management Rules, 2016. Ministry of Environment, Forest and Climate Change Notification, 18th March, 2016. The Gazette of India, Part II- Sec. 3(i).

Government of India. (2019). Coastal Zone Notification 2019.Ministry of Environment, Forest and Climate Change Notification, 18th January, 2019. The Gazette of India: Extraordinary, Part II- Sec. 3(i).

IGNOU. BEVAE – 181: Ability Enhancement Compulsory Course (AECC) on Environmental Studies. 296 pages.

Miller, Robert W., Richard J. Hauer and Les P. Werner. (2015). Urban Forestry: Planning and managing urban greenspaces (third edition). Waveland Press.
Nelson, M. K. and D. Shilling. (2018). Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability. Cambridge University Press.
Oki, T., Blyth, E. M., Berbery, E. H., and Alcaraz-Segura, D. (2013) Land Use and Land Cover Changes and Their Impacts on Hydroclimate, Ecosystems and Society, in: Climate Science for Serving Society, edited by: Asrar, G. R. and Hurrell, J. W., Springer Netherlands, 185–203.
Philip B. Bedient, Wayne C. Huber, Baxter E. Vieux. (2012). Hydrology and floodplain analysis (5th Ed). Pearson.
Saxena, N.C. (1997). The Saga of Participatory Forest Management in India. Center for International Forestry Research. Jakarta, Indonesia.
Shah, M. (2016). Urban Water Systems in India: A way forward. Indian Council for Research on International Economic Relations.
Sharma, P D. (2009). Ecology and Environment. Rastogi publication.
Shaw, R., & Krishnamurthy, R. R. (2009). Disaster Management: Global Challenges and Local Solutions. University Press and CRC Press.
Singh, Savindra. (2015). Environmental Geography. Allahabad: Provalika Publications.
Singh, L. R. (2018). Fundamentals of Human Geography. Allahabad: Sharda Pustak Bhaban.
Terminski, B. (2012). Environmentally-induced displacement. Theoretical frameworks and current challenges. International Organization for Migration. Geneva.

GG-305: Survey (Practical)

***Objectives**: To impart field training on techniques and methods of data primary collection*
***Pre-requisites**: students must have learned research ethics, field disciplines, lessons on respecting biological and cultural diversity*
***Teaching Scheme:** hands on survey equipment, conducting field visit and enumeration*
***Course Outcomes:** on the completion of the course, students will be able to:*

i. Learn the scope, limitation and prospect of primary data collection
ii. Skill up with field techniques for identification and acquisition of primary data
iii. Develop rapport building and convenient attitudes including the vital communication skills for socio-economic surveys

(A) Land use Survey

1. Plain table
2. Dumpy level
3. Prismatic compass

(B) Field Visit

1. Identification of geomorphic features in the field
2. Identification of geologic features in the field
3. Identification of biotic features in the field

(C) Socio-Economic Survey

1. Focus Group Discussion
2. Face to face interview: person-administered survey
3. Participant observation

Suggested Readings:

Krishnan, G. and Singh, Nina. (2017). Researching Geography, Routledge, London,
Kumar, Ranjit: Research Methodology. (2011). A step-by-step guide for beginners, Sage, New Delhi.
Robinson, A.H., et al. (2009): Elements of Cartography. 6th edn. John Wiley & Son, New York.
Kothari, C.R.: Research Methodology. (2004). Methods and Techniques, New Age, New Delhi.
Saha, P. and Basu, P. (2013): Advanced Practical Geography. Book & allied Ltd. Kolkata.
Sarkar, A. (1997): Practical Geography: A Systematic Approach, Orient BlackSwan Ltd. Hyderabad.
Singh. R.L and Singh. R.P.B. (2010). Elements of Practical Geography. Kalyani Pub. New Delhi.
Sjoberg, Gideon and Nett, Roger. (2009): methodology for social research. Rawat, New Delhi

FOURTH SEMESTER

SPECIALIZATIONS & DISSERTATION

In the final semester, each student of M. A./ M. Sc. in Geography has to opt for one of the three specializations offered by the Department. Each specialization shall comprise of three Theory Papers of 4 credits, carrying 100 marks each. Besides, the student has to complete one dissertation on a topic preferably related to the specialization and submit a report for evaluation. The dissertation including presentation and viva-voce will be of 8 credits carrying 100 marks.

Specializations offered:

(A) Urban and Regional Planning
(B) Remote Sensing And GIS
(C) Population Geography

GG-401 A: Urban Development and Planning

Objectives: *To understand processes of urbanization, planning and development in urban India.*

Pre-Requisites: *The course requires conceptual understandings on settlements; planning and development*

Teaching Scheme: *Multimedia presentations and interactive classroom teachings, urban data analysis and discussion.*

Course Outcomes:

i. *Urbanization is a process and an opportunity*
ii. *Planning needs to be effective and efficient to make urban adequate*
iii. *Urban space is uncertain and dynamic*
iv. *We intend to have inclusive, holistic and collaborative planning*

Unit I: Site Analysis and Background Understanding [12 Hours]

Understanding Site: Cases for Site Analysis of Metro Cities and Class 1 To Class 6 Cities; Urban, Urbanization and Urbanism: Concepts and Recent Trends; Approaches to Understand Urban Planning; Theories in Urban Planning: Ecological Vs. Contextual.

Unit II: Urban Policy and Politics: Federal and Local [14 Hour]

Decentralization and Urban Governance; Social and Political Organizations; Landscapes of Power: Structure and Agency; 70 Years of Planning: Lessons from Bhubaneswar; Policy Dialogue on The Need for Urban Policy Changes; Inclusive Planning and Policy.

Unit III: Rise of Sub-urbanization [12 Hours]

Sub-Urbanization: A Process; Urban Growth and Suburban Sprawl: Complex Planning Practices; Emerging Socio-Economic Characteristics of the Suburb; Real Estate; Suburban Environment in Planning and Development; Land Conversions and its Regulation/ Facilitation in Peri-Urban Areas.

Unit IV: Challenges, Opportunities and Trends: The future of Cities [12 Hours]

Methods of Urban Planning: Qualitative and Quantitative; Social Infrastructure: Health and Education; Mobility and Migration; Sites and Practices: Media; Public Spaces; Environmental Concerns; Feminine Urban Space; Pedestrian.

Suggested readings:

Alan Lathan, Derek McCormack, Kim McNamara and Donald McNeill. (2009). Key concepts in urban geography. Sage.

Freire Mila and Richard Stren (Eds.). (2001). The challenge of urban government: Policies and Practices. The World Bank Institute.

Gottdiener Mark and Leslie Budd. (2005). Key Concepts in Urban Studies. Sage.

Hall Tim. (2001). Urban geography. Routledge.

Pacione, Michael. (2009). Urban Geography: A Global Perspective. Routledge.

Peter De Souza. (2018). The Rural and Peripheral in Regional Development: An Alternative Perspective. Routledge.

Peter, R. (2000). Urban Regeneration. University of Dundee. Sage.

Ramachandran H. (2016). Social infrastructure: Health and Education. In Economic Geography (Vol. 2) of Urbanization, Industry and Development, edited by L.S. Bhat and H. Ramachandaran and R. N. Vyas. Oxford.

Randal Crane and Rachel Weber (Eds.). (2012). The oxford handbook of urban planning.

Saskia S. (2000). Cities in a World Economy. University of Chicago, Sage.

Stephen, W. (2004). Planning and Urban Change. Sage.

GG-402 A: Development of Urban Communities and Planning

Objectives: *To explore the correlation between "urban community" and different dimensions of planning.*

Pre-Requisites: *Understandings on local, neighborhood, community living, planning and development*

Teaching Scheme: *Reading recent articles on Indian context and discussions besides classroom*

Course Outcomes:

i. *Revitalizing knowledge on community living in cities*
ii. *Planning has always room for improvement, and often it must come from the community*
iii. *Everyday realities of the community add experience-based expertise for the planned development*

Unit 1: Introduction to the Urban Community [12 Hours]

Urban Community: Concept, Relevance and Problems; Neighborhood Communities; New Urbanism; Community Well Being: Safety, Crime, Insecurity, Deprivation and Social Vulnerability, Gender Issues, The Elderly; Community Participation; Solid Waste Management: Community Involvement in Collection, Disposal, Treatment and Reuse.

Unit 2: Slums and Shanty Towns [14 Hours]

Theorizing Squatter Settlements and Slums; Social Problems of Slums and Squatters; Urban Informality; Community and Sanitation; The Illegal City: Space, Law and Gender; Urban Policies and Planning for Squatters and Slums; Dharavi: A Case for Transformation.

Unit 3: Residential Segregation, Gentrification and the City [12 Hours]

Gated Communities: Ghettos for The Privileged; Housing Segregation; Gentrification Without Segregation; Neighborhood, Gentrification and Exclusion; Planning Gentrification; Towards an Un-Gentrified Future.

Unit 4: Community Development and Urban Sustainability [12 Hours]

Rethinking the Concept of Community; Community Identity; Networking and Innovative Thinking; Everyday Urbanism; Community Experience in Urban Planning and Sustainable Development; The Future of Urban Communities: Inequality and Homelessness

Suggested Readings:

Alan Lathan, Derek McCormack, Kim McNamara and Donald McNeill. (2009). Key concepts in urban geography. Sage.

Gottdiener Mark and Leslie Budd. (2005). Key Concepts in Urban Studies. Sage.

Karen, S. C. (1999). Cities and Complexity. University of California. Sage.

Mohanty Monoranjan. Squatter Settlements and slums and sustainable development. Springer Nature Switzerland AG 2020. W. Leal et al. (eds.), Sustainable Cities and Communities, Encyclopedia of the UN Sustainable Development Goals, https://doi.org/10.1007/978-3-319-71061-7_49-1.

Pacione Michael. (2009). Urban Geography: A Global Perspective. Routledge.

Peter, R. (2000). Urban Regeneration. University of Dundee. Sage

Randal Crane and Rachel Weber (Eds.). (2012). The oxford handbook of urban planning.

Stein Samuel. (2019). Capital City: Gentrification and the real estate state. Verso.

GG-403A: Regional Development and Planning

Objective: *To know the relevance of regional planning realities in Indian context*

Pre-Requisites: *The course expect fundamental understandings on region, planning and development processes*

Teaching Scheme: *Students' led group discussions besides the textual understandings and lectures*

Course Outcomes:

i. *Effective planning practice helps in regional development*
ii. *Understanding contemporary planning practices*
iii. *Human settlements highly relate to urban planning*

Unit 1: Concepts, History and Paradigm Shifts [14 Hours]

Regional Planning: Concept, Emergence and Contemporary Understandings; Emergence of Planning Professionals: Patrick Geddes and Le Corbusier; Journey of Planning Commission in India; Ministry of Development of North Eastern Region: North Eastern Council; Special Purpose Regions' Planning: Drought Prone Area Planning, KBK Regions; Western Odisha Development Council.

Unit 2: Planning Techniques: Theories and Pioneer Thinkers [12 Hours]

Planning Research Methods; Planning Theories: Input-Output Analysis for Planning Purposes; Land Use Analysis; Growth Pole Theory; Growth Foci/ Centre Approach; Friedmann's Synthesis; The Cumulative Causation Theory.

Unit 3: Politics of the Regional Development [12 Hours]

The Politics of Local and Regional Development; Politics of Regionalism in India; Resource, Region and Sustainability; Regional Politics of Water: In Urban India and in Watersheds of India; Regional Development Policy; The Politics of City-Region Planning and Governance.

Unit 4: Regional Development Dynamics: Contemporary Issues [12 Hours]

Planning of City-Regions of India: NCR, Chennai, Kolkata, and Mumbai Metropolitan Regions; Bhubaneswar Development Plan Area; Regional Development and Inequality; Planning for Backward Regions: Tribal Sub-Plan.

Suggested Readings:

Bhatt, L.S. et. al. (Eds.). (1982). Regional Inequalities in India, Society for the study Regional Disparities.

Chand, M and Puri, V.K. (1983). Regional Planning in India. Allied Publication.

Chorley, RJ and Haggett, P. (1967). Models in Geography. Methuen.

Christaller, W. (1966). Central Places in Southern Germany, (Tr) C.W. Baskin, Prentice Hall, Englewood Cliffs.
Friedmann, J and William Alonso. (1967). Regional Development and Planning: a Reader. MIT Press.
Kuklinski, A.R. (Eds.). (1972). Growth Poles and Growth Centres in Regional Planning. Monton. The Hague.
Mishra R P. (2002). Regional Planning: Concepts, Techniques, Policies and Case Studies. Concept Publishing Company.
Misra R.P. et. al. (Eds.). (1974). Regional Development Planning in India. Vikas.
Prasad Sheela. (2016). Regional Development and Inequalities. In Economic Geography (Vol. 2) of Urbanization, Industry and Development, edited by L.S. Bhat and H. Ramachandaran and R. N. Vyas. Oxford.
Raza, Moonis. (1988). Regional Development, Heritage.
Sundram, K. V. (1977). Urban and Regional Planning in India, Vikas Publishig House Pvt Ltd.
Wood, Andrew. (2008). The politics of local and regional development. DOI: 10.4135/9781848607880.n32.

GG-401 B: Advanced Cartography

Learning Objectives: *Geography is an amalgam of physical as well as social sciences and as such, it is necessary for the students to go through laboratory exercises, particularly the techniques of drawing cartograms showing physical, climatic and socio-economic attributes of a region.*

Pre-requisite knowledge: *To achieve this objective, the concept of scale, knowledge of map reading is to be understood at the initial stage.*

Teaching Scheme: *The course will be taught with the help of diagrams, maps and topographical sheets of Survey of India.*

Learning Outcome:

i. *Can able to use modern tools and techniques to data in a variety of topical and regional studies at local, regional and national levels.*
ii. *Can attempt regional synthesis by the use of cartographic and quantitative techniques.*
iii. *Able to create spatial database for their local areas based on satellite imageries and remote sensing techniques and other kinds of maps.*

Unit-I: Introduction to Cartography [12 Hours]

Cartography: Scope and Nature; Historical Development of Cartography; Modern Cartography and Technology Changes; Sources of Cartographic Data: Ground Survey, Remote Sensing, Census and Data from Sample Surveys.

Unit-II: Basic Geodesy and Map Projection [12 Hours]

The Earth: Shape, Size, Areas and Great Circles; Coordinate System: Plane and Spherical, Latitude and Longitude, Direction and Distance; UTM Grids, Map Scale: Types and Utility; Determining the Scale of a Map; Map Projection: Meaning and Use, Brief Historical Aspect, Transformation of Area, Distance and Direction.

Unit-III Cartographic Design [12 Hours]

Cartographic Design: Objectives of Map Design, Scope of Design, Control of Map Design and Design Planning; Symbolization: Visual Variables in Symbolization, Symbolizing Geographic Features - Points, Lines and Areas; Use of Colour and Pattern; Function of Colour and Pattern in Map Design; Enhanced Design, Effectiveness; Special Colour Design Problems; Typography and Lettering.

Unit-IV Application of Cartographic Technique [12 Hours]

Technology and its Application in Cartography: Aerial Photos and Satellite Data; Generating Cartographic Data from Aerial Photographs and Remote Sensing Data Products; Application of Computer in Cartography - Cartography and GIS.

Suggested Readings:

Misra, R.P. and Ramesh, A. (1986). *Fundamentals of Cartography*. McMillan.
Pal, S. K. (1998). *Statistics for Geoscientists - Techniques and Applications*. Concept.
Robinson, A.H. et al. (1995). *Elements of Cartography*. John Wiley & Sons.
Sarkar, A. K. (1997). *Practical Geography: A Systematic Approach*. Oriental Longman.
Singh, R. L. & Dutt, P.K. (1979). *Elements of Practical Geography*, Kalyani Publishers.
Jefreys, S & John, E (1990). *Geographic Information Systems-An Introduction*. Prentice Hall.
Misra, R. P. & Ramesh, A (1989). *Fundamentals of Cartography*. Concept.
Monkhouse, F. J. (1967). *Maps and Diagrams*. Methuen.
Raize, I (1982). *Principals of Cartography*. McGraw Hill.
Robinson, A. H. & Sale, R. D. (1953). *Elements of Cartography*. John Wiley.

GG-402 B: Remote Sensing and Applications

Objectives: *The objectives of the course are to introduce to the students the fundamental of Remote Sensing, to indicate the methods of visual and digital interpretations of satellite imageries and to outline the application value of remote sensing.*

Pre-requisites: *Knowledge of satellites, image, electromagnetic spectrum, sensor, GPS.*

Teaching Scheme: *Regular lecture using audio-visual tools, hands on exercises on GPS/ GIS software.*

Course Outcomes: *At the end of the course, the student is expected to*

i. Can perform basic operational skills necessary to acquire remote sensing data
ii. Can able to extract geo-information from remote sensing data
iii. Can extract information from arial photographs.

Unit I: Physics of Remote Sensing [12 Hours]

Definition and Overview of Remote Sensing and Remote Sensing Systems; Electromagnetic Radiation, Terms and Definitions, Laws of Radiation, EM Spectrum, Sources of EMR; Interaction Between EM Radiation and Matter: Reflection, Absorption and Transmission; Interactions Between EM Radiation and Atmosphere, Atmospheric Windows.

Unit II: Spectral Signature, In-Situ Measurements and Image Interpretation [12 Hours]

Spectral Signatures for Common LULC Features - Water, Soil, Vegetation and Snow; Instruments for Ground Truth Data Collection (Insta-therm, Spectroradiometers); Principles of Visual Interpretation of Aerial Photos and Satellite Imagery; Recognition Elements and Interpretation Keys for Visual Interpretation; Interpretation of Multispectral Imagery and High-Resolution Data.

Unit III: Remote Sensing Systems, platform and sensor [12 Hours]

Active and Passive Systems; Imaging and Non-Imaging Systems; Concept of Resolutions in RS - Spatial, Spectral, Radiometric and Temporal; Orbits and Platforms for Earth Observation; Earth Observation Satellites for Land, Ocean & Atmosphere (Global and Indian) - Resourcesat, Oceansat, INSAT, Sentinel, MODIS; High Resolution Sensors and Sensors for Stereo Data (Worldview, CARTOSAT) and their Characteristics; Satellite Imaging Modes; Principle and Application of PAN/ Multispectral/ Hyperspectral Imaging, Thermal/ Microwave / Radar Data.

Unit IV: Introduction to Arial Photography and Application of RS [12 Hours]

Introduction to Aerial Photography: Definition, History, Scale, Projection, Flight Planning and Overlap; Types of Aerial Photographs and Stereoscopic Vision; Geometry of Aerial Photographs: Over-Flat Terrain and Variable Terrain; Air Photo Interpretation and Application: Land Use/ Land Cover, Mapping of Vegetation and Agriculture; Application of Remote Sensing in Land Use/ Land Cover, Geomorphology, Agriculture, Forestry, Natural Resource Management and Natural Hazards

Suggested Reading:

American Society of Photogrammetry (1983). *Manual of Remote Sensing*. ASP, Falls Church.

Barrett, E. C., & Curtis, L. F. (1992). *Fundamentals of Remote Sensing and Air Photo Interpretation*. Mcmillan.

Compbell, J. (1989). *Introduction to Remote Sensing*. Guilford.

Curran, P. J. (1985), *Principles of Remote Sensing*. Longman.

Hord, R. M. (1989). *Digital Image Processing of Remotely Sensed Data*. Academic, New York.

Luder, D. (1959). *Aerial Photography Interpretation: Principles and Application*. McGraw Hill.

Pratt, W. K. (1978). *Digital Image Processing*. Wiley.

Rao, D. P. (Eds.). (1998). *Remote Sensing for Earth Resources*. Association of Exploration Geophysicist, Hyderabad.

Thomas, M. L., & Ralph, W. K. (1994). *Remote Sensing and Image Interpretation*. John Wiley.

GG-403 B: Geographic Information System and Applications

Objectives: *The objectives of the course are to introduce GIS (Geographic Information System) as a tool of spatial science, to indicate the basic elements of GIS and methodology of GIS and to outline the steps and areas of application of GIS.*

Pre-requisite knowledge: *Knowledge of maps, coordinate system, map making software, spatial and non-spatial data.*

Teaching Scheme: *Regular theoretical and practical classes with hands-on in various GIS software in a well installed GIS laboratory.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Get acquainted with standard GIS techniques through hands-on practical exercises.*
ii. *Be able to use GIS as a decision support system for different geographical applications.*

Unit I: Introduction to GIS [12 Hours]

Geographical Information System (GIS): Meaning, Definitions and Scope of GIS; Historical Development and Future Trends of GIS; Major Components of GIS: Hardware, Software, Data, People and Methods; General Data Base: Concept of Spatial and Non-Spatial Data.

Unit II: Geographic Data Sources **[12 Hours]**

Geographic Data Sources: Land Survey, Remote Sensing, Census and Sampling, Sources of Error, Data Quality and Nature Variations; Data Conversions; Relational Database Model; Data Compression; GIS Functioning; Data Digitizing and Scanning; Pre-Processing; Data Manipulation and Analysis; Spatial Data Editing; Importance of Error, Types of Error.

Unit III: Data Base Management **[12 Hours]**

Data Structure: Raster and Vector; Database Management Systems; Digital Elevation Models (DEM): Characteristics and Applications; Web-based GIS: Definition, Methods and Applications.

Unit IV: GIS Applications **[12 Hours]**

GIS and Cartography; Mapping Concepts: Coordinate System and Geo-coding, GIS and Remote Sensing; Integration of GIS and Remote Sensing; GIS Application Areas; GIS as Decision Making Tools, Management of Information, Facility Management Applications, Urban GIS and Environmental GIS.

Suggested References:

Heywood, I. et. Al. (2002) - An Introduction to Geographical Information Systems, Pearson Education Pvt. Ltd

Chang, Kang-Stung. (2015): Introduction to Geographical Information Systems, Tata McGraw Hill Publishing Co.,

Netzband, M. et. Al. (2012): Applied Remote Sensing for Urban Planning, Governance and sustainability. Springer India Pvt. Ltd.

Jones, Christopher. (): Geographical Information System.

Burrogh, P.A. (1986): Principles of Geographical Information Systems for Land Resources Assessment. Oxford University Press.

Aronoff, Stan. (1989): Geographic Information System – A Management Perspective. WDC Publications, Ottawa, Canada.

Demers, Michale N. (2000): Fundamentals of geographic information systems, 2nd edn. John Wiley & Sons.

GG-401 C: Population Studies, Society and Demographic Data

Objectives: *This course plans to introduce the students about socio-psychological perspectives of population and expose them about demographic data and its scopes.*

Pre-requisite: *Basic knowledge of population geography and society*

Teaching Scheme: *Regular interactive face-to-face classroom teaching with use of ICT tools as per requirement and numerical exercise for better explanation of important techniques.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Know about the major sources of population data in detail.*
ii. *Be able to assess the quality of data and adjust them if needed.*
iii. *Understand the importance and methods of population estimation and projection.*

Unit I: Socio-Psychological Perspectives [12 Hours]

Connecting Population Geography and Population Studies; Social Demography: Concepts and Elements; Marriage and Family in India: Concepts and Nature; Social Change in India: Mechanisms, Determinants and Implications; Tribes in India: Geographical Distribution, Classification and Demographic Characteristics; Psychology and Population Studies: Concepts of Personality, Attitude, Motivation and Perception.

Unit II: Sources of Population Data [12 Hours]

Sources and Types of Demographic Data; Population Census: Uses and Limitations; Steps Involved in Taking a National Census; Indian Census - Historical Background; Vital Registration System - Civil Registration System in India; Sample Registration System in India; Sample Survey: Uses and Limitations; Important Sample Surveys - NSS, NFHS, AHS and DLHS.

Unit III: Evaluation and Adjustment of Data [12 Hours]

Common Measures used in the Study of Age-Sex Structure; Ageing: Concept, Measures, Trend, Determinants and Implications; Types and Sources of Error in Demographic Data; Methods of Detecting Errors in Census Data – Direct and Indirect; Chandrashekar and Demming's Method in Dual Record System; Measurement of Errors: Whipple's Index, Myer's Index, United Nation Joint Score Method; Methods of Adjustment of Age-Sex Data at the Young and Adult Ages.

Unit IV: Population Projection [12 Hours]

Population Estimates and Projections: Concept and Need; Mathematical Method of Population Projection: Linear and Exponential Growth Methods; Component Method of Population Projection; Sub-National Population Projection: Rural-Urban Population and Household Projections; Concepts of Doubling time, Stable and Stationary Population; Projection of Population for India**.**

Suggested Readings:

Albouy, S. (1986). *Introduction to Sociology and Social Psychology*. Steling.

Bhende, A., & Kanitkar, T. (2011). *Principles of Population Studies* (21st ed.). Himalaya Publishing House Pvt. Ltd.

Bouge, D. J. (1969). *Principles of Demography*. John Wiley and Sons.

Chandana, R. C. (2009). *Geography of Population: Concepts Determinants & Patterns* (8th ed.). Kalyani Publishers.

Dorrell, D., Henderson, J., Lindley, T. & Connor, G. (Eds.) (2019). *Introduction to Human Geography* (2nd ed.). Geological Sciences and Geography Open Textbooks.

Fawcett J. T. (1970). *Psychology and Population: Behavioral Research Issues in Fertility and Family Planning*. Population Council.

Feishbein, M. (1967). *Readings in Attitude Theory and Measurement*. John Wiley and Sons.

Government of India (2006). *Population Projections for India and States, 2001-2026*. Office of the Registrar General.

Hasnain, M. (1983). *Tribal India Today*. Harnam Publication.

Hassan, M. I. (2020). *Population Geography: A Systematic Exposition*. Routledge India.

Kapadia, K. M. (1966). *Marriage and Family in India*. Oxford University Press.

Kuppuswamy, B. (1972). *Social Changes in India*. Konark Pub. Pvt. Ltd.

Morgan, C. T., & King, R. A. (1993). *Introduction to Psychology*. Tata McGraw Hill.

Panikar, K. M. (1974). *Essential Features of Indian Culture*. Bhartiya Vidya Bhavan.

Pathak, K. B., & Ram, F. (2013). *Techniques of Demographic Analysis*. Himalaya Publishing House Pvt. Ltd.

Raza, M., & Ahmed, A. (1990). *Atlas of Tribal India*. Concept Publishing House. New Delhi.

Rowland, D. T. (2006). *Demographic Methods and Concepts*. Oxford University Press.

Sharma, S. P. (1999). *Tribal Demography*. Radha Publication.

Srinivas, M. N. (1962). *Caste in Modern India and Other Essays*. Asia Pub. House.

Srinivasan, K. (1997). *Basic Demographic Techniques and Applications*. Sage Publications.

GG-402 C: Fertility, Mortality and Population Policies

Objectives: *This course aims at introducing the learners in detail about the major components of population analysis including nuptiality, fertility and mortality, besides familiarizing them on different aspects of population policies.*

Pre-requisite: *Basic knowledge of population data and components of population change*

Teaching Scheme: *Regular interactive face-to-face classroom teaching with use of ICT tools as per requirement and numerical exercise for better explanation of important techniques.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Be able to compute and analyse various measures of nuptiality, fertility and mortality.*
ii. *Understand the important theories on population growth, fertility behaviour and child survival.*
iii. *Comprehend the need, importance and features of select population policies.*

Unit I: Nuptiality and Fertility Theories [14 Hours]

Nuptiality: Concepts, Data Sources, Measures (Crude Marriage Rate, General Marriage Rate, Age Specific Marriage Rates, Order Specific Marriage Rates) and Estimates (Singulate Mean Age at Marriage - SMAM); Age at Marriage in India: Levels, Trends and Differentials; Blake Intermediate Variable Framework and Bongaart's Proximate Determinant Model; Theories of Fertility: Social Capillarity Theory, Theory of Diffusion and Cultural Lag, Theories of Leibenstein, Becker, Easterlin and UN Threshold Hypothesis.

Unit II: Fertility Measures [14 Hours]

Basic Measures of Fertility: Crude Birth Rate, General Fertility Rate, Age-specific Fertility Rates, Age Specific Marital Fertility Rates, Total Marital Fertility Rate and Total Fertility Rate; Standardized Rates: Direct and Indirect Standardized Birth Rates, Sex-Age Adjusted Birth Rate and Coale's Fertility Indices; Concepts of Complete Family Size, Parity Progression Ratio and Child Women Ratio; Measures of Reproduction: Gross and Net Reproduction Rates; Indirect Estimation: Reverse Survival and Rele's Methods.

Unit III: Mortality [14 Hours]

Mortality: Basic concepts, Data Sources and Importance of Study; Basic Measures of Mortality: Crude Death Rate, Age Specific Death Rate, Infant Mortality Rate, Under-five mortality Rate, Neo-natal mortality Rate and Maternal Mortality Rate (MMR); Factors affecting Infant mortality - Mosley and Chen's Framework for Child Survival; Life Table: Concept, Assumptions, Types, Uses and Construction; Concept of Model Life Table

Unit IV: Population Policy [14 Hours]

Population Policy: Definition, Indicators, Features and Need; Evolution of Family Welfare Programme in India; Role of the United Nations and other International agencies in Health and Population; UN World Population Conferences: Bucharest (1974), Mexico (1984), Cairo (1994) Conferences, Alma Ata Declaration (1978), Health for all by 2000; Role of NITI Ayog in Health and Population related policies and programme; Important Policies of India: National Population Policy 2000, National Health Policy 2002, National Rural Health Mission 2005.

Suggested Readings:

Bhende, A., & Kanitkar, T. (2011). *Principles of Population Studies* (21st ed.). Himalaya Publishing House Pvt. Ltd.

Bongaarts, J., & Potter, R. G. (1983). *Fertility, Biology and Behaviour: An Analysis of the Proximate Determinants*. Academic Press.

Bouge, D. J. (1969). *Principles of Demography*. John Wiley and Sons.

Chandana, R. C. (2009). *Geography of Population: Concepts Determinants & Patterns* (8th ed.). Kalyani Publishers.

Das Gupta, M., Chen, L. C., & Krishnan, T. N. (Eds.) (1996). *Health, Poverty and Development in India*. Oxford University Press.

Dorrell, D., Henderson, J., Lindley, T. & Connor, G. (Eds.) (2019). *Introduction to Human Geography* (2nd ed.). Geological Sciences and Geography Open Textbooks.

Government of India (1999). *National Policy on Older Persons in India*. Ministry of Social Justice

Government of India (2000). *National Population Policy*. Department of Health and Family Welfare.

Government of India (2002). *National Health Policy*. Ministry of Health and Family Welfare.

Government of India (2006). *Population Projections for India and States, 2001-2026*. Office of the Registrar General.

Hassan, M. I. (2020). *Population Geography: A Systematic Exposition*. Routledge India.

Mosley, W. H., & Chen, L. C. (1984). Analytical framework for the study of child survival in developing countries. *Population and Development Review*, 10 (Supplementary Copy).

Park, K. (2009). *Text Book of Preventive and Social Medicine*. Banarsidas Bhanot Publishers.

Pathak, K. B., & Ram, F. (2013). *Techniques of Demographic Analysis*. Himalaya Publishing House Pvt. Ltd.

Preston, S. H. (Ed.) (1982). *Biological and Social Aspects of Mortality and the Length of Life*. Ordina Editions, Liege.

Srinivasan, K. (1997). *Basic Demographic Techniques and Applications*. Sage Publications.

United Nations (1973). *The Determinants and Consequences of Population Trends, Vol. I*. Department of Economic and Social Affairs.

GG-403 C: Migration, Urbanization and Development

Objectives: *This course proposes to develop an understanding of two major geo-demographic processes of the modern world – Migration and Urbanization, among the students and make the realize the population-development linkages*

Pre-requisite: *Basic knowledge of population movement and economic activities*

Teaching Scheme: *Regular interactive face-to-face classroom teaching with use of ICT tools as per requirement and numerical exercise for better explanation of important techniques.*

Course Outcomes: *At the end of the course, the student is expected to*

i. *Understand the concepts, types, theories and measurement of migration.*
ii. *Know the measures of urbanization and visualise the state of urbanization in India and its associated problems.*
iii. *Comprehend the basic concepts, relevance of studying, important measures and common effects of development in the context of population.*

Unit I: Migration - Concepts and Estimates [14 Hours]

Concepts of Mobility and Migration; Sources of Migration Data; Types of Migration; Trends, Pattern and Differentials of Internal and International Migration; Determinants and Consequences of Internal Migration; Estimation of Lifetime and Inter-censal Migration from Place of Birth; Duration of Residence and Place of Last Residence Data; Indirect Measures of Net Internal Migration: Vital Statistics Method, National Growth Rate Method, Census and Life Table Survival Ratio Method.

Unit II: International Migration and Migration Theories [14 Hours]

International Migration: Concept, Sources of Data, Determinants and Consequences; Concepts of Labour Migration, Brain Drain, Refugee and Illegal Migration; Migration Theories and Models: Ravenstein's Laws of Migration, Everett Lee's Theory of Migration, Zelinsky's Five Phase Model of Migration; Todaro's Model of Rural-Urban Migration, Social Network Theory, Cumulative Causation Theory.

Unit III: Urbanization [14 Hours]

Urbanization: Importance of Study and Sources of Data; Components of Urban Population Growth; Kingsley Davis Model of Urbanization; Level and Tempo of Urbanization; City Population Distribution; Urbanization in India and its Spatial Pattern; Phenomena of Over-urbanization and Urban Primacy; Urbanization Related Problems in Developing Countries with Focus on India: Land Use, Housing, Slums, Water Supply and Sanitation, Transport, Environmental Problems, Urban Health Issues and Other Social Problems.

Unit IV: Population Development [14 Hours]

Need to Study Population in the Context of Development; Concepts of Economic, Social and Sustainable Development; Economic, Social and Health Indicators of Development; Refined Indicators of Development: Human Development Index (HDI), Physical Quality of Life Index (PQLI), Human Poverty Index (HPI), Gender Related Development Index (GDI), Gender Empowerment Measure (GEM); Effect of Development on Demography (Mortality, Fertility, Migration, Poverty and Aging); Millennium Development Goals (MDG) and Sustainable Development Goals (SDG).

Suggested Readings:

Bhende, A., & Kanitkar, T. (2011). *Principles of Population Studies* (21st ed.). Himalaya Publishing House Pvt. Ltd.

Bose, A., & Bhatia, J. (1978). *India's Urbanization: 1901-2001*. Tata McGraw-Hill.

Bouge, Donald Joseph (1969), *Principles of Demography*, John Wiley and Sons, New York.

Chandana, R. C. (2009). *Geography of Population: Concepts Determinants & Patterns* (8th ed.). Kalyani Publishers.

Cohen, R. (1996). *Theories of Migration*. The International Library of Studies on Migration.

Davis, K. (1965). The Urbanization of the Human Population. *Scientific American*, 213 (3): 41-53.

Desai, A. R., & Pillai, D. (Eds.). (1990). *Slums and Urbanisation*. Popular Prakashan.

Dorrell, D., Henderson, J., Lindley, T. & Connor, G. (Eds.) (2019). *Introduction to Human Geography* (2nd ed.). Geological Sciences and Geography Open Textbooks.

Hassan, M. I. (2020). *Population Geography: A Systematic Exposition*. Routledge India.

Hollis, C., & Srinivasan, T, N. (Eds.). (2002). *Handbook of Development Economics, Vol 1*. Elsevier.

Pathak, K. B., & Ram, F. (2013). *Techniques of Demographic Analysis*. Himalaya Publishing House Pvt. Ltd.

Ramchandran, R. (1989). *Urbanisation and Urban Systems in India*. Oxford University Press.

Ray, D. (1998). *Development Economics*. Oxford University Press

Srinivasan, K. (1997). *Basic Demographic Techniques and Applications*. Sage Publications.

United Nations (2004). *World Urbanization Prospects*. United Nations.

Yadava, K. N. S. (1989). *Rural-Urban Migration in India: Determinants, Patterns and Consequences*. Independent Publishing Company.

GG-404: Computer Applications in Geography (Practical)

Objectives: *This course is focused on enhancing the ability of students in terms of use of computer and different software for various geographical analyses in the fields of Population, Urban Studies, Health, Regional Planning, Development, Remote Sensing and GIS etc.*

Pre-requisites: *Basic knowledge of computer and MS-Office*

Teaching Scheme: *The classes will be based on hands-on exercises on different dimensions of applied geography with the help of computer programmes like MS-Excel, Arc GIS, Q-GIS, SPSS, PSPP etc.*

Course Outcomes: *At the end of the course, the student is expected to carryout mapping and geo-statistical analyses using available packages and utilize them in different areas of geographical research.*

(A) Microsoft Excel

1. Age-Sex Pyramid
2. Geographic Flow Map
3. Standard Distance (Dispersion of population)
4. Rank Size Rule and Primacy Index
5. Whipple's Index and Myer's Index

(B) SPSS/ PSPP (Open Source)

1. Creation of Data Frame
2. Frequency Distribution, Cross Tabulation and Chi Square
3. Recoding and Construction of Indices
4. Bivariate Correlation
5. Binary Logistic Regression

(C) Arc GIS/ QGIS (Open Source)

1. Georeferencing, Digitizing, Data capturing
2. Adding Style to Data
3. Using Queries
4. Adding Context
5. Making a Map

(D) Practical Record, Seminar and Viva-Voce (20%)

Suggested Readings:

Chawla, D., & Sondhi, N. (2015). *Research Methodology: Concepts and Cases*. Vikas Publ. House.

Dawre, A., & Dawre, R. K. (2019). *Introduction to Remote Sensing, GIS and its Applications*. Walnut Publication.

Field, A. (2019). *Discovering Statistics using IBM SPSS Statistics*. SAGE Publications India Pvt Ltd.

Graser, A. (2016*). Learning QGIS: Create great maps and perform geoprocessing tasks with ease* (3rd ed.). Packt Publishing Limited

Halter, C. P. (2017). The PSPP Guide: *An Introduction to Statistical Analysis* (2nd ed.). Creative Minds.

Hari Shankar, A., & Bhusan, B. (2016). *Statistics for Social Sciences (With SPSS Applications)* (2nd ed.). PHI Learning Private Limited.

Law, M., & Collins, A. (2015). *Getting to Know Arc GIS* (4th ed.). Esri Press

Pathak, K. B., & Ram, F. (2013). *Techniques of Demographic Analysis*. Himalaya Publishing House.

Sarma, K. V. S. (2010). *Statistics Made Simple: Do it Yourself on PC* (2nd ed.). PHI Learning Pvt. Ltd.

Siegel, J. S., & Swanson, D. A. (eds.) (2004). *The Methods and Materials of Demography*. Elsevier.

Srinivasan, K. (1997). *Basic Demographic Techniques and Applications*. Sage Publications.

Verbyla, D. L. (2010). *Practical GIS Analysis*. Taylor and Francis.

GG-405: Dissertation

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