

**SYLLABUS FOR Ph. D. COURSE WORK
IN
GEOGRAPHY AND DISASTER MANAGEMENT**
(As per Tripura University Rule and Regulations for Doctor of Philosophy (Ph. D) -2016
Based on UGC- 2016 Guidelines)



Department of Geography and Disaster Management
TRIPURA UNIVERSITY
(A CENTRAL UNIVERSITY)
SURYAMANINAGAR - 799022, WEST TRIPURA, TRIPURA

Course Structure

Ph. D Course Work (6 months duration) of Geography and Disaster Management will consist of four papers and each paper will carry 100 marks (4 credits). There are Research Methodology –I & II (GEDM–PHD-9001 & GEDM–PHD -9002), GEDM–PHD -9003 is an optional paper (choose any one) and GEDM–PHD -9004 is Practical (related to optional), Review writing and Presentation of proposed research problem.

Course Code	Course Name	Marks	Credits
GEDM-PHD-9001	Research Methodology -I	100	4
GEDM -PHD-9002	Research Methodology – II	100	4
GEDM -PHD-9003	<p><u>Optional (choose any one paper from the following)</u></p> <p>GEDM -PHD-9003 A: Fluvial Geomorphology</p> <p>GEDM -PHD-9003 B: Regional Planning and Development</p> <p>GEDM -PHD-9003 C: Applied Climatology, Hydrology and Environment</p> <p>GEDM -PHD-9003 D: Transport Geography</p> <p>GEDM -PHD-9003 E: Population and Sustainable development</p>	100	4
GEDM -PHD-9004	Practical, Review writing and Presentation	100	4

Course: GEDM-PHD-9001
RESEARCH METHODOLOGY -I

Full Marks – 100 (4 Credits)

Unit – I: Basic Computer Applications (25 Marks)

Basic computer knowledge, Features and applications related to presentation of text in suitable format and saving the data for future applications, Use of word processing, practical knowledge of MS word to type the script, Insert tables, figures and graphs, plotting of graphs in excel, Preparation of power point presentations based on the topic of research, Insertion of figures, graphs, charts in presentation. Use of spreadsheet and database software, preparation of scientific posters for presentations, Internet and its application: Email/WWW, Web browsing. Acquiring technical skills, drawing inferences from data, Cloud computing.

Unit – II: Quantitative methods, Statistics and application of Computer in statistics (25 Marks)

Measures of central tendency and dispersion probability distribution- Normal, Binomial and Poisson distribution. Parametric and Non-Parametric statistics. Confidence interval, Errors. Quantitative Technique: Levels of significance. Regression and Correlation coefficient. Statistical analysis and fitting of data, Chi-Square test, Association of Attributes t-Test Anova , Standard deviation, Co-efficiency of variations, Open source software for quantitative and statistical analysis.

Unit – III: Research Ethics and IPR (25 Marks)

Environmental impacts – Ethical issues- ethical committees – Commercialization – copy right- royalty- intellectual property rights and patent law- Trade Related aspects of Intellectual Property Rights – Reproduction of published material – Plagiarism – Citation and acknowledgement – Reproducibility and accountability.

Unit – IV: Documentation and scientific writing (25 Marks)

Results and Conclusions, Preparation of manuscript for Publication of Research paper, Presenting a paper in scientific seminar, Thesis writing. Structure and Components of Research Report, Types of Report: research papers thesis, Research Proposal, Research Project Reports, Pictures and Graphs, Citation styles, writing reviews of paper, Bibliography.

Course: GEDM-PHD-9002
RESEARCH METHODOLOGY -II

Full Marks – 100 (4 Credits)

Unit – 1: Types and Methods of Research (25 Marks)

Nature and basis of research: Types of research; Geographic Method and its relation to Scientific Regional Spatio- temporal Ecological system analysis and Environmental Approaches; Research Design: Meaning, Need, Features of research designs; Different research designs, Problem identification, Objectives/Hypothesis and Sampling design; Writing Research Report: Significance, Steps and Methods, Reference citing and Footnoting; Formatting and Precaution in writing a Report.

Unit – II: Application of Statistical Techniques in Geography (25 Marks)

Methods of Data Collection: Schedule, Analogue and Questionnaire, Interview, Instrumental Survey and Digital Modes; Hypothesis: Meaning, Procedure, Forms; Lorenz curve and Gini's coefficient; Principal Component Analysis and Factor analysis.

Unit – III: Application of Quantitative Techniques in Geography (25 Marks)

Mean Centre; Population Projection; Nearest Neighbour Analysis; Residual Mapping; Time series Analysis; Crop combination.

Unit – IV: Remote Sensing & GIS (25 Marks)

Remote sensing overview, components and types of remote sensing; data collection, types and use of satellites, multiple spectral remote sensing data (image), resolution in remote sensing, visual interpretation (band combination); Remote sensing data application in GIS (LULC, deforestation process, urban planning)

References:

1. Durrenberger, R. W. (1971): Geographical Research and Writing, Thomas Y. Cromwell & Co. New York
2. Gibbs, J. P (ed) (1966): Urban Research Methods, D Van Nostrand Co., Inc Princeton, New Jersey, New York.
3. Gregory, S. (1963): Statistical Methods and the Geographer, Longman, London
4. Hagget Peter (1990): Geography: Modern Synthesis. Harper International, New York
5. Hammond, R.& Mc Cullagh P.(1974): Quantitative Techniques in Geography Clarendon Press, Oxford.
6. Haring, L. L. & Loundbury, J. F. (1975): Introduction to Scientific Geographic Research. W.C.Brow Company,U.S.A
7. Haring, Lloyed(1975): Scientific Geographic Research . W.C.Brow Company,U.S.A
8. Kothari, C.R.(1996): Research Methodology, Vishwas Prakashan, New Delhi.
9. Lillesand & Kiefer (1994): Remote Sensing and Image Interpretation, John Wiley and sons Inc, New York
10. Mishra, R.P.(1991) : Research Methodology in Geography, Concept Publishing, New Delhi.
11. Saha, P. & Basu, P. (2006) : Advanced Practical Geography, Books and allied Pvt. Ltd. Kolkata
12. Sarvanavel, P (1998): Research Methodology, Kitab Mahal, Allahbad
13. Krishnaswamy and M. Rangnatham (2005) :Methodology of Research in Social Sciences, Himalaya publication House, ISBN: 8184880936
14. Fisher R.A., Statistical Methods for Research Workers, Cosmo Publications, New Delhi ISBN:81-307- 0128- 6
15. Upagade. V and A.Shende (2010): Research Methodology, S.Chanda & Co., New Delhi.
16. Pannerselvam. R (2007): Research Methodology, *Prentice-Hall of India Private Ltd., New Delhi.*
17. Arora P. N. & Arora S (1994): Foundation Course in Statistics, S. Chand and Company Ltd, New Delhi.
18. Aslam Mehmood (1976): Statistical Techniques in Geographical studies, Rajesh Publication, New Delhi.
19. SPSS online manual
20. MINITAB online manual

Course: GEDM-PHD-9003A

FLUVIAL GEOMORPHOLOGY (Theory)

Full Marks – 100 (4 Credits)

UNIT – I: Geomorphic Analysis of Drainage Basin

(25 Marks)

Drainage Basin as a unit of geomorphic study; The morphometric analyses of drainage basin; The measures of magnitude of drainage basin; Measures of relief and linear properties.

UNIT – II: Hydrological Analysis of Drainage Basin

(25 Marks)

Hydrological Cycle of Drainage Basin; Run off Cycle; Major determinants of the hydrological characteristics of the catchments; Analysis of stream flow conditions; Long-term and Short-term channel changes

Unit – III: Fluvio-geomorphological Disasters

(25 Marks)

Causes, Consequences and Mitigation measures of the following disasters: Flood; Landslide; Earthquake; Cyclone

Unit – IV: Remote Sensing Applications

(25 Marks)

Remote Sensing application in the field of agriculture: Land Use/ Land Cover and Soil Mapping; Remote Sensing application in the field of hydrology: Approach and Methodology for ground water exploration, Hydro-geomorphological mapping, Soil moisture and Run off.

References:

1. Sen, P. K. (1993): Geomorphological analysis of drainage basins (An introduction of morphometry and hydrological parameters), Published by The University of Burdwan, Burdwan.
2. Pandey, M. (2014): Disaster Management, Wiley, New Delhi.
3. Chakraborty, S. (2007): Natural Hazards and Disaster Management, Pragatishil Prakashak, Kolkata.
4. Valdiya, K. S. (edt.) (2004): Coping with natural hazards: Indian context, Orient Longman, Hyderabad.
5. Basu, R. and Bhaduri, S. (2007): Contemporary issues and techniques in Geography, Progressive Publishers, Kolkata.
6. Bhatta, B. (2009): Remote Sensing and GIS, Oxford University press, New York.
7. Articles published in various reputed journals

Course: GEDM-PHD-9004A

FLUVIAL GEOMORPHOLOGY (Practical)

Full Marks – 100 (4 Credits)

Unit – I: GIS based Mapping

(25 Marks)

Georeferencing and Mosaicing of SoI topographical maps ; Delineation of drainage basin; Selection of attributes, Supervised classification of land use and measurement of area; Identification and mapping of drainage patterns; Digitization and overlaying of channels of different time periods

Unit – II: Statistical and Hydrological analyses

(25 Marks)

Time series analysis; Calculation of Sinuosity Index; Drawing and interpretation of Rating Curve and Hydrograph.

Unit – III: Literature Review

(25 Marks)

Select two books and three articles (Reputed/UGC approved journals) reviews related to research topic.

Unit – IV: Presentation (Seminar)

(25 Marks)

Title, introduction, statement of the problem, significance of the study, study area, objectives, hypothesis/research questions, proposed methodology, review of related literature.

Course: GEDM-PHD-9003 B

REGIONAL PLANNING AND DEVELOPMENT (Theory)

Full Marks – 100 (4 Credits)

Unit –I: Regional Planning and development (25 Marks)

Concept of Regionalization; Concept, Principles and Classification of Regional Planning and Development; Indicators of Regional Development; Types of Plans.

Unit –II: Rural development and planning (25 Marks)

Concept and approaches of Rural Development; Developed and Developing World; Rural Land use, Infrastructure, Environment; Factors Controlling; Rural Land Use Planning; Models of Rural Development and Planning.

Unit –III: Urban development and planning (25 Marks)

Concept of Urbanization: Developed and Developing World; Functions, Principles, Techniques, Scope of Urban design; Urban Land use, Role of Industry, Housing, Transport and Communication; Tourism in urban land use Planning, Urban Infrastructure, Urban Re-development, Urban Environment, Urban Models; Emerging Concepts of Cities.

Unit –IV: Strategies for planning and development in India (25 Marks)

Objective, Thrust areas and demerits of Indian Planning through Plan Periods; NITI Aayog; Planning Regions of India; Strategies of Rural Planning and Development in India; Strategies of Urban Planning and Development in India; Regional Disparity, Poverty in India in respect of Economic and Human Development; Policy measures.

Reference :

1. Assche, K. V. & Hornidge, A.K., 2015, Rural development: Knowledge and expertise in governance, Wageningen Academic Publishers, London.
2. Bhatt, L.S., 1972, Regional Planning in India, Statistical Publishing Society, Calcutta.
3. Chand, M. & Puri, V. K., 2011, Regional Planning in India, Allied Publishers Limited, New Delhi.
4. Chandna, R.C., 2000, Regional Planning- A Comprehensive Text, Kalyani Publishers, Ludhiana.
5. Chaudhary, S.N., 2004, Dalit and tribal leadership in Panchayats, Concept publication, New Delhi.
6. Friedman, A., 2014, Planning Small and Mid-Sized Towns, Routledge, McGill.
7. Goel, S. L. & Rajneesh, S., 2009, Panchayati Raj in India: Theory and Practice, S.R Publications, New Delhi
8. Hall, P.G., 1996, Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century, Wiley Blackwell, New Delhi.
9. Khullar, D. R., India a Comprehensive Geography, 2011, Kalyani Publishers, New Delhi
10. Kulshrestha, S. K., 2010, Urban and Regional Planning in India: A Handbook for Professional Practice, SAGE Publication, New Delhi.
11. Mathew, G., 1994, Panchayat Raj: From Legislation to Movement, Concept publication, New Delhi.
12. Misra R.P. (eds.), 1974, Regional Development Planning in India, Vikas, New Delhi.

13. Nemes, G., 2005, Integrated Rural Development: The Concept and its Operation, Institute of Economics Hungarian Academy of Sciences, Budapest.
14. Ramachandran, R., 1997, Urbanization and Urban Systems in India, Oxford India, New Delhi.
15. Rangwala, 2015, Town Planning, Charotar Book Distributors, New Delhi.
16. Rao, A., 2005, Communities Panchayats and Governance at Grassroots, Concept Publication, New Delhi.
17. Ray Chaudhuri, J., 2001, An Introduction to Development and Regional Planning: With Special Reference to India, Orient Blackswan, Kolkata.
18. Saxena, H. M., 2005, Transport Geography, Rawat Publications, Jaipur.
19. Singh, K. & Shishodia, A., 2016, Rural Development: Principles, Policies and Management, Sage Publication, New Delhi.
20. Varma, L.N., 2006, Urban Geography, Rawat Publications, Jaipur.

Course: GEDM-PHD-9004 B

REGIONAL PLANNING AND DEVELOPMENT (Practical)

Full Marks – 100 (4 Credits)

Unit – I: Methods of Measurement (25 Marks)

Measurement of Inequality; Measurement of Concentration; Measurement of Transport Accessibility; Methods of Non-spatial and spatial Data Analysis.

Unit – II: Development Index & Technique (25 Marks)

Human Development Index; Social Development Index; Methods of Physical Infrastructural Survey: Regional, Rural and Urban; Application of G.I.S. and Remote sensing techniques in Planning.

Unit – III: Literature Review (25 Marks)

Select two books and three articles (Reputed/UGC approved journals) reviews related to research topic.

Unit – IV: Presentation (Seminar) (25 Marks)

Title, introduction, statement of the problem, significance of the study, study area, objectives, hypothesis/research questions, proposed methodology, review of related literature.

Course: GEDM-PHD-9003 C

APPLIED CLIMATOLOGY, HYDROLOGY AND ENVIRONMENT (Theory)

Full Marks – 100 (4 Credits)

Unit – I: Climatology (25 Marks)

Meaning and scope of climatology and meteorology; Rainfall – precipitation, rainfall intensity, rainfall variability and rainfall ratio; Groundwater - origin, occurrence, aquifer, storage, discharge and recharge; Estimation of surface water resources; Temperature – thermal regime: Agro-climatic regionalization.

Unit – II: Applied Climatology (25 Marks)

Water balance elements – potential evaporation, actual evaporation, water surplus, water deficit, aridity index, moisture index, and climatic classification (Thornthwaite and Mather, 1955); Climate change and its consequences; Urban Heat Island.

Unit – III: Hydrology (25 Marks)

Definition and Scope of hydrology; Hydrological Cycle; Components of Run-off; Factors affecting Run-off; Cloud seeding; National water policy in India; Water pollution; Sprinkle irrigation.

Unit – IV: Environment (25 Marks)

Definition and scope of environment; Ecological balance; Environmental degradation; Ecological crisis; Deforestation; Soil erosion; Environmental hazards and disasters; Agro-forestry & types.

References:

1. Chow V.T., Maidment D.R., Mays L.W., "Applied Hydrology", McGraw Hill Publications, New York, 1995.
2. Subramanya K., "Hydrology, Tata McGraw Hill Co., New Delhi, 1994.
3. Patra. K.C, "Hydrology and Water Resources Engineering", Narosa Publications, 2008, 2nd Edition, New Delhi.
4. Jeya Rami Reddy.P, "Hydrology, Laximi Publications, New Delhi, 2004
5. Haan C.T., "Statistical Methods in Hydrology" Iowa State Press 2002.
6. Lillesand, T.M. and Kiefer, R.W., "Remote Sensing and Image Interpretation" 3rd Edition. John Wiley and Sons, New York. 1993.
7. Burrough P.A. and McDonnell R.A., "Principles of Geographical Information Systems", Oxford University Press. New York. 1998.
8. Ian Heywood Sarah, Cornelius and Steve Carver "An Introduction to Geographical Information Systems". Pearson Education. New Delhi, 2002.
9. Chaturvedi. M.C., "Water Resources Systems Planning and Management". Tata McGraw Hill, New Delhi, 1997.
10. Goodman Alvin S., "Principles of Water Resources Planning", Prentice Hall Inc., Englewood Cliffs, New Jersey, 1995.
11. Odum, E. P. and G. W. Barrett, "Fundamentals of Ecology", India Edition, Thomson Brooks/cole, India, 2005
12. Canter L. W., "Environmental impact assessment", 2nd edition, Mc Graw Hill & Co., NY, USA, 1996
13. Vladimir Novonty, "Water Quality: Diffuse pollution and watershed Management", 2nd edition, John Wiley & Sons, , 2003

14. Jorgensen, S., J. G. Tundisi, J. M. Tundisi, "Handbook of inland aquatic ecosystem management", CRC Prerss, FL, USA, 2013.
15. Mackenzie L Davis, David A Cornwell, "Introduction to Environmental Engineering", McGraw-Hill 2006.
16. Ghanashyam Das, Hydrology and Soil Conservation engineering, Prentice Hall of India Private Limited, New Delhi, 2000.
17. Glenn O. Schwab, Soil and Water Conservation Engineering, John Wiley and Sons, 1981.
18. Gurmail Singh, A Manual on Soil and Water Conservation, ICAR Publication, New Delhi, 1982.
19. Suresh, R. Soil and Water Conservation Engineering, Standard Publication, New Delhi, 1982.
20. Vir Singh, Raj , Watershed Planning and Management, Yash Publishing House, Bikaner, 2000.
21. Lal, Ruttan. 2000. Integrated Watershed Management in the Global Ecosystem. CRC Press, New York.

Course: GEDM-PHD-9004 C

APPLIED CLIMATOLOGY, HYDROLOGY AND ENVIRONMENT (Practical)

Full Marks – 100 (4 Credits)

Unit – I: Climatology Practical (25 Marks)

Rainfall intensity, Rainfall variability and Rainfall ratio; Ground water recharge; Estimation surface water resources; Thermal regime.

Unit – II: Applied Climatology Practical (25 Marks)

Water balance elements – Potential evaporation, Actual evaporation, Water surplus, Water deficit, Aridity index, Moisture index (Thornthwaite and Mathur, 1955)

Unit – III: Literature Review (25 Marks)

Select two books and three articles (Reputed/UGC approved journals) reviews related to research topic.

Unit – IV: Presentation (Seminar) (25 Marks)

Title, introduction, statement of the problem, significance of the study, study area, objectives, hypothesis/research questions, proposed methodology, review of related literature.

Course: GEDM– PHD 9003D
TRANSPORT GEOGRAPHY (Theory)
Full Marks – 100 (4 Credits)

Unit – I: Introduction **(25 Marks)**

Nature and Scope of Transport Geography, Geographic Relevance of Transportation, Transport network and development; Transport network analysis: Centrality, Accessibility and Connectivity.

Unit – II: Modes and Models of Transportation Systems **(25 Marks)**

Characteristics and relative significance of different modes of transport: Railways, Road-ways, Waterways, Airways, Pipelines, etc; Role of intermediary transport modes, concept of modal split; Transport Models: Spatial interaction model, Gravity Models, Allocation Model, and Traffic Congestion Model.

Unit – III: Transport Economics and Trade **(25 Marks)**

Transport Cost Analysis: Principles of transport cost fixation, comparative cost advantage; Role of transport in world and regional trade, Freight Corridor

Unit – IV: Contemporary Issues and Challenges faced at Transport Sector **(25 Marks)**

Urban transport: growth and problem of urban transportation; Environmental degradation: vehicular pollution and congestion; alternatives to the transport system in mega cities in India; Transport policy and planning in India.

References:

1. Ashton, W.D., (1966): The Theory of Traffic Flow, Methuen, London
2. Berry, B.J.L et al.(1966): Essays on Commodity Flow and Spatial Structure of Indian Economy, Department of Geography, Chicago.
3. Black, W. R. (2003): Transportation: A Geographical Analysis, Guilford Press, New York.
4. Chorley, R.J. & Haggett, P.(ed.) (1969) : Network Analysis in Geography, Arnold, London.
5. Haggett, P. (1965): Locational Analysis in Human Geography, London.
6. Hoyle, B.S., and Knowles, R.D. (eds.) (1992): Modern Transport Geography, Belhaven Press, London
7. Hurst, E. (1974) : Transport Geography - Comments & Reading, McGraw Hill.
8. Kansky, K.J., (1963): Structure of Transportation Networks: Relationships between Network Geometry and Regional Characteristics, University of Chicago, Department of Geography, Research Paper, Chicago, 84.
9. Saxena, H. M. (2005): Transport Geography, Rawat Publication, New Delhi
10. Taffe, E. J. and Gauthier H. L. (1973): Geography of Transportation, Prentice-Hall
11. White, H.P. and Senior, M.L. (1983): Transport Geography, Longman, Hong Kong
12. V.D. and Gautam S. (1964): Principles and Problems of Indian Transport, Kailash Pustak Sadan, Gwalior.
13. Raza, M. and Aggarwal, Y., (1986): Transport Geography of India, Concept Publishing Company, New Delhi.
14. Dasgupta, A.K. and Pearee, D.W. (1972); Cost Benefit analysis, theory and practice; Mac Millan, London.
15. Vaidya B C (eds)(1998): Reading in Transport Geography: A Regional Perspective, Devika Publications, New Delhi.

Course: GEDM – PHD 9004D
TRANSPORT GEOGRAPHY (Practical)
Full Marks – 100 (4 Credits)

Unit – I: Quantitative Analysis in Transport Studies (25 Marks)

Graph theory and Network Geometry: Concept of topology, topological measurement of network efficiency; Gravity model and Breaking point analysis; Regional variations in transport density; Traffic flow and regional interaction.

Unit – II: Application of GIS in Transport Planning (25 Marks)

Mapping of Transport Network with help of computer application and GIS.

Unit – III: Literature Review (25 Marks)

Select two books and three articles (Reputed/UGC approved journals) reviews related to research topic.

Unit – IV: Presentation (Seminar) (25 Marks)

Title, introduction, statement of the problem, significance of the study, study area, objectives, hypothesis/research questions, proposed methodology, review of related literature.

Course: GEDM-PHD-9003 E

POPULATION AND SUSTAINABLE DEVELOPMENT (Theory)

Full Marks – 100 (4 Credits)

Unit 1: Concepts and theories (25 Marks)

Concept: population, development, sustainable development; Theories: Malthus, Marx, Neo-Malthusian and Cornucopian; Demographic transition: stages, form and Transformation.

Unit II: Population composition (25 Marks)

Measurement: vital rates, life table and population projection; Ageing: concept, Measurement, global and Indian patterns, implications

Unit III: Human development (25 Marks)

Human development: component, measurement, distribution and poverty; Inequalities: gender, caste, tribe, health, work participation, religion, migration.

Unit IV: Sustainable development (25 Marks)

Indigenous population and sustainable development: vulnerability, sustainable Livelihood system, traditional sustainable resource management systems; Food security and sustainable development: concepts, availability, accessibility, stability, utilization; Sustainable consumption: Trends and patterns in developed and developing world, implications.

References:

1. Beaujen- Garnier J (1966) Geography of Population; Longman, London.
2. Bhende Asha A and Kanitkar (2002) Principles of Population Studies, 14th Edition, Himalaya Publishing House, Mumbai.
3. Bilasborrow, Richard E and Daniel Hogan, Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belgium 1999.
4. Bogua, D. J. Principles in Demography, John Wiley, New York 1969.
5. Bose, Ashish et al. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi 1974.
6. Brock, J.O.M and Welb: Geography of Mankind, McGraw Hill, London 1978.
7. Chandana, R.C. (2002) Geography of Population : Concepts, determination and patterns, Kalyani Publishers, New Delhi.
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9. Council for social development (2006) India social development report OUP new Delhi
10. Crook, Nigel Principles of Populations and Development. Pergamon Press. New York 1997.
11. Daugherty, Helen Gin, Kenneth C. W. Kammeryir, An Introduction to Population (Second Edition) The Guilford Press, New York London 1998.
12. Devaki jain (2005) women development and UN – A sixty years of quest for equality and justice, Indiana university press, USA
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15. Hassan, M.I. (2005) Population Geography, Rawat Publication, Jaipur.
16. Mitra, Ashok India's Population : Aspects of Quality and Control Vol I & II. Abhiman Publications, New Delhi 1978.

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18. Premi, M.K. (1991) India's Population Heading Towards a Billion, B.R. Publishing Coporation, New Delhi.
19. Ramakumar R (2006) technical demography, new age international New Delhi
20. Saraswati raju et al (1999) atlas of women and man in India, kali for women, New Delhi
21. Sialkind nail J (2006) encyclopedia of human development vol I,II,III sage new York
22. Srinivasan, K. and M. Vlassoff, Population Development Nexus in India : Challenges for the New Millennium Lata Mc Graw- Hill, New Delhi 2001.
23. Srinivasn K. Basis Demographic Techniques and Applications Sage Publications, New Delhi 1998.
24. Sundaram K. V. and sudesh Nangia, (ed) Population Geography, Henlage Publilcations, UNDP : Human Development Report, Oxford University Press, Oxford 2000.
25. United Nations, Methods for projections of urban and Rural Population No. VIII, New York 1974.
26. Woods R. Population Analysis in Geography Longman, London 1979.
27. Zelinsky Wilbur, A Prologue to Population Geography, Preglic Hall, 1966.
28. Zukerman Ben at al. (1996) human population and environmental crisis, jone & berlett, boston

Course: GEDM-PHD-9004 E

**POPULATION AND SUSTAINABLE DEVELOPMENT (Practical)
Full Marks – 100 (4 Credits)**

Unit- I: Population distribution, density, composition, growth and projection (25 Marks)

Population distribution: mean centre of population, standard distance from mean centre, location quotient; Population density: arithmetic density, physiological, agricultural, lived density; Population composition: Dependency ratio, economic participation measures, sex ratio, population pyramids; Population growth and projection: percentage changes, geometric rates of change, exponential rates of change, population projections, vital rates, life tables.

Unit- II: Measurement of inequality (25 Marks)

Human development index, gender inequality index, multi-dimensional poverty index, Gini co-efficient, Lorenz curve, gender disparity index, disparity index by Sopher's Method, work participation rate.

Unit – III: Literature Review (25 Marks)

Select two books and three articles (Reputed/UGC approved journals) reviews related to research topic.

Unit – IV: Presentation (Seminar) (25 Marks)

Title, introduction, statement of the problem, significance of the study, study area, objectives, hypothesis/research questions, proposed methodology, review of related literature.
