



# Master of Science in Survey Research and Data Analytics

Approved by the Academic Council on 13 December 2023



(स्थापना / Established in 1956)  
बेहतर भविष्य के लिए क्षमता निर्माण  
Capacity Building for a Better Future

## INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES

[Deemed to be University]

Deonar, Mumbai 400 088. <http://iipsindia.ac.in>

Course Code	Course Name	Course Type	Credits	Hours	No. of Internal exam	Weightage	
						Internal exam	Semester exam
	SEMESTER-I						
MSD-F1	Understanding Demography	F	NC	45	3	50	50
MSD-F2	Social Sciences-A Primer	F	NC	45	3	50	50
MSD-C1	Mathematics and Computing- A refresher	C	3	45	3	40	60
MSD-C2	Statistical-Approaches and Avenues	C	3	45	3	40	60
MSD-C3	Acquainting with data: Surveys and Sources	C	3	45	3	40	60
MSD-C4	Sampling Methods-Basics	C	2	30	2	40	60
MSD-C5	Ways and Means of Data Collection	C	3	45	3	40	60
MSD-E1.1	Programming with R	E	2	30	2	60	40
MSD-E1.2	Analysis in STATA	E		30	2	60	40
	Semester Credits	C	16				
SEMESTER-II							
MSD-C6	Data Visualization with Software	C	3	45	3	60	40
MSD- C7	Sampling Methods-Advance		2	30	2	60	40
MSD-C8	Data Quality Assessment and Management	C	3	45	3	40	60
MSD-C9	Programming for Data Analytics in Python	C	3	45	3	60	40
MSD-C10	Predictive Analytics: Theory and Practice	C	3	45	3	40	60
MSD-E2.1	Introduction to Longitudinal Data Analysis	E	3	45	3	40	60
MSD-E2.2	Methods of Decomposition	E		45	3	40	60
MSD- E3.1	Health Systems, and Policies	E	3	45	3	40	60
MSD-E3.2	Urbanization, Space and Planning	E		45	3	40	60
MSD- I	Internship on Survey Research and Data Analytics	I	2				
MSD-V1	Viva-Voce-1	V	2				
	Semester Credits		24				
SEMESTER-III							
MSD-C11	Research, Ethics, and Publications	C	2	45	3	40	60
MSD-C12	Artificial Intelligence and Machine Learning Applications	C	3	45	3	50	50
MSD-C13	Program Monitoring, and Evaluation Design	C	3	45	3	40	60
MSP-C14	Analysis of Complex Survey and Estimation	C	3	45	3	40	60
MSD-C15	Field Work	C	2	30			
MSD-E4.1	Concepts and Measures of Global Health	E	3	45	3	40	60

*Dr. Preet*

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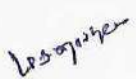

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MSD-E4.2	Health Economics and Financing	E		45	3	40	60
MSD-E4.3	Demographic Models and Indirect Estimations	E		45	3	40	60
MSD- 5.1	Population Ageing and Generational Analysis	E	3				
MSD 5.2	Population, Environment and Sustainable Development	E		45	3	40	60
MSD 5.3	Gender Analytics and Reproductive Health	E		45	3	40	60
	<b>Semester Credits</b>		<b>19</b>				
<b>SEMESTER-IV</b>							
MSD-C16	Applied Multivariate Analysis	C	3	45	3	40	60
MSD-C17	Projections and Forecasting	C	3	45	3	40	60
MSD E6.1	Spatial Analytics	E	3	45	3	40	60
MSD E6.2	Bayesian and Small area estimation Methods	E		45	3	40	60
MSD-D	Dissertation	D	10				
MSD-V2	Viva-Voce-II	V	2				
	<b>Semester Credits</b>		<b>21</b>				
	<b>TOTAL CREDITS</b>		<b>80</b>				

- \*Not counted for calculating the final grade
- F – Foundation course, C – Core course, E – Elective course, NC: Non Credited course; V-Viva voce, D–dissertation.
- Semester I: One elective should be opted from E1.1/E1.2,
- Semester II: One elective should be opted from each group i.e. E2.1, E2.2; E3.1/E3.2
- Semester III: One elective should be opted from each group; i.e. E4.1/E4.2, E5.1/E5.2/E5.3
- Semester IV: One elective should be opted from E6.1/E6.2

**Objective:** To introduce basic concepts, measures and pattern related to Demography

**Course Outcome** On successful completion of this course, students will be able to

1. Understand basic concepts and components of demography
2. Basic knowledge of concepts, measures and determinants of fertility
3. Working knowledge of mortality measures and life table construction
4. Understand concept, measures and determinants of migration

**Course content**

I. **Introduction to Demography:** Definition and Scope: Evolution of demography as a scientific discipline; Nature and scope of demography and changes in it over time. Multi-disciplinary nature of Demography, its linkage with other social science disciplines. Basic demographic concepts. Components of population change. Demographic transition (description rather than theory).

**Measures of age and sex structure** Defining age and sex, sex ratio, sex ratio at birth, Classification of age group and their importance, Measures of age structure: Percent distribution, Median age, age-sex pyramid, dependency ratio and potential support ratio.

Factors affecting age and sex structure, Importance of age-sex structure in Demography. Socio-economic implications of age and sex structure

II. **Fertility:** Importance of the fertility study in population dynamics; Basic terms and concepts used in the study of fertility

Basic concepts; Problems in fertility analysis; period and cohort approaches; Period measures of fertility - basic fertility measures, order-specific fertility rates, Coale's fertility indices; Cohort measures; Birth interval analysis; Reproduction measures

Determinants of natural fertility; Davis intermediate variables framework of fertility; Socio-economic determinants of proximate variables; Lee and Bulatao framework of fertility determinants; Bongaarts proximate determinants

III. **Mortality:** Need and Importance of the study of Mortality; Some basic measures: - crude death rate (CDR) and Age-Specific Death Rates (ASDRs) - their relative merits and demerits

Need and importance of standardization: direct and indirect technique of standardization of rates and ratios in the light of mortality rates; Decomposition

Infant mortality rate and its sub-divisions; Maternal Mortality Rate, Ratios, Life time risk; Issues related to estimation of maternal mortality measures

Basic concept of a life table; Types and forms of life table; Anatomy of life table; uses of life table in demographic analysis; Construction of life tables; model life tables

IV. **Migration:** Concept of mobility and migration, sources and quality of data, types of migration, census definition of migrants, limitations

Internal migration patterns and characteristics in developing countries with a special focus on India; Determinants of internal migration: Causes of migration at the place of origin and at the place of destination; Patterns of international migration: Historical and recent trends; causes and consequences of international migration

Direct estimation of lifetime and inter-censal migration rates from census data; Indirect measures of net internal migration: Vital Statistics Method, National Growth Rate Method and Census and

Life Table Survival Ratio methods; Methods of estimating international migration; Migration surveys

### **Essential Reading List**

1. Bhende, A., (1996): Principles of Population Studies (Seventh Edition), Himalaya Publishing House, Bombay.
2. Davis, Kingsley (1968). The Population of India and Pakistan, Russell and Russell, New York.
3. Jacob S. Siegel and David a. Swanson (2004): The Methods and Materials of Demography, Second Edition, Chapters 1, 2, 3, 7, 9,10, Elsevier Science, USA.
4. Shryock, Henry S. Jacob S. Siegel and Associate, (1980): The Methods and Materials of Demography Vol.1 & 2, U.S. Bureau of the Census, Washington D.C.
5. John R. Weeks, (2005), Population: An Introduction to Concepts and Issues,Nineth Edition, Wadsworth Publishing Company, Belmont, California.
6. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis, Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.
7. Asha A. Bhende and Tara Kanitkar, (2003), Principles of Population Studies,
8. Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
9. Hinde, Andrew (1998) Demographic Methods. London: Arnold.
10. United Nations, (1974): Methods of Measuring Internal Migration, Manual VI, UN, New York.

### **Suggested Reading List**

1. Rowland, Donald T. (2006), Demographic Methods and Concepts. New York: Oxford University Press.
2. Yaukey, David. 1985. Demography: The study of Human population. St. Martins, New York.
3. Coale, Ansley J. and Paul, Demney (1983): Regional Model Life Tables and Stable Populations, Academic Press, New York.
4. United Nations (1982): Model Life Tables for Developing Countries, United Nations, NewYork.
5. United Nations, (1979): “Trends and Characteristics of International Migration Since 1950” Demographic Studies No. 64, UN, New York.

**Objective:** To build foundation on social sciences including Sociology, Psychology, Geography, and Economics

**Course Outcomes** On successful completion of this course, students will be able to

1. Understand concepts of sociology, society, culture and social change.
2. Acquire basic understanding of Social Psychological Concepts including Psychoanalysis, Personality Motivation, Attitude, Behaviour, Learning and Communication Processes

**Course Contents:**

**I. SOCIOLOGY**

Sociology: sociology as a social science- its nature, subject matter and scope Relation of sociology with other social sciences, sociological perspective. Basic Concepts in sociology

The Family: Sociological Significance of the Family; Types and functions of Family; Nuclear and joint families

Marriage: Different forms of marriage, changing patterns of marriage/mate selection in India

Kinship –features of kinship system in India, regional variations

Social stratification : Social Class and Caste: Principles of Class and Caste

Socialization : agencies of socialization

Culture: meaning and characteristics of culture.

**Society and Culture in India**

Aspects of society and culture in India, and its role and importance in Population Studies.

Social Institutions and their role in influencing demographic situation of the Population of India - Family, Marriage, Kinship and Religion

**Caste System**

Concept and definition of Caste System, Changing Caste System in India

Social Mobility : vertical and horizontal, intra- and inter-generational mobility

**Social Change**

Definition and Concept of Social Change. Process of Social and Cultural Changes in India and their role in influencing demographic behaviour: a) Sanskritization b) Westernization c) Modernization

**II. Social Psychological Concepts:**

Psychology as a Discipline: Branches and dominant Psychological thoughts

Psychoanalysis: Cognitive Behaviour,

Social Psychological Concepts and its relevance to Population Studies

Personality Motivation, Attitude, Behaviour,

Learning and Communication Processes: Concept, Meaning, Scope, and need in the Context of Population Studies.

### **III. GEOGRAPHY**

Importance of Geographical factors- Physical factors (relief, rainfall, temperature, soil and vegetation) Economic and Social factors (Mineral resources and industrialisation, transport, language, religion and caste/tribe); the influence of geographical factors on population.

Geographical approaches: the concept of region- formal and functional regions; the concept of growth pole and regional development; core and periphery; distance and decay function; Maps-scale, choropleth, isopleths and distribution maps.

Physical divisions of India; administrative organization of India. Historic-Cultural regions; Agro-climatic regions; NSS regions.

Theoretical Perspectives in Geography- Place of geography in Social sciences; man and nature relationship- determinism and possibilism; Positivism (quantification) and Phenomenology; and Radical and Postmodern Geography.

Concept of Social Space; Social Structure and Spatial Structure; Role of time and space in social sciences.

### **IV. ECONOMICS**

#### **Introduction:**

Defining Economics, Micro and Macro economics, Economic and non economic good, Basic Economic Activities, Factors of Production, Economic Systems.

#### **Basic Concepts in Micro Economics**

Concept of Marginal and Total Utility, Law of Diminishing Marginal Utility, Theory of Demand: Indifference curves Theory and Properties, Equilibrium of consumer, Income, Substitution and Price effect. Elasticity of Demand: Price, Income and cross elasticity, Basic concepts in theory of production, cost and market structure.

#### **Basic Concepts in Macro Economics**

Basic Concepts in National Income: Concept of GDP, NDP, GNP, NNP, NI, PCI, GDPPCI, PPP, GDPPCI (PPPUS\$), Theory of consumption and saving: Consumption function, Keynes' Psychological law of consumption, concept of APC and MPC, APS and MPS, Factors affecting consumption and savings, Basic concept of Investment.

#### **Economic Theories**

Political economy and protectionism – Mercantilism, Classical economics and free enterprise – Adam Smith and David Ricardo, Welfare economics – Alfred Marshall and Amartya Sen, Karl Marx and the Labour theory of Value, Empirical economics – Paul Samuelson.

#### **Indian Economy: Structure, Planning and Growth**

Characteristics of Indian Economy: Economic Transition in India, Strategy of economic planning in India, Industrial Policy 1956, 1977 and 1991, New Economic Reforms- 1991, Other Development issues: Poverty and Unemployment.

#### **Essential Reading List**

1. Davis, Kingslay, Human Society, MacMillan and Co., New York, (1975), Chapters 1, 3,5,6.
2. Kapadia, K. M., Marriage and Family in India, Oxford University Press, Calcutta, (1966).

3. Mandelbaum, D.G., Society in India-Continuity and Change(vol.1) and Change and Continuity, (Vol. 2). University of California Press, London, (1970).
4. Mac Iver R.M. and Charles H. Page, Society: An Introductory Analysis, Holt, Rinehard and Winston, New York, (1949), Chapters No.1, 3,7,11,15,22,24,25,26.
5. Srinivas M.N., Social Change in Modern India, University of California Press, Berkeley, (1966)
6. Haralambos, Michael, Sociology: Themes and Perspectives, Oxford University Press, Delhi (1980).
7. Ahuja H.L, Advanced Economic Theory: Microeconomic Analysis, S. Chand and Company Limited, New Delhi, Chapters 5,6,7,8,9,12,16, 17, 18, 20
8. Koutsoiannis A, 1979, Modern Microeconomics, London: Macmillan Press Ltd,
9. Lipsey and Chrystal, 2004, Economics, Oxford university Press, Part One, part two and part five
10. Dasgupta AK, Epochs of Economic Theory, OUP, Bombay, Chapters 2, 3, 4, 7 and 8
11. Datt R and Sundaram K.P.M, 2000, Indian economy, S. Chand & Company Ltd, Part II.
12. Abler, R, Adams, J and Gould P., (1971): Spatial Organization: The Geographer's view of the World, Prentice Hall, New Jersey.
13. Johnston, R.J., (2004): Geography and Geographers, Oxford Unity Press.
14. Richard, Peet., (1998): Modern Geographic Thought, Blackwall Publishers
15. Singh, R.L., (1971) India: A Regional Geography, National Geographical Society of India, Varanasi.
16. Francis John Monkhouse (1956) Maps and Diagrams: Their Compilation and Construction, University of Michigan.
17. JF Friedman (1966) Regional Development Policy: A Case Study of Venezuela, Cambridge, Massachusetts : MIT Press, 1966.

### **Suggested Reading List**

1. Kuppuswamy B., Social Change in India, Konark Publication Pvt. Ltd. Delhi, (1972).
2. Muzumdar, Haridas , The Grammar of Sociology: Man in Society, Asia Publishing House, Mumbai ( 1966).
3. Johnson, Harry M, Sociology : A Systematic Introduction , Allied publishers, Bombay (1966).
4. Mc Gee , Reece , Sociology: An Introduction , Holt, Rinehard and Winston, New York ( 1980).
5. Magill ,Frank N (ed.), International Encyclopedia of Sociology, Fitzroy Dearborn Publishers, London, (1995).
6. Samuelson, Paul A. and William D. Nordhaus.,, “Economics”, New York: Tata McGraw Hill, part one, two and five
7. Blaug, M., 1962. “Economic Theory in Retrospect”, London: Heinemann Ltd.
8. Haney, Lewis H., 1960, “ History of Economic Thought”, New York: Macmillan
9. Government of India, Ministry of Finance, Economic Division, Economic Survey, 2001-2002
10. Sigmund Freud, The Interpretation of Dreams (1900)
11. Charles M. Duhigg, The Power of Habit (2012)
12. Karen Horney, The Neurotic Personality of Our Time (1937)
13. Oliver Burkeman, The Antidote: Happiness for People Who Can't Stand Positive Thinking



(2012).

14. Carl Gustav Jung, Man and His Symbols (1964)

15. Introduction to Psychology 10th Edition James W. Kalat (2013)

## MSD-C1 MATHEMATICS AND COMPUTING- A REFRESHER

**Objective:** To comprehend students with knowledge of basic mathematics and computational techniques which are essential to build foundation for survey research methods and data analytics.

**Course Outcome:** On successful completion of this course, the students will be able to

1. Understand basic concepts of metrics linear algebra which will be useful in data analytics
2. Acquire knowledge of numerical methods which is essential basic knowledge for understanding dynamics of data
3. Understand basic concepts of functions, equations and their solutions
4. Introduced basic computational concepts and software R.

### Course Content

**I: Set Theory and Vector:** Sets, Types of Sets, Basic Operations on Sets, Venn diagram, Cartesian product of two sets, Distributive law, De Morgan's Law, Definition of functions, Domain and Range, Increasing and decreasing functions, Concavity of functions, Types of vectors, Vectors in 2d and 3d planes, vectors in  $R_n$ , Vector addition, scalar multiplication and their properties, Dot product, cross product and their applications, Orthogonality

**II: Matrices** Matrix, Submatrix, types of matrices, symmetric, square, diagonal matrices, singular and non-singular matrices. Addition, Subtraction, multiplication of matrices, Rank of matrix. Trace, Determinants Transpose, Inverse, eigenvalues, eigenvectors

**III Vector space:** Definition of vectors spaces over real numbers, Subspaces of a vector space, Linear span of vectors, linear dependence and linear independence, Basis and dimension of vector spaces, linear transformation, The matrix of Linear Transformation, Rank Nullity theorem, change of basis and similar matrices

**IV: Numerical Methods:** Factorial, finite differences, and interpolation. Operators, E and divided difference. Newton's forward, backward and divided differences interpolation formulae. Lagrange's interpolation formulae. Central differences, Gauss and Stirling interpolation formulae. Constant change and linear growth, Equation of lines, Linear functions and graphs, Quadratic, Exponential, and Logarithmic Functions, derivatives. Solutions to differential equations

**V Basic concepts for computations:** Events, variable, measurement scale of variable, Person-time, Proportion, Ratio, Rate, and Probability, Period, cohort measures, incidence, prevalence

**VI. Introduction to Computer Programming:** Introduction to computer programs, algorithm, editor, Compiler and Interpreter, Programming Environment: Basic Syntax, Variables and Data Type, Keywords, Basic Operators, Loops, Number, Characters, Arrays, Strings and Functions.

**Introduction to R:** Installation, importing data, calculations, numbers, vectors, objects, arrays and matrices, dataframe

**Readings:**

- 1) Kolman, Busby and Ross, PHI, Discrete Mathematical Structure.
- 2) Malik S.C. and Savita Arora: Mathematical Analysis, Second Edition, Wiley Eastern Limited, New Age International Limited, New Delhi, 1994.
- 3) Gentle J.E. Matrix Algebra : Theory, Computations and Applications in Statistics. Springer Science+Business Media, LLC, New York, 2007.
- 4) Goel B. S. and Mittal S. K.: Numerical Analysis, Pragati Prakashan, ND, 2008
- 5) Jain, M. K., Iyengar, S. R. K. and Jain, R. K. (2003): Numerical methods for scientific and engineering computation, New age International Publisher, India.

**MSD-C2 STATISTICAL-APPROACHES AND AVENUES**

**Objective:** This course aims to provide students with basic knowledge of statistical techniques which is essential to build foundation for survey research methods and data analytics.

**Course Outcome:**

1. Learn basic measures of central tendency and dispersion
2. Working knowledge of probability distribution
3. Knowledge of concept of correlation and regression and interpretations of coefficients
4. Know basic concept of inferential statistics, including choosing appropriate statistic to test hypothesis

**Course Contents:**

**I. Introduction to statistics:**

Descriptive and Inductive statistics. Concept of variables, Nominal, Ordinal and Interval and ratio scale variables. Presentation of data, conversion of raw data into frequency distribution, graphical presentation of nominal, ordinal data,

**Measures of Central Tendency:**

Mean (arithmetic, geometric, harmonic) Median, Mode; Merits and demerits of different measures.

**Measures of dispersion:**

Range, Variance, Standard Deviation; Merits and demerits of different measures of dispersion. Measures of Skewness and Kurtosis.

**II. Introduction to probability:**

Definition of probability, Events: exhaustive, mutually exclusive events; Laws of probability, additive and multiplicative laws of probability, Bayes' theorem with application

**Discrete probability distribution:**

Binomial and exponential functions, Binomial probability distribution and Poisson distribution and their properties.

### **Continuous probability distribution:**

Introduction to Normal distribution and its properties, applications of normal distribution.

### **III. Correlation & Regression:**

Definition of correlation, scatter diagram, Pearson correlation coefficient, and its properties; Spearman ranks correlation coefficient. Concept of linear regression, fitting of regression line.

**IV Statistical Inference** Introduction to Statistical Inference, Types of data and variables, Basic principles of statistical inference, The role of probability in statistical inference

#### **A: Estimation**

1. Concept of population, random sample, parameter, statistic, estimator, sampling distribution of random sample, joint and marginal distribution of functions of random variables.
2. Role of normal distribution in statistical inference, law of large numbers, Central Limit Theorem, sampling from normal distribution- Chi-square distribution, F- distribution, Student's t distribution and their properties.
3. Methods for finding estimators-method of moments, maximum likelihood, method of minimum Chi-square, properties of estimators: mean square error (MSE), minimum MSE, unbiasedness and minimum variance unbiased estimator (MVUE), Cramer-Rao lower bound of variance, relative efficiency of estimator.
4. Concept of confidence interval, confidence interval for- mean, difference in means, variance, methods of finding confidence interval- pivotal quantity and statistical methods.

#### **B: Testing of Hypothesis**

1. Statistical hypotheses- simple and composite, statistical tests, critical region, Type I and Type II errors, size and power of test.
2. Definition of most powerful (MP), and uniformly most powerful (UMP) tests, power functions of tests with illustration, Neyman- Pearson lemma and its application in hypotheses testing regarding binomial, Poisson, normal and exponential distributions.
3. One sample and two sample test for mean, test for a binomial proportion; Score test versus Wald; Exact binomial test; Tests for differences in binomial proportions; Intervals for differences in binomial proportions.
4. Introduce Fisher's exact test; Chi-squared test for equivalence of two binomial proportions; Chi-squared tests for independence; Chi-squared tests for goodness of fit; Hypothesis tests of marginal homogeneity; Estimating marginal risk difference; Estimating marginal odds ratios; Distinction between conditional and marginal odds ratios.
5. Need for non-parametric test, sign test for location of univariate and bivariate populations, Wilcoxon-Mann-Whitney test, run test, median test, and test based on Spearman's rank correlation.

#### **2: Estimation**

- Point estimation and interval estimation
- Properties of estimators

- Confidence intervals and their interpretation

### 3: Hypothesis Testing

- Basic concepts of hypothesis testing
- Types of errors and power
- One-sample and two-sample hypothesis tests

### 4: Likelihood-Based Inference

- Maximum likelihood estimation
- Likelihood ratio tests
- Goodness-of-fit tests

### 5: Nonparametric Inference

- Basic concepts of nonparametric inference
- Nonparametric density estimation
- Nonparametric hypothesis testing

### 6: Advanced Topics in Inference

- Bootstrap methods for inference
- Permutation tests
- Model selection and regularization

### 7: Applications and Software

- Applications of statistical inference to real-world problems
- Statistical software for inference ()
- Interpretation and communication of statistical results

### **Reading List**

1. Bhat N.R and M.R. Singh, 1993. *Applied Mathematics*. New Delhi: Tata McGraw – Hill Publishing Company Ltd.
2. Blalock, Hubert M. (1960): *Social Statistics*, McGraw-Hill Book Company, New York.
3. Chakravorti, S.R. and Giri, N. (1997): *Basic Statistics*, South Asian Publishers, New Delhi.
4. Clarke, G.M. and Cooke, D., (1994): *A Basic Course in Statistics*, Arnold, London.
5. Dillon, W.R. and Goldstein, M. (1984): *Multivariate Analysis*, John Willey and Sons, New York.
6. Dixon, W.J and Massey, F.J. (1983) *Introduction to Statistical Analysis*, 4<sup>th</sup> ed., New York, MC Graw Hill, 380-381, 534.
7. Douglas and Altman (2006): *Practical Statistics for Medical Research*, Chapman and Hall

- Publication, Washington, D.C.
8. Ebdon, E. (1978): Statistics in Geography, Basil Blackwel, Oxford.
  9. Fisher, L.D and Van Belle, G. (1993) Biostatistics : A Methodology of the Health Sciences, New York, Wiley Intgescience,
  10. George Casella and Roger L. Berger "Statistical Inference" by (3rd edition)
  11. Goon, A.M., Gupta, M.K. and Dasgupta, B. (1985): *Fundamental of Statistics* Vol. I , The World Press Private Ltd. Calcutta.
  12. Graeme Hutcheson and Nick Sofroniou, (1999): *The Multivariate for Social Scientist*, SAGE Publications.
  13. Gupta, S.C. and Kapoor, V.K. (1986): *Fundamental of Mathematical Statistics*, Sultan Chand and Sons Publishers, Delhi.
  14. Hogg, R.V and Craig, A.T.: Introduction to Mathematical Statistics, Fourth edition. Collier Macmillan Publisher.
  15. Howell David C. "*Fundamental Statistics for the Behavioral Sciences*", 4<sup>th</sup> Edition, an International Thosurooss Publishing Company, USA.
  16. Jack Lee. "Inference Principles for Biostatisticians
  17. Jain, S.K.1979. *Basic Mathematics for demographers*. Canberra: The Australian National University.
  18. Larry Wasserman "All of Statistics: A Concise Course in Statistical Inference"
  19. Lipshutz, Seymour., *Schaum's Outline Theory and Problems of Set Theory and Related Topics* Series, Mcgraw Hill.
  20. Marcello Pagano and Kimberlee Gourneau (2000) "*Principles of Biostatistics*" Second Edition, Duxbury Thomson Learning, United States.
  21. Mc Clave, James T., P. George Benson and Terry Sincich (2001): *Statistics for Business and Economic*, Eighth Edition, Prentice Hall, NJ, USA.
  22. Mood, A.M., Graybill, F.A., and Boes, D.C. : Introduction to the Theory of Statistics, Third edition. McGraw Hill.
  23. Norman R. Kurtz (1999): *Statistical Analysis for the Social Sciences*, Allyn and Bacon.
  24. Prakasam, C.P., G. Rama Rao, and R.B. Upadhyay (1987): *Basic Mathematics in Population Studies*, Gemini Publishers, Mumbai.
  25. Retherford, R.D. and Choe, M. K., (1993): *Statistical Models for Casual Analysis*, A Wiley-Inter-Science Publications, John Wiley and Sons, INC, New York.
  26. Roa, C.R.: Linear Statistical Inference and Applications, Revised edition. Wiley Eastern.
  27. Siegel J.J. and D.A. Swanson (Ed.), 2004. *The Methods and Materials of Demography*. Second Edition. Elaevier Academic Press.
  28. Sundaram, K. R., S. N. Dwivedi and V Sreenivas. (2009). Medical Statistics-Principles & Methods. Anshan Publisher.
  29. Venkatachary, K (1994). *Elements of Mathematics for Demographers*. Monograph Series No.9. Regional Institute for Population Studies, University of Ghana. Legon.



**Objectives:** To introduce different data sources and provide an overview of Demographic and Population health surveys across the globe and India.

### Course Outcome

1. Working knowledge of the Census, registration system, and history of demographic data sources
2. To comprehend the need, objectives and importance of large-scale data in monitoring and evaluation of health and population policies and programmes
3. Introduced global and national importance surveys
4. Understand the stages of completing a useful and appropriate survey.

### I. History of Demographic and Health data Sources

Paris registers, Population registers, Census, Vital registration data, Bills of mortality, Fiscal documents, Military records, Inventories of properties, Genealogies, Marriage practices, Archaeological remains, Administrative geography, Colonization of new land, Cemetery data, Traveler's tales.

### II. Population Census and Registration System

**Population Census:** Population census across the world. Census taking under British India, Indian census, details of different items on which Indian census collect data, enumeration method, publications of census data/ reports.

**Registration system:** Vital registration system, Civil registration system, Sample registration system (SRS), survey on causes of death, HMIS.

### III. Scope of large-scale survey and its phases

Need for large scale surveys, objectives of cross-sectional, longitudinal, rotational and interpenetrating surveys, representativeness. Planning, sampling design, developing data collection tools, field implementation, data process, analysis, report writing and dissemination

### IV. Introduction to Demographic, Population Health surveys

**Global surveys:** World Fertility Survey (WFS); Demographic Health Survey (DHS); Multiple Indicator Cluster Survey (MICS); World Health Survey (WHS); Health and retirement Survey (HRS); Study on Global Ageing and Adult Health Survey (SAGE)

**Nationwide large-scale surveys:** National Sample Survey Organization's surveys, details of different rounds collecting population and health data; National Family Health Survey (NFHS); District Level Household and Facility Survey (DLHS); Annual Health Survey (AHS); Longitudinal Ageing study in India Survey; Study on Global Aging and Adult Health Survey (WHO-SGAE)-India; Global Youth Tobacco Survey (GYTS); Global Adult Tobacco Survey; YOUTH survey; Nutritional Specific Surveys

### Reading List:

1. United Nations (2005): Household Sample Surveys in Developing and Transition Countries.
2. [www.unstats.un.org/unsd/hhsurveys/](http://www.unstats.un.org/unsd/hhsurveys/)
3. Family Health International: Behavioral Surveillance Surveys. Family Health International, 2000.

4. Bhende, A., (1996): Principles of Population Studies (Seventh Edition), Himalaya Publishing House, Bombay. Davis, Kingsley (1968).
5. Jacob S. Siegel and David a. Swanson (2004): The Methods and Materials of Demography, Second Edition, Elsevier Science, USA.
6. John Weeks (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.
7. Livi-Bacci, M. (1996): A Concise History of World Population (2nd edition), Oxford.
8. Maheshwari, S.R. (1996). The Census Administration under the Raj and After, Concept Publishing Company Pvt. Ltd., New Delhi.
9. Registrar General of India, Census of India -2011, Ministry of Home Affairs, Govt. of India. United Nations (1958). Multilingual Demographic Dictionary, John Wiley & Sons Ltd., New York.
10. United Nations, (1973): The Determinants and Consequences of Population Trends, Vol. I, Population Studies, No. 50, Chapter VII, New York.
11. World Population Prospects

<b>MSD-C4</b>	<b>SAMPLING METHODS-BASICS</b>
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#### **Course Outcomes:**

CO1: Gain understanding of basic concepts related to sample surveys with specific references to health and demographic surveys.

CO2: Gain understanding of basic sample survey designs.

CO3: Learn skills to design and implement sample surveys in keeping with research objectives.

1. Concept of sampling: Concept of population and sample, need for sampling, sample survey verses census, elementary units, sampling units, assumptions of sampling from finite population, sampling frame, selection and inclusion probabilities, probability and non-probability sampling, concept of sampling mechanism and sampling design. Overview of complex surveys, Types of sampling methods, Probability sampling designs, Nonprobability sampling designs

2. Sample size computation

Sample size calculations using estimation targets based on relative standard error, margin of error, and power requirements; Use of mathematical programming to determine sample sizes needed to achieve estimation goals for a series of subgroups and analysis variables, Methods of sample allocation for multistage samples;

3. Simple Random Sampling with and without replacement
  - Estimation of population means and totals
  - Sampling error and variance estimation

#### 4: Stratified Sampling

- Estimation of stratum means and totals
- Optimal allocation of sample size
- Weighting methods for unequal selection probabilities

5. **Systematic random sampling:** Concept of systematic sampling, comparison with simple random sampling, variance estimation, comparison with stratified random sampling, systematic sampling, selection procedure for fractional interval, circular systematic sampling.

6. Use of auxiliary information, ratio and regression methods of estimation under simple random sampling, bias, mean square error, and ratio and regression estimators in stratified random sampling.

7. Cluster Sampling

- Definition and properties of cluster sampling
- Estimation of population means and totals
- Design effects and variance estimation

Readings:

1. Cochran, W.G. (1977). Sampling Technique, Third edition. New York: John Wiley & Sons.
2. Damico, A. Step-by-step instructions to analyze major public-use survey data sets with the R language
3. Des Raj (1972). The design of sample surveys. McGraw Hill
4. Fares Qeadan. Sampling Methods Using STATA
5. Kish, Leslie, (1995): Survey Sampling, John Wiley and Sons, Inc. New York.
6. Ladusingh, L. (2018). Survey Sampling Methods, PHI Learning, New Delhi
7. Lohr L. Sharaon., (1999): Sampling: Design and Analysis, Duxbury Press, London.
8. Lumley, T. Complex Surveys: A Guide to Analysis Using R
9. Murthy, M.N. (1977). Sampling Theory and Methods, 2nd Edition. Calcutta: Statistical Publishing Society.
10. Roy, T.K., Acharya R., Roy, A.K. (2016). Statistical survey design and evaluating impact,
11. Cambridge University Press, New Delhi.
12. Sukhatme, P.V. and Sukhatme, B.V. (1970). Sampling Theory of Surveys with Applications. Asia Publishing

MSD-C5	WAYS AND MEANS OF DATA COLLECTION
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**Objective:** To comprehend students with working knowledge of data collection methods, questionnaires and software

**Course outcome**

1. Understand different interview techniques and methods of data collections
2. Able to design checklist and guidelines for qualitative data collection
3. Understand questionnaire structure and standards for large scale quantitative surveys
4. Working knowledge of software used for data collection

**Course content**

**Data collection and Interview Techniques:** Mail method, interviews through telephone, internet and computers, face-to-face interviews or personal, self-administered and interview administered questionnaire, Quantitative vs. qualitative data collection, Principles and guideline for interview, language.

**Qualitative Methods of data collection:** In-depth interviews, key informant interview, observation (participatory and non-participatory), focus group discussion, content analysis, social

mapping, social networking, free listing, pile sorting, projective techniques, mechanical devices (camera, tape recorder), mystery client technique, vignettes method.

**Software for Qualitative Research:** ANTHROPAC, Atlas Ti and Group Work

**Questionnaire Development for quantitative surveys:** Types of Questionnaire/schedule, Checklist schedules, structure of questionnaire, roster, skipping non applicable questions, checks. Standardization of tools, Principles of constructing a questionnaire/ interview schedule, Types of questions (knowledge, attitudinal, behavioral, practice), framing of questions (simple, delicate, personal matter), sequencing of questions. Updating/developing new questions. Testing survey tools: Pretest. Translation in regional language

Attitude Scales: Point scales, ranking scales, rating scales, limitations of attitude scales, Types of Scales: Bogardus, Guttman, Likert, Semantic, Thurstone scale.

**Software for Data Collection in large scale surveys:** Computer assisted personal interview (CAPI), process of data transfers, introduction to features of Census and Survey Processing System (CSPRO), steps for development of data entry software in CSPro; Web-designed questionnaires.

**Ethical consideration in Data Collection:** Informed Consent, approvals from institution review board

**Field visits and Group work**

**Reading List:**

1. CSPro Software. [www.census.gov/data/software/cspiro.Download.htm](http://www.census.gov/data/software/cspiro.Download.htm)
2. United Nations (2005): Household Sample Surveys in Developing and Transition Countries.
3. [www.unstats.un.org/unsd/hhsurveys/](http://www.unstats.un.org/unsd/hhsurveys/)
4. DHS Manuals
5. NFHS Manual for interviewer
6. LASI manual for interviewer
7. Manual for CAPI used in NFHS

## **MSD-E1.1 PROGRAMMING WITH R**

**Course Outcomes:**

CO1: Learn open source softwares R for data analysis.

CO2: Learn exploratory data analysis with R.

CO3: Learn use of R programming for model development.

**Unit I: Introduction**

Introduction to R/RStudio; advantages of R over other programming languages; R packages for data science

**Unit II: Importing dataset**

Understanding the data; importing and exporting data; getting started analyzing data; accessing database

### **Unit III: Data Visualization**

Histogram; boxplots; bar charts; line graphs; heat map; scatterplots; pie charts; customize plot axes, labels, add legends, and add colors

### **Unit IV: Data manipulation**

Pre-processing data; handling missing values; data formatting; data normalizing; grouping data values into bins; converting categorical variables into numerical quantitative variables

### **Unit V: Exploratory data analysis**

Computation of measures of central tendency and dispersion; computation of correlation coefficient; chi-square test for association between two categorical variables

### **Unit VI: Model development**

Linear regression, multiple linear regression, binary logistic regression; ordinal logistic regression

#### **Essential Reading List**

1. Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani, Introduction to Statistical Learning with Applications in R, Springer 2013. Available free online.
2. Christian Kleiber and Achim Zeileis, Applied Econometrics with R, Springer-Verlag, New York, 2008.
3. Download and install R from <https://cran.r-project.org/>
4. Download RStudio from [www.rstudio.com](http://www.rstudio.com)
5. Video Tutorials on Installing R on windows
6. Video Tutorials for Installing R on Mac

## **MSD-E1.2 ANALYSIS in STATA**

### **Course Outcomes:**

CO1: Familiarity with STATA for data analysis.

CO2: Learn model development in STATA.

CO3: Learn use of STATA for survey data analysis.

### **Unit I: Introduction to STATA**

Facilities, creating database structure, data entry, specifying scales, validation of data entry, importing and exporting data.



**Unit II: Importing dataset**

Understanding the data; importing and exporting data; getting started analyzing data; accessing database

**Unit III: Data visualization**

Histogram; boxplots; bar charts; line graphs; heat map; scatterplots; pie charts; customize plot axes, labels, add legends, and add colors

**Unit IV: Data manipulation**

Recoding; creating new variable; sorting; filtering and selection of specific data; merging files; generating simple frequencies; use of syntax editor; handling missing values

**Unit V: Exploratory data analysis**

Computation of measures of central tendency and dispersion; computation of correlation coefficient; chi-square test for association between two categorical variables

**Unit VI: Model development**

Linear regression analysis - interpretation and regression diagnostic test; regression models for binary outcomes, categorical, and ordinal outcomes

**Unit VII: Survey data analysis**

Introduction; need for using survey data commands; estimation of means, proportions, ratios, totals; regression models for binary outcomes, categorical, and ordinal outcomes

**Essential Reading List**

1. StataCorp. 2021. STATA user's guide, release 17. College Station, TX: StataCorp LLC.
2. StataCorp. 2021. STATA survey data reference manual, release 17. College Station, TX: StataCorp LLC.

MSD-C6	DATA VISUALIZATION WITH SOFTWARE
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**Objective:** To introduce Microsoft power BI and R for data visualization and interactive dashboards.

**Course outcomes**

1. Develop data visualization and infographics thinking
2. Create interactive dashboards using Microsoft Power BI
3. Prepare attractive and meaningful graphs, maps using different software

**I. Data-Analytic Thinking and infographics**

Knowing your data, Different types of data, Data pre-processing, Storytelling with data, infographics, making dashboards, Understanding the concepts of dynamic/interactive data visualization and report generation.

**II. Data Visualization from Different Sources**

Understanding structured, unstructured and semi-structured data sources, Data modelling and creating visualization, Data modelling and creating visualization, charts/dashboards from semi-structured data like CSV files, XML, JSON and others, Data modelling and creating, visualization charts/dashboards from live streaming data.

### **III. Data visualization with Power BI**

Introduction to Power BI, data import, cleaning, building data models, creating visualization, types of visualization, Identify the differences between filters and slicers in a Microsoft Power BI, Customize the filter pane for reporting needs, Making interactive dashboards.

### **IV. Data Visualization With R**

Introduction to R programming, R studio projects, Visualization using R, Transformation using R, Exploratory data analysis, Data manipulation with dplyr (introduction to dplyr package), Data visualization with plot, ggplot2, Data presentation with R Markdown.

#### **Reading List:**

- 1) Zhou A. (2022). Data Visualisation in R, Quantitative Methods in Global Health. URL <https://cdn1.sph.harvard.edu/wp-content/uploads/sites/2488/2022/09/Data-Visualization-in-R.pdf>
- 2) Long, J. D., & Teetor, P. (2019). R cookbook: proven recipes for data analysis, statistics, and graphics, CA: O'Reilly. URL: <https://rc2e.com/>
- 3) Core Python Programming - Second Edition, R. Nageswara Rao, Dreamtech Press
- 4) R Graphics Essentials for Great Data Visualization by Alboukadel Kassambara
- 5) Wickham, H. and Grolemund, G. (2016): R for Data Science Import, Tidy, Transform, Visualize, and Model Data. O'Reilly.
- 6) Lander, J.P. (2017): R for Everyone-Advanced Analytics and Graphics. Pearson Education
- 7) Gandrud, C. (2020): Reproducible Research with R and R Studio. 3rd edition, CRC Pres

<b>MSD-C7</b>	<b>Sampling Methods-Advance</b>
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#### **Course Outcomes:**

CO1: Gain understanding of complex sample survey designs.

CO2: Know and appreciate the sampling design of large-scale surveys conducted in India.

CO3: Learn estimation of sampling errors in large-scale surveys

CO4: Become aware about the concept of sampling weights and estimation and application of sampling weights in large-scale surveys.

#### **Unit I: Advanced concepts**

Use of auxiliary information, ratio and regression methods of estimation under simple random sampling, bias, mean square error, and ratio and regression estimators in stratified random sampling.

#### **Unit II: Multi-stage designs**

Introduction; two-stage design; selection of sampling units at different stages; estimation of mean and sampling variance; design effect; intra-class correlation; probability proportional to size sampling

**Unit III: Examples of sampling design of large-scale surveys**

National Family Health Survey; Longitudinal Ageing Study in India; Sample registration System; National Sample Survey Organization

**Unit IV: Estimating sampling errors in large-scale surveys**

Taylor series linearization method; replication approach - the Jackknife repeated replication method, balanced repeated replication

**Unit V: Sampling weight**

Description; computation of sampling weight under different designs; self-weighting designs; post-stratification

**Unit VI: Nonsampling errors**

Introduction; coverage error; non-response error; response error

**Unit VII:** Use of STATA and R for sampling and estimates: Sampling and estimation by simple random sampling, stratified, cluster, systematic and cluster sampling, PPS sampling using STATA and R. Introduction to STATA for survey data analysis-SVYSET, SVYTAB, SVYMEAN, SVYPROP, SVYTOTAL, SVYLC. Introduction to R: reading ASCII file, data summarization: frequency and graphical representation, survey data summarization using R. Installation of libraries: sampling, survey, samplingbook, pps. Use of svydesign, svytotal, svymean.

**Reading List**

1. Kish, L. (1995). Survey Sampling. New York: John Wiley and Sons, INC.
2. Roy, Tarun Kumar, Acharya, Rajib, and Roy, Arun Kumar (2016). Statistical Survey Design and Evaluating Impact. Delhi, India: Cambridge University Press.
3. United Nations (2005). Household Sample Surveys in Developing and Transition Countries. New York: United Nations.
4. Ladusingh, Laishram (2018). Survey Sampling Methods. Prentice Hall India.
5. Cochran, W.G. (1977). Sampling Technique, Third edition. New York: JohnWiley & Sons.

MSD-C8	DATA QUALITY ASSESSMENT AND MANAGEMENT
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**Objectives:** In this course students learn the assessment of quality of demographic and health data with special focus on age data, missing values, and outliers. After completion of this course students are expected to get the following outcomes

**Course Outcomes:**

1. Demonstrate an understanding of the theoretical basis of survey measurement and measurement error; Identify appropriate survey design strategies for a range of measurement challenges
2. Vision to judge the quality of data, comment on it and adjust the data.
3. Learn data processing, including handling missing data and outliers
4. Familiarize to large-scale survey data handling software (STATA).

**Course Content**

- I. **Data Quality Assessment:** Reliability and validity of measurement: Face, content, construct, convergent, concurrent, and predictive validity; Inter-coder reliability, stability, non-random and random errors, scaling and composite indices.  
  
Appraisal of the quality of demographic and health data; Completeness of registration data  
Types of errors, coverage and content errors. Sources of errors.  
  
Examples of data on survey, and census and registration data affected by errors; sampling and non-sampling errors; methods of detecting errors in population data;  
  
Evaluation and measurement of errors in age reporting; methods of adjustment for age-sex data; method of graduation.  
  
Post-enumeration surveys; dual record system.  
  
Techniques of evaluation of age data using Whipple's index, Myer's index, UN Joint score
- II. **Quality assurance procedures in survey**  
  
Building Checks in data collection tools for consistency in responses, spot check, Revisit of sub-samples, field check tables, Use of AI/ML in data quality assurance, digitization of survey process, non-response pattern, and quality lot assurance, roles of supervisors, editors, field and nodal agencies. Third party audit.
- III. **Large scale data processing and conversion:** process from data collection, validation, cleaning, editing to recoding., conversion to different file format, Conversion of ASCII/ CSpPro data into STATA or other formats.
- IV. **Handling Missing Data:** Assessment of missing data: missing at random, logical, non-response pattern, bias, replacing missing data, imputations by average, by regression method
- V. **Data Management in Software:** Introduction to STATA -facilities, creating database structure, data entry, specifying scales, validation of data entry, importing and exporting data. Reshape data structure and merging files.
- VI. Data manipulation using STATA – recoding creating new variable, sorting, filtering and selection of specific data, generating simple frequencies, use of syntax editor.
- VII. Commands in SQL, data types in SQL, data manipulation and data processing with SQL

**Reading List:**

1. Bhat P.N.M., (2002): Completeness of India's Sample Registration System: An assessment using the general growth balance method, Population Studies, 56 (2002), 119-134, Printed in Great Britain.
2. Seigel Jacob S. and David A. Swanson (eds.) (2004): The Methods and Materials of Demography. 2nd Edition, New York: Elsevier Academic Press. Chapters 20 & 21.
3. Stata user's guide: Release 10., 2nd Edition. Stata Press
4. Stata survey data reference manual: Release 8., 2nd Edition. Stata Press.

## MSD-C9

## PROGRAMMING FOR DATA ANALYTICS IN PYTHON

**Objective:** To introduce the basic and advanced programming in Python.

**Course Outcome:** On successful completion of this course, the students will be able to

1. Demonstrate the programming skills in Python
2. Apply the Python programming for data visualization, and analysis

### Course Content

- I. Introduction to Python:** Basic Programming in Python: Python Basics, Flow Control, Functions, List, Dictionaries. Automating Tasks Using Python: Pattern Matching with Regular Expressions, Reading and Writing Files, Organizing Files, Debugging, error handling.
- II. The NumPy ndarray:** a multidimensional array object, creating ndarrays, data types for ndarrays, arithmetic with numpy arrays, basic indexing and slicing, transposing arrays and swapping axes, universal functions: fast element-wise array functions, array-oriented programming with arrays, file input and output with arrays, pseudorandom number generation. introduction to pandas data structures, series, data frame, Web Scraping.
- III. Data cleaning and preparation:** handling missing data, data transformation, string manipulation. data wrangling: hierarchical indexing, combining and merging datasets, reshaping and pivoting.
- IV. Introduction to Jupyter Notebook,** Basic libraries for data visualization: NumPy, Pandas, Matplotlib, Plotly, Seaborn, GGplot, Geoplotlib (for handling geographical data).
- V. Matplotlib:** Introduction to Matplotlib, Basic plots using matplotlib, Specialized Visualization Tools using Matplotlib, Advanced Visualization Tools using Matplotlib, Waffle Charts, Word Clouds.
- VI. Seaborn:** Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python.
- VII. Introduction to modeling libraries in python:** interfacing between pandas and model code, creating model descriptions with patsy, introduction to statsmodels, scikit-learn.

### Readings:

1. David J. Pine (2019): Introduction to Python for Science and Engineering. CRC Press.
2. Jake vanderPlas (2017): Python Data Science Handbook – Essential Tools for Working with Data.O'Really Media.
3. Johansson, R.(2019):Numerical Python-Scientific Computing and Data Science Applications withNumPy, SciPy and Matplotlib. A press.
4. Jake vanderPlas (2017): Python Data Science Handbook – Essential Tools for Working with Data.O'Really Media.
5. Johansson, R.(2019):Numerical Python-Scientific Computing and Data Science Applications withNumPy, SciPy and Matplotlib. A press.



**Objective:** To introduce prediction-based modelling based on advanced regression analysis.

**Course outcomes:** On successful completion of this course, the students will be able to

1. Formulate linear models in the field of data science.
2. Fundamental knowledge of predictive models.
3. Choose appropriate model by understanding nature of data and regression diagnostics.
4. Test regression diagnosis and choose appropriate model using R and STATA

**Course Content:**

- I. Linear regression model
- II. Generalized regression model
  - Binary outcome
  - Categorical more than 2 response
  - ordinal
  - Count data
- III. Model diagnostics
- IV. **Fitting Regression in STATA/R** Linear regression model, Generalized regression model: Binary outcome, Categorical more than 2, response, ordinal, analysis of Count data
- V. **Regression diagnostics in STATA:** Postestimation commands for different regression analysis, residuals,
- VI. **Modelling in R:** model basics with modelr, visualizing models, formulas and model families, model building, many models with purrr and broom, gapminder, creating list-columns, making tidy data with broom, making tidy data with broom.

**Readings:**

1. Gujarati, DN and Sangeetha (2007). *Basic Econometrics* (Fourth Edition), TataMcGraw Hill, New Delhi
2. Retherford, R.D. and Choe, M. K., (1993): *Statistical Models for Casual Analysis*, A Wiley-Inter-Science Publications, John Wiley and Sons, INC, New York.
3. Wickham, H. and Grolemond, G. (2016): *R for Data Science Import, Tidy, Transform, Visualize, and Model Data*. O'Reilly.
4. Lander, J.P. (2017): *R for Everyone-Advanced Analytics and Graphics*. Pearson Education.
5. Wickham, H. (2014): *Advanced R*. CRC Press.
6. Gandrud, C. (2020): *Reproducible Research with R and R Studio*. 3rd edition, CRC Press
7. STATA manual and help for regression diagnostics

## **MSD-E2.1 INTRODUCTION TO LONGITUDINAL DATA ANALYSIS**

### **Course Outcomes:**

CO1: Learn basic concepts and examples of longitudinal data.

CO2: Learn models frequently used for analyzing longitudinal data.

CO3: Learn longitudinal data analysis using STATA/SAS.

### **Unit I: Introduction and basic concepts**

Exploring longitudinal data, Examples of longitudinal studies, Features and characteristics of longitudinal data statistics, Descriptive methods, Criteria, Causality, Repeated measurements, Clustering, Missing data issues.

### **Unit II: Examples of Longitudinal Data**

Young Lives Study; Health and Retirement Study; British Cohort Study; India Human Development Survey

### **Unit III: Linear Models**

Overview of linear models, Distributional assumptions, Modelling the mean and covariance, Maximum likelihood estimation, Statistical inference, Variance and covariance, Fixed-effects models, Random-effects models, Baseline response, Biasness in mean and variance, Diagnostic and residual analysis

### **Unit IV: Generalized Linear Models (GLM)**

Review of Generalized linear model (GLM), Moments and characteristic functions, Weighted GLM, Conditional GLM models, Estimation of Marginal models, Generalized Estimating Equations, Residual and diagnostics analyses.

### **Unit V: Longitudinal Data Analysis using software**

#### **Essential Reading list:**

1. Garrett M Fitzmaurice, Nan M Laird and James H Ware. Applied longitudinal analysis; John Wiley & Sons.
2. Diggle, P., Heagerty, P., Liang, K. Y., & Zeger, S. (2002). Analysis of longitudinal data. Oxford University Press.
3. Davis, C. S. (2002). Statistical methods for the analysis of repeated measurements. Springer Science & Business Media.

#### **Suggested Reading list:**

1. Walter W Stroup. Generalized linear mixed models: modern concepts,

- methods and applications; CRC Press.
2. Helen Brown and Robin Prescott. Applied mixed models in medicine; John Wiley & Sons.
  3. Brady T West, Kathleen B Welch and Andrzej T Gatecki. Linear mixed models; CRC Press.
  4. Weiss, R. E. (2005). *Modeling Longitudinal Data: With 72 Figures*. Springer Science & Business Media.
  5. Brown, H., & Prescott, R. (2015). *Applied mixed models in medicine*. John Wiley & Sons.

<b>MSD-E2.2</b>	<b>METHODS OF DECOMPOSITION</b>
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**To be prepared**

<b>MSD-E3.1</b>	<b>HEALTH SYSTEMS AND POLICIES</b>
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Course Outcomes:

- CO1: To develop capacity among students to analyze health systems from an international and comparative perspectives.
- CO2: To provide a historical orientation to the students on Indian-scenario; national health policy, health care delivery system, national health programmes and health sector reforms.
- CO3: To understand the need and relevance of health legislations as an instrument of protection and promotion of public health and inculcate the ability to critically review them.
- CO4: To introduce the students to health policy and systems research, and recent developments.

**Unit 1: Basic Concepts:** Concepts of Health; Public health; Community health; Preventive and curative health; Health promotion; Health services; and Primary, secondary and tertiary care.

**Unit 2: Health System:** Goals, boundaries, functions, and WHO's health system building blocks: service delivery, health workforce, health Information systems, access to essential medicines, financing and leadership/ governance.

**Unit 3: Health Services:** Basic models and functions of health services, international experiences and goals and elements in universal health care (UHC) approach.

**Unit 4: Health care system in India:** public sector, private sector, voluntary sector, human resources for health, access to health care, utilisation and expenditure on health services, and UHC initiatives and challenges ahead.

**Unit 5: Health policy:** Concepts and tools of health policy, health policy stakeholders, health policy triangle framework, rational decision making to approach to health policymaking, introduction to health policy and systems research.

**Unit 6: Health policymaking in India:** Health planning in post-Independent India, national health policies, national health policy 2017, and current national health programmes.

**Unit 7: Regulation in the health sector:** Need for regulations, mechanisms for regulation, key legislations and standards in the health sector in India, and challenges in the implementation of regulations.

#### **ESSENTIAL READING LIST**

1. Abel-Smith, Brian. An introduction to health: policy, planning and financing. Routledge, 2018.
2. Murray, Christopher JL, and Julio Frenk. "A framework for assessing the performance of health systems." *Bulletin of the World Health Organization* 78 (2000): 717-731.
3. Rao, K. Sujatha. Do we care?: India's health system. Oxford University Press, 2016.
4. Government of India. 2017. National Health Policy-2017. New Delhi: Ministry of Health and Family Welfare, Government of India.

#### **SUGGESTED READING LIST**

1. Balarajan, Yarlani, Selvaraj Selvaraj, and S. V. Subramanian. "Health care and equity in India." *The Lancet* 377, no. 9764 (2011): 505-515.
2. Central Bureau of Health Intelligence. National Health Profile 2021 (or the latest year). New Delhi: Central Bureau of Health Intelligence, Ministry of Health and Family Welfare, Government of India.
3. Gilson, Lucy, and World Health Organization. Health policy and system research: a methodology reader: the abridged version. World Health Organization, 2013.
4. Montagu, Dominic, and Catherine Goodman. "Prohibit, constrain, encourage, or purchase: how should we engage with the private healthcare sector?." *The Lancet* 388, no. 10044 (2016): 613-621.
5. Mossialos, Elias, Martin Wenzl, Robin Osborn, and Dana Sarnak. 2015 International profiles of health care systems. Ottawa, ON, Canada: Canadian Agency for Drugs and Technologies in Health, 2016.
6. Murray, Christopher JL, and David B. Evans. "Health systems performance assessment: goals, framework and overview." *Health systems performance assessment: Debates, methods and empiricism* (2003): 3-23.
- 7.
8. Nandraj, S., Gupta, P., & Randhawa, S. (2021). Regulation of Health Care Delivery in India - A Landscape Study, Health Systems Transformation Platform, New Delhi.
9. National Statistical Office. Key Indicators of Social Consumption: Health (July 2017–June 2018). New Delhi: National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India. 2019
10. Peters, D.H., 2018. Health policy and systems research: the future of the field. *Health Research Policy and Systems*, 16(1), pp.1-4.
11. World Health Organization. *A vision for primary health care in the 21st century: towards universal health coverage and the Sustainable Development Goals*. No. WHO/HIS/SDS/2018.15. World Health Organization, 2018.
12. Walt, Gill, and Lucy Gilson. "Reforming the health sector in developing countries: the central role of policy analysis." *Health policy and planning* 9, no. 4 (1994): 353-370.

**Course Outcomes:**

- CO1: Developing a comprehensive understanding on concepts of space, place and region.
- CO2: Understanding the history of urban planning and its illustration in Indian context.
- CO3: Acquainting students with theories of regional development and various strategies of regional planning.
- CO4: Developing a critical understanding on urban policies and programmes in India
- CO5: Providing students a practical knowledge of Geographical Information Systems and its utility in regional and urban planning.

**I. Urbanization and Space**

Urbanization and space: Definitions and concepts of urban areas & urbanization. Concepts and forms of formal and informal spaces; Differences between space, place and region; urbanization and space interaction: gravity model, distance decay model, forces of concentration and dispersion, urban agglomeration and spatial economy; Access and right to the city

**II. Evolution of Spaces of Settlements**

Settlement: evolution, characteristics and factors; settlement pattern and hierarchy; Urban morphology; Change in urban land use and population density; Rural-urban relationship: dichotomy or continuum; Role of urban centres in rural development.

**III. Urban and Regional Planning**

**Planning:** Definitions, concepts, purpose, types and levels; geography/demography and planning relationship.

**Regional development/planning:** Region: concept and definition, types (formal, functional and planning); Need for regional planning; Types of regional planning; Spatial structure of regions,

Theories of regional development: Stages of development, economic base theory, Industrial location theory, Growth Pole theory; Core-periphery interactions.

Regional planning in India; Planning regions in India; Regional disparity in development; causes and consequences, North-Eastern regional council, Mumbai Metropolitan Regional Development Plan.

**Urban Planning:** Concepts; history and origins of urban planning; pioneers of urban planning; types of urban plans: New towns, neighborhood, garden city, green belts; healthy urban planning, WHO concept of healthy city, livable city, sustainable city.

Urban policy since independence, important urban plans (New Delhi, Navi Mumbai, Chandigarh, Gandhinagar, Bhubaneswar); Smart Cities Mission; HRIDAY, AMRUT, PURA, RURBAN



mission

#### IV. Challenges in Urban planning

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housing and real estate, Slums and slum rehabilitation, The case of Slum Rehabilitation Authority (SRA) in Mumbai; Urban pollution, Solid waste management; Management of migrants

#### V. Remote Sensing, GIS and Urban and Regional Planning

Application of Remote Sensing and GIS in urban and regional planning.

##### Essential Reading List

1. Friedman, John and William Alonso (1964) *Regional Development and Planning: A Reader*, The MIT Press, Massachusetts.
2. Friedman, John (1966) *Regional Development Policy: A Case Study of Venezuela*, MIT Press, Massachusetts.
3. Chaudhuri, J. R. (2001) *An Introduction to Development and Regional Planning*, Orient Longman, Hyderabad.
4. Chand, M and V.K. Puri, (1983), *Regional Planning in India*, Allied Publishers Private Ltd, New Delhi
5. Mishra, R.P, (1992), *Regional planning: Concepts, Techniques, Policies and Case studies*, Concept Publishing Co., New Delhi

##### Suggested Reading List

1. Bhagat, R. B., Roy, Archana K. and Sahoo, Sahoo. (2020). *Migration and Urban Transition in India: A Development Perspective*. Routledge India, New Delhi.
2. Kumar, A. and Bhagat, R. B. (2021). *Migrants, Mobility and Citizenship in India*. Routledge India, New Delhi.
3. Lefebvre, H (1991). *The Production of Space*, Blackwell, Oxford.
4. Hall, P, (1992), *Urban and Regional Planning*, Third Editions, Routledge, London.
5. Harvey, D. (2012) *Rebel Cities: From the Right to the City to the Urban Revolution*, Verso, London
8. Husain, M, (1994), *Human Geography*, Rawat Publishing, Jaipur.
9. Leong, Goh C. and G.C. Morgan, (1982), *Human and Economic Geography*, Oxford University Press, Singapore.
10. Singh, R. Y. (1994), *Geography of settlements*, Rawat Publications, Jaipur.
11. Ginsburg, N., Bruce Koppel and T.G. Mc Gee (1991) *The Extended Metropolis: Settlement Transition in Asia*, University of Hawaii Press, Honolulu.
12. Nath, V. (1971) "Regional Development Policies", *Economic and Political Weekly*, 6(30-32):1601-1608.
13. Lo, C.P. and Yeung, A. K. W. (2002): *Concepts and Techniques of Geographic Information Systems*. Prentice Hall of India, New Delhi.
14. Nyerges, Timothy L. and, Jankowski Piotr (2010): *Regional and Urban Gis: A Decision Support Approach*, Rawat Publication, Jaipur.

15. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolution of regional planning*, Edward Arnold, London.
16. Kawashima, T and P. Korcelli, (1982), *Human Settlement Systems: Spatial Patterns and Trend*, IIASA, Luxemburg.
17. Knowles, R and J. Warling, (1983), *Economic and Social geography: Made Simple*, Heinemann, London.
18. Sarin, M, (1982), *Urban Planning in the Third World: The Chandigarh Experience*, Manshell, London.
19. MMRDA (2016), Mumbai Metroplatan Regional Development Plan 2016-2036 MMRDA, Mumbai.
20. UNEP and others (2007), *Livable Cities: The benefits of environmental planning*, The CitiesAlliance, Washington. <http://www.citiesalliance.org/index.html>.

## **MSD-C11 RESEARCH, ETHICS AND PUBLICATIONS**

### ***Course outcomes***

1. To understand the research design and scientific approaches to conduct of research in varied settings.
2. Aware of different types of publications, search engines, copyrights.
3. Understand research, publication and data ethics.

### **I. Philosophy of Research**

- Law, Theory, and Model
- Overview on Main Assumptions and Arguments of Selected Social Theories (functionalism, conflict theory, symbolic interactionism, system theory, feminist theories, change theories)
- Causation and Research Design
- Criterion of causation
- Nomothetic casual explanation
- Idiographic casual explanation

### **II. Need for Research and its phases**

Definition of Research, Assumptions, Operations and Motivations and Aims of Scientific Research. The Research Process: conceptual, Empirical and Analytical Phases of Research.

### **II. Research Designs**

Conceptual vs. Empirical; Quantitative vs. Qualitative, Observational Studies: Descriptive, Analytical studies, explanatory, and exploratory, Experimental Studies: Pre-test design, post-test design, Follow-up, longitudinal design, Action research studies, Panel Studies; evaluative studies.

### **III. Research Process**

Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review, identifying gap areas from literature and research database, development of working hypothesis, conceptual framework, sampling, developing tools, data collection, process, analysis, report writing

### **IV Research Publications**

Overview of different type of research articles: -primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, journals, books, publishers, impact factor, reference style

### **V. Ethics in Research**

Ethics of Research, History of ethical guidelines and general principles Informed consent and human subject protection ICMR ethical guidelines for biomedical research on human participants The Biomedical research on human subjects -regulation, control and safeguards

#### **Ethical issues in data collection and willingness to pay**

#### **Ethics in Data Analytics/computing**

Data obfuscation, encryption, confidential computing, privacy implementation.

#### **Scientific Misconduct and Publication ethics**

falsification, fabrication, and plagiarism, Selective reporting and misrepresentation of data. practices/standards setting initiatives and guidelines, Conflict of interest, Violation of publication ethics, copyright and sharing policies

### **Essential Reading List**

1. Bernard, H. Russell, (1995): Research Methods in Anthropology: Qualitative and Quantitative Approaches, Altamira Press, Walnut Creek.
2. Goode W J and Hatt P K. 1952. Methods in Social Resasrch. McGraw Hills, New York.
3. Kish, Leslie, (1995): Survey Sampling, John Wiley and Sons, Inc. New York.
4. Lohr L. Sharaon., (1999): Sampling: Design and Analysis, Duxbury Press, London.
5. Mukherji, P.N., (1999): Methodologies in Social Science, Sage Publications, New Delhi.
6. Royce A. Singleton and Bruce C. Straits, (1999): Approaches to Social Research, Oxford, Oxford University Press.
7. Young P V. 1994. Scientific Social Surveys and Reasearch. Prentice-Hall, New York (4th Edition).

MSD-C12	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING APPLICATIONS
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**Objective:** To provide conceptual knowledge and applications of AI and ML.

**Course outcome:**

1. Describe the concepts of AI and machine learning
2. Visualize the applications of AI and ML in public health interventions and data analytics
3. Apply the machine learning tools in data science.
4. Develop technological foundation of cloud computing

**Course Content:**

- I. Basic concepts of Big Data:** Concept of Big Data, 5Vs, Data Science, Machine Learning (ML), Deep learning (DS), Artificial Intelligence (AI). Survey data vs. digital data – advantages and disadvantages
- II. Application of AI** for planning and monitoring of public health and welfare programmes, Healthcare informatics, Telemedicine, digital health, surveillance. Chatbots
- III. Relational Database Management Systems:** SQLite with R, MariaDB with R on amazon EC2 instance, PostgreSQL with R on amazon RDS.
- IV. Digital trace data and cloud computing:** Digital trace data from social media, websites, Introduction to Cloud Computing, Migrating into a Cloud, Monitoring, Management and Applications, Data Security in the Cloud, Legal Issues in Cloud computing.
- V. Machine Learning:** concepts, Types of machine learning – supervised, unsupervised, reinforcement learning. Regression vs. classification problem, algorithm vs models, Basics of machine learning model building, train-test split, model evaluation, ROC curves, application of machine learning in health, public health and demography, Advantages and disadvantages of ML.
- VI. Models in machine learning** –Basics of Decision Trees, trees vs linear models, Random Forest, fitting of classification and regression trees, support vector machines, Clustering (K-nearest neighbours, PCA), Neural Networks.

**Reading List:**

- 1) Tom Mitchell, “Machine Learning”, McGraw Hill, 1997
- 2) E. Alpaydin, “Introduction to Machine Learning”, PHI, 2005.
- 3) Andrew Ng, Machine learning yearning URL: [https://nessie.ilab.sztaki.hu/~kornai/2020/AdvancedMachineLearning/Ng\\_MachineLearningYearning.pdf](https://nessie.ilab.sztaki.hu/~kornai/2020/AdvancedMachineLearning/Ng_MachineLearningYearning.pdf)
- 4) Russell, Norvig, Artificial Intelligence: A Modern Approach, Third edition, Prentice Hall, 2010
- 5) Burger, S.V. (2018): Introduction to Machine Learning with R: Rigorous mathematical modeling. O Reilly.
- 6) Lantz, B. (2019): Machine Learning with R: Expert Techniques for Predictive Modeling. Packt Publications, 3rd edition

- 7) Lewis, N.D. (2017): Machine Learning Made Easy with R: An Intuitive Step by Step Blueprint for Beginners. CreateSpace Independent Publishing Platform.
- 8) Vecciola, B. and Selvi (2017): Mastering Cloud Computing: Foundations and Applications Programming. Tata McGraw Hill.
- 9) Rittinghouse and Ransome (2009): Cloud Computing: Implementation, Management and Security. CRC Press,
- 10) Doss, A. (2013): Cloud Computing. Tata McGraw Hil

MSD-C13	PROGRAM MONITORING, AND EVALUATION DESIGN
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Course Outcomes: After completing the course, students will be able to-

1. Develop M & E framework and Statistical Analysis Plan
2. Demonstrate an understanding of the essential principles and design of Program evaluation
3. Learn statistical methods used in evaluation Program
4. Understand Ethical issues in evaluation research
5. Understand public interventions related to health and family welfare

**I. Introduction to Monitoring and Evaluation:** Basic concepts, Difference between Monitoring and Evaluation; Linkage between Planning, Monitoring and Evaluation; Importance of Monitoring and Evaluation, Databased decision making

**II. Monitoring and Evaluation Framework:** Resources for monitoring and evaluation, Engagement of stakeholders in monitoring and evaluation; Meaning of Indicators, Ideal requirement, process of developing indicator, illustration of indicators developed from large scale surveys, measurement, need & levels of indicator; Challenges in developing indicators from Large-Scale Surveys; Types of Indicators – Input, Process, Output, Outcome, Impact; Learning and accountability of Monitoring and evaluation data

**III. Monitoring of Policy Implementation:** Components of policy and programme, budget, staff, process of evaluation, developing tangible indicators for policy monitoring in terms of Input, Process, Output, Outcome, Impact; Result based inference

**IV. Evaluation in Theory:** Principles, norms and standards for evaluation; Criterion for evaluation; Theory of Change; Evaluating for results; Roles and responsibilities in evaluation; Scaling Impact

**V. Evaluation Design:** Determination of sample size under different approaches and design including measurement of change due to certain interventions; Quasi Experiment design, Case control design, Evaluation Terms of Reference, Formative and Summative Evaluations, Managing Evaluations; Evaluation at different points: Baseline, Mid-point, Concurrent and End line evaluation; Randomization, Statistical design of Randomization; Randomized control trials, time dependant cluster design, interrupted time series analysis.

**VI. Assuring the Quality of Evaluation Design and Methodology:** Overview; Defining the context; The evaluation purpose; Focusing the evaluation;

Evaluation methodology; Mandatory requirements for programme; SWOT analysis of NHM, ICDS and National Livelihood Mission; Social audit – meaning, objectives, advantage, case study of social audit

**VII. Statistical Approaches of Evaluation of Intervention Programme:** Statistical inferences used in different intervention design – z, t, F and paired ‘t’ tests, two stage LSM, instrument variable method; Propensity score matching; Difference in Difference Method: Theory and application, advantage and disadvantage, regression implementation, Decomposition analysis

**VIII. Healthcare Informatics:** MIS – Monitoring information system; Role of programmers; HMIS system; Global Positioning System, Management Information System and Use of Technology, Use of Artificial Intelligence, tele-interventions, Use of spatial data

**IX. Group work and presentation on Health and family welfare Program evaluation:** review program, SWOT analysis, preparing M&E framework/choosing framework indicators and methods for evaluation

### Reading List

1. Casley, Dennis J and Kumar, Krishna (1988). *The Collection, Analysis, and Use of monitoring and Evaluation Data*. A World Bank Publication, The John Hopkins University Press
2. FHI (2004). *Introduction to Monitoring and Evaluation Monitoring and Evaluation, monitoring hiv/aids programs: A facilitator's training guide*. Family Health International
3. GoI & UNDP (2012). *Guiding Framework for Monitoring and Impact Evaluation of Capacity Building & Training of Panchayati Raj Institutions in States/UTs*. Government of India and United Nation's Development Programme
4. IFRC and RCS (2002). *Handbook for Monitoring and Evaluation*. International Federation of Red Cross and Red Crescent Societies –Geneva
5. McLean R. and Gargani J. (2019) *Scaling Impact Innovations for the Public Good*. Routledge, New York.
6. NIRD&PR; MoRD and TISS (2016). *Social Audit: A manual for Trainers*. National Institute of Rural Development & Panchayati Raj; Ministry of Rural Development and Tata Institute of Social Sciences
7. OECD (2021). *Applying Evaluation Criterion Thoughtfully*, OECD Publishing, Paris. <https://doi.org/10.1787/543e84ed-en>.
8. Rossi, Peter H.; Mark W. Lipsey and Howard E. Freeman (2004). *Evaluation, A Systematic Approach*. Seventh Edition. Sage Publications – New Delhi.
9. Sullivan, T.M., Strachan, M., and Timmons, B.K. (2007). *Guide to Monitoring and Evaluating Health Information Products and Services*. Baltimore, Maryland: Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health; Washington, D.C.: Constella Futures; Cambridge, Massachusetts:
10. Management Sciences for Health, 2007.
11. United nations development Group. *The Theory of Change*, UNDAF Campanian Guideline.

### 1: Multistage Sampling

Definition and properties of multistage sampling, Estimation of population means and totals, Sampling weights and variance estimation, Multi-stage sampling with examples, Methods of variance estimation for complex sample designs, including the Taylor series expansion method, balanced repeated replications, and jack-knife methods, Bootstrap methods for complex sample designs and how to incorporate those methods into inference for complex sample survey data. the effect of stratification and clustering on estimation and inference, alternative variance estimation procedures;

### 2: Weighting and Imputation Methods

- Development and handling of selection and other compensatory weights; methods for handling missing data; methods for incorporating weights, stratification, clustering, and imputed values in estimation and inference procedures for complex sample survey data;
- Nonresponse and missing data in complex surveys
- Weighting adjustments for nonresponse and noncoverage
- Imputation methods for missing data
- Steps in weighting, including computation of base weights, non-response adjustments, and uses of auxiliary data;
- Non-response adjustment alternatives, including weighting cell adjustments, formation of cells using regression trees, and propensity score adjustments;
- Weighting via post-stratification, raking, general regression estimation, and other types of calibration.
- Examples- NFHS, SRS, NSSO, Sero-surveillance

### 3: Model-Based Inference

- Model-assisted and model-based estimation
- Regression models for complex survey data
- Incorporating design effects into regression models

### 4: Design-Based Inference

- Variance estimation for complex survey data
- Survey data analysis using statistical software
- Generalized design effects and variance functions.

### 5. Weighting and Variance Estimation

- Weighting adjustments for unequal probabilities of selection
- Variance estimation in complex surveys

#### Readings:

1. Heeringa, S. G., West, B. T., & Berglund, P. A. (2017). Applied survey data analysis (2nd ed.). Chapman and Hall/CRC.



2. "Applied Survey Data Analysis" by Steven G. Heeringa, Brady T. West, and Patricia A. Berglund (2nd edition, 2017)
3. "Sampling of Populations: Methods and Applications" by Paul Levy and Stanley Lemeshow (5th edition, 2015)
4. "Model Assisted Survey Sampling" by Carl-Erik Särndal, Bengt Swensson, and Jan Wretman (1992)
5. "Survey Methodology" by Robert M. Groves, Floyd J. Fowler Jr., Mick P. Couper, James M. Lepkowski, Eleanor Singer, and Roger Tourangeau (2nd edition, 2011)

## MSD-E4.1 CONCEPTS AND MEASURES OF GLOBAL HEALTH

**Objectives:** This paper introduces to the students the basic concepts of global health. This course emphasizes on understanding the global burden of disease and measuring population health. A key component of this course is to understand the determinants of health and health disparities. It will also provide student with a broad understanding of the relationship between environment and health. It also develops the understanding of the students about the health care delivery system, human resources for health, migration of human resources for health, etc. Finally, it introduces to students the issues related to policy and health.

### Course Outcomes:

CO1: To familiarize the students with the emerging concepts, measures, and significance of global health in contemporary world.

CO2: To understand the global mortality transition in terms of its varied features like cause of death, population age structure and differential quality of life.

CO3: To understand the impact of poverty, inequality on disease prevalence, health infrastructure, deprivation for the mortality divide and its repercussions.

CO4: To introduce and understand impacts of environmental factors and recommend public health measures needed to be taken to mitigate health effect of climate change.

CO5: To recommend appropriate public health intervention in keeping with disease burden and evaluate health system performance in international perspective.

### Course Contents

- I. **Concept and introduction:** Concept of global health; why is it important to study global health?; health and development in the global context; demographic, health and epidemiological transitions; major patterns of distribution of disease in the world; sources of data on disease and disability
- II. **Global burden of disease:** Concept of burden of disease; hypotheses related to burden of diseases – compression of morbidity, expansion of morbidity and dynamic equilibrium; measures of burden of disease at the population level – health expectancy and health gap; methods for estimating DFLE, HALE and DALY; how does the burden of disease and mortality vary by geography, social class, race and gender? GBD 1990, 2010 and 2013 – changes and continuities; new and re-emerging infectious diseases; issues related to HIV/AIDS; introduction to NCDs; double burden of diseases in

developing countries; impact of tobacco abuse; trends and challenges related to maternal and child health; maternal mortality

- III. Determinants of Health:** Culture, gender, race, social, political and economic determinants of health and health disparities; contribution of income, education and other factors to health; Factors responsible for variation in the global burden of disease across countries; poverty and health; income inequality and health; health risk factors
- IV. Environment and health:** Role of water, sanitation, indoor and outdoor air pollution and nutrition in explaining global health disparities; climate change and health; migration, disaster (man-made, natural), conflicts and epidemics
- V. Health care delivery systems:** Introduction to health systems; how to measure performance of health system?; health systems in different countries; factor responsible for better performance of health systems in developed countries; the distribution of human resources for health; quality of human resources for health; the push and pull factors associated with the migration of health care providers
- VI. Policy and health:** Human rights approach to health; national and international policies related to health; how are global health priorities set?; the role of international actors like WHO, World Bank, etc. in global health; influence of international priorities on national priorities

#### Reading List

##### Essential readings :

1. Skolnik, R. (2008). Essentials of global health, Jones and Bartlett: Sudbury, MA.
2. Jacobsen, K.H. (2007). Introduction to global health, Jones and Bartlett: Sudbury, MA.
3. Markel, W.H., Fisher M., Smego R. (2007). Understanding global health, McGraw Hill: Columbus.
4. Merson, M.H., Black, R.E., Mills, A.J. (2001). International public health: diseases, programs, systems and policies, Gaithersburg, MD: Aspen Publishers.
5. Murray, C.J.L., Saloman, J.A., Mathers, C.D., Lopez, A.D. (2002). Summary measures of population health: concepts, ethics, measurement and applications, The World Health Organization: Geneva.
6. Murray, C.J.L., Saloman, J.A., Mathers, C. (2000). A critical examination of summary measures of population health, Bulletin of the World Health Organization 78(8): 981-994.
7. Cutler, D., Deaton, A., Lleras-Muney, A. (2006). The determinants of mortality, Journal of Economic Perspectives 20(3): 97-120.
8. Link, B.G., Phelan, J. (1995). Social conditions as fundamental cause of disease, Journal of Health and Social Behavior 35: 80-94.
9. Smith, J.P. (1999). Healthy bodies and thick wallets: the dual relation between health and economic status, Journal of Economic Perspectives 13(2): 145-166.
10. Shiffman, J. (2009). A social explanation for the rise and fall of global health issues, Bulletin of the World Health Organization 87(8): 608-613.
11. Gwatkin, D.R. (2000). Health inequalities and the health of the poor: what do we know? What can we do? Bulletin of the World Health Organization 78(1): 3-18.
12. Laxminarayanan, R. et al. (2006). Advancement of global health: key messages from the Disease Control Priorities Project, Lancet 367(9517): 1193-1208.
13. Murray, C.J.L., Frenk, J. (2000). A framework for assessing the performance of health systems, Bulletin of the World Health Organization 78(6): 717-731.
14. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In Disease Control Priorities in Developing Countries (2<sup>nd</sup> Edition), pages 87-102, New York: Oxford University Press.

15. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
16. Anand, S., Baernighausen, T. (2004). Human resources and health outcomes: across country econometric study, *Lancet* 364(9445): 1603-09.
17. Chen, L. et al. (2004). Human resources for health: overcoming the crisis, *Lancet* 364(9449): 1984-1990.
18. Pallikadavath, S., Singh, A., Ogollah, R., Dean, T., Stones, W. (2013). Human resource inequalities at the base of India's public health care system, *Health & Place* 23: 26-32.
19. Zurn, P., Dal Poz, M.R., Stilwell, B., Adams, O. (2004). Imbalance in the health workforce, *Human Resources for health* 2(13): 1-12.
20. Willis-Stattuck, M. et al. (2008). Motivation and retention of health workers in developing countries: a systematic review, *BMC Health Services Research* 8: 1-8.
21. Brown, T.M., Cueto, M., Fee, E. (2006). The World Health Organization and the transition from 'international' to 'global' public health, *American Journal of Public Health* 96(1): 62-72.
22. Ruger, J.P. (2005). The changing role of the World Bank in global health, *American Journal of Public Health* 95(1): 60-70.
23. Ravishankar, N. et al. (2009). Financing of global health: tracking development assistance for health from 1990-2007, *Lancet* 373(9681): 2113-2124.
24. London, L. (2008). What is a human-rights based approach to health and does it matter? *Health Human Rights* 10(1): 65-80.

<b>MSD-E4.2</b>	<b>HEALTH ECONOMICS AND FINANCING</b>
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#### Course Outcomes:

1. To introduce various concepts on economic gradient of health and demand for and supply of health care. CO2: To explain various measures on socio-economic inequality in health.
2. To familiarize the means and measures of health financing.
3. To understand the determinants of health insurance and its coverage.
4. To introduce the methods and measures on economic evaluation of health care.

### I: Introduction to Health Economics

Defining health economics, why health economics is important, basic concepts in microeconomics, health across world and over time, scope of health economics, map of health economics, basic questions confronted by health economist, concept of efficiency and equity in health, Production Possibility Frontier (PPF), economic gradient of health, causation of income and health, Preston Curve, economic models and analysis, expenditure function, Theories of X and Y, positive and normative economics.

### II. The Demand for Health and Health care

What is Health and Good Health, Utility Analysis, Health as a form of human capital, What is Medical Care, The production of Good Health, Empirical evidences in the production of health, Health as human

capital, Grossman Model, The Demand for Health Care, Demand function for health, Economic and non-economic factors of health care, Fuzzy Demand Curve, Price and income elasticity of demand for health care, Important consideration in estimating health care demand elasticity, provider's behavior, Empirical findings, externalities and market failure.

### **III. Health Financing**

Health financing in low, middle and high income countries, demographic transition, epidemiological transition and health expenditure, disparity in disease burden and per-capita health spending, sources of health care in India, out-of-pocket expenditure on health care, catastrophic health expenditure, approaches in measuring catastrophic expenditure, impoverishment, health care payment and poverty, national and regional patterns of catastrophic health spending, determinants of catastrophic health spending, Drivers of health care expenditure, health financing in India, Equity in health care finances, Willingness to pay for health care, User charges as determinant of health financing, Performance based financing

### **IV. Health Insurance**

Health care system, a model of health care system, defining health insurance, need for health insurance, type of health insurance, demand for private health services, factors affecting the quantity demanded of health insurances, moral hazards, deductibles, co-insurance, managed care, adverse selection, loading fees, employed based insurance, reimbursement, selection effect, intermediary agent, regulation of health insurance, Need for Government intervention, Trends of health insurance, Coverage of health insurance in India, PM-JAY, coverage and effectiveness

### **V. Measuring Health Inequalities**

#### ***Measurement of health inequality: A Prelude***

Why measure health inequality; Health equity and inequality: Concept and definitions; Understanding of the concepts such as need, access and utilisation; cardinal and ordinal health variables

#### **Black Report and Beyond**

Historical Background of Black Report, Explanation for social class differences, major empirical theme since Black report

#### **Measures of health inequality:**

Measures of health inequality: Index based approach; Axiomatic approach to measurement; Individual-mean and inter-individual comparison; WHO Index, Coefficient of Variation, Generalised Entropy Index, Lorenz Curve and Gini Coefficient

#### ***Measuring socioeconomic rank related health inequality***

Slope index of inequality; Relative index of inequality; Concentration curve and concentration index: various ways of computing; Standardization; Inequality aversion; Normalised and Generalised concentration index; Corrected concentration index

#### ***Measuring inequality in healthcare utilisation***

Horizontal inequality; Vertical inequality; Regression based approach; Measurement of horizontal inequalities; Group inequality, common measures, Gini type index

### **V. Medical Care, Production and Cost**

The Short-Run Production Function of the Medical Firm, Total Product, Marginal Product and Average Product Curve, Law of diminishing marginal productivity, The importance of costing in Health Economics, Short-run cost theory of medical firm, short run cost curves, Cost analysis, Implicit and explicit cost, , factor affecting short-run cost curves, cost minimization, constraints in measuring health cost

## VI. Economic Evaluation

What is economic evaluation? Cost analyses; direct cost, Indirect cost, tangible cost, capital cost, fixed cost, variable cost, Opportunity cost, average cost, marginal cost, Incremental cost, steps in cost analyses: Identification, measurement and valuation, Various types of economic evaluation used in health care: Cost effectiveness analysis (CEA) Cost-Benefit Analysis (CBA), Divergence between social and private costs and benefits in health care, Limitations of economic evaluation, Consumer Impact Assessment.

## ESSENTIAL READING LIST

1. Rexford E. Snterre and Stephen P. Neun, Health Economics: Theories, Insights and Industry Studies, Thompson South – Western, 3<sup>rd</sup> Edition (614, San/Hea, 073226) Note: 4<sup>th</sup> Edition is out in 2007 (ISBN: 032432068X; ISBN13: 9780324320688)
2. Phelps, Charles E. *Health economics*. Routledge, 2017.
3. Drummond MF, Sculpher MJ, Torrance GW, O'Brien B, Stoddart GL, eds. Methods for economic evaluation of health care programmes, Third Edition, Oxford University Press, 2005.
4. Wagstaff, Adam, Owen O'Donnell, Eddy Van Doorslaer, and Magnus Lindelow. Analyzing health equity using household survey data: a guide to techniques and their implementation. World Bank Publications, 2007.

## SUGGESTED READING LIST

1. Arrow, Kenneth J. "Uncertainty and the welfare economics of medical care." In *Uncertainty in economics*, pp. 345-375. Academic Press, 1978.
2. Culyer A J and J P Newhouse, 2000, The state and scope of health economics, Handbook of Health Economics, Volume 1A, Eds. Culyer and Newhouse, Elsevier, 2000.
3. Grossman (1982), On the concept of Health capital and Demand for Health, Journal of Political Economy, 80(2)
4. Glied, Sherry, and Peter C. Smith, ' Introduction', in Sherry Glied, and Peter C. Smith (eds), The Oxford Handbook of Health Economics. 2011; online edn, Oxford Academic, 18 Sept. 2012) <https://academic.oup.com/edited-volume/28339>
5. Gottret, Pablo Enrique, and George Schieber. *Health financing revisited: a practitioner's guide*. World Bank Publications, 2006.
6. Macintyre S (1997). The Black Report and Beyond-What are the issues, Social Science, Medicine, 44(6):723-745
7. Pauly, Mark V. "The economics of moral hazard: comment." *The American economic review* 58, no. 3 (1968): 531-537.
8. Victoria Y Fan and William D. Savedoff (2014), "Health Financing transition: A conceptual framework and empirical evidences, *Social Science Medicine*, 105 (2014):112-121
9. Wagstaff A, P. Paci and E van Doorslaer (1991), On the measurement of inequalities in health, *Social Science and Medicine* 33(5), 545-557
10. Xu K (2005))Distribution of health payments and catastrophic expenditures Methodology World .Health Organization

The objectives of learning the course is to acquaint students to understand demographic models, indirect estimations and carry out population projections independently and apply them in other social sector projections.

### **I. Concepts of Demographic Models:**

Stable population; Generalized Population; Momentum of Population Growth; Concept of Multiregional Model; and Micro Model such as Birth Interval, Waiting Time (Birth Distribution etc, Estimation of fecundability?)

### **II. Indirect methods for estimating fertility:**

Needs for Indirect methods; Concept of Reverse Survival Method, Robust Method and method based on Generalized Population Model; Rele's Method; Concept of P/F ratio method and its modification [Hypothetical Cohort methods]

### **III. Indirect Method of Estimating Mortality:**

#### *1. Indirect Methods of Estimating Infant and Child Mortality*

(a) Basic concepts, fundamental assumptions and underlying principles to the technique proposed by Brass based on retrospective data on children ever-born and surviving mothers classified by current age of mother; (b) Modifications proposed by Sullivan and subsequently by Trussell over Brass method; and (c) the UN revised and extended version of Trussell's method.

#### *2. Some Methods of Estimating Adult (including Maternal Mortality) and Old Age Mortality*

(i) Some methods of estimating adult mortality using successive census age-distributions; (ii) Methods of estimating life expectancies at older ages; and (iii) Estimation of maternal mortality through sisterhood method.

#### *3. Some Indirect Methods for Estimating Death Registration Completeness for Countries Having Limited and Defective Vital Registration Data*

An overview of some selected methods of estimating completeness of death registration, starting from Brass growth balance method and its subsequent development.

### **VII. Lab Practice in MORTPAK**

1. Bennett, N.G., and S. Horiuchi (1981): "Estimating completeness of death registration in a closed population", *Population Index*, 47(2):207-221.

2. Bennett, Nail. G., and Shiro Horiuchi (1984): "Mortality estimation from registered deaths in less developed countries", *Demography*, 21(2):217-233.

3. Bhat P.N.M, (2002): General growth balance method: A reformulation for population open to migration, *Population Studies*, 56 (2002), 23-34, Printed in Great Britain.

4. Bhat P.N.M., (2002): Completeness of India's Sample Registration System: An assessment using the general growth balance method, *Population Studies*, 56 (2002), 119-134, Printed in Great Britain.

5. Coale, A.J., (1981): "Robust estimation of Fertility by the Use of Model Stable Population", *Asian and Pacific Census Forum*, Vol.8 No.2. East-West Centre, Honolulu, Hawaii.

6. EL. Badry, M.A., (1961): "Failure of Enumerators to make Entries of Zero", *Errors in Recording Childless Cases in Population Censuses*, Journal of American Statistical Association Vol. 56.
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8. Hill, Kenneth (1987): "Estimating Census and Death Registration Completeness", *Asia and Pacific Population Forum*, 1(3): 8-13 & 23-24.
9. Horiuchi, S. and A. J. Coale (1982): "A Simple Equation for Estimating the Expectation of Life at Old Ages, *Population Studies*", Vol. 36, pp.317-326.
10. Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography*, Second Edition, Chapters 1, 2, 3, 7, 9,10, Elsevier Science, USA.
11. John Weeks (2005): *Population: An Introduction to Concepts and Issues*, Wordsworth Learning. Singapore 9th edition.
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13. KIm, Young J., Schoen, R. & Sarma, P.S.(1991) : *Momentum and The Growth-Free Segment of Population*, *Demography*, Vol.28, No.1 pp. 159-173.
14. Lahiri, Subrata (1990): *Some New Approaches to the Estimation of Life Expectancies at Older Ages*, In *Dynamics of Population and Family Welfare, 1989*, (eds. by Srinivasan and K.B. Pathak), pp.315- 341.
15. Lahiri, Subrata, and Lysander Menezes (2004): "Estimation of adult mortality from two enumerations of a destabilized population subject to response biases in age-reporting", In *Population, Health and Development in India: Changing Perspectives*, (Eds. by T. K. Roy, M. Guruswamy, and P. Arokiasamy), Rawat Publications, Jaipur: 2004, pp.101-136.
16. Lahiri, Subrata, Arni S. R. Srinivasa Rao, and S. Srinivasan (2005): *Role of Age-specific Growth Rates on Population Ageing in Some Developed and Developing Countries – A Comparative Study*, *Demography-India*, 34(1): 63-83.
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19. Mitra, S., 1984, "Estimating the Expectation of Life at Old Ages", *Population Studies*, Vol. 38, pp. 313-319.
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22. Potter, R.G. and Kulkarni, P.M. (1977) : *Population Momentum : A WiderDefination*, *Popluation Studies* Vol. 40 pp. 555-56.
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26. Preston, Samuel H., and Subrata Lahiri (1991): "A Short-cut Method for Estimating Death Registration Completeness in Destabilized Populations", *Mathematical Population Studies*, 3(1):39- 51.



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28. Rele, J. R., (1987), "Fertility Levels and Trends in India, 1951-81", Population and Development Review Vol. 13 (2). Academic Press, New York.
29. Schoen, R. and Kim Young J. (1991) : "Momentum Towards Stability as a Fundamental Principle of Population Dynamics" Demography, Vol.28 No.3, pp.455-466.
30. Seigel Jacob S. and David A. Swanson (eds.) (2004): The Methods and Materials of Demography. 2nd Edition, New York: Elsevier Academic Press. Chapters 20 & 21.

<b>MSD-E5.1</b>	<b>Population Ageing and Generational Analysis</b>
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### **Course Outcomes:**

CO1: Learn concepts and theoretical framework relating to demography of ageing, and its health and societal interface.

CO2: Develop skills to analyze trends, determinants and consequences of population ageing.

CO3: Familiarize with generational analysis

### **Unit I: Demography of ageing**

A. Concepts and measures of population ageing; components of population ageing; Inter-relationship between population ageing, fertility, mortality and migration; population ageing and momentum of population growth, age structure transition and ageing, and declining population.

B. Population ageing trends, patterns and determinants in India; state variations; future scenario of population ageing in India and states.

### **Unit II: Life course perspective and social dynamics of ageing**

A. Life course perspective of population ageing; Age and Ageing, Ageism; Social Status and Roles of Elderly, Family Structure, Intergenerational relations, Kinship and family support, Social Security; Social network- Frameworks (Berkman and others) and measurement.

B. Living Arrangements of Elderly, Old Age Homes, Social Networks, and Contribution of elderly: "Feminization" of Ageing, Dependency, Gender Dimensions and Discrimination, Widows, Elder abuse, Social and legal Vulnerability.

C. Generational analysis

### **Unit III: Ageing and health**

A. Ageing and Functional Health: Ageing and disabilities; trends and prevalence; Wellbeing and Life satisfaction.

B. Ageing and mental health problems; cognition, memory loss, dementia and depression; Alzheimer's and Parkinson.

C. Ageing and health risk factors: nutrition, diet and food practices; health risk behaviour-tobacco, alcohol; physical activities

#### Unit IV: Ageing policies and programmes

A. Social and Economic Support Policies and Programmes for the Elderly- Retirement, Pensions and Social Care Policies in developed and developing countries. Social security and welfare policies and programmes for elderly in India. National Programmes for HealthCare of Elderly (NPHCE); National Policy for Senior Citizens

B. Worldwide Longitudinal Ageing Studies: LASI, SAGE, SHARE, HRS, CHARLS, JSTAR, etc.

#### Essential Reading List

1. Chakraborti, Rajagopal Dhar (2004), *The Greying of India: Population Ageing in the Context of Asia*, SAGE Publications Private Limited, New Delhi.
2. UNFPA, 2001, *Population Ageing and Development: Social, Health and Gender Issues*, United Nations, Malta.
3. UNFPA (2011), *Report on the status of elderly in select states of India*, UNFPA, India.

#### Suggested Reading List

1. World Health Organization (2015), *WHO Report on Ageing and Health*, WHO, Geneva.
2. United Nations (2001): *Living Arrangements of Older Persons: Critical Issues and Policy Responses*. Population Division, Department of Economic and Social Affairs, Special Issue Nos. 42/43, 2001, New York.
3. Sandra Gruescu, (2006), *Population ageing and economic growth*. Physica-Verlag.
4. M. Alam (2004). Ageing, old age income security and reforms: An exploration of Indian situation. *Economic and Political Weekly*, 39(33): 3731-3740.
5. Berman, Lisa (2000) "Social Support, Social Networks, Social Cohesion and Health" *Social Work in Health Care*  
[http://dx.doi.org/10.1300/J010v31n02\\_02](http://dx.doi.org/10.1300/J010v31n02_02).
6. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), *Age-structural transitions: challenges for development*. Paris: CIRCRED.

<b>MSD-E5.2</b>	<b>Population, Environment and Sustainable Development</b>
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### **Course Outcomes:**

CO1: Learn the concept of sustainable development and its challenges.

CO2: Learn quantitative and qualitative methods in environmental health analysis.

CO3: Comprehend the role of the environment in development modeling.

### **Unit I: Sustainable development: Conceptual and contemporary issues**

Sustainable development; Meaning, Concepts, and Definitions; Inter-linkages between ecology and development; Brundtland Report on Environment and Development; SDG goals, progress; Pillars of SDG; Environmental Kuznetz model, Living Planet Index, ecological footprint;

Approaches to environment; Gandhian, Socialist, Neo-classical approach; Environment and development challenges: Water, energy, health and disease, nutrition, education, energy, food, species, climate;

Trends of global warming and climate change; drivers of global warming and Global Warming Potential (GWP) & climate change; impact of climate change on atmosphere, weather patterns, sea level rise, agricultural productivity and biological responses, CO<sub>2</sub> fertilization and agriculture; impact on the economy and spread of human diseases; the challenges for International Environmental Governance.

### **Unit II: Environmental challenges in India**

Calamities and the measurements; urban challenges; environmental health hazards; air Pollution and health- estimate, data sources, Indian standards, geospatial modeling;

Water resources and condition of surface and ground water resources; water quality standards in India; role of state in water resources management, water and health;

Regional Development in India; Women and Environment; Green Movements in India; Solid Waste Management; Success models of efficient environmental management;

### **Unit III: Environmental resilience, adaptive capacity, and vulnerability (RACV)**

Meaning and measurements of vulnerability and resilience, concept and processes of adaptive capacity; indicators and modeling; qualitative methods to measure RACV; Case studies and practical exercises.

### **Essential Reading List**

1. The Economics of Climate Change: The Stern Review (2014) Cambridge University Press
2. UN Climate reports <https://www.un.org/en/climatechange/reports>
3. Bründtland, G.H. (1987). Our Common Future: The World Commission on Environment and Development, Oxford, Oxford University Press.
4. Psychology and Climate Change (2018) Human Perceptions, Impacts, and

### Suggested reading list

1. Hardin, Garrett.(1968): “The Tragedy of the Commons.” *Science*. Vol. 162, No. 13, reprinted in Rex R. Campbell and Jerry L. Wade, (Eds), *Society and Environment: The Coming Collision*. Allyn and Bacon, Inc: Boston, MA, pp. 1243-1248.
2. Lutz, Wolfgang, A.Prskawetz and W.C.Sanderson (eds.) (2002). *Population and Environment: Methods of Analysis*. Supplement to Population and Development Review. New York, Population Council.
3. Simon, Julian L. (1996). *Population Matters: People, Resources, Environment, and Immigration*. Transaction Publishers: New Brunswick, NJ.
4. Hanley, N., Shogren, J. F., & White, B. 2007. *Environmental Economics: In Theory and Practice*. Palgrave Macmillan
5. Bongaarts, John. (1992). Population growth and global warming. *Population and Development Review*, 18: 299-319.

<b>MSD-E5.3</b>	<b>GENDER, HEALTH AND DEVELOPMENT</b>
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### Course Outcomes:

CO1: To sensitize students on gendered perspectives in reading health and development outcome

CO2: To gain an understanding of theoretical and conceptual issues involving gender in examining development at large

CO3: To acquaint students with varied gendered frameworks and relevant analytical tools towards gendered inspection

CO4: To offer skills of adopting a gendered outlook in introspecting health and development.

### Introduction

The purpose of this section is to explain the basic concepts of three major components of this course namely gender, health and development.

The Concept of gender, Evolution of gender in historical perspective

Patriarchy, Kinship Structure and gender roles, Feminist theories, Gender stratification in traditional and modern societies, Gender Analysis Tools, Gender Sensitive Indicators and Gender budgeting and auditing

Concept of health, Evolution of the concept of Reproductive Health, life cycle approach to RH and recommendations from ICPD

Changing concept of development, Indicators of development, gender adjusted

HDI

## **Gender and Health**

This section presents the situation analysis regarding sex differentials in different aspects of health and highlights some special issues of women and men's health.

### ***Situation analysis of sex differentials in morbidity and mortality***

Major morbidity and mortality burden in the developing world with major focus on India- sex ratio of births, major health problems experienced by women and men, reproductive health of women and men in developing world, differentials in use of male and female methods of contraception

Health infra-structure and health care

providersNutritional status,

susceptibility to infections

Accidents and other risk factor and health seeking behavior

Health and Nutrition issues of adolescent of boys and girls , abuse and maltreatment, Puberty, Sexual Debut, Adolescent Pregnancy, Abortion, women and family planning programs, Contraceptive Technology

Major risk factors of men's health: masculinity, alcoholism, tobacco and drug consumption, accident

Gender and Sexuality: Sexual health of men and women, gender dimension of HIV

/AIDS. Genderand Infertility

## **Gender and Development**

The purpose of this section is to understand the sex differentials in health in terms of socio- economic and cultural context of gender and to study the gender dimensions of development.

Understanding social structures- role of caste, class, ethnicity and religion and gender in healthinequalities and health outcomes

Gender dimension of social development, status and role of men and women in household andcommunity, culture, marriage customs, dowry and bride price practices, age at marriage

Gender differentials in household headship and role in decision making

Gender differences in access to knowledge-, education, exposure to media and freedom of movements

Gender based violence- Domestic and community violence and gender, Legal aspects of domesticviolence and rape

Women's role in community life and involvement in politics-as voter, political worker and leader,women in Panchayati Raj Institutions and self-help groups

Media representation of men and women

Gender dimension of economic development: women's access to economic resources, entitlements, land ownership, inheritance laws, access to credit, measurements of women's work, profiling women's work, informal sector involvement, working condition, maternity benefits, wage differentials, gender and poverty  
 Globalization, changing pattern of economic activity, issues of marginalization and vulnerability along with agency, negotiation and spaces of power, Gender Divisions in Urban Labor Markets, Gender and Migration  
 Housing, Household environment and its differential impact on men and women's life  
 Environmental degradation, changes in climate, water table and land use and their differential impact on men and women

### **Gender mainstreaming in health and development programs**

The purpose of this section is to understand the concept of mainstreaming gender in development and to review the measures taken for eliminating undesirable impact of gender inequalities and to bring women in the main stream of development

The concept of Gender Mainstreaming

Historic overview of Gender Mainstreaming- Women in development (WID) concept and criticism by feminist; shift to Gender and Development (GAD), Gender Mainstreaming and the Millennium Development Goals (MDGs)

The rights approach to Health, sexual and reproductive rights, violence, human rights and health Paradigm shift from the Target Based Supply Driven Fertility influencing programs to RH Approach.

Legal aspects – laws regarding marriage, dowry, domestic violence, rape PNDT act, property inheritance, maternity and other benefits of working women, sexual harassments at workplace, reservations in political institutions and Gender mainstreaming in various health and development sectors- e.g. Agriculture, Health, Education, gender in work place (Public & private) etc. Advocating for Gender equality

Gender responsive policy making and planning of health and development programs.

### **Section 5: Some case studies of Gender analysis of health and development programs, budgeting and auditing**

This section aims to give necessary skills and tools to undertake the gender analysis of health and development policies and programs and to help them to develop gender sensitive indicators and measures

#### **Essential Readings:**

1. Basu, Alaka M., (1992): *Culture, The Status of Women and Demographic Behaviour*, Oxford University, New York.
2. Bhasin K. 1993. *What is patriarchy?*, Kali for Women Publishers, New Delhi.
3. Bhasin K. (2000). *Understanding Gender*, Kali for Women Publishers, New Delhi.
4. Dyson, Tim and Mick Moore, (1983). "On Kinship structure, female autonomy, and demographic behaviour in India", *Population and Development Review* vol. 9(1), pp. 35-60.
5. Ellsberg Mary and Heise Lori L. (2005) *Researching violence against women: A practical guide for researchers and activists*. WHO and Path, Washington D.C.

6. Folbre, Nancy. (1992). Improper arts: Sex in classical political economy. *Population and Development Review*. 18(1): 105-112.
7. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): *Population Policies Reconsidered: Health and Empowerment and Rights*, Harvard University Press, Harvard.
8. Jeffery Patricia and R. Jeffery. 1997. *Population Gender and Politics: Demographic change in rural north India*. Cambridge University, Cambridge.
9. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, New York.
10. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social Science Research*. Sage Publication, London.
11. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economic and Social Affairs (Dept. of), New York
12. World Health Organization. (1998). *Gender and Health. Technical paper WHO/FRH/WHD/98*. (Website: [www.who.int](http://www.who.int))
13. World Bank. (1991). *Gender and Poverty in India*. World Bank, Washington.
14. World Health Organization (2003): *Comparative Evaluation of Indicators for Gender Equity and Health*, Women and Health Programme, Centre for Health Development, Kobe, Japan.
15. William Joan. 1989. Deconstructing Gender, 87 Michigan L Rev. 797. *Law Journal Article*

### **Suggested Readings:**

1. Agnes, Flavia. (2000). Law and gender inequalities: the policies of women's right in India. Oxford, New Delhi.
2. Anker, R.(1997). *Gender and Jobs: Sex Segregation of Occupations in the World*, ILO, Geneva.
3. Balk, Deborah, 1997): "Defying Gender Norms in Rural Bangladesh: A Socio demographic Analysis". *Population Studies* Vol.51, pp. 153-172.
4. Bandhopadhyay, D. 2000. Gender and governance in India. *Economic and Political Weekly*. 35(3):2696-269xxx).
5. Basu, Alaka Malwade. 2000. Gender in population research: Confusing implications for health policy. *Population Studies*. 54: 19-22.
6. Das Gupta, Monica, 1987. Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1): 77-100.
7. Doyal L.(1995) What Makes Women Sick: Gender and the Political Economy of Health. London, Macmillan.
8. Dreze, Jean and Sen Amartya, (1995): *India: Economic and Social Opportunity*, Oxford University Press, New York.
9. Harriet B. Presser, (1997): Demography, Feminism and the Science-policy Nexus, *Population and Development Review* Vol. 23(2), pp. 295-331.
10. Jeffery, Roger and Basu, Alka M. (Eds.), (1996): *Girls Schooling, Women's Autonomy and Fertility Changes in South Asia*, Sage Publications, New Delhi.



11. Jejeebhoy S. 1996. Women's Education, Autonomy and Reproductive Behavior: Assessing what we have learned. East West Centre, Hawaii.
12. Reeves Hazel and Baden Sally (2000): Gender and Development: Concepts and Definitions, Report No. 55, Bridge (development- gender) Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK.
13. Sonya, Andermahr, Lovell Terry and Wolkowitz, Carol, (1997): A Glossary of Feminist Theory, Arnold-Hodder Headline Group, London.
14. Sopher, David, (1980). An Exploration of India: Geographical Perspective on Society and Culture, Cornell University New York

<b>MSD-C16</b>	<b>APPLIED MULTIVARIATE ANALYSIS</b>
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#### I. Review of Multiple Linear Regression Analysis and its Assumptions

#### II. Advanced Multivariate Techniques

- Simultaneous equation models- the identification problem. Methods of estimation-the instrumental variable method and two-stage-least squares method. Diagnostic checking and model selection
- Generalized linear models: A general model for the response probability, the logit, the probit and the complementary log –log model, choice of link function, Estimation of the generalized model. Latent variable representation of a generalized linear model.
- Revision and extended to binary outcome Structure Equation Modelling, Structural Approach to evaluate the policies/programs, IV-method, structural equation modeling (with an application of latent class models to methodological studies of measurement error),
- Multilevel modelling: A multilevel model for group effects, estimating group effects, random vs. fixed effects, random intercept model
- Generalized linear random intercept model, random intercept logit model, a random slope logit model
- Multilevel and marginal modeling techniques for clustered or longitudinal data (with applications to methodological studies of interviewer effects and modeling trends in the NFHS/LASI survey), two-level random intercept model,
- Concept of Bayes theorem and development of regression techniques based on Bayes concept and its application
- Computer Applications using Stata and MLwiN softwares

#### Readings:

1. "Applied Multivariate Statistical Analysis" by Richard A. Johnson and Dean W. Wichern (8th edition, 2020) -
2. "Multivariate Statistical Methods: A Primer" by Bryan F. J. Manly (4th edition, 2016)
3. "Multivariate Data Analysis" by Hair, Black, Babin, and Anderson (8th edition, 2019)
4. "Applied Multivariate Techniques" by Subhash Sharma (2nd edition, 2018)
5. "Multivariate Analysis: Methods and Applications" by Alvin C. Rencher (2nd edition, 2003)
6. Rencher, A. C. (2015). Methods of multivariate analysis (2nd ed.). John Wiley & Sons

**Objective:** The objectives of learning the course is to acquaint students to carry out projections, and forecast independently and apply them with real data.

**Course Outcome:** On successful completion of this course, the students will be able to

1. Demonstrate the concepts of time series analysis, projection and forecast
2. Understand demographic, mathematical and statistical methods of projections
3. Forecasts with valid conclusions based on appropriate time series data.

**I Time series analysis:** significance of time series analysis, Nature of time series data, measures of dependence, assumption, and component (stationary non-stationary), vector-valued and multidimensional series, moving average, smoothing in the time series context, autoregressive model, ARMA, ARIMA, application in forecast

**II. Concept of Projections and forecast:** basic concepts and need for projections, forecast, time series analysis, different approaches of projections and forecast: mathematical, time series, regression based, simulation, period vs cohort, building scenarios, expert opinion,

### III. Population Estimates and Projections

Concepts of population projections; population estimates, forecasts and projections, uses of population projections.

Methods of interpolation; extrapolation using linear, exponential, polynomial, logistics, Gompertz curves and growth rate models.

Cohort component method: basic methodology; projection of mortality, fertility and migration components; population projections of United Nations, World Bank and Expert Committees of Government of India; accuracy of population projections. Methods of rural-urban and sub-national population projections.

**IV. Mortality Forecasts:** Lee-carter model, ARIMA model, cause specific mortality

**V. Methods of socio-economic projections:** labour force projections, school-enrolment, health personnel and households. Multi-state projections and forecasting, Age-Period-Cohort methods

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### Reading List

1. Box, G., Jenkins, G.M. Reinsel, G.C. and Ljung, G. (2016): Time Series Analysis: Forecasting and Control. Fifth Ed., Wiley.
2. Montgomery, D.C., Jennings, C. and Kulahci, M. (2016): Introduction to Time Series Analysis and Forecasting. Second Ed., Wiley.
3. Shumway, R.H. and Stoffer, D.S. (2017): Time Series Analysis and Its Applications: With R Examples. Fourth Edition. Springer.
4. Navaneetham Kannan and George Groenewold, (1998): The Projection of Populations: Data Appraisal, Basic Methods and Applications, Population and Sustainable Development Teaching Texts, Thiruvananthapuram: Centre for Development Studies.
5. Smith Stanley K., Jeff Tayman, and David A. Swanson, (2001): State and Local Population Projections: Methodology and Analysis. New York: Kulwer Academic/Plenum Publishers.

MSD-E6.1	SPATIAL ANALYTICS
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Course Outcomes:

CO1: Understanding the concept of space and develop spatial dynamics in demographic process.

CO2: Learning visualisation tools of demographic data and draw inferences.

CO3: Learning different Geo-Spatial software to facilitate spatial analytical methods in demographic research.

CO4: Learning Geographic Information System (GIS), spatial pattern analysis and spatial statistical techniques to explain a specific spatial pattern.

## I. Concepts and Theories

Demography as a spatial science; difference between spatial demography and population geography; Spatial pattern and spatial process; location, distance and area; Distance and decay relationship and spatial hierarchy; space, place and region; Type of spaces- concrete and abstract space; absolute, relative and relational spaces.

Understanding demographic process by geographical scale; nature of disaggregated data- Census and secondary sources; Linking micro and macro demography in a spatial frame.

Application of spatial frameworks to demographic process; Space, culture and fertility; Spatial pattern of mortality and diseases; Distance as factor in access to health care and health planning; Migration and distance- gravity model; space, culture and migration; urban sprawl and sub-urbanization.

## II. Statistical and Geospatial Data and Software

**Spatial Concepts and Cartography:** Spatial parameters: Site and location; Scale; Plane and spherical coordinate, Map Projection-UTM, Types of maps: cadastral, toposheet, thematic, digital; Representation of spatial and non-spatial data; **Introduction to geospatial software: GIS:** discrete data: point, and polygon data,

Raster and vector data, layouts preparation. Geocoding and basics of digitization in ArcGIS

**Introduction to Geoda:** ESDA in (Exploratory Spatial Data Analysis); Local Indicators of Spatial Association (LISA)

**Statistical Concepts:** Bar diagram, Frequency polygon, Frequency curve; Test of significance, confidence intervals, Univariate and Multivariate Statistics: Correlation and Regression, Matrix algebra; Auto-correlation; kriging, Moran's I index

**Introduction to Statistical software:** SPSS, STATA, R

## III. GIS and Spatial Analysis of demographic data

**Representation of statistical data and automated cartography (Lab based exercises):**

- Population distribution map of India using dot and sphere/circle, cubes, combined; Cartograms
- Density map by Choropleth and population density gradient by Isopleth;
- Fertility, mortality and natural growth of population by Polygraph.

- d) Measurement of population concentration by cumulative curve.
- e) Migration flow by Carogram

#### **Concept and application Models:**

- a) Spatial Lag and Error Regression Modeling;
- b) Multilevel modeling (hierarchical linear modeling);
- c) Geographically Weighted Regression;
- d) Spatial Pattern Analysis;
- e) Urban and city level projection

#### **Reading List**

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Workbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on <http://geodacenter.asu.edu/>.
2. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Harlow, Longman.
3. Bonham, Carter G.F. (1995): Information Systems for Geoscientists–Modelling with GIS. Pergamon, Oxford.
4. Chen, X., Orum A.M., and Paulsen K.E. (2013). Introduction to Cities: How Place and Space shape Human Experience. West Sussex, Wiley-Blackwell.
5. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
6. Griffith, D. A. and Amrhein (1997): Multivariate Statistical Analysis for Geographers. Englewood Cliffs, New Jersey, Prentice Hall.
7. Kurland K. S., Gorr W. L. (2007). GIS Tutorial for Health. Redlands, CA, ESRI Press.
8. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. New Delhi, Prentice Hall of India.
9. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984) Elements of Cartography. New York, John Wiley and Sons.
10. Chang, K. (2008). Introduction to Geographic Information Systems. New Delhi, McGraw Hill Education.
11. Shaw, G. and Wheeler, D. (1994). Statistical Techniques in Geographical Analysis. Englewood Cliffs, New Jersey, Prentice Hall.
12. Soja, E. W. (1996). Third space: Journeys to Los Angeles and Other Real-and Imagined Places. Wiley-Blackwell.
13. Barbara E., Ronald R. R., Stephen J. W., Tom P. E. and Sara R. C. (1997). *Geographic Information Systems, Spatial Network Analysis, And Contraceptive Choice*. Demography. 34(2): 171-187.
14. de Castro M. C. (2007). *Spatial Demography: An Opportunity to Improve Policy Making at Diverse Decision Levels*. Population Research and Policy Review 26: 477-509.
15. Paul V. (2007). *Demography as a Spatial Social Science*. Population Research and Policy Review 26: 457-476. (plus Introduction to the special issue of PRPR on Spatial Demography) pp. 455-456).
16. Reibel, Michael, (2007). *Geographic Information Systems and Spatial Data Processing in Demography: A Review*. Population Research and Policy Review 26: 601-608.

### I. Introduction to Bayesian Inference

- Bayesian and Classical Statistics
- Basic principles of Bayesian inference
- Certainty, uncertainty and probability
- Non-informative priors and conjugate priors, Prior and Posterior inference
- Hypothesis testing and credible intervals

### II. Introduction to hierarchical models

- Bayesian linear regression model
- Hierarchical and empirical Bayesian models
- MCMC Simulation Methods-Markov chains, M-H algorithm, Gibbs sampling

### III. Small Area Estimation

- Introduction to small area estimation
- Small area estimation using hierarchical models
- Synthetic and model-based estimation

### IV. Advanced Topics in Bayesian Inference

- Bayesian model averaging
- Bayesian variable selection
- Bayesian nonparametric models

### V. Applications of Bayesian and Small Area Estimation

- Bayesian inference for big data
- Machine learning techniques in Bayesian inference
- Bayesian inference for complex models

#### Readings:

1. Bayesian Data Analysis, Third Edition by Andrew Gelman, John B. Carlin, Hal S. Stern, David B. Dunson, Aki Vehtari, and Donald B. Rubin
2. Small Area Estimation by J.N.K. Rao and Isabel Molina





# **M.A./M.Sc. in Population Studies**

## **Rules, Regulations and Syllabus**



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Website: <http://www.iipsindia.org>



## ABOUT THE INSTITUTE

The International Institute for Population Sciences (IIPS), Mumbai, formerly known as the Demographic Training and Research Centre (DTRC) till 1970, was established in July 1956 under the joint sponsorship of Sir Dorabji Tata Trust, the Government of India and the United Nations. It serves as a regional centre for Training and Research in Population Studies for the ESCAP region. The Institute was re-designated to its present title in 1985 to facilitate the expansion of its academic activities. It was declared as a 'Deemed University' on August 19, 1985 under Section 3 of the UGC Act, 1956 by the Ministry of Human Resource Development, Government of India. The recognition has facilitated the award of recognized degrees by the Institute itself and paved the way for further expansion of the Institute as an academic institution. In 2006, the Institute celebrated its Golden Jubilee.

IIPS holds a unique position among all the regional population centres. It was the first such centre to be started in India, and it serves a much larger population than any of the other regional centres. The Institute is under the administrative control of the Ministry of Health and Family Welfare, Government of India. There are seven Academic Departments in the Institute. The faculty members and the supporting staff belong to diverse interdisciplinary background with specialisation in some core areas of population sciences, trained in India or abroad.

The Institute is the hub of population and health related teaching and research in India, playing a vital role for planning and development of the country. During the past years, students from different countries of Asia and the Pacific region, Africa and North America have been trained at the Institute. The alumni are occupying prestigious positions at national and international organisations, universities and colleges and non-governmental reputed organisations. Besides teaching and research activities, the Institute also provides consultancy to the Government and Non-Governmental organizations and other academic institutions.

During the last six decades the Institute has organized many seminar and conferences of National and International level in the field of population studies which are of worldwide importance. Institute had conducted many important surveys like National Family Health Survey (NFHS), District Level Household Survey (DLHS), Assessment of National Rural Health Mission (NRHM), YOUTH in India Project, Global Adult Tobacco Survey (GATS India Project), Research Intervention on Sexual Health Theory to Action (RISHTA Project), Nutrition Surveys and Longitudinal Aging Study in India (LASI).

## TEACHING PROGRAMS

The Institute offers the following academic programs:

### ***Full Time Course and duration of courses***

1. Master of Arts/ Master of Science in Population Studies (M.A./M.Sc.) – two years
2. Master of Science (M.Sc.) in Biostatistics and Demography – two years
3. Master of Population Studies (MPS) – one year
4. Master of Philosophy (M.Phil.) in Population Studies / Biostatistics & Demography – one year
5. Integrated M.Phil. and Ph.D. in Population Studies / Biostatistics & Demography – four to seven years
6. Doctor of Philosophy (Ph.D.) in Population Studies – four to six years
7. Post-Doctoral Fellowship (P.D.F.) – one year
8. Diploma in Health Promotion Education (D.H.P.E) [*Offered by the Family Welfare Training and Research Centre (FWTRC), Mumbai in affiliation with IIPS*]

### ***Distance Education Courses***

9. Master of Arts in Population Studies (MA) – two to four years

### ***Short Term Training Courses***

Institute also conducts short term training courses and workshops on population and related issues and charges nominal fee.

**Rules for Master of Arts/Science in Population Studies (M.A./M.Sc.)**

The M.A./M.Sc. Program is designed to provide a higher level of understanding of population sciences including an in-depth knowledge of the linkages between population and various dimensions of socio-economic development and health

**Eligibility Criteria for Admission:**

Candidates with a Bachelor's degree from any recognized universities in India or abroad with a minimum of 55% marks ( 50% for reserved candidates) will be eligible for admission to the above programme. From the academic year 2020, candidates holding a bachelors degree in any subject other than B.Com and Management sciences can apply for this course. Candidates awaiting results of qualifying examination latest by 30th September of the admission year can also apply for consideration. The upper age limit is 25 years as on 30th June of admission year. Marks and age are relaxable for candidates belonging to reserved categories as per GOI rules. The eligibility criteria is revised time to time. Applicants need to check the admission notice in detail before applying for this course.

**Selection Criteria for the M.A./M.Sc. Program :** The selection is made on the basis of written test.

**Number of Seats and Award of Degrees :**

There are 50 Government of India Awards (Fellowships of Rs. 5000/- per month) available for M.A./M.Sc. course. There are no other allowances. Number of seats to be filled depends on the internal committee decision.

**Duration of the Course :**

The M.A./M.Sc. program, which is of two academic years comprises four semesters, begins from the July. The first semester ends by November. The second semester ends by May; the third semester begins in July and the fourth semester begins by November.

**Conditions for the Award:**

M.A./M.Sc. Program is a full time course.

- a) The student must not accept or hold any appointment paid or otherwise or receive any emoluments, salary, stipend, etc., from any other source during the tenure of the award.
- b) The student should also obtain prior permission of the Director in writing for appearing at any examination conducted by any other University/Institution.
- c) The fellowship will be available from the onset of the course till the end of the course.

d) The fellowship may be terminated at any time if the Institute is not satisfied with the progress or conduct of the fellow. e) The student will have to execute a bond requiring him/her to refund the fellowship received by him/her, if the fellow discontinues before the end of the prescribed period. The condition of the bond cannot be waived or relaxed except by the Director with the consent of the Executive Council of the Institute. f) If a student's performance in the first semester is not found satisfactory, or his/her conduct is found unsatisfactory on the basis of indiscipline of any act as is likely to undermine the prestige of the Institute, or endanger harmony of academic life of the Institute or is likely to violate the rules of the institute, his/her admission and fellowship will be terminated without any further notice. In case the fellowship is terminated, he/she will be required to refund the whole of the fellowship money drawn till that date provided the action against him/her has not been contemplated on the ground of unsatisfactory performance as stated above. g) After fulfilling all the criteria as per the rules & regulation of M.A./M.Sc. Program, the candidates having degree in Bachelor of Arts and Bachelor of Mass Communication, will be awarded Master of Arts (M.A.) in Population Studies and the candidates having degree in Bachelor of Science will be awarded Master of Science (M.Sc.) degree in Population Studies from Institute in the formal convocation function. h) Fees: The candidates admitted to the programme will have to pay the fees as per schedule of the Institute on 1st January and 1st July every year regularly. For payment of fees, a grace period of 30 days shall be given without late fee. Thereafter, 5% on all dues will be charged extra as late fee, every month.

**Hostel Accommodation:**

Accommodation in the hostel of the Institute will be provided to the students at the applicable rate, subject to availability.

**Medical Facilities:**

The students of the Institute will have access to free medical advice from the medical officers of the Institute.

**Leave:**

A student can take leave for a maximum of four working days in a semester on the recommendation of Course Co-ordinator and granted by the Director. Kindly check updates from IIPS web page.

**Attendance**

Please look into the updated attendance rule in the Institute Webpage.

**Evaluation**

Grades obtained in all the subjects counted for determining the overall grade for M.A./M.Sc. programme. Minimum Grade required for passing is “P” (Pass) in each unit.

**Grading System** The following ten points grading system is followed in the Institute:

1. The teacher concerned will set the question paper and also evaluate the answer books as per grading pattern.
2. A final grade for each paper will be arrived by taking weighted average of grades given in different sections of the paper in case of questions of unequal weights. The weights can be given in proportion to the credit (i.e. number of hours) assigned for each section of the paper.
3. Overall Grade will be arrived on the basis of the number of credit hours and grade points for each subject

For Updated grading system, please see IIPS website.

### **Written Examination**

Written examination will be conducted for all Courses

### **Re-evaluation of Answer Sheets**

- i) A student can have access to his/her examination papers in the form of photocopies at a cost of Rs. 200/- per paper with prior approval of the Director.
- ii) A candidate shall apply for revaluation of his/her answer sheet on the prescribed form to the Director of the Institute within three weeks from the date of declaration of the result along with the non-refundable fee of Rs. 500/- only per paper.
- iii) No application for revaluation will be entertained unless a photocopy of the statement of marks in the examination concerned is enclosed to the application.
- iv) The result of the revaluation of a candidate's answer-book(s) shall be binding on him/her and that he/she shall accept the revised marks as final.
- v) If a candidate, whose answer-book(s) have been reassessed, becomes eligible for any prize or any other award, the same shall be granted to him/her and the award previously made shall be cancelled. If as a result of revaluation, a candidate becomes eligible for the provision of a condonation of deficiency, the same shall be given to him/her.

### **Re-examination**

- (1) Re-examination will not be conducted during the course period.
- (2) Those students who fail or could not appear in any examination will be allowed to re-appear in a paper in the next semester examinations.
- (3) Those failing in any exam of final semester will not be awarded the degree in the same academic year. They can appear in the re-examination along with first semester of the next batch.
- (4) Maximum of three attempts will be allowed including the first appearance in each paper.
- (5) There will not be any down grading in re-examinations.
- (6) 50 Percent of clearance of the total papers in each semester is compulsory to continue the study in next semester.

### **Dissertation:**

Students in IV semester need to prepare a dissertation on approved topic. It could be based on primary and/or secondary data. No funding is provided for primary data collection.

Students need to present and defend his/her work which is being evaluated by committee members. During presentation sessions, participation of all MA/MSc second year students is compulsory, failing which Institute can take action. Last date for submitting soft copy of the dissertation synopsis to a) the Academic section, b) to MA/MSc 2nd Year students and c) to all faculty members is fixed.

Hard copy of the synopsis should be given to the Evaluation Committee Members and Guide one day before presentation. Length of the synopsis (including tables, figures and references etc.) should not be more than 22 pages. Each presenter will have 20 minutes for presentation. The grade for dissertation is a combined score based on presentation, defense, content. Each internal evaluator must submit a separate grade sheet in sealed envelope to the Controller of Examinations. Students need to submit a bound volume of the dissertation by a date specified by examination centre. In viva- voce, students should carry a copy of the dissertation.

**Expected Outcomes of MA/ M.Sc. in Population Studies:**

On completion of two years Masters course, students shall be able to:

- analyse, interpret and criticise demographic, health and public health research
- demonstrate an understanding of the essential principles of modern demographic methods and statistical softwares and how to apply them
- employ basic computational skills used in the analysis of population, health and development
- undertake original research projects that makes a contribution to the body of knowledge for human wellbeing
- gain understanding in presentation skills and developing research papers
- develop knowledge in research proposal development, sampling, modalities of conducting research
- exhibit the ability to disseminate research findings to the scientific community and the general public
- develop confidence in works related to public welfare
- undertake jobs related to health and development

## M.A./M.Sc. in Population Studies

Course No.	Course Name	Course Type	Credits
<b>SEMESTER-I</b>			
MSP-F1	Sociology, Psychology and Anthropology*	F	NC
MSP-C1	Basic Statistical Methods for Population Studies	C	4
MSP-C2	Introduction to Demography and History of Population	C	4
MSP-C3	Fertility and Nuptiality	C	4
MSP-C4	Mortality, Morbidity and Public Health	C	4
MSP-E1.1	Healthcare System and Policies	E	3
MSP-E1.2	Biostatistics and Epidemiology	E	3
	<b>Semester Credits</b>		<b>19</b>
<b>SEMESTER-II</b>			
MSP-F2	Economics and Geography*	F	NC
MSP-C5	Evaluation, Adjustment of Demographic Data and		
	Population Projection	C	4
MSP-C6	Introduction to Demographic and Statistical Software	C	4
MSP-C7	Migration and Urbanization	C	4
MSP-V1	Viva-Voce-I	V1	2
MSP-E2.1	Historical Demography	E	3
MSP-E2.2	Spatial Demography	E	3
MSP-E3.1	Health Economics and Financing	E	3
MSP-E3.2	Urbanisation, Space and Planning	E	3
	<b>Semester Credits</b>		<b>20</b>
<b>SEMESTER-III</b>			
MSP-C8	Gender and Reproductive Health	C	4
MSP-C9	Population and Development	C	4
MSP-C10	Research Methodology	C	4
MSP-E4.1	Concepts and Measures of Global Health	E	3
MSP-E4.2	Gender, Health and Development	E	3
MSP-E5.1	Advanced Statistical Packages and Application in		
	Large Scale data	E	3
MSP-E5.2	Population, Environment and Sustainable Development	E	3
	<b>Semester Credits</b>		<b>18</b>



SEMESTER-IV			
MSP-C11	Population Policies, Programme and Evaluation of HFW Programme	C	4
MSP- C12	Population Ageing and Health Transition	C	4
MSP-D	Dissertation	C	10 <sup>s</sup>
MSP-V2	Viva-Voce-II	V2	2
MSP-E6.1	Operation Research in Reproductive Health	E	3
MSP-E6.2	Monitoring and Evaluation in Population & Health	E	3
	<b>Semester Credits</b>		<b>23</b>
	<b>TOTAL CREDITS</b>		<b>80</b>

\*Not counted for calculating the final grade

- F – Foundation course, C – Core course, E – Elective course, NC: Non Credited course; V-Viva voce, D–dissertation.
- Semester I: One elective should be opted; i.e. E1.1/E1.2
- Semester II: Two electives should be opted from each group, i.e. E2.1/E2.2 & E3.1/E3.2
- Semester III: Two electives should be opted from each group; i.e. E4.1/E4.2 & E5.1/E5.2
- Semester IV: One elective should be opted; i.e. E6.1/E6.2
- Core courses: 68%; Elective courses: 32%
- Core papers cannot be changed. Elective paper can be changed if the student fails in an elective paper and submits his/her request for a change in writing.
- \$ Weightage in evaluation procedure for dissertation – Guide: 0.25, Presentation & Defense: 0.25, Content: 0.50.
- For all papers, the written and assignment weightage is 0.8 and 0.2 respectively while for Research Methodology ( MSP C-10) it is 0.6 and 0.4 respectively.

## **SEMESTER – I**

**MSP-F1**

**45 Hours**

## **SOCIOLOGY, PSYCHOLOGY AND ANTHROPOLOGY**

### **The Study of Human Society:**

- a) The Sociological/Anthropological point of views, b) The Value of Sociology and Anthropology and c) Perspectives in Sociology and Anthropology

### **Major Groups:**

- a) Primary and Secondary Groups, b) Rural and Urban Communities, c) Caste
- d) Class and Stratification

### **The Social Structure:**

Major forms of Social Structure: a) Types of social group, b) Groups in social life c) The Primary group, d) The Great Association

The Family: a) Sociological Significance of the Family, b) Early forms of the Family, c) Types and functions of Family

### **The Community:**

- a) The Communities as place. Its Physical Configuration
- b) Community and Intra Communal Difference

### **Social Class and Caste: Principles of Class and Caste**

#### **Ethnic and Racial Groups:**

- a) Ethnic and Racial Relations in Social life, b) Ethnic and Racial groups as 'Caste'

#### **Varna and Caste System**

- i) Concept & Definition of Varna and Caste System, Scheduled Caste
- ii) Changing Caste System in India-legislation, normative, and behavioral context and its influence on demographic characteristic of the Population

#### **Tribes in India:**

- a) Definition of Tribe/ Scheduled Tribe; b) Special distribution; c) Composition;
- d) Size and Growth

**Society and Culture in India**

1. Aspects of society and culture in India, and its role and importance in Population Studies.
2. Social Institutions and their role in influencing demographic situation of the Population of India - Family, Marriage, Kinship and Religion

**Social Institutions:**

Family, Kinship, Marriage, Religion, Status of women and Relevance with demographic components

Economics Institutions: Land tenure, Land use pattern, and Tribal Economy.

Administrative and Political: Traditional Panchayat and Panchayat Raj Institutions, Tribal Movements and Developments.

**Social Change**

Definition and Concept of Social Change

Process of Social Cultural Change in India and its role in influencing demographic characteristic:

- a) Sanskritization, b) Secularization, c) Liberalization, d) Modernization, e) Democratization

**Social Psychological Concepts:**

The Value of psychology and perspectives in psychology; scientific study of social influences on behavior and the interaction between individuals and groups; social pressure, leadership

**Basics of Psychology:**

Why Psychology, branches of psychology, methods of research, Psychological well-being across major stages of the life span. Role of psychology in population studies.

**Sensation, Attention and Perception:**

Sensation: concepts of threshold, Factors influencing attention including set and characteristics of stimulus; Definition and concept of perception, biological factors in perception; Perceptual organization-influence of past experiences, perceptual defence-factors influencing space and depth perception, size estimation and perceptual readiness; Extrasensory perception; Culture and perception, Subliminal perception.

**Motivation and Emotion:**

Psychological and physiological basis of motivation and emotion; Effects of motivation and emotion on behaviour; Extrinsic and intrinsic motivation; Factors influencing intrinsic motivation; the related issues.

**Personality:**

Definition and concept of personality; Theories of personality (psychoanalytical, socio-cultural, interpersonal, developmental, humanistic, behaviouristic, trait and type approaches); big 5 factor theory;

**Language and Communication:**

Human language - Properties, structure and linguistic hierarchy, Language acquisition-predisposition, critical period hypothesis; Process and types of communication - effective communication training.

**Psychological well being and Mental Disorders:**

Concept of health-ill health; Positive health, well being; Causal factors in mental disorders (Anxiety disorders, mood disorders, schizophrenia and delusional disorders; personality disorders, substance abuse disorders); Factors influencing positive health, well being, life style and quality of life; Happiness disposition.

**Reading List****Essential Readings :**

1. Davis Kingslay, *Human Society*, Macmillen and Co., New York, (1975), Chapters 1, 3,5,6.
2. Kapadia K. M., *Marriage and Family in India*, Oxford University Press, Calcutta, (1986).
3. Ketkar S.V., *History of Caste in India*, Rawt Publication, Jaipur, (1979).
4. Kuppuswamy B., Revised by B.V. Kumar, *Social Change in India*, Konark Publication Pvt. Ltd. Delhi, (1990).
5. Mandelbaum D.G., *Society in India-Continuity and Change and Change and Continuity*, Vol.I. University of California Press, London, (1970).
6. MaCiver R.M., Charles H. Page, *Society an Introductory Analysis*, Halt Riehart Winston, New York, (1949), Chapters No.1, 3,7,11,15,22,24,25,26.
7. Srinivas M.N., *Social Change in Modern India*, University of California Press, Berkeley, (1966)

8. Vidyarthi L.P., *The Tribal Culture of India*, Concept Publishing Co., Delhi, (1977).
9. Sigmund Freud, *The Interpretation of Dreams* (1900)
10. Charles M. Duhigg, *The Power of Habit* (2012)
11. Karen Horney, *The Neurotic Personality of Our Time* (1937)
12. Oliver Burkeman, *The Antidote: Happiness for People Who Can't Stand Positive Thinking* (2012) .
13. Carl Gustav Jung, *Man and His Symbols* (1964)
14. *Introduction to Psychology* 10th Edition James W. Kalat (2013)

**Suggested Readings :**

1. Hasain N., *Tribal India Today*, Harnam Publication, New Delhi, (1986).
2. Krech D.; Crutchfield R.S. and Ballachey E.L., *Individual in Society*, International Student Edition, McGraw-Hill Book Company, INC, New York, (1962).
3. Linda A. Mooney, Davis Knox & Caroline Schacht, *Understanding Social Problems*, 3rd Edition, Wadsworth / Thomson Learning, USA, (2002).
4. N.P. Chaubey, *Indian Society at the Turn of the Century*, Century Printers, New Delhi, (1988).
5. Ram Mohan, *Encyclopedia of Social Problems in Developing Countries*, Vol-1, 2,3, Sarup & Sons, New Delhi, (2003).
  - a. Richard T. Lapiere, *Social Change*, McGraw-Hill Book Company, New York, (1965).
6. S. Kumar and S. Gajrani, *Culture and Society in India*, Om Publications, Faridabad, (1999).
7. S.R. Maheswary, *Society and Culture*, Rajat Publications, Delhi, (2000).
8. Ram Krishna Mukherjee, *Society, Culture & Development*, Sage Publications, New Delhi, (1991).
9. Feldman R.S., *Social Psychology Theories, Research and Applications*, International Student Edition, McGraw-Hill Book Company, INC, New York, (1985).
10. France N. Magill (ed.), *International Encyclopedia of Sociology*, Vol. II and I (selected readings) Fitzry Dearborn Publishers, England, (1995).

MSP C1

60 Hours

## BASIC STATISTICAL METHODS FOR POPULATION STUDIES

**Learning Objective:** This course aims to provide students with basic knowledge of statistical techniques which can be used in demographic analysis.

**Introduction to statistics:** Descriptive and Inductive statistics. Concept of variables, Nominal, Ordinal and Interval and ratio scale variables.

Tabulation of data, conversion of raw data into frequency distribution, graphical presentation of nominal, ordinal data, Logarithms: properties of logarithms, Ratios, Proportion and rates, growth rates (arithmetic, geometric and exponential), Interpolation and Extrapolation.

**Measures of Central Tendency:** Mean (arithmetic, geometric, harmonic) Median, Mode; Merits and demerits of different measures.

**Measures of dispersion:** Range, Variance, Standard Deviation; Merits and demerits of different measures of dispersion. Measures of Skewness and Kurtosis.

**Techniques of analyzing bivariate nominal and ordinal level data:** Contingency table, odds ratios, relative risk.

**Introduction to set theory, permutations and combinations:** Introduction to the concept of probability, A-priory, and mathematical probability. Events: exhaustive, mutually exclusive events; Laws of probability, additive and multiplicative laws of probability through demographic data, Bayes' theorem

**Discrete probability distributions:** Binomial and exponential functions, Binomial probability distribution and Poisson distribution and their properties. Continuous probability distribution; Introduction to Normal distribution and its properties, applications of normal distribution.

**Introduction to the concept of correlation:** Pearson correlation coefficient, and its properties; Spearman ranks correlation coefficient. Concept of linear regression, fitting of regression line to bi-variate data.

**Concepts in Inductive statistics:** Population, sample parameter, and statistic. Sampling distribution of mean and standard error. Concepts of statistical hypothesis, critical region, level of significance, confidence interval and two types of errors.

**Testing statistical hypothesis and test of significance :** Introducing the t distribution, comparing two groups, principles of comparison, independent t-test and paired t-test, Assumptions involved in t testing. Testing the association of attributes and Chi-square goodness of fit.

**Analysis of Variance:** Introduction to Multivariate Analysis. Concept of multi-variate regression. Concept of Multiple and Partial correlation coefficients in regression analysis. Standardized regression coefficients, Regression with dummy variables.

### Reading List

#### Essential Readings :

1. Blalock, Hubert M. (1960): *Social Statistics*, McGraw-Hill Book Company, New York.
2. Chakravorti, S.R. and Giri, N. (1997): *Basic Statistics*, South Asian Publishers, New Delhi.
3. Clarke, G.M. and Cooke, D.,(1994): *A Basic Course in Statistics*, Arnold, London.
4. Dixon, W.J and Massey, F.J. (1983) Introduction to Statistical Analysis, 4<sup>th</sup> ed., New York, MC Graw Hill, 380-381, 534.
5. Goon, A.M., Gupta, M.K. and Dasgupta, B. (1985): *Fundamentals of Statistics* Vol. I , The World Press Private Ltd. Calcutta.
6. Jain, S.K. 1979. *Basic Mathematics for demographers*. Canberra: The Australian National University.
7. Lipshutz, Seymour., Schaum's Outline Theory and Problems of *Set Theory and Related Topics* Series, Mcgraw Hill.
8. Marcello Pagano and Kimberlee Gourneau (2000) "Principles of Biostatistics" Second Edition, Duxbury Thomson Learning, United States.
9. Prakasam, C.P., G. Rama Rao, and R.B. Upadhyay (1987): *Basic Mathematics in Population Studies*, Gemini Publishers, Mumbai.
10. Siegel J.J. and D.A. Swanson (Ed.), 2004. *The Methods and Materials of Demography*. Second Edition. Elsevier Academic Press.
11. Venkatachary, K (1994). *Elements of Mathematics for Demographers*.



Monograph Series No.9. Regional Institute for Population Studies, University of Ghana. Legon.

**Suggested Readings :**

1. Bhat N.R and M.R. Singh, 1993. *Applied Mathematics*. New Delhi: Tata McGraw – Hill Publishing Company Ltd.
2. Dillon, W.R. and Goldstein, M. (1984): *Multivariate Analysis*, John Willey and Sons, New York.
3. Douglas and Altman (2006): *Practical Statistics for Medical Research*, Chapman and Hall Publication, Washington, D.C.
4. Ebdon, E. (1978): *Statistics in Geography*, Basil Blackwel, Oxford.
5. Fisher, L.D and Van Belle, G. (1993) *Biostatistics : A Methodology of the Health Sciences*, New York, Wiley Intgescience,
6. Goon, A.M., Gupta, M.K. and Dasgupta, B. (1985): *Fundamental of Statistics* Vol. I , The World Press Private Ltd. Calcutta.
7. Graeme Hutcheson and Nick Sofroniou, (1999): *The Multivariate for Social Scientist*, SAGE Publications.
8. Gupta, S.C. and Kapoor, V.K. (1986): *Fundamental of Mathematical Statistics*, Sultan Chand and Sons Publishers, Delhi.
9. Howell David C. “*Fundamental Statistics for the Behavioral Sciences*”, 4<sup>th</sup> Edition, an International Thosuross Publishing Company, USA.
10. Mc Clave, James T., P. George Benson and Terry Sincich (2001): *Statistics for Business and Economic*, Eighth Edition, Prentice Hall, NJ, USA.
11. Norman R. Kurtz (1999): *Statistical Analysis for the Social Sciences*, Allyn and Bacon.
12. Retherford, R.D. and Choe, M. K., (1993): *Statistical Models for Casual Analysis*, A Wiley-Inter-Science Publications, John Wiley and Sons, INC, New York.
13. Sundaram, K. R., S. N. Dwivedi and V Sreenivas. (2009). *Medical Statistics Principles & Methods*. Anshan Publisher.

## INTRODUCTION TO DEMOGRAPHY AND HISTORY OF POPULATION

**Learning Objectives:** This is the first paper in Population Studies course for MA/ M Sc. students. The basic objective of this paper is to introduce the students to the scope and importance of the discipline of population studies. At the end of 60 hours, including lectures and assignments, the students are expected to get clear idea of the evolution and the scope of the discipline, past, present and future scenario of population growth and age and sex structures of the world, major regions, and India. They will be familiar with various sources of demographic data with a focus on India, as well as the strengths and weaknesses of data sets.

### **Introduction to Demography.**

- a. Definition and Scope: Evolution of demography as a scientific discipline; Nature and scope of demography and changes in it over time. Multi-disciplinary nature of Demography, its linkage with other social science disciplines including statistics and mathematics. Basic demographic concepts. Components of population change, and demographic equation
- b. Demographic transition theory

### **Population History**

- a. Global population trends: Historical population trends, World Population Growth- a brief history, The Power of Doubling
- b. Global variation in population size and growth
- c. Past, present and future population trends across the world, continents, and major regions
- d. History of population in India: Trends and growth of India's population
- e. Concerns of population growth- before and after independence.
- f. Demographic profiles of India and states

### **Concepts and Measures of age and sex structure**

- a. Defining age and sex, sex ratio, sex ratio at birth
- b. Classification of age group and their importance

- c. Measures of age structure: Percent distribution, Median age, age-sex pyramid, dependency ratio and potential support ratio
- d. Factors affecting age and sex structure
- e. Importance of age-sex structure in Demography.
- f. Socio-economic implications of age and sex structure
- g. Demographic dividend.

#### **Sources of Demographic Data.**

- a. Data requirements, types of demographic data.
- b. Different sources of data.
- c. Population census across the world. Census taking under British India, Indian census, details of different items on which Indian census collect data, publication of census data/ reports.
- d. Vital registration system
- e. Sample registration system (SRS), survey on causes of death.
- f. National Sample Survey Organization's surveys, details of different rounds collecting population and health data.
- g. Nationwide sample surveys National Family Health Survey (NFHS), District Level Household and Facility Survey (DLHS), etc.
- h. Availability of data at various levels of disaggregation
- i. Strengths and weaknesses of various data sets

#### **Dynamics of Age-Sex Structure of the World and India .**

- a. Present levels, past trends and probable future changes in age-sex structure of the world and major regions.
- b. Present levels, past trends and probable future changes in age-sex structure of India and states.
- c. Determinants and consequences of age-sex structure of population. Ageing of the population. Relative role of low fertility and low mortality in ageing. Socio-economic consequences of population ageing.

#### **Reading List**

##### **Essential Readings :**

1. Henry S. Shryock, Jacob S. Siegel, Elizabeth A. Larmon (1973) *The Methods and Materials of Demography*, Chapters 1, 2, 3, 7, 9,10, Elsevier Science, USA.

2. John Weeks (2005): *Population: An Introduction to Concepts and Issues*, Wordsworth Learning. Singapore 9<sup>th</sup> edition.
3. United Nations, (1973): *The Determinants and Consequences of Population Trends*, Vol. I, *Population Studies*, No. 50, Chapter VII, New York.
4. Bhende, A. and T. Kanitkar, (2006): *Principles of Population Studies* Himalaya Publishing House, Bombay.
5. United Nations, *World Population Ageing*, 1950-2050
6. Davis, Kingsley (1968) . *The Population of India and Pakistan*, Russell and Russell, New York
7. United Nations (1958). *Multilingual Demographic Dictionary*, John Wiley & Sons Ltd., New York
8. Registrar General of India, *Census of India -2011*, Ministry of Home Affairs, Govt. of India.
9. Maheshwari, S.R. (1996). *The Census Administration under the Raj and After*, Concept Publishing Company Pvt. Ltd., New Delhi.

MSP-C3

60 Hours

## FERTILITY AND NUPTIALITY

**Learning Objectives:** After completion of this course the student will be able to:

- 1 Distinguish among different terms used for fertility study
- 2 Describe physiology of human reproduction and methods of family planning
- 3 Identify different sources of data to calculate different indicators of fertility
- 4 Understand levels, trends and differentials in fertility
- 5 Describe and analyze the framework for fertility analysis
- 6 Calculate and interpret different indicators of fertility

### I. FERTILITY CONCEPTS, THEORIES, LEVELS AND TRENDS

#### Terms and Concepts

Importance of the study fertility in population dynamics; Basic terms and concepts used in the study of fertility; Physiology of human reproduction and methods of family planning.

#### Sources of Data for Fertility Study

Census, Sample Registration System, National Family Health Survey, District Level Household Survey – Reproductive and Child Health

#### Fertility Transition in Developed Countries

Levels, Trends and Differentials in fertility of Developed Countries and underlying factors; Below-replacement level fertility in developed countries and its implications.

#### Fertility Transition in Developing Countries

Levels, Trends and Differentials in fertility of Developing Countries; Causes of high fertility in developing countries; Fertility Transition in India: Historical trend and regional patterns in development, culture and fertility transition; Fertility Surveys (WFS, DHS, NFHS) - substantive findings, Emerging research issues.

#### Framework for Fertility Analysis

Determinants of natural fertility; Davis intermediate variables framework of fertility; Bongaarts proximate determinants of fertility; Socio-economic determinants of proximate variables;

### **Hypothesis and Theories of Fertility**

Theory of Social Capillarity, Theory of Change Response, Theory of Diffusion and Cultural Lag, Liebenstein Theory, Becker's Theory, Easterlin Framework of Fertility, Caldwell's Theory, U. N. Threshold Hypothesis and Reproductive motivations and value of children theories.

### **Reading List for Fertility (Section A)**

1. David G. Mandelbaum, (1974), *Human Fertility in India: Social Components and Policy Perspectives*, University of California Press, Berkeley.
2. Gray, R et al (eds.), (1993), *Biomedical and demographic determinants of reproduction*, Oxford University Press, Oxford.
3. Van De Ka, (1996), "Anchored Narratives: Fifty Years of Research into the Determinants of Fertility" *Population Studies*, 50,1.
4. Sydney H. Coontz, (1968), *Population Theories and the Economic Interpretation*, Routelage, London.
5. United Nations, (1999), *Below Replacement Fertility*, Population Bulletin of the UN, Special Issue Nos. 40/41, Department of Economic and Social Affairs, UN, New York.
6. United Nations, (1973), *Determinants and Consequences of Population Trends, Vol. 1*, pages 96-104, UN, New York.

## **II. MEASURING AND MODELING FERTILITY PROCESS**

### **Learning Objectives**

After completing the lesson on *Measuring and modeling fertility*, you should be able to:

- define, calculate and point out: the data sources, data requirements, salient features, advantages and disadvantages of various direct and indirect measures of fertility and reproduction
- define what is meant by 'proximate determinants of fertility' and describe the Bongaarts model for proximate determinants of fertility
- define what is meant by 'age pattern of fertility' and describe the Coale-Trussell model for estimating the fertility control measure the small 'm'.
- define what is meant by 'reverse survival of the population' and describe the indirect procedure for estimating CBR/GFR using the reverse survival method
- define what is meant by 'Child-woman ratio (CWR)' and describe the indirect

- procedure for estimating CBR/TFR using the CWRs and the Rele method.
- define what is meant by 'mean number of children-ever born (MNCEB) and describe the indirect procedure for estimating CBR/TFR using the Brass method and its variants

### **Important Key Terms**

Age-order specific fertility rate, Age-specific fertility rate, Age-specific marital fertility rate, Age-specific non-marital fertility rate, Child-woman ratio, Cohort, Cohort approach, Completed fertility, Crude birth rate, Direct standardized crude birth rate, Indirect standardized crude birth rate, Fertility, General order fertility rate, General fertility rate, General marital fertility rate, General non-marital fertility rate, General order-specific fertility rate, Gross reproduction rate, Mean age of the Fertility Schedule, Natural fertility, Net reproduction rate, Period approach, Real cohort, Replacement-level fertility, Reproduction, Standardization, Synthetic cohort, Total-order fertility rate, Total fertility rate, Total marital fertility rate, Total non-marital fertility rate.

### **Detailed Course outline:**

Concepts/Definitions: (Live Birth, Fertility/Natality, Infertility, Fecundity, Infecundity (Sterility), Primary Sterility, Secondary Sterility, Fecundability, Reproduction)

Sources of data for fertility studies

Quality of Data (in specific to birth statistics)/Errors in fertility rates

Problems in analysis of fertility statistics

Period measures versus cohort measures

Direct Estimation of Fertility and Indirect Estimation of Fertility

Period measures of fertility (Definition, Formula, Data Required, Example, Points to note, Advantages, Limitations)

Fertility Measures

Basic Measures of Fertility: Crude birth rate (CBR); General fertility rate (GFR); Age-specific fertility rate (ASFR); Total fertility rate (TFR)

Child-Woman Ratio (CWR), Sex Ratio at Birth (SRB)

Timing of Fertility: Cumulative Age-specific Fertility Rate (CASFR) (Children already born); Percent age distribution of lifetime fertility (ADF); Mean Age of the Fertility Schedule (MAFS or 'm bar');

Order-specific fertility measures: Proportion of births of order  $i$  or above; General Order-Specific Fertility rate ( $GFR_i$ ) or (GOSFR), Age-Order Specific Fertility Rate ( $AOSFR_i$ ), Total Order Specific Fertility Rate ( $TFR_i$ ) or (TOSFR), Marital and Nonmarital specific fertility measures, General marital fertility rate (GMFR), Age-specific marital fertility rate (ASMFR), Total marital fertility rate (TMFR), General nonmarital fertility rate (GIFR), Age-specific nonmarital fertility rate (ASIFR), Total nonmarital fertility rate (TIFR), Non-marital birth ratio (or illegitimacy ratio),

Standardized Birth Rates: Direct Standardized (Crude) birth rate, Indirect Standardized (Crude) birth rate, Sex Age Adjusted Birth Rate (SAABR), Coale's Fertility Indexes

Reproduction Measures: Gross reproduction rate (GRR), Net reproduction rate (NRR)  
Cohort measures of fertility: Cohort total fertility rate (CTFR), Mean number of children ever born (MNCEB), Parity Progression Ratios (PPR), Birth Interval Analysis (BIA)

### **Fertility Models**

Bongaarts model for proximate determinants of fertility and its applications  
Coale-Trussell's model for age patterns of fertility

Indirect Estimation of Fertility: (Description, Data Required, Assumptions, Procedure, Advantages, Limitations, Software)

Techniques based on enumerated population

- Rejuvenation (/Reverse Survival) technique (Spreadsheet: REVCBR)
- Rele technique (Spreadsheet: RELEFERT)

Techniques based on special fertility questions

- P/F ratio technique (Spreadsheet: PFRATIO)
- Brass P1/F1 ratio technique (Spreadsheet: PFRATIO)

### **Reading List**

#### **Essential Readings :**

1. Siegel, J and D.A. Swanson (2004). *The Methods and Materials of Demography (Second Edition)*. Elsevier Academic Press, USA. Chapter 15, Pp.371-405; Chapter 16, Pp.407-428; Chapter 17, Pp.429-453.
2. Bhende, Asha A. and Tara Kanitkar (2004) *Principles of Population Studies*, Mumbai: Himalaya Publishing House, Chapter 8, Pp.241-288.



3. Pathak, K.B. and F.Ram (1998) *Techniques of Demographic Analysis*, Mumbai: Himalaya Publishing House, Chapter 4 Pp.108-153 and Chapter8, Pp.339-372.
4. Mishra, B.D.(1981) *An Introduction to the Study of Population*, New Delhi: South Asian Publishers, Pvt. Ltd., Chapter 7, Pp.
5. Srinivasan K. (1998) *Basic Demographic Techniques and Applications*. New Delhi: Sage Publications. Chapter IV,Pp.59-85

**Suggested Readings :**

1. Campbell, Aruthur A. (1983) *Manual of Fertility Analysis*. London: Churchill Livingstone, for the World Health Organization
2. Newell, Colin (1988). *Methods and Models in Demography*. London: Frances Pinter
3. Palmore, James A. and Gardner, Robert W. (1983). *Measuring Mortality, Fertility and Natural Increase: a Self-Teaching Guide to Elementary Measures*. Honolulu: East-West Population Institute., East-West Center, Chapter 3,Pp.59-19.
4. Pollard, A.H., Yusuf, Farhat, and Pollard, G.N. (1990). *Demographic Techniques* (third edition). Sydney: Pergamon Press, Chapter 6,Pp.81-103.
5. Rowland, Donald,T. (2006) *Demographic methods and concepts*. New Yark: Oxford University Press, Chapter 7, Pp.220-261.

### III. NUPTIALITY

**Introduction, Basic Concepts, Sources of Data and their limitations.**

**Measures of Nuptiality** from Registration data.

Analysis of Marital Status Data from Census.

- a. Singulate Mean Age at Marriage (SMAM) - Synthetic Cohort and Decadal Synthetic Cohort Method.
- b. Indices of Nuptiality (Coale's Indices)  
 Marriage Pattern in India and Selected Countries and related factors.  
 Marriage squeeze: Concepts and Implications  
 Gross and Net Nuptiality Tables.  
 Multistate approach in Nuptiality analysis.  
 Standard Age Pattern of Marriage – Coale's Model.  
 Divorce and Widowhood.
- c. Definition and basic measures.
- d. Marriage Dissolution Tables.

- e. Mean Age at Widowhood/Divorce from Census Returns.
- f. Levels and Trends in Widowhood in India and Selected Countries.
- g. Impact of Changes in Widowhood/Divorce on Fertility.

**Definition and Measures of Remarriages of Widowed and Divorces.**

**Reading List**

**Essential Readings :**

1. Agarwala S. N. (1962). *Age at Marriage in India*. Kitab Mahal, Allahabad.
2. Coale, A. J. (1971). Age Patterns of Marriage, *Population Studies*, Vol. 25(2), PP 193-214.
3. Hajnal, John. (1953). Age at Marriage and Proportions Marrying. *Population Studies*, Vol. 7 (2), PP 111-136.
4. Henry S. Shryock et. al. *The Methods and Materials of Demography*, Vol. 1 and 2, 1971, U.S. Department of Commerce, Bureau of Census, PP. 283-298 and 549-578.
5. Siegel Jacob S., David A. Swansn (Eds.). (2004). *The Methods and Materials of Demography*. Second Edition. Chapter 9, Pp.191-210, New York: Elsevier Academic Press, Chapter 3, Pp.301-340.
6. Smith, P.C., (1978): Indices of Nuptiality: Asia and Pacific, *Asian Pacific Census Forum*, Vol. 5(2)

**Suggested Readings :**

1. Agarwala S. N. (1972). *India's Population Problem*. Tata McGraw Hill Publishing Co. Ltd., Bombay, Chapters 6, 7, 8.
2. Bhat, P.N.M. and Halli, S., (1999): Demography of Bride Price and Dowry: Causes and Consequences of the Indian Marriage Squeeze, *Population Studies*, Vol. 53, pp. 129-375.
3. Caldwell, J.C., Reddy, P.H. and Caldwell, P., (1983): The causes of marriage change in South India, *Population Studies*, vol. 37, No. 3, pp. 343-361.
4. Kapadia, K.M. (1966): *Marriage and Family in India*, Oxford University Press, Delhi.
5. Krishnan P and A.K. Kayani (1976). Model Divorce Tables, *Genus*, Vol. 32, No. 1-2, pp. 109-126.
6. Kumar Joginder, Methods of Construction of Attrition Life Tables for Single Population Based on Two Successive Censuses. *Journal of the American*

- Statistical Association*, Vol. 62, No. 320, 1967 PP 1433-1457.
7. Grabill, W.H., (1945): Attrition Life tables for the single Population, *Journal of American Statistical Association (JASA)*, Vol. 40, pp. 364-375.
  8. Lesthaeghe R. (1973). The Feasibility of Controlling Population Growth through Nuptiality and Nuptiality Policies, *In: International Population Conference*, IUSSP, Liege, Vol. 3.
  9. Sinha, R.K.,(1992): Impact of Age at Marriage on Fertility and Completed Family Size in Rajasthan, *Journal of Family Welfare*, Vol. 34(1).
  10. Sinha, R. K.(1994):*Marriage and Marital Dissolution in India: A Multistate Life-table analysis*, IIPS Research Report series. 1994-95/No. 15, IIPS, Mumbai.
  11. Willekens, F.J. (1985). The marital-status life table. In: Bongaarts,J.T. Burch and K.W. Watcher (eds.), *Family demography: Methods and application*. Oxford: Oxford University Press.

## **MORTALITY, MORBIDITY AND PUBLIC HEALTH**

### **I. Basic Concepts and Measures of Mortality**

Need and Importance of the study of Morbidity and Mortality; Sources of morbidity and mortality data and their quality with special reference to the developing countries and India.

Basic Concepts and definitions: Miscarriage, abortion, fetal deaths, still births, live birth, deaths, early and late neonatal death, infant death, child death

Introduction and basic measures of mortality: crude death rate (CDR) and Age-Specific Death Rates (ASDRs) and their relative merits and demerits.

Need and importance of standardization of mortality Ratios/Rates; Direct and indirect techniques of standardization of mortality rates; Decomposition.

Conventional measures of infant mortality (IMR) and its sub-divisions- Neo-natal (early and late) and Post-Neonatal mortality

Need for adjustment of IMR; Numerator and denominator separation factor Approaches for estimating adjusted rate and Lexis diagram; Estimating IMR from large scale sample surveys.

Various measures of pregnancy wastage: Fetal Death Ratio, Still Birth Rate, Perinatal Mortality Ratio/Rate; and Maternal Mortality Ratio/Rate.

### **II. Life Tables**

Basic concept of a life table; Brief history of life tables; Anatomy of life table; Types and forms of life tables; Application of life table in demographic analysis.

Construction of Life tables based on Age- specific death Rates (ASDRs: Underlying assumptions of life table construction using ASDRs of a community during a specified period; Methods of life table Construction—Conventional approach, and those proposed by Grevillie, and Chiang and Read and Merrell method; Multiple decrement life table

Need for Model Life Tables (MLT) for areas having poor vital registration statistics; Underlying principles of constructing important MLT systems - MLT by United Nation, Coale and Demeny Regional MLT; Brass two- parameter Logit Life table system; and; MLT by WHO

Application of model life tables in demographic analysis for areas having limited/ poor civil registration and age-data

Stable Population Models; Generalized Stable Population Models; Brass Method of Estimating Child Mortality; Indirect Estimation Methods using Age-Distribution at two-censuses; Sisterhood Method for Estimating Maternal Mortality; Bhat's Regression method for estimating maternal mortality

### **III. Introduction to and Measures of Morbidity**

Concepts and definitions of health and morbidity; Need for morbidity indices; Various measures of morbidity: incidence and prevalence rates; Interrelationships between measures of morbidity

### **IV. Burden of disease**

Need for the study of burden of disease; Basic concepts; Compression and Expansion of Morbidity hypotheses; Measures of Burden of Disease; and Current global scenario

### **V. Infant & child mortality and child survival framework**

Importance of infant mortality in population and health; Causes of infant mortality (endogenous and exogenous); Levels and trends of infant and child mortality (global and south Asia/India); and Mosley and Chen' framework for child survival.

### **VI. Mortality and health transitions**

Levels and trends in mortality by developed and developing regions with special reference to India; Age and sex specific mortality with a focus on excess female mortality in selected developing countries; differentials in mortality by place of residence and socio-economic characteristics

Historic mortality transitions as experienced by developed and developing countries with special reference to India; Factors responsible for high mortality in the past; Main reasons for mortality decline in developing countries

Overview of epidemiological transition; Changing disease pattern in developed and

developing countries with special reference to India; Current global mortality scenario; and concepts and overview of health transition

## VII. Causes of death

Importance of causes of death statistics; Definition and sources of causes of death statistics; a brief history of the International statistical classification of diseases, injuries and causes of death (ICD); An overview of ICD – X (1990)

Global leading causes of death with special reference to Asia and India; Distribution of deaths by main causes by age, development, life expectancy (UN).

## Reading List

### Essential Readings :

1. Caldwell, J, Sally Findley, Pat Caldwell and Gigi Santow (1990): What we know about health transition: The cultural, social and behavioural determinants of health. *The proceedings of an international workshop, Vol.1&2, ANU, Canberra*, Health Transition Centre.
2. Mosley, W. H. and L. C. Chen (1984): Analytical framework for the study of child survival in developing countries, *Population and Development Review* 10 (Supplementary Copy).
3. Murray, C. J. L., (1994): Quantifying the Burden of Disease: The Technical Basis for Disability Adjusted Life Years, *Bulletin of the WHO*, Vol. 72(3), pp.429-445.
4. Omran, A. R. (1971): The epidemiologic transition: a theory of the epidemiology of population change, *Milbank Memorial Fund Quarterly*, Vol. XLIX, pp. 509-538.
5. Park, J.E. and K. Park (1989): *Text Book of Preventive and Social Medicine (Twelfth Edition)*, M/S Banarsidas Bhanot Publishers, Jabalpur (Chapters 2 & 3).
6. F. Ram and K.B. Pathak (1998): *Techniques of Demographic Analysis*, Himalaya Publishing house, Bombay (Chapters 2 & 3).
7. Preston, S. H., Patrick Heuveline and Michel Guillot (2001): *Demography: Measuring and Modeling Population Process*, Blackwell Publishers, Oxford, UK (Chapters 2, 3 & 4).
8. Shryock, Henry S. Jacob Siegel and Associates (1980): *The Methods and Materials of Demography*, Vol. 2, Fourth printing (revised), US Department of Commerce. Washington DC, pp. 389-393, Chapter 14.

9. WHO (1992): *International Statistical Classification of Diseases and related Health Problems*, Tenth Revision, Vol. 1, Geneva.

**Suggested Readings :**

1. Administrative Staff College of India (2002): A comparative assessment of the Burden of Disease in selected states: Methodology, results, policy and program intervention. *Research Paper No. 2*.
2. Bhende, Asha and Tara Kanitkar (1982): *Principles of Population Studies*, Himalaya Publishing House, Bombay (Chapter 7).
3. Coale, Ansley J. and Paul, Demney (1983): *Regional Model Life Tables and Stable Populations*, Academic Press, New York.
4. Government of India (1994): *National Child Survival and Safe Motherhood Program*, Ministry of Health and Family Welfare, New Delhi.
5. Jagger, C (1999): *Health Expectancy calculation by the Sullivan Method: A Practical Guide*, NUPRI, Research Paper Series No. 68.
6. Murray C. J. L. and A.D. Lopez (1994): Global and regional cause -of-death patterns in 1990, *Bulletin of the WHO*, 72(3): 447-480.
7. Murray C. J. L., J. A. Salomon, C. D. Mathers and A. D. Lopez (2002). *Summary Measures of Population Health: Concepts, Ethics, Measurement and Applications*. WHO, Geneva.
8. Murray, C. J. L., B. D. Ferguson, A. D. Lopez, M. Guillot, J. A. Salomon and O. Ahmad (2003): Modified logit life table system: Principles, empirical validation and application, *Population Studies* 57 (2): 1-18.
9. Pugh, Thomas F. and Brian MacMohan (1970): *Epidemiology: Principles and Methods*, Little Brown Publishers, Boston (Chapters 1 through 5).
10. UNESCAP (1987): Mortality and Health Issues in Asia and the pacific, *Asian Population Studies*, Series No. 78.
11. United Nations (1955): *Age and Sex Pattern of Mortality: Model Life Tables for Under-Developed Countries*, United Nations, New York.
12. United Nations (1973): *The Determinants and Consequences of Population Trends, Vol. I*, Population Studies No.50, Dept. of Economic and Social Affairs, UN, New York (Chapter 5).
13. United Nations (1982): *Model Life Tables for Developing Countries*, United Nations, New York.
14. United Nations (1986): *Determinants of Mortality Change and Differentials in*



- Developing Countries, the Five-Country Case Study Project*, United Nations Dept of Economic and Social Affairs, New York.
15. United Nations (1999): *Health and Mortality Issues of Global Concern*, Proceeding of the Symposium on Health and Mortality, Brussels, 19-22 November 1997.
  16. United Nations (1998): *To Young to Die: Genes or Gender*, Dept. of Economic and Social Affairs, United Nations, New York.
  17. World Bank (1993): *World Development Report 1993: Investing in Health*, Oxford University Press, New York.
  18. World Health Organization (1999): *The World Health Report 1999: Making a Difference*, WHO, Geneva.

**MSP-E1.1****45 Hours****HEALTHCARE SYSTEMS AND POLICIES**

- Identify the structure, components and characteristics of global health care system
- Understanding the needs and goals for various policies related to public health, policy environment, frameworks for policy analysis
- Basic models and functions of health services, health care systems, international experience
- Health infrastructure and health delivery system in India- public, private, NGOs, Indigenous health systems
- National health programmes- Public health preparedness
- Public health system- A re-appraisal and SWOT analysis, a critique on the health delivery system- problems related to structural, functional and management of public health care services
- Health care system- stakeholders in health care system, human capital and health, role of government in providing health care, improving access to health care with quality
- Health care legislations in India: Legal aspect of health care, MTP Act, biomedical waste Rules, COPRA Act, PNDT Act, Transplantation of human organs Act, etc.
- Principles of planning and management of health programmes- monitoring and evaluation- quality assurance- health impact assessment- five year plans
- Health services- Community needs assessment, Decentralization of health facilities
- Sustainability of public health intervention- Concept and mechanism of sustainability, models and examples of sustainability, community ownership, Public-private mix
- Introduction to health services and research policies - Perspectives- methodological approach
- Major National Health Policies and Missions- NHP-2002, NRHM (2005-12)
- Major public health problems – A critical review and analysis, identification of major areas of public health requiring interventions, ongoing public health interventions in India. Health system reforms and their impact

## Reading List

### Essential Reading :

1. Lassey M, Lassey W, and Jinks, M. (1997). Health Care Systems around the World: Characteristics, Issues and Reforms. Prentice-Hall, Inc.
2. Graig, Laurene A. (1999) Health of Nations: An International Perspective on US Healthcare Reform. 3rd Edition, Congressional Quarterly, Inc.
3. Bodenheimer, Thomas S., Kevin Grumbach. *Understanding Health Policy*
4. Fort, Meredith, Mary Anne Mercer and Oscar Gish (Editors). *Sickness and Wealth: The Corporate Assault on Global Health*
5. Govt. of India (2002)-National Health Policy-2002, Ministry of Health and Family Welfare, New Delhi.
6. Govt. of India (2005) Report of the National Commission on Macroeconomics and Health, Ministry of Health and Family Welfare, New Delhi.
7. Peters, et.al (2002), Better Health System for India's poor: Findings, Analysis and Options: The World bank, New Delhi
8. Reddy, K.S. et.al (2011)" Towards achievement of universal health care in India by 2020 : A Call of Action", [www.thelancet.com](http://www.thelancet.com)
9. Banerjee, D. (1982), Poverty, class and Health Culture in India, Vol. 1 Parchi Prakashan, New Delhi.
10. Indian Council of Social Science Research and Indian Council of Medical Research (1981), Health for All by 2000 A. D., ICSSR, Delhi.
11. Madan, T.N. (1969), "Who Chooses Modern Medicine and Why", Economic and Political Weekly, pp. 1475-84.

MSP-E1.2

45 Hours

**BIOSTATISTICS AND EPIDEMIOLOGY**

**Learning Objectives:** The disciplines of Epidemiology and Biostatistics create and apply methods for quantitative research in health sciences. The Biostatisticians at Johns Hopkins School of Public Health have rightly said “Our designs and analytic methods enable health scientists and professionals in academia, government, pharmaceutical companies, medical research organizations and elsewhere to efficiently acquire knowledge and draw valid conclusions from their ever-expanding sources of information”. The main objective of this course is to equip students with the basic concepts and methods employed in epidemiologic and biostatistical research. At the same time, the course aims to equip the students with recent advances in the fields of Epidemiology and Biostatistics. The idea is to emphasize concepts over details, with recent applications in public health. After going through this course, the students should be capable enough to take up responsibilities and actively participate in academics, government organizations, pharmaceutical companies, health organizations, etc. The introduction of such course is especially very important in India as there is very limited capacity in India at this moment.

**I. Basic Concepts in Epidemiology**

Introduction: Definition and objectives of epidemiology; Epidemiology and clinical practice; The epidemiologic approach; Infectious disease epidemiology, occupational epidemiology, disaster epidemiology

The dynamics of disease transmission: Modes of transmission; epidemic, endemic and pandemic; Disease outbreak; Determinants of disease outbreak; Herd immunity; incubation period; outbreak investigation; epidemiological modeling.

Identifying the roles of genetic and environmental factors in disease causation: Association with known genetic diseases; Age at onset; Family studies; Interaction of genetic and environmental factors.

Epidemiology and public policy: Epidemiology and prevention; Population versus high-risk approaches to prevention; epidemiology and clinical medicine; Risk assessment; Meta Analysis.

Epidemiological Study Designs: Ecological, Cross-Sectional, Case-Control, Cohort Studies, Randomized Intervention Studies.

Experimental epidemiology; Randomized trials; Clinical Trials- Basic concepts; Definitions; Historical perspectives, Phase I, II, III and IV trials, Protocol development, Use of control arms, Concepts of randomization and blinding, ethical issues

## **II. Measurement of Health & Disease Burden**

Measuring the occurrence of disease: Measures of morbidity - prevalence and incidence rate, association between prevalence and incidence, uses of prevalence and incidence, problems with incidence and prevalence measurements; Surveillance; Quality of life including DALY, HALE, etc., Measures of mortality.

Assessing the validity and reliability of diagnostic and screening test: Validity of screening test – sensitivity, specificity, positive predictive value and negative predictive value; Reliability; Relationship between validity and reliability; ROC curve and its applications; Overall accuracy.

Issues in epidemiology: Association; causation; causal inference; Errors and bias; Confounding; Controlling confounding; Measurement of interactions; Generalizability.

Estimating risk: Estimating association – absolute risk, relative risk, odds ratio; Estimating potential for prevention – attributable risk; comparison of relative risk and attributable risk; Odds ratios for retrospective studies; Odds ratios approximating the prospective RR; Exact inference for odds ratio analysis of matched case-control data.

Modeling of Infectious Disease Process: Infectious diseases of human – malaria, tuberculosis, Hepatitis, HIV/AIDs, Deterministic modeling of infectious diseases

Probit and Survival Analysis Concepts and definition of Survival analysis - Kaplan-Meir, Life table method, Mantel-Haensal, method, Cox proportional hazards method, Dose response analysis.

## **Reading List**

### **Essential Readings :**

1. Last J M: A Dictionary of Epidemiology, ed. 2. New York, Oxford University Press, 1988.

2. Bonita R, Beaglehole R, Kjellstrom T: Basic Epidemiology, ed. 2. World Health Organization, 2006.
3. Park LE, Park K: Textbook of Preventive and Social Medicine. Jabalpur, Banarasidas Bhanot, 1986.
4. Dunn G, Everitt B: Clinical Biostatistics: An Introduction to Evidence-based Medicine. Edward Arnold, 1995.
5. Friedman L M, Furberg C D, DeMets D L: Fundamentals of Clinical Trials. Boston, PSG, 1982.
6. MacMahon B, Pugh T F: Epidemiology: Principles and Methods. Boston, Little Brown, 1970.
7. Gordis L: Epidemiology, ed. 3. Philadelphia, 2004.
8. Rosner B: Fundamentals of Biostatistics, ed. 6, 2006.
9. Altman D G: Practical Statistics for Medical Research, London: Chapman and Hall, 2006.
10. United Nations Department of Economic and Social Affairs: Designing Household Survey Samples. United Nations, 2005.
11. Lee E T: Statistical Methods for Survival Data Analysis, ed. 2. New York, John Wiley & Sons.
12. Goldstein H: Multilevel Statistical Model. London, Institute of Education, 1999.
13. Murray C J L, Chen LC: Understanding morbidity change. In Arthur Kleinmann and Norma C Wane (eds.) Health and Social Change in International Perspective, Harvard Series on Population and International Health, March 1994.
14. Pocock S J: Clinical Trials: A Practical Approach. Michigan, Wiley Medical Publication, 1983.
15. Everitt B S, Pickles A: Statistical Aspects of the Design and Analysis of Clinical Trials, ed. 2. London, Imperial College Press.
16. Wackerly DO, Mendenhall W, Scheaffer RL: Mathematical Statistics with Applications, 7th edition, Wadsworth Publishing Co Inc, 2007.
17. Kutner MH, Nachtsheim CJ, Neter J, Li W: Applied Linear Statistical Models. 5th edition, McGraw-Hill/Irwin, 2005.
18. Gelman A, Carlin JB, Stern HS, Rubin DB, Dunson DB, Vehtari A: Bayesian Data Analysis, 3rd ed. Chapman and Hall, 2013.
19. Van Der Vaart: Asymptotic Statistics. Cambridge University Press, 2000.
20. Groeneboom P: Nonparametric Estimation under Shape Constraints, Cambridge University Press; 1 edition, 2014.

21. Robin H. Lock, Patti Frazer Lock, Kari Lock Morgan, Eric F. Lock, Dennis F. Lock: Statistics: Unlocking the Power of Data, 1 edition, Wiley 2013
22. James F. Jekel: Epidemiology, Biostatistics and Preventive Medicine: With STUDENT CONSULT, Elsevier Health-US, 2013.
23. Kestenbaum, Brya: Epidemiology and Biostatistics, Springe ,2009.

## **SEMESTER - II**



## **ECONOMICS AND GEOGRAPHY**

### **ECONOMICS**

**Learning Objectives:** This course aims to provide students with basic knowledge of micro and macro economics, public finance, economic theories, the structure, characteristics and growth of the Indian economy through the five year plans, policies and issues and economic evaluation of programmes and projects.

#### **Introduction:**

- 1.1 Defining Economics
- 1.2. Micro and Macro economics
- 1.3. Basic Economic Activities
- 1.4. Factors of Production
- 1.5 Economic Systems

#### **Basic Concepts in Micro Economics:**

- 2.1. Demand, Supply and Prices
- 2.2. Elasticity of Demand: Price, Income and cross elasticity
- 2.3. Demand Analysis: Marginal Utility
- 2.4 Demand Analysis: Indifference Theory
  - 2.4.1. Indifference curves Theory: Properties, Equilibrium effect
  - 2.4.2. Income, Substitution and Price effect
- 2.5. Basic concepts in theory of production
  - 2.5.1. Concept of Total Product, Average Product and Marginal Product
  - 2.5.2. Law of Diminishing Return

#### **Basic Concepts in Macro Economics:**

- 3.1. Economic and non economic goods
- 3.2. Basic Concepts in National Income: Concept of GDP, NDP, GNP, NNP, NI, PCI, GDPPCI.
- 3.3. Theory of consumption and saving: Consumption function, Keynes' psychological law of consumption, concept of APC and MPC, APS and MPS

- 3.4. Factors affecting consumption function
- 3.5. Basic concept of Investment

**Basic concepts in Public Finance:**

- 4.1 Public Goods and Private Goods
- 4.2 Externalities
- 4.3 Public Revenue – Sources
- 4.4 Public Expenditure – Sectoral spending with emphasis on Health and Education
- 4.5 Concept and measures of equity in health care

**Indian Economy:**

- 5.1 Structure and Characteristics of the Indian economy
- 5.2 Economic Growth – Progress through the Five Year Plans
- 5.3. Industrial Policy 1956, 1977 and 1991
- 5.4. Other Development issues: Poverty and Unemployment

**Economic Evaluation of Programmes and Projects:**

- 6.1 Cost-benefit analysis: Concept of direct cost, indirect cost, short run average cost, short run marginal cost, average fixed cost and average variable cost, capital cost, recurrent cost, joint cost, accounting vs. economic cost.
- 6.2 Economic evaluation: Definition, need for economic evaluation, methods of economic evaluation, cost allocation techniques (top-down and bottom up approach)
- 6.3 Empirical Evidence from developmental projects.

**Reading List:**

- 1. Agrawal, A.N. (2001) Indian Economy: Problems of Development and Planning, Mumbai: Wishawa
- 2. Ahuja, H.L., Advanced Economic Theory: Micro-Economic Analysis, New Delhi, Chand and Co.
- 3. Dandekar, V.M., (1996) Indian Economy, Vol 2, New Delhi, Sage Publications
- 4. Haney, Lewis H., (1949). History of Economic Thought. New York, Macmillan
- 5. Kapila, Uma (2005) Indian Economy: Issues in Development & Planning and Sectoral Aspects, Academic Foundation
- 6. Samuelson P.A., (1995). Economics, New York, Tata-McGraw Hill
- 7. Sury, M.M. (2008), India's Five Year Plans I to XI, New Delhi, New Century

## **GEOGRAPHY**

**Learning Objectives:** This section of the course intends to make the students of M.A. in Population Studies familiar with basic concepts and approaches that can be applied for studying population phenomena. After going through this course students shall learn about the important geographical features of India, regionalization and administrative set up of India.

### **Study of man and nature:**

Man environment relationship- determinism, possibilism, neo-determinism; Human ecology; Scope of geography.

### **Geographic approaches:**

Exploration and description; quantitative revolution; welfare geography; postmodern philosophy.

### **Concepts in human Geography:**

Space and place; scale; map and mental map; location; interaction and network; innovation and diffusion; geographic clustering, heartland and rim land; frontiers and boundaries; cultural realm and hearth; Global Positioning system (GPS) and Geographical Information System (GIS)-concepts, use reading and interpretations; Concepts of carrying capacity, overpopulation, optimum population and underpopulation.

### **Indian geography:**

Natural regions of India- Macro, Meso and Micro regions- profile and main characteristics

Administrative regions- States, Union territories- boundary changes and its implication for census data, Evolution of Human settlementst: factors, types and patterns

Land resource: Landuse pattern and changes

Agricultural development - Factors, cropping patterns and changes

Industrial development - major mineral resources and industries, inequalities in Industrial development and associated factors

Energy - Resource types, production and consumption patterns, future demand,

Water resources: supply and demand for different activities

Regional inequalities in development -causes and implications

Changing politicalgeography.

## Reading List

### Essential Readings :

1. Blasil Blackwell Publisher Limited. Edited by R.L. Johnston. (1981) *The Dictionary of Goegraphy*.
2. Harm J. De Blij, Jonh Wiley & Sons (1977). *Human Geography: Culture, Society and Space*.
3. R. Knowled J. Wareing (1977). *Economic and Social Geography, Mode Simple*. Rupa and Co. New Delhi.
4. Majid Husain (2002). *Human Geography*. Rawat Publication, New Delhi.
5. Government of India, *Statistical Abstract of India (2004)*, Central Statistical Organization, New Delhi.
6. Steven J. Steinberg & Sheila L. Steinberg (2006). *Geographic Information System (GIS) for Social Sciences*. Investigating Space of Place. Sage Publication, New Delhi.
7. D.R. Khullar. *India : A Comprehensive Geography*. Kalyani Publishers, New Delhi.

**MSP-C5**

**60 Hours**

## **EVALUATION AND ADJUSTMENT OF DEMOGRAPHIC DATA AND POPULATION PROJECTIONS**

### **Learning objectives:**

In this course students learn the techniques of evaluation and adjustment of any demographic data, with more focus of age-sex data. After completion of this course students are expected to get a vision to judge the quality of data, comment on it and adjust the data. After learning techniques of evaluation and adjustment of age data, students can proceed for projection techniques.

The objectives of learning the course on population projections are to acquaint students to carry out population projections independently and apply them in other social sector projections.

### **Course Contents:**

#### **Evaluation and Adjustment of Demographic Data:**

- Types of errors, coverage and content errors. Sources of errors.
- Examples of data on survey and census data affected by errors.
- Post-enumeration surveys; dual record system.
- Techniques of evaluation of age data using Whipple's index, Myer's index, UN Joint score.
- Quality checks incorporated in survey procedures to minimize errors.
- Smoothing of age data.

#### **Population Estimates and Projections**

- Concepts of population projections; population estimates, forecasts and projections, uses of population projections.
- Methods of interpolation; extrapolation using linear, exponential, polynomial, logistics, Gompertz curves.
- Cohort component method: basic methodology; projection of mortality, fertility and migration components; population projections by f United Nations, World Bank and Expert Committees of Government of India.

- Methods of rural-urban and sub-national population projections.
- Methods of related socio-economic projections: labour force, school-enrolment, health personnel and households.

## **Reading List**

### **Essential Readings :**

1. Government of India (2006): *Population Projections for India and States, 2001-2026*. New Delhi: Office of the Registrar General.
2. Navaneetham Kannan and George Groenewold, (1998): *The Projection of Populations: Data Appraisal, Basic Methods and Applications*, Population and Sustainable Development Teaching Texts, Thiruvananthapuram: Centre for Development Studies.
3. Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography*, Second Edition, Chapters 1, 2, 3, 7, 9,10, Elsevier Science, USA.
4. John Weeks (2005): *Population: An Introduction to Concepts and Issues*, Wordsworth Learning. Singapore 9<sup>th</sup> edition.

## **INTRODUCTION TO DEMOGRAPHIC AND STATISTICAL SOFTWARES**

1. Basics of MORTPAK4, SPECTRUM and applications.
2. Introduction to SPSS-facilities, creating database structure, data entry, specifying scales, validation of data entry, importing and exporting data. Data Manipulation – recoding creating new variable, sorting, filtering and selection of specific data, generating simple frequencies, use of syntax editor. Correlation and regression analysis – interpretation and regression diagnostic test.
3. Introduction to STATA, generating, variables, commands and do file editor. Survey analysis – estimation of mean, proportion, design.
4. Multivariate analysis – concepts and interpretation of results of multiple regression, logistic regression, ANOVA, with and without interaction. Survival analysis-Kaplan Meier, Cox regression-test of proportionality and heterogeneity.
5. Large scale data handling – (using NFHS, DLHS, NSSO) Merging, splitting data and formatting.
6. Introduction to GIS and illustration.

### **Reading List**

#### **Essential Readings :**

1. *SPSS 14.0 Brief Guide* – SPSS Inc.
2. *SPSS regression models 14.0* - SPSS Inc.
3. *SPSS advanced models 14.0* - SPSS Inc.
4. *Stata user's guide: Release 10.*, 2<sup>nd</sup> Edition. Stata Press.
5. *Stata survey data reference manual: Release 8.*, 2<sup>nd</sup> Edition. Stata Press.
6. Cromley, Ellen K. and McLafferty, Sara L., (2002): *GIS and public health*. Guilford Press, New York.

MSP- C7

60 Hours

## MIGRATION AND URBANIZATION

**Learning objectives :** The aim of this course is to familiarize the M.A./M.Sc. students in Population Sciences about the demographic aspects of migration, spatial distribution and urbanization. On completion of this course students are expected to learn about the scientific definitions of migration, urbanization and spatial distribution, their patterns, trends, causes and consequences. Students are also expected to learn about the data sources and their constraints and the techniques to analyse migration, spatial distribution and urbanization.

### I. MIGRATION

- i. Concepts, pattern, determinants and consequences of migration and issues related to migration
- ii Concept of mobility and migration, sources and quality of data, types of migration, census definition of migrants and its limitations.
- iii Internal Migration: Internal migration patterns and characteristics in developing countries with a special focus on India.  
Determinants of internal migration: Causes of migration at the place of origin and at the place of destination  
Consequences of internal migration: demographic, economic, social and political consequences at the individual, household and community level
- iv International migration

### **Sources of international migration data and problems.**

Patterns of international migration: Historical and recent trends, permanent immigrants, Indian Diaspora and people of Indian origin, labour migration, brain drain, refugee migration and Illegal migration.

Causes and consequences of international migration

- v Migration theories and models  
Ravenstein's Laws of Migration



Everett Lee's Theory of Migration  
Mobility Field Theory  
Lewis-Fei-Ranis Model of Development  
Todaro's Model of Rural-Urban Migration

- vi Measures of Migration  
Direct estimation of lifetime and inter-censal migration rates from census data  
Indirect measures of net internal migration: Vital Statistics Method, National Growth Rate Method and Census and Life Table Survival Ratio methods  
Methods of estimating international migration
- vii Migration surveys

## **II. SPATIAL DISTRIBUTION AND URBANISATION**

- i Spatial Distribution  
Spatial distribution: importance and pattern, factors affecting spatial distribution of population: physical, economic, social factors and Govt. policies
- ii Urbanization  
Urbanization definition and Importance; Important aspects of urbanization process-level and tempo of urbanization, urban population growth and its components, urban size class structure; Data sources; Definitional and conceptual problems; Definition of urban and other associated urban concepts in Indian census; Forces of urbanization and components of urban population growth in developed countries, suburbanization and phenomena of urban turnaround; Current urbanization process in developed and developing countries with special focus on India, Kingsley Davis model of urbanization process; Forces of urbanization and components of urban population growth in developing countries, over urbanization phenomena and urban primacy, Major urbanization problems and policies in developing countries with focus on India.
- iii Measures of Spatial Distribution and Urbanization  
Selected measures of concentration of population-Density, percentage distribution and dissimilarity index; Selected measures of Degree and tempo of urbanization; selected measures of growth and distribution of urban population-Rank-Size rule and Primacy Index, Lorenz curve and Gini's concentration ratio.

## Reading List

### Essential Readings :

1. Cohen, Robin, (1996): *Theories of Migration*, The International Library of Studies on Migration, Edward Elgar, Cheltenham
2. Eduardo Arriaga, (1975): "Selected Measures of Urbanization", in Sydney Goldstein and David Sly (Eds.) *Measures of Urbanization and Projections of Urban Population*, IUSSP Belgium
3. Kingsley, Davis, (1972): *World Urbanization, 1950-70*, Vol. II, Analysis of Trends, Relationship and Development, Population Monograph Series 4 and 9, University of California, Berkeley
4. United Nations, (2004): *World Urbanization Prospects, The 2003 Revision*, New York
5. United Nations, (1974): *Methods of Measuring Internal Migration*, Manual VI, UN, New York.

### Suggested Readings :

1. Oberai, A.S. (1987): *Migration, Urbanization and Development*, International Labour Office, Geneva
2. Gavin Jones and Visaria, Pravin, (Eds.), 1997: *Urbanization in large developing countries – China, Indonesia, Brazil and India*, Clarendon Press, Oxford
3. Mitra R. G., (2002): *Understanding Patterns of Migration from Census 2001 Data*, Population Stabilization and Development, Council of Cultural Growth and Cultural Relations, Cuttack
4. Shryock, Henry S. Jacob S. Siegel and Associate, (1980): *The Methods and Materials of Demography* Vol.1 U.S. Bureau of the Census, Washington D.C.
5. Todaro, Michael P.(1976), *Internal Migration in Developing Countries*, International Labour Office, Geneva
6. United Nations, (1979): "Trends and Characteristics of International Migration since 1950" *Demographic Studies* No. 64, UN, New York
7. United Nations, (1983): *Determinants and Consequences of Population Trends*, Vol 1, UN, New York, Chapter-VI.

## HISTORICAL DEMOGRAPHY

### I. Introduction to historical demography

Introduction to historical demography: Meaning, Scope, and Importance; Difference between History of Demography, Demographic History and Historical Demography; Limitations of Research in Historical Demography. Development of historical demography (Europe and Asia).

### II. Data Sources, Methods and Approaches

**Data Sources:** Paris registers, Population registers, Census, Vital registration data, Bills of mortality, Fiscal documents, Military records, Inventories of properties, Genealogies, Marriage practices, Archaeological remains, Administrative geography, Colonization of new land, Cemetery data, Traveler's tales.

**Approaches:** Family reconstitution; Cross checking the information from different sources. Back Projection, and Generalised Inverse Projection, Other Methodological Developments

### III. Evolution of human and peopling of the earth

Evolutionary Process and Emergence of human (Darwinism, Mendel, Lamarckism); Historical trend and pattern of migration and distribution of population; Historical evolution of towns and peopling of the world, Industrial and agricultural revolution and peopling of the earth

### IV. India's demographic history

Historical sources of population data, Population in India from pre-historic to modern time; Peopling in India and racial classification; Peopling in India and linguistic classification; Indian great famines and its implication on mortality; family transition and status of women from historical perspective; Transition from traditional family planning methods to modern methods and health practices in India – a historical perspective

## Reading List

### Essential Readings :

1. Davis, Kingsley, *The Population of India and Pakistan*, Princeton, Princeton University Press, 1951.
2. Tim Dyson (ed.), *India's Historical Demography: Studies in Famine, Disease and Society*, London, Curzon, 1989.
3. Glass D.V. & Eversley, D.E., *Population in History: Essays in Historical Demography*, London, Edward Arnold, 1965.
4. Hollingsworth, T.H., *Historical Demography: The Sources of History, Studies in the Uses of Historical Evidence*, London, 1969.
5. Maharatna, Arup, *Demography of Famines: An Indian Historical Perspective*, Delhi, 1996.
6. Willigan, J. Dennis, Lynch, Katherine A., *Sources and Methods of Historical Demography*, Academic Press, New York, 1982.

### Suggested Readings :

1. Akerman, S., "History and Demography: An Evaluation of the Family Reconstitution Technique" in A.E. Andersson and I. Holmberg (eds) *Demographic, Economic, and Social Interaction*, Cambridge, Ballinger Publishing Company, 1977.
2. Harris, P.M.G., *History of Human Populations, Vol.II (Migration Urbanization and structural change)* London: Praeger, 2003.
3. John Knodel, "Two and a Half Centuries of Demographic History in a Bavarian Village". *Population studies* Vol.XXIV No.3, Nov. 1970, pp. 353-376.
4. Kertzer, David I., "Qualitative and Quantitative Approaches to Historical Demography", *Population and Development Review*, Vol.23 (4). Dec. 199— (839-84), 1997.
5. Krishnan, P., "Historical Demography Through Literature: Preliminary Report on Indian Historical Demography", Paper presented in the Session Historical Demography, IUSSP Meeting, Florence, Italy, June, 1985.
6. Paul E.Vincent, "French Demography in the Eighteenth Century" *Population Studies* Vol.I, 1947-48. Pp.44-71.
7. Razzell, P.E., "The evolution of Baptism as a form of Birth Registration through Cross Matching census and Parish Register Data: A study in Methodology" *Population Studies* Vol.26, No.1. March 1972, pp.121-146.

8. Saito, Osamu, Historical Demography: Achievements and Prospects, Population Studies, Vol.50 (3—(53), 1996.
9. Srivastava, H.C., “Registration of vital Events in Goa- A study of current system in Retrospect”, Artha Vijanana, Vol. XIII, No.4, Dec. 1971.
10. Vinovskis, Maris A., Studies in American Historical Demography, Academic Press, New York, 1979.
11. William H. Howells, “Estimating Population Numbers Through Archeological and Skeletal Remains” in Robert F. Heizar and Sherburne F. cook. The application of Quantitative methods in Archeology, Viking Fund Publication in Archeology, No.28, 1960. pp. 158-159.

MSP-E2.2

45 Hours

## SPATIAL DEMOGRAPHY

### I. Concepts and Theories

Demography as a spatial science; difference between spatial demography and population geography; Spatial pattern and spatial process; location, distance and area; Distance and decay relationship and spatial hierarchy; space, place and region; Type of spaces- concrete and abstract space; absolute, relative and relational spaces.

Understanding demographic process by geographical scale; nature of disaggregated data- Census and secondary sources; Linking micro and macro demography in a spatial frame.

Application of spatial frameworks to demographic process; Space, culture and fertility; Spatial pattern of mortality and diseases; Distance as factor in access to health care and health planning; Migration and distance- gravity model; space, culture and migration; urban sprawl and sub-urbanization.

### II. Statistical and Geospatial Data and Software

**Spatial Concepts and Cartography:** Spatial parameters: Site and location; Scale; Plane and spherical coordinate, Map Projection-UTM, Types of maps: cadastral, toposheet, thematic, digital; Representation of spatial and non spatial data;

**Introduction to geospatial software: GIS:** discrete data: point, and polygon data, Raster and vector data, layouts preparation. Geocoding and basics of digitization in ArcGIS

**Introduction to Geoda:** ESDA in (Exploratory Spatial Data Analysis); Local Indicators of Spatial Association (LISA)

**Statistical Concepts:** Bar diagram, Frequency polygon, Frequency curve; Test of significance, confidence intervals, Univariate and Multivariate Statistics: Correlation and Regression, Matrix algebra; Auto-correlation; kriging, Moran's I index

**Introduction to Statistical software:** SPSS, STATA, R

### III. GIS and Spatial Analysis of demographic data

#### **Representation of statistical data and automated cartography (Lab based exercises):**

- a) Population distribution map of India using dot and sphere/circle, cubes, combined; Cartograms
- b) Density map by Choropleth and population density gradient by Isopleth;
- c) Fertility, mortality and natural growth of population by Polygraph.
- d) Measurement of population concentration by cumulative curve.
- e) Migration flow by Carogram

#### **Concept and application Models:**

- a) Spatial Lag and Error Regression Modeling;
- b) Multilevel modeling (hierarchical linear modeling);
- c) Geographically Weighted Regression;
- d) Spatial Pattern Analysis;
- e) Urban and city level projection

#### **Reading List**

##### **Essential Readings :**

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Workbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on <http://geodacenter.asu.edu/>.
2. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Harlow, Longman.
3. Barbara E., Ronald R. R., Stephen J. W., Tom P. E. and Sara R. C. (1997). *Geographic Information Systems, Spatial Network Analysis, And Contraceptive Choice*. Demography. 34(2): 171-187.
4. Bonham, Carter G.F. (1995): Information Systems for Geoscientists—Modelling with GIS. Pergamon, Oxford.
5. Chen, X., Orum A.M., and Paulsen K.E. (2013). Introduction to Cities: How Place and Space shape Human Experience. West Sussex, Wiley-Blackwell.
6. de Castro M. C. (2007). *Spatial Demography: An Opportunity to Improve Policy Making at Diverse Decision Levels*. Population Research and Policy Review 26: 477-509.

7. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
8. ESRI (1993): Understanding GIS. Redlands, USA
9. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. New York, John Wiley and Sons,
10. Griffith, D. A. and Amehein (1997): Multivariate Statistical Analysis for Geographers. Englewood Cliffs, New Jersey, Prentice Hall.
11. Goodchild, M.F. and Janelle, D.G. (eds). (2003). Spatially Integrated Social Science: Examples in Best Practice. Oxford University Press.
12. John R. Weeks. 2004. The Role of Spatial Analysis in Demographic Research. Chapter 19 (pp. 381-399) in M.F. Goodchild and D.G. Janelle (eds.) (2004) Spatially Integrated Social Science New York, NY, Oxford University Press.
13. Kurland K. S., Gorr W. L. (2007). GIS Tutorial for Health. Redlands, CA, ESRI Press.
14. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. New Delhi, Prentice Hall of India.
15. Massey, D. (2008). for space. New Delhi, Sage Publications Ltd.
16. Monkhouse, F.J. and Wilkinson, H. R. (1962). Maps and Diagrams. London, Methuen and Company Ltd.
17. Parker R. N., Asencio E. K. (2008). GIS and Spatial Analysis for the Social Sciences: Coding, Mapping, and Modeling. New York, NY, Routledge/Taylor & Francis.
18. Paul V. (2007). *Demography as a Spatial Social Science*. Population Research and Policy Review 26: 457-476. (plus Introduction to the special issue of PRPR on Spatial Demography) pp. 455-456).
19. Editor. (2007). *Introduction to the Special Issue*. Population Research and Policy Review 26: 455-456).
20. Reibel, Michael, (2007). *Geographic Information Systems and Spatial Data Processing in Demography: A Review*. Population Research and Policy Review 26: 601-608.
21. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984) Elements of Cartography. New York, John Wiley and Sons.
22. Shaw, G. and Wheeler, D. (1994). Statistical Techniques in Geographical Analysis. Englewood Cliffs, New Jersey, Prentice Hall.



23. Soja, E. W. (1996). *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*. Wiley-Blackwell
24. Sparks Corey. (2013). *Spatial Analysis in R: Part 1*. Spatial Demography 1(1) 131-139
25. Sparks Corey. (2013). *Spatial Analysis in R: Part 2*. Spatial Demography 1(2) 219-226
26. Zhu E J. and Chi G. (2008). *Spatial Regression Models for Demographic Analysis*. Population Research Policy Review 27:17–42 DOI 10.1007/s11113-007-9051-8

**MSP-E3.1****45 Hours****HEALTH ECONOMICS AND HEALTH FINANCING****Learning objectives:**

1. To familiarize the students with basic concepts, theories and models in health economics and how to apply the economic tools in analyzing the structure and performance of health care sector.
2. To provide an understanding on the functioning of health care markets and health care industry.
3. To orient and encourage the students to understand main economics of health and micro financing of health care.

**I. Introduction to Health Economics**

Defining health economics, why health economics is important, basic concepts in microeconomics, health across world and over time, scope of health economics, map of health economics, basic questions confronted by health economist, concept of efficiency and equity in health, Production Possibility Frontier (PPF), economic gradient of health, causation of income and health, Preston Curve, economic models and analysis, expenditure function, Theories of X and Y, positive and normative economics.

**II. The Demand for Health and Health care**

What is Health and Good Health, Utility Analysis, Health as a form of human capital, What is Medical Care, The production of Good Health, Empirical evidences in the production of health, Health as human capital, Grossman Model, The Demand for Health Care, Demand function for health, Economic and non-economic factors of health care, Fuzzy Demand Curve, Price and income elasticity of demand for health care, Important consideration in estimating health care demand elasticity, provider's behavior, Empirical findings, externalities and market failure.

**III. Medical Care, Production and Cost**

The Short-Run Production Function of the Medical Firm, Total Product, Marginal Product and Average Product Curve, Law of diminishing marginal

productivity, The importance of costing in Health Economics, Short-run cost theory of medical firm, short run cost curves, Cost analysis, Implicit and explicit cost, factor affecting short-run cost curves, cost minimization, constraints in measuring health cost

#### **IV. Measuring Health Inequalities**

##### ***Measurement of health inequality: A Prelude***

Why measure health inequality; Health equity and inequality: Concept and definitions; Understanding of the concepts such as need, access and utilisation; cardinal and ordinal health variables

##### **Black Report and Beyond**

Historical Background of Black Report, Explanation for social class differences, major empirical theme since Black report

##### **Measures of health inequality:**

Measures of health inequality: Index based approach; Axiomatic approach to measurement; Individual-mean and inter-individual comparison; WHO Index, Coefficient of Variation, Generalised Entropy Index, Lorenz Curve and Gini Coefficient

##### ***Measuring socioeconomic rank related health inequality***

Slope index of inequality; Relative index of inequality; Concentration curve and concentration index: various ways of computing; Standardization; Inequality aversion; Normalised and Generalised concentration index; Corrected concentration index

##### ***Measuring inequality in healthcare utilisation***

Horizontal inequality; Vertical inequality; Regression based approach; Measurement of horizontal inequalities; Group inequality, common measures, Gini type index

#### **V. Health Financing**

Health financing in low, middle and high income countries, demographic transition, epidemiological transition and health expenditure, disparity in disease burden and percapita health spending, sources of health care in India, out-of-pocket expenditure on health care, catastrophic health expenditure, approaches in measuring catastrophic expenditure, impoverishment, health

care payment and poverty, national and regional patterns of catastrophic health spending, determinants of catastrophic health spending, Drivers of health care expenditure, health financing in India, Equity in health care finances, Willingness to pay for health care, User charges as determinant of health financing

#### **VI. Measuring Health**

Importance of Measures of general health status and quality of life, Measuring health outcomes, human life and Quality Adjusted Years of Life, Quality Adjusted Life Years (QALYs) and Health Year Equivalents (HYEs), Economics of Prevention and Public Health – Economic evaluation of prevention programs (include ADL and IADL for aged)

#### **VII. Health Insurance**

Health care system, a model of health care system, defining health insurance, need for health insurance, type of health insurance, demand for private health services, factors affecting the quantity demanded of health insurances, moral hazards, deductibles, co-insurance, managed care, adverse selection, loading fees, employed based insurance, reimbursement, selection effect, intermediary agent, regulation of health insurance, Need for Government intervention, Trends of health insurance, Coverage of health insurance in India

#### **VIII. Economic Evaluation**

What is economic evaluation? Cost analyses; direct cost, Indirect cost, tangible cost, capital cost, fixed cost, variable cost, Opportunity cost, average cost, marginal cost, Incremental cost, steps in cost analyses: Identification, measurement and valuation, Various types of economic evaluation used in health care: Cost effectiveness analysis (CEA) Cost-Benefit Analysis (CBA), Divergence between social and private costs and benefits in health care, Limitations of economic evaluation, Consumer Impact Assessment.

### **Reading List**

#### **Essential Readings :**

1. Rexford E. Snterre and Stephen P. Neun, Health Economics: Theories, Insights and Industry Studies, Thompson South – Western, 3<sup>rd</sup> Edition (614, San/Hea, 073226) Note: 4<sup>th</sup> Edition is out in 2007 (ISBN: 032432068X; ISBN13: 9780324320688)

2. Drummond MF, Sculpher MJ, Torrance GW, O'Brien B, Stoddart GL, eds. *Methods for economic evaluation of health care programmes*, Third Edition, Oxford University Press, 2005.
3. O'Donnell O, Doorslaer E v, Wagstaff A and Lindelow M. *Analyzing Health Equity Using Household Survey Data, A Guide to Techniques and Their Implementation* <http://www.sciencedirect.com/science/handbooks> 15740064
4. Culyer A J and J P Newhouse, 2000, *The state and scope of health economics*, *Handbook of Health Economics*, Volume 1A, Eds. Culyer and Newhouse, Elsevier, 2000.
5. Dewar D M , *Essentials of health economics*, Chapter 3
6. Ringel et al (2005) *The Elasticity of Demand for Health Care A Review of the Literature and Its Application to the Military Health System* [https://www.rand.org/content/dam/rand/pubs/monograph\\_reports/2005/MR1355.pdf](https://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1355.pdf)
7. Grossman (1982), *On the concept of Health capital and Demand for Health*, *Journal of Political Economy*, 80(2)
8. Macintyre S (1997). *The Black Report and Beyond-What are the issues*, *Social Science, Medicine*, 44(6):723-745
9. Wagstaff A, P. Paci and E van Doorslaer (1991), *On the measurement of inequalities in health*, *Social Science and Medicine* 33(5), 545-557
10. O'Donnell O. et al (2008), *Analysing health equity using household survey data: A guide to techniques and their implementation*, The World Bank
11. Wagstaff, Adam & van Doorslaer, Eddy, 2000. "Chapter 34 Equity in health care finance and delivery," *Handbook of Health Economics*, in: A. J. Culyer & J. P. Newhouse (ed.), *Handbook of Health Economics*, edition 1, volume 1, chapter 34, pages 1803-1862 Elsevier
12. Erreygers, G (2009b), *Correcting the Concentration Index*. *Journal of Health Economics* 28, 516–520.

#### Recommended journals

1. *Journal of Health Economics*
2. *Health Economics*
3. *The Lancet*
4. *Health Policy and Planning*

MSP-E3.2

45 Hours

## URBANIZATION, SPACE AND PLANNING

### I. Urbanization and Space

Urbanization and space: concepts and forms (formal and informal spaces); Differences between space, place and region; urbanization and space interaction: gravity model, distance decay model, forces of concentration and dispersion, urban agglomeration and spatial economy; Access to urban and right to the city

### II. Evolution of Spaces of Settlements

Settlement: evolution, characteristics and factors; settlement pattern and hierarchy; Urban morphology; Change in urban land use and population density; Rural-urban relationship: dichotomy or continuum; Role of urban centres in rural development.

### III. Urban and Regional Planning

**Planning:** Definitions, concepts, purpose, types and levels; geography/demography and planning relationship.

**Regional development/planning:** Region: concept and definition, types (formal, functional and planning); Need for regional planning; Types of regional planning; Spatial structure of regions,

Theories of regional development: Stages of development, economic base theory, Industrial location theory, Growth Pole theory; Core-periphery interactions.

Regional planning in India; Planning regions in India; Regional disparity in development; Special area development planning (hilly area development planning, (North-Eastern regional council, Mumbai Metropolitan Regional Development Plan).

**Urban Planning:** Concepts; history and origins of urban planning; pioneers

of urban planning; types of urban plans: New towns, neighborhood, garden city, green belts; healthy urban planning, WHO concept of healthy city, livable city, sustainable city.

Urban policy since independence, five year plans, important urban plans (New Delhi, Navi Mumbai, Chandigarh); Smart Cities Mission; HRIDAY, AMRUT, PURA, RURBAN mission

#### **IV. Challenges in Urban planning**

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housing and real estate, Slums and slum rehabilitation, The case of SRA in Mumbai; Urban pollution, Solid waste management; Management of migrants

#### **V. GIS and Urban and Regional Planning**

Application of GIS in urban and regional planning.

### **Reading List**

#### **Essential Readings :**

1. Friedman, John and William Alonso (1964) *Regional Development and Planning: A Reader*, The MIT Press, Massachusetts.
2. Friedman, John (1966) *Regional Development Policy: A Case Study of Venezuela*, MIT Press, Massachusetts.
3. Chaudhuri, J. R. (2001) *An Introduction to Development and Regional Planning*, Orient Longman, Hyderabad.
4. Chand, M and V.K. Puri, (1983), *Regional Planning in India*, New Delhi, Allied.
5. Friedman, J and W. Alonso, (eds: 1969), *Regional Development and Planning: A Reader*, Cambridge, MIT Press.
6. Lefebvre, H (1991) *The Production of Space*, Blackwell, Oxford.
7. Hall, P, (1992), *Urban and Regional Planning*, Third Editions, London, Routledge.
8. Harvey, D. (2008) 'The Right to the City', *New Left Review* 53 (September-October): 23-40.
9. Harvey, D. (2012) *Rebel Cities: From the Right to the City to the Urban Revolution*, Verso, London.
10. Husain, M, (1994), *Human Geography*, Jaipur, Rawat.
11. Leong, Goh C. and G.C. Morgan, (1982), *Human and Economic Geography*, Singapore, Oxford University Press.

12. Singh, R. Y. (1994), Geography of settlements, Rawat, Jaipur.
13. Ginsburg, N., Bruce Koppel and T.G. Mc Gee (1991) *The Extended Metropolis: Settlement Transition in Asia*, University of Hawaii Press, Honolulu.
14. Nath, V. (1971) Regional Development Policies “, Economic and Political Weekly, 6(30-32): 1601-1608.
15. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
16. Nyerges, Timothy L. and , Jankowski Piotr (2010): Regional And Urban Gis: A Decision Support Approach, Rawat Publication, Jaipur. ISBN: 9788131603697, 8131603695

**Suggested Readings :**

1. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolution of regional planning*, London, Edward Arnold.
2. Kawashima, T and P. Korcelli, (1982), *Human Settlement Systems: Spatial Patterns and Trend*, Luxemburg, IIASA.
3. Knowles, R and J. Warling, (1983), *Economic and Social geography: Made Simple*, London, Heinemann.
4. Misra, R.P, (1992), *Regional planning: Concepts, Techniques, Policies and Case studies*, New Delhi, Concept.
5. Sarin, M, (1982), *Urban Planning in the Third World: The Chandigarh Experience*, London, Manshell.
6. MMRDA(2016), Mumbai Metroplotan Regional Development Plan 2016-2036 MMRDA, Mumbai.
7. UNEP and others (2007), *Livable Cities: The benefits of environmental planning*, The Cities Alliance, Washington. <http://www.citiesalliance.org/idex.html>.



## **SEMESTER - III**

MSP-C8

60 Hours

## GENDER AND REPRODUCTIVE HEALTH

### GENDER

**Learning objectives :** The objective of this section is to impart knowledge to students on gender issues related to population, development and health. The main goal is to build skills for students to analyze and understand evidence relating to institutional context of gender and gender-based inequalities and linkages between gender, population, development and reproductive health.

#### I. Basic terms and concepts

Importance of the study of Gender Issues in Population Studies; Emergence of the Gender Issues as an important area of concern; Differences between sex and gender.

Definitions, Concepts and Terminologies: gender, unequal gender relations, gender equity, gender disparities, gender inequalities, gender mainstreaming, gender sensitive planning and gender balance.

Patriarchy and matriarchy, kinship structure and gender roles; gender stratification in traditional and modern societies.

#### II. Autonomy, Empowerment and Status of Women

Autonomy, Empowerment and Status of Women: Concepts, definition and measurement; various indicators and their merits and demerits; gender sensitive development and health intervention models and programme; status of women and population dynamics: Inter-linkages.

#### III. Social Institutions and Gender Inequalities

Gender and social institutions in India: Religious, Caste, Family, Society, Marriage customs and patterns, dowry system, segregation and seclusion of women - Purdah system. Implications for sex ratio trends and patterns in India; Son Preference, Desired sex composition of children, child sex ratio, sex ratio at birth and sex selective abortion.

Gender inequalities in health: gender differentials in nutrition and health, mortality differentials by sex (children, adults, and aged) and gender inequalities in health care utilization.

Gender inequalities in employment, education, in important decision making process and in workplace, undercounts of women's work in GDP. Gender disparities in access to resources- practice to relating to property inheritance, political representation, and female headship.

#### **IV. Gender, Development and Reproductive Health**

Gender in development and reproductive health – key issues relating to equal access participation in development, and control over capital. Right-based approach to gender equity and reproductive health and HIV/AIDS.

Gender as a key determinant of vulnerability to poverty, gender based violence and health implications.

#### **V. Policies and Programmes for Addressing Gender Disparities**

Gender and mass media: Language, image and portrayal of women in different mass media and the changes over the time.

National programmes, policies and laws for empowerment of women.

#### **Reading List**

##### **Essential Readings :**

1. Basu, Alaka M., (1992): *Culture, The Status of Women and Demographic Behaviour*, Oxford University, New York.
2. Dyson, Tim and Mick Moore, (1983). "On Kinship structure, female autonomy, and demographic behaviour in India", *Population and Development Review* vol. 9(1), pp. 35-60.
3. Ellsberg Mary and Heise Lori L. (2005) *Researching violence against women: A practical guide for researchers and activists*. WHO and Path, Washington D.C.
4. Folbre, Nancy. (1992). Improper arts: Sex in classical political economy. *Population and Development Review*. 18(1): 105-112.
5. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): *Population Policies Reconsidered: Health and Empowerment and Rights*, Harvard University Press, Harvard.
6. Jeffery Patricia and R. Jeffery. 1997. *Population Gender and Politics: Demographic change in rural north India*. Cambridge University, Cambridge.

7. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, New York.
8. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social Science Research*. Sage Publication, London.
9. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economic and Social Affairs (Dept. of), New York
10. World Health Organization. (1998). *Gender and Health. Technical paper* WHO/FRH/WHO/98. (Website: [www.who.int](http://www.who.int))
11. World Bank. (1991). *Gender and Poverty in India*. World Bank, Washington.
12. World Health Organization (2003): *Comparative Evaluation of Indicators for Gender Equity and Health*, Women and Health Programme, Centre for Health Development, Kobe, Japan.
13. William Joan. 1989. Deconstructing Gender, 87 Michigan L Rev. 797. *Law Journal Article*

#### **Suggested Readings :**

1. Agnes, Flavia. (2000). Law and gender inequalities: the policies of women's right in India. Oxford, New Delhi.
2. Anker, R.(1997). *Gender and Jobs: Sex Segregation of Occupations in the World*, ILO, Geneva.
3. Balk, Deborah, 1997): "Defying Gender Norms in Rural Bangladesh: A Socio demographic Analysis". *Population Studies* Vol.51, pp. 153-172.
4. Bandhopadhyay, D. 2000. Gender and governance in India. *Economic and Political Weekly*. 35(3): 2696-269xxx).
5. Basu, Alaka Malwade. 2000. Gender in population research: Confusing implications for health policy. *Population Studies*. 54: 19-22.
6. Bhasin K. 1993. *What is patriarchy?*, Kali for Women Publishers, New Delhi.
7. Bhasin K. (2000). *Understanding Gender*, Kali for Women Publishers, New Delhi.
8. Das Gupta, Monica, 1987. Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1): 77-100.
9. Doyal L.(1995) *What Makes Women Sick: Gender and the Political Economy of Health*. London, Macmillan.
10. Dreze, Jean and Sen Amartya, (1995): *India: Economic and Social Opportunity*, Oxford University Press, New York.

11. Harriet B. Presser, (1997): Demography, Feminism and the Science-policy Nexus, *Population and Development Review* Vol. 23(2), pp. 295-331.
12. Jeffery, Roger and Basu, Alka M. (Eds.), (1996): *Girls Schooling, Women's Autonomy and Fertility Changes in South Asia*, Sage Publications, New Delhi.
13. Jejeebhoy S. 1996. *Women's Education, Autonomy and Reproductive Behavior: Assessing what we have learned*. East West Centre, Hawaii.
14. Reeves Hazel and Baden Sally (2000): *Gender and Development: Concepts and Definitions*, Report No. 55, Bridge (development- gender) Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK.
15. Sonya, Andermahr, Lovell Terry and Wolkowitz, Carol, (1997): *A Glossary of Feminist Theory*, Arnold-Hodder Headline Group, London.
16. Sopher, David, (1980). *An Exploration of India: Geographical Perspective on Society and Culture*, Cornell University New York

## REPRODUCTIVE HEALTH

**Learning Objectives:** This section aims to introduce the concepts and methods used in reproductive health research and to equip students with the principles, methods and research skills necessary to conduct policy relevant research. It provides a non-clinical foundation in the main aspects of reproductive health: family planning, obstetric health and STI/HIV/AIDS.

### I. Introduction to reproductive health

- Definition and rationale of RH approach,
- Evolution of ideas about reproductive health
- Components of RH and life cycle approach of RH
- Recommendations from ICPD

### II. Physiology of human reproduction

- Male and female reproductive system; Conception, Pregnancy
- Customs, and taboos related to menstruation and puberty in different societies

### III. Maternal and obstetric morbidity

- Maternal morbidity, safe motherhood programmes, emergency obstetric care
- Cultural practices during pregnancy, childbearing and its impact on health of women
- Effects of maternal death on family
- Strategies to reduce maternal morbidity and mortality

**IV. Abortion and related issues**

- Spontaneous, induced abortion, legal and illegal abortions, safe and unsafe abortions and consequences of unsafe abortions
- Laws regarding abortion.

**V. Infertility**

- Methodological issues in measurement of infertility, Sexual dysfunction, behavioural risk factors, and consequences, Assisted reproductive technologies and its use and misuse; component of infertility in government programmes.

**VI. Gynecological and contraceptive morbidity**

- Anemia, Breast, Cervical, Ovarian, Prostate Cancer; Behavioural risk factors
- Contraceptive morbidity related to different methods.

**VII. Reproductive Tract Infection/Sexually Transmitted Infections and HIV/AIDS**

- Issues related to HIV infection; socio-cultural, medical, public health and psychological perspectives
- Social epidemiological questions concerning HIV infection in Asian countries with emphasis on India
- Coping with HIV/AIDS infection: Psycho-social and economic issues
- Reproductive Tract Infections (RTI) and Sexually Transmitted Infections (STIs)
- Interaction between RTIs/STIs and HIV/AIDS
- Impact of HIV/AIDS on fertility, mortality and its relationship with migration

**VIII. Male Reproductive Health Issues**

- Men's reproductive health services
- Men's role in women's health,
- Strategies to reaching out to men.

**IX. Adolescent and Menopausal women**

- Aspects of adolescent sexual and reproductive behaviours
- Socio-psychological and health problems of menopausal women

**X. Gender and Reproductive Health**

- Rights based approach to gender equity and reproductive health and HIV/AIDS
- Gender and HIV/AIDS vulnerability and its demographic impact

**XI. Reproductive rights and ethical issues**

- Human rights and values
- Ethical values in RH services; information, liberty of choice
- Professional and ethical issues

**Reading List**

**Essential Readings :**

1. Berer, M., (2000): *Making Abortions Safe: A Matter of Good Public Health Policy and Practice*, Bulletin, WHO, Vol. 78(5), pp. 590-592.
2. Bott, S. et al (Eds. 2003): *Towards Adulthood: Exploring the Sexual and Reproductive Health of Adolescent in South Asia*, World Health Organization, Department of Reproductive Health and Research, Geneva.
3. Pachauri, S. (Eds. 1999): *Implementing a Reproductive Health Agenda in India : The Beginning*, New Delhi ; Population Council.
4. Rutsein, Shea, O. and Shah, Iqbal, H. (2004): *Infecundity, Infertility, and Childlessness in Developing Countries*. DHS Comparative Reports No.9. Calverton, Maryland, USA ORC Macro and the World Health Organization.
5. Srinivasan, K. (Eds. 1996): *Population Policy and Reproductive Health*, New Delhi; PFI and Hindustan Publications.
6. Verma, R., P.J. Pelto, S.L. Schensul, and A. Joshi (Eds. 2004): *Sexuality in the Times of AIDS: Contemporary Perspectives from Communities in India*, New Delhi; Sage.
7. World Health Organization, (1990): *Measuring Reproductive Morbidity*”, Report of a Technical Working Group, Geneva, August 30-September 1, 1989, WHO/MCH/90.4.

**Suggested Readings :**

1. Alan Guttmacher Institute, (2000): “Readings on induced abortion vol.1: Politics and policies- Articles from Family Planning Perspectives 1974-1999”, The Alan Guttmacher Institute, New York.

2. Casterline, J.B., (1989): Collecting Data on Pregnancy Loss: A Review of Evidence from the World Fertility Survey, *Studies in Family Planning* Vol. 20(2):81-85.
3. Gittleston, J.; Bentley, M.E.; Pelto, P.J.; Nag, M.; Pachuri, S.; Harison, A.B., and Landman, L.T (Eds), (1994): *Listening to Women Talk About Their Health: Issues and Evidence from India*, The Ford Foundation, New Delhi.
4. Goliber, T.J., (1997): Population and Reproductive Health, *Population Bulletin* Vol. 52(4), Washington, DC: Population Reference Bureau.
5. Raju, S. and Leonard, A.(eds.) (2004): *Men as Supportive Partners in Reproductive Health*, Population Council, New Delhi
6. Unisa, S., (1999): Childlessness in Andhra Pradesh, India: Treatment-Seeking and Consequences, *Reproductive Health Matters*, Vol. 7, No. 13.
7. Bergman Ylva, (2004): *Breaking Through, A Guide to Sexual and Reproductive Health and Rights*, Norra Skane Offset, Stockholm.
8. Singh, S.K., Lhungdim H., Chattopadhyay, A and Roy, T.K, (2006): “*Women’s vulnerability to STI/HIV in India*, I.I.P.S, Mumbai.



## POPULATION AND DEVELOPMENT

**Learning Objectives:** The main objective of this paper is to impart knowledge on development in context of population.

The goal of this course is to make students aware of varying concepts and theories of development, population issues and its linkages with development and environment.

### **I. Concepts and Measures of Development:**

Need to study population in the context of development; economic development – definition and indicators; economic determinants of development, non-economic determinants of development and role of institutional structure.

Concepts of development and measures: limitations of per capita income as an indicator of development; emphasis on equality, Lorenz curve and Gini coefficient; towards human centered development-welfare approach, investment in human capital approach, physical quality of life index (PQLI); human development index (HDI), gender development index (GDI), Concepts and Measures of Poverty, human poverty index (HPI); concept of sustainable development; concepts of social development, social capital and social change.

### **II. Theories and Strategies of Development:**

Theories of development: Arthur Lewis's two-sector model; big push theory, Liebenstein's critical minimum effort theory, Harrod-Domar and Solow's growth models. Development strategies through the different five year plans.

Millennium development goals and achievements with special reference to India.

### **III. Linkages of Population on Development**

Effect of development on demographic variables:

Demographic transition theory, age structure transition, demographic dividends and population ageing; effects of fertility and mortality declines, health improvements and migration on economic growth.

Divergent views regarding the relationship between population and development:

- (i) Pre-modern, Mediaeval and classical writings on population- Early and mediaeval Christian views, Hebrew writers, Muslim authors, and Hindu writings of pro-natalist and prosperity argument; ancient Greece philosophers views, Chinese philosopher Confucius writings on optimum population; Classical Mercantilist and Physiocrats views, Socialist and Marxist views.  
Modern theories of population and development: three major viewpoints – pessimist, optimist and neutralist:
- (ii) Pessimistic perspective: Population growth viewed as an obstacle to development; Malthus theory, Coale and Hoover study, tragedy of commons, limits to growth study and Enke's investment model.
- (iii) Optimistic perspective: Population growth is conducive to development – Mercantilist views, Colin and Condorcet views, views of Colin Clark, Ester Boserup and Julian Simon.
- (iv) Neutralist/revisionist perspective: need to study linkages between population change and development- views of Simon Kuznets, Allan Kelly and Robert Schmidt, and Bloom and Williamson.

#### **IV. Population and Resources:**

Natural resources: classification of natural resources, renewable and non-renewable resources, resources scarcity and resource depletion.

Capital resources: effect of demographic factors on savings and investments, technology and development; importance of technology to improve the productivity of physical assets.

Human resources - quantitative aspects: concepts labour force, economically active population, unemployment, types of unemployment, disguised, seasonal frictional and chronic. Factors affecting demand and supply of labour, effect of population growth and development on structure of employment.

Human resources – qualitative aspects: factors influencing productivity of human beings need for investment in human capital, implications of population growth on food, sanitation, housing, employment, education and health and social security to improve the quality of human resources.

Educational development, urbanization and exposure to mass media and their social consequences.

### **V. Population and Environment:**

Various forms of environmental degradation and their implications; population growth, development and the greenhouse effect – global warming; pressure of population growth on water resources; pressure of population growth on land use; soil erosion, desertification, deforestation, and soil salinity. Pressure of population growth on energy resources; environmental degradation and its implications for health; guidelines for environmental protection.

### **Reading List**

#### **Essential Readings :**

1. Todaro, Michael P. (1981): *Economic Development in the Third world*. New York: Longman, Chapter 3.
2. Sen, Amartya, (2002): The concept of development in Chenery Hollis and T.N. Srinivasan (eds), *Handbook of Development Economics* Vol. 1. Amsterdam: Elsevier. Chapter 1.
3. Haq, Mahbubul (1996): *Reflections on Human Development*, Delhi: Oxford University Press. Chapters 1 & 2.
4. United Nations Development Programme (2006): *Human Development Report 2006*, New Delhi: Palgrave Macmillan Technical Note 1. pp. 393-99.
5. Ray, Debraj (1998): *Development Economics*. Delhi: Oxford University Press. Chapters 3 & 4.
6. Kapila, Ray and Uma Kapila (2001): *India's Economy in the Twenty First Century*. 2nd Revised Edition. New Delhi: Academic Foundation. Chapters 1 to 5, 15, 16 & 21.
7. Birdsall, Nancy, Kelley, Allen C. and Sinding, Steven W. (2001). *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World*, Oxford: Oxford University Press Chapters 2, 4 and 5.
8. Jamison D. et al. (eds) (2006): *Disease Control Priorities in Developing Countries*, New York: Oxford University Press and World Bank. Chapter 1.
9. David E Bloom, David Canning, JaypeeSevilla, (2003): *The Demographic Dividend*. Sanata Monica, CA: Rand Corporation. Chapter 2.
10. National Research Council (1986): *Population Growth and Economic Development: Policy Questions*. Washington D.C.: National Academy Press. Chapters 1, 2, 3, 4, 6 & 8.

11. United Nations (1973): *The Determinants and Consequences of Population Trends*, Volume 1, Chapters 11 & 13.
12. Chenery Hollis and T.N. Srinivasan (eds), (2002): *Handbook of Development Economics*, Vol 1, Amsterdam: Elsevier. Chapters 10, 11, 13 & 15.
13. Kawadia, G. and K. Ahuja, (2006): *Environmental Issues of Development*. Sections A and E, Ambala: Associated Publishers. Chapters 1, 3 & 13.

**Suggested Readings :**

1. Ray, Debraj (1998): *Development Economics*. Delhi: Oxford University Press. Chapters 1 & 2.
2. United Nations Development Programme (1 UNDP, *Human Development Report 1990* Delhi: Oxford University Press. Chapter 1.
3. Lewis W.A, (1958): Economic development with unlimited supplies of labour. In A. N. Agarwala and P. Singh (eds.) *The Economics of Underdevelopment*. New York: Oxford University Press.
4. Leibenstein, H. (1963): *Economic Backwardness and Economic Growth*. New York: John Wiley Chapter 8.
5. Solow, R.M. (1956): A contribution to the theory of economic growth, *Quarterly Journal of Economics*, 70:65-94.
6. Coale A.J. and Hoover, E.M. (1958): *Population Growth and Economic Development in Low Income countries*, Princeton N. J.: Princeton University Press.
7. Simon Julian. (1981): *The Ultimate Resource*, Princeton N.J.: Princeton University Press.
8. United Nations (1973): *The Determinants and Consequences of Population Trends*, Volume 1, Chapters 3 & 7.
9. Martin Philips L, (2004): *Migration and Development: Towards Sustainable Solutions*, Geneva: ILO.
10. Chary, S.N and Vinod Vyasulu (eds). (2000): *Environmental Management – An Indian Perspective*, New Delhi: Macmillan India.
11. United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definition, Rationale, Concepts and Sources*. New York: United Nations.

## RESEARCH METHODOLOGY

**Learning objective:** The main objective of this course is to impart knowledge and skills on the principals and methods of social science research. The goal of this course is to equip students with the skill to prepare a scientific research proposal and conduct social science research.

### **I. Scientific Methods of Research**

- Definition of Scientific Research: Assumptions, Operations and Aims of Scientific Research.
- Research Processes: Conceptual, Empirical and Analytical.
- Phases of Research: Essential Criteria of Scientific Research Method.

### **II. Research Design**

Observational Studies: Descriptive, explanatory, and exploratory, monitoring and evaluative studies.

Experimental Studies: Pre experimental design, True experimental Design, Pre-test & post-test designs, Follow-up or longitudinal design, Panel Studies.

Threat to internal validity: Reliability and Internal-External validity.

Action research studies.

### **III. Measurement**

Reliability and validity of measurement: Face, content, construct, convergent, concurrent, and predictive validity; Inter-coder reliability, stability, non random and random errors, scaling and composite indices.

Attitudinal Scales: Point scales, ranking scales, rating scales, limitations of attitudinal scales,

Types of Scales: Nominal and Ordinal Scale, Guttman, Likert, Semantic and Thurstone scales.

### **IV. Methods of Data Collection**

Quantitative Methods: Checklist schedules, questionnaire (mail method, interviews through telephone, internet and computers), interview schedule

(face-to-face interviews or personal interviews), Cross cultural variability and vignettes.

Questionnaire/interview schedule design and construction: Principles of constructing a questionnaire/ interview schedule, Types of questions, framing of questions (simple, delicate, personal matter), sequencing of sections and questions and Interview techniques.

Qualitative Method: Walk through and observation (participatory and non-participatory), Social mapping, key informant interview, In-depth interviews, Focus group discussion, content analysis, free listing, pile sorting, projective techniques, mechanical devices (camera, tape recorder), mystery client technique.

## **V. Sampling**

Complete enumeration versus sampling.

Concept of sampling unit, sampling frame and sampling design.

Sampling methods: Simple random sampling, stratified sampling, systematic sampling, cluster sampling, and purposive sampling.

Multistage sampling in large-scale surveys, self-weighting designs, Stratification in multistage sampling.

Sampling and non-sampling errors, calculation of weights, sample size determination.

## **VI. Data Collection, processing and analysis**

Research ethics; At the level of respondent, community, organization and presentation of results

Fieldwork – interaction with community and respondent.

Editing, coding, data entry, validation, processing & analysis.

## **VII. Writing research proposal and report**

Purpose of a proposal/report

Content of proposal/report: Introduction, Review of Literature, Objectives and conceptual framework, Sources of data, Methods of data collection and analysis, Summary, conclusions and recommendations.

Footnotes, References/Bibliography, Appendices and Glossary

**VIII. Research Methodology: Lab-exercise and field work**

Application of Atlas Ti and ANTHROPAC in analyzing qualitative data,  
Group Work- Field practices encompassing application of Research Methods

**Reading List**

**Essential Readings :**

1. Bernard, H. Russell, (1995): *Research Methods in Anthropology: Qualitative and Quantitative Approaches*, Altamira Press, Walnut Creek.
2. Goode W J and Hatt P K. 1952. *Methods in Social Research*. McGraw Hills, New York.
3. Kish, Leslie, (1995): *Survey Sampling*, John Wiley and Sons, Inc. New York.
4. Lohr L. Sharaon., (1999): *Sampling: Design and Analysis*, Duxbury Press, London.
5. Lwanga S. K. and Lemeshow S., (1991): *Sample Size determination in Health Studies: A Practical Manual*, World Health Organization, Geneva.
6. Mukherji, P.N., (1999): *Methodologies in Social Science*, Sage Publications, New Delhi.
7. Pullum W. 2006. An Assessment of Age and Data Reporting in the DHS Surveys, 1985-2003. DHS Methodological Report No. 5. Calverton, Maryland, Marco International Inc.
8. Royce A. Singleton and Bruce C. Straits, (1999): *Approaches to Social Research*, Oxford, Oxford University Press.
9. Young P V. 1994. *Scientific Social Surveys and Research*. Prentice-Hall, New York (4<sup>th</sup> Edition).

MSP-E4.1

45 Hours

## CONCEPTS AND MEASURES OF GLOBAL HEALTH

**Learning Objectives:** This paper introduces to the students the basic concepts of global health. This course emphasizes on understanding the global burden of disease and measuring population health. A key component of this course is to understand the determinants of health and health disparities. It will also provide student with a broad understanding of the relationship between environment and health. It also develops the understanding of the students about the health care delivery system, human resources for health, migration of human resources for health, etc. Finally, it introduces to students the issues related to policy and health. The topics that will be covered in the course are listed below:

- I. Concept and introduction:** Concept of global health; why is it important to study global health?; health and development in the global context; demographic, health and epidemiological transitions; major patterns of distribution of disease in the world; sources of data on disease and disability
- II. Global burden of disease:** Concept of burden of disease; hypotheses related to burden of diseases – compression of morbidity, expansion of morbidity and dynamic equilibrium; measures of burden of disease at the population level – health expectancy and health gap; methods for estimating DFLE, HALE and DALY; how does the burden of disease and mortality vary by geography, social class, race and gender? GBD 1990, 2010 and 2013 – changes and continuities; new and re-emerging infectious diseases; issues related to HIV/AIDS; introduction to NCDs; double burden of diseases in developing countries; impact of tobacco abuse; trends and challenges related to maternal and child health; maternal mortality
- III. Determinants of Health:** Culture, gender, race, social, political and economic determinants of health and health disparities; contribution of income, education and other factors to health; Factors responsible for variation in the global burden of disease across countries; poverty and health; income inequality and health; health risk factors



- IV. Environment and health:** Role of water, sanitation, indoor and outdoor air pollution and nutrition in explaining global health disparities; climate change and health; migration, disaster (man-made, natural), conflicts and epidemics
- V. Health care delivery systems:** Introduction to health systems; how to measure performance of health system?; health systems in different countries; factor responsible for better performance of health systems in developed countries; the distribution of human resources for health; quality of human resources for health; the push and pull factors associated with the migration of health care providers
- VI. Policy and health:** Human rights approach to health; national and international policies related to health; how are global health priorities set?; the role of international actors like WHO, World Bank, etc. in global health; influence of international priorities on national priorities

### Reading List

#### Essential readings :

1. Skolnik, R. (2008). Essentials of global health, Jones and Bartlett: Sudbury, MA.
2. Jacobsen, K.H. (2007). Introduction to global health, Jones and Bartlett: Sudbury, MA.
3. Markel, W.H., Fisher M., Smego R. (2007). Understanding global health, McGraw Hill: Columbus.
4. Merson, M.H., Black, R.E., Mills, A.J. (2001). International public health: diseases, programs, systems and policies, Gaithersburg, MD: Aspen Publishers.
5. Murray, C.J.L., Saloman, J.A., Mathers, C.D., Lopez, A.D. (2002). Summary measures of population health: concepts, ethics, measurement and applications, The World Health Organization: Geneva.
6. Murray, C.J.L., Saloman, J.A., Mathers, C. (2000). A critical examination of summary measures of population health, Bulletin of the World Health Organization 78(8): 981-994.
7. Cutler, D., Deaton, A., Lleras-Muney, A. (2006). The determinants of mortality, Journal of Economic Perspectives 20(3): 97-120.
8. Link, B.G., Phelan, J. (1995). Social conditions as fundamental cause of disease, Journal of Health and Social Behavior 35: 80-94.
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13. Murray, C.J.L., Frenk, J. (2000). A framework for assessing the performance of health systems, *Bulletin of the World Health Organization* 78(6): 717-731.
14. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In *Disease Control Priorities in Developing Countries* (2<sup>nd</sup> Edition), pages 87-102, New York: Oxford University Press.
15. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
16. Anand, S., Baernighausen, T. (2004). Human resources and health outcomes: a cross country econometric study, *Lancet* 364(9445): 1603-09.
17. Chen, L. et al. (2004). Human resources for health: overcoming the crisis, *Lancet* 364(9449): 1984-1990.
18. Pallikadavath, S., Singh, A., Ogollah, R., Dean, T., Stones, W. (2013). Human resource inequalities at the base of India's public health care system, *Health & Place* 23: 26-32.
19. Zurn, P., Dal Poz, M.R., Stilwell, B., Adams, O. (2004). Imbalance in the health workforce, *Human Resources for health* 2(13): 1-12.
20. Willis-Stattuck, M. et al. (2008). Motivation and retention of health workers in developing countries: a systematic review, *BMC Health Services Research* 8: 1-8.
21. Brown, T.M., Cueto, M., Fee, E. (2006). The World Health Organization and the transition from 'international' to 'global' public health, *American Journal of Public Health* 96(1): 62-72.
22. Ruger, J.P. (2005). The changing role of the World Bank in global health, *American Journal of Public Health* 95(1): 60-70.
23. Ravishankar, N. et al. (2009). Financing of global health: tracking development assistance for health from 1990-2007, *Lancet* 373(9681): 2113-2124.
24. London, L. (2008). What is a human-rights based approach to health and does it matter? *Health Human Rights* 10(1): 65-80.

## GENDER, HEALTH AND DEVELOPMENT

**Learning Objectives:** The rationale of the course is to synthesize the issues studied in different papers and equipping the students with a number of gender sensitive indicators and analytical tools.

### I. Introduction

The purpose of this section is to explain the basic concepts of three major components of this course namely gender, health and development.

1. The Concept of gender, Evolution of gender in historical perspective
2. Patriarchy, Kinship Structure and gender roles, Feminist theories, Gender stratification in traditional and modern societies, Gender Analysis Tools, Gender Sensitive Indicators and Gender budgeting and auditing
3. Concept of health, Evolution of the concept of Reproductive Health, life cycle approach to RH and recommendations from ICPD
4. Changing concept of development, Indicators of development, gender adjusted HDI

### II. Gender and Health

This section presents the situation analysis regarding sex differentials in different aspects of health and highlights some special issues of women and men's health.

#### *Situation analysis of sex differentials in morbidity and mortality*

1. Major morbidity and mortality burden in the developing world with major focus on India- sex ratio of births, major health problems experienced by women and men, reproductive health of women and men in developing world, differentials in use of male and female methods of contraception
2. Health infra-structure and health care providers
3. Nutritional status, susceptibility to infections
4. Accidents and other risk factor and health seeking behavior
5. Health and Nutrition issues of adolescent of boys and girls , abuse and maltreatment, Puberty, Sexual Debut, Adolescent Pregnancy, Abortion, women and family planning programs, Contraceptive Technology

6. Major risk factors of men's health: masculinity, alcoholism, tobacco and drug consumption, accident
7. Gender and Sexuality: Sexual health of men and women, gender dimension of HIV /AIDS. Gender and Infertility

### **III. Gender and Development**

The purpose of this section is to understand the sex differentials in health in terms of socio- economic and cultural context of gender and to study the gender dimensions of development.

1. Understanding social structures- role of caste, class, ethnicity and religion and gender in health inequalities and health outcomes
2. Gender dimension of social development, status and role of men and women in household and community, culture, marriage customs, dowry and bride price practices, age at marriage
3. Gender differentials in household headship and role in decision making
4. Gender differences in access to knowledge-, education, exposure to media and freedom of movements
5. Gender based violence- Domestic and community violence and gender, Legal aspects of domestic violence and rape
6. Women's role in community life and involvement in politics-as voter, political worker and leader, women in Panchayati Raj Institutions and self help groups
7. Media representation of men and women
8. Gender dimension of economic development: women's access to economic resources, entitlements, land ownership, inheritance laws, access to credit, measurements of women's work, profiling women's work, informal sector involvement, working condition, maternity benefits, wage differentials, gender and poverty
9. Globalization, changing pattern of economic activity, issues of marginalization and vulnerability along with agency, negotiation and spaces of power, Gender Divisions in Urban Labor Markets, Gender and Migration
10. Housing, Household environment and its differential impact on men and women's life
11. Environmental degradation, changes in climate, water table and land use and their differential impact on men and women

#### **IV. Gender mainstreaming in health and development programs**

The purpose of this section is to understand the concept of mainstreaming gender in development and to review the measures taken for eliminating undesirable impact of gender inequalities and to bring women in the main stream of development

1. The concept of Gender Mainstreaming
2. Historic overview of Gender Mainstreaming- Women in development (WID)- concept and criticism by feminist; shift to Gender and Development (GAD), Gender Mainstreaming and the Millennium Development Goals (MDGs)
3. The rights approach to Health, sexual and reproductive rights, violence, human rights and health
4. Paradigm shift from the Target Based Supply Driven Fertility influencing programs to RH Approach.
5. Legal aspects – laws regarding marriage, dowry, domestic violence, ,rape PNDT act , property inheritance, maternity and other benefits of working women, sexual harassments at workplace, reservations in political institutions and
6. Gender mainstreaming in various health and development sectors- e.g. Agriculture, Health, Education, gender in work place (Public & private) etc.
7. Advocating for Gender equality
8. Gender responsive policy making and planning of health and development programs.

#### **Section 5: Some case studies of Gender analysis of health and development programs, budgeting and auditing**

This section aims to give necessary skills and tools to undertake the gender analysis of health and development policies and programs and to help them to develop gender sensitive indicators and measures

#### **Reading List**

##### **Essential Readings :**

1. Basu, Alaka M., (1992): *Culture, The Status of Women and Demographic Behaviour*, Oxford University, New York.
2. Bhasin K. 1993. *What is patriarchy?*, Kali for Women Publishers, New Delhi.
3. Bhasin K. (2000). *Understanding Gender*, Kali for Women Publishers, New Delhi.
4. Dyson, Tim and Mick Moore, (1983). “On Kinship structure, female autonomy,

- and demographic behaviour in India”, *Population and Development Review* vol. 9(1), pp. 35-60.
5. Ellsberg Mary and Heise Lori L. (2005) *Researching violence against women: A practical guide for researchers and activists*. WHO and Path, Washington D.C.
  6. Folbre, Nancy. (1992). Improper arts: Sex in classical political economy. *Population and Development Review*. 18(1): 105-112.
  7. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): *Population Policies Reconsidered: Health and Empowerment and Rights*, Harvard University Press, Harvard.
  8. Jeffery Patricia and R. Jeffery. 1997. *Population Gender and Politics: Demographic change in rural north India*. Cambridge University, Cambridge.
  9. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, New York.
  10. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social Science Research*. Sage Publication, London.
  11. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economic and Social Affairs (Dept. of), New York
  12. World Health Organization. (1998). *Gender and Health. Technical paper WHO/FRH/WHD/98*. (Website: [www.who.int](http://www.who.int))
  13. World Bank. (1991). *Gender and Poverty in India*. World Bank, Washington.
  14. World Health Organization (2003): *Comparative Evaluation of Indicators for Gender Equity and Health*, Women and Health Programme, Centre for Health Development, Kobe, Japan.
  15. William Joan. 1989. Deconstructing Gender, 87 Michigan L Rev. 797. *Law Journal Article*

#### **Suggested Readings :**

1. Agnes, Flavia. (2000). *Law and gender inequalities: the policies of women's right in India*. Oxford, New Delhi.
2. Anker, R.(1997). *Gender and Jobs: Sex Segregation of Occupations in the World*, ILO, Geneva.
3. Balk, Deborah, 1997): “*Defying Gender Norms in Rural Bangladesh: A Socio demographic Analysis*”. *Population Studies* Vol.51, pp. 153-172.
4. Bandhopadhyay, D. 2000. Gender and governance in India. *Economic and*

- Political Weekly*. 35(3): 2696-269xxx).
5. Basu, Alaka Malwade. 2000. Gender in population research: Confusing implications for health policy. *Population Studies*. 54: 19-22.
  6. Das Gupta, Monica, 1987. Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1): 77-100.
  7. Doyal L.(1995) What Makes Women Sick: Gender and the Political Economy of Health. London, Macmillan.
  8. Dreze, Jean and Sen Amartya, (1995): *India: Economic and Social Opportunity*, Oxford University Press, New York.
  9. Harriet B. Presser, (1997): Demography, Feminism and the Science-policy Nexus, *Population and Development Review* Vol. 23(2), pp. 295-331.
  10. Jeffery, Roger and Basu, Alka M. (Eds.), (1996): *Girls Schooling, Women's Autonomy and Fertility Changes in South Asia*, Sage Publications, New Delhi.
  11. Jejeebhoy S. 1996. *Women's Education, Autonomy and Reproductive Behavior: Assessing what we have learned*. East West Centre, Hawaii.
  12. Reeves Hazel and Baden Sally (2000): *Gender and Development: Concepts and Definitions*, Report No. 55, Bridge (development- gender) Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK.
  13. Sonya, Andermahr, Lovell Terry and Wolkowitz, Carol, (1997): *A Glossary of Feminist Theory*, Arnold-Hodder Headline Group, London.
  14. Sopher, David, (1980). *An Exploration of India: Geographical Perspective on Society and Culture*, Cornell University New York

**MSP-E5.1****45 Hours**

## **ADVANCED STATISTICAL PACKAGES AND APPLICATION IN LARGE SCALE DATA**

### **Learning objectives:**

1. To comprehend the need for big data in monitoring and evaluation of health and population policies
2. To introduce national and international big data and guide students in managing these data
3. To familiarize students to survey softwares

### **Unit I: Scope of large scale surveys and big data**

Concept of big data, need for big data for planning and monitoring of public health programmes, introduction to large scale demographic and health surveys (DHS): NFHS, DLHS, WHO-SAGE, LASI-objectives, designs, instruments, sample size. Cleaning of big data- range and consistency checks, missing data, long and wide format conversion, merging files. Hands on exercise, Ethical considerations in large-scale sample surveys

### **Unit II: Software and Quality assurance procedures**

Introduction to STATA for survey data analysis-SVYSET, SVYTAB, SVYMEAN, SVYPROP, SVYTOTAL, SVYLC. Summarization of big DHS data, Conversion of ASCII and SPSS data into STATA format. Hands on exercise. Revisit of sub-samples, field check tables, non-response pattern, and quality lot assurance, roles of supervisors, editors, field and nodal agencies. Third party audit.

Introduction to R: reading ASCII file, data summarization: frequency and graphical representation, survey data summarization using R. Installation of libraries: sampling, survey, samplingbook, pps. Use of svydesign, svytotal, svymean.

### **Unit III: Use of STATA and R for sampling and estimates**

Sampling and estimation by simple random sampling, stratified, cluster, systematic and multi-stage sampling, PPS sampling using STATA and R.



## **Reading List**

### **Suggested readings:**

1. Lumley, T. Complex Surveys: A Guide to Analysis Using R
2. Damico, A. Step-by-step instructions to analyze major public-use survey data sets with the R language
3. Ladusingh, L. Survey Sampling Methods
4. Fares Qeadan. Sampling Methods Using STATA

**MSP-E5.2****45 Hours**

## **POPULATION, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT**

### **Learning objectives:**

This paper attempts to address the theoretical and empirical advancements and the strategies and concerns regarding population-environment-development linkages. After the successful completion of this paper, students will be able to:

- 1) Define the concept of sustainable development and explain how the idea of sustainability and development has changed over time.
- 2) Understand how the policies have evolved in line with the concept of sustainable development and population trends.
- 3) Critically examine the recent trends in sustainable development with specific focus on population changes.
- 4) Apply sustainable development concepts and policies to current population, environmental and developmental issues.

### **Modules**

#### **I. Sustainable development: Conceptual and Theoretical issues**

Importance of Studying Sustainable development; Meaning, Concepts and Definitions; Inter-linkages between ecology and development; Economic growth and ecological degradation; Indicators and processes involved in its achievement; Brundtland Report on Environment and development and agenda.

#### **II. Innovations for Sustainable Development**

Conventional perspectives on development; Critics of Conventional Development perspectives; Case studies based on experiences from developed and developing countries; How the concept of sustainability has influenced the policy, programme practice in development sectors

#### **III. Population-environment linkages**

Ecological and environmental dimensions of sustainable development; Approaches to environment; Gandhian approach, Marxian/Socialist

approach, Neo-classical approach, Market approach; Population growth and climate change; Population matters to sustainable development and environment (growth, age structure, spatial distribution)

**IV. Population and Quality of Life**

Quality of life: definition and measurement; Resource creation, management and distribution of water, air, housing, etc; Land, Cattle and open Space linkages; Sanitation, Health and health care; Education and Information.

**V. Environmental Degradation and Poverty**

Sustainable livelihoods; Population and common property resources; Population, poverty and vulnerability; gender dimensions; Grass-root perspectives – Environment-Development struggle; Development and displacement; Alienation of tribal; Tribal land encroachment; Forest Depletion; Case studies – Narmada and Vedanta (Orissa) Projects.

**VI. Environmental issues in the context of migration and displacement**

Regional Development; Green Movements; Chipko movement; Silent valley movements etc; Natural Calamities – Flood, Droughts, Landslide, Earth Quakes, Tsunami etc; Urbanization-new challenges- environmental health hazards (water or air pollution); Solid Waste Management; Rain Harvesting; Mobility and Patterns of settlement; Development and urban ecology; Slums, Urban Poverty and Rehabilitation.

**VII. Governance for Sustainable Development**

Issues related to natural resources management; Forest management; Mining of natural resources, Ground Water, River and Ocean Pollution; Different institutional arrangements for environmental protection and their limitations; Creating and managing emission related norms; Some success models of efficient environmental management – CNG, Smokeless Choolah, and other successful green models; The Challenges for International Environmental Governance; Emerging new institutions of environmental protection; Capacity Building, Technology Transfer for Sustainable Development.

**VIII. Population, Society and Sustainable development**

Population and resources; Human versus land ‘carrying capacity’; ‘Population stabilization’ to ‘Population balance’; Critiques of sustainable development

perspectives; Role of social institutions; Individual behavior in the context of social costs and benefits; Gender and environment; Indigenous population and traditional methods of environmental sustainability; Sociological approaches to sustainable development; Vulnerability of Indigenous population; Case Studies – Sacred forests, Anti-Eucalyptus movement

#### **IX. Contemporary issues**

Affluence and environment: How rich countries are also responsible for the sad state of affairs?; NGOs and Development issues; Civil society initiatives and involvement; International Agencies; Population and Biodiversity; Research Methods to examine Population, sustainable development and environment nexus.

#### **Reading List**

##### **Suggested Readings :**

1. Bongaarts, John. (1992). Population growth and global warming. *Population and Development Review*, 18: 299-319.
2. Bründtland, G.H. (1987). *Our Common Future: The World Commission on Environment and Development*, Oxford, Oxford University Press.
3. Clarke, John I. (1996): "The Impact of Population Change on Environment: An Overview." in Bernardo Colombo, Paul Demeny, and Max F. Perutz, (Eds.), *Resources and Population: Natural, Institutional, and Demographic Dimensions of Development*. Clarendon Press, Oxford, pp. 254-268.
4. Davis, Kingsley and Mikhail S. Bernstam (eds.) (1991), *Resources, Environment, and Population: Present Knowledge, Future Options*. New York: Oxford University Press.
5. Dawson, P. J, and R. Piffin, (1998), Is there a long run relationship between Population growth and living standards? The case of India, *Journal of Development Studies*, 34. 149-156.
6. Demeny, Paul. (1989). Demography and the limits to growth. In Michael S. Teitelbaum and Jay M. Winter (eds), *Population and Resources in Western Intellectual Traditions*. Supplement to *Population Development Review*. New York: Population Council.
7. Diana Liverman, Emilio F. Moran, Ronald R. Rindfuss, and Paul C. Stern, (Eds). (1998): *People and Pixels: Linking Remote Sensing and Social Science*. Committee on the Human Dimensions of Global Change, Commission on

- Behavioral and Social Sciences and Education, National Research Council, National Academy Press: Washington DC.
8. Dietz, Thomas and Eugene A. Rosa.(1997): "Effects of population and affluence on CO<sub>2</sub> emissions." *Proceedings of the National Academy of Sciences*. Vol. 94l pp. 175-179.
  9. Government of India (1999): *Silent Revolution for Environmental Conservation*, Ministry of Environment and Forests, New Delhi.
  10. Guha, Ramachandra and Martinez-Alier,J ( 1998): *Varieties of Environmentalism*, Oxford University Press, New Delhi.
  11. Hardin, Garrett.(1968): "The Tragedy of the Commons." *Science*. Vol. 162, No. 13, reprinted in Rex R. Campbell and Jerry L. Wade, (Eds), *Society and Environment: The Coming Collision*. Allyn and Bacon, Inc: Boston, MA, pp. 1243-1248.
  12. Harris, J.M. (2004) *Basic Principles for Sustainable Development*, Global Development and Environment Institute, working paper 00-04.  
(Available at [http:// ase.tufts.edu/gdae/publications/Working\\_Papers/Sustainable% 20 Development.PDF](http://ase.tufts.edu/gdae/publications/Working_Papers/Sustainable%20Development.PDF)).
  13. Holdren, J. P., and P. R. Ehrlich.( 1974). Human population and the global environment. *Am. Sci.* 62: 282-292.
  14. Kem, R., Parto, S. and Gibson, R.B.(2005). Governance for Sustainable Development: Moving from theory to practice, *The International Journal of Sustainable Development*, 8(1/2), 12-30.
  15. Keyfitz, N. (1991). Population and development within the ecosphere: one view of the literature. *Population Index*, 57: 5-22.
  16. Lafferty.W. (ed.) (2004). *Governance for Sustainable Development. The Challenge of Adapting form of Functions*, Cheltenham: Edward Elgar, (chapter 1 and 11).
  17. Lutz, Wolfgang, A.Prskawetz and W.C.Sanderson (eds.) (2002). *Population and Environment: Methods of Analysis*. Supplement to Population and Development Review. New York, Population Council.
  18. McNicoll, Goefferey.( 2005). *Population and Sustainability*. Working paper No.205. New York, Population Council.
  19. Pebley, Anne R. (1998): "Demography and the Environment." *Demography*. Vol. 35, No. 4; pp. 377-389.

20. Pimental, David, et al. (1999). Will limits of the Earth's resources control human numbers? *Environment, Development and Sustainability* 1: 19-39.
21. Preston, Samuel H. (1994). *Population and Environment: From Rio to Cairo*. Liège: International Union for the Scientific Study of Population (IUSSP).
22. Simon, Julian L. (1996). *Population Matters: People, Resources, Environment, and Immigration*. Transaction Publishers: New Brunswick, NJ.
23. UNFPA (2009): *State of World Population- 2009: Facing a changing world: Women, Population and Climate*, UNFPA, New York.
24. Zelezny, Lynnette C., Poh-Pheng Chua, and Christina Aldrich (2000): "Elaborating on Gender Differences in Environmentalism." *Journal of Social Issues*. Vol. 56, N. 3; pp. 443-457.

## **SEMESTER -VI**

**MSP-C11****60 Hours****POPULATION POLICIES, PROGRAMME AND  
EVALUATION OF HFW PROGRAMME****Learning objectives:**

The objective of this course is to learn how the Government interventions in the form of policies and programmes can affect population trends. The course discusses history of population policies, and different policies across the world. After this, the course focuses on the evolution of India's population policies and programmes. It also covers other policies aimed at specific groups like youth, aged and women.

The course also covers India's population and health programmes, and the methods of the programme management.

After introducing to family welfare programmes, this course introduces to the evaluation of these programmes, with more focus on the evaluation of fertility impact of family planning programmes.

At the end of this course students are expected to have overview of India's population policy and programmes. They are in a position to undertake evaluation studies under the supervision of senior programme personnel. They are expected to be able to chalk out framework for evaluation of any programme in the field of health or population and implement it with the support from senior personnel.

**I. POPULATION POLICIES AND PROGRAMMES**

Definition of Population Policy; principal features of a population policy; policies in the context of population growth, structure and distribution. Policy formulation: Policy indicators, justification of population policy, socio-cultural, political and ethical issues related to population policy and the mechanism of how government decisions influence family decisions.

Role of the United Nations, and other International agencies; U.N. World Population Conferences: Bucharest (1974) and Mexico (1984), and Cairo (1994) the World Population Plan of Action in different countries.



Fertility influencing policies: pro-natalist policies, fertility control policies- direct and indirect. Policies and programmes for special groups: women and children, youth and aged.

Health influencing policies: historical perspective for policies and programmes in developing and developed countries. The Alma Ata Declaration and Health for all by 2000 A.D.

National health and family planning programmes: CNA, RCH, National Population Policy 2000, National Health Policy 2002, and National Rural Health Mission 2005.

## **II. POPULATION AND PROGRAMME MANAGEMENT**

Reproductive Health Programme Management Strategies; Strategic management approach, Targeting the people in need; Marketing approach, client segmentation; community needs assessment; unmet need approach, and health seeking behavior. Providing services; commercial distribution, community based distribution (CBD) systems and social marketing.

Programme design: Management Information System (MIS), structural interventions, management training, organization development (OD).

Quality of Care in Reproductive Health Programme: A Management Perspective: Definition and importance of quality of care. Framework of quality of care in family planning.

## **III. EVALUATION OF FAMILY WELFARE PROGRAMME**

What is evaluation of the programme, objectives of the evaluation. Types of evaluations. Frame-work for the evaluation of the programmes.

Types and levels of indicators in FW programme evaluation. Discussion on Methodological Issues in different evaluation studies in India. Data requirements for the evaluation of programmes. Role of service statistics and surveys as sources of data.

Family Welfare service statistics.

Management Information System (MIS) with special emphasis on Indian FW programme, Role of MIS in evaluation of the programmes.

Operation Research Technique (ORT) in evaluation.

Economic evaluation of the programmes, Cost- effectiveness studies.

SWOT Analysis.

Natural fertility, Potential fertility, Contraceptive Prevalence Rate, Use effectiveness of family planning methods, Unmet need for family planning, Wanted and unwanted fertility, Bongaarts' implementation index.

Fertility impact of Family planning programme. Bongaarts' model for estimating fertility impact.

### **Reading List**

#### **Suggested Reading :**

1. Chrissie, P. and Selwyn S. T. Leger, (1993): *Assessing Health Need Using Life Cycle Framework*, Open University, Buckingham.
2. Peabody, J.W.; Rahman, H. Omar; Gertlor, Paull, J.; Haan, Joyce, (1999): *Policy and Health Implication for Development in Asia*, Cambridge University Press. Cambridge.
3. Peters, David H. Yazbeek Abdo S.; Sharma, Rashmi R.; Ramana G.N.V., (2002): *Better Health Care Systems in India*, World Bank, Washington D.C.
4. Stephen, Chee, William, J. House and Laurie Lewis, (1999): "Population Policies and Programmes", in Post- ICPD Era: "Can the Pacific Island Countries Meet the Challenges" *Asia Pacific Journal*; United Nations, New York.
5. UNESCAP, (1988): *Asia Pacific Population Policies and Programmes; Future Directions*, New York.
6. United Nations, (1974): "World Population Plan of Action", *Studies in Family Planning*, 5(12).
7. United Nations, (1998): *National Population Policies*, Department of Economics and Social Affairs, New York.
8. World Health Organization, (1978): "Primary Health Care", International Conference on Primary Health Care, Alma Ata, USSR, 6-12, September.

## **POPULATION AGING AND HEALTH TRANSITION**

### **Learning objectives:**

- 1) To impart knowledge of concepts and theoretical framework relating to demography of ageing, and health, social and economic dynamics of population ageing
- 2) To impart concepts and theories of health transition, linkage between health transition and ageing transitions
- 3) To develop skills to analyze trends, determinants and consequences of population ageing
- 4) To build capacity to understand and use theoretical and empirical advancements to develop strategies, policies and programmes to meet challenges of population ageing and plan for health care and social and economic wellbeing of ageing population.

### **I. Demography of Ageing:**

- a. Concepts and measures of population ageing; components of population ageing; Inter-relationship between population ageing, fertility, mortality and migration; population ageing and momentum of population growth, age structure transition and ageing, and declining population.
- b. Population ageing trends and patterns in developed and developing countries; Factors determining ageing trends and patterns; Projected trends and pattern of population ageing; global and regional perspective.
- c. Population ageing trends, patterns and determinants in India; state variations; future scenario of population ageing in India and states.

### **II. Life Course Perspective and Social Dynamics of Ageing:**

- a. Life course perspective of population ageing; Age and Ageing, Ageism; Social Status and Roles of Elderly, Family Structure, Intergenerational relations, Kinship and family support, Social Security; Social network-Frameworks (Berkman and others) and measurement.
- b. Living Arrangements of Elderly, Old Age Homes, Social Networks, and

Contribution of elderly: “Feminization” of Ageing, Dependency, Gender Dimensions and Discrimination, Widows, Elderly abuse, Social and legal Vulnerability, Legislations to protect elderly in India.

### **III. Health Transition:**

Understanding Health Transition and Ageing Transition; Critiques of “Health Transition” and “Epidemiological Transition” theory: Mortality and Morbidity Compression, Age Patterns of Mortality and Morbidity; Global burden of disease, communicable diseases, injuries and violence; Health Transition and emergent infectious diseases; social epidemiology and medical social determinants of health as fundamental causes of chronic disease; social determinants of health; the relative income hypothesis and the social gradients of health for ageing population: Healthy Ageing; WHO Framework for Healthy Ageing.

### **IV. Ageing and Health:**

- a. Ageing and Life Expectancy: ageing and life expectancy; changing age pattern of mortality, oldest old mortality; ageing and epidemiological transition in disease prevalence and patterns; Measuring population health; life expectancy and
- b. Ageing and Burden of Disease: Measurement issues in assessing burden of chronic and multiple diseases in ageing populations; Self-Reported Prevalence, Symptom based prevalence; Measured Prevalence; burden of non-communicable diseases, dual burden of communicable and non-communicable in developed and developing countries; injuries and violence Indian scenario; Ageing, Intrinsic Capacity and Biomarkers of Ageing.
- c. Ageing and Functional Health: Ageing and disabilities; trends and prevalence; ageing and injuries, ageing and functional health on various domains- mobility, self-care, pain, vision, interpersonal activities, sleep and energy; Ageing and Quality of Life, WHOQol Ageing and Disability; WHODAS; Ageing and wellbeing and Life satisfaction.
- d. Ageing and mental health problems; cognition, memory loss, dementia and depression; Alzheimer’s and Parkinson.
- e. Ageing and health risk factors: nutrition, diet and food practices; health risk behaviour- tobacco, alcohol; physical activities; Access to minimum living conditions (sanitation, water).

**V. Health Care System for Geriatric Care and Health Financing:**

- a. Availability and accessibility to geriatric care, Geriatric Health Care Institutions; Human Resource Development for Geriatric Care; institutional care; Long-term Care; Health Systems Inequalities for Addressing NCDs.
- b. Ageing, health care and health financing: health care utilization, public and private health services utilization; outpatient and inpatient health care utilization; sources of health spending; out of pocket health expenditure; lack of health care options for elderly; Health induced impoverishment among elderly.

**VI. Population Ageing and Economic Conditions:**

- a. Population Ageing and Labour Force: Implications of population ageing on labor force, Retirement and work participation among elderly; occupational distribution among the elderly.
- b. Ageing and Public Finance: Ageing, savings and investment; pressures on public finance - government health expenditure; implications for health insurance and health financing for elderly, Implications for Government expenditure for social security – pension, social support and housing; The Solow model with an ageing population, Becker’s family model; Bloom and Williamson’s model; ageing and poverty; Ageing, health and development.

**VII. Ageing Policies and Programmes:**

- a. Social and Economic Support Policies and Programmes for the Elderly- Retirement, Pensions and Social care Policies in developed and developing countries. Social security and welfare policies and programmes for elderly in India. National Programmes for Health Care of Elderly (NPHCE); National Policy for Senior Citizens.
- b. Organizations Engaged in Wellbeing of Ageing Populations: Helpage International, Dignity Foundation, Age in Action, Age International, Alliance for Aging Research, Alzheimer’s Disease International (ADI), The Parkinson Alliance, Geriatrics Societies and Gerontological Associations; Age –friendly world: environment, security and health care.
- c. Worldwide Longitudinal Ageing Studies in 40 countries: LASI, SAGE, SHARE, HRS, CHARLS, JSTAR, ELAS, KLoSHA

## Reading List

### Suggested readings :

1. World Health Organization (2015), *WHO Report on Ageing and Health*, WHO, Geneva.
2. United Nations (1994), *Ageing and the Family*, United Nations, New York
3. United Nations (1998), *Economic and Social Implications of Population Ageing*, Department of International Economic and Social Affairs, UN, New York.
4. United Nations (2001): *Living Arrangements of Older Persons: Critical Issues and Policy Responses*. Population Division, Department of Economic and Social Affairs, Special Issue Nos. 42/43, 2001, New York.
5. UNFPA, 2001, *Population Ageing and Development: Social, Health and Gender Issues*, United Nations, Malta.
6. Bloom, D.E., D. Canning, et.al. (2002): *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. Santa Monica, CA, RAND.
7. Bose, A.B. (2006). *Social Security for the Old*. New Delhi: Concept Publishing Company.
8. Linda J. Waite (ed.) (2004) *Aging, Health, and Public Policy: Demographic and Economic Perspectives*, Supplement to Population and Development Review
9. Irudaya Rajan, (2007) *Social Security for the Elderly Experiences from South Asia*, Routledge, New Delhi.
10. Prskawetz, Bloom, and Lutz, eds., 2008 *Population Aging, Human Capital Accumulation, and Productivity Growth*, A Supplement to Population and Development Review.
11. Sandra Gruescu, (2006), *Population ageing and economic growth*. Physica-Verlag
12. Heslop A (1999), *Ageing and Development*, Social Development Working Paper: 3, Help Age International.
13. M. Alam (2004). Ageing, old age income security and reforms: An exploration of Indian situation. *Economic and Political Weekly*, 39(33): 3731-3740.
14. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), *Age-structural transitions: challenges for development*. Paris: CIRCRED.
15. Berman, Lisa (2000) "Social Support, Social Networks, Social Cohesion and Health" *Social Work in Health Care* [http://dx.doi.org/10.1300/J010v31n02\\_02](http://dx.doi.org/10.1300/J010v31n02_02).

## OPERATION RESEARCH IN REPRODUCTIVE HEALTH

- I. Introduction:** What is Operations Research: History, OR in Social Sciences and Health Sciences, Need; Focus and Objective of Operations Research; Types and Recent examples of Operations Research; Successful Examples in Developing and Developed world-(Presentations)
- II. Researchers and Managers-Interface and Roles:** Managers at Different Level (who are those managers); Researchable and Non-researchable problems, Researchers' Role and Responsibilities.
- III. Components of OR Proposal:** Problem statement, Strategies selection, operation definition, Intervention description and design, Sampling, Ethical issues, Data collection and analysis, Utilization, Dissemination and Up-scaling possibilities.
- IV. Identification of Problem and Solution:** Identification and definition, Justification, Alternative Solution, Indicators-Input, Process, Outputs, Outcomes and Impacts, Exercises based on actual situation, Contemporary OR problems
- V. Causality (Randomize Experimental Design):** Random assignment, Matching, Validity, Threat to Validity, Reliability, Pretest-Post test Control Group Design, Post test-only Control Group Design, Multiple Treatment Design, RBD, LBD and Treatment Effects, Preparing a Report on Design used in a few contemporary OR studies
- VI. Quasi/Non-Experimental Design:** Non-Experimental Control Design; Time Series, and Before and After Design, Examples in Different real Situations)
- VII. Inferential Statistics in Operations Research:**  $X^2$ , t, F, z-tests, ANOVA and MANOVA, Deciding Sample Size in case of Different Experimental Design, Linking Different, Design and Statistical Test

- VIII. Monitoring and Evaluation in Operation Research:** Monitoring and Evaluation in OR (Baseline, Concurrent and Endline), Logical Framework Approach, Results Based Management, Examples.
- IX. Study Design Exercises:** Example of different OR studies and discussion on them
- X. Ethics in Operations Research:** Principles of Research of Ethics, ICMR Guidelines, International Perspectives, NIH-Study Material Case Studies
- XI. Utilization and Dissemination:** Conceptual Framework of Utilization, Identifying audience, Developing Media Kit and Policy Brief, Dissemination-Academic and Non-academic activities, Conducting Mock Disseminations Interaction with managers (local Mumbai or peripheral areas), Field Report Preparation and submission

### **Reading List**

#### **Essential Readings :**

1. Brandeau L. Margaret et. al. 2004. Operation Research and Health Care: A Handbook of Methods and Applications, Kulwer Academic Press.
2. Fisher, Andrew A., James R. Foreit, J. Laing, J. Stoeckel and J. Townsend 2002: Designing HIV/AIDS Intervention Studies-An Operations Research Handbook, Population Council, New York.
3. Foreit, James R. and Tomas Frejka 1998: Family Planning Operations Research- A Book of Reading, Population Council, New York
4. Rossi, P.H. et.al. (1993). Evaluation: A Systematic Approach, Sage Publications, London
5. Kish, Leslie 1965: Survey Sampling, New York, John Wiley and Sons.



## MONITORING AND EVALUATION IN POPULATION & HEALTH

- I. Introduction to Monitoring and Evaluation:** Basic concepts, Difference between Monitoring and Evaluation; Linkage between Planning, Monitoring and Evaluation; Importance of Monitoring and Evaluation
- II. Monitoring and Evaluation Framework:** Resources for monitoring and evaluation, Engagement of stakeholders in monitoring and evaluation; Meaning of Indicators, Ideal requirement, process of developing indicator, illustration of indicators developed from large scale surveys, measurement, need & levels of indicator; Challenges in developing indicators from Large-Scale Surveys; Types of Indicators – Input, Process, Output, Outcome, Impact; Capacity building for monitoring and evaluation
- III. Monitoring of Policy Implementation:** Components of policy and programme, budget, staff, process of evaluation, developing tangible indicators for policy monitoring in terms of Input, Process, Output, Outcome, Impact; Result based inference
- IV. Evaluation Design:** Determination of sample size under different approaches and design including measurement of change due to certain interventions; Quasi Experiment design, Case control design, Evaluation Terms of Reference-Formative and Summative Evaluations, Managing Evaluations; Evaluation at different points: Baseline, Mid-point, Concurrent and End line evaluation; Evaluating for results: Need and Uses of evaluation, Principles, norms and standards for evaluation; Roles and responsibilities in evaluation; Randomization, Statistical design of Randomization; Randomized control trials, time dependant cluster design, interrupted time series analysis.
- V. Assuring the Quality of Evaluation Design and Methodology:** Overview; Defining the context; The evaluation purpose; Focusing the evaluation; Evaluation methodology; Mandatory requirements for programme; SWOT

analysis of NHM, ICDS and National Livelihood Mission; Social audit – meaning, objectives, advantage, case study of social audit

**VI. Statistical Approaches of Evaluation of Intervention Programme:** Statistical inferences used in different intervention design – z, t, F and paired ‘t’ tests, two stage LSM, instrument variable method; Propensity score matching; Difference in Difference Method: Theory and application, advantage and disadvantage, regression implementation

**VII. Management Information System and Use of Technology:** MIS – Monitoring information system; Role of programmers; HMIS system; Global Positioning System and use of other technology

### Reading List

#### Suggested reading :

1. Casley, Dennis J and Kumar, Krishna (1988). *The Collection, Analysis, and Use of monitoring and Evaluation Data*. A World Bank Publication, The John Hopkins University Press
2. FHI (2004). *Introduction to Monitoring and Evaluation Monitoring and Evaluation, monitoring hiv/aids programs: A facilitator’s training guide*. Family Health International
3. GoI & UNDP (2012). *Guiding Framework for Monitoring and Impact Evaluation of Capacity Building & Training of Panchayati Raj Institutions in States/UTs*. Government of India and United Nation’s Development Programme
4. IFRC and RCS (2002). *Handbook for Monitoring and Evaluation*. International Federation of Red Cross and Red Crescent Societies –Geneva
5. NIRD&PR; MoRD and TISS (2016). *Social Audit: A manual for Trainers*. National Institute of Rural Development & Panchayati Raj; Ministry of Rural Development and Tata Institute of Social Sciences
6. Rossi, Peter H.; Mark W. Lipsey and Howard E. Freeman (2004). *Evaluation, A Systematic Approach*. Seventh Edition. Sage Publications – New Delhi.
7. Sullivan, T.M., Strachan, M., and Timmons, B.K. (2007). *Guide to Monitoring and Evaluating Health Information Products and Services*. Baltimore, Maryland: Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health; Washington, D.C.: Constella Futures; Cambridge, Massachusetts: Management Sciences for Health, 2007

8. UNDP (2009). *Handbook on planning, monitoring and evaluating for development results*. United Nations Development Programme - New York
9. UNESCO (2014). *Monitoring and Evaluation Guidance for School Health Programs: Thematic Indicators*. United National Educational, Scientific and Cultural Organization.

*Coordinators of MA/MSc course*

<b>Year</b>	<b>Coordinators</b>
2009-11	Dr. P.K. Murthy
2011-13	Dr. H Lhungdim
2013-15	Dr. S Mohanty and Dr. Manas R Pradhan
2015-17	Dr. Chander Shekher and Dr. Aparajita Chattopadhyay
2017-19	Dr. Aparajita Chattopadhyay and Dr. Dipti Govil



MA/MSc Students: 2015-17



**INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES, MUMBAI  
59 th CONVOCATION**



**International Institute for Population Sciences**

**(DEEMED UNIVERSITY)**

BSD Marg, Deonar, Mumbai 400 088.

Website: <http://www.iipsindia.org>

Capacity Building for a Better Future

# **RULES, REGULATIONS AND SYLLABUS M.SC. IN BIOSTATISTICS AND DEMOGRAPHY**



**International Institute for Population Sciences  
(DEEMED UNIVERSITY)**

Deonar, Mumbai 400 088.

Website: <http://www.iipsindia.org>

## **About the Institute**

The International Institute for Population Sciences (IIPS), formerly known as Demographic Training and Research Centre (DTRC), was established at Mumbai in July 1956 with joint collaboration of the United Nations Population Fund (UNFPA), Government of India and Sir Dorabji Tata Trust to serve as the regional institute for training and research in population studies for the countries of Asia and the Pacific region, functioning under the aegis of the Ministry of Health and Family Welfare, Government of India. IIPS is the only institute of its kind in the world exclusively devoted to teaching and research in population and health issues.

In 1985, the institute became a Deemed to be University (u/s 3 of the UGC Act of 1956). In 2006, the institute celebrated its Golden Jubilee, to mark 50 years of glorious existence. The institute has been the hub of population and health related teaching and research in India. IIPS plays a vital role for planning and development of the country by generating valuable health and development indicators at the district and state levels through nationwide large-scale sample surveys at regular interval, funded by the various ministries of Government of India, the UN agencies and other development partners. By 2016, the institute has trained 3,515 students through various courses of which 2,836 were from India and 679 from 41 countries. The alumni are occupying prestigious positions in national and international research organizations, universities, development agencies and non-governmental organizations and created a brand value for the Institute.

## **Learning Objectives**

The Master of Science in Biostatistics and Demography will provide students' knowledge and understanding of modern statistical demographic and epidemiological methods. The students will learn about their application in all areas of public health, health, demography, and social sciences aimed at understanding and improving human wellbeing. The course offers a thorough grounding in modern epidemiological research and the application of statistical methods to epidemiological investigation and practice. Students will be given the opportunity to apply research techniques to a variety of challenging epidemiological and biomedical problems. The course also aim at providing students scope for professional development in understanding and use of statistical software packages including SPSS, STATA, SAS, MLWin, GIS and R. In the second year of the course students shall write a dissertation on the basis of contemporary applications of epidemiological and statistical methods and statistical softwares in public health, health and demography. Opportunities are given to develop presentation and consultancy skills which are much valued by employers.

In India, there is a serious shortage of biostatisticians, demographers and epidemiologists trained to Master's level, which is the entry level to a broad range of employment sectors including the pharmaceutical industry, medical research and health services. The aim of this Master's course is to equip students with the required knowledge to follow careers in these areas. The Master of Science in Biostatistics and Demography shall also be gateway to further pursue Ph.D.



### **Expected Outcomes of M.Sc. Biostatistics and Demography**

On completion of two years Master of Science in Biostatistics and Demography the passing out students shall be able to:

- design, analyse, interpret and criticise demographic, epidemiological, health and public health research
- demonstrate an understanding of the essential principles of modern biostatistical methods and statistical softwares and how to apply them
- employ basic mathematical and computational skills used in the analysis of population, disease pathogenesis, transmission and control
- undertake original research projects that makes a contribution to the body of knowledge for human wellbeing
- exhibit the ability to disseminate research findings to the scientific community and the general public
- prepare Statistical Analysis Plan (SAP)
- undertake analysis of clinical trials

### **Eligibility for admission and selection procedure**

Candidates with a Bachelor's degree from recognized universities in India or abroad in core subject of Mathematics or Statistics or with at least two full papers of Mathematics or Statistics with a minimum of 55% marks or equivalent grade will be eligible for admission to the above programme. Candidates awaiting results of qualifying examination latest by 30<sup>th</sup> September of the admission year can also apply for consideration. The upper age limit is 25 years as on 30<sup>th</sup> June of the admission year. Marks and age are relaxable for candidates belonging to reserved categories as per GOI rules.

### **Selection Criteria for the M.Sc. in Biostatistics and Demography Program**

The selection will be made on the basis of online admission test.

### **Number of Seats and Award of Degrees**

There are 50 seats available with the Government of India fellowship.

### **Fellowships**

There are 50 Government of India Awards (Fellowships of Rs. 5000/- per month) available for M.Sc. in Biostatistics and Demography programme. There are no other allowances.

### **Duration of the Course**

The M.Sc. in Biostatistics and Demography programme, which is of two academic years comprises four semesters, begins from the second week of July. The first semester ends in the month of November. The second semester starts in the last week of November and ends in month of May next year. The third semester begins again in the month of July and ends in the month of May next year completing of fourth semester.

### **Conditions for the Award**

- a) M.Sc. in Biostatistics and Demography programme is a full time course. The student shall not accept or hold any appointment paid or otherwise or receive any emoluments, salary, stipend, etc., from any other source during the tenure of the award.
- b) The student should also obtain prior permission of the Director in writing for appearing at any examination conducted by any other University/Institution.
- c) The fellowship will be available from the onset of the course till the end of the course.
- d) The fellowship may be terminated at any time if the Institute is not satisfied with the progress or conduct of the student.
- e) The student will have to execute a bond requiring him/her to refund the fellowship received by him/her, if the fellow discontinues before the end of the prescribed period. The condition of the bond cannot be waived or relaxed except by the Director with the consent of the Executive Council of the Institute.
- f) If a student's performance in the first semester is not found satisfactory, or his/her conduct is found unsatisfactory on the basis of indiscipline of any act as is likely to undermine the prestige of the Institute, or endanger harmony of academic life of the Institute or is likely to violate the rules of the institute, his/her admission and fellowship will be terminated without any further notice. In case the fellowship is terminated, he/she will be required to refund the whole of the fellowship money drawn till that date provided the action against him/her has not been contemplated on the ground of unsatisfactory performance as stated above.
- g) Fees: The candidates admitted to the programme will have to pay the fees as per schedule of the Institute on 1<sup>st</sup> January and 1<sup>st</sup> July every year regularly. For payment of fees, a grace period of 30 days shall be given without late fee. Thereafter, 5% on all dues will be charged extra as late fee, every month.

### **Hostel Accommodation**

Double/triple seated accommodation in the hostel of the Institute will be provided to the students at the applicable rate, subject to availability.

### **Medical Facilities**

The students of the Institute will have access to free medical advice from the medical officers of the Institute.

### **Leave**

A student can take leave for a maximum of four working days in a semester on the recommendation of Course Co-ordinator and granted by the Director.

### **Attendance**

- (1) Minimum of 95 percent of attendance in classes is compulsory to receive full fellowship.
- (2) Minimum of 75 percent of attendance in classes is compulsory to appear in exams.

### **Dissertation**

A student is required to write a dissertation on some demographic or health or related problems under the guidance of a faculty member. The topics of the dissertation have to be submitted at the beginning of the Forth Semesters. The dissertation will be presented in formal seminar of the students and faculty members of the Institute. The content and presentation and participation in the seminar shall be subjected to assessment by a committee comprising of faculty members.

### **Evaluation**

Grades obtained in all the subjects counted for determining the overall grade for M.SC. in Biostatistics and Demography programme. Minimum Grade required for passing is “P (Pass) in each unit.

### **Grading System**

The following ten points grading system is followed in the Institute:

Letter Grade	Numerical Value	Qualitative Level	Equivalent % of marks
O	10	Outstanding	85-100
A+	9	Excellent	75-84.9
A	8	Very Good	65-74.9
B+	7	Good	55-64.9
B	6	Above Average	50-54.9
C	5	Average	45-49.9
P	4	Pass	40-44.9
F+	3	Fail	30-39.9
F	2	Fail	20-29.9
F-	1	Fail	0-19.9
Ab	0	Absent	-

- i) A student obtaining Grade F will be considered failed and will be required to reappear in the examination.
- ii) The teacher concerned will set the question paper and also evaluate the answer books as per grading pattern.
- iii) A final grade for each paper will be arrived by taking weighted average of grades given in different sections of the paper in case of questions of unequal weights. The weights can be given in proportion to the credit (i.e. number of hours) assigned for each section of the paper.
- iv) Overall Grade will be arrived on the basis of the number of credit hours and grade points for each subject.
- v) A student securing an overall average grade points (OAGP) of less than “P (Pass)”, i.e., “Grade F” will not be eligible for the award of the degree.

### **Written Examination**

Written examination will be conducted for all courses.

### **Re-evaluation of Answer Sheets**

- i) A student can have access to his/her examination papers in the form of photo copies at a cost of Rs. 200/- per paper with prior approval of the Director.
- ii) A candidate shall apply for revaluation of his/her answer sheet on the prescribed form to the Director of the Institute within three weeks from the date of declaration of the result along with the non-refundable fee of Rs. 500/- only per paper.
- iii) No application for revaluation will be entertained unless a photocopy of the statement of marks in the examination concerned is enclosed to the application.
- iv) The result of the revaluation of a candidate's answer-book(s) shall be binding on him/her and that he/she shall accept the revised marks as final.
- v) If a candidate, whose answer-book(s) have been reassessed, becomes eligible for any prize or any other award, the same shall be granted to him/her and the award previously made shall be cancelled. If as a result of revaluation, a candidate becomes eligible for the provision of a condonation of deficiency, the same shall be given to him/her.

**Re-examination**

- (1) Re-examination will not be conducted during the course period.
- (2) Those students who fail or could not appear in any examination will be allowed to re- appear in a paper in the next semester examinations.
- (3) Those failing in any exam of final semester will not be awarded the degree in the same academic year. They can appear in the re-examination along with first semester of the next batch.
- (4) Maximum of three attempts will be allowed including the first appearance in each paper.
- (5) There will not be any down grading in re-examinations.
- (6) 50 Percent of clearance of the total papers in each semester is compulsory to continue the study in next semester.

**Course Structure of Master of Science in Biostatistics and Demography (MBD)  
as per UGC Choice Based Credit System (CBCS)**

<b>SEMESTER I</b>		
<b>Paper Code</b>	<b>COURSE TITLE</b>	<b>No. of credits</b>
MBD-F1	Basics of Human Biology	2*
MBD-C1	Introduction to Demography and History of Population	4
MBD-C2	Demographic Methods I	4
MBD-C3	Introduction to Biostatistics & Epidemiology	4
MBD-E1	MBD E-1.1: Healthcare Systems and Policies	3
	MBD E-1.2: Basic concepts of Sociology, Psychology and Anthropology	3
	<b>Semester Credits</b>	<b>15</b>
<b>SEMESTER II</b>		
MBD-C4	Demographic Methods II	4
MBD-C5	Epidemiological Methods	4
MBD-C6	Research Methodology	4
MBD-E2	MBD E-2.1: Historical Demography	3
	MBD E-2.2: Spatial Demography	3
MBD-E3	MBD E-3.1: Urbanization, Space and Planning	3
	MBD E-3.2: Large-scale Sample Surveys	3
MBD-F2	Application of Statistical and Demographic Packages I	3*
MBD-V1	Viva-voce	2
	<b>Semester Credits</b>	<b>20</b>
<b>SEMESTER III</b>		
MBD-C7	Sampling Techniques in Health & Demographic Surveys	4
MBD-C8	Applied Multivariate Analysis	4
MBD-E4	MBD E-4.1: Concepts and Measures of Global Health	3
	MBD E-4.2: Gender, Development and Health	3
MBD-E5	MBD E-5.1: Population Ageing and Health Transition	3
	MBD R 5.2: Population, Environment and Sustainable Development	3
MBD-C9	Application of Statistical and Demographic Packages II	4
MBD-C10	Demographic Models and Indirect Methods of Estimation	3
	<b>Semester Credits</b>	<b>21</b>
<b>SEMESTER IV</b>		
MBD-C11	Survival Analysis	4
MBD-C12	Methods in Clinical Trials	4
MBD-E6	MBD E-6.1: Health Economics and Financing	3
	MBD E-6.2: Operations Research	3
	MBD E-6.3: Monitoring and Evaluation	3
MBD-S1	Seminar Series	S*
MBD-D	Dissertation	10 <sup>\$</sup>
MBD-V2	Viva-voce	2
	<b>Semester Credits</b>	<b>23</b>
	<b>Total credits</b>	<b>79</b>

\*Not counted for calculating the final grade

F – Foundation course, C – Core course, E – Elective course, S- Skill enhancement course, V-Viva voce, D – Dissertation.

Semester I: One elective may be opted by the student

Semester II: Two electives may be opted from each shaded groups

Semester III: Two electives may be opted from each shaded groups

Semester IV: One elective may be opted

Core courses: 72%; Elective courses: 28%

Core papers cannot be changed. Elective paper can be changed if the student fails in an elective paper and submits his/her request for a change in writing.

\$ Evaluation procedure for dissertation: Guide - 0.25, Presentation & Defense – 0.25, Content – 0.50. The grade for 'presentation & defense must also be given independently by each member, and submitted to the controller of examinations independently. For content evaluation, the director may appoint a three-member committee for each dissertation. The three members should independently evaluate the dissertation and independently submit the grades to the controller of examinations.

# Foundation Courses

<b>MBDF1</b>	<b>Basics of Human Biology</b>	<b>30 Hours</b>
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Introduction to human Biology; Human life cycle; Definition & structure of cell, tissue structure & type

Anatomy and physiology of human organ and organ related diseases - Digestive system; Respiratory system; Cardiovascular System; Lymphoid & haemopoietic system (circulatory); Nervous & the special senses; Muscular and Skeletal system; Excretory System; Urinary system; Reproductive System (Female and Male)

## **Essential Reading List**

1. Guyton Arthur C., 1991, Textbook of Medical Physiology, A Prism Book Pvt. Ltd. Bangalore
2. Horton Casey, 1994, Atlas of Anatomy, Marshall Cavendish Books, London
3. W.Gordon Sears, Robert S. Winwood and J.L. Smith, 1985, Anatomy and Physiology for Nurses and Students of Human Biology, Education Academic and Medicinal Publishing Division of Hodder and Stoughton, London.
4. Keele, Neil et.al, 1991, Samson Wright's Applied Physiology, Oxford University Press, Delhi.

<b>MBDF2</b>	<b>Application of Statistical and Demographic Packages I</b>	<b>45 Hours</b>
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Introduction to SPSS-facilities, creating database structure, data entry, specifying scales, validation of data entry, importing and exporting data.

Data manipulation using SPSS – recoding creating new variable, sorting, filtering and selection of specific data, generating simple frequencies, use of syntax editor.

Introduction to STATA -facilities, creating database structure, data entry, specifying scales, validation of data entry, importing and exporting data.

Data manipulation using STATA – recoding creating new variable, sorting, filtering and selection of specific data, generating simple frequencies, use of syntax editor.

Correlation and regression analysis – interpretation and regression diagnostic test, Survey analysis – estimation of mean, proportion

Introduction to GIS and illustration

Basics of MORTPAK4, SPECTRUM and its applications.



### **Essential Reading List**

1. SPSS 14.0 Brief Guide – SPSS Inc.
2. SPSS regression models 14.0 - SPSS Inc.
3. SPSS advanced models 14.0 - SPSS Inc.
4. Stata user's guide: Release 10., 2<sup>nd</sup> Edition. Stata Press.
5. Stata survey data reference manual: Release 8., 2<sup>nd</sup> Edition. Stata Press.
6. Cromley, Ellen K. and McLafferty, Sara L., (2002): GIS and public health. Guilford Press, New York.

# Core Courses

<b>MBDC1</b>	<b>Introduction to Demography and History of Population</b>	<b>60 Hours</b>
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## **Introduction to Demography.**

- a. Definition and Scope: Evolution of demography as a scientific discipline; Nature and scope of demography and changes in it over time. Multi-disciplinary nature of Demography, its linkage with other social science disciplines. Basic demographic concepts. Components of population change.
- b. Demographic transition (description rather than theory).

## **Population History**

- a. Global population trends: Historical population trends, World Population Growth- a brief history, The Power of Doubling
- b. Global variation in population size and growth
- c. Past, present and future population trends across the world, continents, and major regions
- d. History of population in India: Trends and growth of India's population
- e. Concerns of population growth- before and after independence.
- f. Current Population scenario of India and its states.
- g. Demographic profiles of India and states

## **Measures of age and sex structure**

- a. Defining age and sex, sex ratio, sex ratio at birth
- b. Classification of age group and their importance
- c. Measures of age structure: Percent distribution, Median age, age-sex pyramid, dependency ratio and potential support ratio
- d. Factors affecting age and sex structure
- e. Importance of age-sex structure in Demography.
- f. Socio-economic implications of age and sex structure

## **Sources of Demographic Data**

- a. Data requirements, types of demographic data.
- b. Different sources of data.
- c. Population census across the world. Census taking under British India, Indian census, details of different items on which Indian census collect data, publication of census data/ reports.
- d. Vital registration system
- e. Sample registration system (SRS), survey on causes of death.
- f. National Sample Survey Organization's surveys, details of different rounds collecting population and health data.
- g. Nationwide sample surveys National Family Health Survey (NFHS), District Level Household and Facility Survey (DLHS), etc.

- h. Availability of data at various levels of disaggregation
- i. Strengths and weaknesses of various data sets

### **Age-Sex Structure and its Dynamics**

- a. Present levels, past trends and probable future changes in age-sex structure of the world and major regions.
- b. Present levels, past trends and probable future changes in age-sex structure of India and states.
- c. Determinants and consequences of sex-age structure of population. Demographic dividend.
- d. Ageing of the population. Relative role of low fertility and low mortality in ageing. Socioeconomic consequences of population ageing.

### **Essential Readings:**

- Bhende, A., (1996): *Principles of Population Studies* (Seventh Edition), Himalaya Publishing House, Bombay.
- Davis, Kingsley (1968). *The Population of India and Pakistan*, Russell and Russell, New York.
- Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography*, Second Edition, Chapters 1, 2, 3, 7, 9,10, Elsevier Science, USA.
- John Weeks (2005): *Population: An Introduction to Concepts and Issues*, Wordsworth Learning. Singapore 9<sup>th</sup> edition.
- Livi-Bacci, M. (1996): *A Concise History of World Population* (2nd edition), Oxford.
- Maheshwari, S.R. (1996). *The Census Administration under the Raj and After*, Concept Publishing Company Pvt. Ltd., New Delhi.
- Registrar General of India, *Census of India -2011*, Ministry of Home Affairs, Govt. of India.
- United Nations (1958). *Multilingual Demographic Dictionary*, John Wiley & Sons Ltd., New York.
- United Nations, (1973): *The Determinants and Consequences of Population Trends*, Vol. I, *Population Studies*, No. 50, Chapter VII, New York.
- United Nations, *World Population Ageing, 1950-2050*.

### **Suggested Reading List**

- World Population Prospects 2006, Vol I and II, United Nation
- Bogue, D. (1969): *Principles of Demography*, John Wiley and Sons, New York.

<b>MBDC2</b>	<b>Demographic Methods I</b>	<b>60 Hours</b>
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### **1. Fertility**

Importance of the fertility study in population dynamics; Basic terms and concepts used in the study of fertility

Basic concepts; Problems in fertility analysis; period and cohort approaches; Period measures of fertility - basic fertility measures, order-specific fertility rates, Coale's fertility indices; Cohort measures; Birth interval analysis; Reproduction measures

Determinants of natural fertility; Davis intermediate variables framework of fertility; Socio-economic determinants of proximate variables; Lee and Bulatao framework of fertility determinants; Bongaarts proximate determinants

## **2. Mortality**

Need and Importance of the study of Mortality; Some basic measures: - crude death rate (CDR) and Age-Specific Death Rates (ASDRs) - their relative merits and demerits

Need and importance of standardization: direct and indirect technique of standardization of rates and ratios in the light of mortality rates; Decomposition

Infant mortality rate and its sub-divisions; Maternal Mortality Rate, Ratios, Life time risk; Issues related to estimation of maternal mortality measures

Basic concept of a life table; Types and forms of life table; Anatomy of life table; uses of life table in demographic analysis; Construction of life tables; model life tables

## **3. Migration**

Concept of mobility and migration, sources and quality of data, types of migration, census definition of migrants, limitations

Internal migration patterns and characteristics in developing countries with a special focus on India; Determinants of internal migration: Causes of migration at the place of origin and at the place of destination; Patterns of international migration: Historical and recent trends; causes and consequences of international migration

Direct estimation of lifetime and inter-censal migration rates from census data; Indirect measures of net internal migration: Vital Statistics Method, National Growth Rate Method and Census and Life Table Survival Ratio methods; Methods of estimating international migration; Migration surveys

### **Essential Reading List**

1. Shryock, Henry S. Jacob S. Siegel and Associate, (1980): The Methods and Materials of Demography Vol.1 & 2, U.S. Bureau of the Census, Washington D.C.
2. John R. Weeks, (2005), *Population: An Introduction to Concepts and Issues*, Ninth Edition, Wadsworth Publishing Company, Belmont, California.
3. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis, Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.
4. Asha A. Bhende and Tara Kanitkar, (2003), *Principles of Population Studies*, Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
5. Hinde, Andrew (1998) *Demographic Methods*. London: Arnold.

6. United Nations, (1974): *Methods of Measuring Internal Migration*, Manual VI, UN, New York.

### **Suggested Reading List**

1. Rowland, Donald T. (2006), *Demographic Methods and Concepts*. New York: Oxford University Press.
2. Yaukey, David. 1985. *Demography: The study of Human population*. St. Martins, New York.
3. Coale, Ansley J. and Paul, Demney (1983): *Regional Model Life Tables and Stable Populations*, Academic Press, New York.
4. United Nations (1982): *Model Life Tables for Developing Countries*, United Nations, New York.
5. United Nations, (1979): "Trends and Characteristics of International Migration Since 1950" *Demographic Studies* No. 64, UN, New York.

<b>MBDC3</b>	<b>Introduction to Biostatistics &amp; Epidemiology</b>	<b>60 Hours</b>
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## **1. Biostatistics**

Measuring the occurrence of disease: Measures of morbidity - prevalence and incidence rate, association between prevalence and incidence, uses of prevalence and incidence, problems with incidence and prevalence measurements; Clinical agreement: kappa statistics, Mantel-Haenszel test; intra-class correlation; Surveillance

Assessing the validity and reliability of diagnostic and screening test: Validity of screening test – sensitivity, specificity, positive predictive value and negative predictive value; Reliability; Relationship between validity and reliability; ROC curve and its applications; Overall accuracy

Issues in epidemiology: Association; causation; causal inference; Errors and bias; Confounding; Controlling confounding; Measurement of interactions; Generalizability

*Estimating risk*: Estimating association – absolute risk, relative risk, odds ratio; Estimating potential for prevention – attributable risk; comparison of relative risk and attributable risk; Odds ratios for retrospective studies; Odds ratios approximating the prospective RR; Exact inference for odds ratio analysis of matched case-control data

*Statistical process control*: special and common causes of variation, Shewhart, CUSUM and EWMA charts

## **2. Epidemiology**

Introduction: Definition and objectives of epidemiology; Epidemiology and clinical practice; The epidemiologic approach; Infectious disease epidemiology, occupational epidemiology, disaster epidemiology

The dynamics of disease transmission: Modes of transmission; epidemic, endemic and pandemic; Disease outbreak; Determinants of disease outbreak; Herd immunity; incubation period; outbreak investigation; epidemiological modeling

Identifying the roles of genetic and environmental factors in disease causation: Association with known genetic diseases; Age at onset; Family studies; Interaction of genetic and environmental factors

Epidemiology and public policy: Epidemiology and prevention; Population versus high-risk approaches to prevention; epidemiology and clinical medicine; Risk assessment

Context of environmental epidemiological studies, impetus of study, multi-sectoral interaction: social, economic legal and policy aspects. Risk perception and communication; Biological basis of environmental epidemiology, exposure and response, exposure assessment, exposure pathways: air, water, soil, food; physical factors- noise, radiation, exposure measurement, exposure modeling

### Essential Reading List

1. *Altman D G*: Practical Statistics for Medical Research, London: Chapman and Hall, 2006.
2. *Rosner B*: Fundamentals of Biostatistics, ed. 6, 2006.
3. *Bonita R, Beaglehole R, Kjellstrom T*: Basic Epidemiology, ed. 2. World Health Organization, 2006.
4. *Gordis L*: Epidemiology, ed. 3. Philadelphia, 2004.
5. Baker, D. et al.: Environmental Epidemiology: A Text Book on Study Methods and Public Health Applications, WHO/SDE/99.7, 1999.
6. *Dunn G, Everitt B*: Clinical Biostatistics: An Introduction to Evidence-based Medicine. Edward Arnold, 1995.

<b>MBDC4</b>	<b>Demographic Methods II</b>	<b>60 Hours</b>
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#### 1. Population Theories

By Malthus and Marx; Optimum population

#### 2. Fertility Theories

Theory of Social Capillarity, Theory of Change Response, Theory of Diffusion and Cultural Lag, Liebenstein Theory, Becker's Theory, Easterlin Framework of Fertility, Caldwell's Theory, U. N. Threshold Hypothesis and Reproductive motivations and value of children theories.

#### 3. Mosley & Chen Framework of Child Survival

#### 4. Demographic Transition Theory

## 5. Evaluation and Adjustment of Demographic Data

Types of errors: Coverage and content errors;  
Sources of errors: Examples of data on survey and census data affected by errors;  
Post-enumeration surveys, Dual record system;  
Techniques of evaluation of age data using Whipple's index, Myer's index, UN Joint score;  
Quality checks incorporated in survey procedures to minimize errors;  
Smoothing of age data;

## 6. Population Estimates and Projections

Concepts of population projections; population estimates, forecasts and projections, uses of population projections;  
  
Methods of interpolation, extrapolation using linear, exponential, polynomial, logistics and Gompertz curves;  
  
Cohort component method: basic methodology; projection of mortality, fertility and migration components;  
  
Population projections of United Nations, World Bank and Expert Committees of Government of India;  
  
Methods of rural-urban and sub-national population projections;  
  
Methods of related socio-economic projections: labour force, school-enrolment, health personnel and households;

### Essential Reading List

1. Bhende, A. and Kanitkar, T. (2011). Principles of Population Studies, 21<sup>st</sup> Edition. Mumbai: Himalaya Publishing House.
2. Mosley, W.H. and Chen, L.C. (1984). An analytical framework for the study of child survival in developing countries. *Population and Development Review* 10: 25-45.
3. Shryock, H.S. and Siegel, J.S. (1976). The methods and materials of demography. California: Academic Press, Inc.
4. Srinivasan, K. (1997). Basic demographic techniques and applications. New Delhi: SAGE.
5. United Nations (1956). Manual III. Methods for population projections by age and sex. New York: United Nations.
6. Government of India (2006). *Population Projections for India and States, 2001-2026*. New Delhi: Office of the Registrar General.

<b>MBD-C5</b>	<b>Epidemiological Methods</b>	<b>60 Hours</b>
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Application of epidemiology to identify the cause of disease – Cohort Studies; case-control and cross-sectional studies; nested case-control studies; comparing cohort and case-control studies; deriving inferences from epidemiologic studies.

Analysis of unmatched case-control studies; stratified analysis; effect modification; analysis of matched case-control studies – conditional logistic regression models.

Experimental epidemiology; Randomized trials - end point; surrogate end point; multiple comparison procedures; Bonferroni correction.

Infectious disease epidemiology – introduction; basic concepts; transmission dynamics models; SI, SIS, and SIR models; Kermack- McKendrick threshold theorem; Kermack-McKendrick threshold theorem epidemiology; basic reproductive number ( $R_0$ ); what determines  $R_0$ ; endemic vs. epidemic; effective reproductive number ( $R_t$ ); eradication threshold; other considerations while vaccinating; estimating  $R_0$ .

Surveillance of infectious diseases; guiding principles behind surveillance; uses of surveillance; surveillance of HIV/AIDS and malaria surveillance in India.

Ethical and professional issues in Epidemiology.

Meta Analysis – concept, application to bio-medical research, application using real data.

Application of epidemiology to evaluate health services.

### Essential Reading List

1. *MacMahon B, Pugh T F*: Epidemiology: Principles and Methods. Boston, Little Brown, 1970.
2. *Gordis L*: Epidemiology, ed. 3. Philadelphia, 2004.
3. *Everitt B S, Pickles A*: Statistical Aspects of the Design and Analysis of Clinical Trials, ed. 2. London, Imperial College Press, 2004.
4. *Leandro G*: Meta-analysis in Medical Research: The Handbook for the Understanding and Practice of Meta-analysis, BMJ Books, Blackwell Publishing, 2005.
5. *Family Health International*: Behavioral Surveillance Surveys. Family Health International, 2000.

<b>MBD-C6</b>	<b>Research Methodology</b>	<b>60 Hours</b>
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**Goal and Objectives:** The main objective of this course is to impart student's knowledge and skills on the principals and methods of social research to be used in epidemiological analysis of various disease, health and injuries. The goal of this course is to equip students with the skill to prepare a scientific research proposal with application of various bio



statistical techniques and skills learnt during the course and also to conduct social science research with the help of hospital data.

This course also presents the fundamentals of quantitative and qualitative methods of data collection and preparation of research instruments for data collection. The course prepares students to design, carry out, report, and present a research projects based on the fieldwork carried out by them. Students learn how to collect data using methods including interviewing, participant observation, social mapping, focus group discussions, key informant interviews, in-depth interviews etc. in a real population. Students further learn how to process and analyze the data using computer software such as ATLAS Ti and Nvivo. The course equips students with conceptual understandings of current academic debates regarding methods of data collection with practical skills to put those methods into practice. Students submit a written report and present their practical work for assessment.

**1. Scientific Methods of Research**

Definition of Research, Assumptions, Operations and Aims of Scientific Research.  
The Research Process: conceptual, Empirical and Analytical Phases of Research,  
Essentials Criteria of Scientific methods.

**2. Research Designs**

Observational Studies: Descriptive, explanatory, and exploratory,  
Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, threats to internal validity  
Cohort Studies  
Case Control Studies  
Cross sectional studies  
Monitoring and evaluative studies  
Action research/Intervention studies,  
Panel Studies.

**3. Measurement**

Reliability and validity of measurement  
Face, construct, concurrent, and predictive validity  
Inter-coder reliability and stability,  
Non random and random errors,  
Reliability and validity of screening and diagnostic tests,  
Concept of Golden Test, Specificity and Sensitivity  
Predictive power of positive and negative test  
ROC Curve and its interpretation  
Scaling and composite indices,  
Attitude Scales: Point scales, ranking scales, rating scales, limitations of attitude scales,  
Types of Scales: Bogardus, Guttman, Likert, Semantic, Thurstone scale.  
Use of standards in measurements  
Gold standards for measuring biomarkers in field settings

**4. Writing research proposal and report**

Purpose of a proposal/report  
Content of proposal/report

Critical review of research report and journal article  
Introductory section, methodology adopted,  
Development of research tools  
Protocol preparation  
Analysis and inferences,  
Summary, conclusions and recommendations.  
References/Bibliography,  
Appendices,  
Footnotes.

## **5. Research Ethics**

Ethics of Research,  
History of ethical guidelines and general principles  
Informed consent and human subject protection  
ICMR ethical guidelines for biomedical research on human participants  
The Biomedical research on human subjects -regulation, control and safeguards

## **6. Sampling**

Complete enumeration versus sampling.  
Concept of sampling unit, sampling frame and sampling design.  
Sampling methods: Simple random sampling, stratified sampling, systematic sampling, cluster sampling, and purposive sampling.  
Multistage sampling in large-scale surveys, self-weighting designs, Stratification in multistage sampling.  
Sampling and non-sampling errors, calculation of weights, sample size determination.

## **7. Methods of Data Collection – Quantitative and qualitative**

Quantitative Methods: Questionnaire (mail method, interviews through telephone, internet and computers), interview schedule (face-to-face interviews or personal interviews).

Questionnaire/interview schedule design and construction: Principles of constructing a questionnaire/interview schedule, Types of questions, framing of questions, sequencing of sections and questions and Interview techniques

Qualitative Method: Walk through and observation (participatory and non-participatory), Social mapping, key informant interview, In-depth interviews, Focus group discussion, content analysis, free listing, pile sorting, mechanical devices (camera, tape recorder)

## **8. Data Collection - Field work**

## **9. Data processing and analysis, research report**

## **10. Presentation of research report**

### Essential Reading List

1. Bernard, H. Russell, (1995): *Research Methods in Anthropology: Qualitative and Quantitative Approaches*, Altamira Press, Walnut Creek.
2. Goode W J and Hatt P K. 1952. *Methods in Social Research*. McGraw Hills, New York.
3. Mukherji, P.N., (1999): *Methodologies in Social Science*, Sage Publications, New Delhi.
4. Royce A. Singleton and Bruce C. Straits, (1999): *Approaches to Social Research*, Oxford, Oxford University Press.
5. Young P V. 1994. *Scientific Social Surveys and Research*. Prentice-Hall, New York (4<sup>th</sup> Edition).
6. Pullum W. 2006. An Assessment of Age and Data Reporting in the DHS Surveys, 1985-2003. DHS Methodological Report No. 5. Calverton, Maryland, Marco International Inc.
7. Royce A. Singleton and Bruce C. Straits, (1999): *Approaches to Social Research*, Oxford, Oxford University Press.

<b>MBD-C7</b>	<b>Sampling Techniques in Health &amp; Demographic Surveys</b>	<b>60 Hours</b>
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Concept of population and sample, need for sampling, sample survey versus census, elementary units, sampling units, assumptions of sampling from finite population, sampling frame, selection and inclusion probabilities, probability and non-probability sampling, concept of sampling mechanism and sampling design.

Simple random sampling with and without replacement, concept of unequal probability sampling with and without replacement.

Stratified random sampling, sample allocation methods, gain due to stratification, determination of strata boundaries, number of strata, allocations for multiple characteristics.

Concept of systematic sampling, comparison with simple random sampling, variance estimation, comparison with stratified random sampling, systematic sampling, selection procedure for fractional interval, circular systematic sampling.

Use of auxiliary information, ratio and regression methods of estimation under simple random sampling, bias, mean square error, and ratio and regression estimators in stratified random sampling.

Simple random cluster sampling for equal size and unequal size clusters, gain in efficiency of cluster sampling, concept of multi stage sampling, two stage equal probability sampling

at both stages, comparisons with unistage unit sampling and cluster samplings, components of variance of two stage sampling and estimation, cost function and sample size determination.

Sampling weight concept and computation, sampling and sampling errors.

### Essential Reading List

1. Cochran, W.G. (1977). Sampling Technique, Third edition. New York: John Wiley & Sons.
2. Des Raj (1972). The design of sample surveys. McGraw Hill.
3. Sukhatme, P.V. and Sukhatme, B.V. (1970). Sampling Theory of Surveys with Applications. Asia Publishing House.
4. Murthy, M.N. (1977). Sampling Theory and Methods, 2<sup>nd</sup> Edition. Calcutta: Statistical Publishing Society.
5. Kish, L. (1995). Survey Sampling. New York: John Wiley and Sons, INC.
6. Lwanga, S.K. and Lemeshow, S. (1991). Sample size determination in health studies. Geneva: The World Health Organization.

<b>MBD-C8</b>	<b>Applied Multivariate Analysis</b>	<b>60 Hours</b>
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**Rationale:** The course is intended to give an overview of statistical models commonly used in causal analyses of non-experimental data in the social and bio-medical sciences. The goal is to impart an intuitive understanding and working knowledge of these models. The strategy would be to simplify the treatment of statistical inference and to focus primarily on how to specify and interpret models in the context of testing causal relationships. All the problems/exercises will be based on real data in the social/bio sciences and will be solved through the widely used statistical computing package, namely, Stata and MLwiN. Emphasis will be given on interpreting and understanding of the results obtained from these statistical models/computer outputs. Students of statistics/mathematics wishing to upgrade their methodological skills will find this course very useful.

1. Random variables and Probability distributions, Joint, marginal and conditional distributions.
2. Basic concept of Law of large numbers and Central Limit Theorem, Normal distribution, Chi-square distribution, F- distribution and Student's t distribution. Methods for finding estimators- method of moments, maximum likelihood method. Properties of estimators- Unbiasedness, Efficiency and consistency.

3. Concept of confidence interval, confidence interval for- mean and variance. Testing of hypotheses, Relationship between confidence interval procedures and tests of hypotheses.
4. Simple linear regression and its assumptions, the method of least squares, Analysis of variance for the simple regression model, outliers, non-linearity, centring in the regression. Multiple regressions, partial correlation, relationship among simple, partial and multiple correlation coefficients, Omission of relevant variables and inclusion of irrelevant variables. R square and adjusted R square. Tests for stability. Violation of the assumptions of the basic model-heteroskedasticity, autocorrelation and multicollinearity-principal component regression. Regression with dummy explanatory variables. Interaction effect and Effect modifier.
5. Simultaneous equation models- the identification problem. Methods of estimation-the instrumental variable method and two-stage-least squares method. Diagnostic checking and model selection.
6. Generalized linear models: A general model for the response probability, the logit, the probit and the complementary log –log model, choice of link function, Estimation of the generalized model. Latent variable representation of a generalized linear model.
7. Multilevel modelling: A multilevel model for group effects, estimating group effects, random vs. fixed effects, random intercept model
8. Generalized linear random intercept model, random intercept logit model, a random slope logit model
9. Computer Applications using Stata and MLwiN softwares.

#### **Essential Reading List:**

1. Hogg, R.V and Craig, A.T.: Introduction to Mathematical Statistics, Fourth edition. Collier Macmillan Publisher.
2. Mood, A.M., Graybill, F.A., and Boes, D.C. : Introduction to the Theory of Statistics, Third edition. McGraw Hill.
3. Goon, A.M., Gupta, M.K., and Dasgupta, B. : An Outline of Statistical Theory, Vol 2. The World Press Publishers Pvt. Ltd., Calcutta.
4. Rao, C.R.: Linear Statistical Inference and Applications, Revised edition. Wiley Eastern.
5. Snijders, Tom A.B. and Bosker, Roel J., (1999): *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Sage Publications.
6. Retherford, R.D. and Choe, M. K., (1993): *Statistical Models for Casual Analysis*, A Wiley-Inter-Science Publications, John Wiley and Sons, INC, New York.

7. Graeme Hutcheson and Nick Sofroniou, (1999): *The Multivariate for Social Scientist*, SAGE Publications.
8. Gujarati, DN and Sangeetha (2007). *Basic Econometrics* (Fourth Edition), Tata McGraw Hill, New Delhi.
9. Jones, Andrew (2007). *Applied Econometrics for Health Economists*, Radcliffe Publishing Ltd, United Kingdom.
10. Maddala, G.S (1989). *Introduction to Econometrics*, Macmillan Publishing Company, New York.

<b>MBD-C9</b>	<b>Application of Statistical and Demographic Packages II</b>	<b>60 Hours</b>
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### Course Objectives:

- To introduce SAS software.
  - To teach application of SAS for bio-statistical and epidemiological analysis.
1. Introduction to SAS programs, running SAS programs, diagnosing and correcting syntax errors. Producing List Reports using PRINT procedure; sequencing and grouping observations, using special WHERE statement operators; customizing report appearance - formatting data values, creating HTML reports.  
  
Programming with the DATA Step - reading SAS data sets and creating variables, executing statements conditionally, dropping and keeping variables.  
  
Assigning and Changing variable attributes, combining merging and SAS Data Sets  
Producing Summary Reports using REPORT procedure.
  2. Using SAS Enterprise Guide: naming a project, working with existing code, diagnosing and correcting errors, creating SAS programs, accessing data sources with the LIBNAME statement, understanding Output Delivery System (ODS). Using Graphics in SAS Enterprise Guide.  
  
Controlling Input and Output - controlling when a record loads, reading hierarchical raw data files; outputting multiple observations, selecting variables and observations, writing to multiple SAS data sets, writing to external files; Processing Data Iteratively using DO loop, SAS array processing.
  3. Using SQL with SAS: Understanding the purpose, design, uses, and terminology of SQL; Basic Queries, using SQL procedure, summarizing data with column and row functions, grouping data, performing analyses on groups of data, subquerying, and remerging, ordering data, customizing query output.  
  
Combining Tables - querying multiple tables using joins, using union, intersect, and other set operators to combine tables.

Creating and Modifying Tables and Views, using views to simplify queries and access changing data, creating and using indexes; maintaining tables, views, and indexes.

4. Introduction to the Macro Facility- purpose of the macro facility, program flow. Macro Variables and macro functions; defining and calling macros, macro parameters.

DATA Step and SQL Interfaces - creating macro variables in the DATA step, indirect references to macro variables, retrieving macro variables in the DATA step, creating macro variables in SQL.

5. EPI Info, HIV Surveillance

### **Essential Reading List**

1. Cody R, Smith J. '*Applied Statistics & the SAS Programming Language*'. Prentice Hall 1997. 4th edition.

<b>MBD-C10</b>	<b>Demographic Models and Indirect Methods of Estimation</b>	<b>60 ours</b>
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1. **Concepts of Demographic Models:** Stable population; Generalized Population; Momentum of Population Growth; Concept of Multiregional Model; and Micro Model such as Birth Interval, Waiting Time (Birth Distribution etc, Estimation of fecundability);
2. **Indirect methods for estimating fertility:** Needs for Indirect methods; Concept of Reverse Survival Method, Robust Method and method based on Generalized Population Model; Rele's Method;

Concept of P/F ratio method and its modification [Hypothetical Cohort methods]

3. **Indirect Method of Estimating Mortality:**

#### **I. Indirect Methods of Estimating Infant and Child Mortality**

(a) Basic concepts, fundamental assumptions and underlying principles to the technique proposed by Brass based on retrospective data on children ever-born and surviving mothers classified by current age of mother; (b) Modifications proposed by Sullivan and subsequently by Trussell over Brass method; and (c) the UN revised and extended version of Trussell's method.

#### **II. Some Methods of Estimating Adult (including Maternal Mortality) and Old Age Mortality**

- (i) Some methods of estimating adult mortality using successive census age-distributions; (ii) Methods of estimating life expectancies at older ages; and (iii) Estimation of maternal mortality through sisterhood method.

### **III. Some Indirect Methods for Estimating Death Registration Completeness for Countries Having Limited and Defective Vital Registration Data**

An overview of some selected methods of estimating completeness of death registration, starting from Brass growth balance method and its subsequent development.

#### **Essential Reading List**

1. Preston, Samuel H. Patrick, Heuveline and Michel Guillot, 2003, *Demography: Measuring and Modeling Population Processes*, Blackwell Publishers, 2001 (First Indian Reprint 2003).
2. Bhat P.N.M, (2002): General growth balance method: A reformulation for population open to migration, *Population Studies*, 56 (2002), 23-34, Printed in Great Britain.
3. Bhat P.N.M., (2002): Completeness of India's Sample Registration System: An assessment using the general growth balance method, *Population Studies*, 56 (2002), 119-134, Printed in Great Britain.
4. Keyfitz, Nathan (1977): *Introduction to the Mathematics of Population with Revision*, Addison-Wesley Publishing Company, Inc., Massachusetts.
5. Pathak, K.B. and F. Ram (1998): *Techniques of Demographic Analysis*, Himalaya Publishing House, Second Edition, Mumbai.
6. United Nations (1983): *Indirect Techniques for Demographic Estimations*, Manual X, Population Studies No.81, Department International Economic and Social Affairs, (ST/ESA/SER.A/81).

<b>MBD-C11</b>	<b>Survival Analysis</b>	<b>60 Hours</b>
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**Learning Objectives:** The main objective of this course is to equip students with the basic concepts and methods employed in survival analysis. At the same time, the course aims to equip the student with recent advances in the field of Survival Analysis. The idea is to emphasize concepts over details, with recent applications in public health. After going through this course, the student should be capable enough to take up responsibility and actively participate in academics, government organizations, pharmaceutical companies, health organizations, etc. The introduction of such course is especially very important in India as there is very limited capacity in India at this moment.

1. Introduction to survival analysis; motivating the need; concepts and definitions; concept of censoring and type of censoring.
2. Survival function, probability density function, hazard function; relationship between the three types of function; survival curve; estimating median survival time;



estimation of these function in the absence and presence of censoring; application of these functions in survival analysis.

3. Survival distributions- Weibull distribution; exponential distribution; lognormal distribution; gamma distribution.
4. Nonparametric methods of estimating survival function- introduction; Kaplan-Meier estimates; life table estimates; clinical life tables; life table vs. Kaplan-Meier estimates; The Mantel-Haenszel test.
5. Estimating survival rates using large scale data like DHS, NFHS, DLHS, etc.
6. Comparing survival curves- Generalized Wilcoxon (Breslow, Gehan); logrank test
7. Regression methods for survival analysis- introduction to Cox-proportional hazard models; proportionality assumption in Cox-proportional hazard models; test of proportionality; interpretation of coefficients; application of Cox-proportional hazard models in Epidemiology and Public Health.
8. Discrete-time survival models: introduction.

#### **Essential Reading List**

1. *Altman D G*: Practical Statistics for Medical Research, London: Chapman and Hall, 2006
2. *Lee E T*: Statistical Methods for survival Data Analysis, ed. 2. New York, John Wiley & Sons.
3. *Armitage P, Berry G*: Statistical Methods in Medical Research, ed.4, Wiley Blackwell, 2001.
4. *Choe MK, Retherford RD*: Statistical Models for Causal Analysis, Wiley-Interscience, 1993.

<b>MBD-C12</b>	<b>Methods in Clinical Trials</b>	<b>60 Hours</b>
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**Learning Objectives:** The main objective of this course is to equip students with the basic concepts and methods employed in Clinical Trials. At the same time, the course aims to equip the students with recent advances in the field of Clinical Trials. The idea is to emphasize concepts over details, with recent applications in public health. After going through this course, the students should be capable enough to take up responsibilities and actively participate in academics, government organizations, pharmaceutical companies, health organizations, etc. The introduction of such course is especially very important in India as there is very limited capacity in India at this moment.

1. **Basic concepts of clinical trials:** Basic concepts; definitions; historical perspectives

2. Classification of trials by design and purpose: phases of clinical trials, concept of randomization, process of randomization, types of blinding
3. Basic concepts of design of experiments: completely randomized design, randomized block designs and factorial designs.
4. Designs of phases of clinical trials, cross over designs, hybrid designs, response variables, response surface experiments, group allocation design
5. Sample size determination for qualitative and quantitative outcomes, sample size for cluster randomization, sample size for repeated trials
6. Planning and conduct of clinical trials: Protocol development; Multicentric trials; Deviations from protocol; Stopping rules; Considerations of adverse effects and non-compliance
7. Ethical issues: Ethical issues in clinical research; ICMR guidelines on ethical issues in medical research
8. Data safety and monitoring concepts: Types of form for clinical trials- baseline assessment, evaluation form, flow sheet, layout and design, missing, range and logical checks, data transfer
9. Analysis of data from clinical trials: Describing clinical trials data-qualitative and quantitative, prognostic, adjustment for prognostic factors

#### **Essential Reading List**

1. Pocock S. J.: Clinical Trials: A Practical Approach. Michigan, Wiley Medical Publication, 1983.
2. Everitt B.S., Pickels, A.: Statistical Aspects of the Design and Analysis of Clinical Trials, ed. 2. London, Imperial College Press, 2004.
3. Friedman L. M., Furberg, C.D., DeMets, D. L.: Fundamentals of Clinical Trials. Boston, PSG, 1982.
4. Dean, A., Voss, M: Design and Analysis of Experiments.
5. Khuri, A. and Cornell, M.: Response Surface Methodology. Marcel Dekker.
6. Federer, W.T.: Experimental Designs- Theory and Methods. Oxford & IBH.
7. Goon, A.M., Gupta, M.K. and Dasgupta, B.: Fundamental of Statistics, Vol. II. World Press.
8. Das, M.N. and Giri, N.C.: Design and Analysis of Experiments. Wiley Eastern.

## **Elective Courses**

<b>MBD E-1.1</b>	<b>Healthcare Systems and Policies</b>	<b>45 Hours</b>
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1. Identify the structure, components and characteristics of global health care system.
2. Understanding the needs and goals for various policies related to public health, policy environment, frameworks for policy analysis.
3. Basic models and functions of health services, health care systems, international experience.
4. Health infrastructure and health delivery system in India- public, private, NGOs, Indigenous health systems.
5. National health programmes- Public health preparedness.

6. Public health system- A re-appraisal and SWOT analysis, a critique on the health delivery system- problems related to structural, functional and management of public health care services.
7. Health care system- stakeholders in health care system, human capital and health, role of government in providing health care, improving access to health care with quality.
8. Health care legislations in India: Legal aspect of health care, MTP Act, biomedical waste Rules, COPRA Act, PNDT Act, Transplantation of human organs Act, etc.
9. Principles of planning and management of health programmes- monitoring and evaluation- quality assurance- health impact assessment- five year plans.
10. Health services- Community needs assessment, Decentralization of health facilities.
11. Sustainability of public health intervention- Concept and mechanism of sustainability, models and examples of sustainability, community ownership, Public-private mix.
12. Introduction to health services and research policies - Perspectives- methodological approach.
13. Major National Health Policies and Missions- NHP-2002, NRHM (2005-12).
14. Major public health problems – A critical review and analysis, identification of major areas of public health requiring interventions, ongoing public health interventions in India. Health system reforms and their impact

### **Essential Reading List**

1. Lassey M, Lassey W, and Jinks, M. (1997). Health Care Systems around the World: Characteristics, Issues and Reforms. Prentice-Hall, Inc.
2. Graig, Laurene A. (1999) Health of Nations: An International Perspective on US Healthcare Reform. 3rd Edition, Congressional Quarterly, Inc.
3. Bodenheimer, Thomas S., Kevin Grumbach. *Understanding Health Policy*
4. Fort, Meredith, Mary Anne Mercer and Oscar Gish (Editors). *Sickness and Wealth: The Corporate Assault on Global Health*
5. Govt. of India (2002)-National Health Policy-2002, Ministry of Health and Family Welfare, New Delhi.
6. Govt. of India (2005) Report of the National Commission on Macroeconomics and Health, Ministry of Health and Family Welfare, New Delhi.
7. Peters, et.al (2002), Better Health System for India's poor: Findings, Analysis and Options: The World bank, New Delhi
8. Reddy, K.S. et.al (2011)" Towards achievement of universal health care in India by 2020 : A Call of Action", [www.thelancet.com](http://www.thelancet.com)
9. Banerjee, D. (1982), Poverty, class and Health Culture in India, Vol. 1 ParchiPrakashan, New Delhi.
10. Indian Council of Social Science Research and Indian Council of Medical Research (1981), Health for All by 2000 A. D., ICSSR, Delhi.

Madan, T.N. (1969), "Who Chooses Modern Medicine and Why", Economic and Political Weekly, pp. 1475-84.

<b>MBD E-1.2</b>	<b>Basic concepts of Sociology, Psychology and Anthropology</b>	<b>45 Hours</b>
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- 1. The Nature of Human Society:** The Study of Human Society: a) The Sociological/Anthropological point of views, b) The Value of Sociology and Anthropology, and c) Perspectives in Sociology and Anthropology.
- 2. Major Groups:** a) Primary and Secondary Groups, b) Rural and Urban Communities, c) Caste, d) Class and Stratification.
- 3. The Social Structure:** Major forms of Social Structure: a) Types of social group, b) Groups in social life c) The Primary group, d) The Great Association.
- 4. The Family:** a) Sociological Significance of the Family, b) Early forms of the Family, c) Types and functions of Family.
- 5. The Community:** a) The Communities as place. Its Physical Configuration, b) Community and Intra Communal Difference,

*Social Class and Caste: Principles of Class and Caste*

- 6. Ethnic and Racial Groups:** a) Ethnic and Racial Relations in Social life, b) Ethnic and Racial groups as 'Caste'.
- 7. Society and Culture in India:**
  1. Aspects of society and culture in India, and its role and importance in Population Studies.
  2. Social Institutions and their role in influencing demographic situation of the Population of India - Family, Marriage, Kinship and Religion.
  3. Varna and Caste System
    - i) Concept & Definition of Varna and Caste System, Scheduled Caste
    - ii) Changing Caste System in India-legislation, normative, and behavioral context and its influence on demographic characteristic of the Population
- 8. Tribes in India:** a) Definition of Tribe / Scheduled Tribe, b) Special distribution, c) Composition, d) Size and Growth

Social Institutions:

Family, Kinship, Marriage, Religion, Statuses of women and Relevance with demographic components

Economics Institutions:

Land tenure, Land use pattern, and Tribal Economy.

Administrative and Political:

Traditional Panchayat and Panchayat Rai Institutions, Tribal Movements and Developments.

## **9. Social Change: Definition and Concept of Social Change,**

Process of Social Cultural Change in India and its role in influencing demographic characteristic: a) Sanskritization, b) Secularization, c) Liberalization, d) Modernization, e) Democratization

## **10. Social Psychological Concepts:**

I. Psychology as a Discipline:

- Branches and dominant Psychological thoughts
- Psychoanalysis: Cognitive Behaviour,

II. Social Psychological Concepts and its relevance to Population Studies

- Personality Motivation, Attitude, Behaviour,

III. Learning and Communication Processes:

Concept, Meaning, Scope, and need in the Context of Population Studies.

## **Essential Reading List**

1. Davis Kingslay, *Human Society*, Macmillen and Co., New York, (1975), Chapters 1, 3,5,6.
2. Kapadia K. M., *Marriage and Family in India*, Oxford University Press, Calcutta, (1986).
3. Ketkar S.V., *History of Caste in India*, Rawt Publication, Jaipur, (1979).
4. Kuppaswamy B., Revised by B.V. Kumar, *Social Change in India*, Konark Publication Pvt. Ltd. Delhi, (1990).
5. Mandelbaum D.G., *Society in India-Continuity and Change and Change and Continuity*, Vol.I. University of California Press, London, (1970).
6. MacIver R.M., Charles H. Page, *Society an Introductory Analysis*, Hail Riehart Winston, New York, (1949), Chapters No.1, 3,7,11,15,22,24,25,26.
7. Srinivas M.N., *Social Change in Modern India*, University of California Press, Berkeley, (1966)
8. Vidyarthi L.P., *The Tribal Culture of India*, Concept Publishing Co., Delhi, (1977).

## **Suggested Readings**

1. Hasain N., *Tribal India Today*, Harnam Publication, New Delhi, (1986).

2. Krech D.; Crutchfield R.S. and Ballachey E.L., *Individual in Society*, International Student Edition, McGraw-Hill Book Company, INC, New York, (1962).
3. Linda A. Mooney, Davis Knox & Caroline Schacht, *Understanding Social Problems*, 3rd Edition, Wadsworth / Thomson Learning, USA, (2002).
4. N.P. Chaubey, *Indian Society at the Turn of the Century*, Century Printers, New Delhi, (1988).
5. Ram Mohan, *Encyclopedia of Social Problems in Developing Countries*, Vol-1, 2,3, Sarup & Sons, New Delhi, (2003).
6. Richard T. Lapiere, *Social Change*, McGraw-Hill Book Company, New York, (1965).
7. S. Kumar and S. Gajrani, *Culture and Society in India*, Om Publications, Faridabad, (1999).
8. S.R. Maheswary, *Society and Culture*, Rajat Publications, Delhi, (2000).
9. Ram Krishna Mukherjee, *Society, Culture & Development*, Sage Publications, New Delhi, (1991).
10. Feldman R.S., *Social Psychology Theories, Research and Applications*, International Student Edition, McGraw-Hill Book Company, INC, New York, (1985).
11. France N. Magill (ed.), *International Encyclopedia of Sociology*, Vol. II and I (selected readings) Fitzry Dearborn Publishers, England, (1995).

<b>MBD E-2.1</b>	<b>Historical Demography</b>	<b>45 Hours</b>
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### **I. Introduction to historical demography**

Introduction to historical demography: Meaning, Scope, and Importance; Difference between History of Demography, Demographic History and Historical Demography; Limitations of Research in Historical Demography. Development of historical demography (Europe and Asia).

### **II. Data Sources, Methods and Approaches**

**Data Sources:** Paris registers, Population registers, Census, Vital registration data, Bills of mortality, Fiscal documents, Military records, Inventories of properties, Genealogies, Marriage practices, Archaeological remains, Administrative geography, Colonization of new land, Cemetery data, Traveler's tales.

**Approaches:** Family reconstitution; Cross checking the information from different sources. Back Projection, and Generalised Inverse Projection, Other Methodological Developments

### **III. Evolution of human and peopling of the earth**

Evolutionary Process and Emergence of human (Darwinism, Mendel, Lamarckism); Historical trend and pattern of migration and distribution of

population; Historical evolution of towns and peopling of the world, Industrial and agricultural revolution and peopling of the earth

#### **IV.India's demographic history**

Historical sources of population data, Population in India from pre-historic to modern time; Peopling in India and racial classification; Peopling in India and linguistic classification; Indian great famines and its implication on mortality; family transition and status of women from historical perspective; Transition from traditional family planning methods to modern methods and health practices in India – a historical perspective

#### **Essential Readings**

1. Davis, Kingsley, The Population of India and Pakistan, Princeton, Princeton University Press, 1951.
2. Tim Dyson (ed.), India's Historical Demography: Studies in Famine, Disease and Society, London, Curzon, 1989.
3. Glass D.V. & Eversley, D.E., Population in History: Essays in Historical Demography, London, Edward Arnold, 1965.
4. Hollingsworth, T.H., Historical Demography: The Sources of History, Studies in the Uses of Historical Evidence, London, 1969.
5. Maharatna, Arup, Demography of Famines: An Indian Historical Perspective, Delhi, 1996.
6. Willigan, J. Dennis, Lynch, Katherine A., Sources and Methods of Historical Demography, Academic Press, New York, 1982.

#### **Reading List:**

1. Akerman, S., "History and Demography: An Evaluation of the Family Reconstitution Technique" in A.E. Andersson and I. Holmberg (eds) Demographic, Economic, and Social Interaction, Cambridge, Ballinger Publishing Company, 1977.
2. Harris, P.M.G., History of Human Populations, Vol.II (Migration Urbanization and structural change) London: Praeger, 2003.
3. John Knodel, "Two and a Half Centuries of Demographic History in a Bavarian Village". Population studies Vol.XXIV No.3, Nov. 1970, pp. 353-376.
4. Kertzer, David I., "Qualitative and Quantitative Approaches to Historical Demography", Population and Development Review, Vol.23 (4). Dec. 1997--(839-84), 1997.
5. Krishnan, P., "Historical Demography Through Literature: Preliminary Report on Indian Historical Demography", Paper presented in the Session Historical Demography, IUSSP Meeting, Florence, Italy, June, 1985.
6. Paul E.Vincent, "French Demography in the Eighteenth Century" Population Studies Vol.I, 1947-48. Pp.44-71.
7. Razzell, P.E., "The evolution of Baptism as a form of Birth Registration through Cross Matching census and Parish Register Data: A study in Methodology" Population Studies Vol.26, No.1. March 1972, pp.121-146.



8. Saito, Osamu, Historical Demography: Achievements and Prospects, Population Studies, Vol.50 (3--(53), 1996.
9. Srivastava, H.C., "Registration of vital Events in Goa- A study of current system in Retrospect", Artha Vijanana, Vol. XIII, No.4, Dec. 1971.
10. Vinovskis, Maris A., Studies in American Historical Demography, Academic Press, New York, 1979.
11. William H. Howells, "Estimating Population Numbers Through Archeological and Skeletal Remains" in Robert F. Heizar and Sherburne F. cook. The application of Quantitative methods in Archeology, Viking Fund Publication in Archeology, No.28, 1960. pp. 158-159.

<b>MBD E-2.2</b>	<b>Spatial Demography</b>	<b>45 Hours</b>
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<b>Unit</b>	<b>Contents</b>	<b>lectures</b>
<b>A.</b>	<b>Concepts and Theories</b>	
	Demography as a spatial science; difference between spatial demography and population geography; Spatial pattern and spatial process; location, distance and area; Distance and decay relationship and spatial hierarchy; space, place and region; Type of spaces- concrete and abstract space; absolute, relative and relational spaces	(6).
	Understanding demographic process by geographical scale; nature of disaggregated data- Census and secondary sources; Linking micro and macro demography in a spatial frame	(4)
	Application of spatial frameworks to demographic process; Space, culture and fertility; Spatial pattern of mortality and diseases; Distance as factor in access to health care and health planning; Migration and distance- gravity model; space, culture and migration; urban sprawl and sub-urbanization	(5)
<b>B.</b>	<b>Statistical and Geospatial Data and Software</b>	
	<b>Spatial Concepts and Cartography:</b> Spatial parameters: Site and location; Scale; Plane and spherical coordinate, Map Projection-UTM, Types of maps: cadastral, toposheet, thematic, digital; Representation of spatial and non spatial data;	(3)
	<b>Introduction to geospatial software: GIS:</b> discrete data: point, and polygon data, Raster and vector data, layouts preparation. Geocoding and basics of digitization in ArcGIS	(6)
	<b>Introduction to Geoda:</b> ESDA in (Exploratory Spatial Data Analysis); Local Indicators of Spatial Association (LISA)	
	<b>Statistical Concepts:</b> Bar diagram, Frequency polygon, Frequency curve; Test of significance, confidence intervals, Univariate and Multivariate	(3)

Statistics: Correlation and Regression, Matrix algebra; Auto-correlation; kriging, Moran's I index

**Introduction to Statistical software:** SPSS, STATA, R (6)

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**C. GIS and Spatial Analysis of demographic data**

**Representation of statistical data and automated cartography (Lab based exercises):** (4)

- a) Population distribution map of India using dot and sphere/circle, cubes, combined; Cartograms
- b) Density map by Choropleth and population density gradient by Isopleth;
- c) Fertility, mortality and natural growth of population by Polygraph.
- d) Measurement of population concentration by cumulative curve.
- e) Migration flow by Carogram

**Concept and application Models:** (8)

- a) Spatial Lag and Error Regression Modeling;
  - b) Multilevel modeling (hierarchical linear modeling);
  - c) Geographically Weighted Regression;
  - d) Spatial Pattern Analysis;
  - e) Urban and city level projection
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**Reading list:**

Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Workbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on <http://geodacenter.asu.edu/>.

Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Harlow, Longman.

Barbara E., Ronald R. R., Stephen J. W., Tom P. E. and Sara R. C. (1997). *Geographic Information Systems, Spatial Network Analysis, And Contraceptive Choice*. Demography. 34(2): 171-187.

Bonham, Carter G.F. (1995): Information Systems for Geoscientists—Modelling with GIS. Pergamon, Oxford.

Chen, X., Orum A.M., and Paulsen K.E. (2013). Introduction to Cities: How Place and Space shape Human Experience. West Sussex, Wiley-Blackwell.

- de Castro M. C. (2007). *Spatial Demography: An Opportunity to Improve Policy Making at Diverse Decision Levels*. Population Research and Policy Review 26: 477-509.
- Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
- ESRI (1993): Understanding GIS. Redlands, USA
- Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. New York, John Wiley and Sons,
- Griffith, D. A. and Amrhein (1997): Multivariate Statistical Analysis for Geographers. Englewood Cliffs, New Jersey, Prentice Hall.
- Goodchild, M.F. and Janelle, D.G. (eds). (2003). Spatially Integrated Social Science: Examples in Best Practice. Oxford University Press.
- John R. Weeks. 2004. The Role of Spatial Analysis in Demographic Research. Chapter 19 (pp. 381-399) in M.F. Goodchild and D.G. Janelle (eds.) (2004) Spatially Integrated Social Science New York, NY, Oxford University Press.
- Kurland K. S., Gorr W. L. (2007). GIS Tutorial for Health. Redlands, CA, ESRI Press.
- Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. New Delhi, Prentice Hall of India.
- Massey, D. (2008). for space. New Delhi, Sage Publications Ltd.
- Monkhouse, F.J. and Wilkinson, H. R. (1962). Maps and Diagrams. London, Methuen and Company Ltd.
- Parker R. N., Asencio E. K. (2008). GIS and Spatial Analysis for the Social Sciences: Coding, Mapping, and Modeling. New York, NY, Routledge/Taylor & Francis.
- Paul V. (2007). *Demography as a Spatial Social Science*. Population Research and Policy Review 26: 457-476. (plus Introduction to the special issue of PRPR on Spatial Demography) pp. 455-456).
- Editor. (2007). *Introduction to the Special Issue*. Population Research and Policy Review 26: 455-456).
- Reibel, Michael, (2007). *Geographic Information Systems and Spatial Data Processing in Demography: A Review*. Population Research and Policy Review 26: 601-608.
- Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984) Elements of Cartography. New York, John Wiley and Sons.

Shaw, G. and Wheeler, D. (1994). *Statistical Techniques in Geographical Analysis*.  
Englewood Cliffs, New Jersey, Prentice Hall.

Soja, E. W. (1996). *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*. Wiley-Blackwell

Sparks Corey. (2013). *Spatial Analysis in R: Part 1*. *Spatial Demography* 1(1) 131-139

Sparks Corey. (2013). *Spatial Analysis in R: Part 2*. *Spatial Demography* 1(2) 219-226

Zhu E J. and Chi G. (2008). *Spatial Regression Models for Demographic Analysis*.  
*Population Research Policy Review* 27:17–42 DOI 10.1007/s11113-007-9051-8

MBD E-3.1	Urbanization, Space and Planning	45 Hours
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**I. Urbanization and Space**

Urbanization and space: concepts and forms (formal and informal spaces); Differences between space, place and region; urbanization and space interaction: gravity model, distance decay model, forces of concentration and dispersion, urban agglomeration and spatial economy; Access to urban and right to the city

**II. Evolution of Spaces of Settlements**

Settlement: evolution, characteristics and factors; settlement pattern and hierarchy; Urban morphology; Change in urban land use and population density; Rural-urban relationship: dichotomy or continuum; Role of urban centres in rural development.

**III. Urban and Regional Planning**

**Planning:** Definitions, concepts, purpose, types and levels; geography/demography and planning relationship.

**Regional development/planning:** Region: concept and definition, types (formal, functional and planning); Need for regional planning; Types of regional planning; Spatial structure of regions,

Theories of regional development: Stages of development, economic base theory, Industrial location theory, Growth Pole theory; Core-periphery interactions.

Regional planning in India; Planning regions in India; Regional disparity in development; Special area development planning (hilly area development planning, (North-Eastern regional council, Mumbai Metropolitan Regional Development Plan).

**Urban Planning:** Concepts; history and origins of urban planning; pioneers of urban planning; types of urban plans: New towns, neighborhood, garden city, green belts; healthy urban planning, WHO concept of healthy city, livable city, sustainable city.

Urban policy since independence, five year plans, important urban plans (New Delhi, Navi Mumbai, Chandigarh); Smart Cities Mission; HRIDAY, AMRUT, PURA, RURBAN mission

#### **IV. Challenges in Urban planning**

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housing and real estate, Slums and slum rehabilitation, The case of SRA in Mumbai; Urban pollution, Solid waste management; Management of migrants

#### **V. GIS and Urban and Regional Planning**

Application of GIS in urban and regional planning.

### **Essential Reading List**

1. Friedman, John and William Alonso (1964) *Regional Development and Planning: A Reader*, The MIT Press, Massachusetts.
2. Friedman, John (1966) *Regional Development Policy: A Case Study of Venezuela*, MIT Press, Massachusetts.
3. Chaudhuri, J. R. (2001) *An Introduction to Development and Regional Planning*, Orient Longman, Hyderabad.
4. Chand, M and V.K. Puri, (1983), *Regional Planning in India*, New Delhi, Allied.
5. Friedman, J and W. Alonso, (eds: 1969), *Regional Development and Planning: A Reader*, Cambridge, MIT Press.
6. Lefebvre, H (1991) *The Production of Space*, Blackwell, Oxford.
- 7.
8. Hall, P, (1992), *Urban and Regional Planning*, Third Editions, London, Routledge.
9. Harvey, D. (2008) 'The Right to the City', *New Left Review* 53 (September-October): 23-40.
10. Harvey, D. (2012) *Rebel Cities: From the Right to the City to the Urban Revolution*, Verso, London.
11. Husain, M, (1994), *Human Geography*, Jaipur, Rawat.
12. Leong, Goh C. and G.C. Morgan, (1982), *Human and Economic Geography*, Singapore, Oxford University Press.
13. Singh, R. Y. (1994), *Geography of settlements*, Rawat, Jaipur.
14. Ginsburg, N., Bruce Koppel and T.G. Mc Gee (1991) *The Extended Metropolis: Settlement Transition in Asia*, University of Hawaii Press, Honolulu.
15. Nath, V. (1971) Regional Development Policies ", *Economic and Political Weekly*, 6(30-32): 1601-1608.
16. Lo, C.P. and Yeung, A. K. W. (2002): *Concepts and Techniques of Geographic Information Systems*. Prentice Hall of India, New Delhi.
17. Nyerges, Timothy L. and , Jankowski Piotr (2010): *Regional And Urban Gis: A Decision Support Approach*, Rawat Publication, Jaipur. ISBN: 9788131603697, 8131603695

### **Suggested readings**

1. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolution of regional planning*, London, Edward Arnold.
2. Kawashima, T and P. Korcelli, (1982), *Human Settlement Systems: Spatial Patterns and Trend*, Luxemburg, IIASA.
3. Knowles, R and J. Warling, (1983), *Economic and Social geography: Made Simple*, London, Heinemann.
4. Misra, R.P, (1992), *Regional planning: Concepts, Techniques, Policies and Case studies*, New Delhi, Concept.
5. Sarin, M, (1982), *Urban Planning in the Third World: The Chandigarh Experience*, London, Manshell.
6. MMRDA(2016), *Mumbai Metroplitan Regional Development Plan 2016-2036* MMRDA, Mumbai.
7. UNEP and others (2007), *Livable Cities: The benefits of environmental planning* , The Cities Alliance, Washington. <http://www.citiesalliance.org/index.html>.

<b>MBD E-3.2</b>	<b>Large-scale Sample Surveys</b>	<b>45 Hours</b>
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#### **Unit I: Scope of large scale surveys and sampling design**

Need for large scale surveys, objectives of cross-sectional, longitudinal, rotational and interpenetrating surveys. Sample size determination and sample allocations for such surveys to districts, states and regions in terms of individuals, households and primary sampling units.

#### **Unit II: Sampling frames**

Sources of sampling frame for cross-sectional, longitudinal, rotational and interpenetrating surveys. Explicit and implicit stratifications, domain controlled sampling by regions and social groups, merging and segmentation procedures for small and large primary sampling units. Mapping and listing for preparation of frame for last stage sampling units. Sample selection of PSUs and households.

#### **Unit III: Quality assurance procedures**

Revisit of sub-samples, field check tables, non-response pattern, and quality lot assurance, roles of supervisors, editors, field and nodal agencies. Third party audit.

#### **Unit IV: Software development**

Computer assisted personal interview (CAPI), process of data transfers, introduction to features of Census and Survey Processing System (CSPro), steps for development of data entry software in CSPro.

#### **Unit V: Ethical considerations in large-scale sample surveys**

#### **Unit VI: Estimation of sampling weights**

#### **Unit VII: Preparation of factsheets, reports and other deliverables**

## Reading List

1. United Nations (2005): Household Sample Surveys in Developing and Transition Countries. [www.unstats.un.org/unsd/hhsurveys/](http://www.unstats.un.org/unsd/hhsurveys/)
2. CSPro Software. [www.census.gov/data/software/cspro.Download.htm](http://www.census.gov/data/software/cspro.Download.htm)
3. Kish, Leslie, (1995): Survey Sampling, John Wiley and Sons, Inc. New York.
4. Lohr L. Sharaon., (1999): Sampling: Design and Analysis, Duxbury Press, London
5. Ladusingh, L. (2018). Survey Sampling Methods, PHI Learning, New Delhi
6. Roy, T.K., Acharya R., Roy, A.K. (2016). Statistical survey design and evaluating impact, Cambridge University Press, New Delhi.

<b>MBD E-4.1</b>	<b>Concepts and Measures of Global Health</b>	<b>45 Hours</b>
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**Rationale:** This course introduces to the students the basic concepts of global health. This course emphasizes on understanding the global burden of disease and measuring population health. A key component of this course is to understand the determinants of health and health disparities. It will also provide student with a broad understanding of the relationship between environment and health. It also develops the understanding of the students about the health care delivery system, human resources for health, migration of human resources for health, etc. Finally, it introduces to students the issues related to policy and health. The topics that will be covered in the course are listed below:

1. **Concept and introduction:** Concept of global health; why is it important to study global health?; health and development in the global context; demographic, health and epidemiological transitions; major patterns of distribution of disease in the world; sources of data on disease and disability
2. **Global burden of disease:** Concept of burden of disease; hypotheses related to burden of diseases – compression of morbidity, expansion of morbidity and dynamic equilibrium; measures of burden of disease at the population level – health expectancy and health gap; methods for estimating DFLE, HALE and DALY; how does the burden of disease and mortality vary by geography, social class, race and gender? GBD 1990, 2010 and 2013 – changes and continuities; new and re-emerging infectious diseases; issues related to HIV/AIDS; introduction to NCDs; double burden of diseases in developing countries; impact of tobacco abuse; trends and challenges related to maternal and child health; maternal mortality
3. **Determinants of Health:** Culture, gender, race, social, political and economic determinants of health and health disparities; contribution of income, education and other factors to health; Factors responsible for variation in the global burden of disease across countries; poverty and health; income inequality and health; health risk factors
4. **Environment and health:** Role of water, sanitation, indoor and outdoor air pollution and nutrition in explaining global health disparities; climate change and health; migration, disaster (man-made, natural), conflicts and epidemics

5. **Health care delivery systems:** Introduction to health systems; how to measure performance of health system?; health systems in different countries; factors responsible for better performance of health systems in developed countries; the distribution of human resources for health; quality of human resources for health; the push and pull factors associated with the migration of health care providers
6. **Policy and health:** Human rights approach to health; national and international policies related to health; how are global health priorities set?; the role of international actors like WHO, World Bank, etc. in global health; influence of international priorities on national priorities

### **Essential Reading List**

1. Skolnik, R. (2008). *Essentials of global health*, Jones and Bartlett: Sudbury, MA.
2. Jacobsen, K.H. (2007). *Introduction to global health*, Jones and Bartlett: Sudbury, MA.
3. Markel, W.H., Fisher M., Smego R. (2007). *Understanding global health*, McGraw Hill: Columbus.
4. Merson, M.H., Black, R.E., Mills, A.J. (2001). *International public health: diseases, programs, systems and policies*, Gaithersburg, MD: Aspen Publishers.
5. Murray, C.J.L., Saloman, J.A., Mathers, C.D., Lopez, A.D. (2002). *Summary measures of population health: concepts, ethics, measurement and applications*, The World Health Organization: Geneva.
6. Murray, C.J.L., Saloman, J.A., Mathers, C. (2000). A critical examination of summary measures of population health, *Bulletin of the World Health Organization* 78(8): 981-994.
7. Cutler, D., Deaton, A., Lleras-Muney, A. (2006). The determinants of mortality, *Journal of Economic Perspectives* 20(3): 97-120.
8. Link, B.G., Phelan, J. (1995). Social conditions as fundamental cause of disease, *Journal of Health and Social Behavior* 35: 80-94.
9. Smith, J.P. (1999). Healthy bodies and thick wallets: the dual relation between health and economic status, *Journal of Economic Perspectives* 13(2): 145-166.
10. Shiffman, J. (2009). A social explanation for the rise and fall of global health issues, *Bulletin of the World Health Organization* 87(8): 608-613.
11. Gwatkin, D.R. (2000). Health inequalities and the health of the poor: what do we know? What can we do? *Bulletin of the World Health Organization* 78(1): 3-18.
12. Laxminarayanan, R. et al. (2006). Advancement of global health: key messages from the Disease Control Priorities Project, *Lancet* 367(9517): 1193-1208.
13. Murray, C.J.L., Frenk, J. (2000). A framework for assessing the performance of health systems, *Bulletin of the World Health Organization* 78(6): 717-731.
14. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In *Disease Control Priorities in Developing Countries* (2<sup>nd</sup> Edition), pages 87-102, New York: Oxford University Press.
15. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
16. Anand, S., Baernighausen, T. (2004). Human resources and health outcomes: a cross country econometric study, *Lancet* 364(9445): 1603-09.



17. Chen, L. et al. (2004). Human resources for health: overcoming the crisis, *Lancet* 364(9449): 1984-1990.
18. Pallikadavath, S., Singh, A., Ogollah, R., Dean, T., Stones, W. (2013). Human resource inequalities at the base of India's public health care system, *Health & Place* 23: 26-32.
19. Zurn, P., Dal Poz, M.R., Stilwell, B., Adams, O. (2004). Imbalance in the health workforce, *Human Resources for health* 2(13): 1-12.
20. Willis-Stattuck, M. et al. (2008). Motivation and retention of health workers in developing countries: a systematic review, *BMC Health Services Research* 8: 1-8.
21. Brown, T.M., Cueto, M., Fee, E. (2006). The World Health Organization and the transition from 'international' to 'global' public health, *American Journal of Public Health* 96(1): 62-72.
22. Ruger, J.P. (2005). The changing role of the World Bank in global health, *American Journal of Public Health* 95(1): 60-70.
23. Ravishankar, N. et al. (2009). Financing of global health: tracking development assistance for health from 1990-2007, *Lancet* 373(9681): 2113-2124.
24. London, L. (2008). What is a human-rights based approach to health and does it matter? *Health Human Rights* 10(1): 65-80.

<b>MBD E-4.2</b>	<b>Gender, Development and Health</b>	<b>45 Hours</b>
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The rationale of the course is to synthesize the issues studied in different papers and equipping the students with a number of gender sensitive indicators and analytical tools.

**Section 1: Introduction:** The purpose of this section is to explain the basic concepts of three major components of this course namely gender, health and development.

1. The Concept of gender, Evolution of gender in historical perspective
2. Patriarchy, Kinship Structure and gender roles, Feminist theories, Gender stratification in traditional and modern societies, Gender Analysis Tools, Gender Sensitive Indicators and Gender budgeting and auditing
3. Concept of health, Evolution of the concept of Reproductive Health, life cycle approach to RH and recommendations from ICPD
4. Changing concept of development, Indicators of development, gender adjusted HDI

**Section 2: Gender and Health:** This section presents the situation analysis regarding sex differentials in different aspects of health and highlights some special issues of women and men's health.

***Situation analysis of sex differentials in morbidity and mortality***

1. Major morbidity and mortality burden in the developing world with major focus on India- sex ratio of births, major health problems experienced by women and men, reproductive health of women and men in developing world, differentials in use of male and female methods of contraception

2. Health infra-structure and health care providers
3. Nutritional status, susceptibility to infections
4. Accidents and other risk factor and health seeking behavior
5. Health and Nutrition issues of adolescent of boys and girls, abuse and maltreatment, Puberty, Sexual Debut, Adolescent Pregnancy, Abortion, women and family planning programs, Contraceptive Technology
6. Major risk factors of men's health: masculinity, alcoholism, tobacco and drug consumption, accident
7. Gender and Sexuality: Sexual health of men and women, gender dimension of HIV /AIDS. Gender and Infertility

**Section 3: Gender and Development:** The purpose of this section is to understand the sex differentials in health in terms of socio- economic and cultural context of gender and to study the gender dimensions of development.

1. Understanding social structures- role of caste, class, ethnicity and religion and gender in health inequalities and health outcomes
2. Gender dimension of social development, status and role of men and women in household and community, culture, marriage customs, dowry and bride price practices, age at marriage
3. Gender differentials in household headship and role in decision making
4. Gender differences in access to knowledge-, education, exposure to media and freedom of movements
5. Gender based violence- Domestic and community violence and gender, Legal aspects of domestic violence and rape
6. Women's role in community life and involvement in politics-as voter, political worker and leader, women in Panchayati Raj Institutions and self-help groups
7. Media representation of men and women
8. Gender dimension of economic development: women's access to economic resources, entitlements, land ownership, inheritance laws, access to credit, measurements of women's work, profiling women's work, informal sector involvement, working condition, maternity benefits, wage differentials, gender and poverty
9. Globalization, changing pattern of economic activity, issues of marginalization and vulnerability along with agency, negotiation and spaces of power, Gender Divisions in Urban Labor Markets, Gender and Migration
10. Housing, Household environment and its differential impact on men and women's life
11. Environmental degradation, changes in climate, water table and land use and their differential impact on men and women

**Section 4: Gender mainstreaming in health and development programs:** The purpose of this section is to understand the concept of mainstreaming gender in development and to review the measures taken for eliminating undesirable impact of gender inequalities and to bring women in the main stream of development

1. The concept of Gender Mainstreaming

2. Historic overview of Gender Mainstreaming- Women in development (WID)- concept and criticism by feminist; shift to Gender and Development (GAD), Gender Mainstreaming and the Millennium Development Goals (MDGs)
3. The rights approach to Health, sexual and reproductive rights, violence, human rights and health
4. Paradigm shift from the Target Based Supply Driven Fertility influencing programs to RH Approach.
5. Legal aspects – laws regarding marriage, dowry, domestic violence, ,rape PNDT act , property inheritance, maternity and other benefits of working women, sexual harassments at workplace, reservations in political institutions and
6. Gender mainstreaming in various health and development sectors- e.g. Agriculture, Health, Education, gender in work place (Public & private) etc.
7. Advocating for Gender equality
8. Gender responsive policy making and planning of health and development programs.

### **Section 5: Some case studies of Gender analysis of health and development**

**programs, budgeting and auditing:** This section aims to give necessary skills and tools to undertake the gender analysis of health and development policies and programs and to help them to develop gender sensitive indicators and measures

### **Essential Reading List**

1. Basu, Alaka M., (1992): *Culture, The Status of Women and Demographic Behaviour*, Oxford University, New York.
2. Bhasin K. 1993. *What is patriarchy?*, Kali for Women Publishers, New Delhi.
3. Bhasin K. (2000). *Understanding Gender*, Kali for Women Publishers, New Delhi.
4. Dyson, Tim and Mick Moore, (1983). “On Kinship structure, female autonomy, and demographic behaviour in India”, *Population and Development Review* vol. 9(1), pp. 35-60.
5. Ellsberg Mary and Heise Lori L. (2005) *Researching violence against women: A practical guide for researchers and activists*. WHO and Path, Washington D.C.
6. Folbre, Nancy. (1992). Improper arts: Sex in classical political economy. *Population and Development Review*. 18(1): 105-112.
7. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): *Population Policies Reconsidered: Health and Empowerment and Rights*, Harvard University Press, Harvard.
8. Jeffery Patricia and R. Jeffery. 1997. *Population Gender and Politics: Demographic change in rural north India*. Cambridge University, Cambridge.
9. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, New York.
10. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social Science Research*. Sage Publication, London.
11. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economic and Social Affairs (Dept. of), New York
12. World Health Organization. (1998). *Gender and Health. Technical paper* WHO/FRH/WHO/98. (Website: [www.who.int](http://www.who.int))
13. World Bank. (1991). *Gender and Poverty in India*. World Bank, Washington.

14. World Health Organization (2003): *Comparative Evaluation of Indicators for Gender Equity and Health*, Women and Health Programme, Centre for Health Development, Kobe, Japan.
15. William Joan. 1989. Deconstructing Gender, 87 Michigan L Rev. 797. *Law Journal Article*

### Suggested Readings

1. Agnes, Flavia. (2000). Law and gender inequalities: the policies of women's right in India. Oxford, New Delhi.
2. Anker, R.(1997). *Gender and Jobs: Sex Segregation of Occupations in the World*, ILO, Geneva.
3. Balk, Deborah, (1997): "Defying Gender Norms in Rural Bangladesh: A Socio demographic Analysis". *Population Studies* Vol.51, pp. 153-172.
4. Bandhopadhyay, D. 2000. Gender and governance in India. *Economic and Political Weekly*. 35(3): 2696-269xxx).
5. Basu, AlakaMalwade. 2000. Gender in population research: Confusing implications for health policy. *Population Studies*. 54: 19-22.
6. Das Gupta, Monica, 1987. Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1): 77-100.
7. DoyalL.(1995) What Makes Women Sick: Gender and the Political Economy of Health. London, Macmillan.
8. Dreze, Jean and Sen Amartya, (1995): *India: Economic and Social Opportunity*, Oxford University Press, New York.
9. Harriet B. Presser, (1997): Demography, Feminism and the Science-policy Nexus, *Population and Development Review* Vol. 23(2), pp. 295-331.
10. Jeffery, Roger and Basu, Alka M. (Eds.), (1996): *Girls Schooling, Women's Autonomy and Fertility Changes in South Asia*, Sage Publications, New Delhi.
11. Jejeebhoy S. 1996. *Women's Education, Autonomy and Reproductive Behavior: Assessing what we have learned*. East West Centre, Hawaii.
12. Reeves Hazel and Baden Sally (2000): *Gender and Development: Concepts and Definitions*, Report No. 55, Bridge (development- gender) Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK.
13. Sonya, Andermahr, Lovell Terry and Wolkowitz, Carol, (1997): *A Glossary of Feminist Theory*, Arnold-Hodder Headline Group, London.
14. Sopher, David, (1980). *An Exploration of India: Geographical Perspective on Society and Culture*, Cornell University New York

<b>MBD E-5.1</b>	<b>Population Ageing and Health Transition</b>	<b>45 Hours</b>
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The aims of this course are:

- 1) To impart knowledge of concepts and theoretical framework relating to demography of ageing, and health, social and economic dynamics of population ageing
- 2) To impart concepts and theories of health transition, linkage between health transition and ageing transitions

- 3) To develop skills to analyze trends, determinants and consequences of population ageing
- 4) To build capacity to understand and use theoretical and empirical advancements to develop strategies, policies and programmes to meet challenges of population ageing and plan for health care and social and economic wellbeing of ageing population.

### **I Demography of Ageing:**

A. Concepts and measures of population ageing; components of population ageing; Inter-relationship between population ageing, fertility, mortality and migration; population ageing and momentum of population growth, age structure transition and ageing, and declining population.

B. Population ageing trends and patterns in developed and developing countries; Factors determining ageing trends and patterns; Projected trends and pattern of population ageing; global and regional perspective.

C. Population ageing trends, patterns and determinants in India; state variations; future scenario of population ageing in India and states.

### **II Life Course Perspective and Social Dynamics of Ageing:**

A. Life course perspective of population ageing; Age and Ageing, Ageism; Social Status and Roles of Elderly, Family Structure, Intergenerational relations, Kinship and family support, Social Security; Social network- Frameworks (Berkman and others) and measurement.

B. Living Arrangements of Elderly, Old Age Homes, Social Networks, and Contribution of elderly: “Feminization” of Ageing, Dependency, Gender Dimensions and Discrimination, Widows, Elderly abuse, Social and legal Vulnerability, Legislations to protect elderly in India.

**III Health Transition:** Understanding Health Transition and Ageing Transition; Critiques of “Health Transition” and “Epidemiological Transition” theory: Mortality and Morbidity Compression, Age Patterns of Mortality and Morbidity; Global burden of disease, communicable diseases, injuries and violence; Health Transition and emergent infectious diseases; social epidemiology and medical social determinants of health as fundamental causes of chronic disease; social determinants of health; the relative income hypothesis and the social gradients of health for ageing population: Healthy Ageing; WHO Framework for Healthy Ageing.

### **IV Ageing and Health:**

A. Ageing and Life Expectancy: ageing and life expectancy; changing age pattern of mortality, oldest old mortality; ageing and epidemiological transition in disease prevalence and patterns; Measuring population health; life expectancy and disability free life expectancy, health adjusted life expectancy.

B. Ageing and Burden of Disease: Measurement issues in assessing burden of chronic and multiple diseases in ageing populations; Self-Reported Prevalence, Symptom based prevalence; Measured Prevalence; burden of non-communicable diseases, dual burden of communicable and non-communicable in developed and developing countries; injuries and violence Indian scenario; Ageing, Intrinsic Capacity and Biomarkers of Ageing.

C. Ageing and Functional Health: Ageing and disabilities; trends and prevalence; ageing and injuries, ageing and functional health on various domains- mobility, self-care, pain, vision, interpersonal activities, sleep and energy; Ageing and Quality of Life, WHOQoL Ageing and Disability; WHODAS; Ageing and wellbeing and Life satisfaction.

D. Ageing and mental health problems; cognition, memory loss, dementia and depression; Alzheimer's and Parkinson.

E. Ageing and health risk factors: nutrition, diet and food practices; health risk behaviour- tobacco, alcohol; physical activities; Access to minimum living conditions (sanitation, water).

### **V Health Care System for Geriatric Care and Health Financing:**

A. Availability and accessibility to geriatric care, Geriatric Health Care Institutions; Human Resource Development for Geriatric Care; institutional care; Long-term Care; Health Systems Inequalities for Addressing NCDs.

B. Ageing, health care and health financing: health care utilization, public and private health services utilization; outpatient and inpatient health care utilization; sources of health spending; out of pocket health expenditure; lack of health care options for elderly; Health induced impoverishment among elderly.

### **VI Population Ageing and Economic Conditions:**

A. Population Ageing and Labour Force: Implications of population ageing on labor force, Retirement and work participation among elderly; occupational distribution among the elderly.

B. Ageing and Public Finance: Ageing, savings and investment; pressures on public finance - government health expenditure; implications for health insurance and health financing for elderly, Implications for Government expenditure for social security – pension, social support and housing; The Solow model with an ageing population, Becker's family model; Bloom and Williamson's model; ageing and poverty; Ageing, health and development.

### **VII Ageing Policies and Programmes:**

A. Social and Economic Support Policies and Programmes for the Elderly- Retirement, Pensions and Social care Policies in developed and developing countries. Social security and welfare policies and programmes for elderly in India. National Programmes for Health Care of Elderly (NPHCE); National Policy for Senior Citizens.

B. Organizations Engaged in Wellbeing of Ageing Populations: Helpage International, Dignity Foundation, Age in Action, Age International, [Alliance for Aging Research](#), Alzheimer's Disease International (ADI), [The Parkinson Alliance](#), Geriatrics Societies and Gerontological Associations; Age –friendly world: environment, security and health care.

C. Worldwide Longitudinal Ageing Studies in 40 countries: LASI, SAGE, SHARE, HRS, CHARLS, JSTAR, ELAS, KLoSHA

### **Reading List**

7. World Health Organization (2015), *WHO Report on Ageing and Health*, WHO, Geneva.

8. United Nations (1994), *Ageing and the Family*, United Nations, New York
9. United Nations (1998), *Economic and Social Implications of Population Ageing*, Department of International Economic and Social Affairs, UN, New York.
10. United Nations (2001): *Living Arrangements of Older Persons: Critical Issues and Policy Responses*. Population Division, Department of Economic and Social Affairs, Special Issue Nos. 42/43, 2001, New York.
11. UNFPA, 2001, *Population Ageing and Development: Social, Health and Gender Issues*, United Nations, Malta.
12. Bloom, D.E., D. Canning, et.al. (2002): *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. Santa Monica, CA, RAND.
13. Bose, A.B. (2006). *Social Security for the Old*. New Delhi: Concept Publishing Company.
14. Linda J. Waite (ed.) (2004) *Aging, Health, and Public Policy: Demographic and Economic Perspectives*, Supplement to Population and Development Review
15. Irudaya Rajan, (2007) *Social Security for the Elderly Experiences from South Asia*, Routledge, New Delhi.
16. Prskawetz, Bloom, and Lutz, eds., 2008 *Population Aging, Human Capital Accumulation, and Productivity Growth*, A Supplement to Population and Development Review.
17. Sandra Gruescu, (2006), *Population ageing and economic growth*. Physica-Verlag
18. Heslop A (1999), *Ageing and Development*, Social Development Working Paper: 3, Help Age International.
19. M. Alam (2004). Ageing, old age income security and reforms: An exploration of Indian situation. *Economic and Political Weekly*, 39(33): 3731-3740.
20. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), *Age-structural transitions: challenges for development*. Paris: CIRCRED.
15. Berman, Lisa (2000) "Social Support, Social Networks, Social Cohesion and Health" *Social Work in Health Care* [http://dx.doi.org/10.1300/J010v31n02\\_02](http://dx.doi.org/10.1300/J010v31n02_02)

<b>MBD E-5.2</b>	<b>Population, Environment and Sustainable Development</b>	<b>45 Hours</b>
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### **Objectives:**

After the successful completion of this paper, students will be able to:

- 1) Define the concept of sustainable development and explain how the idea of sustainability and development has changed over time.
- 2) Understand how the policies have evolved in line with the concept of sustainable development and population trends.
- 3) Critically examine the recent trends in sustainable development with specific focus on population changes.
- 4) Apply sustainable development concepts and policies to current population, environmental and developmental issues.

## **Modules**

### **1. Sustainable development: Conceptual and Theoretical issues**

Importance of Studying Sustainable development; Meaning, Concepts and Definitions; Inter-linkages between ecology and development; Economic growth and ecological degradation; Indicators and processes involved in its achievement; Brundtland Report on Environment and development and agenda.

### **2. Innovations for Sustainable Development**

Conventional perspectives on development; Critics of Conventional Development perspectives; Case studies based on experiences from developed and developing countries; How the concept of sustainability has influenced the policy, programme practice in development sectors

### **3. Population-environment linkages**

Ecological and environmental dimensions of sustainable development; Approaches to environment; Gandhian approach, Marxian/Socialist approach, Neo-classical approach, Market approach; Population growth and climate change; Population matters to sustainable development and environment (growth, age structure, spatial distribution)

### **4. Population and Quality of Life**

Quality of life: definition and measurement; Resource creation, management and distribution of water, air, housing, etc; Land, Cattle and open Space linkages; Sanitation, Health and health care; Education and Information.

### **5. Environmental Degradation and Poverty**

Sustainable livelihoods; Population and common property resources; Population, poverty and vulnerability; gender dimensions; Grass-root perspectives – Environment-Development struggle; Development and displacement; Alienation of tribal; Tribal land encroachment; Forest Depletion; Case studies – Narmada and Vedanta (Orissa) Projects.

### **6. Environmental issues in the context of migration and displacement**

Regional Development; Green Movements; Chipko movement; Silent valley movements etc; Natural Calamities – Flood, Droughts, Landslide, Earth Quakes, Tsunami etc; Urbanization-new challenges- environmental health hazards (water or



air pollution); Solid Waste Management; Rain Harvesting; Mobility and Patterns of settlement; Development and urban ecology; Slums, Urban Poverty and Rehabilitation.

## **7. Governance for Sustainable Development**

Issues related to natural resources management; Forest management; Mining of natural resources, Ground Water, River and Ocean Pollution; Different institutional arrangements for environmental protection and their limitations; Creating and managing emission related norms; Some success models of efficient environmental management – CNG, Smokeless Choolah, and other successful green models; The Challenges for International Environmental Governance; Emerging new institutions of environmental protection; Capacity Building, Technology Transfer for Sustainable Development.

## **8. Population, Society and Sustainable development**

Population and resources; Human versus land ‘carrying capacity’; ‘Population stabilization’ to ‘Population balance’; Critiques of sustainable development perspectives; Role of social institutions; Individual behavior in the context of social costs and benefits; Gender and environment; Indigenous population and traditional methods of environmental sustainability; Sociological approaches to sustainable development; Vulnerability of Indigenous population; Case Studies – Sacred forests, Anti-Eucalyptus movement

## **9. Contemporary issues**

Affluence and environment: How rich countries are also responsible for the sad state of affairs?; NGOs and Development issues; Civil society initiatives and involvement; International Agencies; Population and Biodiversity; Research Methods to examine Population, sustainable development and environment nexus.

### **Essential Reading List**

1. Bongaarts, John. (1992). Population growth and global warming. *Population and Development Review*, 18: 299-319.
2. Bründtland, G.H. (1987). *Our Common Future: The World Commission on Environment and Development*, Oxford, Oxford University Press.
3. Clarke, John I. (1996): “The Impact of Population Change on Environment: An Overview.” in Bernardo Colombo, Paul Demeny, and Max F. Perutz, (Eds.), *Resources and Population: Natural, Institutional, and Demographic Dimensions of Development*. Clarendon Press, Oxford, pp. 254-268.

4. Davis , Kingsley and Mikhail S. Bernstam (eds.) (1991), *Resources, Environment, and Population: Present Knowledge, Future Options*. New York: Oxford University Press.
5. Dawson, P. J, and R. Piffin, (1998), Is there a long run relationship between Population growth and living standards? The case of India, *Journal of Development Studies*, 34. 149-156.
6. Demeny, Paul. (1989). Demography and the limits to growth. In Michael S. Teitelbaum and Jay M. Winter (eds), *Population and Resources in Western Intellectual Traditions*. Supplement to *Population Development Review*. New York: Population Council.
7. Diana Liverman, Emilio F. Moran, Ronald R. Rindfuss, and Paul C. Stern, (Eds). (1998): *People and Pixels: Linking Remote Sensing and Social Science*. Committee on the Human Dimensions of Global Change, Commission on Behavioral and Social Sciences and Education, National Research Council, National Academy Press:Washington DC.
8. Dietz, Thomas and Eugene A. Rosa.(1997): "Effects of population and affluence on CO2 emissions." *Proceedings of the National Academy of Sciences*. Vol. 94l pp. 175-179.
9. Government of India (1999): *Silent Revolution for Environmental Conservation*, Ministry of Environment and Forests, New Delhi.
10. Guha, Ramachandra and Martinez-Alier,J ( 1998): *Varieties of Environmentalism*, Oxford University Press, New Delhi.
11. Hardin, Garrett.(1968): "The Tragedy of the Commons." *Science*. Vol. 162, No. 13, reprinted in Rex R. Campbell and Jerry L. Wade, (Eds), *Society and Environment: The Coming Collision*. Allyn and Bacon, Inc: Boston, MA, pp. 1243-1248.
12. Harris, J.M. (2004) *Basic Principles for Sustainable Development*, Global Development and Environment Institute, working paper 00-04. (Available at [http:// ase.tufts.edu/gdae/publications/Working\\_Papers/Sustainable%20Development.PDF](http://ase.tufts.edu/gdae/publications/Working_Papers/Sustainable%20Development.PDF)).
13. Holdren, J. P., and P. R. Ehrlich.( 1974). Human population and the global environment. *Am. Sci.* 62: 282-292.
14. Kem, R., Parto, S. and Gibson, R.B.(2005). Governance for Sustainable Development: Moving from theory to practice, *The International Journal of Sustainable Development*, 8(1/2), 12-30.
15. Keyfitz, N. (1991). Population and development within the ecosphere: one view of the literature. *Population Index*, 57: 5-22.
16. Lafferty.W. (ed.) (2004). *Governance for Sustainable Development. The Challenge of Adapting form of Functions*, Cheltenham: Edward Elgar, (chapter 1 and 11).
17. Lutz, Wolfgang, A.Prskawetz and W.C.Sanderson (eds.) (2002). *Population and Environment: Methods of Analysis*. Supplement to *Population and Development Review*. New York, Population Council.
18. McNicoll, Goefferey.( 2005). *Population and Sustainability*. Working paper No.205. New York, Population Council.
19. Pebley, Anne R. (1998): "Demography and the Environment." *Demography*. Vol. 35, No. 4; pp. 377-389.
20. Pimental, David, et al. (1999). Will limits of the Earth's resources control human numbers? *Environment, Development and Sustainability* 1: 19-39.
21. Preston, Samuel H. (1994). *Population and Environment: From Rio to Cairo*. Liège: International Union for the Scientific Study of Population (IUSSP).

22. Simon, Julian L. (1996). *Population Matters: People, Resources, Environment, and Immigration*. Transaction Publishers: New Brunswick, NJ.
23. UNFPA (2009): *State of World Population- 2009: Facing a changing world: Women, Population and Climate*, UNFPA, New York.
24. Zelezny, Lynnette C., Poh-Pheng Chua, and Christina Aldrich (2000): "Elaborating on Gender Differences in Environmentalism." *Journal of Social Issues*. Vol. 56, N. 3; pp. 443-457.

<b>MBD E-6.1</b>	<b>Health Economics and Health Financing</b>	<b>45 Hours</b>
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### **Objectives:**

- To familiarize the students with basic concepts, theories and models in health economics and how to apply the economic tools in analyzing the structure and performance of health care sector.
- To provide an understanding on the functioning of health care markets and health care industry.
- To orient and encourage the students to understand main economics of health and micro financing of health care.

### **I: Introduction to Health Economics**

Defining health economics, why health economics is important, basic concepts in microeconomics, health across world and over time, scope of health economics, map of health economics, basic questions confronted by health economist, concept of efficiency and equity in health, Production Possibility Frontier (PPF), economic gradient of health, causation of income and health, Preston Curve, economic models and analysis, expenditure function, Theories of X and Y, positive and normative economics.

### **II. The Demand for Health and Health care**

What is Health and Good Health, Utility Analysis, Health as a form of human capital, What is Medical Care, The production of Good Health, Empirical evidences in the production of health, Health as human capital, Grossman Model, The Demand for Health Care, Demand function for health, Economic and non-economic factors of health care, Fuzzy Demand Curve, Price and income elasticity of demand for health care, Important consideration in estimating health care demand elasticity, provider's behavior, Empirical findings, externalities and market failure.

### **III. Medical Care, Production and Cost**

The Short-Run Production Function of the Medical Firm, Total Product, Marginal Product and Average Product Curve, Law of diminishing marginal productivity, The importance of costing in Health Economics, Short-run cost theory of medical firm, short run cost curves, Cost analysis, Implicit and explicit cost, , factor affecting short-run cost curves, cost minimization, constraints in measuring health cost

#### **IV. Measuring Health Inequalities**

##### ***Measurement of health inequality: A Prelude***

Why measure health inequality; Health equity and inequality: Concept and definitions; Understanding of the concepts such as need, access and utilisation; cardinal and ordinal health variables

##### **Black Report and Beyond**

Historical Background of Black Report, Explanation for social class differences, major empirical theme since Black report

##### **Measures of health inequality:**

Measures of health inequality: Index based approach; Axiomatic approach to measurement; Individual-mean and inter-individual comparison; WHO Index, Coefficient of Variation, Generalised Entropy Index, Lorenz Curve and Gini Coefficient

##### ***Measuring socioeconomic rank related health inequality***

Slope index of inequality; Relative index of inequality; Concentration curve and concentration index: various ways of computing; Standardization; Inequality aversion; Normalised and Generalised concentration index; Corrected concentration index

##### ***Measuring inequality in healthcare utilisation***

Horizontal inequality; Vertical inequality; Regression based approach; Measurement of horizontal inequalities; Group inequality, common measures, Gini type index

#### **V: Health Financing**

Health financing in low, middle and high income countries, demographic transition, epidemiological transition and health expenditure, disparity in disease burden and percapita health spending, sources of health care in India, out-of-pocket expenditure on health care, catastrophic health expenditure, approaches in measuring catastrophic expenditure, impoverishment, health care payment and poverty, national and regional patterns of catastrophic health spending, determinants of catastrophic health spending, Drivers of health care expenditure, health financing in India, Equity in health care finances, Willingness to pay for health care, User charges as determinant of health financing

#### **VI. Measuring Health**

Importance of Measures of general health status and quality of life, Measuring health outcomes, human life and Quality Adjusted Years of Life, Quality Adjusted Life Years (QALYs) and Health Year Equivalents (HYEs), Economics of Prevention and Public Health – Economic evaluation of prevention programs (include ADL and IADL for aged)

#### **VII. Health Insurance**

Health care system, a model of health care system, defining health insurance, need for health insurance, type of health insurance, demand for private health services, factors affecting the quantity demanded of health insurances, moral hazards, deductibles, co-insurance, managed care, adverse selection, loading fees, employed based insurance, reimbursement, selection effect, intermediary agent, regulation of health insurance, Need for Government intervention, Trends of health insurance, Coverage of health insurance in India

### VIII. Economic Evaluation

What is economic evaluation? Cost analyses; direct cost, Indirect cost, tangible cost, capital cost, fixed cost, variable cost, Opportunity cost, average cost, marginal cost, Incremental cost, steps in cost analyses: Identification, measurement and valuation, Various types of economic evaluation used in health care: Cost effectiveness analysis (CEA) Cost-Benefit Analysis (CBA), Divergence between social and private costs and benefits in health care, Limitations of economic evaluation, Consumer Impact Assessment.

### Reading List

- Culyer A J and J P Newhouse, 2000, The state and scope of health economics, Handbook of Health Economics, Volume 1A, Eds. Culyer and Newhouse, Elsevier, 2000.
- Dewar D M , Essentials of health economics, Chapter 3
- Drummond MF, Sculpher MJ, Torrance GW, O'Brien B, Stoddart GL, eds. Methods for economic evaluation of health care programmes, Third Edition, Oxford University Press, 2005.
- Erreygers, G (2009b), Correcting the Concentration Index. *Journal of Health Economics* 28, 516–520.
- Grossman (1982), On the concept of Health capital and Demand for Health, *Journal of Political Economy*, 80(2)  
<http://www.sciencedirect.com/science/handbooks/15740064>
- Macintyre S (1997). The Black Report and Beyond-What are the issues, *Social Science, Medicine*, 44(6):723-745
- O'Donnell O. et al (2008), *Analysing health equity using household survey data: A guide to techniques and their implementation*, The World Bank
- O'Donnell O, Doorslaer E v, Wagstaff A and Lindelow M. Analyzing Health Equity Using Household Survey Data, A Guide to Techniques and Their Implementation
- Rexford E. Snterre and Stephen P. Neun, *Health Economics: Theories, Insights and Industry Studies*, Thompson South – Western, 3<sup>rd</sup> Edition (614, San/Hea, 073226)  
 Note: 4<sup>th</sup> Edition is out in 2007 (ISBN: 032432068X; ISBN13: 9780324320688)
- Ringel et al (2005) The Elasticity of Demand for Health Care A Review of the Literature and Its Application to the Military Health System  
[https://www.rand.org/content/dam/rand/pubs/monograph\\_reports/2005/MR1355.pdf](https://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1355.pdf)
- Wagstaff A, P. Paci and E van Doorslaer (1991), On the measurement of inequalities in health, *Social Science and Medicine* 33(5), 545-557

Wagstaff, Adam & van Doorslaer, Eddy, 2000. "[Chapter 34 Equity in health care finance and delivery](#)," [Handbook of Health Economics](#), in: A. J. Culyer & J. P. Newhouse (ed.), Handbook of Health Economics, edition 1, volume 1, chapter 34, pages 1803-1862 Elsevier

**Recommended journals:**

1. Journal of Health Economics
2. Health Economics
3. The Lancet
4. Health Policy and Planning

<b>MBD E-6.2</b>	<b>Operations Research</b>	<b>45 Hours</b>
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1. Definition of OR
  - (a) What is Operations Research
  - (b) Focus and Objective of Operations Research
  - (c) Types and Examples of Operations Research
2. Role of Researchers and Managers
3. Components of OR proposal
4. Identification of Problem and Solution
  - (a) Identification and Definition
  - (b) Justification
  - (c) Alternative Solution
  - (d) Indicators- Outputs, Outcomes and Impacts
5. Causality (Randomize Experimental Design)
  - (a) Pretest-Post test Control Group Design
  - (b) Post test –only Control Group Design
  - (c) Multiple Treatment Design
6. Quasi/Non-Experimental Design
  - (a) Non-Experimental Control Design
  - (b) Time Series, and Before and After Design
7. Inferential Statistics in Operations Research
  - (a) ( $X^2$ , t, F)-tests
  - (b) Deciding Sample Size in case of Different Experimental Design
  - (c) Linking Different Design and Statistical Test
8. Study Design Exercises
9. Ethics in Operations Research
  - (a) ICMR Guidelines
  - (b) International Perspectives
  - (c) Case Studies
10. Utilization and Dissemination, and Process Documentation
11. Critiques to OR proposal

**Essential Reading List**

1. Fisher, Andrew A., James R. Foreit, J. Laing, J. Stoeckel and J. Townsend 2002: Designing HIV/AIDS Intervention Studies-An Operations Research Handbook, Population Council, New York.
2. Foreit, James R. and Tomas Frejka 1998: Family Planning Operations Research-A Book of Reading, Population Council, New York
3. Kish, Leslie 1965: Survey Sampling, New York, John Wiley and Sons.

<b>MBD E-6.3</b>	<b>Monitoring and Evaluation</b>	<b>45 Hours</b>
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1. **Introduction to Monitoring and Evaluation:** Basic concepts, Difference between Monitoring and Evaluation; Linkage between Planning, Monitoring and Evaluation; Importance of Monitoring and Evaluation
2. **Monitoring and Evaluation Framework:** Resources for monitoring and evaluation, Engagement of stakeholders in monitoring and evaluation; Meaning of Indicators, Ideal requirement, process of developing indicator, illustration of indicators developed from large scale surveys, measurement, need & levels of indicator; Challenges in developing indicators from Large-Scale Surveys; Types of Indicators – Input, Process, Output, Outcome, Impact; Capacity building for monitoring and evaluation
3. **Monitoring of Policy Implementation:** Components of policy and programme, budget, staff, process of evaluation, developing tangible indicators for policy monitoring in terms of Input, Process, Output, Outcome, Impact; Result based inference
4. **Evaluation Design:** Determination of sample size under different approaches and design including measurement of change due to certain interventions; Quasi Experiment design, Case control design, Evaluation Terms of Reference-Formative and Summative Evaluations, Managing Evaluations; Evaluation at different points: Baseline, Mid-point, Concurrent and End line evaluation; Evaluating for results: Need and Uses of evaluation, Principles, norms and standards for evaluation; Roles and responsibilities in evaluation; Randomization, Statistical design of Randomization; Randomized control trials, time dependant cluster design, interrupted time series analysis.
5. **Assuring the Quality of Evaluation Design and Methodology:** Overview; Defining the context; The evaluation purpose; Focusing the evaluation; Evaluation methodology; Mandatory requirements for programme; SWOT analysis of NHM, ICDS and National Livelihood Mission; Social audit – meaning, objectives, advantage, case study of social audit

6. **Statistical Approaches of Evaluation of Intervention Programme:** Statistical inferences used in different intervention design – z, t, F and paired ‘t’ tests, two stage LSM, instrument variable method; Propensity score matching; Difference in Difference Method: Theory and application, advantage and disadvantage, regression implementation
7. **Management Information System and Use of Technology:** MIS – Monitoring information system; Role of programmers; HMIS system; Global Positioning System and use of other technology

**References:**

- Casley, Dennis J and Kumar, Krishna (1988). *The Collection, Analysis, and Use of monitoring and Evaluation Data*. A World Bank Publication, The John Hopkins University Press
- FHI (2004). *Introduction to Monitoring and Evaluation Monitoring and Evaluation, monitoring hiv/aids programs: A facilitator’s training guide*. Family Health International
- GoI & UNDP (2012). *Guiding Framework for Monitoring and Impact Evaluation of Capacity Building & Training of Panchayati Raj Institutions in States/UTs*. Government of India and United Nation’s Development Programme
- IFRC and RCS (2002). *Handbook for Monitoring and Evaluation*. International Federation of Red Cross and Red Crescent Societies –Geneva
- NIRD&PR; MoRD and TISS (2016). *Social Audit: A manual for Trainers*. National Institute of Rural Development & Panchayati Raj; Ministry of Rural Development and Tata Institute of Social Sciences
- Rossi, Peter H.; Mark W. Lipsey and Howard E. Freeman (2004). *Evaluation, A Systematic Approach*. Seventh Edition. Sage Publications – New Delhi.
- Sullivan, T.M., Strachan, M., and Timmons, B.K. (2007). *Guide to Monitoring and Evaluating Health Information Products and Services*. Baltimore, Maryland: Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health; Washington, D.C.: Constella Futures; Cambridge, Massachusetts: Management Sciences for Health, 2007
- UNDP (2009). *Handbook on planning, monitoring and evaluating for development results*. United Nations Development Programme - New York
- UNESCO (2014). *Monitoring and Evaluation Guidance for School Health Programs: Thematic Indicators*. United National Educational, Scientific and Cultural Organization.

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# SYLLABUS M.P.S. COURSE



**International Institute for Population Sciences**

**(DEEMED UNIVERSITY)**

Deonar, Mumbai 400 088.

Website: <http://www.iipsindia.org>

## About the Institute

The Institute was established in 1956 as the regional centre for training and research in Population Studies for the country of Asia and Pacific region. The International Institute for Population Sciences embraced the present name and was declared a "Deemed University" in 1985 by the Ministry of Human Resource Development, Government of India. The Institute is an autonomous body under the administrative control of the Ministry of Health and Family Welfare, Government of India. This is the only Institute of its kind in the world exclusively devoted to teaching and research in population sciences. Over the last fifty years, the Institute has helped in building a nucleus of professionals in the field of population in various countries in the ESCAP region. Many who were trained at the Institute now occupy key positions in reputed national and international organizations.

## Rules for Master of Population Studies (M.P.S.)

The M.P.S. course is designed to provide a higher level of understanding of the population sciences including an in-depth knowledge of the linkages between population and various dimensions of socio-economic, health and environmental development. These courses also provide a comprehensive idea to conduct further research in various aspects of population and development.

MPS One-Year Course				
Semester I				
Paper Code	Explanation	TITLE	Credits	Hours
MPS F1	Foundation	Basic Statistical Methods for Population Studies	NC	45
MPS F2	Foundation	Social Science Concept and Issues	NC	45
MPS C1	Core	Introduction to Demography and History of Population	4	60
MPS C2	Core	Fertility and Nuptiality	4	60
MPS C3	Core	Mortality, Morbidity and Public Health	4	60
MPS C8	Core	Research Methodology	4	60
MPS E1	Elective	E1.1: Healthcare Systems and Policies E1.2: Introduction to Biostatistics & Epidemiology	3	45
MPS E2	Elective	E2.1: Concepts and Measures of Global Health E2.2: Population Ageing and Health Transition	3	45
Viva-Voce Examination (related to courses)			1	
Total			23	420
Semester II				
MPS C4	Core	Migration, Spatial Distribution and Urbanization	4	60
MPS C5	Core	Population and Development	4	60
MPS C6	Core	Gender Issues and Reproductive Health	4	60
MPS C7	Core	Population Policies and Programmes	4	60
MPS C9	Core	Advanced Statistical and Computer Applications	4	60
MPS C10	Core	Indirect Estimation Techniques, <b>Population Projection</b> and Demographic Models ( <i>Quality of data and projection are added</i> )	4	60
MPS E3	Elective	E3.1: Spatial Demography E3.2: Operations Research E3.3: Monitoring and Evaluation	3	45

<b>MPS E4</b>	Elective	E4.1: Large-scale Sample Surveys E4.2: Health Economics and Financing E4.3: Urbanization, Space and Planning	3	45
<b>Term paper</b>			6	90
<b>Viva-Voce Examination (related to courses taught in the programme)</b>			1	
<b>Total</b>			<b>37</b>	<b>540</b>
<b>Grand Total</b>			<b>60</b>	<b>960</b>

### Term Paper

A student is required to write a term paper on some demographic or related problems under the guidance of a faculty member. The topics of the term paper have to be submitted at the beginning of the Second Semester. The term paper will be presented in formal seminar of the students and faculty members of the Institute. The content, presentation & defence and participation in the seminar shall be subjected to assessment by a committee comprising of faculty members.

### Grading System

The following ten points grading system is followed in the Institute:

<b>Letter Grade &amp; Qualitative Level</b>	<b>Value</b>	<b>Percentage</b>
O (Outstanding)	10	85-100.0
A+(Excellent)	9	75.0-84.9
A(Very Good)	8	65.0-74.9
B+(Good)	7	55.0-64.9
B(Above Average)	6	50.0-54.9
C (Average)	5	45.0-49.9
P (Pass)	4	40.0-44.9
F+(Fail)	3	30.0-39.9
F (Fail)	2	20.0-29.9
F- (Fail)	1	0.0-19.9
AB (Absent)	0	-

1. The teacher concerned will set the question paper and also evaluate the answer books as per grading pattern.
2. A final grade for each paper will be arrived by taking weighted average of grades given in different sections of the paper in case of questions of unequal weights. The weights can be given in proportion to the credit (i.e. number of hours) assigned for each section of the paper.
3. Overall Grade will be arrived on the basis of the number of credit hours and grade points for each subject.
4. A student securing a overall average grade points (OAGP) of less than P only, i.e. grade F+ (plus) and below will not be eligible for the award of the degree.

### **Re-evaluation of Answer Sheets**

A student can have access to his/her examination papers in the form of photo copies at a cost of Rs. 200/- per paper with prior approval of the Director.

A student can apply for re-evaluation of his/her answer sheet at a cost of Rs. 500/- per paper.

### **EVALUATION PROCEDURE FOR TERM PAPER**

The term paper will be of 6 credits. Each of the students is given appropriate weightage for initiative and interest (by his/her guide) and for the content of the paper presentation, defence and his/her participation in the seminar by a Committee specially constituted by the Director for evaluation purpose.

### **Re-Examination**

- (1) Re-examination will not be conducted during the course period.
- (2) Those students who fail or could not appear in any examination will be allowed to re-appear in a paper in the next semester examinations on payment of re-examination fee.
- (3) Those failing in any exam of final semester will not be awarded the degree in the same academic year. They can appear in the re-examination along with first semester of the next batch on payment of re-examination fee.
- (4) Maximum of three attempts will be allowed including the first appearance in each paper.
- (5) There will not be any down grading in re-examinations.

<b>F1</b>	<b>BASIC STATISTICAL METHODS FOR POPULATION STUDIES</b>	<b>(45 Hours)</b>
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**Objective:** This course aims to provide students with basic knowledge of statistical techniques which can be used in demographic analysis.

Introduction to statistics: Descriptive and Inductive statistics. Concept of variables, Nominal, Ordinal and Interval scale variables.

Tabulation of data, conversion of raw data into frequency distribution, graphical presentation of nominal, ordinal data, Logarithms: properties of logarithms, Rates and Ratios, Interpolation and Extrapolation.

Introduction to statistics: Descriptive and Inductive statistics. Concept of variables, Nominal, Ordinal and Interval scale variables.

Tabulation of data, conversion of raw data into frequency distribution, graphical presentation of nominal, ordinal data, Logarithms: properties of logarithms, Rates and Ratios, Interpolation and Extrapolation.

Measures of Central Tendency: Mean (arithmetic, geometric, harmonic) Median, Mode; Merits and demerits of different measures.

Measures of dispersion: Range, Variance, Standard Deviation; Merits and demerits of different measures of dispersion. Measures of Skewness and Kurtosis.

Techniques of analyzing bivariate nominal and ordinal level data: Contingency table, odds ratios, relative risk.

Introduction to set theory, permutations and combinations; Introduction to the concept of probability, A-priori, and mathematical probability. Events: exhaustive, mutually exclusive events; Laws of probability, additive and multiplicative laws of probability through demographic data, Bayes' theorem

Discrete probability distributions: Binomial and exponential functions, Binomial probability distribution and Poisson distribution and their properties. Continuous probability distribution; Introduction to Normal distribution and its properties, applications of normal distribution.

Introduction to the concept of correlation: Pearson correlation coefficient, and its properties; Spearman ranks correlation coefficient. Concept of linear regression, fitting of regression line to bi-variate data.

Concepts in Inductive statistics: Population, sample parameter, and statistic. Sampling distribution of mean and standard error. Concepts of statistical hypothesis, critical region, level of significance, confidence interval and two types of errors.

Testing statistical hypothesis and test of significance. Introducing the t distribution, comparing two groups, principles of comparison, independent t-test and paired t- test, Assumptions involved in t testing. Testing the association of attributes and Chi-square goodness of fit.

Analysis of Variance. Introduction to Multivariate Analysis. Concept of multi-variate regression. Concept of Multiple and Partial correlation coefficients in regression analysis. Standardized regression coefficients, Regression with dummy variables.

## Essential Reading List

1. Blalock, Hubert M. (1960): *Social Statistics*, McGraw-Hill Book Company, New York.
2. Chakravorti, S.R. and Giri, N. (1997): *Basic Statistics*, South Asian Publishers, New Delhi.
3. Clarke, G.M. and Cooke, D.,(1994): *A Basic Course in Statistics*, Arnold, London.
4. Dixon, W.J and Massey, F.J. (1983) *Introduction to Statistical Analysis*, 4<sup>th</sup> ed., New York, MC Graw Hill, 380-381, 534.
5. Goon, A.M., Gupta, M.K. and Dasgupta, B. (1985): *Fundamentals of Statistics* Vol. I , The World Press Private Ltd. Calcutta.
6. Jain, S.K.1979. *Basic Mathematics for demographers*. Canberra: The Australian National University.
7. Lipshutz, Seymour., Schaum's Outline Theory and Problems of *Set Theory and Related Topics* Series, Mcgraw Hill.
8. Marcello Pagano and Kimberlee Gourneau (2000) "Principles of Biostatistics" Second Edition, Duxbury Thomson Learning, United States.
9. Prakasam, C.P., G. Rama Rao, and R.B. Upadhyay (1987): *Basic Mathematics in Population Studies*, Gemini Publishers, Mumbai.
10. Siegel J.J. and D.A. Swanson (Ed.), 2004. *The Methods and Materials of Demography*. Second Edition. Elsevier Academic Press.
11. Venkatachary, K (1994). *Elements of Mathematics for Demographers*. Monograph Series No.9. Regional Institute for Population Studies, University of Ghana. Legon.

## Suggested Reading List

1. Bhat N.R and M.R. Singh, 1993. *Applied Mathematics*. New Delhi: Tata McGraw – Hill Publishing Company Ltd.
2. Dillon, W.R. and Goldstein, M. (1984): *Multivariate Analysis*, John Wiley and Sons, New York.
3. Douglas and Altman (2006): *Practical Statistics for Medical Research*, Chapman and Hall Publication, Washington, D.C.
4. Ebdon, E. (1978): *Statistics in Geography*, Basil Blackwell, Oxford.
5. Fisher, L.D and Van Belle, G. (1993) *Biostatistics : A Methodology of the Health Sciences*, New York, Wiley Interscience,
6. Goon, A.M., Gupta, M.K. and Dasgupta, B. (1985): *Fundamental of Statistics* Vol. I , The World Press Private Ltd. Calcutta.
7. Graeme Hutcheson and Nick Sofroniou, (1999): *The Multivariate for Social Scientist*, SAGE Publications.
8. Gupta, S.C. and Kapoor, V.K. (1986): *Fundamental of Mathematical Statistics*, Sultan Chand and Sons Publishers, Delhi.
9. Howell David C. "Fundamental Statistics for the Behavioral Sciences", 4<sup>th</sup> Edition, an International Thomson Publishing Company, USA.
10. McClave, James T., P. George Benson and Terry Sincich (2001): *Statistics for Business and Economic*, Eighth Edition, Prentice Hall, NJ, USA.
11. Norman R. Kurtz (1999): *Statistical Analysis for the Social Sciences*, Allyn and Bacon.
12. Retherford, R.D. and Choe, M. K., (1993): *Statistical Models for Casual Analysis*, A Wiley-Inter-Science Publications, John Wiley and Sons, INC, New York.
13. Sundaram, K. R., S. N. Dwivedi and V Sreenivas. (2009). *Medical Statistics-Principles & Methods*. Anshan Publisher.

<b>F2</b>	<b>SOCIAL SCIENCE CONCEPT AND ISSUES</b>	<b>(45 Hours)</b>
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## **SOCIOLOGY**

1. Sociology: sociology as a social science- its nature, subject matter and scope
2. Relation of sociology with other social sciences, sociological perspective
3. Basic Concepts in sociology
4. The Family:
  - a) Sociological Significance of the Family b) Types and functions of Family
  - c) Nuclear and joint families
5. Marriage: Different forms of marriage, changing patterns of marriage/mate selection in India
6. Kinship –features of kinship system in India, regional variations
7. Social stratification : Social Class and Caste: Principles of Class and Caste
8. Socialization : agencies of socialization
9. Culture: meaning and characteristics of culture.
10. Society and Culture in India
  - a) Aspects of society and culture in India, and its role and importance in Population Studies.
  - b) Social Institutions and their role in influencing demographic situation of the Population of India
    - Family, Marriage, Kinship and Religion
11. Caste System
  - i) Concept and definition of Caste System,
  - ii) Changing Caste System in India
12. Social Mobility : vertical and horizontal, intra- and inter-generational mobility
13. Social Change
 

Definition and Concept of Social Change
14. Process of Social and Cultural Changes in India and their role in influencing demographic behaviour: a) Sanskritization b) Westernization c) Modernization

## **Essential Reading List**

1. Davis, Kingslay, *Human Society*, MacMillan and Co., New York, (1975), Chapters 1, 3,5,6.
2. Kapadia, K. M., *Marriage and Family in India*, Oxford University Press, Calcutta, (1966).
3. Mandelbaum, D.G., *Society in India-Continuity and Change(vol.1) and Change and Continuity*, (Vol. 2). University of California Press, London, (1970).
4. Mac Iver R.M. and Charles H. Page, *Society: An Introductory Analysis*, Holt, Rinehard and Winston, New York, (1949), Chapters No.1, 3,7,11,15,22,24,25,26.
5. Srinivas M.N., *Social Change in Modern India*, University of California Press, Berkeley, (1966)
6. Haralambos, Michael, *Sociology: Themes and Perspectives*, Oxford University Press, Delhi (1980).

## Suggested Reading List

1. Kuppaswamy B., *Social Change in India*, Konark Publication Pvt. Ltd. Delhi, (1972).
2. Muzumdar, Haridas , *The Grammar of Sociology: Man in Society*, Asia Publishing House, Mumbai ( 1966).
3. Johnson, Harry M, *Sociology : A Systematic Introduction* , Allied publishers, Bombay (1966).
4. Mc Gee , Reece , *Sociology: An Introduction* , Holt, Rinehard and Winston, New York ( 1980).
5. Magill ,Frank N (ed.), *International Encyclopedia of Sociology*, Fitzroy Dearborn Publishers, London, (1995).

## GEOGRAPHY

1. Importance of Geographical factors- Physical factors (relief, rainfall, temperature, soil and vegetation) Economic and Social factors (Mineral resources and industrialisation, transport, language, religion and caste/tribe); the influence of geographical factors on population.
2. Geographical approaches: the concept of region- formal and functional regions; the concept of growth pole and regional development; core and periphery; distance and decay function; Maps-scale, choropleth, isopleths and distribution maps.
3. Physical divisions of India; administrative organization of India. Historic-Cultural regions; Agro-climatic regions; NSS regions.
4. Theoretical Perspectives in Geography- Place of geography in Social sciences; man and nature relationship- determinism and possibilism; Positivism (quantification) and Phenomenology; and Radical and Postmodern Geography.
5. Concept of Social Space; Social Structure and Spatial Structure; Role of time and space in social sciences.

## Reading List

1. Abler, R, Adams, J and Gould P., (1971): *Spatial Organization: The Geographer's view of the World*, Prentice Hall, New Jersey.
2. Johnston, R.J., (2004): *Geography and Geographers*, Oxford Unity Press.
3. Richard, Peet., (1998): *Modern Geographic Thought*, Blackwall Publishers
4. Singh, R.L., (1971) *India: A Regional Geography*, National Geographical Society of India, Varanasi.
5. Francis John Monkhouse (1956) *Maps and Diagrams: Their Compilation and Construction*, University of Michigan.
6. JF Friedman (1966) *Regional Development Policy: A Case Study of Venezuela*, Cambridge, Massachusetts : MIT Press, 1966.

## ECONOMICS

### A. Introduction:

Defining Economics, Micro and Macro economics, Economic and non economic good, Basic Economic Activities, Factors of Production, Economic Systems.

### B. Basic Concepts in Micro Economics

Concept of Marginal and Total Utility, Law of Diminishing Marginal Utility, Theory of Demand: Indifference curves Theory and Properties, Equilibrium of consumer, Income, Substitution and Price effect. Elasticity of Demand: Price, Income and cross elasticity, Basic concepts in theory of production, cost and market structure.



### **C. Basic Concepts in Macro Economics**

Basic Concepts in National Income: Concept of GDP, NDP, GNP, NNP, NI, PCI, GDPPCI, PPP, GDPPCI (PPPUS\$), Theory of consumption and saving: Consumption function, Keynes' Psychological law of consumption, concept of APC and MPC, APS and MPS, Factors affecting consumption and savings, Basic concept of Investment.

### **D. Economic Theories**

Political economy and protectionism – Mercantilism, Classical economics and free enterprise – Adam Smith and David Ricardo, Welfare economics – Alfred Marshall and Amartya Sen, Karl Marx and the Labour theory of Value, Empirical economics – Paul Samuelson.

### **E. Indian Economy: Structure, Planning and Growth**

Characteristics of Indian Economy: Economic Transition in India, Strategy of economic planning in India, Industrial Policy 1956, 1977 and 1991, New Economic Reforms- 1991, Other Development issues: Poverty and Unemployment.

### **Essential Readings**

1. Ahuja H.L, Advanced Economic Theory: Microeconomic Analysis, S. Chand and Company Limited, New Delhi, Chapters 5,6,7,8,9,12,16, 17, 18, 20
2. Koutsoiannis A, 1979, Modern Microeconomics, London: Macmillan Press Ltd,
3. Lipsey and Chrystal, 2004, Economics, Oxford university Press, Part One, part two and part five
4. Dasgupta AK, Epochs of Economic Theory, OUP, Bombay, Chapters 2, 3, 4, 7 and 8
5. Datt R and Sundaram K.P.M, 2000, Indian economy, S. Chand & Company Ltd, Part II.

### **Suggested Readings**

1. Samuelson, Paul A. and William D. Nordhaus., "Economics", New York: Tata McGraw Hill, part one, two and five
2. Blaugh, M., 1962. "Economic Theory in Retrospect", London: Heinemann Ltd.
3. Haney, Lewis H., 1960, "History of Economic Thought", New York: Macmillan
4. Government of India, Ministry of Finance, Economic Division, Economic Survey, 2001-2002

<b>C1</b>	<b>INTRODUCTION TO DEMOGRAPHY AND HISTORY OF POPULATION</b>	<b>(60 Hours)</b>
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### 1. Introduction to Demography

Definition and Scope: Demography as a scientific discipline; Development of demography as a discipline. Some basic demographic concepts. Components of population change.

Historical trends in population situation in the world. Present population situation and past and future trends in the world and in developed and developing countries.

Brief description of Demographic transition theory.

### 2. Population History

Contribution of fertility, mortality and migration to population change in the past; major sources of data about the population in the past; major explanations of population change in the past; relation between population change and other social and economic changes at the national and local levels; All the above in relation to India

### 2. Sources of Demographic Data

Population census; Uses and limitations; Indian Censuses.

Vital registration system.

National Sample Survey. Sample Registration System and Demographic Health Surveys (DHS) and other sample surveys.

### 3. Dynamics of Age-Sex Structure

Present levels and past trends in the sex and age structure of the population of world and developed and developing countries. Present levels and past trends in the sex and age structure of India's population.

Importance of age-sex structure in population dynamics and factors affecting sex ratio of the population. Sex ratio of India's population and role of different factors in changing sex ratio.

Factors affecting age structure of the population: dynamics of age structure along with demographic transition; Ageing of the population and relative roles of low fertility and low mortality in population ageing.

### 4. Population growth rates – Arithmetic, geometric and exponential

### Essential Readings

1. Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography*, Second Edition, Chapters 1, 2, 3, 7, 9,10, Elsevier Science, USA.
2. John Weeks (2005): *Population: An Introduction to Concepts and Issues*, Wordsworth Learning. Singapore 9<sup>th</sup> edition.
3. United Nations, (1973): *The Determinants and Consequences of Population Trends*, Vol. I, *Population Studies*, No. 50, Chapter VII, New York.

4. Bhende, A., (1996): *Principles of Population Studies* (Seventh Edition), Himalaya Publishing House, Bombay.
5. United Nations, World Population Ageing, 1950-2050
6. Livi-Bacci, M., (1996): *A Concise History of World Population* (2<sup>nd</sup> edition), Oxford.
7. [www.censusindia.gov.in](http://www.censusindia.gov.in)

### Suggested Readings

1. World Population Prospects 2006, Vol I and II, United Nation
2. Warren S. Thompson, *Population Problems*
3. Bogue, D., (1969): *Principles of Demography*, John Wiley and Sons, New York.
4. Registrar General, India (1997): *Civil Registration System in India*, Office of the Registrar General, India, New Delhi. .
5. United Nations, (1998): *Handbook on Civil Registration and Vital Statistics Systems, Management, Operation and Maintenance*, New York.

<b>C2</b>	<b>FERTILITY AND NUPTIALITY</b>	<b>(60 Hours)</b>
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#### A. FERTILITY – SUBSTANTIVE

1. **Terms and Concepts**  
Importance of the fertility study in population dynamics; Basic terms and concepts used in the study of fertility
2. **Framework for Fertility Analysis**  
Determinants of natural fertility; Davis intermediate variables framework of fertility; Socio-economic determinants of proximate variables; Lee and Bulatao framework of fertility determinants.
3. **Fertility Transition in Developed Countries**  
Historical fertility decline in European and Non-European Industrialized Countries and underlying factors; Below-replacement level fertility in developed countries and its implications.
4. **Fertility Transition in Developing Countries**  
Pattern of fertility transition in developing countries; causes of high fertility in Africa and Asia. Fertility Transition in India: Historical trend and regional patterns in development, culture and fertility transition. Fertility Surveys – Findings and Emerging research issues.
5. **Hypotheses and Theories of Fertility**  
Theory of Social Capillarity, Theory of Change Response, Theory of Diffusion and Cultural Lag, Liebenstein Theory, Becker's Theory, Easterlin Framework of Fertility, Caldwell's Theory, U. N. Threshold Hypothesis, Reproductive motivations and value of children theories.

#### B. FERTILITY MEASURES AND MODELS

6. **Introduction**  
Some Basic Concepts  
Sources of Data for Fertility Analysis  
Problems in Fertility Analysis  
Period and Cohort Approaches

7. **Direct Estimation of Fertility**  
 Period Measures of Fertility
  - Basic Fertility Measures
  - Order-Specific Fertility Rates
  - Marital Status Specific Fertility Rates
  - Standardized Birth Rates and Coale's Fertility Indices
 Cohort Measures  
 Birth Interval Analysis  
 Reproduction Measures
8. **Fertility Models**  
 Age patterns of Fertility: Coale and Trussell Fertility Model: Estimating M and m  
 Bongaarts and Potters Aggregate Fertility Model and its applications

## C. NUPTIALITY

9. Introduction, Concepts, Sources and Quality of Nuptiality Data.
10. Measures and Indices of Nuptiality: Crude and Specific Rates; Standardization of Marriage Rates.
11. Analysis of Marital Status Data: Singulate Mean Age at Marriage (SMAM) – Synthetic Cohort and Decade Synthetic Cohort Method.
12. Gross and Net Nuptiality Tables.
13. Marriage Patterns in India and Selected Countries, Marriage Squeeze.
14. Divorce & widowhood: Basic concepts & Measures.
15. Standard Age Pattern of Marriage – Coale's Model.

## Essential Reading List

1. Asha A. Bhende and Tara Kanitkar, (2003), *Principles of Population Studies*, Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
2. David G. Mandelbaum, (1974), *Human Fertility in India: Social Components and Policy Perspectives*, University of California Press, Berkeley.
3. John R. Weeks, (2005), *Population: An Introduction to Concepts and Issues*, Ninth Edition, Wadsworth Publishing Company, Belmont, California.
4. Ronald Gray, Henri Leridon and Alfred Sipra, (1993), *Biomedical and Demographic Determinants of Reproduction*, Oxford University Press, Oxford.
5. Sydney H. Coontz, (1968), *Population Theories and the Economic Interpretation*, Routledge, London.
6. United Nations, (1973), *Determinants and Consequences of Population Trends, Vol. 1*, pages 96-104, UN, New York.
7. United Nations, (1999), *Below Replacement Fertility*, Population Bulletin of the UN, Special Issue Nos. 40/41, Department of Economic and Social Affairs, UN, New York.
8. Bongaarts, J and Potter, R (1983) *Fertility, Biology and Behavior: An Analysis of the Proximate Determinants*. Academic Press, New York.
9. Hinde, Andrew (1998) *Demographic Methods*. London: Arnold.
10. Newell, Colin (1988) *Methods and Models in Demography*. London: Frances Pinter.
11. Pathak, K.B. and F.Ram, (1998) *Techniques of Demographic Analysis*, Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.
12. Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel (2001) *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers.
13. Siegel, Jacob S., and David A. Swanson (eds.), (2004) *The Methods and Materials of Demography* (Second edition). San Diego: Elsevier Academic Press.
14. Coale Ansley J. and T. James Trussell (1978) *Technical Note: Finding the Two Parameters that Specify a Model Schedule of Marital Fertility. Population Index* 44, 2 (1978), pp. 203-213.

## Suggested Reading List

1. Bogue, Donald J., Eduardo E. Arriaga, and Douglas L. Anderson, eds. (publication editor George W. Rumsey) (1993) *Readings in Population Research Methodology*. Chicago: United Nations Population Fund. Volume 3: Fertility Research, (All three chapters but selected pages).
2. Mishra, B.D. (1981) *An Introduction to the Study of Population*, New Delhi: South Asian Publishers Pvt. Ltd.
3. Palmore, James A. and Gardner, Robert W. (1983) *Measuring Mortality, Fertility and Natural Increase: a Self-Teaching Guide to Elementary Measures*. Honolulu: East-West Population Institute, East-West Center.
4. Pollard, A.H., Yusuf, Farhat and Pollard, G.N. (1990) *Demographic Techniques* (third edition). Sydney: Pergamon Press.
5. Rowland, Donald T. (2006), *Demographic Methods and Concepts*. New York: Oxford University Press.

C3	MORTALITY, MORBIDITY AND PUBLIC HEALTH	(60 Hours)
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### A. MORTALITY

#### 1. Basic Concepts and Measures of Mortality

Definition of deaths and fetal deaths according to WHO; Need and Importance of the study of Mortality; various sources of mortality data and its quality with special reference to the developing countries.

*Introduction and basic measures:*

Some basic measures: - crude death rate (CDR) and Age-Specific Death Rates (ASDRs)- their relatives merits and demerits.

*Techniques of standardization and decomposition of Rates/Ratio*

Need and importance of standardization: direct and indirect technique of standardization of rates and ratios in the light of mortality rates; Decomposition.

*Infant mortality and its sub-division*

Need and importance of the study of infant mortality in demographic analysis; Conventional measures of infant mortality (IMR) and its sub-divisions- Neo-natal, Post-Neonatal mortality and Peri-natal Mortality Ratio/Rate. Approaches for estimating infant and child mortality rates from birth history collected in large-scale surveys; and Lexis diagram.

*Measures of maternal mortality*

Maternal Mortality Rate, Ratios, Life time risk; Issues related to estimation of maternal mortality measures.

#### 2. Life Tables

*Introduction*

Basic concept of a life table; types and forms of life table;

Brief history of life tables; Anatomy of life table; uses of life table in demographic analysis.

*Construction of Life tables based on Age- specific death Rates (ASDRs)*

Underlying assumptions of life table construction using ASDRs of a community during a specified period; Methods of life table Construction—Conventional approach, and those proposed by Greville and Chiang.

*Model Life Tables (MLT)*

Need for MLT for countries having poor vital registration statistic; underlying principles of constructing some important MLT systems - First UN MLT, Coale and Demeny Regional MLT; Brass two- parameter logit Life table system; and New UN MLT; WHO Model life table, Uses of model life tables in demographic analysis for countries having limited and / or defective civil registration and age- data; and Multiple decrement life table.

### **3. Mortality and health transitions**

Levels and trends in mortality by regions, with special reference to India; age and sex specific mortality with a focus on excess female mortality; differentials by residence and socio-economic factors (occupation, income, education, etc); historic mortality transitions as experienced by developed countries (Europe); overview of epidemiological transition; changing disease and death pattern in developing countries; factors responsible for high mortality in the past; main causes of mortality decline in developing countries; current global mortality scenario; and concepts and overview of health transition.

### **4. Child survival framework**

Importance of infant mortality in population and health; causes of infant mortality (endogenous and exogenous factors); levels and trends (global and south Asia/India); and Mosley and Chen' framework for child survival.

### **5. Causes of death**

Importance of causes of death statistics; definition and sources of causes of death statistics; a brief history of the International statistical classification of diseases, injuries and causes of death (ICD); an overview of ICD – X (1990); global leading causes of death (with a focus on Asia and India); cause of death statistics in India (RG: Rural and MCCD); distribution of deaths by main causes by age, development, life expectancy (UN).

## **B. MORBIDITY AND PUBLIC HEALTH**

### **6. Introduction to Morbidity**

Need and importance of the morbidity study; sources of morbidity data; concepts and definitions of health and morbidity; conditions as proposed by WHO and other social scientists.

### **7. Measures of Morbidity**

Need for morbidity indices; various measures of morbidity: incidence and prevalence rates; interrelationships between measures of morbidity; other measures related to working day loss etc.

### **8. Burden of disease**

Need for the study; basic concepts; measurement and current global scenario.

### **9. Public Health and Epidemiology**

Basic concepts of community health; principles of Epidemiology- basic concepts and definitions; types of Epidemiology: descriptive and analytical; epidemiology of communicable and non-communicable diseases; nutrition and health, environment and health; occupation and health.

## Reading List

### Compulsory Reading List

1. Caldwell, J, Sally Findley, Pat Caldwell and Gigi Santow (1990): What we know about health transition: The cultural, social and behavioural determinants of health. *The proceedings of an international workshop, Vol.1 &2, ANU, Canberra*, Health Transition Centre.
2. Mosley, W. H. and L. C. Chen (1984): Analytical framework for the study of child survival in developing countries, *Population and Development Review* 10 (Supplementary Copy).
3. Murray, C. J. L., (1994): Quantifying the Burden of Disease: The Technical Basis for Disability Adjusted Life Years, *Bulletin of the WHO*, Vol. 72(3), pp.429-445.
4. Pugh, Thomas F. and Brian MacMohan (1970): *Epidemiology: Principles and Methods*, Little Brown Publishers, Boston (Chapters 1 through 5).
5. Ram, F. and K.B. Pathak (1998): *Techniques of Demographic Analysis, 2<sup>nd</sup> Ed*, Himalaya Publishing house, Bombay (Chapters 2 & 3).
6. Shryock, Henry S. Jacob Siegel and Associates (1980): The Methods and Materials of Demography Vol. 2, US Department of Commerce. Washington DC, pp. 389-393, Chapter 14.
7. WHO (1992): *International Statistical Classification of Diseases and related Health Problems*, Tenth Revision, Vol. 1, Geneva.
8. Weeks, John R. 2005. Population: An Investigation to concepts and Issues. 9<sup>th</sup> Edition, Wadsworth Publishing Co. CA.
9. Yaukey, David. 1985. Demography: The study of Human population. St. Martins, New York.

### Suggested Reading List

1. Administrative Staff College of India (2002): *A comparative assessment of the Burden of Disease in selected states: Methodology, results, policy and program intervention*. Research Paper No. 2.
2. Coale, Ansley J. and Paul, Demney (1983): *Regional Model Life Tables and Stable Populations*, Academic Press, New York.
3. Government of India (1997) *Reproductive & Child Health Program: Schemes for Implementation*, Ministry of Health and Family Welfare, New Delhi.
4. Jagger, C (1999): *Health Expectancy calculation by the Sullivan Method: A Practical Guide*, NUPRI, Research Paper Series No. 68.
5. Murray C. J. L., J. A. Salomon, C. D. Mathers and A. D. Lopez (2002). *Summary Measures of Population Health: Concepts, Ethics, Measurement and Applications*. WHO, Geneva.
6. Office of the Registrar General of India (2007). *Medical Certification of Cause of Death 2001*. Ministry of Home Affairs, New Delhi.
7. Omran, A. R. (1971): The epidemiologic transition: a theory of the epidemiology of population change, *Milbank Memorial Fund Quarterly*, Vol. XLIX, pp. 509-538.
8. Park, J.E. and K. Park (1989): *Text Book of Preventive and Social Medicine (Twelfth Edition)*, M/S Banarsidas Bhanot Publishers, Jabalpur (Chapters 2 & 3).
9. Preston, S. H., Patrick Heuveline and Michel Guillot (2001): *Demography: Measuring and Modeling Population Process*, Blackwell Publishers, Oxford, UK (Chapters 2, 3 & 4).
10. United Nations (1973): *The Determinants and Consequences of Population Trends, Vol. I*, Population Studies No.50, Dept. of Economic and Social Affairs, United Nations, New York (Chapter 5).
11. United Nations (1982): *Model Life Tables for Developing Countries*, United Nations, New York.
12. United Nations (1998): *Too Young to Die: Genes or Gender*, Dept. of Economic and Social Affairs, United Nations, New York.
13. United Nations (1999): *Health and Mortality Issues of Global Concern*, Proceeding of the Symposium on Health and Mortality, Brussels, 19-22 November 1997.

<b>C4</b>	<b>MIGRATION, SPATIAL DISTRIBUTION AND URBANISATION</b>	<b>(60 Hours)</b>
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## **A. MIGRATION**

### **1. Concepts, pattern, determinants and consequences of migration and issues related to migration**

Concept of mobility and migration, sources and quality of data, types of migration, census definition of migrants, limitations.

### **2. Internal Migration**

Internal migration patterns and characteristics in developing countries with a special focus on India.

Determinants of internal migration: Causes of migration at the place of origin and at the place of destination.

Consequences of internal migration: demographic, economic, social and political consequences at the individual, household and community level.

International migration

### **3. Sources of international migration data and problems.**

Patterns of international migration: Historical and recent trends, permanent immigrants, labour migration, brain drain, refugee migration and Illegal migration.

### **4. Causes and consequences of international migration.**

Migration theories and models -

**Ravenstein's Laws of Migration**

**Everett Lee's Theory of Migration**

**Mobility Field Theory**

**Lewis-Fei-Ranis Model of Development**

**Todaro's Model of Rural-Urban Migration**

### **5. Measures of Migration**

Direct estimation of lifetime and inter-censal migration rates from census data.

Indirect measures of net internal migration: Vital Statistics Method, National Growth Rate Method and Census and Life Table Survival Ratio methods.

Methods of estimating international migration.

Migration surveys

## **B. SPATIAL DISTRIBUTION AND URBANISATION**

### **6. Spatial Distribution**

Spatial distribution: importance and pattern, factors affecting spatial distribution of population: physical, economic, social factors and Govt. policies.



## 7. Urbanization

Urbanization definition and Importance; Important aspects of urbanization process-level and tempo of urbanization, urban population growth and its components, urban size class structure; Data sources; Definitional and conceptual problems; Definition of urban and other associated urban concepts in Indian census; Forces of urbanization and components of urban population growth in developed countries, sub-urbanization and urban turnaround; Current urbanization process in developed and developing countries with special focus on India, Kingsley Davis model of urbanization process; Forces of urbanization and components of urban population growth in developing countries, over urbanization phenomena and urban primacy, Major urbanization problems and policies in developing countries with focus on India.

## 8. Measures of Spatial Distribution and Urbanization

Selected measures of concentration of population-Density, percentage distribution and dissimilarity index; Selected measures of Degree and tempo of urbanization; Growth and distribution of urban population, Rank-Size rule and Primacy Index, Lorenz curve and Gini's concentration ratio.

### Essential Reading List

1. Cohen, Robin, (1996): *Theories of Migration*, The International Library of Studies on Migration, Edward Elgar, Cheltenham.
2. Eduardo Arriaga, (1975): "Selected Measures of Urbanization", in Sydney Goldstein and David Sly (Eds.) *Measures of Urbanization and Projections of Urban Population*, IUSSP Belgium.
3. United Nations, (2004): *World Urbanization Prospects, The 2003 Revision*, New York.
4. United Nations, (1998): *World Population Monitoring 1997*, International Migration and Development, New York.
5. United Nations, (1974): *Methods of Measuring Internal Migration*, Manual VI, UN, New York.
6. Shryock, Henry S. Jacob S. Siegel and Associate, (1980): *The Methods and Materials of Demography Vol.1 & 2*, U.S. Bureau of the Census, Washington D.C.

### Suggested Reading List

1. Oberai, A.S. (1987): *Migration, Urbanization and Development*, International Labour Office, Geneva
2. Gavin Jones and Visaria, Pravin, (Eds.), 1997: *Urbanization in large developing countries – China, Indonesia, Brazil and India*, Clarendon Press, Oxford.
3. Kingsley, Davis, (1972): *World Urbanization, 1950-70*, Vol. II, Analysis of Trends, Relationship and Development, Population Monograph Series 4 and 9, University of California, Berkeley.
4. Mitra R. G., (2002): *Understanding Patterns of Migration from Census 2001 Data*, Population Stabilization and Development, Council of Cultural Growth and Cultural Relations, Cuttack
5. Todaro, Michael P.(1976), *Internal Migration in Developing Countries*, International Labour Office, Geneva.
6. United Nations, (1979): "Trends and Characteristics of International Migration Since 1950" *Demographic Studies* No. 64, UN, New York.
7. United Nations, (1983): *Determinants and Consequences of Population Trends*, Vol 1, UN, New York, Chapter-VI.

<b>E1.1</b>	<b>Healthcare Systems and Policies</b>	<b>(45 Hours)</b>
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1. Identify the structure, components and characteristics of global health care system
2. Understanding the needs and goals for various policies related to public health, policy environment, frameworks for policy analysis
3. Basic models and functions of health services, health care systems, international experience
4. Health infrastructure and health delivery system in India- public, private, NGOs, Indigenous health systems
5. National health programmes- Public health preparedness
6. Public health system- A re-appraisal and SWOT analysis, a critique on the health delivery system- problems related to structural, functional and management of public health care services
7. Health care system- stakeholders in health care system, human capital and health, role of government in providing health care, improving access to health care with quality
8. Health care legislations in India: Legal aspect of health care, MTP Act, biomedical waste Rules, COPRA Act, PNDT Act, Transplantation of human organs Act, etc.
9. Principles of planning and management of health programmes- monitoring and evaluation- quality assurance- health impact assessment- five year plans
10. Health services- Community needs assessment, Decentralization of health facilities
11. Sustainability of public health intervention- Concept and mechanism of sustainability, models and examples of sustainability, community ownership, Public-private mix
12. Introduction to health services and research policies - Perspectives- methodological approach
13. Major National Health Policies and Missions- NHP-2002, NRHM (2005-12)
14. Major public health problems – A critical review and analysis, identification of major areas of public health requiring interventions, ongoing public health interventions in India. Health system reforms and their impact

#### **Essential Reading List**

1. Lassey M, Lassey W, and Jinks, M. (1997). Health Care Systems around the World: Characteristics, Issues and Reforms. Prentice-Hall, Inc.
2. Graig, Laurene A. (1999) Health of Nations: An International Perspective on US Healthcare Reform. 3rd Edition, Congressional Quarterly, Inc.
3. Bodenheimer, Thomas S., Kevin Grumbach. *Understanding Health Policy*
4. Fort, Meredith, Mary Anne Mercer and Oscar Gish (Editors). *Sickness and Wealth: The Corporate Assault on Global Health*
5. Govt. of India (2002)-National Health Policy-2002, Ministry of Health and Family Welfare, New Delhi.
6. Govt. of India (2005) Report of the National Commission on Macroeconomics and Health, Ministry of Health and Family Welfare, New Delhi.

7. Peters, et.al (2002), Better Health System for India's poor: Findings, Analysis and Options: The World bank, New Delhi
8. Reddy, K.S. et.al (2011)" Towards achievement of universal health care in India by 2020 : A Call of Action", www.thelancet.com
9. Banerjee, D. (1982), Poverty, class and Health Culture in India, Vol. 1 Parchi Prakashan, New Delhi.
10. Indian Council of Social Science Research and Indian Council of Medical Research (1981), Health for All by 2000 A. D., ICSSR, Delhi.  
Madan, T.N. (1969), "Who Chooses Modern Medicine and Why", Economic and Political Weekly, pp. 1475-84.

<b>E1.2</b>	<b>INTRODUCTION TO BIOSTATISTICS &amp; EPIDEMIOLOGY</b>	<b>(45 Hours)</b>
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Learning Objectives: The disciplines of Epidemiology and Biostatistics create and apply methods for quantitative research in health sciences. The Biostatisticians at Johns Hopkins School of Public Health have rightly said "Our designs and analytic methods enable health scientists and professionals in academia, government, pharmaceutical companies, medical research organizations and elsewhere to efficiently acquire knowledge and draw valid conclusions from their ever-expanding sources of information". The main objective of this course is to equip students with the basic concepts and methods employed in epidemiologic and biostatistical research. At the same time, the course aims to equip the students with recent advances in the fields of Epidemiology and Biostatistics. The idea is to emphasize concepts over details, with recent applications in public health. After going through this course, the students should be capable enough to take up responsibilities and actively participate in academics, government organizations, pharmaceutical companies, health organizations, etc. The introduction of such course is especially very important in India as there is very limited capacity in India at this moment.

#### A. Basic Concepts in Epidemiology

1. Introduction: Definition and objectives of epidemiology; Epidemiology and clinical practice; The epidemiologic approach; Infectious disease epidemiology, occupational epidemiology, disaster epidemiology
2. The dynamics of disease transmission: Modes of transmission; epidemic, endemic and pandemic; Disease outbreak; Determinants of disease outbreak; Herd immunity; incubation period; outbreak investigation; epidemiological modeling.
3. Identifying the roles of genetic and environmental factors in disease causation: Association with known genetic diseases; Age at onset; Family studies; Interaction of genetic and environmental factors.
4. Epidemiology and public policy: Epidemiology and prevention; Population versus high-risk approaches to prevention; epidemiology and clinical medicine; Risk assessment; Meta Analysis.
5. Epidemiological Study Designs: Ecological, Cross-Sectional, Case-Control, Cohort Studies, Randomized Intervention Studies.
6. Experimental epidemiology; Randomized trials; Clinical Trials- Basic concepts; Definitions; Historical perspectives, Phase I, II, III and IV trials, Protocol development, Use of control arms, Concepts of randomization and blinding, ethical issues

#### B. Measurement of Health & Disease Burden

1. Measuring the occurrence of disease: Measures of morbidity - prevalence and incidence rate, association between prevalence and incidence, uses of prevalence and incidence, problems with incidence and prevalence measurements; Surveillance; Quality of life including DALY, HALE, etc., Measures of mortality.

2. Assessing the validity and reliability of diagnostic and screening test: Validity of screening test – sensitivity, specificity, positive predictive value and negative predictive value; Reliability; Relationship between validity and reliability; ROC curve and its applications; Overall accuracy.
3. Issues in epidemiology: Association; causation; causal inference; Errors and bias; Confounding; Controlling confounding; Measurement of interactions; Generalizability.
4. Estimating risk: Estimating association – absolute risk, relative risk, odds ratio; Estimating potential for prevention – attributable risk; comparison of relative risk and attributable risk; Odds ratios for retrospective studies; Odds ratios approximating the prospective RR; Exact inference for odds ratio analysis of matched case-control data.
5. Modeling of Infectious Disease Process: Infectious diseases of human – malaria, tuberculosis, Hepatitis, HIV/AIDs, Deterministic modeling of infectious diseases
6. Probit and Survival Analysis Concepts and definition of Survival analysis - Kaplan-Meier, Life table method, Mantel-Haensel method, Cox proportional hazards method, Dose response analysis.

#### Reading List:

1. Last J M: A Dictionary of Epidemiology, ed. 2. New York, Oxford University Press, 1988.
2. Bonita R, Beaglehole R, Kjellstrom T: Basic Epidemiology, ed. 2. World Health Organization, 2006.
3. Park LE, Park K: Textbook of Preventive and Social Medicine. Jabalpur, Banarasidas Bhanot, 1986.
4. Dunn G, Everitt B: Clinical Biostatistics: An Introduction to Evidence-based Medicine. Edward Arnold, 1995.
5. Friedman L M, Furberg C D, DeMets D L: Fundamentals of Clinical Trials. Boston, PSG, 1982.
6. MacMahon B, Pugh T F: Epidemiology: Principles and Methods. Boston, Little Brown, 1970.
7. Gordis L: Epidemiology, ed. 3. Philadelphia, 2004.
8. Rosner B: Fundamentals of Biostatistics, ed. 6, 2006.
9. Altman D G: Practical Statistics for Medical Research, London: Chapman and Hall, 2006.
10. United Nations Department of Economic and Social Affairs: Designing Household Survey Samples. United Nations, 2005.
11. Lee E T: Statistical Methods for Survival Data Analysis, ed. 2. New York, John Wiley & Sons.
12. Goldstein H: Multilevel Statistical Model. London, Institute of Education, 1999.
13. Murray C J L, Chen LC: Understanding morbidity change. In Arthur Kleinmann and Norma C Wane (eds.) Health and Social Change in International Perspective, Harvard Series on Population and International Health, March 1994.
14. Pocock S J: Clinical Trials: A Practical Approach. Michigan, Wiley Medical Publication, 1983.
15. Everitt B S, Pickles A: Statistical Aspects of the Design and Analysis of Clinical Trials, ed. 2. London, Imperial College Press.
16. Wackerly DO, Mendenhall W, Scheaffer RL: Mathematical Statistics with Applications, 7th edition, Wadsworth Publishing Co Inc, 2007.
17. Kutner MH, Nachtsheim CJ, Neter J, Li W: Applied Linear Statistical Models. 5th edition, McGraw-Hill/Irwin, 2005.
18. Gelman A, Carlin JB, Stern HS, Rubin DB, Dunson DB, Vehtari A: Bayesian Data Analysis, 3rd ed. Chapman and Hall, 2013.
19. Van Der Vaart: Asymptotic Statistics. Cambridge University Press, 2000.
20. Groeneboom P: Nonparametric Estimation under Shape Constraints, Cambridge University Press; 1

edition, 2014.

21. Robin H. Lock, Patti Frazer Lock, Kari Lock Morgan, Eric F. Lock, Dennis F. Lock: Statistics: Unlocking

the Power of Data, 1 edition, Wiley 2013

22. James F. Jekel: Epidemiology, Biostatistics and Preventive Medicine: With STUDENT CONSULT, Elsevier Health-US, 2013.

23. Kestenbaum, Brya: Epidemiology and Biostatistics, Springe, 2009.

<b>E2.1</b>	<b>CONCEPTS AND MEASURES OF GLOBAL HEALTH</b>	<b>(45 Hours)</b>
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**Rationale:** This paper introduces to the students the basic concepts of global health. This course emphasizes on understanding the global burden of disease and measuring population health. A key component of this course is to understand the determinants of health and health disparities. It will also provide student with a broad understanding of the relationship between environment and health. It also develops the understanding of the students about the health care delivery system, human resources for health, migration of human resources for health, etc. Finally, it introduces to students the issues related to policy and health. The topics that will be covered in the course are listed below:

1. **Concept and introduction:** Concept of global health; why is it important to study global health?; health and development in the global context; demographic, health and epidemiological transitions; major patterns of distribution of disease in the world; sources of data on disease and disability
2. **Global burden of disease:** Concept of burden of disease; hypotheses related to burden of diseases – compression of morbidity, expansion of morbidity and dynamic equilibrium; measures of burden of disease at the population level – health expectancy and health gap; methods for estimating DFLE, HALE and DALY; how does the burden of disease and mortality vary by geography, social class, race and gender? GBD 1990, 2010 and 2013 – changes and continuities; new and re-emerging infectious diseases; issues related to HIV/AIDS; introduction to NCDs; double burden of diseases in developing countries; impact of tobacco abuse; trends and challenges related to maternal and child health; maternal mortality
3. **Determinants of Health:** Culture, gender, race, social, political and economic determinants of health and health disparities; contribution of income, education and other factors to health; Factors responsible for variation in the global burden of disease across countries; poverty and health; income inequality and health; health risk factors
4. **Environment and health:** Role of water, sanitation, indoor and outdoor air pollution and nutrition in explaining global health disparities; climate change and health; migration, disaster (man-made, natural), conflicts and epidemics
5. **Health care delivery systems:** Introduction to health systems; how to measure performance of health system?; health systems in different countries; factors responsible for better performance of health systems in developed countries; the distribution of human resources for health; quality of human resources for health; the push and pull factors associated with the migration of health care providers
6. **Policy and health:** Human rights approach to health; national and international policies related to health; how are global health priorities set?; the role of international actors like WHO, World Bank, etc. in global health; influence of international priorities on national priorities

### Essential readings

1. Skolnik, R. (2008). Essentials of global health, Jones and Bartlett: Sudbury, MA.
2. Jacobsen, K.H. (2007). Introduction to global health, Jones and Bartlett: Sudbury, MA.
3. Markel, W.H., Fisher M., Smego R. (2007). Understanding global health, McGraw Hill: Columbus.

4. Merson, M.H., Black, R.E., Mills, A.J. (2001). International public health: diseases, programs, systems and policies, Gaithersburg, MD: Aspen Publishers.
5. Murray, C.J.L., Saloman, J.A., Mathers, C.D., Lopez, A.D. (2002). Summary measures of population health: concepts, ethics, measurement and applications, The World Health Organization: Geneva.
6. Murray, C.J.L., Saloman, J.A., Mathers, C. (2000). A critical examination of summary measures of population health, *Bulletin of the World Health Organization* 78(8): 981-994.
7. Cutler, D., Deaton, A., Lleras-Muney, A. (2006). The determinants of mortality, *Journal of Economic Perspectives* 20(3): 97-120.
8. Link, B.G., Phelan, J. (1995). Social conditions as fundamental cause of disease, *Journal of Health and Social Behavior* 35: 80-94.
9. Smith, J.P. (1999). Healthy bodies and thick wallets: the dual relation between health and economic status, *Journal of Economic Perspectives* 13(2): 145-166.
10. Shiffman, J. (2009). A social explanation for the rise and fall of global health issues, *Bulletin of the World Health Organization* 87(8): 608-613.
11. Gwatkin, D.R. (2000). Health inequalities and the health of the poor: what do we know? What can we do? *Bulletin of the World Health Organization* 78(1): 3-18.
12. Laxminarayanan, R. et al. (2006). Advancement of global health: key messages from the Disease Control Priorities Project, *Lancet* 367(9517): 1193-1208.
13. Murray, C.J.L., Frenk, J. (2000). A framework for assessing the performance of health systems, *Bulletin of the World Health Organization* 78(6): 717-731.
14. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In *Disease Control Priorities in Developing Countries* (2<sup>nd</sup> Edition), pages 87-102, New York: Oxford University Press.
15. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
16. Anand, S., Baernighausen, T. (2004). Human resources and health outcomes: a cross country econometric study, *Lancet* 364(9445): 1603-09.
17. Chen, L. et al. (2004). Human resources for health: overcoming the crisis, *Lancet* 364(9449): 1984-1990.
18. Pallikadavath, S., Singh, A., Ogollah, R., Dean, T., Stones, W. (2013). Human resource inequalities at the base of India's public health care system, *Health & Place* 23: 26-32.
19. Zurn, P., Dal Poz, M.R., Stilwell, B., Adams, O. (2004). Imbalance in the health workforce, *Human Resources for health* 2(13): 1-12.
20. Willis-Stattuck, M. et al. (2008). Motivation and retention of health workers in developing countries: a systematic review, *BMC Health Services Research* 8: 1-8.
21. Brown, T.M., Cueto, M., Fee, E. (2006). The World Health Organization and the transition from 'international' to 'global' public health, *American Journal of Public Health* 96(1): 62-72.
22. Ruger, J.P. (2005). The changing role of the World Bank in global health, *American Journal of Public Health* 95(1): 60-70.
23. Ravishankar, N. et al. (2009). Financing of global health: tracking development assistance for health from 1990-2007, *Lancet* 373(9681): 2113-2124.
24. London, L. (2008). What is a human-rights based approach to health and does it matter? *Health Human Rights* 10(1): 65-80.

<b>E2.2</b>	<b>POPULATION AGEING AND HEALTH TRANSITION</b>	<b>(45 Hours)</b>
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The aims of this course are:

- 1) To impart knowledge of concepts and theoretical framework relating to demography of ageing, and health, social and economic dynamics of population ageing
- 2) To impart concepts and theories of health transition, linkage between health transition and ageing transitions
- 3) To develop skills to analyze trends, determinants and consequences of population ageing
- 4) To build capacity to understand and use theoretical and empirical advancements to develop strategies, policies and programmes to meet challenges of population ageing and plan for health care and social and economic wellbeing of ageing population.

### **I Demography of Ageing:**

A. Concepts and measures of population ageing; components of population ageing; Inter-relationship between population ageing, fertility, mortality and migration; population ageing and momentum of population growth, age structure transition and ageing, and declining population.

B. Population ageing trends and patterns in developed and developing countries; Factors determining ageing trends and patterns; Projected trends and pattern of population ageing; global and regional perspective.

C. Population ageing trends, patterns and determinants in India; state variations; future scenario of population ageing in India and states.

### **II Life Course Perspective and Social Dynamics of Ageing:**

A. Life course perspective of population ageing; Age and Ageing, Ageism; Social Status and Roles of Elderly, Family Structure, Intergenerational relations, Kinship and family support, Social Security; Social network- Frameworks (Berkman and others) and measurement.

B. Living Arrangements of Elderly, Old Age Homes, Social Networks, and Contribution of elderly: “Feminization” of Ageing, Dependency, Gender Dimensions and Discrimination, Widows, Elderly abuse, Social and legal Vulnerability, Legislations to protect elderly in India.

**III Health Transition:** Understanding Health Transition and Ageing Transition; Critiques of “Health Transition” and “Epidemiological Transition” theory: Mortality and Morbidity Compression, Age Patterns of Mortality and Morbidity; Global burden of disease, communicable diseases, injuries and violence; Health Transition and emergent infectious diseases; social epidemiology and medical social determinants of health as fundamental causes of chronic disease; social determinants of health; the relative income hypothesis and the social gradients of health for ageing population: Healthy Ageing; WHO Framework for Healthy Ageing.

### **IV Ageing and Health:**

A. Ageing and Life Expectancy: ageing and life expectancy; changing age pattern of mortality, oldest old mortality; ageing and epidemiological transition in disease prevalence and patterns; Measuring population health; life expectancy and disability free life expectancy, health adjusted life expectancy.

B. Ageing and Burden of Disease: Measurement issues in assessing burden of chronic and multiple diseases in ageing populations; Self-Reported Prevalence, Symptom based prevalence; Measured Prevalence; burden of non-communicable diseases, dual burden of communicable and non-communicable in developed and developing countries; injuries and violence Indian scenario; Ageing, Intrinsic Capacity and Biomarkers of Ageing.

C. Ageing and Functional Health: Ageing and disabilities; trends and prevalence; ageing and injuries, ageing and functional health on various domains- mobility, self-care, pain, vision, interpersonal activities, sleep and energy; Ageing and Quality of Life, WHOQol Ageing and Disability; WHODAS; Ageing and wellbeing and Life satisfaction.

D. Ageing and mental health problems; cognition, memory loss, dementia and depression; Alzheimer’s and Parkinson.

E. Ageing and health risk factors: nutrition, diet and food practices; health risk behaviour- tobacco, alcohol; physical activities; Access to minimum living conditions (sanitation, water).

### **V Health Care System for Geriatric Care and Health Financing:**

A. Availability and accessibility to geriatric care, Geriatric Health Care Institutions; Human Resource Development for Geriatric Care; institutional care; Long-term Care; Health Systems Inequalities for Addressing NCDs.

B. Ageing, health care and health financing: health care utilization, public and private health services utilization; outpatient and inpatient health care utilization; sources of health spending; out of pocket health expenditure; lack of health care options for elderly; Health induced impoverishment among elderly.

### **VI Population Ageing and Economic Conditions:**

A. Population Ageing and Labour Force: Implications of population ageing on labor force, Retirement and work participation among elderly; occupational distribution among the elderly.

B. Ageing and Public Finance: Ageing, savings and investment; pressures on public finance - government health expenditure; implications for health insurance and health financing for elderly, Implications for Government expenditure for social security – pension, social support and housing; The Solow model with an ageing population, Becker’s family model; Bloom and Williamson’s model; ageing and poverty; Ageing, health and development.

### **VII Ageing Policies and Programmes:**

A. Social and Economic Support Policies and Programmes for the Elderly- Retirement, Pensions and Social care Policies in developed and developing countries. Social security and welfare policies and programmes for elderly in India. National Programmes for Health Care of Elderly (NPHCE); National Policy for Senior Citizens.

B. Organizations Engaged in Wellbeing of Ageing Populations: Helpage International, Dignity Foundation, Age in Action, Age International, [Alliance for Aging Research](#), Alzheimer’s Disease International (ADI), [The Parkinson Alliance](#), Geriatrics Societies and Gerontological Associations; Age –friendly world: environment, security and health care.

C. Worldwide Longitudinal Ageing Studies in 40 countries: LASI, SAGE, SHARE, HRS, CHARLS, JSTAR, ELAS, KLoSHA

### **Reading List**

1. World Health Organization (2015), *WHO Report on Ageing and Health*, WHO, Geneva.
2. United Nations (1994), *Ageing and the Family*, United Nations, New York
3. United Nations (1998), *Economic and Social Implications of Population Ageing*, Department of International Economic and Social Affairs, UN, New York.
4. United Nations (2001): *Living Arrangements of Older Persons: Critical Issues and Policy Responses*. Population Division, Department of Economic and Social Affairs, Special Issue Nos. 42/43, 2001, New York.
5. UNFPA, 2001, *Population Ageing and Development: Social, Health and Gender Issues*, United Nations, Malta.
6. Bloom, D.E., D. Canning, et.al. (2002): *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. Santa Monica, CA, RAND.
7. Bose, A.B. (2006). *Social Security for the Old*. New Delhi: Concept Publishing Company.
8. Linda J. Waite (ed.) (2004) *Aging, Health, and Public Policy: Demographic and Economic Perspectives*, Supplement to Population and Development Review
9. Irudaya Rajan, (2007) *Social Security for the Elderly Experiences from South Asia*, Routledge, New Delhi.
10. Prskawetz, Bloom, and Lutz, eds., 2008 *Population Aging, Human Capital Accumulation, and Productivity Growth*, A Supplement to Population and Development Review.



11. Sandra Gruescu, (2006), *Population ageing and economic growth*. Physica-Verlag
12. Heslop A (1999), *Ageing and Development*, Social Development Working Paper: 3, Help Age International.
13. M. Alam (2004). Ageing, old age income security and reforms: An exploration of Indian situation. *Economic and Political Weekly*, 39(33): 3731-3740.
14. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), *Age-structural transitions: challenges for development*. Paris: CIRCRED.
15. Berman, Lisa (2000) "Social Support, Social Networks, Social Cohesion and Health" *Social Work in Health Care* [http://dx.doi.org/10.1300/J010v31n02\\_02](http://dx.doi.org/10.1300/J010v31n02_02)

<b>C5</b>	<b>POPULATION AND DEVELOPMENT</b>	<b>(60 Hours)</b>
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#### **A. Concepts and Measures of Development:**

Need to study population in the context of development: Meaning, definition and scope of development – definition and indicators.

Concepts of development and measures: Limitations of per capita income as an indicator of development; emphasis on equality, Lorenz curve and Gini coefficient; towards human centered development-welfare approach, investment in human capital approach, concepts of social development, physical quality of life index (PQLI); human development index (HDI), gender development index (GDI), human poverty index (HPI); concept of sustainable development.

#### **B. Theories and Strategies of Development:**

Theories of development: Arthur Lewis's two-sector model; big push theory, Liebenstein's critical minimum effort theory, Harrod-Domar and Solow's growth models.

Development strategies through the different five year plans in India.

Millennium development goals and achievements with special reference to India.

#### **C. Linkages of Population on Development:**

Divergent views regarding relationship between population and development: (i) Classical views: Malthus and marx, concept of optimum population (ii) population growth as obstacle to development Coale and Hoover study, tragedy of commons, limits to growth study, Enke's investment model (iii) population growth as conducive to development – views of Colin Clark, Ester Boserup and Julian Simon (iv) views of revisionists and need to study linkages between population change and development.

Effect of development on demographic variables; Demographic transition theory, demographic dividends and population ageing: effects of fertility and mortality declines, health improvements and migration on economic growth.

#### **D. Population and Resources:**

Natural resources: classification of natural resources, renewable and non-renewable resources, resources scarcity and resource depletion.

Capital resources: effect of demographic factors on savings and investments, technology and development; importance of technology to improve the productivity of physical assets.

Human resources - quantitative aspects: concepts labour force, economically active population, unemployment, types of unemployment, disguised, seasonal frictional and chronic. Factors affecting demand and supply of labour, effect of population growth and development on structure of employment.

Human resources – qualitative aspects: factors influencing productivity of human beings need for investment in human capital, implications of population growth on food, sanitation, housing, employment, education and health and social security to improve the quality of human resources.

## **E. Population and Environment:**

Concepts of environment-biosphere, ecosystem, environmental Kuznetz curve, sustainable development-definition and scope.

Philosophical dimensions of the new environmentalism: postmodernism, eco Marxism, deep ecology, social ecology and ecofeminism.

Human impact on environmental - pressure of population on water, land and air; pollution and environmental degradation; Global warming and climate change- debate on climate change and mitigation.

Environmental degradation and its implications on population- food, health; poverty and local environment; development and displacement.

Environmental policies and programmes- global and national policies.

## **Essential Readings**

1. Todaro, Michael P. (1981): *Economic Development in the Third world*. New York: Longman, Chapter 3.
2. Haq, Mahbubul (1996): *Reflections on Human Development*, Delhi: Oxford University Press. Chapters 1 & 2.
3. United Nations Development Programme (2007): *Human Development Report 2007/08*, New Delhi: Palgrave Macmillan Technical Note 1. pp. 393-99.
4. Ray, Debraj (1998): *Development Economics*. Delhi: Oxford University Press. Chapters 1, 2, 3 & 4.
5. Kapila, Ray and Uma Kapila (2001): *India's Economy in the Twenty First Century*. 2nd Revised Edition. New Delhi: Academic Foundation. Chapters 1 to 5, 15, 16 & 21.
6. Birdsall, Nancy, Kelley, Allen C. and Sinding, Steven W. (2001). *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World*, Oxford: Oxford University Press Chapters 2, 4 and 5.
7. David E Bloom, David Canning, Jaypee Sevilla, (2003): *The Demographic Dividend*. Sanata Monica, CA: Rand Corporation. Chapter 2.
8. National Research Council (1986): *Population Growth and Economic Development: Policy Questions*. Washington D.C.: National Academy Press. Chapters 1, 2, 3, 4, 6 & 8.
9. United Nations (1973): *The Determinants and Consequences of Population Trends*, Volume 1, Chapters 11 & 13.
10. Kawadia, G. and K. Ahuja, (2006): *Environmental Issues of Development*. Sections A and E, Ambala: Associated Publishers. Chapters 1, 3 & 13.
11. Goudie Andrew ( 1986) *The human impact on the natural environment*; Blackwell, UK
12. Rogers J W John and Feiss Geoffrey P ( 1998) *People and the earth* Cambridge University Press, UK

## Suggested Readings

1. Sen, Amartya, (2002): The concept of development in Chenery Hollis and T.N. Srinivasan (eds), *Handbook of Development Economics* Vol. 1. Amsterdam: Elsevier. Chapter 1.
2. Jamison D. et al. (eds) (2006): *Disease Control Priorities in Developing Countries*, New York: Oxford University Press and World Bank. Chapter 1.
3. Chenery Hollis and T.N. Srinivasan (eds), (2002): *Handbook of Development Economics*, Vol 1, Amsterdam: Elsevier. Chapters 10, 11, 13 & 15.
4. United Nations Development Programme (1 UNDP, *Human Development Report 1990* Delhi: Oxford University Press. Chapter 1.
5. Lewis W.A, (1958): Economic development with unlimited supplies of labour. In A. N. Agarwala and P. Singh (eds.) *The Economics of Underdevelopment*. New York: Oxford University Press.
6. Leibenstein, H. (1963): *Economic Backwardness and Economic Growth*. New York: John Wiley Chapter 8.
7. Solow, R.M. (1956): A contribution to the theory of economic growth, *Quarterly Journal of Economics*, 70:65-94.
8. Coale A.J. and Hoover, E.M. (1958): *Population Growth and Economic Development in Low Income countries*, Princeton N. J.: Princeton University Press.
9. Simon Julian. (1981): *The Ultimate Resource*, Princeton N.J.: Princeton University Press.
10. United Nations (1973): *The Determinants and Consequences of Population Trends*, Volume 1, Chapters 3 & 7.
11. Martin Philips L, (2004): *Migration and Development: Towards Sustainable Solutions*, Geneva: ILO.
12. Chary, S.N and Vinod Vyasulu (eds). (2000): *Environnemental Management – An Indian Perspective*, New Delhi: Macmillan India.
13. United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definition, Rationale, Concepts and Sources*. New York: United Nations.

<b>C6</b>	<b>GENDER ISSUES AND REPRODUCTIVE HEALTH</b>	<b>(60 Hours)</b>
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1. Importance of the study of Gender Issues in Population Studies. Emergence of the Gender Issues as an important area of concern. Differences between sex and gender. Definitions, Concepts and Terminologies: gender, unequal gender relations, gender equity, gender disparities, gender inequalities, gender main streaming, gender sensitive planning and gender balance.
2. Patriarchy and Matriarchy, Kinship Structure and gender roles; Gender stratification in traditional and modern societies.
3. Feminists Theories: Evolution of feminism; Shift from women in development to gender in development. International and national experience: Different theories of feminism.
4. Autonomy, Empowerment and Status of Women: Concepts, definition and measurement; various indicators and their merits and demerits; Gender sensitive development and health intervention models and programme. Status of Women and Population Dynamics: Inter-linkages.
5. Gender and social institutions in India: State, Legal System, Religious, Family, Society, Marriage customs and patterns, dowry system, segregation and seclusion of women - Purdah system. Implications for sex ratio trends and patterns in India; Son Preference, Desired sex composition of children, child sex ratio, sex ratio at birth and sex selective abortion.
6. Gender inequalities in health: gender differentials in nutrition and health, mortality differentials by sex (children, adults, and aged) and gender inequalities in health care utilization.

Gender inequalities at family level, in employment, in education, in important decision making process and in workplace.

7. Implications of gender inequalities for development - equal access to and utilization of services; equal participation in social development, equal access and control over capital for economic development; equal participation in policy and decision making process; equal distribution of political power.
8. Right-based approach to gender equity and Reproductive Health and HIV/AIDS; Human rights related to gender, reproductive health rights.  
Gender as a key determinant of vulnerability to poverty, gender and HIV/AIDS vulnerability and its demographic impact.
9. Gender based violence: Different forms of violence during life time
10. Gender and mass media: Language, image and portrayal of women in different mass media and the changes over the time
11. Gender mainstreaming, gender sensitive financing and budgeting.
12. National and international programme, policies and laws favoring empowerment of women. National Policy of Women Empowerment.
13. Introduction to reproductive health, Definition and rationale of RH approach, Evolution of ideas about reproductive health, Components of RH and life cycle approach of RH, Recommendations from ICPD.
14. Physiology of human reproduction, Male and female reproductive system; Conception, Pregnancy, Customs, and taboos related to menstruation and puberty in different societies.
15. Maternal and obstetric morbidity, Maternal morbidity, safe motherhood programmes, emergency obstetric care, Cultural practices during pregnancy, childbearing and its impact on health of women, Effects of maternal death on family, Strategies to reduce maternal morbidity and mortality.
16. Abortion and related issues, Spontaneous, induced abortion, legal and illegal abortions, safe and unsafe abortions and consequences of unsafe abortions, Laws regarding abortion.
17. Infertility, Methodological issues in measurement of infertility, Sexual dysfunction, behavioural risk factors, and consequences, Assisted reproductive technologies and its use and misuse; component of infertility in government programmes.
18. Gynecological and contraceptive morbidity: Anemia, Breast, Cervical, Ovarian, Prostate Cancer; Behavioural risk factors, Contraceptive morbidity related to different methods.
19. Reproductive Tract Infection/Sexually Transmitted Infections and HIV/ AIDS: Issues related to HIV infection; socio-cultural, medical, public health and psychological perspectives, Social epidemiological questions concerning HIV infection in Asian countries with emphasis on India, Coping with HIV/AIDS infection: Psycho-social and economic issues, Reproductive Tract Infections (RTI) and Sexually Transmitted Infections (STIs) • Interaction between RTIs/STIs and HIV/AIDS • Impact of HIV/AIDS on fertility, mortality and its relationship with migration.
20. Male Reproductive Health Issues: Men's reproductive health services, Men's role in women's health, Strategies to reaching out to men.
21. Adolescent and Menopausal women, Aspects of adolescent sexual and reproductive behaviours, Socio-psychological and health problems of menopausal women.
22. Gender and Reproductive Health • Rights based approach to gender equity and reproductive health and HIV/ AIDS • Gender and HIV/AIDS vulnerability and its demographic impact
23. Reproductive rights and ethical issues • Human rights and values • Ethical values in RH services; information, liberty of choice • Professional and ethical issues

### **Essential Readings**

1. Basu, Alaka M., (1992): *Culture, The Status of Women and Demographic Behaviour*, Oxford University, New York.
2. Berer, M., (2000): Making Abortions Safe: A Matter of Good Public Health Policy and Practice, Bulletin, WHO, Vol. 78(5), pp. 590-592. 2.
3. Bott, S. et al (Eds. 2003): *Towards Adulthood: Exploring the Sexual and Reproductive Health of Adolescent in South Asia*, World Health Organization, Department of Reproductive Health and Research, Geneva.

4. Dyson, Tim and Mick Moore, (1983). "On Kinship structure, female autonomy, and demographic behaviour in India", *Population and Development Review* vol. 9(1), pp. 35-60.
5. Ellsberg Mary and Heise Lori L. (2005) *Researching violence against women: A practical guide for researchers and activists*. WHO and Path, Washington D.C.
6. Folbre, Nancy. (1992). Improper arts: Sex in classical political economy. *Population and Development Review*. 18(1): 105-112.
7. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): *Population Policies Reconsidered: Health and Empowerment and Rights*, Harvard University Press, Harvard.
8. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social Science Research*. Sage Publication, London.
9. Jeffery Patricia and R. Jeffery. 1997. *Population Gender and Politics: Demographic change in rural north India*. Cambridge University, Cambridge.
10. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, New York.
11. Pachauri, S. (Eds. 1999): *Implementing a Reproductive Health Agenda in India : The Beginning*, New Delhi ; Population Council.
12. Rutsein, Shea, O. and Shah, Iqbal, H. (2004): *Infecundity, Infertility, and Childlessness in Developing Countries*. DHS Comparative Reports No.9. Calverton, Maryland, USA ORC Macro and the World Health Organization.
13. Srinivasan, K. (Eds. 1996): *Population Policy and Reproductive Health*, New Delhi; PFI and Hindustan Publications.
14. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economic and Social Affairs (Dept. of), New York
15. Verma, R., P.J. Pelto, S.L. Schenshul, and A. Joshi (Eds. 2004): *Sexuality in the Times of AIDS: Contemporary Perspectives from Communities in India*, New Delhi; Sage.
16. William Joan. 1989. Deconstructing Gender, 87 Michigan L Rev. 797. *Law Journal Article*
17. World Bank. (1991). *Gender and Poverty in India*. World Bank, Washington.
18. World Health Organization (2003): *Comparative Evaluation of Indicators for Gender Equity and Health*, Women and Health Programme, Centre for Health Development, Kobe, Japan.
19. World Health Organization, (1990): *Measuring Reproductive Morbidity*", Report of a Technical Working Group, Geneva, August 30-September1, 1989, WHO/MCH/90.4
20. World Health Organization. (1998). *Gender and Health. Technical paper* WHO/FRH/WHD/98. (Website: [www.who.int](http://www.who.int))

### **Suggested Readings**

1. Agnes, Flavia. (2000). *Law and gender inequalities: the policies of women's right in India*. Oxford, New Delhi.
2. Alan Guttmacher Institute, (2000): "Readings on induced abortion vol.1: Politics and policies- Articles from Family Planning Perspectives 1974-1999", The Alan Guttmacher Institute, New York.
3. Anker, R.(1997). *Gender and Jobs: Sex Segregation of Occupations in the World*, ILO, Geneva.
4. Balk, Deborah, 1997): "Defying Gender Norms in Rural Bangladesh: A Socio demographic Analysis". *Population Studies* Vol.51, pp. 153-172.
5. Bandhopadhyay, D. 2000. Gender and governance in India. *Economic and Political Weekly*. 35(3): 2696-269xxx).
6. Basu, Alaka Malwade. 2000. Gender in population research: Confusing implications for health policy. *Population Studies*. 54: 19-22.
7. Bergman Ylva, (2004): *Breaking Through, A Guide to Sexual and Reproductive Health and Rights*, Norra Skane Offset, Stockholm.
8. Bhasin K. (2000). *Understanding Gender*, Kali for Women Publishers, New Delhi.

9. Bhasin K. 1993. *What is patriarchy?*, Kali for Women Publishers, New Delhi.
10. Casterline, J.B., (1989): Collecting Data on Pregnancy Loss: A Review of Evidence from the World Fertility Survey, *Studies in Family Planning* Vol. 20(2):81-85.
11. Das Gupta, Monica, 1987. Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1): 77-100.
12. Doyal L.(1995) *What Makes Women Sick: Gender and the Political Economy of Health*. London, Macmillan.
13. Dreze, Jean and Sen Amartya, (1995): *India: Economic and Social Opportunity*, Oxford University Press, New York.
14. Gittleson, J.; Bentley, M.E.; Pelt, P.J.; Nag, M.; Pachuri, S.; Harison, A.B., and Landman, L.T (Eds), (1994): *Listening to Women Talk About Their Health: Issues and Evidence from India*, The Ford Foundation, New Delhi.
15. Goliber, T.J., (1997): *Population and Reproductive Health*, *Population Bulletin* Vol. 52(4), Washington, DC: Population Reference Bureau.
16. Harriet B. Presser, (1997): *Demography, Feminism and the Science-policy Nexus*, *Population and Development Review* Vol. 23(2), pp. 295-331.
17. Jeffery, Roger and Basu, Alka M. (Eds.), (1996): *Girls Schooling, Women's Autonomy and Fertility Changes in South Asia*, Sage Publications, New Delhi.
18. Jejeebhoy S. 1996. *Women's Education, Autonomy and Reproductive Behavior: Assessing what we have learned*. East West Centre, Hawaii.
19. Raju, S.and Leonard, A.(eds.) (2004): *Men as Supportive Partners in Reproductive Health*, Population Council, New Delhi
20. Reeves Hazel and Baden Sally (2000): *Gender and Development: Concepts and Definitions*, Report No. 55, Bridge (development- gender) Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK.
21. Singh, S.K., Lhungdim H., Chattopadhyay, A and Roy, T.K, (2006): "Women's vulnerability to STI/HIV in India, I.I.P.S, Mumbai.
22. Sonya, Andermahr, Lovell Terry and Wolkowitz, Carol, (1997): *A Glossary of Feminist Theory*, Arnold-Hodder Headline Group, London.
23. Sopher, David, (1980). *An Exploration of India: Geographical Perspective on Society and Culture*, Cornell University New York.
24. Unisa, S., (1999): *Childlessness in Andhra Pradesh, India: Treatment-Seeking and Consequences*, *Reproductive Health Matters*, Vol. 7, No. 13.

<b>C7</b>	<b>POPULATION POLICY AND PROGRAMMES</b>	<b>(60 Hours)</b>
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## **A. POPULATION POLICIES AND PROGRAMMES**

Definition of Population Policy; principal features of a population policy; policies in the context of population growth, structure and distribution.

Policy formulation: Policy indicators, justification of population policy, socio-cultural, political and ethical issues related to population policy and the mechanism of how government decisions influence family decisions.

Role of the United Nations, and other International agencies; U.N. World Population Conferences: Bucharest (1974) and Mexico (1984), and Cairo (1994) the World Population Plan of Action in different countries.

Fertility influencing policies: pro-natalist policies, fertility control policies.

Programmes for special groups: women and children, youth, aged, and for tribal.

Health influencing policies: historical perspective of policies and programmes in developing and developed countries. The Alma Ata Declaration and Health for All by 2000 A.D.

Migration influencing policies.

National health and family planning programmes: CNA, RCH, National Population Policy- 2000, National Health Policy- 2002, and National Rural Health Mission 2005-2012.

## **B. POPULATION AND PROGRAMME MANAGEMENT**

Reproductive health Programme Management: Principles: Human Resource Development System (HRDS), performance appraisal, feedback and counseling.

Reproductive Health Programme Management Strategies; Targeting the people in need; Marketing approach, client segmentation; community needs assessment; unmet need approach, and health seeking behavior. Providing services; commercial distribution, community based distribution (CBD) systems, and social marketing.

Quality of Care in Reproductive Health Programme: A Management Perspective: Definition and importance of quality of care. Framework for quality of care in family planning.

## **C. EVALUATION of FAMILY WELFARE PROGRAMMES**

Introduction to evaluation of population, health and family welfare programme, objectives of the evaluation, types of evaluation, Evaluation Framework, Types and levels of indicators in FW programme evaluation. Discussion on Methodological Issues in different evaluation studies in India.

Role of MIS in evaluation of family welfare programmes, Operation Research Techniques (ORT) in evaluation and intervention.

Natural fertility; Potential fertility; Contraceptive Prevalence Rate; Use effectiveness of family planning methods; Unmet need for family planning, Wanted and unwanted fertility, Bongaarts' model for estimating fertility impact, Demand-supply framework to evaluate family planning programmes.

Cost-Effective Analysis, SWOT Analysis.

### **Essential Reading List**

1. Bruce, Judith, (1990): "Fundamental Elements of Quality of Care: A Simple Framework", *Studies in Family Planning*, Vol. 21, No.2.
2. Giridhar, G. Sattar E.M. and Kang J.S., (Eds.), (1989): *Reading in Population Programme Management*, ICOMP.
3. Government of India, (1996): *Community Need Assessment*, Ministry of Health and Family Welfare, New Delhi.
4. Government of India (2002): *National Health Policy*, Ministry of Health and Family Welfare, New Delhi.
5. Government of India, (1999): *National Policy on Older Persons in India*, Ministry of Social Justice and Empowerment, New Delhi.
6. Government of India, (2000): *National Population Policy*, Department of Health and Family Welfare, Ministry of Health and Family Welfare, Govt. of India, New Delhi.
7. Jain, Anirudh, (1988): *Do Population Policy Matter? Fertility and Policies in Egypt, India, Kenya, and Mexico*, Population Council, New York.

8. Bertrand Jane T., Robert J. Magnani, Naomi Rutenberg (1994): *Handbook of Indicators For Family Planning Programme Evaluation*, The Evaluation Project, Carolina Population Center, University of North Carolina at Chapel Hill, USA.

### **Suggested Reading List**

1. Peabody, J.W.; Rahman, H. Omar; Gertlor, Paull, J.; Haan, Joyce, (1999): *Policy and Health Implication for Development in Asia*, Cambridge University Press. Cambridge.
2. Peters, David H. Yazbeek Abdo S.; Sharma, Rashmi R.; Ramana G.N.V., (2002): *Better Health Care Systems in India*, World Bank, Washington D.C.
3. United Nations, (1979): "The Methodology of Measuring the Impact of Family Planning Programme on Fertility", Manual IX, *Population Studies*, No.66, New York.
4. United Nations, (1998): *National Population Policies*, Department of Economics and Social Affairs, New York.
5. World Bank, (2006): *World Development Report, 2006*, Oxford University Press, London.
6. World Health Organization, (1978): "Primary Health Care", International Conference on Primary Health Care, Alma Ata, USSR, 6-12, September.

<b>C8</b>	<b>RESEARCH METHODOLOGY</b>	<b>(60 Hours)</b>
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#### **1. Scientific Methods of Research**

Definition of Research, Assumptions, Operations and Aims of Scientific Research. The Research Process: conceptual, Empirical and Analytical Phases of Research: Essentials Criteria of Scientific methods.

#### **2. Research Designs**

Observational Studies: Descriptive, explanatory, and exploratory, monitoring and evaluative studies. Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, threat to internal validity. Action research studies, Panel Studies.

#### **3. Methods of Data Collection**

Quantitative Methods: Checklist schedules, questionnaire (mail method, interviews through telephone, internet and computers), interview schedule (face-to-face interviews or personal interviews).

Questionnaire/interview schedule design and construction: Principles of constructing a questionnaire/ interview schedule, Types of questions, framing of questions (simple, delicate, personal matter), sequencing of questions.

Qualitative Method: In-depth interviews, key informant interview, observation (participatory and non-participatory), focus group discussion, content analysis, social mapping, social networking, free listing, pile sorting, projective techniques, mechanical devices (camera, tape recorder), mystery client technique, vignettes method.



#### **4. Measurement**

Reliability and validity of measurement: Face, content, construct, convergent, concurrent, and predictive validity; Inter-coder reliability, stability, non random and random errors, scaling and composite indices.

Attitude Scales: Point scales, ranking scales, rating scales, limitations of attitude scales,  
Types of Scales: Bogardus, Guttman, Likert, Semantic, Thurstone scale.

#### **5. Sampling**

Complete enumeration versus sampling.

Concept of sampling unit, sampling frame and sampling design.

Sampling methods: Simple random sampling, stratified sampling, systematic sampling, cluster sampling, and purposive sampling.

Multistage sampling in large-scale surveys, self-weighting designs, Stratification in multistage sampling.

Sampling and non-sampling errors, calculation of weights, sample size determination.

#### **6. Data Collection, processing and analysis**

Research ethics; At the level of respondent, community, organization and presentation of results

Fieldwork – interaction with community and respondent.

Editing, coding, data entry, validation & analysis.

#### **7. Writing research proposal and report**

Purpose of a proposal/report

Content of proposal/report: Introductory section, methodology adopted, analysis and inferences, summary, conclusion and recommendations.

References/Bibliography, Appendices, Footnotes.

#### **8. Research Methodology Lab-exercise: ANTHROPAC, Atlast Ti and Group Work**

##### **Essential Reading List**

1. Bernard, H. Russell, (1995): *Research Methods in Anthropology: Qualitative and Quantitative Approaches*, Altamira Press, Walnut Creek.
2. Goode W J and Hatt P K. 1952. *Methods in Social Resasrch*. McGraw Hills, New York.
3. Kish, Leslie, (1995): *Survey Sampling*, John Wiley and Sons, Inc. New York.
4. Lohr L. Sharaon., (1999): *Sampling: Design and Analysis*, Duxbury Press, London.
5. Lwanga S. K. and Lemeshow S., (1991): *Sample Size determination in Health Studies: A Practical Manual*, World Health Organisation, Geneva.
6. Mukherji, P.N., (1999): *Methodologies in Social Science*, Sage Publications, New Delhi.
7. Pullum W. 2006. An Assessment of Age and Data Reporting in the DHS Surveys, 1985-2003. DHS Methodological Report No. 5. Calverton, Maryland, Marco International Inc.
8. Royce A. Singleton and Bruce C. Straits, (1999): *Approaches to Social Research*, Oxford, Oxford University Press.
9. Young P V. 1994. *Scientific Social Surveys and Reasearch*. Prentice-Hall, New York (4<sup>th</sup> Edition).

<b>C9</b>	<b>ADVANCE STATISTICAL METHODS AND COMPUTER APPLICATIONS</b>	<b>(60 Hours)</b>
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1. Basics of MORTPAK4, SPECTRUM and applications.
2. Introduction to SPSS-facilities, creating database structure, data entry, specifying scales, validation of data entry, importing and exporting data. Data Manipulation – recoding creating new variable, sorting, filtering and selection of specific data, generating simple frequencies, use of syntax editor. Large scale data handling – (using NFHS, DLHS-RCH, NSSO) Merging, splitting data and formatting.
3. Correlation and regression analysis – interpretation and regression diagnostic test.
4. Multivariate analysis – concepts and interpretation of results of multiple regression, logistic regression, ANOVA, MCA with and without interaction. Survival analysis-cox regression test of proportionality and heterogeneity.
5. Introduction to STATA, generating, variables, commands and do file editor. Survey analysis – estimation of mean, proportion, design effect and probit analysis and standard non-parametric test.
6. Concept of data hierarchy and multilevel analysis. Introduction to MLwiN, importing and formatting data. Illustration of 2 and 3 level analysis using NFHS, DLHS-RCH, NSSO data.
7. Introduction to GIS and illustration.

## References

1. *SPSS 14.0 Brief Guide* – SPSS Inc.
2. *SPSS regression models 11.0* - SPSS Inc.
3. *SPSS advanced models 11.0* - SPSS Inc.
4. *Stata user's guide: Release 8.*, 2<sup>nd</sup> Edition. Stata Press.
5. *Stata programming reference manual: Release 8.*, 2<sup>nd</sup> Edition. Stata Press.
6. *Stata survey data reference manual: Release 8.*, 2<sup>nd</sup> Edition. Stata Press.
7. Snijders, Tom A.B. and Bosker, Roel J., (1999): *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Sage Publications.
8. Cromley, Ellen K. and McLafferty, Sara L., (2002): *GIS and public health*. Guilford Press, New York.

<b>C10</b>	<b>Indirect Estimation Techniques, Population Projection and Demographic Models</b>	<b>(60 Hours)</b>
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### I. Concepts of Demographic Models:

Stable population; Generalized Population; Momentum of Population Growth; Concept of Multiregional Model; and Micro Model such as Birth Interval, Waiting Time (Birth Distribution etc, Estimation of fecundability?)

### II. Indirect methods for estimating fertility:

Needs for Indirect methods; Concept of Reverse Survival Method, Robust Method and method based on Generalized Population Model; Rele's Method; Concept of P/F ratio method and its modification [Hypothetical Cohort methods]

### III. Indirect Method of Estimating Mortality:

#### 1. Indirect Methods of Estimating Infant and Child Mortality

(a) Basic concepts, fundamental assumptions and underlying principles to the technique proposed by Brass based on retrospective data on children ever-born and surviving mothers classified by current age of mother; (b) Modifications proposed by Sullivan and subsequently by Trussell over Brass method; and (c) the UN revised and extended version of Trussell's method.

## **2. Some Methods of Estimating Adult (including Maternal Mortality) and Old Age Mortality**

(i) Some methods of estimating adult mortality using successive census age-distributions; (ii) Methods of estimating life expectancies at older ages; and (iii) Estimation of maternal mortality through sisterhood method.

## **3. Some Indirect Methods for Estimating Death Registration Completeness for Countries Having Limited and Defective Vital Registration Data**

An overview of some selected methods of estimating completeness of death registration, starting from Brass growth balance method and its subsequent development.

## **IV. valuation and Adjustment of Demographic Data**

Appraisal of the quality of demographic data; types and sources of errors; sampling and non-sampling errors; methods of detecting errors in population data; post-enumeration surveys; dual record system; brief introduction to indirect methods.

Evaluation and measurement of errors in age reporting; methods of adjustment for age-sex data; method of graduation.

## **V. Population Estimates and Projections**

Concepts of population projections; population estimates, forecasts and projections, uses of population projections.

Methods of interpolation; extrapolation using linear, exponential, polynomial, logistics, Gompertz curves and growth rate models.

Cohort component method: basic methodology; projection of mortality, fertility and migration components; population projections of United Nations, World Bank and Expert Committees of Government of India; accuracy of population projections.

Methods of rural-urban and sub-national population projections.

Methods of related socio-economic projections: labour force, school-enrolment, health personnel and households.

## **Essential Readings**

1. Bennett, N.G., and S. Horiuchi (1981): "Estimating completeness of death registration in a closed population", *Population Index*, 47(2):207-221.
2. Bennett, Nail. G., and Shiro Horiuchi (1984): "Mortality estimation from registered deaths in less developed countries", *Demography*, 21(2):217-233.
3. Bhat P.N.M, (2002): General growth balance method: A reformulation for population open to migration, *Population Studies*, 56 (2002), 23-34, Printed in Great Britain.
4. Bhat P.N.M., (2002): Completeness of India's Sample Registration System: An assessment using the general growth balance method, *Population Studies*, 56 (2002), 119-134, Printed in Great Britain.
5. Coale, A.J., (1981): "Robust estimation of Fertility by the Use of Model Stable Population", *Asian and Pacific Census Forum*, Vol.8 No.2. East-West Centre, Honolulu, Hawaii.
6. EL. Badry, M.A., (1961): "Failure of Enumerators to make Entries of Zero", Errors in Recording Childless Cases in Population Censuses, *Journal of American Statistical Association* Vol. 56.
7. Hill, Kenneth (1987): "Estimating Census and Death Registration Completeness", *Asia and Pacific Population Forum*, 1(3): 8-13 & 23-24.

8. Horiuchi, S. and A. J. Coale (1982): "A Simple Equation for Estimating the Expectation of Life at Old Ages, *Population Studies*", Vol. 36, pp.317-326.
9. Keyfitz, Nathan (1977): *Introduction to the Mathematics of Population with Revision*, Addison-Wesley Publishing Company, Inc., Massachusetts.
10. Kim, Young J., Schoen, R. & Sarma, P.S.(1991) : Momentum and The Growth-Free Segment of Population, *Demography*, Vol.28, No.1 pp. 159-173.
11. Lahiri, Subrata (1990): Some New Approaches to the Estimation of Life Expectancies at Older Ages, In *Dynamics of Population and Family Welfare, 1989*, (eds. by Srinivasan and K.B. Pathak), pp.315-341.
12. Lahiri, Subrata, and Lysander Menezes (2004): "Estimation of adult mortality from two enumerations of a destabilized population subject to response biases in age-reporting", In *Population, Health and Development in India: Changing Perspectives*, (Eds. by T. K. Roy, M. Guruswamy, and P. Arokiasamy), Rawat Publications, Jaipur: 2004, pp.101-136.
13. Lahiri, Subrata, Arni S. R. Srinivasa Rao, and S. Srinivasan (2005): Role of Age-specific Growth Rates on Population Ageing in Some Developed and Developing Countries – A Comparative Study, *Demography-India*, 34(1): 63-83.
14. Martin, Linda G. (1980): "A Modification for use in Destabilized Population Brass's Technique for Estimating Completeness of Death Registration", *Population Studies*, 3(1):39-51.
15. Mishra, B.D. (1981). *Introduction to Study of Population*. South Asian Publishers. Chapters 4 & 7.
16. Mitra, S., 1984, "Estimating the Expectation of Life at Old Ages", *Population Studies*, Vol. 38, pp. 313-319.
17. Pathak, K.B. and F. Ram (1998): *Techniques of Demographic Analysis*, Himalaya Publishing House, Second Edition, Mumbai.
18. Potter, R.G. and Kulkarni, P.M. (1977) : Population Momentum : A Wider Definition, *Population Studies* Vol. 40 pp. 555-56.
19. Preston, S.H., and A.J. Coale (1982): "Age structure, growth, attrition, and accession: A new synthesis, *Population Index*", 48(2): 217-259.
20. Preston, S.H.; Himes, Christine and Mitchell, Eggers (1989): "Demographic Conditions Responsible for Population Aging", *Demography*, 26 (4): 691-704.
21. Preston, Samuel H. Patrick, Heuveline and Michel Guillot, 2003, *Demography: Measuring and Modeling Population Processes*, Blackwell Publishers, 2001 (First Indian Reprint 2003).
22. Preston, Samuel H., and Subrata Lahiri (1991): "A Short-cut Method for Estimating Death Registration Completeness in Destabilized Populations", *Mathematical Population Studies*, 3(1):39-51.
23. Rele, J. R. (1967): "Fertility Analysis Through extension of Stable Population Concepts", *Population Monograph Series No.2*, University of Berkeley.
24. Rele, J. R., (1987), "Fertility Levels and Trends in India, 1951-81", *Population and Development Review* Vol. 13 (2). Academic Press, New York.
25. Schoen, R. and Kim Young J. (1991) : "Momentum Towards Stability as a Fundamental Principle of Population Dynamics" *Demography*, Vol.28 No.3, pp.455-466.
26. Seigel Jacob S. and David A. Swanson (eds.) (2004): *The Methods and Materials of Demography*. 2<sup>nd</sup> Edition, New York: Elsevier Academic Press. Chapters 20 & 21.
27. Smith Stanley K., Jeff Tayman, and David A. Swanson, (2001): *State and Local Population Projections: Methodology and Analysis*. New York: Kulwer Academic/Plenum Publishers. Chapters 3 & 7.

### **Suggested Readings**

1. Government of India (2006): *Population Projections for India and States, 2001-2026*. New Delhi: Office of the Registrar General.
2. Makridakis, S. Steven C., Wheelwright, and Rob J. Hyndman (1998): *Forecasting: Methods and Applications*, New York: John Wiley and Sons, p607-.

3. Shryock, Henry S. Jacob S. Seigel and Associates: (1973): *The Methods and Materials of Demography*, Vol. I. Washington, D.C. U.S. Bureau of the Census. Chapter 8.
4. United Nations (1974): *Methods for Projections of Urban and Rural Population: Manual VIII*. Population Studies, No. 55. New York: Department of Economic and Social Affairs. Chapters 3 & 4.
5. United Nations (1983): *Indirect Techniques for Demographic Estimations*, Manual X, Population Studies No.81, Department International Economic and Social Affairs, (ST/ESA/SER.A/81).
6. United Nations (2006): *World Population Prospectus: The 2004 Revision* Vol. III: Analytical Report. New York: United Nations.
7. United Nations, (1955): *Methods of Appraisal of Quality of Basic Data for Population Estimates*, Manual II. New York: United Nations. Chapter 1 & 3.
8. Zlotnik, H. and Hill, K., (1981): "Use of Hypothetical Cohort in Estimating Demographic Parameters under Conditions of Changing Fertility and Mortality", *Demography*, Vol. 18, No.1.

### Electives 3

E3.1	SPATIAL DEMOGRAPHY	(45 Hours)
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#### **A. Concepts and Theories**

Demography as a spatial science; difference between spatial demography and population geography; Spatial pattern and spatial process; location, distance and area; Distance and decay relationship and spatial hierarchy; space, place and region; Type of spaces- concrete and abstract space; absolute, relative and relational spaces

Understanding demographic process by geographical scale; nature of disaggregated data- Census and secondary sources; Linking micro and macro demography in a spatial frame

Application of spatial frameworks to demographic process; Space, culture and fertility; Spatial pattern of mortality and diseases; Distance as factor in access to health care and health planning; Migration and distance- gravity model; space, culture and migration; urban sprawl and sub-urbanization

#### **B. Statistical and Geospatial Data and Software**

**Spatial Concepts and Cartography:** Spatial parameters: Site and location; Scale; Plane and spherical coordinate, Map Projection-UTM, Types of maps: cadastral, toposheet, thematic, digital; Representation of spatial and non spatial data;

**Introduction to geospatial software: GIS:** discrete data: point, and polygon data, Raster and vector data, layouts preparation. Geocoding and basics of digitization in ArcGIS

**Introduction to Geoda:** ESDA in (Exploratory Spatial Data Analysis); Local Indicators of Spatial Association (LISA)

**Statistical Concepts:** Bar diagram, Frequency polygon, Frequency curve; Test of significance, confidence intervals, Univariate and Multivariate Statistics: Correlation and Regression, Matrix algebra; Auto-correlation; kriging, Moran's I index

**Introduction to Statistical software:** SPSS, STATA, R

#### **C. GIS and Spatial Analysis of demographic data**

##### **Representation of statistical data and automated cartography (Lab based exercises):**

- a) Population distribution map of India using dot and sphere/circle, cubes, combined; Cartograms
- b) Density map by Choropleth and population density gradient by Isopleth;
- c) Fertility, mortality and natural growth of population by Polygraph.
- d) Measurement of population concentration by cumulative curve.
- e) Migration flow by Carogram

##### **Concept and application Models:**

- a) Spatial Lag and Error Regression Modeling;
- b) Multilevel modeling (hierarchical linear modeling);
- c) Geographically Weighted Regression;

- d) Spatial Pattern Analysis;
- e) Urban and city level projection

**Reading list:**

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Workbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on <http://geodacenter.asu.edu/>.
2. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Harlow, Longman.
3. Barbara E., Ronald R. R., Stephen J. W., Tom P. E. and Sara R. C. (1997). *Geographic Information Systems, Spatial Network Analysis, And Contraceptive Choice*. Demography. 34(2): 171-187.
4. Bonham, Carter G.F. (1995): Information Systems for Geoscientists—Modelling with GIS. Pergamon, Oxford.
5. Chen, X., Orum A.M., and Paulsen K.E. (2013). Introduction to Cities: How Place and Space shape Human Experience. West Sussex, Wiley-Blackwell.
6. de Castro M. C. (2007). *Spatial Demography: An Opportunity to Improve Policy Making at Diverse Decision Levels*. Population Research and Policy Review 26: 477-509.
7. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
8. ESRI (1993): Understanding GIS. Redlands, USA
9. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. New York, John Wiley and Sons,
10. Griffith, D. A. and Amrhein (1997): Multivariate Statistical Analysis for Geographers. Englewood Cliffs, New Jersey, Prentice Hall.
11. Goodchild, M.F. and Janelle, D.G. (eds). (2003). Spatially Integrated Social Science: Examples in Best Practice. Oxford University Press.
12. John R. Weeks. 2004. The Role of Spatial Analysis in Demographic Research. Chapter 19 (pp. 381-399) in M.F. Goodchild and D.G. Janelle (eds.) (2004) Spatially Integrated Social Science New York, NY, Oxford University Press.
13. Kurland K. S., Gorr W. L. (2007). GIS Tutorial for Health. Redlands, CA, ESRI Press.
14. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. New Delhi, Prentice Hall of India.
15. Massey, D. (2008). for space. New Delhi, Sage Publications Ltd.
16. Monkhouse, F.J. and Wilkinson, H. R. (1962). Maps and Diagrams. London, Methuen and Company Ltd.
17. Parker R. N., Asencio E. K. (2008). GIS and Spatial Analysis for the Social Sciences: Coding, Mapping, and Modeling. New York, NY, Routledge/Taylor & Francis.
18. Paul V. (2007). *Demography as a Spatial Social Science*. Population Research and Policy Review 26: 457-476. (plus Introduction to the special issue of PRPR on Spatial Demography) pp. 455-456).
19. Editor. (2007). *Introduction to the Special Issue*. Population Research and Policy Review 26: 455-456).
20. Reibel, Michael, (2007). *Geographic Information Systems and Spatial Data Processing in Demography: A Review*. Population Research and Policy Review 26: 601-608.
21. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984) Elements of Cartography. New York, John Wiley and Sons.
22. Shaw, G. and Wheeler, D. (1994). Statistical Techniques in Geographical Analysis. Englewood Cliffs, New Jersey, Prentice Hall.
23. Soja, E. W. (1996). Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places. Wiley-Blackwell
24. Sparks Corey. (2013). *Spatial Analysis in R: Part 1*. Spatial Demography 1(1) 131-139
25. Sparks Corey. (2013). *Spatial Analysis in R: Part 2*. Spatial Demography 1(2) 219-226
26. Zhu E. J. and Chi G. (2008). *Spatial Regression Models for Demographic Analysis*. Population Research Policy Review 27:17–42 DOI 10.1007/s11113-007-9051-8

### **Operations Research in Reproductive Health**

1. Definition of OR
  - (a) What is Operations Research
  - (b) Focus and Objective of Operations Research
  - (c) Types and Examples of Operations Research
2. Role of Researchers and Managers
3. Components of OR proposal
4. Identification of Problem and Solution
  - (a) Identification and Definition
  - (b) Justification
  - (c) Alternative Solution
  - (d) Indicators- Outputs, Outcomes and Impacts
5. Causality (Randomize Experimental Design)
  - (a) Pretest-Post test Control Group Design
  - (b) Post test –only Control Group Design
  - (c) Multiple Treatment Design
6. Quasi/Non-Experimental Design
  - (a) Non-Experimental Control Design
  - (b) Time Series, and Before and After Design
7. Inferential Statistics in Operations Research
  - (a) ( $X^2$ , t, F)-tests
  - (b) Deciding Sample Size in case of Different Experimental Design
  - (c) Linking Different Design and Statistical Test
8. Study Design Exercises
9. Ethics in Operations Research
  - (a) ICMR Guidelines
  - (b) International Perspectives
  - (c) Case Studies
10. Utilization and Dissemination, and Process Documentation
10. Critiques to OR proposal

E3.3	MONITORING AND EVALUATION	(45 Hours)
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1. **Introduction to Monitoring and Evaluation:** Basic concepts, Difference between Monitoring and Evaluation; Linkage between Planning, Monitoring and Evaluation; Importance of Monitoring and Evaluation
2. **Monitoring and Evaluation Framework:** Resources for monitoring and evaluation, Engagement of stakeholders in monitoring and evaluation; Meaning of Indicators, Ideal requirement, process of developing indicator, illustration of indicators developed from large scale surveys, measurement, need & levels of indicator; Challenges in developing indicators from Large-Scale Surveys; Types of Indicators – Input, Process, Output, Outcome, Impact; Capacity building for monitoring and evaluation
3. **Monitoring of Policy Implementation:** Components of policy and programme, budget, staff, process of evaluation, developing tangible indicators for policy monitoring in terms of Input, Process, Output, Outcome, Impact; Result based inference
4. **Evaluation Design:** Determination of sample size under different approaches and design including measurement of change due to certain interventions; Quasi Experiment design, Case control design, Evaluation Terms of Reference- Formative and Summative Evaluations, Managing Evaluations; Evaluation at different points: Baseline, Mid-point, Concurrent and End line evaluation; Evaluating for results: Need and Uses of evaluation, Principles, norms and standards for evaluation; Roles and responsibilities in evaluation; Randomization, Statistical design of Randomization; Randomized control trials, time dependant cluster design, interrupted time series analysis.
5. **Assuring the Quality of Evaluation Design and Methodology:** Overview; Defining the context; The evaluation purpose; Focusing the evaluation; Evaluation methodology; Mandatory requirements for programme; SWOT analysis of NHM, ICDS and National Livelihood Mission; Social audit – meaning, objectives, advantage, case study of social audit
6. **Statistical Approaches of Evaluation of Intervention Programme:** Statistical inferences used in different intervention design – z, t, F and paired ‘t’ tests, two stage LSM, instrument variable method; Propensity score matching; Difference in Difference Method: Theory and application, advantage and disadvantage, regression implementation
7. **Management Information System and Use of Technology:** MIS – Monitoring information system; Role of programmers; HMIS system; Global Positioning System and use of other technology

#### References:

1. Casley, Dennis J and Kumar, Krishna (1988). *The Collection, Analysis, and Use of monitoring and Evaluation Data*. A World Bank Publication, The John Hopkins University Press
2. FHI (2004). *Introduction to Monitoring and Evaluation Monitoring and Evaluation, monitoring hiv/aids programs: A facilitator's training guide*. Family Health International
3. GoI & UNDP (2012). *Guiding Framework for Monitoring and Impact Evaluation of Capacity Building & Training of Panchayati Raj Institutions in States/UTs*. Government of India and United Nation's Development Programme



4. IFRC and RCS (2002). *Handbook for Monitoring and Evaluation*. International Federation of Red Cross and Red Crescent Societies –Geneva
5. NIRD&PR; MoRD and TISS (2016). *Social Audit: A manual for Trainers*. National Institute of Rural Development & Panchayati Raj; Ministry of Rural Development and Tata Institute of Social Sciences
6. Rossi, Peter H.; Mark W. Lipsey and Howard E. Freeman (2004). *Evaluation, A Systematic Approach*. Seventh Edition. Sage Publications – New Delhi.
7. Sullivan, T.M., Strachan, M., and Timmons, B.K. (2007). *Guide to Monitoring and Evaluating Health Information Products and Services*. Baltimore, Maryland: Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health; Washington, D.C.: Constella Futures; Cambridge, Massachusetts: Management Sciences for Health, 2007
8. UNDP (2009). *Handbook on planning, monitoring and evaluating for development results*. United Nations Development Programme - New York
9. UNESCO (2014). *Monitoring and Evaluation Guidance for School Health Programs: Thematic Indicators*. United National Educational, Scientific and Cultural Organization.

## Electives 4

<b>E4.1</b>	<b>HEALTH ECONOMICS and FINANCING</b>	<b>(45 Hours)</b>
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### **Aim and General description**

Health economics is a growing field of economics primarily dealing with issues relating to scarcity in the allocation health and health care. The aim of this proposed course is to familiarize the students with economic ideas and motivate them into undertaking future research and build their careers in health economics. This is an introductory course giving the application of economic principles to policy relevant questions in the arena of health and health care. The course begins with an overview of health economics and students will learn about the health care sector and how to apply economic tools in analyzing structure and performance of health care sector.

**Teaching Strategy:** Teaching by class room lectures, seminars, case studies and group exercise.

**I: Introduction to Health Economics:** Basic concepts in Economics– Utility, Demand and supply analysis, Elasticity, Expenditure Function, Production Possibility Frontier (PPF), Externalities and Market Failure: Approaches to Economics-Positive and Normative, Welfare economics and health.

**II: Costing and Health Economics:** Cost theory and cost analysis, Type of cost curves: SAVC, SAMC, STC, AFC, LATC, The importance of costing in Health Economics, Alternative definitions of cost, types of cost - monetary and non-monetary, measurement and valuation issues in cost, production cost and discounting, Constraints in measuring health cost.

**III: Economic Evaluation:** What is economic evaluation? Various types of economic evaluation used in health care, measuring outcome, Cost effectiveness analysis (CEA), Cost-Benefit Analysis (CBA), Divergence between social and private costs and benefits in health care, Limitations of economic evaluation, Consumer Impact Assessment.

**IV: Concepts and Measures of Health Inequalities:** Defining health inequality, Why measure health inequality; Health equity and inequality: Concept and definitions; Understanding of the concepts such as need, access and utilisation; cardinal and ordinal health variables; Presence of inequality: Review of some elementary measures of health inequality: Index based approach; Axiomatic approach to measurement; Individual-mean and inter-individual comparison; WHO Index, Coefficient of Variation, Generalised Entropy Index, Lorenz Curve and Gini Coefficient

**V: Health Financing and Health Insurance:** Health care financing system, source of health care spending, The Health Insurance – intermediary agent, The private health insurance, Regulation of health insurance, Government as health insurer in India, Equity in health care finances, Future investment strategies in health sector, Willingness to pay for health care, User charges as determinant of health financing, National Health Accounting: Sources and Uses of Funds, health budgeting, Interrelationship between epidemiological transition and health expenditure

#### **Reading List: Essential**

1. Rexford E. Snterre and Stephen P. Neun, Health Economics: Theories, Insights and Industry Studies, Thompson South – Western, 3<sup>rd</sup> Edition 4<sup>th</sup> Edition, 2007.
2. Drummond MF, Sculpher MJ, Torrance GW, O'Brien B, Stoddart GL, eds. Methods for economic evaluation of health care programmes, Third Edition, Oxford University Press, 2005.
3. O'Donnell O, Doorslaer E v, Wagstaff A and Lindelow M. Analyzing Health Equity Using Household Survey Data, AGuide to Techniques and Their Implementation
4. Gold Marthe R, Joanna E Siegel, Lousie B russel, and Milton C Weinstein, 1996, Cost effectiveness in health and medicine, new York: Oxford University Press.

#### **Reading List: Suggested**

1. Zweifel and Breyer, 1997, Health Economics, Oxford University Press)
2. Health economics: 3<sup>rd</sup> Edition by Phelps
3. The economics of health and health care, 2<sup>nd</sup> edition by Folland, Goodman and Stono (FGS)
4. Handbook of Health Economics (Anthony J. Culyer and Joseph P Newhouse eds., Elsevier Science, 2000: Available online at:
5. Culyer A J and J P Newhouse, 2000, The state and scope of health economics, Handbook of Health Economics, Volume 1A, Eds. Culyer and Newhouse, Elsevier, 2000, pages 1-7.

#### **Recommended Journal:**

1. Health Policy and Planning
2. Health Policy
3. Inequalities in Health
4. Bulletin of the World Health
5. The Lancet

E4.2	URBANIZATION, SPACE AND PLANNING	(45 Hours)
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### I. Urbanization and Space

Urbanization and space: concepts and forms (formal and informal spaces); Differences between space, place and region; urbanization and space interaction: gravity model, distance decay model, forces of concentration and dispersion, urban agglomeration and spatial economy; Access to urban and right to the city

### II. Evolution of Spaces of Settlements

Settlement: evolution, characteristics and factors; settlement pattern and hierarchy; Urban morphology; Change in urban land use and population density; Rural-urban relationship: dichotomy or continuum; Role of urban centres in rural development.

### III. Urban and Regional Planning

**Planning:** Definitions, concepts, purpose, types and levels; geography/demography and planning relationship.

**Regional development/planning:** Region: concept and definition, types (formal, functional and planning); Need for regional planning; Types of regional planning; Spatial structure of regions,

Theories of regional development: Stages of development, economic base theory, Industrial location theory, Growth Pole theory; Core-periphery interactions.

Regional planning in India; Planning regions in India; Regional disparity in development; Special area development planning (hilly area development planning, (North-Eastern regional council, Mumbai Metropolitan Regional Development Plan).

**Urban Planning:** Concepts; history and origins of urban planning; pioneers of urban planning; types of urban plans: New towns, neighborhood, garden city, green belts; healthy urban planning, WHO concept of healthy city, livable city, sustainable city.

Urban policy since independence, five year plans, important urban plans (New Delhi, Navi Mumbai, Chandigarh); Smart Cities Mission; HRIDAY, AMRUT, PURA, RURBAN mission

### IV. Challenges in Urban planning

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housing and real estate, Slums and slum rehabilitation, The case of SRA in Mumbai; Urban pollution, Solid waste management; Management of migrants

### V. GIS and Urban and Regional Planning

Application of GIS in urban and regional planning.

### Essential Reading List

1. Friedman, John and William Alonso (1964) *Regional Development and Planning: A Reader*, The MIT Press, Massachusetts.
2. Friedman, John (1966) *Regional Development Policy: A Case Study of Venezuela*, MIT Press, Massachusetts.
3. Chaudhuri, J. R. (2001) *An Introduction to Development and Regional Planning*, Orient Longman, Hyderabad.
4. Chand, M and V.K. Puri, (1983), *Regional Planning in India*, New Delhi, Allied.

5. Friedman, J and W. Alonso, (eds: 1969), *Regional Development and Planning: A Reader*, Cambridge, MIT Press.
6. Lefebvre, H (1991) *The Production of Space*, Blackwell, Oxford.
7. Hall, P, (1992), *Urban and Regional Planning*, Third Editions, London, Routledge.
8. Harvey, D. (2008) 'The Right to the City', *New Left Review* 53 (September-October): 23-40.
9. Harvey, D. (2012) *Rebel Cities: From the Right to the City to the Urban Revolution*, Verso, London.
10. Husain, M, (1994), *Human Geography*, Jaipur, Rawat.
11. Leong, Goh C. and G.C. Morgan, (1982), *Human and Economic Geography*, Singapore, Oxford University Press.
12. Singh, R. Y. (1994), *Geography of settlements*, Rawat, Jaipur.
13. Ginsburg, N., Bruce Koppel and T.G. Mc Gee (1991) *The Extended Metropolis: Settlement Transition in Asia*, University of Hawaii Press, Honolulu.
14. Nath, V. (1971) Regional Development Policies “, *Economic and Political Weekly*, 6(30-32): 1601-1608.
15. Lo, C.P. and Yeung, A. K. W. (2002): *Concepts and Techniques of Geographic Information Systems*. Prentice Hall of India, New Delhi.
16. Nyerges, Timothy L. and , Jankowski Piotr (2010): *Regional And Urban Gis: A Decision Support Approach*, Rawat Publication, Jaipur. ISBN: 9788131603697, 8131603695

### **Suggested readings**

1. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolution of regional planning*, London, Edward Arnold.
2. Kawashima, T and P. Korcelli, (1982), *Human Settlement Systems: Spatial Patterns and Trend*, Luxemburg, IIASA.
3. Knowles, R and J. Warling, (1983), *Economic and Social geography: Made Simple*, London, Heinemann.
4. Misra, R.P, (1992), *Regional planning: Concepts, Techniques, Policies and Case studies*, New Delhi, Concept.
5. Sarin, M, (1982), *Urban Planning in the Third World: The Chandigarh Experience*, London, Manshell.
6. MMRDA (2016), *Mumbai Metroplotan Regional Development Plan 2016-2036* MMRDA, Mumbai.
7. UNEP and others (2007), *Livable Cities: The benefits of environmental planning*, The Cities Alliance, Washington. <http://www.citiesalliance.org/index.html>.

<b>E4.3</b>	<b>Large Scale Sample Survey</b>	<b>(45 Hours)</b>
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### **Unit I: Scope of large scale surveys and sampling design**

Need for large scale surveys, objectives of cross-sectional, longitudinal, rotational and interpenetrating surveys. Sample size determination and sample allocations for such surveys to districts, states and regions in terms of individuals, households and primary sampling units.

### **Unit II: Sampling frames**

Sources of sampling frame for cross-sectional, longitudinal, rotational and interpenetrating surveys. Explicit and implicit stratifications, domain controlled sampling by regions and social groups, merging and segmentation procedures for small and large primary sampling units. Mapping and listing for preparation of frame for last stage sampling units. Sample selection of PSUs and households.

**Unit III: Quality assurance procedures**

Revisit of sub-samples, field check tables, non-response pattern, and quality lot assurance, roles of supervisors, editors, field and nodal agencies. Third party audit.

**Unit IV: Software development**

Computer assisted personal interview (CAPI), process of data transfers, introduction to features of Census and Survey Processing System (**CSPro**), steps for development of data entry software in CSPro.

**Unit V:** Ethical considerations in large-scale sample surveys

**Unit VI:** Estimation of sampling weights

**Unit VII:** Preparation of factsheets, reports and other deliverables

**Reading List**

1. United Nations (2005): Household Sample Surveys in Developing and Transition Countries.  
[www.unstats.un.org/unsd/hhsurveys/](http://www.unstats.un.org/unsd/hhsurveys/)
2. CSPro Software. [www.census.gov/data/software/cspro.Download.htm](http://www.census.gov/data/software/cspro.Download.htm)
3. Kish, Leslie, (1995): Survey Sampling, John Wiley and Sons, Inc. New York.
4. Lohr L. Sharaon., (1999): Sampling: Design and Analysis, Duxbury Press, London
5. Ladusingh, L. (2018). Survey Sampling Methods, PHI Learning, New Delhi
6. Roy, T.K., Acharya R., Roy, A.K. (2016). Statistical survey design and evaluating impact, Cambridge University Press, New Delhi.

**International Institute for Population Sciences**  
(Deemed to be University)  
**Mumbai**

**Ph.D.Rules, Regulations and Syllabus**



Capacity Building for a Better Future

**International Institute for Population Sciences**  
*An Autonomous Organization of Ministry of Health and Family Welfare, Govt. of India*  
Deonar, Govandi Station Road, Mumbai 400 088  
Website: <http://www.iipsindia.ac.in>

The International Institute for Population Sciences (IIPS), formerly known as Demographic Training and Research Centre (DTRC), was established at Mumbai in July 1956 with joint collaboration of the United Nations Population Fund (UNFPA), Government of India and Sir Dorabji Tata Trust to serve as the regional institute for training and research in population studies for the countries of Asia and the Pacific region, functioning under the aegis of the Ministry of Health and Family Welfare, Government of India. IIPS is the only institute of its kind in the world exclusively devoted to teaching and research in population and health issues.

In 1985, the institute became a Deemed to be University (u/s 3 of the UGC Act of 1956). In 2006, the institute celebrated its Golden Jubilee, to mark 50 years of glorious existence. The institute has been the hub of population and health related teaching and research in India. IIPS plays a vital role for planning and development of the country by generating valuable health and development indicators at the district and state levels through nationwide large-scale sample surveys at regular interval, funded by the various ministries of Government of India, the UN agencies and other development partners. By 2016, the Institute has trained 3,515 students through various courses of which 2,836 were from India and 679 from 41 countries. The alumni are occupying prestigious positions in national and international research organizations, universities, development agencies and non-governmental organizations and created a brand value for the Institute.

## 1 (A). Ph.D. in Population Studies / Biostatistics & Demography

The International Institute for Population Sciences (IIPS) offers the following research programmes in Population Studies and Biostatistics and Demography:

- i) Ph.D. in Population Studies
- ii) Ph.D. in Biostatistics & Demography
- iii) Part-time Ph.D in Population Studies
- iv) Part-time Ph.D. in Biostatistics & Demography

**Eligibility criteria:** Candidates having MPS in Population Studies/ M.A/M.Sc. in Population Studies/MSc in Biostatistics & Demography/ Master Degree in any discipline with atleast one paper/Course/subject in Population Studies/ Demography/Biostatistics/ Health Statistics /MPhil in Population Studies/ Demography/Biostatistics & Demography/ from a recognised university with at least B+ or 55% of aggregate marks in all subjects are eligible to apply. The upper age limit is 30 years for this programme. Marks and age are relaxable for candidates belonging to reserved categories and women as per GOI rules.

**1.2 Procedure for admission:** The admission to direct Ph.D. programme is through a three-stage process; online entrance test, written test (research proposal) and personal interview. The online Entrance Test is of qualifying. The syllabus of Entrance Test for direct Ph.D. consists of objective type questions on English, Logical Reasoning, Statistics / Mathematics / Biostatistics, Research Methodology, Population Studies / Demography and Epidemiology. Based on the performance in the Online Entrance Test, shortlisted candidates will be called for writing a research proposal and personal interview at IIPS. The selection for Ph.D. programme is based on weighted average of online entrance test, written test (research proposal) and personal interview.

**1.3 Number of seats:** The selected Indian students will be awarded a Government of India fellowship initially for one year only and is extendable on yearly basis as per rules of the Institute. Each eligible candidate with NET qualification for lecturership only either in Population Studies or its interdisciplinary subjects will be awarded the Government of India fellowship @ Rs. 31,000/- per month for first and second year and Rs. 35,000/- per month for the third year respectively. Each fellowship carries a Contingency Grant of Rs. 10,000/- for the first two years and Rs. 20,500/- for the third year.

Number of seats with other than Government of India fellowships will be decided depending upon the availability of the Guide at the time of admission.

**1.4** Students with UGC-JRF and other such fellowships in Population Studies/Biostatistics & Demography (Rajiv Gandhi National Fellowship, Maulana Azad National Fellowship for Minorities, Babasaheb Ambedkar National Research Fellowship, ICSSR Fellowship, CSIR fellowship, National OBC/SC/ST/Differently Abled Fellowship, etc.) are encouraged to apply for the Ph.D. programme. Foreign students with external financial support can also apply for the programme.

**1.5 Sponsored candidates:** Eligible **in-service candidates and foreign candidates** (with M.Phil. or Pre-Doctoral Coursework in Population Studies/Demography) with financial support from UGC/ICSSR/Foreign funding may be considered for admission to the Ph.D. programme without entrance test during the academic year.

Officials working in Government departments, research institutions, universities, medical colleges, and non-governmental organisations can also be sponsored for being considered for admission. However, the selection will be made as per selection criteria.

Eligible foreign candidates can also apply for admission provided they secure financial support from any outside agency. Processing fee will not be charged from the foreign candidates while submission of completed application forms. Also, admission test will not be conducted for the foreign candidates and admission will be offered directly if the candidates fulfil the eligibility criteria of the Institute.

## **1.6 Pre-PhD Coursework:**

**Duration:** 8 months, 2 Semesters- (4 months each)

**Credits:** 10 credits in each Semester, Total 20 Credits

### **Course Content:**

#### **Semester 1:**

RM1-Research methodology Paper 1- Credits 4

RM2-Research methodology Paper 2- Credits 4

RP1-Preparation of a Review based Research Paper- Credits 2

#### **Semester 2:**

O1-Optional papers (select 1 out of 4)- credits 4

RP2-Preparation of a Secondary data-based Research paper- Credits 2

CN-Preparation and presentation of Pre-Proposal (Concept Note) for PhD work- Credits 4

**O1-Optional Papers:** Scholars may choose one out of the four papers

- Fertility and reproductive rights
- Public health and mortality
- Migration, urbanization and development
- Population, social welfare policies and development

### **Requirements of Pre-PhD coursework:**

- Pre-proposal (Concept Note) of PhD work to be submitted to Academic Section by the end of Pre-PhD coursework (eight months).





# International Institute for Population Sciences

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2. Scholars need to publish at least a research paper in a journal by end of the second year for further extension of PhD fellowship. It should be either the secondary data-based paper or the Review based Paper prepared during the Pre-PhD course work.
3. Minimum grade to be achieved is B + in the Pre-PhD course work to continue in the PhD program. Re-examination will be permitted for any paper if the scholar fails to obtain the required grade.
4. Papers RM1, RM2 and O1 of the coursework are assessed based on assignments, class room presentations and written examination.
5. The examinations will be conducted after the classes and assignments are completed in each semester.
6. Scholars who successfully complete the Pre-PhD course work will only be allowed to register for the PhD Programme. It would be termed as confirmation of PhD admission.
7. For 2021-22 batch and subsequent years, M Phil holders in Population Studies/ Demography/ Biostatistics are exempted from undergoing the Pre-PhD coursework.
8. Those selected under the Part-time PhD program need to undergo the Pre-PhD course work compulsorily.
9. Number of contact hours in 2nd semester is less than 1st Semester, so that students get time for reading which will be beneficial for PhD topic formulation. Students will have fortnightly meetings with faculty in the 1<sup>st</sup> Semester to discuss prospective thesis topic. By the end of 1st Semester, Academic Section will allot the Guide and advisory committee members to the scholars.
10. Pre-Proposal will be prepared in consultation with PhD Guide and advisory committee members.
11. Once the Pre-Proposal is ready by the end of the coursework, scholars are in a position to prepare the detailed PhD proposal and present it in a faculty-student seminar within the next four months. In other words, scholars should be ready with their PhD proposal within one year after joining the program.
12. Though not related with coursework, the committee felt that, in order to attract better talent to the PhD programme, the eligibility criteria for admission need to be modified and broadened. Presently those with a Master's or M Phil. degree in Population Studies/ Demography / Bio-statistics are only allowed to apply. This should be open to candidates from other subjects as well.

## **Review based Paper- Credits 2**

Scholars should select a topic of their research interest. They may identify at least 15 published articles and review them critically to prepare the review based research paper for publication.

Course Description/Explanation: Students will write review of selected papers published in peer reviewed journals to critically assess the quality in terms of data, methods, analysis, findings, presentations and conclusions. This work is designed to broaden students' perspectives and to provide them with an opportunity for the integration of course concepts. Emphasis will be placed on methods of interpretation, writing, and critical thinking related to topical issues.

Student Learning Outcomes: Think critically about important issues, Problem-solve solutions to relevant problems, enhance communication skills and research/writing acumen.

The purpose of this course is to assist students in preparing and completing their review based paper and publish it in a journal by end of second year.

When preparing the review based paper, scholars may critically think through each task. Determine the problem/issue they are trying to solve. Develop a hypothesis and/or possible solution to the problem/issue. Brainstorm other possible solutions. Think about the pros and cons of the problem/issue. Gather information on the problem/issue that may support or contradict the existing position. Evaluate the facts objectively. Determine a reasonable conclusion based on all of the facts. Make sure the facts (and the reporting of the facts) are accurate. Scholars will be graded on how well they are able to perform these tasks by a committee of faculty.

## **Secondary data-based paper- Credits 2**

Scholars need to be familiar with available secondary data sets in demography and health domains. They need to select a topic of their research interest and identify one or two issues that can be probed using the secondary data. The selected questions/ issues can be related to their future PhD thesis work. Using the latest available data, scholars need to prepare a research paper for publication.

This exercise will help them identify researchable themes, identifying latest data sets, analyzing them, presenting and interpreting the analysis and findings, identifying the major outcomes and their policy implications. This exercise will enable them how to prepare/draft a research paper for publication and how best it can be presented within the limited space (usually most journals limit the length of their articles to about 6000 words, including tables and references). This exercise also familiarizes the scholars on what are the requirements for publishing a research paper in a peer reviewed journal.

The paper will be evaluated by a faculty committee and necessary suggestions will be provided to the scholars for further improving the contents, arguments, and presentation of the paper to bring it to the publishable standard. Once it is ready, the scholars can identify a suitable journal and send it for the consideration of publication.

## **Preparation and presentation of Pre-proposal (concept note)- Credits 4**

Before the preparation of the PhD research proposal, the scholars need to submit a Pre-proposal (Concept Note) that will broadly outline their area of research interest, research gaps and questions, objectives, methodology and data sources, etc. This Concept Note will be reviewed by a Faculty Committee and provides suggestions to improve its quality, methods and usefulness. This committee will also examine whether the suggested topic is relevant and good enough in the present context for a PhD work, and possible enough to be implemented within the stipulated time available for research scholars. This feedback will help the scholars to conceptualize the topic of research and then work on the detailed research proposal.

The detailed PhD proposal will be later presented in a faculty-student seminar for wider discussion.

Three external experts will also review the PhD proposal and suggest necessary modifications. Based on the discussions in the seminar and feedback from the external experts, scholars will revise the research proposal in consultation with their supervisor and doctoral advisory committee members.

This final proposal will be submitted to the Academic Section, preferably within one year after joining the programme. Syllabus for the above mentioned papers is enclosed as **Appendix I** to this document.

## **1.7 Attendance**

- i) Minimum of 95 percent of attendance in classes during the coursework is compulsory to receive the Government of India Fellowship.
- ii) Minimum of 75 percent of attendance in classes is compulsory to appear in the coursework examinations for all the students.

**1.8 Registration:** All the students who got admission into Ph.D. programme after Pre-Doctoral Coursework from IIPS are required to register in the beginning of academic year.

## **1.9 Duration of Ph.D. programme**

- i) Ph.D. programme shall be for a minimum duration of four years, including coursework and maximum of six years.
- ii) The women candidates and persons with disability (more than 40% disability) may be allowed a relaxation of two years for Ph.D. in the maximum duration.
- iii) Extension beyond six years may be considered for one more year for In-service candidates or those who have opted for part-time after three years of regular research work, including coursework/M.Phil.
- iv) The women candidates may be provided Maternity Leave/Child Care Leave once in the entire duration of Ph.D. as per the prevailing UGC guidelines (currently 240 days). Male candidates are eligible for Paternity Leave as per Govt. of India norms (currently 15 days) issued from time to time at full rates of fellowship once during the tenure of their award.

## **1.10 Conditions for the award of fellowship**

- i) Ph.D. programme is a full time course. The student shall not accept or hold any appointment paid or otherwise or receive any emoluments, salary, stipend, etc., from any other source during the tenure of the award.
- ii) The student should also obtain prior permission of the Director in writing for appearing at any examination conducted by any other University/Institution.
- iii) The fellowship will be available from the onset of the course till the end of the course.
- iv) The student will have to execute a bond requiring him/her to refund the fellowship received by him/her, if the fellow discontinues before the end of the prescribed period. The condition of the bond cannot be waived or relaxed except by the Director with the consent of the Executive Council of the Institute.
- v) If a student's performance in the during the Ph.D. programme is not found satisfactory, or his/her conduct is found unsatisfactory on the basis of indiscipline of any act as is likely to undermine the prestige of the Institute, or endanger harmony of academic life of the Institute or is likely to violate the rules of the institute, his/her admission and fellowship will be terminated without any further notice. In case the fellowship is terminated, he/she will be required to refund the whole of the fellowship money drawn till that date provided the action against him/her has not been contemplated on the ground of unsatisfactory performance as stated above.

**1.11 Payment of fees:** The candidates admitted to the Ph.D. programme will have to pay the fees as per schedule of the Institute given in the Ph.D Fee Structure uploaded on the Institute website on 1st January and 1st July every year regularly. For payment of fees, a grace period of 30 days shall be given without late fee. Thereafter, 5% on all dues will be charged extra as late fee, every month. **Students will be allowed to pay only one semester fee with penalty. If any student fails to pay consecutively two semester fees, then his/her admission will be cancelled.**

**1.12 Grading system:** The following ten points grading system is followed in the Institute:

Letter Grade	Numerical Value	Equivalent Marks	Qualitative Level
O	10	85-100	Outstanding
A+	9	75-84.9	Excellent
A	8	65-74.9	Very Good
B+	7	55-64.9	Good
B	6	50-54.9	Above Average
C	5	45-49.9	Average
P	4	40-44.9	Pass
F+	3	30-39.9	Fail
F	2	20-29.9	Fail
F-	1	0-19.9	Fail
NA	0	---	Not Attempted/ Absent

**1.13 Written examination:** Written examination will be conducted for Pre-Phd Course work.

#### 1.14 Re-examination

- Those students who could not appear in the examination will be allowed to re-appear for the paper(s) in the next semester examinations.
- Those failing in any paper can re-appear in the examination in the subsequent semester.
- Maximum of three attempts will be allowed including the first appearance in each paper.
- There will not be any down grading in re-examinations.
- 100 percent of clearance of the papers is a prerequisite to continue the Ph.D. programme.

#### 1.15 Re-evaluation of answer sheets

- A student can have access to his/her examination papers in the form of photo copies at a cost of Rs. 200/- per paper with prior approval of the Director.
- A candidate shall apply for revaluation of his/her answer sheet on the prescribed form to the Director of the Institute within three weeks from the date of declaration of the result along with the non-refundable fee of Rs. 500/- only per paper.
- No application for revaluation will be entertained unless a photocopy of the statement of marks in the examination concerned is enclosed to the application.
- The result of the revaluation of a candidate's answer-book(s) shall be binding on him/her and that he/she shall accept the revised marks as final.
- If a candidate, whose answer-book(s) have been reassessed, becomes eligible for any prize or any other award, the same shall be granted to him/her and the award previously made shall be cancelled. If as a result of revaluation, a candidate becomes eligible for the provision of a condonation of deficiency, the same shall be given to him/her.

## Certificate of course work

Students who have successfully completed the coursework will move into Ph.D. programme and will receive a Certificate for the Pre-Ph.D Course Work successfully undertaken by them for two semester.

### 1 (B) Part-time Ph.D. in Population Studies / Biostatistics & Demography

- (i) Candidate admitted to Part-time Ph.D programme are required to undergo a full time pre-Ph.D. Course work compulsorily. Refer to the Pre Ph.D Course work point no.1.6
- (ii) **The successful completion of Course Work allows the candidate to continue with the Ph.D in part-time mode.**
- (iii) The Part-time candidate shall be in touch with the Guide (Faculty from IIPS) continuously through emails, and shall meet the Ph.D Guide personally at regular intervals. A three member Doctoral Advisory Committee (Guide and two Faculty members of the Institute) will review the progress of the Ph.D work bi-annually.
- (iv) Total duration of part-time Ph.D. programme is minimum of four years (including coursework) and maximum of six years.
- (v) **The Part-time candidate shall submit the following documents at the time of joining the programme: (a) No Objection Certificate from their Employer for undertaking Part-time Ph.D at IIPS, and (b) approval of leave from the Employer for the period of full time coursework.**
- (vi) No fellowship/financial assistance will be provided to the part-time Ph.D scholars during the pre-Ph.D. Coursework/programme.
- (vii) The candidates admitted to Part-time Ph.D Programme will pay the admission fees for the first year as shown in the Fee Structure uploaded on the Institute website, and for the subsequent years the part-time fee structure shall be followed.
- (viii) Candidates admitted to the Ph.D programme under part-time mode shall be governed by all other rules and regulations governing the Ph.D programme of the Institute from time to time.

### 2. Guide and Co-Guide for Ph.D.

- i) All Professors and Associates Professors are automatically recognised as research guides. An Assistant Professor with a Ph.D. degree and at least two research publications in refereed journals may be recognized as a Research Guide.
- ii) Only a full time teacher can act as a research guide. However, a Co-guide, who is recognised as a research guide in his/her parent organisation, can be allowed in inter-disciplinary areas from other institutions with the approval of Chairperson of Academic Council.
- iii) A Research Guide who is a Professor, at any given point of time, cannot guide more than eight (8) Ph.D. scholars. An Associate Professor as Research Guide can guide up to a maximum of six (6) Ph.D. scholars and an Assistant Professor as Research Guide can guide up to a maximum of four (4) Ph.D. scholars. The faculty who are going to retire in another two years should not be allotted Ph.D. students.



- iv) Based on his/her subject interest the student may choose his/her guide from among the teachers recognised by the Institute subject to the approval of the Director at the time of registration.

### 3. Procedure and requirements for Ph.D. degree

- i) Candidates for Ph.D. programme are normally required to be enrolled at the beginning of the academic year. However, eligible candidate with financial support from other organisations may be considered for admission to the Ph.D. programme of the Institute any time on case to case basis with the approval of the Board of Studies and Research.
- ii) All the selected candidates for Ph.D. programme (without M.Phil. degree) are required to undergo compulsory pre Ph.D course work for a minimum of 8 (eight) months/two semester.
- iii) A Ph.D. student is required to undertake an original research on a topic selected by him/her in consultation with the guide.
- iv) All the selected candidate for Ph.D programme(with M.Phil degree) is required to submit the Concept Note on the topic selected by him/her within three months of admission. In the Concept Note, Ph.D. scholars should submit the title of their proposed thesis along with a detailing need for the study, objectives, data source and methodology.
- v) A Ph.D. Committee constituted by the Director would review these Concept Notes before according permission to pursue the study. The Committee will evaluate the Concept Note about the originality and feasibility and suggest the Advisory Committee members.
- vi) Candidate (with M.Phil degree) is required to present the Research Proposal before completing one year from the date of admission in Ph.D . It will be discussed and its feasibility would be examined in a student- be faculty seminar. A Rapporteur among PhD student will be appointed to report proceeding of the presentation. Based on the Rapporteur report, PhD student is required to submit the revised Research Proposal within one month from the date of issue of office memo.

### 4. Monitoring of Ph.D. work

- i) Ph.D students shall submit the half yearly progress report and appear before the Research Advisory Committee formulated at the Institute by the Director once in six months to make a presentation of the progress of his/her work for evaluation and further guidance. The committee will submit the six-monthly progress report to Institute and shall recommend further extension with/without fellowship and may also recommend for conversion of Ph.D. programme from full time to part-time, if progress is not found satisfactory. It is mandatory for the Part time students to submit the progress report once in a year. For the Research Advisory Committee meetings, Guide will be the convener.
- ii) The Ph.D students on completion of six months will have to submit half yearly progress report to the Guide and Advisory Committee Members in the month of January and July every year along with the semester fee receipt. A student whose joining date falls between July to December will submit progress report in the month of January and student whose joining date falls between January to June will submit progress report in the month of July. The format for submission of half yearly progress report is given as Annexure at the end of this document.





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- iii) Students with UGC and other funding shall present his/her progress in front of a committee consisting of an external member from other Institution/University, Coordinator and Guide for the enhancement of a fellowship from JRF-SRF. The format for submission of progress report for enhance of fellowship is given as Annexure at the end of this document.
- iv) Students with Government of India Fellowship shall present their progress in front of Research Advisory Board formulated at the Institute by the Director for the extension of a scholarship from JRF-SRF. The format for submission of progress report for enhance of fellowship is given as Annexure at the end of this document.
- v) For the award of Ph.D. degree, a student should have presented at least two papers related to the Ph.D. topic in workshop/seminars/conference conducted anywhere outside the Institute; published at least one research paper based on the Ph.D. work; and submitted proof of submission for second paper.
- vi) Government of India Research Fellowship will normally be tenable for a period of four years. It shall not be extended for fifth year. After two years of the tenure, the performance of all the Research Fellows shall be assessed by the Supervisor and Advisory Committee. On assessment, if it is found that the fellow lacks research potential, the fellowship may be terminated. In case of a research fellow who has shown research ability but not achieved significant progress, he/she may be given an extension for a period of one year and at the end of three years' period, his/her research work would be subjected to a further assessment and only if the report is found to be satisfactory, he/she be given further extension of one year. The fellowship could be withdrawn if the progress in research is considered unsatisfactory.
- vii) The fellowship may be terminated at any time if the Institute is not satisfied with progress or conduct of the fellow.
- viii) Ph.D. student must make herself/himself available to a committee (Guide, advisors) to review the progress every six months. In case a student fails to complete this clause, she/he will not be allowed to continue the research work. A student may be permitted to delay this in view of appropriate reasons (sickness, for example) with the approval of Director. A Ph.D. research scholar shall submit progress report & time line atleast one month before the expiry of existing extension period, failing which gap period will be considered without fellowship and no arrears will be paid.
- ix) One month before the end of the second year of fellowship, two years' progress will be reviewed by a committee appointed by Director and further extension of fellowship will be on the recommendation of this committee.
- x) A Ph.D. candidate who has completed most of his/her research work should present synopsis of his/her work before completion of the tenure in a seminar which will be attended by both the faculty and the Ph.D. students of the Institute. After the presentation of the synopsis, the candidate has to submit the revised synopsis within one month from the date of issue of office memo by incorporating the suggestion given by the students and faculty during the presentation.

## 5. Submission and evaluation of the Ph.D. thesis

- i) Earliest, a candidate can submit his/her thesis is only after completing two years from the date of his/her registration.

- ii) A Ph.D. student should submit his/her thesis within 3 months from the date of presentation of the synopsis. If a student fails to submit the thesis within the above stipulated time on recommendation of the guide, an extension of 3 months may be allowed by the Director in genuine cases. Failing which the candidate may be given one more chance to re-present his/her synopsis.
- iii) A candidate has to submit 4 typed or printed copies of his/her Thesis containing the results of his research work duly approved by the guide. These copies will be sent to Examiners within one month of submission.
- iv) The candidate may incorporate in his thesis the contents of any work which he may have published on the subject and shall indicate it in the thesis but he shall not submit as his thesis any work for which a degree has been conferred on him by the Institute or any other University.
- v) On submission of the final synopsis by the student, the Supervisor will recommend a panel of names of six experts in the area of research pertaining to the candidate's work within India and outside India. A Ph.D. committee headed by the Director will consider the panel of experts provided by the Supervisor. From the approved panel of examiners, Director will choose two experts to evaluate the Ph.D. thesis. The Supervisor will also be an independent evaluator of the thesis.
- vi) The examiner of Ph.D. thesis should be persuaded to submit comments/remarks on the thesis within three months' period.
- vii) Each examiner including the Supervisor will be submitting a detailed report on the evaluation of the Ph.D. thesis indicating whether it is an original piece of work or is a significant contribution to the study of population by way of application or otherwise of a novel presentation of the earlier works with new interpretation and critique. He has to precisely state in the report the following:
  - a) The Thesis is recommended for award of Ph.D. degree.
  - b) The Thesis is to be modified before the award of Ph.D. degree.
  - c) Thesis is rejected.
- viii) Reports of the examiners shall be sent by Controller of Examinations/Assistant Registrar (Academic), to the Director for his consideration.
- ix) If the reports of Examiners are unanimous, the thesis will be rejected if two of the examiners reject it or it will be revised if two of them have so recommended.
- x) If all the three Examiners recommend the award of the degree to the candidate and the reports are unanimous, the viva-voce test of the candidate will be arranged.
- xi) If two of the three Examiners recommend the award of the degree and one examiner does not recommend award of the degree to the candidate, the thesis should be sent to another Examiner from the panel by the Director for his/her opinion. If the thesis is again rejected it will be deemed to have been rejected.
- xii) Director, Ph.D. Coordinator and Guide will decide whether remarks are minor or major. In the case of significant changes suggested by the examiners, student may not be allowed more than one year for modification of work.





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Website: <http://www.iipsindia.ac.in>

- xiii) In case, any examiner suggests major modification to the Thesis, the candidate has to incorporate the suggestion in the Thesis and submit the modified Thesis to the same examiner for his final recommendation.
- xiv) If the candidate is able to clarify the minor suggestions raised by the examiner satisfactorily he/she need not submit the thesis again for evaluation, in which case a certificate of the Examiner will be deemed to imply that he/she has recommended the award of the degree.
- xv) A research scholar who has received a positive report from the three examiners without or with minor modifications should submit the final bound thesis within three months from the date of issue of reports to him/her.
- xvi) A Ph.D. student should submit four copies of the thesis to the Institute after incorporating the suggestions and comments received during the synopsis presentation within one month.
- xvii) Students should submit the revised thesis within three months. However, in the case of major revisions is required, students should submit the thesis within one year.
- xviii) The comments of the examiners will be made available to the candidate (in confidence i.e. without revealing the names of examiners) to incorporate his/her reply with a detailed clarification to the comments and include the same as an "ANNEXURE" within his/her thesis along with the examiners comments.
- xix) The four hard-bound copies of the thesis should be submitted with the "ANNEXURE" incorporated at the end of the thesis, at an early date. Since the thesis has already been judged by the examiners, the present form of the thesis must be maintained, as per the rules of the Institute.
- xx) Each candidate is also required to include one paged **Abstract** containing major objectives, hypothesis, methodology, samples, instruments/tools used, statistical techniques/designs, experimental, observation, inference and findings, within the thesis on its final submission.
- xxi) One of the outside examiners will be requested to be on the viva-voce panel. The candidate will have to appear for final open Viva-Voce examination, before the Board of Viva-Voce examination comprising the Director, one of the outside evaluators and the supervisor. The right to ask questions to the candidate will, however, be restricted to the Board of Examiners.
- xxii) The Viva-voce of research scholar shall be conducted within two months after submission of the bound copies of the thesis by the candidate.
- xxiii) The candidate will be declared to have qualified for the award of Ph.D. if the candidate performance is found satisfactory in viva-voce examination and committee recommends the award of the degree.
- xxiv) The Academic Council will be informed of the result of such candidates who have qualified for the award of Ph.D. degree, in its next meeting.
- xxv) As per the UGC guidelines, each candidate is required to submit soft copy of the Ph.D. thesis in pdf format for the award of the degree.

## 6. General information and rules

- i) All Ph.D students are allowed to apply for financial support for field work from external funding agency through proper channel. After receiving such funds, the concerned Ph.D. student must report to the Director through his/her guide.
- ii) All the Ph.D. students must attend compulsorily all proposals, synopsis, term paper and other presentations including guest lectures conducted by the Institute, failing which fellowship will be deducted. In addition, written explanation must be submitted to continue the registration.
- iii) All the students must sign the daily attendance register at 9.30 a.m., every day failing which fellowship will be deducted. In addition, written explanation must be submitted to continue his/her registration.
- iv) All selected candidates are required to stay in Mumbai as a full-time student for a minimum of 2 (two) years to continue his/her Ph.D. work, failing which registration shall be cancelled.
- v) The Ph.D. research scholars may be involved in the institutional academic work such as taking practical classes, preparation of teaching material and teaching of non-credited courses. Certificate may be issued to the Ph.D. research scholars for their involvement in institutional academic work.
- vi) The fellow shall not accept or hold any appointment paid or otherwise or receive any emoluments, salary, stipend etc., from any other source during the tenure of the award. The Research Fellows may be required to undertake assignments as provided by the Institute to the extent possible, e.g., assisting in tutorials and/or laboratory sessions invigilation work, etc., which would help them in future as teachers.
- vii) The fellow shall present, through his/her supervisor half-yearly report on the progress of his-her work.
- viii) He/She shall before the expiry of the fellowship, present Ph.D. thesis of a standard acceptable to the Institute and supply to the Institute free of cost copy of the dissertation and the published work if any, and abstract in about 500 words of the research work done during the tenure of the fellowship.
- ix) If a fellow wish to leave the fellowship before the end of the tenure, it should be done with the prior approval of the Director. He/She should also obtain prior permission of the Director in writing for appearing at any examination conducted by any University or Public Body.
- x) One of the 3<sup>rd</sup> year Ph.D. students will act as a Rapporteur in each Ph.D. proposal/synopsis presentation on rotation to note down the discussion and recommendation. The final note should be submitted to (i) Director, (ii) Coordinator and (iii) Assistant Registrar (Academic) in separate copies. This note shall be sent to student and guide after moderation for incorporation in the thesis.

## 7. Termination

- i) Scholars whose progress has been found unsatisfactory (not paying fees and/or not meeting with the guide and/or non-completion of various milestones each year), upon recommendation and approval of the Guide and Advisory Committee members can be

terminated from the Ph.D. programme. In order to avoid being terminated, the scholars are to display consistency in their research work, comply with financial rules and regulations, and adhere to ethical practices during their tenure. These rules are applicable for full time as well as part time Ph.D. students.

- ii) Where the thesis is not submitted within the period of 5 years from the date of registration, the period may be extended maximum by another 2 years and in no case a candidate will be allowed to carry the registration beyond 7 years. The candidate however has to give satisfactory reasons for not completing the work within 5 years, subject to the approval of the Guide and Advisory Committee Members.
- iii) Scholars who have been terminated cannot attempt to re-register.

## 8. Re-Registration Provision for Ph.D

Based on the recommendation of an assessment committee consisting of advisory committee members and one external expert, Re-registration of those students who failed to submit the thesis within the maximum period of six years (seven years in case of women/PWD/in-service/part-time students) shall be allowed for a maximum period of two more years (initially for one year and then, if required for second year) with the approval of the Chairperson, Academic Council and subsequently ratified by the Academic Council. Such students should pay the re-registration fees as approved by the Academic Council/SFC.

## 9. Leave rules

- i) Personal leave for a maximum period of 30 days in a year in addition to general/public holidays may be taken by a fellow with the prior approval of the **Director & Sr. Professor** on recommendation of the Supervisor. The General/Public holidays, however, do not include the vacation period e.g., summer, winter and **Diwali/Pooja** vacation. The above leave may also be used for presenting papers and attending seminars.
- ii) Field leave for a maximum period of 180 days during the entire tenure of the fellowship can be considered by the Director for a scholar using exclusively primary data. Scholars using secondary data are NOT entitled to avail the above field leave. However, Director at his discretionary power may consider a maximum of three months leave for purpose of library reference work related to Ph.D. data in deserving cases of candidates using secondary data. Field leave cannot be availed for attending conference.
- iii) **Academic leave** without fellowship shall be permissible only for **one year** throughout the **tenures** (for any kind of academic assignment/teaching/foreign visit in connection with research work). The period of leave without fellowship will be counted towards the tenure. Expenditure on foreign visit in connection to research work cannot be claimed from UGC or IIPS.
- iv) The fellows are granted special leave of maximum of 10 days in a year to attend **workshop/seminar/conference** in India or abroad with the prior approval of the Director and on the recommendation of the Supervisor concerned. Fellows availing leave for attending conferences must submit along with leave application a copy of paper being presented in the conferences. Fellows availing leave for attending conferences must submit a letter of participation from the organizers/host Institutions at the time of re-joining the Institute. **The Special leave balance will not be carried for the subsequent year for attending Workshop/ Seminar/Conference.**

- v) The special leave for attending training programme abroad/**India** for maximum of three months during the entire tenure of the fellowship is permissible with the prior approval of the Director on the recommendation of the Supervisor concerned. However, granting of fellowship for the said purpose shall be purely based on the merit of individual case and at the discretionary power of the Director. On return they are required to submit the detailed report in writing to the Director.
- vi) The women candidates may be provided Maternity Leave/Child Care Leave once in the entire duration of Ph.D. as per the prevailing UGC guidelines (currently 240 days).

Besides this an 'Intermittent Break' for a maximum period of 1 year may also be permissible to the women candidates. The leave can be availed 3 times during entire period of fellowship. However, the total duration of leave shall not exceed one year. This Flexi Time period should not be counted towards the tenure of the fellowship and thus effectively the total period of fellowship will remain the same.

Male candidates are eligible for paternity leave as per Govt. of India norms issued from time to time at full rates of fellowship once during the tenure of their award. Male candidate with less than two children may be granted 15 days Paternity Leave during the confinement of his wife for childbirth. The Paternity Leave can be availed upto 15 days before or upto six months from the date of delivery of the child. Paternity Leave shall not be debited to the leave account.

- vii) The period of leave without fellowship will be counted towards the tenure of the fellowship. The fellows are not eligible for Medical Leave. The fellows may avail personal leave for medical reasons. These leave rules are framed in accordance with the UGC guidelines and hence separate medical leave is not allowed to the fellows.

Note: Scholars are required to submit the leave forms well in advance or within the stipulated period prior to releasing the monthly fellowship, failing which no arrears for the absence period will be released.

## 10. Rules for utilisation of contingency grants admissible to research fellows at IIPS

- i) A Ph.D Student is required to submit the contingency claim along with all the necessary documents after completion of one year in the month of January and July irrespective of the date of joining. A student whose joining date falls between July to December will submit contingency claim in the month of January and student whose joining date falls between January to June will submit contingency claim in the month of July. The format for submission of contingency claim is given as Annexure at the end of this document.
- ii) The contingency grant of Rs. 10,000/20,500 per annum for scholars in Population Studies may be utilized on books, journals, photostat copies, hiring computer time, micro-films, typing, stationery, postage, field-work, travel, needed in connection with approved research project with approval of the concerned guide, and the Director. The expenditure on stationery and postal charges should not exceed 20% of the grant.
- iii) Contingency grant is not intended to meet expenditure on stationery items such as; pen, pencils, folders, file, cover, carbon paper, etc. and furniture items or items normally provided by the Institute or for payment of examination and other fees.

- iv) The books purchased out of the contingency grant will be entered in the accession register of the Library of the Institute and then the books will be issued to the research fellow for their personal use and same need not be returned to the Institute.
- v) The non-consumable articles purchased out of the contingency grant will be entered in the stock register of the Store of the Institute and then the articles will be issued to the research fellow so as to ensure that on expiry/termination/relinquishment of fellowship the articles are returned to the Institute.
- vi) For all expenditure out of the contingency grant, a certificate from the guide to the effect that the expenditure incurred is in furtherance of the approved research project is necessary.
- vii) Travel allowances for approved field work/travel in connection with the research work will be admissible out of the contingency grant according to rules of the Institute.
- viii) The contingency grant of the fellowship tenure may be availed in yearly instalments from the date scholar joins the programme subject to fulfilling of conditions as stated in previous paras.
- ix) The amount remaining unspent out of the first annual contingency grant can be carried forward and utilized in the second year of the award only and thereafter only the annual provisions for contingencies may be utilized with no carry forward of any unspent balance.
- x) The bills for purchase of books/non-consumable stationery items will only be passed on production of certificate from library/stores to the effect that the items have been duly entered in the accession/stock registers.
- xi) Print out charges.
- xii) Thesis photocopy (colour as well as B/W) and binding.
- xiii) Registration fee, accommodation, travel to conference (related to Ph.D. thesis and in case it is not available from the conference).
- xiv) Expenses of Library visit to any other university (travel, accommodation (hostel/hotel) and local transport).
- xv) Stationery: A4 size papers.
- xvi) Computer accessories: External hard disk and pen drive.
- xvii) Repair of laptop and anti-virus.
- xviii) For primary data collection: For primary data collection in Districts other than home town, reimbursement of accommodation charges (Hostel/Lodge/Hotel) is possible, subject to obtaining prior approval of the Director in principle. However, the amount of claim is limited to actuals or Rs. 505/-, Rs. 405/-, Rs. 330/- and Rs. 225/- per day for A1, A, B1 and other cities, respectively, whichever is less.
- xix) Hiring charges of field instruments if any such as weight machine, height tape, voice recorder, etc. for qualitative field work.
- xx) Director's prior approval should be obtained for any expenditure requiring a sum of Rs. 500/- and above.



# International Institute for Population Sciences

An Autonomous Organization of Ministry of Health and Family Welfare, Govt. of India  
Deonar, Govandi Station Road, Mumbai 400 088  
Website: <http://www.iipsindia.ac.in>

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- xxi) If any student is found to have misused the grant in any manner whatsoever or submitted fake bills, his/her registration/fellowship grant shall be terminated forthwith, without any further notice.
- xxii) Fellows are required to submit the contingency claim for each year and no claim will be considered after completion of fellowship period.
11. **Payment of fees:** The candidates admitted to the Ph.D programme will have to pay the fees as per the Fee Structure uploaded on the Institute website on 1st January and 1st July every year regularly. Fee structure is same for both Full-time and Part-time Ph.D. students except that Part-time students need not pay Computer Fee and Sports Fee.
12. **Bond:** The fellow will have to execute a bond requiring him/her to refund the fellowship received by him/her, if the fellowship is discontinued before the end of the prescribed period. The condition of bond cannot be waived or relaxed except by the Executive Council of the Institute.
13. **Payment of fellowship:** Payment of the fellowship amount will be made to the fellows by 10<sup>th</sup> of every month.
14. **Hostel accommodation:** Single/double/triple seated accommodation in the hostel of the Institute may be provided to research fellows, depending upon the availability of the rooms.
15. **Medical facilities:** Ph.D. students of the Institute will have an access to free medical advice from the Medical Officers and Councillor of the Institute.

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## Course Contents details:

### **Research methodology 1- Credits 4 (60 lectures)**

#### **RM 1: ADVANCED RESEARCH METHODOLOGY**

#### **OBJECTIVES:**

The aim of introducing this paper is to develop skills in different types of research methods applicable in the field of Population Studies/Bio-statistics. The main focus of this paper is to train the students with the nuance of research. The paper covering various types of research design, sampling techniques, data collection techniques and data analysis using various packages in the field of Population Studies and Bio-statistics. This paper is also intended to give an overview of statistical models commonly used in causal analyses of non-experimental data in the social and biomedical sciences. The strategy would be to simplify the treatment of statistical inference and to focus primarily on how to specify and interpret models in the context of testing causal relationships. This course will furthermore cover the orientation of statistical packages of data analysis. Apart from this, students will be taken for field trips to Hospital/Pharmaceutical companies to understand the clinical trials.

#### **A. RESEARCH METHODOLOGY: AN INTRODUCTION**

1. Types of research and its significance
2. Research Methods vs Research Methodology
3. Defining the Research Problem

#### **B. RESEARCH DESIGN**

1. Features of Research Design
2. Review of Different Research Design
3. Basic Principles of Research Design

#### **C. SAMPLING DESIGN**

1. Components of sample size  $\alpha$ ,  $\beta$ , prevalence, variance and difference to be detected, Importance of power, what determines power, concept of power index, estimation oriented studies-mean, proportion, comparison oriented studies, Studies involving two means, proportions, Sample size determination in case of cohort and case control studies, sample size determination in case of time to failure data, Sample-size calculations in multilevel studies
2. Review of basic sampling design: simple random sampling, stratified sampling and systematic sampling
3. Multistage sampling, probability proportion to size sampling, Estimation of mean, proportion and variance, Estimation of sample weights, design weights, weights for unit non-response, Post stratification, Sampling from imperfect frames, Sampling and Non-sampling errors
4. Sampling of large scale demographic surveys (Design, Sample Size, and Content): National Family Health Survey (NFHS), National Sample Survey (NSS) and Sample Registration System (SRS) etc.

#### **D. MEASUREMENT AND SCALING TECHNIQUES**

1. Measurement scales
2. Techniques of developing measurement tools
3. Scale Classification bases
4. Scale construction techniques

## **E. METHODS OF DATA COLLECTION**

1. Quantitative data collection techniques  
Preparation and presentation of questionnaires
2. Qualitative data collection techniques  
Guidelines for Free listing, pile sorting, FGDs, In-depth interviews, Observation techniques  
Preparation and presentation  
Other techniques of data collection – Vignettes, mystery client technique, projective techniques,  
Most significant change method
3. Mix methods in data collection

## **F. DATA MANAGEMENT**

1. CS Pro- programme for data collection/data entry
2. Data cleaning
3. Data editing
4. Orientation to EPI info (Biostatistics and Demography)
5. Orientation of SAS (Population Studies)
6. Big Data Analysis orientation

## **G. QUANTITATIVE DATA ANALYSIS SKILLS**

1. Simple & multiple regression, Statistical inference in the multiple regression model, Alternative functional forms for regression equations, Interpretation of the regression coefficients, Concept of standardized regression coefficients, Path coefficients, Multiple regression analysis with dummy variables, interactions involving dummy variables, Adjusted R-squared, Prediction and Residual Analysis, Presentation of the results in Multiple Classification Analysis (MCA) format
2. Simultaneous equations models, simultaneity bias in OLS, identifying and estimating a structural equation, Instrumental variable method and two stage least squares
3. Regression with binary dependent variable, the logit and probit models, Presentation of the results in Multiple Classification Analysis (MCA) format, Tobit model, Multinomial Logit Regression: The basic form of the multinomial logit model, presentation of results, interpretation of coefficients
4. Multilevel analysis and its applications, random intercept, random slopes, intra-class correlation coefficient, Assumptions in multilevel analysis, Random regression coefficients versus fixed regression coefficients, Multilevel analysis in longitudinal studies
5. Introduction to evaluation design, types of evaluation designs, Bias and error in measurement of treatment effect, Allocation of study units: randomization & matching, Difference-in- differences (DID) method, propensity score matching, Basic concept of missing data analysis

## **H. Applied Statistical Methods (only for those with Biostatistics background)**

- Structural Equation Modelling
- Econometric Methods for Policy Analysis
- Multilevel Analysis
- Bayesian Analysis including brief about small area estimation
- Applications in Stata and R software

## **I. FIELD TRIP AND TRAINING**

1. Hospital/Pharmaceutical companies to see the clinical trials (Bio-statistics and Demography)
2. Training of anthropometric and other measurements



**EVALUATION:** Written examination and assignments, like development of tools, and statistical analysis by software. The weightage for examination and assignments will be 60: 40 basis.

## READING LIST:

1. C.R. Kothari (2004): *Research Methodology –Methods and Techniques*, New Age International, New Delhi.
2. Dillon, W. R. and Goldstein, M., (1984): *Multivariate Analysis*, John Willey and Sons, New York.
3. Graeme Hutcheson and Nick Sofroniou, (1999): *The Multivariate for Social Scientist*, SAGE Publications.
4. Gujarati, D.N and Sangeetha (2007) *Basic Econometrics* (Fourth edition), Tata McGraw Hill, New Delhi
5. Jones, Andrew (2007). *Applied Econometrics for Health Economists*, Radcliffe Publishing Ltd, United Kingdom.
6. Jos W. R. Twisk (2006) “Applied Multilevel Analysis” Cambridge University Press, The Edinburgh Building, Cambridge CB2 8RU, UK
7. J M Wooldridge (2009) “Introductory econometrics A Modern Approach”. CENGAGE Learning.
8. Kalton, Graham, (1983): *Introduction to Survey Sampling*, Sage Publications, Beverly Hills, London.
9. Kish, L. (1995): *“Survey Sampling”*, John Wiley and Sons, INC, New York.
10. Maddala, G.S (1989). *Introduction to Econometrics*, Macmillan Publishing Company, New York.
11. Murthy, M.N. (1997): *Sampling Theory, and Methods*, Statistical Publishing Society, Calcutta, India.
12. Retherford, Robert D. and Choe, Minja Kim., (1993): *Statistical Models for Casual Analysis*, John Willey and Sons, Inc. New York.
13. Roy, T.K., R Acharya and A K Roy (2016) “Statistical Survey Design and Evaluating Impact”, Cambridge University Press,
14. Roy, T.K., and Arvind Pandey (2008). *National Family Health Survey in India: Survey Design and Related Issues*, Demography India, Vol. 37 (Supplement) pp. 13-40. For survey design, student should also refer the other articles published in the Demography India, Vol. 37 (Supplement) in the year 2008.
15. Snijders, Tom A.B. and Bosker, Roel J. (1999): *Multilevel analysis: An introduction to Basic and Advanced Multilevel Modeling*. Sage Publications.
16. Bird, A. (2006). *Philosophy of Sciences*. Routledge.

## Research methodology 2- Credits 4 (60 lectures)

### RM-2: QUALITATIVE RESEARCH, SCIENTIFIC WRITING AND ETHICS

#### OBJECTIVES:

This course would acquaint the scholars with basic processes of qualitative research and would enable them to pursue research in a systematic and critical way. Given the interdisciplinary character of the demographic inquiry, the focus of the course would be on to deliberate upon how to expand the scope of research, that would provide them with some critical perspectives on the broad paradigms of socio-demographic research. The objectives of this paper is to familiarize the scholars with various qualitative research methods and their practical applications for research purposes. This will prepare the students for designing and conducting independent research and equip them with techniques of qualitative data analysis and interpretation. Another important aspect is to teach the scholars on issues related to ethical issues involved in conducting field based research and publications of their research work. It has also been observed that a majority of students enrolled in PhD programme are not adequately trained on scientific and academic writing. This paper will help the scholars to learn the ways of scientific writing in an acceptable academic standard.

## **A. Philosophy of Research**

Science and Scientific Method - Naïve science, Pseudo-science, True science

Causation and Research Design

- Law, Theory, and Model

- Overview on Main Assumptions and Arguments of Selected Social Theories

(functionalism, conflict theory, symbolic interactionism, system theory, feminist theories, change theories)

## **B. Theory in Qualitative Research**

1. Using the existing literature
2. Theories underlying the qualitative research
3. Approaches to qualitative research
4. Texts as data in qualitative research

## **C. Designing Qualitative Research**

1. The qualitative research process
2. Research questions
3. Entering the field
4. Interviews, focus groups, key informants
5. Using narrative data
6. Collecting data beyond talk.

## **D. Writing qualitative research**

1. Using documents as data
2. Qualitative research today
3. Making qualitative research relevant

## **E. ETHICS OF SCIENTIFIC RESEARCH**

1. Introduction to Ethics in research
2. Ethical issues in design cycle
3. Ethical issues in data collection and willingness to pay in surveys
4. Ethical issues in analytic cycle
5. Ethical issues in writing report/scientific paper

## **F. ETHICS IN RESEARCH PUBLICATION**

1. Philosophy and Ethics (Theory)
2. Scientific Conduct (Theory)
3. Publication Ethics (Theory)
4. Open Access Publication (Practical & Assignment)
5. Publication Misconduct (Practical & Assignment)
6. Database and Research Metrics (Practical & Assignment)

## **G. QUALITATIVE DATA ANALYSIS SKILLS**

1. Data preparation
2. Developing codes
3. Making codebook and its process
4. Free listing and Pile sorting analysis using ANTHROPAK
5. In-depth Interviews, FGDs data analysis by N-Vivo/ATLAS-Ti
6. Group work - hands on data collection, data analysis and presentation

## H. SCIENTIFIC WRITING

1. Layout of research proposal and dissertation
2. Techniques of interpretation
3. Preparation of policy briefs
4. Preparation of research papers
5. Preparation of posters for conference
6. Preparation of concept note

## I. FIELD VISITS

1. Visit to the field sites where NGOs are conducting action/ intervention research.
2. Conducting Key Informant Interviews and Focus Group Discussions at field level and writing up.

**EVALUATION:** Written examinations and assignments. The assignment includes a review of a recently published book in the area of research interest of the scholar. Book review will be prepared and presented in the group/ class room. Based on the feedback from faculty and others, this will be revised and sent for publication in journals/ newspapers. The weightage for examination and assignments will be 60: 40 basis.

### Reading List:

**Gastel, Barbara and Robert A. Day.** *How to write and publish a scientific paper.*

**Turabian, Kate L.** *A manual for writers of research papers, theses and dissertation* Web reference: <http://owl.english.purdue.edu>

**Hollis, M.** (1994) *Philosophy of Social Science: An Introduction*. Cambridge, Cambridge University Press

**Booth, W. C., Colomb, G. G., Colomb, and J. M., & Williams, J. M.** (2003). *The Craft of Research*. University of Chicago press.

**Hennink, M., Hutter, I. and Bailey, A.** (2011). *Qualitative Research Methods*, Sage Publications, London.

**Schenshul, S.L, J.J. Schenshul and M.D. LeCompte** (1999), *Essential Ethnographic Methods*, Altamira Press, New York.

**MacIntyre, A.** (1967) *A Short History of Ethics*. London.

**P. Chaddah** (2018). *Ethics in Competitive Research: Do not get scooped; do not get plagiarized*, ISBN:978-9387480865

**National Academy of Sciences. National Academy of Engineering and Institute of Medicine.** (2009). *On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition*. National Academies Press.

**Resnik, D.B.** (2011). *What is ethics in research & why is it important*. National Institute of Environmental Health Sciences, 1-10.

Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>

**Beall, J.** (2012). Predatory publishers are corrupting open access. *Nature*, 489(7415), 179-179.

**Indian National Science Academy (INSA), Ethics in Science Education, Research and Government** (2019), ISBN:978-81-939482-1-7. [http://www.insaindia.res.in/pdf/Ethics\\_book.pdf](http://www.insaindia.res.in/pdf/Ethics_book.pdf).

**Flick, Uwe** (2014). *An Introduction to Qualitative Research*, SAGE, New Delhi

**Whyte, William Foote.** (2001). *Street corner society*. In Down to earth sociology: introductory readings. The Free Press.

**Srinivas, M. N., A. M. Shah, and E. A. Ramaswamy.** (1979). *The Fieldworker and the field : problems and challenges in sociological investigation*. Delhi: Oxford University Press.

- Mukherjee, R. And P. N. Mukherjee** ( 2000). *Methodology in social research: dilemmas and perspectives*. Sage Publication.
- Bryman, Alan** (2012). *Social Research Methods*, Oxford University Press
- Sayer, Andrew.** (1984). *Method in Social Science: A Realist Approach*, London: Hutchinson
- Creswell, J.** (2012). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.) Thousand Oaks, CA: Sage
- Denzin, N, and Lincoln, Y.** (2011). *The SAGE handbook of qualitative research* (4th ed.). Thousand Oaks, CA: Sage
- Lincoln, Y.S. & Guba, E.G.** (1985). *Naturalistic Inquiry*. Newbury Park, CA: Sage.
- Lee, T. W.** (1999) *Using Qualitative Methods in Organization Research*. London: Sage.
- Marshall, C. & Rossman, G. B.**( 2006). *Designing qualitative research* (4th ed.) Thousand Oaks, CA: Sage.
- Miles, M.B., Huberman, A.M. & Saldana, J.**( 2014). *Qualitative data analysis: A methods sourcebook* – Third edition. Thousand Oaks, CA: Sage.
- Patton M. Q.**( 2002). *Qualitative Research and Methods Evaluation*, Newbury Park: Sage.
- Silverman, D.**( 2013) *Doing Qualitative Research*, London: Sage
- Berg, B. L. & Lune, H.** *Qualitative Research Methods for the Social Sciences*, 8th edition, Boston: Pearson, Allyn & Bacon. 201

## OPTIONAL PAPERS (select 1 out of 4)- credits 4

The committee also looked into the five optional papers currently offered to scholars in the Pre-PhD / MPhil. courses. After reviewing the contents of each paper, it was suggested to retain the first three papers as it is –

1. **Fertility and reproductive rights**
2. **Public health and mortality**
3. **Migration, urbanization and development**

After looking into the syllabus of the optional paper – **social welfare policies and development**- it was decided to combine this paper with another existing paper- **Population and development**- considering the linkages of development with policies. it was suggested to title this paper as-

### **4. Population, social welfare policies and development.**

So in the Pre-PhD course, scholars will be offered four optional papers dealing with four major domains of Population Studies/ Demography, and they can choose any one of their choice. The detailed syllabus and reading list of four optional papers are given below.

## **OPTIONAL PAPERS**

<b>A</b>	<b>FERTILITY AND REPRODUCTIVE RIGHTS</b>	<b>60 Hours</b>
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**Objectives:** The purpose of this course is to provide advance knowledge in the area of fertility and reproductive rights. Students will get acquainted with new and advanced method of fertility analysis. An emphasis is also given on existing theories of fertility and their critical review. In the era of modernization, to understand nuptiality dynamics and issues regarding reproductive rights become essentials, especially in view of causes and consequences emerged from them in a society. Therefore, marriage and reproductive rights are also given due importance in this course.

### **1. Review of Basic Measures of Fertility and Reproduction:**

Definition of natural fertility, fertility, fecundity, fecundability; Basic measures of fertility and reproduction; Cohort and period measures of fertility; Sources of fertility data; Nuptiality, Nuptiality Table and Measurements; Timings of Events-Age at first marriage, first birth, last birth, birth intervals, menarche, menopause, sterilization, Mean age childbearing; Tempo and quantum effects in fertility; Parity and birth order-distributions with Indian examples, Parity progression ratios (PPRs); Abortion (legal/illegal/safe/unsafe) and Measurement of Abortions; Birth and pregnancy histories; **Family Planning and Unmet Needa.**

### **2. Estimation of Fertility and Analysis:**

Coale's fertility indices; Coale's-Trussel model of natural fertility; SMAM, P/F Method to estimate fertility; Decomposition of fertility; Age-pattern of Fertility, Estimating fertility through PPRs, Calculation of Bongaarts' Indices, Rele's method of estimating fertility, Reverse survival method of estimating fertility; Estimating fertility from Own-children data; Coale's (1981) Robust Procedure to Estimate fertility from single census; Estimating of fertility from CEB data using Gompertz relational model; Estimating fertility from historical data; Estimating sex ratio at birth, birth intervals, Probit analysis to estimate age of menopause; Long term fertility projections: Intergenerational Rationale and time series models

### **3. Using Secondary Data/Official Statistics for Small Area Planning:**

Estimating number of births using different fertility indicators at district level, Total fertility rate from birth order statistics at district level, Problems of estimating fertility from HMIS data,

Projection of fertility rate at smaller level, calculating different fertility indicators from vital registration and assessing its quality, Calculation of pregnancy, fertility rate and abortion rate from survey data, Estimating wanted and unwanted fertility rate from survey data. Small area estimation techniques to derive basic fertility indicators, estimation of duration of breastfeeding/postpartum insusceptibility from large scale-survey, Estimating infertility level from survey and census data.

#### 4. **Review of Theories and New Perspectives:**

Overview of Socioeconomic Theories and Frameworks of Fertility: Demographic Transition (FDT), Demographic Equilibrium and Demographic Convergence; Second Demographic Transition (SDT) and Below Replacement Level Fertility (BRLF) and Lowest low fertility (LLF); Causes of below replacement level fertility in developed and developing countries – country specific case studies; social, health and economic consequences; Population ageing and low fertility linkage. Health and Development Contributions of Fertility Decline in Developing Countries.

#### 5. **Emerging Issues Related to Fertility Research:**

Determinants of fertility and lowest low fertility in developed and developing countries: postponement of marriage and child bearing, rise in life expectancy, urbanization and densification, higher education and women employment, child care options, individualism, self-interest and feminism. Recent Trends and Patterns in Fertility in developed and developing countries; Future of fertility in the Global Context and the Indian context; Pro-natalist Policies and Prospects for Reversal of Fertility Decline; Fertility postponement and Recuperation. Second Demographic Transition (SDT) in India; Low and high Fertility Context and Demographic Risk Sharing in India.

Levels and Trends in Nuptiality: Impact of declining sex ratio at birth on marriage market, Concepts and empirical patterns relating to fertility preferences-wanted/unwanted fertility, planned and unplanned births and timing of birth; Stopping Rule Behaviour (SRB) and implications for sex ratio patterns; Changing sexual, marriage and child bearing patterns among young adults. No marriage, no child and one child hypotheses; Fertility variations in low fertility context and its ramifications.

#### 6. **Reproductive and Health Rights:**

Reproductive rights and international consensus and convictions; Definition of Reproductive and Sexual Rights; Right to choose partner; Protection from entering into Coercive Marital Union and reproduction; Right to have children: time, space and the number; Reproductive Decisions (Free from discrimination, Coercion and violence); Right to Safe Abortion, Right to Privacy; Freedom of movement, Overlap of Human, civil and reproductive rights; Right to correct sexual and reproductive health information

### **Reading List (Essential)**

1. **Arokiasamy P. (2009).** “Fertility Decline in India: Contribution by Women without Education, *Economic and Political Weekly*, Vol. XLIV no 30: 55-64.
2. **Bongaarts, J and Potter, R. (1983).** *Fertility, Biology and Behavior: An Analysis of the Proximate Determinants*. Academic Press, New York.
3. **Bulatao, A. and J. B. Casterline (eds.) 2001,** “*Global Fertility Transition*” Supplement to Population and Development Review, Population Council, New York.
4. **Dorius(2008).** Global Demographic Convergence? A Reconsideration of Inter-country Inequality in Fertility, *Population and Development Review*, 34(3): 519-539
5. **Goldstein, J.R., T. Sobotka and A. Jasilioniene(2009).** The End of Lowest Low Fertility? *Population and Development Review*, 35 (4): 663-700.



6. **John Bryant**(2007). Theories of Fertility Decline and Evidence from Development Indicators, *Population and Development Review*, 33(1): 101-128.
7. **Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel** (2001). *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers.
8. **Ron Lesthaege**(2010). The unfolding Story of Second Demographic Transition *Population Development Review*, 36 (2): 211-252.
9. **Siegel, Jacob S., and David A. Swanson** (eds.), (2004). *The Methods and Materials of Demography* (Second edition). San Diego: Elsevier Academic Press.
10. **United Nations** (1973). *Determinants and Consequences of Population Trends, Vol. 1*, pages 96-104, UN, New York.
11. **United Nations** (1999). *Below Replacement Fertility*, Population Bulletin of the UN, Special Issue Nos. 40/41, Department of Economic and Social Affairs, UN, New York.
12. **Wilson, C.**(2001). On the Scale of Global Demographic Convergence 1950-2000, *Population and Development Review*, 27: 155-171.

## Reading List (Suggested)

1. **Bogue, Donald J., Eduardo E. Arriaga, and Douglas L. Anderson**, eds. (publication editor George W. Rumsey) (1993) *Readings in Population Research Methodology*. Chicago: United Nations Population Fund. Volume 3: Fertility Research, (All three chapters but selected pages).
2. **Palmore, James A. and Gardner, Robert W.** (1983) *Measuring Mortality, Fertility and Natural Increase: a Self-Teaching Guide to Elementary Measures*. Honolulu: East-West Population Institute, East-West Center.
3. **Pollard, A.H., Yusuf, Farhat and Pollard, G.N.** (1990) *Demographic Techniques* (third edition). Sydney: Pergamon Press.
4. **Rowland, Donald T.** (2006), *Demographic Methods and Concepts*. New York: Oxford University Press.

<b>B</b>	<b>PUBLIC HEALTH AND MORTALITY</b>	<b>60 Hours</b>
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**Objectives:** The purpose of the course is to familiarize the students with public health issues and the basic measures of health and their applications. There will be a special emphasis on Indian health systems and the policies implemented over the years. Care is taken to avoid the issues already covered in the compulsory paper titled as “Morbidity, Mortality and Public Health” (both in MPS and MA/MSc courses). Practical sessions must include fieldwork such as visit to health care facility and interaction with health administrators/personnel. The impact of Covid-19, both on the health systems and people, need attention.

## Course outline:

1. Concepts and definitions:  
Health, morbidity, disease burden, disability, prevalence and incidence, etc.
2. Sources of health data/information: Civil Registration, Sample Registration System (SRS), Census and other large scale surveys, completeness and quality of data.
3. Applications of health measures in planning, monitoring and evaluation;  
CDR, IMR or ASDR for estimating immunization needs, clustering, patterning of death, etc.  
Advanced methods of estimating/assessing mortality, and  
Construction and applications of life tables (multiple decrement).
4. Age pattern of mortality: focus on adult mortality and morbidity/disease pattern
5. Avoidable mortality
6. Measures of health and burden of disease

Concepts of health expectancy, DALY, survivorship curve; epidemiological estimates for diseases (Years of Lost due to Disability- YLD),  
Introduction and use of DISMOD – II software (WHO),

7. Culture, community and disease (anthropological epidemiology):  
Traditional health providers (primitive/tribal/ancient) and practices, and  
Cultural and socio-religious interpretation/meaning associated with diseases, and health-seeking behaviours,
8. Indian Health System: Structure, functioning, and organization,  
Structure: Centre (MoHFW, Departments of Health, Family Welfare, AYUSH) and State  
Facility: Type, structure, functioning,  
Public (Civil, Military) versus Private (Trust, Society, NGO),  
Hierarchy: State (Hospital/Medical College), District Hospital, FRU/CHC, PHC, Health Sub-Centre,  
Municipal Hospital, Urban Health Post/Centre, Family Welfare Centre, Maternity Homes, Hospice/Old age Homes, Super-speciality Hospitals/ Institutions,  
Health Management Information System (HMIS): Data, mapping, surveillance mechanism  
Health insurance policies,  
Public-private partnership (PPP) in health care: Different models and experiences, and  
Decentralization of health services in India
9. Health policies and programmes:  
Critical review of major international policies and declarations (UN declarations, ICPD-1994, etc.),  
Indian health policies: NHP, NPP, other health programmes, etc., and  
Communitization of health programmes in India: NRHM (2005-12) with focus on ASHA, ANM, RKS, and role of Panchayats (PRI).

## Suggested readings

1. **Das Gupta, M and M. Rani** (2004), *India's Public Health System: How well does it function at the National level*, Policy Research Working Paper No. 3447, World Bank, Washington, D.C.
2. **Government of India** (2002), *National Health Policy*, Ministry of Health and Family Welfare, New Delhi.
3. **Government of India** (2005), *National Rural Health Mission – Framework for Implementation 2005-2012*, Ministry of Health and Family Welfare, New Delhi.
4. **Mathers, CD, T. Vos, AD Lopez, J. Salomon, and M. Ezzati** (eds) (2001). *National Burden of Disease Studies: A Practical Guide*, Global Program on Evidence for Health Policy. Geneva: World Health Organization.
5. **Mills, A, JP Vaughan, DL Smith and I Tabibzadeh** (eds.) (1993). *Health System Decentralization: Concepts, issues and country experience*, WHO, Geneva.
6. **Murray, CJL, and AD Lopez** (Eds: 1996). *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries and Risk Factors in 1990 and Projected to 2020*. Global Burden of Disease and Injury Series, Vol. 1. Cambridge: Harvard University Press.
7. **Peter, D.H., AS Yazbeck, RR Sharma, GNV Ramana, LH Pritchett and AWagstaff** (2000). *Better Health System for India's Poor: Findings, analysis and options*, World Bank, Washington, D.C.
8. **VHAI** (1997). *Report of the Independent Commission on Health in India*, VHAI, New Delhi.
9. **World Bank** (2003). *World Development Report: Making services work for poor people*, Oxford University Press, Washington, D.C.
10. **World Health Organization** (2000). *World Health Report 2000. Health systems: Improving Performance*. Geneva, World Health Organization.



C	MIGRATION, URBANIZATION AND DEVELOPMENT	60 Hours
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**Objectives:** The rationale of this course is to advance the understanding on the issues on migration and urbanisation already studied by students at the MA/M.Sc / MPS programmes. The course would equip students the recent theoretical and empirical developments in the field of migration and urbanisation. The methods of the measurement of migration and urban processes would be emphasized along with advancing an understanding of related indicators. At the end of the course, students would be able to critically examine the policies and programmes related to migration and urban policies. This course is broadly organised under two heads- namely dealing with migration and urbanisation.

## 1. MIGRATION

### A. Process of Migration:

1. Changing perspectives on migration in the context of globalization;
2. Demographic diversity and Migration: applications of Lee's theory, Zipf's gravity model, Stouffer's opportunities and intervening opportunities model, Roger's model of migration;
3. Demographic transition and mobility transition- the contribution of Zelinsky;
4. Wolpert decision making model of migration; New economics of migration and probability models of migration;
5. Mobility field theory to explain the decision making process and its application.

### B. Consequences of migration:

1. Applications and modifications in Todaro's model of wage differentials in the context of inequalities in development in developed and developing countries;
2. Effects of migration on fertility and family Planning;
3. Effect of migration on mortality and health;
4. Migration, development, displacement and social conflict;
5. Migration, return migration and remittances;
6. Women and migration- a changing perspectives focusing on labour migration and trafficking.

### C. International Migration:

1. A critical appraisal of theories of international migration;
2. Emigration from India: Patterns, Magnitude, Composition, Diasporas and Remittances;
3. Immigrants in India: Changing patterns, and profiles including refugee migration;
4. Globalization and Migration: Some pressing contradictions.

## 2. URBANIZATION

### A. Theoretical and Conceptual Issues (10 lectures)

1. Historical evolution of urbanisation; Contribution of Castells, David Harvey and Kinsley Davis. Urbanism as a way of life (Louis Wirth);
2. Relationship between urbanisation and development- Agricultural development and urbanisation; urbanisation and industrialisation linkages;
3. Urbanisation and social change;
4. Urbanisation as a demographic process;
5. Defining urban- a cross-country comparison; urban and rural relationship; Urban hierarchy; Definitions of slum and slum demography;

### B. Pattern of Urbanisation (5 lectures)

1. World pattern of urbanisation; Pattern of urbanisation in India;
2. Components of urban growth; Mega cities and urbanisation;
3. Pre-colonial, Colonial and post-colonial phases of urbanisation.
4. Modern and post-modern cities and their problems;

## C. Urbanisation, Health and Environment (5 lectures)

1. Urbanisation, land use change and housing market;
2. Urban environment- air pollution; water pollution; solid waste management;
3. Urbanisation, slums and quality of life
4. Urbanisation and health; health care delivery in urban areas
5. Urban disasters- mitigation and coping strategies

## D. Urban policy, Urban Planning and Programmes (5 lectures)

1. Urban policy and programmes in five-years plans
2. Jawaharal Nehru Urban Renewal Mission
3. Urban reforms and urban governance
4. Urban planning and city development strategies

## Readings List

1. **Clark, David** (1996). *Urban World/Global City*, Routledge, London.
2. **Cohen, Robin** (1996). *Theories of Migration*, Edward Elgar, Cheltenham.
3. **Harvey, David** (1973). *Social Justice and City*, Edward Arnold and The Johns Hopkins University Press, Baltimore.
4. **Khadaria, B.** (2010). *India Migration Report 2009: Past, Present and Future Outlook*, Cambridge University Press, New Delhi
5. **Louis Wirth** (1938). Urbanism as a Way of Life, *The American Journal of Sociology*, Vol. 44, No. 1, (Jul., 1938), pp. 1-24.
6. **McGee, T.G.** (1971). *Urbanisation Process in the Third World*, Bell, London
7. **Manuel Castells** (1977). *The Urban Question*, MIT Press, Cambridge.
8. **Oberai, A.S. and Singh, H.K.M.** (1983) *Causes and Consequences of Internal Migration: A Study in the Indian Punjab*, Oxford University Press Delhi.
9. **Samuel, J.** (1995). *Life cycle and Female Migration: A Study of Pattern and Causes*, B R Publishing Corporation, New Delhi.
10. **Soja, Edward** (2000). *Postmetropolis: Critical Studies of Cities and Regions*, Basil Blackwell, Oxford.
11. **Steven Vertovec** (2010). *Migration: Critical Concepts in Social Sciences*, Vol.1, Routledge, Abingdon.
12. **United Nations** (2010). *World Urbanisation Prospects: The 2009 Revision*, Population Division, United Nations, New York.

<b>D</b>	<b>POPULATION, SOCIAL WELFARE POLICIES AND DEVELOPMENT</b>	<b>60 Hours</b>
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**Objectives:** The objective of this course is provide detailed understanding of the theories and issues, on poverty, inequality, regional and social development and on food and nutritional security. The course also lays emphasis on sustainable development, innovations for sustainable development, developmental policies and programmes with special reference to India and on the global perspective of development policies. Further, the purpose of the course is to familiarize the students with the basic issues related to development and social welfare policies implemented over the years. The course will encourage the students to undertake research pertaining to health systems, policies, and social and welfare aspects. Care has been taken not include the aspects which are already covered under the compulsory papers at Masters level on “population policies and programmes, and population and development”. Apart from class room lectures, assignments, case studies, lab exercises and debates are part of this paper. The class room discussions, readings, writing assignments and exams are designed to encourage the students to develop tools for understanding social welfare measures and policies which are closely linked with developmental issues in Indian context.

## I. Review of Concepts, Theories and Issues

1. Review of Concepts and Development Measures
2. Theories with Emphasis on Growth Model Theories
3. Contemporary issues related to population and development – Demographic Dividend, Economics of Ageing, Economics of Health care, Social and Health issues.

## II. Poverty, Inequality and Regional Development

1. Concept and Measurement of poverty, Strengths and limitations of Different Approaches, Multi-dimensional Assessment of Poverty
2. Measures of Inequality – Strengths and Limitations, Issues Related to Inequality and Equity; Social Economic and Health Inequalities.
3. Concepts and issues related to Social Exclusion
4. Regional development: Regional structure of underdevelopment in colonial and present India, regional disparities in developmental indices, Regional development Theories and (Spatial Organization, Polarized development, development from below), regional planning in India, regional social movements in India.
5. Micro Finance: Terms and Concepts of Microfinance. Microfinance as a Tool for Development. Evolution and character of Microfinance in India, Some Innovative and Creative Microfinance Models, Role of subsidies in microfinance, Case studies from Andhra Pradesh Microfinance Experiment, Role of Self Help Groups (SHG), Bangladesh Grameen Experiment, Financial Expansion.
6. Food and Nutritional Security – defining food security and hunger, evidence based assessment of food security and hunger, trends and prospects in nutritional security.

## III. Population and Sustainable Development

1. Conceptual and Theoretical issues of Sustainable development:  
Importance of Studying Sustainable development; Meaning, Concepts and Definitions, context and issues; Inter-linkages between ecology and development; Conventional perspectives on development; Critics of Conventional Development perspectives; Critiques of sustainable development perspectives; Biophysical limits to growth: Malthus, Ricardo, Ehrlich-Commoner model, K Boulding, Nicholas Georgescu-Roegen and H Daly models. Modern Environmental principles and philosophies- gaia, eco-feminism, deep ecology, gender and environment, eco-feminism, Marxian views and Gandhian views.
2. Population, Society and Sustainable Development:  
Population and resources; 'Population stabilization' to 'Population balance'; Population and food; Migration, population change and rural environment; Population, environment and development in Urban settings; Development and urban ecology; Slums, Urban Poverty and Rehabilitation. Resettlement and rehabilitation of people: Its problems and concerns; Indigenous population and traditional methods of environmental sustainability; Common property resources and rural poor in India. Environmental conflicts and movements in India. Vulnerability of Indigenous population; Population, poverty and vulnerability; Case Studies – Sacred forests, Anti-Eucalyptus movement, Narmada and Vedanta (Orissa) Projects.
3. Population, Quality of Life and environment Linkages:  
Quality of life: definition and measurement; environmental health hazards, Causes and Effects of Pollution; Different types of pollution, Case studies on pollution; Global environmental pollution.
4. Innovations for Sustainable Development:  
Why making policy on environment is difficult, Case studies based on experiences from developed and developing countries; How the concept of sustainability has influenced the policy,

programme practice in development sectors., World summits- issues and challenges, Issues related to natural resources management; Emerging new institutions of environmental protection; Capacity Building, Technology Transfer for Sustainable Development; Creating and managing emission related norms; Some success models of efficient environmental management – CNG, Smokeless Choolah, and other successful green models.

#### IV. Developmental Policies and Programmes:

1. Developmental policies and programmes with special reference to India, policies related to environment.
2. Global Perspective of Development and environmental policies

#### V. Social Policies

1. Introduction: Defining social policy, need for social policies, overview of social and welfare policies, evolution of social and welfare policies. Social policies linked with development and population: Rights approach,
2. Gender and development: Theoretical issues and recent developments, gender dimensions of policy making, social construction of gender, ‘engendering’ development

#### VI. Welfare policies and measures in India at different sectors:

- a. Health b. Education c. Food and nutrition d. Water and Sanitation
- b. Housing f. Youth g. Women and children h. Aged i. Social security

#### VII. Health policies and programmes:

Critical review of major Indian/international declarations, ICPD-1994, NPP-2000, NHP-2017, recent health programmes, success stories, etc.

Evaluation of social welfare and health policies: Macro level and micro level, coverage and quality, beneficiary assessment.

#### Reading List

1. **Alkire, S. and Santosh** (2010). *Acute Multidimensional Poverty: A New index for developing countries*, Oxford Poverty & Human Development initiative (OPHI) Working paper 38, Oxford Department of International Development, University of Oxford.
2. **Alkire, S.**(2007).*The Missing Dimensions of Poverty Data: Introduction to the Special Issue*, Oxford Development Studies, 35 (4), 347-359.
3. **Atkinson, AB and Bourguignon F.***Introduction to Handbook of Income Distribution*.
4. **Beatriz Armendáriz and Jonathan Morduch**(2005). *The Economics of Microfinance*, The MIT press.
5. **Bryant H Richard** (1996). *Physical Geography Made Simple*, Rupa C Publication.
6. **Bourguignon, F and Chakravarty SR.** (2003). The Measurement of Multidimensional Poverty, *Journal of Economic Inequality*, 1(1), 25-49.
7. **Bründtland, GH (ed.)**(1987). *Our Common Future: The World Commission on Environment and Development*, Oxford, Oxford University Press.
8. **Burchart, T Grand, JL and Piachaud, D**(2002). *Understanding Social Exclusion*. Oxford University Press, London.

9. **Chakravorty, S.** (2005). The History and Geography of Regional Development Theory: A Futile Search for a Paradigm; in N. Banerjee and S. Marjit (eds.) *Development, Displacement and Disparity*. Orient Longman, New Delhi: pp. 29-52.
10. **Datt, R.** (2008). *Growth, Poverty and Equity: Story of India's Economic Development*. Deep and Deep Publication, New Delhi.
11. **Deaton, A.** (2003). Health, inequality, and economic development. *Journal of Economic Literature* 41: 113–58.
12. **Gordon, D et. al.** (2000). Poverty and Social Exclusion in Britain, *Joseph Rowntree Foundation*, The Homestead, New York.
13. **Goudie Andrew** (1994). *The nature of the Environment*, Blackwell Publishers.
14. **Hussain Ahmed** (2000). *Principles of Environmental Economics*, Routledge.
15. **Karmakar K.G.** (2008). *Microfinance in India*, SAGE.
16. **Lafferty W. (ed.)** 2004. *Governance for Sustainable Development. The Challenge of Adapting form of Functions*, Cheltenham: Edward Elgar, (chapter 1 and 11).
17. **McNicoll, Goefferey** (2005). *Population and Sustainability*. Working paper No.205. New York, Population Council.
18. **O'Neill et al.** (2004). Population, Greenhouse Gas Emissions and Climate Change. Essay in book: Lutz W. et al. (editors). 2004. *The End of Population Growth in the 21st Century* London: Earthscan Our Common Future, Report of the World Commission on Environment and Development
19. **Rangarajan M.** (2007). *Environmental Issues in India*, Pearson Langman.
20. **Sen, A.K.** (2000). Social exclusion: Concept, Application and Scrutiny, *Social Development Papers No. 1*, Asian Development Bank, Malina, Phillippines.
21. **Sen A.** (1997). *On Economic Inequality*. Oxford: Clarendon Press.
22. **Shiva Vandana** (1988). *Staying Alive: Women, ecology and Development*, ZED Books.
23. **Stern O.** (2006). *The Economics of Climate Change*, Cambridge.
24. **Susan Johnson, Ben Rogaly** (1999). *Microfinance and poverty reduction*, OXFAM.
25. **UNDP** (2010). *Human Development Report 2010*, Palgrave Macmillan, New York.
26. **UN.** (2001). *Population, Environment and Development: A concise report*.
27. **University Grant Commission** (2005). Text Book of Environmental Studies. Universities Press
28. **Wagstaff A, Paci P, Van Doorslaer E.** (1991). On the measurement of inequalities in health. *Social Science & Medicine* 33: 545–57.
29. **Yunus Md.** (2007). *Banker to the Poor: Micro-Lending and the Battle Against World Poverty*, Public Affairs, New York.
30. **World Health Organization** (2000). *World Health Report 2000. Health systems: Improving Performance*. Geneva, World Health Organization. Also available on the worldwide web at [www.who.int/whr](http://www.who.int/whr).
31. **Bründtland, G.H.** (1987). *Our Common Future: The World Commission on Environment and Development*, Oxford, Oxford University Press.
32. **Davis, Kingsley and Mikhail S. Bernstam** (eds.) (1991), *Resources, Environment, and Population: Present Knowledge, Future Options*. New York: Oxford University Press.
33. **Dawson, P. J, and R. Piffin**, (1998). Is there a long run relationship between Population growth and living standards? The case of India, *Journal of Development Studies*, 34. 149-156
34. **Holdren, J. P., and P. R. Ehrlich** (1974). Human population and the global environment. *Am. Sci.* 62: 282-292.
35. **Kem, R., Parto, S. and Gibson, R.B.** (2005). Governance for Sustainable Development: Moving from theory to practice, *The International Journal of Sustainable Development*, 8(1/2), 12-30.
36. **McNicoll, Goefferey** (2005). *Population and Sustainability*. Working paper No.205. New York, Population Council.
37. **Preston, Samuel H.** (1994). *Population and Environment: From Rio to Cairo*. Liège: International Union for the Scientific Study of Population (IUSSP).





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38. **Simon, Julian L.** (1996). *Population Matters: People, Resources, Environment, and Immigration*. Transaction Publishers: New Brunswick, NJ.
39. **UNFPA** (2009). *State of World Population- 2009: Facing a changing world: Women, Population and Climate*, UNFPA, New York.
40. **Sabatier, Paul** (2007). *Theory of the policy Issues*, West View Press, Colorado.
41. **Dreze, Jean and Amartya Sen** (1996). *Indian Development: Select Regional Perspectives*, Oxford University Press, New Delhi.
42. **Baldock, J, N. Manning and S. Vickerstaff** (2007). *Social Policy*, Oxford University Press, New York.
43. **Government of India** (2008). *Eleventh Five Year Plan 2007-2012: Social Sector*, Planning Commission, Oxford University Press, New Delhi.



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## Ph.D –JOINING REPORT [Annexure-I]

To  
The Director  
International Institute of Population Sciences  
Deonar, Mumbai

Date:.....

Sub: Ph.D. Joining Report – Reg.

Ref: Your admission letter No. \_\_\_\_\_ dated. \_\_\_\_\_

Respected Sir,

With reference to your letter cited, I hereby join the Ph.D. [Full time / Part-time ] programme in the Department of \_\_\_\_\_, International Institute of Population Sciences- Mumbai on \_\_\_\_\_, under \_\_\_\_\_ fellowship. In case of UGC or any other fellowship, mention award letter No. \_\_\_\_\_, and date \_\_\_\_\_.

Attach fee receipt.

Thanking You,

Yours faithfully,

\_\_\_\_\_  
(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Enrolment No. : \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

### Office Use Only

Forwarded

Checked by :.....

Not Recommended /Recommended

Assistant Registrar(Acad)  
Ph.D Coordinator

Approved

Director & Sr.Professor





# International Institute for Population Sciences

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Deonar, Govandi Station Road, Mumbai 400 088  
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## APPLICATION FOR CONCEPT NOTE [Annexure-II] PART A: FOR STUDENT'S USE

To  
Assistant Registrar (Acad.)  
IIPS. Deonar, Mumbai 400 088

Sir,

With due respect, I request to kindly consider my application and allow me to submit concept note. The particulars of my Ph.D. is given below;

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No. & Date of Admission	:	
3.	Date of Ph.D Registration	:	
4.	Proposed title of the thesis	:	
5.	Admission Fee Receipt	:	

### SUMMARY OF THE CONCEPT NOTE:

Ph.D Supervisor	Title of the Proposed Work	Objectives of the Study	Data Sources
		1 2 3	Primary..... Secondary.....

Student will have to submit the detailed Concept Note containing (a) ntroduction/Background/Problem statement, (b) Rationale, (c) Aims and Objectives, (d) Method (how you are going to investigate your research question/s/research design, (e) Proposed source of data, (f) Instruments, (g) Method of Data Collection/Procedure, (h) Method of Data Analysis, (i) Contribution to knowledge/originality, and (j) References etc., should be submitted with signature of student and his/her Ph.D Supervisor.  
Yours Sincerely,

\_\_\_\_\_  
(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Enrolment No. : \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_



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..2..

## PART B: FOR OFFICE USE ONLY

Mr./Ms..... was admitted to Ph.D. programme on....., and he has completed ..... from the date of admission, and would like to submit his Concept Note.

Remarks: .....

O.S.

(Acad. Section)

Asstt. Registrar (Acad.)

Ph.D Coordinator

(Remark.....)



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## APPLICATION FOR PRESENTATION OF PH.D PROPOSAL [Annexure-III]

### PART A: FOR STUDENT'S USE

To

Assistant Registrar (Acad.)

IIPS. Deonar, Mumbai 400 088

Sir,

With due respect, I request to kindly consider my application and allow me to present my Ph.D. Proposal as per availability of dates. The particulars of my Ph.D. work is given below;

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No. & Date of Admission	:	
3.	Date of Concept Note approval	:	
4.	Title of the Ph.D. thesis	:	
5.	Current Extension Period	:	
6.	Current Semester Fee Receipt	:	

Student are required to submit detailed Research Proposal along with this form.

Signature with date

Name of the Students

Contact details (mobile and email)

: \_\_\_\_\_  
: \_\_\_\_\_  
: \_\_\_\_\_

### PART B: FOR SUPERVISOR AND ADVISORY COMMITTEE MEMBERS

<b>SUPERVISOR</b>	Remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (i)</b>	Remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (ii)</b>	Remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	



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..2..

## PART C: FOR OFFICE USE ONLY

Mr./Ms..... was admitted to Ph.D. programme on.....  
His/her Concept Note was approved on .....and would like to present his Ph.D Proposal  
on ..... Further it is stated that Scholar has paid fees for the current semester  
i.e., .....to.....

The date of proposal presentation is .....

O.S. (Acad. Section)

Asstt. Registrar (Acad.)

Ph.D  
(Remark.....) Coordinator

Director & Sr. Professor



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## APPLICATION FOR SUBMISSION OF REVISED PH.D PROPOSAL [Annexure-IV]

(Candidate is required to submit the revised Research Proposal within one month from the date of issue of office memo)

### PART A: FOR STUDENT'S USE

To

Assistant Registrar (Acad.)

IIPS. Deonar, Mumbai 400 088

Sir,

With due respect, I request to kindly consider my application and allow me to present my Ph.D. Proposal as per availability of dates. The particulars of my Ph.D. work is given below;

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No. & Date of Admission	:	
3.	Date of Concept Note approval	:	
4.	Title of the Ph.D. thesis	:	
5.	Current Extension Period	:	
6.	Current Semester Fee Receipt	:	
Student are required to submit detailed Research Proposal along with this form.			

Signature with date

:

Name of the Students

:

Contact details (mobile and email)

:

### PART B: FOR SUPERVISOR AND ADVISORY COMMITTEE MEMBERS

<b>SUPERVISOR</b>	Remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (i)</b>	Remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (ii)</b>	Remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	



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## SYNOPSIS SUBMISSION FORM[Annexure-V]

### PART A: FOR STUDENT'S USE

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No	:	
3.	Date of Admission	:	
4.	Date of Concept Note approval	:	
5.	Date of Ph.D. Proposal Presentation	:	
6.	Title of the Ph.D. thesis	:	

#### A. Research articles published(If available)

Sr. No.	Title of the Research Article	Journal Name	Volume No.	Issue No.	Page Nos.	Year
1						
2						

#### B. Research articles communicated for publication(If available)

Sr. No.	Title of the Research Article	Journal Name	Present Stage
1			
2			

#### C. List of papers presented in Conferences/Seminars(If available)

Sr. No.	Title of the Research Article	Name of conference/seminar	Organizer	Date(s)	Oral/poster presentation
1					
2					

I have emailed a soft copy of the synopsis to the Academic Office.

I certify that my work is based on the discovery of new facts by me or of new relations of facts observed by others and the work tends to the general advancement of knowledge. The enclosed synopsis clearly states the sources from which my information has been derived and the extent to which I have based my work on the work of others, and the portion or portions of my thesis which I claim as original. For the thesis which I intend to submit, no degree or diploma has been conferred on me before either in this or in any other University or body, further I have not submitted the synopsis of my thesis or my thesis to any other University or body.

Yours Sincerely,

(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Enrolment No. : \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

Enclosed: Signature copy of Synopsis.

..2/-



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..2..

## PART B: FOR SUPERVISOR AND ADVISORY COMMITTEE MEMBERS

CERTIFICATE OF SUPERVISOR	
I certify that the thesis to be presented by _____ represents his/her original work which was carried out by him/her at _____ under my guidance and supervision during the period from _____ to _____.	
I further certify that the foregoing statements made by him/her in regard to his/her thesis are correct to the best of my knowledge.	
Date: _____	
Signature _____ Name of SUPERVISOR: _____	
The synopsis is recommended for submission	
Advisory Committee Member (i)	Signature: Name: Date:
Advisory Committee Member (ii)	Signature: Name: Date:

PART C: FOR OFFICE USE ONLY	
Mr./Ms..... was admitted to Ph.D. programme on.....	
His/her Concept Note was approved on .....and presented Ph.D Proposal on .....	
Further it is stated that Scholar has paid fees for the current semester i.e., .....to.....	
The tentative date(s) available for the presentation is / are.....	
O.S. (Acad. Section)	
Asstt. Registrar (Acad.)	
Ph.D Coordinator (Remark.....)	
Director & Sr. Professor	



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## RAPPORTEUR REPORT [Annexure-VI]

Name of the Ph.D. Scholar:
Title of the Ph.D. Proposal / Synopsis:
Name Ph.D. Supervisor & Advisory Committee:
Date, time and venue of Presentation:
Name of Rapporteur:
Date of Rapporteur Report submission:

The following comments/suggestion/remark/questions has been made during the presentation.

Sr. No.	Comments/Suggestion made by (Expert/ Faculty/ Ph.D. Scholar)	Question/ Remark	Replied to Comment/Suggestion/ Question/Remark

Signature of the  
Rapporteur.....  
Name of the  
Rapporteur.....  
Contact  
number.....





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## REVISED SYNOPSIS SUBMISSION FORM[Annexure-VII]

(After the presentation of the synopsis Candidate is required to submit the revised synopsis within one month from the date of issue of office memo by incorporating the suggestion given by the students and faculty during the presentation.)

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No	:	
3.	Date of Admission	:	
4	Date of Concept Note approval	:	
5	Date of Ph.D. Proposal Presentation	:	
6	Date of Synopsis Presentation	:	
6	Title of the Ph.D. thesis	:	

I have incorporated additions / alterations, etc. as suggested by the facultys/students. A certificate to t his effect from my supervisor is appended below.

**Yours Sincerely,**

\_\_\_\_\_  
(Signature of the candidate with date)

**Name: Mr. / Ms.** \_\_\_\_\_

**Enrolment No. :** \_\_\_\_\_

**Mobile No:** \_\_\_\_\_

**Email:** \_\_\_\_\_

## CERTIFICATION FROM SUPERVISOR

Certified that the corrections / alterations as suggested by the the facultys/students have been incorpor ated by the student .

**Date:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Name of Supervisor:** \_\_\_\_\_



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## **PANEL OF Ph.D THESIS EXAMINERS** [Annexure-VIII]

### **CONFIDENTIAL**

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No	:	
3	Title of the Ph.D. thesis	:	
<b>NAME OF EXAMINERS</b>			
1	Name: Present Position: Postal Address:  Phone/Mobile nos.: E-mail:	2	Name: Present Position: Postal Address:  Phone/Mobile nos.: E-mail:
3	Name: Present Position: Postal Address:  Phone/Mobile nos.: E-mail:	4	Name: Present Position: Postal Address:  Phone/Mobile nos.: E-mail:
5	Name: Present Position: Postal Address:  Phone/Mobile nos.: E-mail:	6	Name: Present Position: Postal Address:  Phone/Mobile nos.: E-mail:

**I the supervisor(s) of the thesis, do not have any potential conflict of interest with the above suggested examiners.**

**Signature** \_\_\_\_\_  
**Name of Supervisor:** \_\_\_\_\_  
**Date:** \_\_\_\_\_



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## **THESIS SUBMISSION**[Annexure-IX]

(A Ph.D. Candidate should submit his/her thesis within 3 months from the date of presentation of the synopsis.)

To,  
The Assistant Registrar (Academic)  
IIPS-Mumbai  
Deonar, Mumbai

I am submitting electronic / Spiral copy(s) of my thesis, the title of which is :

\_\_\_\_\_  
\_\_\_\_\_

All the copies of the thesis have been prepared in accordance with the rules and regulations of the Institute.

I state that the work embodied in this thesis forms my own contribution to the research work carried out under the guidance of \_\_\_\_\_. This work has not been submitted for any other degree to this or any other University. Whenever references have been made to previous works of others, it has been clearly indicated.

Yours Sincerely,

\_\_\_\_\_  
(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Enrolment No. : \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

## **CERTIFICATION FROM SUPERVISOR**

I certify that the thesis represents original work carried out by the candidate under my supervision.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Enclosed: Payment receipt of Thesis submission.



# International Institute for Population Sciences

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## FINAL SUBMISSION OF THESIS REPORT (Ph.D) [Annexure-X]

(A Ph.D. Candidate shall submit to the Academic Office the four copies of his/her approved thesis, duly bound, together with the application for submission of the same in the prescribed format, within one month, from the date of issue of OM to him/her.)

To,  
The Assistant Registrar (Academic)  
IIPS-Mumbai  
Deonar, Mumbai

I am submitting electronic / four bound copy(s) of my thesis, the title of which is :

All the copies of the thesis have been prepared in accordance with the rules and regulation of the Institute.

I have incorporated additions / alterations, etc. as suggested by the external examiner / board of examiners. In view of the above, I hereby request you to conduct my Ph.D. Viva-Voce at your earliest convenience.

Yours Sincerely,

(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Enrolment No. : \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

### **CERTIFICATION FROM SUPERVISOR**

Certified that the corrections / alterations as suggested by the external examiner / board of examiners have been incorporated by the student, and the four bound copies of the thesis may be accepted. I recommend Controller of Examination to kindly initiate necessary action to conduct Ph.D. Viva-voce.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Name of Supervisor: \_\_\_\_\_

### **CERTIFICATION FROM LIBRARY**

This is to certify that the Library is in receipt of soft copies of the thesis.

**LIBRARY AND INFORMATION OFFICER**

Enclosed: Documents as per checklist.



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## CERTIFICATE OF GENUINENESS FOR PUBLICATION[Annexure-XI]

This is to certify that the Ph.D. scholar Mr/Ms.....working under my supervision has published research articles as listed below.

### A. Research articles published

Sr. No.	Title of the Research Article	Journal Name	Volume No.	Issue No.	Page Nos.	Year
1						
2						
3						

### B. Research articles communicated for publication

Sr. No.	Title of the Research Article	Journal Name	Present Stage
1			
2			
3			
4			

### C. List of papers presented in Conferences/Seminars

Sr. No.	Title of the Research Article	Name of conference/seminar	Organizer	Date(s)	Oral/Poster presentation
1					
2					

The contents of his / her publication /s and presentation/s in the conferences/seminars, incorporates part of the results presented in his/her Thesis.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Name of Supervisor: \_\_\_\_\_



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## **Check list for Ph.D. viva-voce***[Annexure-XII]*

1. Signature copy of Application Final Submission of Thesis
2. Four hard bound copies of the Ph.D. Thesis duly signed by the Ph.D. Scholar and Guide.
3. Pdf version of revised synopsis and Ph.D. Thesis.
4. Copies of published research articles of the Ph. D. scholar.
5. Copy of correspondence with the publisher (Research Articles communicated for publication).
6. Copies of certificate of attendance in Conference, Seminar etc.
7. Certificate of Genuineness for Publication.
8. Copies of fee receipts.
9. No dues certificate.

Signature	
Name of the Scholar	
Contact details (Mobile and Email ID)	



## THESIS EVALUATION REPORT[Annexure-XIII]

### Confidential

[To be completed by the Ph.D. Thesis Examiner]

### Part A:Ph.D. THESIS DETAILS

1.	Name of the Ph.D. Scholar	:	
2.	Title of the Ph.D. thesis	:	

### Part:B THESIS EXAMINER'S RECOMMENDATION

Please send detailed report on the thesis on separate sheet, and specific recommendation by ticking any one of the following options)

d) The Thesis is recommended for award of Ph.D. degree.	<input type="checkbox"/>
e) The Thesis is to be modified before the award of Ph.D. degree.	<input type="checkbox"/>
f) Thesis is rejected.	<input type="checkbox"/>

(Signature of the Examiner)

Name: .....

Designation: .....

Address: .....

.....

.....

Mobile Number: .....

N.B: 1. A detailed Report is enclosed in a separate sheet

2. The Institute requires a signed report from the examiner.



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## VIVA-VOCE REPORT OF PH.D. STUDENTS[Annexure-XIV]

Title of Ph.D. Thesis:
Name of Research Scholar:
Enrollment Number:
Name/Designation of Research Supervisor:
Date of submission of the Ph.D. Thesis:
Date of Ph.D. Defence Viva-Voce:

### RECOMMENDATIONS

The Defence Examination Board evaluated the Ph.D. work and thesis of the candidate taking into account the queries/questions raised by the external examiners and recommend that (tick one):

1. The thesis in the present form is recommended for the award of the Ph.D degree **in Population Studies** of the International Institute for Population Sciences, Mumbai. ☐
2. The thesis is recommended for the award of the degree. However, suggestions for modifications of the thesis based on the discussions during the defence examination and detailed in a separate sheet, be incorporated in the thesis. ☐
3. The thesis is not acceptable for the award of the degree. ☐

Overall Comments of the board on the Viva-Voce Examination.....  
.....  
.....  
.....

### Defence Examination Board

Signature of Supervisor	Signature of External Thesis Examiner	Signature of Chairperson
Name: Designation: Address:	Name: Designation: Address:	Name: Designation: Address:





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## **INSTITUTE SEMESTER REGISTRATION FORM (Ph.D.) [Annexure-XV]**

**(To be submitted at the beginning of each semester on payment of the registration fee)**

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No	:	
3.	Date of Admission	:	
4.	Date of Concept Note approval	:	
5.	Title of the Ph.D. thesis	:	
6.	SEMESTER TO WHICH ADMISSION IS SOUGHT	:	
7.	Semester fee payment details	:	Payment Amount: Date:
8.	<b>Mandatory Enclosure:-</b> <b>1. Self Attested Payment receipt</b> <b>2. Approved copy of half yearly progress report</b>		1. Yes( ) No( ) 2. Yes( ) No( )

:

\_\_\_\_\_  
(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Enrolment No. : \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

### **CERTIFICATION FROM SUPERVISOR**

Certify that he/she is eligible for admission in .....Semester.

\_\_\_\_\_  
(Signature of the Supervisor with date)

Name of Supervisor \_\_\_\_\_



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## FORMAT FOR SUBMITTING HALF YEARLY PROGRESS REPORT AND WORK TO BE DONE IN REPORTING MONTHS BY PH.D STUDENTS FOR EXTENSION OF FELLOWSHIP [Annexure-XVI]

Date of Submission : \_\_\_\_\_

1	Name of the Ph.D. Scholar	:	
2	Enrolment No	:	
3	Date of Admission	:	
4	Title of the Ph.D. thesis	:	

Date of Registration : <u>dd/mm/yyyy</u>	Date of Concept Note approved
Type of Fellowship : .....	<u>dd/mm/yyyy</u>
Existing Ph.D work extension period from <u>dd/mm/yyyy to dd/mm/yyyy</u> [Not applicable in case of Part Time Student)	Date of Proposal Presented : <u>dd/mm/yyyy</u> , If not presented tentative Date of Proposal Presentation : <u>dd/mm/yyyy</u>
Tentative Date of Synopsis Presentation: <u>dd/mm/yyyy</u>	Date of Part Time conversion <u>dd/mm/yyyy</u>
Date of Fees paid: <u>dd/mm/yyyy</u> (attach Receipt)	
Semester: III/IV/V/VI/VII/VIII/IX/X	

Work being done in reporting months (no narrative only bullets) <b>From dd/mm/yyyy to dd/mm/yyyy</b>	Work done in earlier three months* (no narrative only bullets) <b>From dd/mm/yyyy to dd/mm/yyyy</b>

\* It is mandatory to submit detailed progress report separately duly approved by the Guide and Advisory Committee along with this form

\_\_\_\_\_  
Name & Signature of Ph.D Student

...2/-

..2..

## Recommendation

<b>Supervisor</b>	Ph.D progress report submitted by the student is satisfactory / non satisfactory.( <i>please tick</i> ) Any other remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (i)</b>	Ph.D progress report submitted by the student is satisfactory / non satisfactory.( <i>please tick</i> ) Any other remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (ii)</b>	Ph.D progress report submitted by the student is satisfactory / non satisfactory.( <i>please tick</i> ) Any other remarks:
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	

Student will have to fill up the above form, and obtain the report of the Guide and Advisory Committee members and submit to the Academic Section for further process.

## **FORMAT FOR ENHANCEMENT OF FELLOWSHIP FOR Ph.D. DEGREE**

[Annexure-XVII] (After two years of admission)

1	Name of the Ph.D. Scholar	:	
2	Enrolment No. & Date of Admission	:	
3	Date of Ph.D Registration	:	
4	Proposed title of the thesis	:	
5	Date of seminar (Enhance of fellowship)	:	
6	Details of Publications in Journals/ Conferences, if any (Published/Accepted/Communicated):		

### **Recommendation**

<b>Supervisor</b>	Progress of the scholar is <u>satisfactory/ unsatisfactory</u> (please tick) and <u>recommends/does not recommend</u> (please tick) an enhancement in fellowship.
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (i)</b>	Progress of the scholar is <u>satisfactory/ unsatisfactory</u> (please tick) and <u>recommends/does not recommend</u> (please tick) an enhancement in fellowship.
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	
<b>Advisory Committee Member (ii)</b>	Progress of the scholar is <u>satisfactory/ unsatisfactory</u> (please tick) and <u>recommends/does not recommend</u> (please tick) an enhancement in fellowship.
<b>Signature :</b> <b>Name:</b> <b>Date:</b>	

## Application for Conversion of Candidature from Full-time to Part-time[Annexure-XVIII]

1.	Name of the Ph.D. Scholar	:	
2.	Enrolment No. & Date of Admission	:	
3.	Date of Ph.D Registration	:	
4.	Proposed title of the thesis	:	
5.	Date of Concept Note approval	:	
6.	Reason of conversion from Full Time to Part time: ( Employment/other ) (Please ✓ the relevant)	Remark for other reason _____  In case of employment furnish the following details:  (i) Name of Employer: (ii) Date of appointment: (iii) Attach appointment and joining letter: (iv) NOC from the employer permitting the student continue part time Ph.D. programme.	
7.	i) Tentative date of Proposal presentation ii) Tentative date of Synopsis presentation iii) Tentative date of Thesis submission	i) ii) iii)	
8. Detailed work schedule for completion of remaining research work and thesis writing after conversion:			
	From	To	Work to be completed

(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

### Recommendation

<b>Supervisor:</b>	Recommended/Not recommended for conversion from Full Time to Part Time (Remark, if any)
Name:..... .....	Signature:.....Date:..... .....
<b>Advisory Committee Member (i)</b>	Recommended/Not recommended for conversion from Full Time to Part Time (Remark, if any)
Name:..... .....	Signature:.....Date:..... .....
<b>Advisory Committee Member (ii)</b>	Recommended/Not recommended for conversion from Full Time to Part Time (Remark, if any)
Name:..... .....	Signature:.....Date:..... .....

**NOTE:** The request for conversion from full time/part time to off campus shall be considered only if:

I. Submission of fee receipt for current semester.

II. Recommendation of the Guide

\* Student will have to submit duly filled in form with the recommendation of the Guide and Advisor Committee Members to Academic Section for further process.



# International Institute for Population Sciences

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## CLAIM FORM FOR CONTINGENCY GRANT FOR PHD STUDENTS REGISTERED UNDER GOI

### FELLOWSHIP [Annexure-XIX]

#### FORM A

Name of Student:	Course: Ph.D :
Date of Joining:	Course : Population Studies or Biostatistics & Demography
Date of Concept note approved	Date of Proposal Presentation:
Duration of present extension tenure From ..... To.....	Contingency claimed for 1 <sup>st</sup> / 2 <sup>nd</sup> /3 <sup>rd</sup> /4 <sup>th</sup> Year

Expenditure details given below:

Sr. no.	Type of Expenditure	Name of the vendor	Invoice no.	Date	Amount
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
	Total				

I have attached prior approval for above expenditure. Contingency claim have been submitted for the extension period from ..... to..... for First/Second/Third/fourth year. It requested to kindly approve admissible contingency grant as per rule.

(Signature of the candidate with date)

Name: Mr. / Ms. \_\_\_\_\_

Mobile No: \_\_\_\_\_

Email: \_\_\_\_\_

Payment for contingency grant is recommended / not recommended.

Signature and Name of the Guide/Supervisor

#### OFFICE USE ONLY

As per IIPS Ph.D rule, claim of the Student is admissible/ not admissible. Student is entitled for Rs. .... contingency grant for the period from..... to..... for First/Second/Third/fourth year

Academic Section

Remark

Remark

Incharge – Academic Section

M.Phil / Ph.D Coordinator

Approved / Not Approved

Director & Sr. Professor, IIPS.

List of Enclosures:

i. Bills of Purchase/Repair of laptop in original	ii. Bills/ tickets/ boarding pass reg. travel for conf./ research/ workshop./etc.	iii. Participation certificate of conference/workshop/seminar, etc.
iv. Any foreign transaction, the details should be produced in INR also		
Bills should be in original, online bills should be in proper order with correct invoice number, tax deductions, date and name of the student		



# International Institute for Population Sciences

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## FORM B

### FORM FOR OBTAINING PRIOR APPROVAL FOR UTILIZING CONTINGENCY GRANT

Name of the Student	
Course	
Joining Date	
Fellowship Type	
Period of Contingency Claim	1 <sup>st</sup> year/2 <sup>nd</sup> year/3 <sup>rd</sup> year/4 <sup>th</sup> year/5 <sup>th</sup> year
Purpose for which prior approval is required	
Amount (approx..)	

Signature of the Student: \_\_\_\_\_

Name of the Student: \_\_\_\_\_

Date: \_\_\_\_\_

Recommended/Not Recommended Remarks	
Name of the Supervisor/Guide	
Signature	

Date: \_\_\_\_\_

Forwarded to:  
Academic Section



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## APPLICATION FOR REGISTRATION/CONTINUATION OF REGISTRATION FOR PH.D. PROGRAMME[Annexure-XX]

**The Director,**  
IIPS, Deonar,  
Mumbai-400088.

**Sir,**

I hereby apply to register myself/continue my registration for the Ph.D. programme of the Institute.  
My details are furnished below:

A sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) has  
been also paid on account of the fee vide Receipt No. \_\_\_\_\_  
dated \_\_\_\_\_.

Name of the Candidate : \_\_\_\_\_

Enrollment No. : \_\_\_\_\_ Date of Joining: \_\_\_\_\_

Date of Birth : \_\_\_\_\_

Address : \_\_\_\_\_

Marital Status : \_\_\_\_\_

Nationality : \_\_\_\_\_

Whether holding fellowship : GOI/UGC

If yes, give details of fellowship : \_\_\_\_\_

Highest Degree Obtained : \_\_\_\_\_ Sub : \_\_\_\_\_

Name of University : \_\_\_\_\_

Year of obtaining degree : \_\_\_\_\_ Class/Div. obtained : \_\_\_\_\_

Percentage of Marks/Grade : \_\_\_\_\_

Were you a past student of IIPS : Yes/No

If yes, course of study attended : \_\_\_\_\_

Year of passing : \_\_\_\_\_ Division : \_\_\_\_\_

Percentage of Marks/Grade : \_\_\_\_\_

Proposed topic for Ph.D. : \_\_\_\_\_

Proposed Thesis title : \_\_\_\_\_

Name and Designation of the proposed Guide: \_\_\_\_\_

Data to be used : Primary/Secondary

Date: \_\_\_\_\_ Student's Signature : \_\_\_\_\_

\*Concurrence of the proposed Guide : \_\_\_\_\_  
(Guides are requested to ensure that the Ph.D. students under their guidance at any given time  
does not exceed the prescribed limit including the above student.)

..2/-





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..2..

## **For Office Use only**

Mr./Ms. \_\_\_\_\_ has been selected for admission to Ph.D. programme of the Institute vide letter No. \_\_\_\_\_ dated \_\_\_\_\_. He/She has proposed the name of Dr./Mr./Ms. \_\_\_\_\_ as his/her Guide.

Dr./Mr./Ms. \_\_\_\_\_ has \_\_\_\_\_ students registered under him/her.

Academic Section: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Asstt. Registrar (Acad): \_\_\_\_\_

Ph.D Co-ordinator: \_\_\_\_\_

Director & Sr. Professor: \_\_\_\_\_



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## APPLICATION FOR RENEWAL OF IDENTITY CARD FOR PH.D. PROGRAMME[Annexure-XXI]

The Director,  
IIPS, Deonar,  
Mumbai-400088.

Dear Sir,

This is to request you to kindly approve renewal of Identity Card for continuation of my Ph.D programme at the Institute. The details of my registration are as follows:

Name	
Email ID & Mobile Number	
Date of Joining	
Enrollment Number	
Current extension period	
Date of expiry of Id Card	

- Students are required to submit the application one month before the expiry of the ID card for renewal.

Signature of the Student: \_\_\_\_\_

Date: \_\_\_\_\_

### FOR OFFICE USE

This is to certify that the Ms./Mr. \_\_\_\_\_ has joined Ph.D programme w.e.f. \_\_\_\_\_, and is continuing the course. He/She has paid the fees upto \_\_\_\_\_, and has submitted the progress report for the period from \_\_\_\_\_ to \_\_\_\_\_.

O.S.(Acad.) \_\_\_\_\_

Date: \_\_\_\_\_

Recommended/Not Recommended

Asstt. Registrar (Acad.) \_\_\_\_\_

Date: \_\_\_\_\_

Ph.D Co-ordinator \_\_\_\_\_

Director & Sr. Professor \_\_\_\_\_