International Institute for Population Sciences

GOVANDI STATION ROAD, DEONAR, MUMBAI 400088

Criterion: I

1.1.2 - Number of Programmes where syllabus revision was carried out during the year

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MINUTES OF THE MEETING OF THE ACADEMIC COUNCIL OF THE INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES HELD ON July 05, 2023.

The meeting of the Academic Council was held on July 05, 2023 at 10.30 AM in hybrid mode, and was chaired by Prof K.S. James, Director and Senior Professor, IIPS. At the outset, the Chairperson extended warm welcome to all members and external experts to the meeting of Academic Council.
The list of members attended the meeting is given in Annexure I

Prof. K.S James, Chairperson of Academic Council requested Prof. S.K. Singh, Member-Secretary to proceed with the agenda.

Agenda Item No.1: To confirm the minutes of Academic Council Meeting held on April 24, 2023.

The members confirmed and approved the minutes of the meeting of Academic Council held on April 24, 2023.

Agenda Item No.2: Action taken on the Minutes of Academic Council Meeting held on April 24, 2023.

Action taken were noted.

Agenda Item No.3: To discuss & approve revision of syllabus of Master of Arts/Master of Science (M.A/M.Sc.) in Population Studies (Regular & Distance mode).

The Director & Sr. Professor, constituted a committee for the revision of syllabus of Master of Arts/Science in population Sciences (Regular & Distance). Prof. T. V. Sekher, Chairperson ,Syllabus revision committee made a presentation on the revised syllabus. He also mentioned the recommendation of the external syllabus committee on the revision. The member of the AC gave their views and opinions on the syllabus.
The members of Academic Council approved the revised syllabus for M.A/M.Sc in Population Studies w.e.f AY 2023-24. **Annexure II**

Agenda Item No.4: To discuss & approve revision of syllabus of Master of Science (M.Sc.) in Biostatistics and Demography.

The Director & Sr. Professor constituted a committee for the revision of syllabus of Master of Science in Biostatistics and Demography. Prof. Abhishek Singh, Chairperson, Syllabus revision committee made a presentation on the revised syllabus. He also mentioned about the recommendation of the external syllabus committee on the revision. The member of the AC gave their views and opinions on the syllabus.
The members of Academic Council approved the revised syllabus for M.Sc in Bio-Statistics & Demography w.e.f AY 2023-24. **Annexure III**

Agenda Item No.5: To discuss & approve revision of syllabus of Master of Population Studies (MPS).

The Director & Sr. Professor constituted a committee for the revision of syllabus of Master of Population Studies. Prof. Chander Shekhar, Chairperson, Syllabus revision committee made a presentation on the revised syllabus. He also mentioned about the recommendation of the external syllabus committee on the revision. The member of the AC gave their views and opinions on the syllabus.
The members of Academic Council approved the revised syllabus for Master of Population Studies w.e.f AY 2023-24. **Annexure IV**

Agenda Item No.6: To discuss and approve the UGC (Minimum Standards and Procedures for Award of Ph.D. Degree) regulations.

In line with UGC official Gazette notification dated 7th November 2022,The Academic Council has approved the same.

Agenda Item No.7: To discuss the change of Ph.D. specialization from Population studies to Bio-statistics & Demography.

The Director & Sr. Professor, constituted a committee to look into the request received from Ph.D students to change their specialization from population Studies to Bio-Statistics & Demography. Prof.D.A.Nagdeve ,Chairperson of the committee made a presentation on the above.

Academic Council approved the report of the committee for implementation. As suggested by the committee the following students are eligible for the specialization of Biostatistics and Epidemiology

1] Mr. Rahul Bawankule
2] Mr. Dinesh Chaurasiya
3] Mr. Dipak Kumar Das

The committee did not consider the requests of the Ph.D. scholars to change the specialization as they have master degree in statistics/health statistics and they have applied for PhD in Population Studies at the time of Ph.D. admission.

In Addition, academic council decided after deliberation to offer only population studies as specialization for the Ph.D. degree from the academic year 2024-25.

Agenda Item No. 8: To discuss about the grievances received in connection with admission and reservation roaster.

Academic council reviewed the entire admission procedure & reservation system followed in IIPS Mumbai and also recommended to continue the same process. The AC did not find any substance in the complaints being sent by external member to the Ministry regarding the admission procedure or in the reservation system.

In addition, Academic Council recommended to add one external member in Personal Interview in the Ph.D. admission process from the academic year 2024-25.

Agenda Item No.9: Any other matter with the permission of Chair

As there was no any other matter for the discussion meeting ended with vote of thanks by the Member-secretary, Academic Council.

Singh

(Prof. S.K. Singh)
Member-Secretary

ANNEXURE – I

1	Prof. K.S. James, Director & Sr. Professor	Chairperson	Attended
2	Mrs. Renu Singh, Chief Director (stats), MOHFW, GOI	Member	Absent
3	Dr. Sunil Vasanrao Gite, Director, NIRRCH, Mumbai	Member	Online Attended
4	Dr. Dheeraj Shah, Director, NIHFW, Mumbai (Nominated to Dr. Vijay Kumar Tiwari)	Member	Online Attended
5	Prof. S.K. Singh, HoD, Dept. of Survey Research & Data Analytics	Member Secretary	Attended
6	Prof. D.A. Nagdeve, HoD, Dept. of Fertility & Social Demography	Member	Attended
7	Prof. Hemkhothang Lhungdim, HoD, Dept. of Public Health and Mortality Studies	Member	Attended
8	Prof. Kailash Chandra Das, HoD, Dept. of Migration & Urban Studies	Member	Absent
9	Prof. T.V. Sekher, HoD, Dept. of Family & Generations.	Member	Attended
10	Prof. Chander Shekhar, Dept. of Fertility & Social Demography	Member	Attended
11	Prof. Sanjay Kumar Mohanty, HoD, Dept. of Population & Development	Member	Attended
12	Prof. R. Nagarajan, Dept. of Population & Development	Member	Absent
13	Prof. Abhishek Singh, Dept. of Public Health & Mortality Studies	Member	Attended
14	Prof. Murali Dhar, HoD, Dept. of Bio-Statistics and Epidemiology	Member	Attended
15	Prof. Archana Roy, Dept. of Migration & Urban Studies	Member	Absent
16	Prof. Dhananjay Bansod, Dept. of Public Health & Mortality Studies	Member	Attended
17	Prof. Aparajita Chattopadhya, Dept. of Population & Development	Member	Attended
18	Prof. Laxmikant Dwivedi, Dept. of Survey Research & Data Analytics	Member	Attended
19	Prof. Nandita Saikia, Dept. of Public Health & Mortality Studies	Member	Absent
20	Prof. Udaya Shankar Mishra, Dept. of Bio-Statistics and Epidemiology	Member	Attended
21	Prof. S. Chandrasekhar, IGIDR, Mumbai	External Member	Online Attended
22	Prof. Anjali Radkar, GIPE, Pune	External Member	Online Attended
23	Prof. Asha Banu Soletti, TISS, Mumbai.	External Member	Online Attended
24	Dr. Sukanya Rangamani, NCDIR, ICMR, Bengaluru	External Member	Attended
25	Dr. Sunil Sarode, Associate Professor	Member	Absent
26	Dr. Srinivas Goli, Associate Professor	Member	Absent
27	Dr. Archana Kujur, MA/MSc Co-ordinator	Member	Attended
28	Dr. Sarang P. Pedgaonkar, Assistant Professor	Member	Attended
29	Dr. Pradeep Salve, MPS Co-ordinator	Member	Attended
30	Dr. Guru Vasishtha MBD Coordinator	Member	Attended
31	Dr. Kunal Keshri, MA/MSc Co-ordinator	Member	Attended
32	Mr. Sudarshan Bhadre, Assistant Registrar (Academic)	Invitee	Attended

ANNEXURE-II

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

A. Program Outcomes (POs):

PO1: To have trained demographers / population scientists equipped with necessary skills and expertise to address evolving population concerns.
PO2: To widen and popularize the relevance of the discipline of Demography/Population Studies in the social science discourses.
PO3: Training students to encourage evidence-based policy making with an understandingof population dynamics and its varied underpinnings.
PO4: To inculcate an interdisciplinary approach in their professional pursuit/academic engagement.
PO5: Prepare students for an advanced career in research/academics with sufficient adaptive potential to contribute in the national and international sphere.

B. Programme Specific Outcomes (PSOs):

PSO1: Understand the basic concepts and measurements in Demography/Population Sciences.
PSO2: Appreciate and recognize the relevance of changing age sex structure of human population with its implications for understanding the development.
PSO3: Develop the unique expertise in handling large scale survey data sets using statistical packages towards research and policy derivatives.
PSO4: Adopt an interdisciplinary perspective in reading population and health issues.
PSO5: Obtain the required skills for conducting scientific research and its communication to a varied audience.
PSO6: Become qualified professionals to contribute towards the frontiers in understanding population dynamics and its overarching relevance in examining the development.

11.8.

Index to the Courses

Course No.	Course Name	Course Type	Credits	Hours
SEMESTER-I				
MSP F1	Social Science Concepts	Foundation	NC	45
MSP C1	Basic Statistical Methods for Population Studies	Core	4	60
MSP C2	Demography and History of Population	Core	2	30
MSP C3	Age-sex Structure, Quality of Data and Population Dynamics	Core	2	30
MSP C4	Nuptiality	Core	2	30
MSP C5	Fertility	Core	3	45
MSP E1.1	Healthcare System and Policies	Elective	3	45
MSP E1.2	Biostatistics and Epidemiology	Elective		
MSP E1.3	Family Demography	Elective		
Semester Credits			**16**	**285**
SEMESTER-II				
MSP C6	Mortality, Morbidity and Public Health	Core	4	60
MSP C7	Research Methodology I	Core	2	30
MSP C8	Gender Equity and Reproductive Health	Core	3	45
MSP C9	Migration and Urbanization	Core	4	60
MSP C10	Statistical Methods and Computer Applications	Core	2	30
MSP E2.1	Historical Demography	Elective	3	45
MSP E2.2	Health Economics and Financing	Elective		
MSP E2.3	Urbanisation, Space and Planning	Elective		
MSP E2.4	Gender, Health and Development	Elective		
MSP V1	Viva-Voce-I	VI	2	30
Semester Credits			**20**	**300**
SEMESTER-III				
MSP C11	Application of Statistical Packages in Large Scale data	Core	4	60
MSP C12	Population Projections	Core	2	30
MSP C13	Demographic Estimation Techniques and Models	Core	2	30
MSP C14	Population, Development and Environment	Core	4	60
MSP C15	Population Policies and Programme Evaluation	Core	4	60
MSP C16	Research Methodology II	Core	3	45
MSP E3.1	Concepts and Measures of Global Health	Elective	3	45
MSP E3.2	Political Demography	Elective		
MSP E3.3	Population, Environment and Sustainable Development	Elective		

Course No.	Course Name	Course Type	Credits	Hours
MSP E3.4	Occupational Health	Elective		
Semester Credits			**22**	**330**
SEMESTER-IV				
MSP C17	Spatial Demography and Application of GIS	Core	4	60
MSP C18	Population Ageing and Health Transition	Core	4	60
MSP E4.1	Operations Research in Reproductive Health	Elective	3	45
MSP E4.2	Monitoring and Evaluation in Population and Health	Elective		
MSP E4.3	Gender Theories in Demography and Development	Elective		
MSP D	Dissertation	Core	10	
MSP V2	Viva-Voce-II	Core	2	
	Semester Credits		**23**	**165**
	TOTAL CREDITS		**81**	

- 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/E1.3
- Semester II: One elective should be opted i.e. E2.1/E2.2/E2.3/E2.4
- Semester III: One electives should be opted; i.e. E3.1/E3.2/E3.3/E3.4
- Semester IV: One elective should be opted; i.e. E4.1/E4.2/E4.3

SEMESTER – I

MSP F1 **45 Hours**

SOCIAL SCIENCE CONCEPTS

Course Outcomes:

CO1: To gain familiarity with basic social science concepts that has bearing on understanding population dynamics.
CO2: Understand the varied aspects of social reality, such as caste, tribe, gender, kinship, marriage, social mobility and religion in terms of its relevance in population studies.
CO3: Viewing population in space and time and read population geography in consideration of man-environment relationship, geographical factors and regional perspective.
CO4: Recognition of interplay between economic development and population changes in an evolving world order.
CO5: To understand the psychological concepts like perception, behaviour, emotion, personality, coping mechanism, and their bearing on Population Studies

SOCIOLOGY

1. Sociology: sociology as a social science- its nature, subject matter and scope
2. Relation of sociology with other social sciences, sociological perspectives
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 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 behaviours: a) Sanskritization b) Westernization c) Modernization

GEOGRAPHY

1. Importance of Geographical factors- Physical factors (relief, rainfall, temperature, soil and vegetation) Economic and Social factors (Mineral resources and industrialization, 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; Mapsscale, 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.

ECONOMICS

A. Introduction:

Defining Economics and welfare 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, PPP. 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.

PSYCHOLOGY

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 defense-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.

ESSENTIAL READINGS:

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. Sen, A. (2018). Collective Choice and Social Welfare: An Expanded Edition. United Kingdom: Harvard University Press.Haralambos, Michael, *Sociology: Themes and Perspectives*, Oxford University Press, Delhi (1980).
7. Sigmund Freud, The Interpretation of Dreams (1900)
8. Charles M. Duhigg, *The Power of Habit* (2012)
9. Karen Horney, The Neurotic Personality of Our Time (1937)
10. Oliver Burkeman, The Antidote: Happiness for People Who Can't Stand Positive Thinking (2012) .
11. Carl Gustav Jung, Man and His Symbols (1964)
12. Introduction to Psychology 10th Edition James W. Kalat (2013)
13. Abler, R, Adams, J and Gould P., (1971): *Spatial Organization: The Geographer's view of the World*, Prentice Hall, New Jersey.
14. Johnston, R.J., (2004): *Geography and Geographers*, Oxford Unity Press.
15. Richard, Peet., (1998): *Modern Geographic Thought*, Blackwall Publishers
16. Singh, R.L., (1971) *India: A Regional Geography*, National Geographical Society of India, Varanasi.
17. 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
18. Koutsoiannis A, 1979. Modern Microeconomics, London: Macmillan Press Ltd,

19. Lipsey and Chrystal, 2004, Economics, Oxford university Press, Part One, part two and part five
20. Dasgupta AK, Epochs of Economic Theory, OUP, Bombay, Chapters 2, 3, 4, 7 and 8

SUGGESTED READINGS:

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. Francis John Monkhouse (1956) *Maps and Diagrams: Their Compilation and Construction*, University of Michigan.
7. JF Friedman (1966) *Regional Development Policy: A Case Study of Venezuela*, Cambridge, Massachusetts : MIT Press, 1966.
8. Samuelson, Paul A. and William D. Nordhaus., "Economics", New York: Tata McGraw Hill, part one, two and five
9. Datt R and Sundaram K.P.M, 2000, Indian economy, S. Chand & Company Ltd, Part II.

MSP C1 **60 Hours**

BASIC STATISTICAL METHODS FOR POPULATION STUDIES

Course Outcomes:

CO1: Refresh on basic statistical methods and its application to population data.

CO2: Recognize the relevance of distribution in bivariate and multivariate tabulations.

CO3: Application of statistical distribution in diagnosing demographic outcome and indicators.

CO4: Develop an understanding of generalization based on principles of statistical 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. Generating simple frequencies. Graphical presentation of nominal, ordinal data,Logarithms: properties of logarithms, Ratios, Proportion and rates, growth rates (arithmetic. geometric and exponential), Interpolation and Extrapolation.

Data Manipulation - recoding creating new variables, sorting, filtering and selection of specific data.

Measures of Location: Mean (arithmetic, geometric, harmonic) Median, Mode; Its temporal and cross-sectional comparison: virtues and vices as a means of aggregation. Analyzing mean, (arithmetic, geometric, harmonic), median, mode.

Measures of dispersion: Range, Variance, Standard Deviation, coefficient of variation; use and interpretation in comparative reading of situation. Measures of Skewness and Kurtosis.

Techniques of analysing bivariate nominal and ordinal level data: Contingency table, odds ratios, relative risk. Measuring association and interpreting concordance and discordance

Probability concept and set theory: Introduction to the concept of probability, A-priory, and mathematical probability. Events: exhaustive, mutually exclusive events; Illustrating 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: Normal distribution and its properties. applications of normal distribution.

Concept of correlation and regression: 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 with and without interaction, Concept of unbiased estimates, Introduction to Multivariable Analysis. Multiple regression. Concept of Multiple and Partial correlation coefficients in regression analysis,Standardized regression coefficients, Regression with dummy variables. Logistic regression.

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, 4th 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.

SUGGESTED READINGS:

1. Lipshutz, Seymour., Schaum's Outline Theory and Problems of *Set Theory and Related Topics* Series, Mcgraw Hill.
2. Marcello Pagano and Kimberlee Gourneau (2000) "Principles of Biostatistics" Second Edition, Duxbury Thomson Learning, United States.
3. Prakasam, C.P., G. Rama Rao, and R.B. Upadhyay (1987): *Basic Mathematics in Population Studies*, Gemini Publishers, Mumbai.
4. Siegel J.J. and D.A. Swanson (Ed.), 2004. *The Methods and Materials of Demography*. Second Edition. Elsevier Academic Press.
5. Venkatachary, K (1994). *Elements of Mathematics for Demographers*. Monograph Series No.9. Regional Institute for Population Studies, University of Ghana. Legon.
6. Bhat N.R and M.R. Singh. 1993. *Applied Mathematics*. New Delhi: Tata McGraw – Hill Publishing Company Ltd.
7. Dillon, W.R. and Goldstein, M. (1984): *Multivariate Analysis*, John Willey and Sons, New York.
8. Douglas and Altman (2006): Practical Statistics for Medical Research, Chapman and Hall Publication, Washington, D.C.
9. Fisher, L.D and Van Belle, G. (1993) Biostatistics: A Methodology of the Health Sciences, New York, Wiley Intgescience.

MSP C2 **30 Hours**

DEMOGRAPHY AND HISTORY OF POPULATION

Course Outcomes:

CO1: Acquaint the students with the scope and relevance of the discipline ofpopulation studies.
CO2: Become aware of the global, regional and national population trends.
CO3: To understand the nature of diversity in the size, distribution, composition, and basic characteristics of population across Indian states.
CO4: To familiarize on various sources of demographic data in India, andtheir limitations.
CO5: To appreciate the historical perspectives on population change.

1. Introduction to Demography

Definition and Scope: Demography as a scientific discipline; Development of demography as a discipline. Multi-disciplinary nature of Demography, Linkage with other social science disciplines including statistics, mathematics, economics etc. Some basic demographic concepts. Balancing Equation and components of population change, Concept of doubling time. Malthusian concept of population growth and resources.

2. Sources of Demographic Data

Population census; Uses and limitations; Indian Censuses. Census taking under British India and later, details of different domain on which Indian census collect data, publication of census data/ reports, Vital registration system., Historical data – Parish Records, National Sample Survey. Sample Registration System, Demographic Health Surveys (DHS), Longitudinal ageing Survey in India, Other sample surveys. Strengths and weaknesses of various data sets

3. Population History

Historical trends in population situation in the world. Present population situation and past and future trends in the world, in developed and developing countries.

Demographic characteristics of first modern people. Socio-economic and demographic features of Indus Valley Civilisation, population change from medieval to Mughal times

History of population in India: Population estimates in ancient time, population history during British rule, famine, plague, influenza and its impact on population. Trends and growth of India's population during pre-independence and post-independence period, major sources of data about the population in the past; major explanations of population change in the past; Contribution of fertility, mortality and migration to population change in the past.

ESSENTIAL READINGS:

1. Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography*, Second Edition, Chapters 1, 2, 3, 7, 8, 9,10, Elsevier Science, USA. https://books.google.co.in/books/about/The_Methods_and_Materials_of_Demography.html?id=-uPrAAAAMAAJ&redir_esc=y

2. John Weeks (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.
3. Dyson, Tim, A Population History of India: From the First Modern People to the Present Day (Oxford, 2018: online edn, Oxford Academic, 18 Oct. 2018), https://doi.org/10.1093/oso/9780198829058.001.0001, accessed 20 Mar. 2023.
4. Bhende, A., and Kanitkar, T. (1996): *Principles of Population Studies* (Seventh Edition), Himalaya Publishing House, Bombay.

SUGGESTED READINGS:

1. Warren S. Thompson, (1930). *Population Problems, New York: London: McGraw-Hill, [C1930]*
2. Bogue, D., (1969): *Principles of Demography*, John Wiley and Sons, New York. United Nations, (1973): *The Determinants and Consequences of Population Trends*, Vol. I, Chapters 1, 2 and
3. Census of India: http://www.censusindia.gov.in
4. United Nations. DESA. World Population Prospects 2022. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/wpp2022_summary_of_results.pdf
5. United Nations, (1998): Handbook on Civil Registration and Vital Statistics Systems. Management, Operation and Maintenance, New York.
6. United Nations (1958). Multilingual Demographic Dictionary, John Wiley & Sons Ltd., New York

MSP C3 **30 HOURS**

AGE-SEX STRUCTURE, DATA SOURCES AND POPULATION DYNAMICS

CO1: To familiarize the students with age-sex structure of the population
CO2: To develop capacity in measuring and analyzing the age-sex structure of a populationand its determinants and consequences.
CO3: To develop an understanding of demographic transition and demographic dividend.

Concepts and Measures of age and sex structure
Defining age and sex, sex ratio, sex ratio at birth, classification of age group and its importance, Measures of age structure; median age, percent distribution, dependency ratio, potential support ratio

Age and sex pyramid of developed and developing countries, variations in age distribution, sex ratio and sex ratio at birth. Concept of age standardization, demographic transition theory and demographic dividend.

Dynamics of Age-Sex Structure of the World and India
Present levels and past trends in the sex and age structure of the population of the world, developed and developing countries and India.

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 role of low fertility and low mortality. Implication of migration on age sex structure.

Evaluation and Adjustment of Demographic Data:
Appraisal of quality of age-sex data:
Types and source of errors
Methods of data evaluation and error detection: direct (Post-enumeration surveys)and indirect methods
Appraisal of birth and death statistics by means of balancing equation
Dual system of records
Techniques of evaluation of age and sex data:
Measures of errors in age data (Graphical representations, Whipple's index, Myer'sindex. Age ratio. Sex ratio and UN Joint score
Evaluation of age data for young and old ages
Techniques of errors adjustment in age data and prorating
Quality checks incorporated in survey procedures to minimize errors
Possible errors and implications
Component of non-sampling errors
Mechanisms and protocols to minimize and correct errors

Quality Assessment of Large-Scale Demographic Surveys

ESSENTIAL READINGS:

1. Jacob S. Siegel and David a. Swanson (2004): The Methods and Materials of Demography, Second Edition, Chapters 1, 2, 3, 7, 8, 9,10. Elsevier Science, USA. https://books.google.co.in/books/about/The_Methods_and_Materials_of_Demography.html?id=uPrAAAAMAAJ&redir_esc=y
2. John Weeks (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.
3. Bhende, A., and Kanitkar, T. (1996): Principles of Population Studies (Seventh Edition). Himalaya Publishing House, Bombay.
4. Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel (2001) Demography: Measuring and Modeling Population Processes. Oxford: Blackwell Publishers.

SUGGESTED READINGS:

1. Warren S. Thompson, (1930), Population Problems, New York; London: McGraw-Hill, [C1930]
2. Bogue, D., (1969): Principles of Demography, John Wiley and Sons, New York.
3. United Nations, (1973): The Determinants and Consequences of Population Trends, Vol. I, Chapters 1, 2 and 8.
4. Census of India: http://www.censusindia.gov.in
5. United Nations. DESA. World Population Prospects 2022. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/wpp2022_summary_of_results.pdf
6. United Nations, (1998): Handbook on Civil Registration and Vital Statistics Systems, Management, Operation and Maintenance, New York.
7. Mukherjee S.B. 1976. 'The Age Distribution of the Indian Population: A Reconstruction for the state and territories, 1881-1961'. East-West Centre, University Press of Hawaii. Honolulu.
8. S Irudaya Rajan, K S James (2008). Third National Family Health Survey in India: Issues, Problems and Prospects. Economic & Political Weekly, November 29, 2008 33
9. K S James, S Irudaya Rajan (2004). Respondents and Quality of Survey Data. Economic and Political Weekly February 14, 2004

MSP C4 **30 HOURS**

NUPTIALITY

CO1: Familiarize students' basic concepts on nuptiality

CO2: Inculcate an understanding of various theories of family formation.

CO3: Identify the different sources of data for nuptiality

CO4: Perform nuptiality analysis

Nuptiality

Introduction, Basic Concepts, Sources of Data and their limitations. Measures of Nuptiality from Registration data.

1. Analysis of Marital Status Data from Census.
2. Singulate Mean Age at Marriage (SMAM) - Synthetic Cohort and Decadal Synthetic Cohort Method.
3. Indices of Nuptiality (Coale's Indices)

4. Marriage Pattern in India and Selected Countries and related factors.
5. Marriage squeeze: Concepts and Implications, Concepts of Hypergamy and Hypogamy Gross and Net Nuptiality Tables.
6. Non-marriage
7. Multistate approach in Nuptiality analysis. Standard Age Pattern of Marriage – Coale's Model. Divorce and Widowhood.
8. Definition and basic measures.
9. Marriage Dissolution Tables and Remarriage Concept
10. Mean Age at Widowhood/Divorce from Census Returns.

Definition and Measures of Remarriages of Widowed and Divorces.

ESSENTIAL READINGS:

1. Siegel, Jacob S., and David A. Swanson (eds.), (2004) The Methods and Materials of Demography (Second edition). San Diego: Elsevier Academic Press.
2. Newell, Colin (1988) Methods and Models in Demography. London: Frances Pinter.
3. Asha A. Bhende and Tara Kanitkar, (2003). Principles of Population Studies,
4. Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
5. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis, Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.

SUGGESTED READINGS:

1.Coale Ansley J. and T. James Trussell (1978) *Technical Note: Finding the TwoParameters that Specify a Model Schedule of Marital Fertility Population Index 44, 2* (1978), pp. 203-213.

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.Rowland, Donald T. (2006), *Demographic Methods and* Concepts. New York: Oxford University Press.

4.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: FertilityResearch, (All three chapters but selected pages).
5.Pollard, A.H., Yusuf, Farhat and Pollard, G.N. (1990) *Demographic Techniques* (third edition). Sydney: Pergamon Press.

MSP C5 **45 Hours**

FERTILITY

Course Outcomes:

CO1: Familiarize students on basic concepts on fertility
CO2: Recognize socio-cultural and economic factors influencing fertility behaviours.
CO3: Inculcate an understanding of various theories of reproduction andfamily formation.
CO4: Identify the different sources of data for fertility measurements
CO5: Perform fertility analysis

A. FERTILITY

1. Terms and Concepts
Importance of the fertility study in population dynamics; Basic terms and concepts used in the study of fertility, desired family size, fertility regulation

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 declines 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's Framework of Fertility, Intergenerational Wealth Flow Theory, U. N. Threshold Hypothesis, Reproductive motivations and value of children theories. Second demographic transition

B. FERTILITY MEASURES AND MODELS

6. Introduction of Basic Concepts
Sources of Data for Fertility Analysis
Concept of Period and Cohort Approaches

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 of Fertility
Children Ever Born
Completed Fertility
Parity Progression Ratios

Reproduction Measures
Concept of Maternity Function
Basic Idea of Tempo and Quantum Effects

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

Essential Readings:

1. Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel (2001) *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers.
2. Siegel, Jacob S., and David A. Swanson (eds.), (2004) *The Methods and Materials of Demography* (Second edition). San Diego: Elsevier Academic Press.
3. Newell, Colin (1988) *Methods and Models in Demography*. London: Frances Pinter.
4. United Nations, (1973), *Determinants and Consequences of Population Trends, Vol. I*, pages 96–104, UN, New York.
5. Bongaarts, J and Potter, R (1983) *Fertility, Biology and Behavior: An Analysis of the Proximate Determinants*. Academic Press. New York.
6. Asha A. Bhende and Tara Kanitkar, (2003). *Principles of Population Studies*. Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
7. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis,Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.

Suggested Readings:

1. David G. Mandelbaum, (1974), *Human Fertility in India: Social Components and Policy Perspectives*, University of California Press, Berkeley.
2. United Nations, (1973), *Determinants and Consequences of Population Trends, Vol. I*, pages 96-104, UN, New York.
3. 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.
4. 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.
5. Rowland, Donald T. (2006), *Demographic Methods and* Concepts. New York: Oxford

University Press.

6. 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: FertilityResearch. (All three chapters but selected pages).
7. Sydney H. Coontz, (1968), *Population Theories and the Economic Interpretation*, Routelage, London.
8. Siegel, Jacob S., and David A. Swanson (eds.), (2004) *The Methods and Materials of Demography* (Second edition). San Diego: Elsevier Academic Press.
9. Newell, Colin (1988) *Methods and Models in Demography*. London: Frances Pinter.
10. Asha A. Bhende and Tara Kanitkar, (2003). *Principles of Population Studies*, Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
11. Pathak, K.B. and F.Ram. (1998) Techniques of Demographic Analysis, Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.

MSP C6 **60 Hours**

MORTALITY, MORBIDITY AND PUBLIC HEALTH

CO1: Become familiar with the basic definitions and concepts used, importance and the scope of mortality study and its bearing on fertility, and population health.
CO 2: Become aware of varied sources of health data (morbidity, mortality, disability), their merits/demerits, uses and significance as indicators; and their basic measures.
CO3: Explain synthetic formulation of survival experience (e.g., life table).
CO4: To convey the transitional and differential dynamics of early age life experiences.
CO5: To understand the linkages among epidemiology, mortality transition, and public health.

I. 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. Global Mortality and Emerging Issues

Introduction and basic measures:

Some basic measures: - crude death rate (CDR) and Age-Specific Death Rates (ASDRs)- their relative 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.

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 and XI (1990, 2019); 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, and burden of disease; 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. 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.

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.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).
4.Ram, F. and K.B. Pathak (1998): Techniques of Demographic Analysis,2nd Ed, Himalaya Publishing house, Bombay (Chapters 2 & 3).
5.WHO (1992): International Statistical Classification of Diseases and related Health Problems, Tenth Revision, Vol. 1, Geneva.

SUGGESTED READINGS:

1.Omran, A. R. (1971): The epidemiologic transition: a theory of the epidemiology of population change, Milbank Memorial Fund Quarterly, Vol. XLIX, pp. 509-538.
2.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).
3.Preston, S. H., Patrick Heuveline and Michel Guillot (2001): Demography: Measuring and Modeling Population Process, Blackwell Publishers, Oxford, UK (Chapters 2, 3 & 4).
4.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

MSP E1.1 **45 Hours**

HEALTHCARE SYSTEMS AND POLICIES

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 caredelivery system, national health programmes and health sector reforms. CO3: To understand the need and relevance of health legislations as an instrument of protection and promotionof 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 curate 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, SWOT analysis of Indian health system, a critique on the health delivery system- problems related to structural
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, Bhore Committee Report 1946, 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. 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

ESSENTIAL READINGS:

1. Lassey M, Lassey W, and Jinks. M. (1997). Health Care Systems around the World: Characteristics. Issues and Reforms. Prentice-Hall, Inc.
2. Bodenheimer, Thomas S., Kevin Grumbach. *Understanding Health Policy*
3. Fort, Meredith, Mary Anne Mercer and Oscar Gish (Editors). *Sickness and Wealth: The Corporate Assault on Global Health*
4. Govt. of India (2017) - National Health Policy-2017, Ministry of Health and Family Welfare, New Delhi.
5. Peters, et.al (2002), Better Health System for India's poor: Findings, Analysis and Options: The World bank, New Delhi
6. Abel-Smith. Brian. An introduction to health: policy, planning and financing. Routledge, 2018. Murray, Christopher JL, and Julio Frenk. "A framework for assessing the performance of healthsystems." Bulletin of the World Health Organization 78 (2000): 717-731.

SUGGESTED READINGS

1. Bhore, J. (1946). Report of the health survey and development committee (Vol. 1-4). Manager of Publications.
2. Reddy, K.S. et.al (2011)" Towards achievement of universal health care in India by 2020: A Call of Action", www.thelancet.com
3. Banerjee, D. (1982), Poverty, class and Health Culture in India, Vol. 1 Parchi Prakashan, New Delhi.
4. Indian Council of Social Science Research and Indian Council of Medical Research (1981). Health for All by 2000 A. D., ICSSR, Delhi.
5. Madan, T.N. (1969), "Who Chooses Modern Medicine and Why". Economic and Political Weekly, pp. 1475-84.
6. K. Sujatha Rao, (2017). Do We Care: India's Health System, Oxford University Press, ISBN10 : 9780199469543, 478 pages

MSP E1.2 **45 Hours**

BIOSTATISTICS AND EPIDEMIOLOGY

Course Outcomes:

CO1: To introduce the basic concepts of different streams of epidemiology, diseaserisks, andinterventions as public health tools in population studies.

CO2: To introduce the study designs and methodology in cross-sectional, case-control, cohort, andexperimental data to analyze epidemiological patterns.

CO3: To understand the use of summary measures of disease burden over epidemiologicaldata in populationscience.

CO4: To understand comparability of estimates obtained from various parametric and non-parametric models.

CO5: To appreciate the relevance of epidemiology in public policy making.

I. Basic concepts in Biostatistics

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

II. 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. Design and analysis of epidemiological studies, test of significance.

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

III. 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.

Reading List
ESSENTIAL READINGS:

1. Gordis L: Epidemiology, ed. 5, Philadelphia, 2014. Elsevier Saunders; ISBN: 978-1-4557-3733-8
2. Bonita R, Beaglehole R, Kjellstrom T: Basic Epidemiology, ed. 2. World Health Organization, 2006.
3. Friedman L M, Furberg C D, DeMets D L: Fundamentals of Clinical Trials. Boston, PSG, 1982.
4. MacMahon B, Pugh T F: Epidemiology: Principles and Methods. Boston, Little Brown, 1970.
5. Altman D G: Practical Statistics for Medical Research. London: Chapman and Hall, 2006.
6. Bhore, J. (1946). Report of the health survey and development committee (Vol. 1-4). Manager of Publications.

SUGGESTED READINGS:

1. Lee E T: Statistical Methods for Survival Data Analysis, ed. 2. New York. JohnWiley & Sons.
2. Goldstein H: Multilevel Statistical Model. London, Institute of Education, 1999.
3. Murray C J L, Chen LC: Understanding morbidity change. In Arthur Kleinmannand Norma C Wane (eds.) Health and Social Change in International Perspective, Harvard Series on Population and International Health, March 1994.
4. Everitt B S, Picklas A: Statistical Aspects of the Design and Analysis of ClinicalTrials, ed. 2. London, Imperial College Press.
5. Kutner MH, Nachtsheim CJ, Neter J, Li W: Applied Linear Statistical Models.5th edition, McGraw-Hill/Irwin, 2005.
6. Gelman A, Carlin JB, Stern HS, Rubin DB, Dunson DB, Vehtari A: BayesianData Analysis, 3rd ed. Chapman and Hall, 2013.
7. Van Der Vaart: Asymptotic Statistics. Cambridge University Press, 2000.
8. Groeneboom P: Nonparametric Estimation under Shape Constraints, CambridgeUniversity Press; 1 edition. 2014.
9. Robin H. Lock, Patti Frazer Lock, Kari Lock Morgan, Eric F. Lock. Dennis F.Lock: Statistics: Unlocking the Power of Data, I edition, Wiley 2013
10. Kestenbaum, Brya: Epidemiology and Biostatistics. Springe .2009.

MSP E1.3 **45 Hours**

Family Demography

1. Introduction to Family Demography:

Concepts of Family Demography: Family, Household, Family Size, Family Structure; Attitudes and Expectations in Family Formation; Cohabitation and Live-in Relationships, Type of Families in Global and Indian Perspective. Unconventional families – lone parenting, gay families, living alone etc.

2. Theories of Family:

Theoretical Perspectives on Family Change; Social Exchange Theory, Abraham Maslow's (1954) Theory of Changing Needs, Becker's Theory of Family, Becker's Theory of Marriage, Becker's Theory of Time Allocation, Second Demographic Transition.

3. Family Transitions in Life Course and Implications of Family Change

Family Life Cycle, Implications of Family Change for Wellbeing of Women, Children and Older Population; Family Change and Inter-generational Support and Policy; Family Instability in an International Perspective. Evaluating Evidence on the Consequences of Family Change

4. Family Transitions and Gender Roles

Families in Transiting Societies and Changing Gender Roles; Gender, Work, and Family; Gender, Families, and Time Use; Work-Family Balance and Conflict.

5. Family Transitions and Demographic Behaviour

Marriage and Family; Family Transitions and its Effect on Fertility, Mortality and Health; Fertility in Complex Families, Family Structure and Child Outcomes; Time Use of Parents and Children;

Impact of Fertility on Families in Later Life; Intergenerational Impacts on Health and Demographic Events; Grandparents and Parents Residence: Health and Socio-Economic Wellbeing in Later Life.

6. Family and Household Economics

New Home Economics, Household and Family Economics, New Economics of Migration, Living Arrangement for Children and Older Population; Economic, Emotional and Social Support for Children and Older Population; Left Behind Children and Older Population.

7. Data and Methods in Family Demography (Will be updated in the class)

Cross-sectional and Longitudinal Data, Village Census and Microdata, NTA, and Marriage-market data. Panel data regressions, Regression Discontinuity models or Segmented Regression models, Multistate models; Microsimulation models; Behavioural models; Projection of marriages, divorces and remarriages; Bridging the Macro-to micro gap: Multi-Level Even-History analyses and Even-History analyses of groups; Meta-Analyses and Age-based simulations.

Essential Readings

1. Becker, G. S. (1981). *A Treatise on the Family*. Enlarged Edition. Harvard University Press, Cambridge, Massachusetts, London.
2. Casterline, J., & Gietel-Basten, S. (2018). Exploring family demography in Asia through the lens of fertility preferences. *In Family Demography in Asia* (pp. 1-14). Edward Elgar Publishing.
3. Ermisch, J. (2003). *An Economic Analysis of the Family*. Princeton, New Jersey: Princeton University Press.
4. Farris, D. N., & Bourque, A. J. J. (Eds.). (2020). *International Handbook on the Demography of Marriage and the Family*. Cham: Springer International Publishing.
5. Gietel-Basten, S., Casterline, J., & Choe, M. K. (Eds.). (2018). *Family demography in Asia: A comparative analysis of fertility preferences*. Edward Elgar Publishing.

Indian Readings

1. Chakravorty, S., Goli, S., & James, K. S. (2021). Family demography in India: Emerging patterns and its challenges. *Sage Open*, 11(2), 21582440211008178.
2. Kapadia, K. M. (1966). *Marriage and family in India* (3rd edition, 1983). Oxford University Press.
3. Patel, T. (Ed.). (2005). *The family in India: Structure and practice*. Sage.
4. Shah, A. M. (1998). *The family in India: Critical essays*. Orient Blackswan.
5. Uberoi, P. (2005). The family in India: Beyond the nuclear versus joint debate. Writing the Women's Movement: a reader. New Delhi, Zubaan, 361-396.

SEMESTER – II

MSP-C7 **30 Hours**

RESEARCH METHODOLOGY 1

CO1: To understand the research design and scientific approaches to conduct of research invaried settings.
CO2: To familiarize the quantitative methods of data collection.
CO3: To understand various sampling procedures

I. Scientific Methods of Research

Definition of Scientific Research: Assumptions. Operations and Aims of ScientificResearch. Philosophy of 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 andevaluative 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, Guttmann. 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.

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 inmultistage 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

Reading List Essential Readings:

1. Bernard, H. Russell, (1995): *Research Methods in Anthropology: Qualitative and Quantitative Approaches*, Altamita 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
4. 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, Macro 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 (4th Edition).
10. Kothari, CR (2020), Research Methodology - Methods And Technique, Generic, ASIN : B0BCPDON66 , 394 pages

MSP-C8 45 Hours

GENDER EQUITY AND REPRODUCTIVE HEALTH

Course Outcomes:

CO1: To sensitize students with the basic concepts of gender, gender equity and theories.
CO2: To explain students with gender differentials, gender inequalities and empowerment
CO3: To familiarize students with reproductive health paradigm and right based approach to reproduction and gender egalitarianism.

I. Basic concepts and theories

Definitions, Concepts and Terminologies: gender, unequal gender relations, gender equity, gender disparities, gender Inequalities, gender main streaming, gender sensitive planning and gender balance, Masculinity and femininity. Importance of the study of Gender Issues in Population Studies; Social Stratification and gender, third gender.

II. Gender Inequalities and linkages with development

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; Marriage, customs and practices, dowry and mohar system, age at marriage; Purdah system: female genital mutilation; land rights of women; education, skill development and gender; labour force participation, household activities and social reproduction; gender differentials in nutrition and health; access to health care; political representation, and female headship; valuation of women in context of marriage, dowry and development; Gender based violence (GBV) and its implications on child adult and elderly; media and gender.

III. Autonomy, Empowerment and Status

Concepts, definition and measurement; various indicators and frameworks; approaches: Functionalist. Marxist, Feminist, Behaviouralism; process of empowerment; paradigm shift in gender, development and empowerment: WID, WAD, GID, GAD, WED; policies and programmes related to empowerment.

V. Reproduction physiology, rights and ethical issues Evolution of ideas about reproductive health and rationale of RH approach, Components of RH and life cycle approach of RH, Male and female reproductive system; Conception, Pregnancy; Customs and taboos related to menstruation & puberty. and pregnancy in different societies; Aspects of adolescent sexual and reproductive behaviours, vulnerability of adolescent and their health needs. Role of reproductive health policies and programmes on health; ethical values in RH services: information, liberty of choice.

VI. Maternal, obstetric gynaecological and contraceptive morbidity

Risk factors of maternal mortality and morbidity, Three delay model, Emergency obstetric care, Maternal near miss and obstetric fistula, Impact of cultural practices during pregnancy on women's health, Programmes, policies and strategies for safe motherhood. Behavioural and lifestyle factors of different reproductive morbidities, Issues related to RTIs/STIs; HIV infection; Issues related to menopause and socio-psychological health problems of menopausal women.

VIII. Infertility and abortion

Methodological issues in measuring primary and secondary infertility, Social, cultural, environmental and anatomical risk factors of infertility, Sexual Consequences of infertility on marital stability of couples, mental health and violence, assisted reproductive technologies use and misuse; surrogacy; laws and acts regarding their use; abortion data and its measurement, type of abortions, Association of abortion with untimed and unintended births, Unsafe abortion and its association with maternal death and infertility, Laws regarding abortion

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. Starrs, A. (2015): A Lancet Commission on sexual and reproductive health and rights: going beyond the Sustainable Development Goals. The Lancet, Vol 386 September 19, 2015.
3. Kamla Bhasin, Understanding Gender (1999): Kali for Women, India, 88 pages, 9788186706213 (ISBN10: 8186706216).
4. Rosemarie Tong, Tina Fernandes Botts (2018), Feminist Thought; A More Comprehensive Introduction, 5th edition, by Routledge, ISBN 9781138329522, 432 Pages

5. Michael S. Kimmel, The Gendered Society (2000), Oxford University Press, USA, ISBN 9780195399028 (ISBN10: 0195399021), 472 pages.
6. Andrea Parrot, Nina Cummings (2006), Forsaken Females: The Global Brutalization of Women, Rowman & Littlefield Publishers, ISBN-10 : 0742545792, 270pages

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. Chhabra P. Maternal near miss: an indicator for maternal health and maternal care. Indian J Community Med. 2014 Jul;39(3):132-7. doi: 10.4103/0970-0218.137145. PMID: 25136152; PMCID: PMC4134527
3. Zampas, C. (2013) Legal and ethical standards for protecting women's human rights and the practice of conscientious objection in reproductive healthcare settings. International Journal of Gynecology & Obstetrics 123(Suppl 3): S63-S65.
4. Macaluso, M., et al. (2010) A public health focus on infertility prevention, detection, and management. Fertility and Sterility 93(1):16.e1-10.
5. Basu, Alaka M., (1992): Culture, The Status of Women and Demographic Behaviour, Oxford University, New York.
6. Ellsberg Mary and Heise Lori L. (2005) Researching violence against women: A practical guide for researchers and activists. WHO and Path, Washington D.C.
7. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): Population Policies
8. Rutstein SO, Shah IH. Infecundity, infertility, and childlessness in developing countries. DHS Comparative Reports No.9. Calverton, MD: ORC Macro and Geneva: World Health Organization, 2004
9. Pachauri. S. (Eds. 1999): Implementing a Reproductive Health Agenda in India: The Beginning, New Delhi; Population Council.
10. Rozee G.V. and Sayeed Unisa (Editors) (2016) Assisted Reproductive Technologies in the Global South and North: Issues, Challenges and Future, Rutledge, London.
11. Visvanathan, Nalini, Lynn Duggan, Nan Wiegersma and Laurie Nisonoff (Eds. 2011): The Women, Gender and Development Reader, Fernwood Publishing Halifax, Winnipeg.

MSP C9 **60 Hours**

MIGRATION AND URBANIZATION

Course Outcomes:

CO1: To make the students understand the basic concepts, definitions, sources of data etc. on migration and urbanization.

CO2: To develop a critical understanding on the various theories/models concerning migration and urbanisation.

CO3: To equip students on the measurement and estimation of level, trend and pattern of migration and urbanization.

CO4: To understand the trend and pattern of spatial distribution and its linkage with migration and urbanization.

CO5: To develop a critical understanding on the emerging migration and urban issues, government policies and programmes in the context of development.

I. SPATIAL DISTRIBUTION

Pattern and factors affecting spatial distribution of population

Selected measures of concentration of population: Measures of concentration of population-Density, percentage distribution and dissimilarity index

II. MIGRATION Introduction and Concepts

Concept of mobility and migration, types of migration, censusdefinition of migrants and its limitations sources and quality of data : Census, NSSO, Migration surveys

Migration theories and models

Ravenstein's Laws of Migration

Everett Lee's Theory of Migrationiii Mobility Field Theory

Todaro's Model of Rural-Urban Migrationv New Economics of Labour Migration

Transnationalism Theory of Migration

Internal Migration

Patterns and characteristics in developing countries with a special focus on India.

Causes and consequences of internal migration: demographic, economic, social and political consequences at the individual, household and community level

Policies related to internal migration

International migration

Sources of international migration data and problems.

Patterns and types of international migration: Historical and recent trends. Indian Diaspora and people of Indian origin.

Causes and consequences of international migration: demographic, economic, social and political consequences at the individual, household and community level

Policies of international migration

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
Estimation of return migration
Methods of estimating international migration

Migration and health
Migrants' rights and Social entitlements

Urbanization Definition and Concepts
Definitional and conceptual problems and Data sources: Rural-Urban Fringe, Metropolis or Metropolitan Area, Conurbation, Metropolitan Region, Megalopolis, Metropolitan Hinterland, urban turnaround, sub-urbanization
Definition of urban and other associated urban concepts in Indian census; Urban size class structure

Measures
Degree and tempo of urbanization;
Urban population growth and its components;
Rank-Size rule and Primacy Index, Lorenz curve and Gini's concentration ratio

Theories
Kingsley Davis model of urbanization process
Functional Classification of Urban Centres by Harris iii The City-Region Relationship
Theories and Models of urban planning, Concept of New Towns

Urbanization process
Current urbanization process in developed and developing countries with special focus on India, Major urbanization problems and policies

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, (2019): World Urbanization Prospects, The 2018 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. International organization for Migration (2021), World Migration Report 2022, IOM, Geneva.
4. Shryock, Henry S. Jacob S. Siegel and Associate, (1980): The Methods and Materials of Demography Vol.I 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-V
8. Weeks, John R. (2015), Population: An Introduction to Concepts and Issues, Cengage Learning
9. Haas, H. d., Castles, S., & Miller, M. J. (2020). The age of migration: international population movements in the modern world. Sixth edition. New York, The Guilford Press

MSP C10 **30 Hours**

INTRODUCTION TO DEMOGRAPHIC AND STATISTICAL SOFTWARES

Course Outcomes:

CO1: To have hands on experience on statistical packages like SPSS, STATA to facilitate handling of large-scale data sets.
CO2: To familiarize with the data management such as recoding, sorting, filtering, file merging and splitting using SPSS and STATA
CO3: To understand and learn the uses of univariate, bivariate and multivariate analysis using software packages

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.

Introduction to STATA, generating, variables, commands and do file editor.
Survey analysis – estimation of mean, proportion, design.
Multivariate analysis – concepts and interpretation of results of multiple regression, logistic regression, ANOVA, with and without interaction.

Large scale data handling – (using NFHS, DLHS, NSSO) Merging, splitting, data and formatting.

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.*, 2nd Edition. Stata Press.
5. *Stata survey data reference manual: Release 8.*, 2nd Edition. Stata Press.

6. Cromley, Ellen K. and McLafferty, Sara L., (2002): GIS *and public health.* Guilford Press, New York.

MSP-E2.1 **45 HOURS**

HISTORICAL DEMOGRAPHY

Course Outcomes:

CO1: To appreciate and recognize an evolutionary account of population changes withtraces of historical trends in population

CO2: Familiarizing the students the data sources and methods in analysis of historical demography

CO3: To gain an understanding of transformational trends in settlement and livelihoodpatterns of humanpopulation

CO4: A detailed understanding of India's population history in particular reference to social and cultural reforms.

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, Traveller'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 evolutionof 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 womenfrom historical perspective; Transition from traditional family planning methods to modernmethods and health practices in India – a historical perspective

Essential Readings:

1. Davis, Kingsley, The Population of India and Pakistan, Princeton, Princeton UniversityPress, 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 Usesof 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 Archeologicaland 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.
12. W. Ernst, B. Pati and T.V. Sekher (2017). *Health and Medicine in the Indian Princely States: 1850-1950,* Routledge, London,. https://www.routledge.com/Health-and-Medicine-in-the-Indian-Princely-States-1850-1950/Ernst-Pati-Sekher/p/book/9780415679350
13. Dyson, Tim. A Population History of India: From the First Modern People to the Present Day (Oxford, 2018; online edn, Oxford Academic, 18 Oct. 2018), https://doi.org/10.1093/oso/9780198829058.001.0001, accessed 20 Mar. 2023.

MSP E2.2 **45 Hours**

HEALTH ECONOMICS AND FINANCING

Course Outcomes:

CO1: 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.
CO3: To familiarize the means and measures of health financing.
CO4: To understand the determinants of health insurance and its coverage.
CO5: 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 Heath, 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

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 utilization: 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. 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

VII. 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 READINGs:

1. Rexford E. Snterre and Stephen P. Neun, Health Economics: Theories, Insights and Industry Studies. Thompson South – Western, 3rd Edition (614. San/Hea, 073226) Note: 4th 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 (2008), AGiide to Techniques and Their Implementation
4. Xu K (2005). Distribution of health payments and catastrophic expenditures Methodology World Health Organization.

SUGGESTED READINGS

1. 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.
2. Grossman (1982). On the concept of Health capital and Demand for Health. Journal of Political Economy, 80(2)
3. Macintyre S (1997). The Black Report and Beyond-What are the issues, Social Science, Medicine, 44(6):723-745
4. Mohanty, S. K., & Dwivedi, L. K. (2021). Addressing data and methodological limitations in estimating catastrophic health spending and impoverishment in India, 2004–18. *International journal for equity in health*, *20*(1), 1-18.
5. Ringel etal (2005) The Elasticity of Demand for Health Care A Review of the Literature and Its Application to the Military Health System
6. Victoria Y Fan and William D. Savedoff (2014), "Health Financing transition: A conceptual framework and empirical evidences, *Social Science Medicine*, 105 (2014):112-121
7. Wagstaff A, P. Paci and E van Doorslaer (1991), On the measurement of inequalities in health, *Social Science and Medicine* 33(5), 545-557
8. 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

MSP E2.3 **45 Hours**

URBANIZATION, SPACE AND PLANNING

Course Outcomes:

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

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

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 indevelopment; causes and consequences, North-Eastern regional council, Mumbai Metropolitan Regional Development Plan.

Concepts; history and origins of urban planning; pioneers ofurban 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, Bhubaneshwar); 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, Urban pollution, Solid waste management; Management of migrants; Case studies of rehabilitation programs (SRA)

V. Remote Sensing, GIS and Urban and Regional Planning

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

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 ofVenezuela*, MIT Press, Massachusetts.
3. Chaudhuri, J. R. (2001) *An Introduction to Development and RegionalPlanning*, Orient Longman, Hyderbad.
4. Chand, M and V.K. Puri, (1983), *Regional Planning in India*, Allied PublishersPrivate Ltd, New Delhi
5. Mishra, R.P. (1992), *Regional planning: Concepts, Techniques, Policies and Casestudies*, Concept Publishing Co., New Delhi

Suggested Readings:

1. Bhagat, R. B., Roy, Archana K. and Sahoo, Sahoo. (2020). *Migration and UrbanTransition 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. SettlementTransition in Asia*, University of Hawaii Press, Honolulu.
12. Nath, V. (1971) “Regional Development Policies”, Economic and PoliticalWeekly, 6(30-32):1601-1608.
13. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic InformationSystems. Prentice Hall of India, New Delhi.
14. Nyerges. Timothy L. and. Jankowski Piotr (2010): Regional and Urban Gis: A DecisionSupport Approach, Rawat Publication, Jaipur.
15. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolution of regionalplanning*, Edward Arnold, London.
16. Kawashima, T and P. Korcelli, (1982), *Human Settlement Systems. Spatial Patternsand Trend*, IIASA, Luxemburg.
17. Knowles, R and J. Warling, (1983). *Economic and Social geography: MadeSimple*,

Heinemann, London.

18. Sarin, M. (1982), *Urban Planning in the Third World: The ChandigarhExperience*, Manshell, London.
19. MMRDA (2016). Mumbai Metroplotan Regional Development Plan 2016-2036 MMRDA,Mumbai.
20. UNEP and others (2007). Livable Cities: The benefits of environmentalplanning, The CitiesAlliance, Washington. http://www.citiesalliance.org/idex.html.

MSP E2.4 45 Hours

GENDER, HEALTH AND DEVELOPMENT

CO1: To sensitise 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 providers

Nutritional 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. Gender and 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 health inequalities and health outcomes

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

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 domestic violence 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 andwomen's life

Environmental degradation, changes in climate, water table and land use andtheir 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)
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

SEMESTER – III

MSP C11 **60 Hours**

APPLICATION OF STATISTICAL PACKAGES IN LARGE SCALE DATA

Course Outcomes:

CO1: To familiarise students with national and international large scale survey data sets andtheir exploration
CO2: To gain practical expertise in use of statistical softwares
CO3: To make the students appreciate the veracities of evaluation of survey data sets and itsderived outcomesin keeping with statistical principles and properties

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.

Unit II: Large scale survey data management and quality assuranace - Cleaning of big data, Range and consistency checks, missing data, long and wide format conversion, merging files (practical sessions) Revisit of sub-samples, field check tables, non-responsepattern, and quality lot assurance. roles of supervisors, editors, field and nodal agencies, Third party audit.

Unit III: Use of STATA for sampling and estimates
Sampling and estimation by simple random sampling, stratified, cluster, systematic and multi-stage sampling, PPS sampling, Use of STATA for sampling
Introduction to STATA for survey data analysis- Summarization of big DHS data, Conversion of ASCII and SPSS data into STATA format (practical sessions).

UNIT IV : Introduction to R
Use of R for samplingReading ASCII file, data summarization: frequency and graphical representation, survey data summarization using R.

UNIT V : Application of statistical package in survey data
Installation of libraries: sampling, survey, samplingbook, pps. Use of svydesign, svytotal, svymean. Use of R for estimates.
Survival analysis-Kaplan Meier, Cox regression-test of proportionality and heterogeneity.

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 Fares Qeadan. Sampling Methods Using STATA

MSP C12 **30 Hours**

POPULATION PROJECTIONS

Course Outcomes:
CO1: To train the students in mathematical and component methods of population projection
CO2: To familiarize the students with Use of SPECTRUM and its applications

Population Estimates and Projections

Concepts of population projections: population estimates, forecasts, and projections; uses of population projections.
Methods of interpolation and extrapolation: linear, exponential, polynomial, logistics, and Gompertz curves. Intercensal and post-censal estimates. Regression method of projection for behavioural event. ARIMA.
Cohort component method: basic methodology; projection of mortality, fertility, and migration components; population projections of United Nations and Office of the RegistrarGeneral of India. Use of SPECTRUM and its applications.
Methods of rural-urban and sub-national population projections: ratio method, apportionment (Water) method, urban-rural growth difference method, and concept ofraking.
Methods of related socio-economic projections: labour force, school-enrolment, and households.
Projection of Future Health Needs: Like ambulatory services, sanitary napkins, old age nest/home, health personnel, nursing staff (hospital and home-based), counselors etc. SPECTRUM software.

ESSENTIAL READINGS:

1. 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.
2. United Nations (1955). Manuals on methods of estimating populations: Manual II – Methods of Appraisal of Quality of Basic Data for Population Estimates. Department of Economics and Social Affairs, New York. Chapter 1, 2, 3

3. United Nations, (1955): Methods of Appraisal of Quality of Basic Data for Population Estimates, Manual II. New York: United Nations. Chapter 1 & 3.
4. Pathak, K.B. and F. Ram (1998): *Techniques of Demographic Analysis*, Himalaya Publishing House, Second Edition, Mumbai.
5. 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.
6. Srinivasan, K. (1998), *Basic Demographic Techniques and Applications*. London: Sage Publications.

SUGGESTED READINGS:

1. 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.
2. Potter, R.G. and Kulkarni, P.M (1977): Population Momentum: A Wider Definition, Population Studies Vol. 40 pp. 555-56.
3. 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.
4. Rele, J. R., (1987), "Fertility Levels and Trends in India, 1951-81", *Population and Development Review* Vol. 13 (2). Academic Press, New York.
5. Mishra, B.D. (1981): An Introduction to the Study of Population, New Delhi: South Asian Publishers. Pvt. Ltd. New Delhi.
6. K. Srinivasan. Training Manual on Demographic Techniques. Census of India and United Nations Population Fund, India. Chapter 4, 10
7. Jeremiah P. Banda (2003). Non-sampling errors in surveys. UNITED NATIONS SECRETARIAT ESA/STAT/AC.93/7. Statistics Division 03 November 2003
8. Census of India (2011). Report on Post Enumeration Survey, 2011. Registrar General &Census Commissioner.
9. 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.
10. Potter, R.G. and Kulkarni, P.M. (1977): Population Momentum: A Wider Definition, Population Studies Vol. 40 pp. 555-56.

MPS C13 **30 Hours**

DEMOGRAPHIC ESTIMATION TECHNIQUES AND MODELS

Course Outcomes:

CO3: To develop the skills to use different demographic packages of projection of population, households, urban-rural, education, and employment for programs andpolicymaking.

CO4: To familiarize students with the indirect techniques of estimating demographic components under the limited circumstance of data availability.

CO2: To familiarize students with demographic models to understand the population issues and evaluate the observed demographic rates and ratios.

Demographic Models

Concepts of Demographic Models:

Stationary, Stable and 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?)

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] Completeness of Death Registration by Lopez applications of MORTPAK in estimating age specific fertility rate (ASFR) and total fertility rate (TFR).

Indirect Method of Estimating Mortality:

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; applications of MORTPAK in estimating infant and child mortality.
(b) Modifications proposed by Sullivan and subsequently by Trussell over Brass method; and (c) the UN revised and extended version of Trussell's method.

Methods of Estimating Adult (including Maternal Mortality) and Old Age Mortality

(i) 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.

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 READINGS:

1. 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).
2. Preston, Samuel H. Patrick, Heuveline and Michel Guillot, 2003, *Demography: Measuring and Modeling Population Processes*, Blackwell Publishers, 2001 (First Indian Reprint 2003).

3. United Nations (1955). Manuals on methods of estimating populations: Manual III Methods of Population Projections by Age and Sex. Department of Economics and Social Affairs, New York. Chapter 2.

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.

SUGGESTED READINGS:

1. 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.
2. 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.
3. Rele, J. R., (1987), "Fertility Levels and Trends in India, 1951-81", *Population and Development Review* Vol. 13 (2). Academic Press, New York.
4. Srinivasan, K. (1998), *Basic Demographic Techniques and Applications*. London: Sage Publications.
5. Government of India (2019): *Population Projections for India and States, 2011-2036*. New Delhi: NCP, MoHFW.
6. Field, J.L. (1990) Past projections: How successful? In Population Projections: Trends, Methods and Uses. Liverpool, 12-14 sept. 1990. Occasional paper 38. Office of Population Censuses and Surveys, pp. 23-29.
7. Shaw, C. (2007). Fifty years of United Kingdom national population projections: how accurate

have they been? Population Trends 128: 8-23. Available at www.ons.gov.uk/ons/rel/population-trends-rd/population-treends/no--128--summer-2007/fifty-years-of-united-kingdom-national-population-projections--how-accurate-have-they-been--.pdf

8. Moultrie, Tom, Rob Dorrington, Allan Hill, Kenneth Hill, Ian Timæus and Basia Zaba, (2013) Tools for
9. Demographic Estimation. International Union for the Scientific Study of Population (IUSSP)

10. Office of the Registrar General of India, Government of India (2020): Population Projections for India and States, 2011-2036. Report of the Technical Group on Population Projection, National Commission on Population and Ministry of Health & Family Welfare, Government of India. New Delhi

MSP C14 **60 Hours**

POPULATION, DEVELOPMENT AND ENVIRONMENT

CO1: To acquaint students on key concepts, indicators and composite indices of development
CO2: To familiarize students on various theories of population and development
CO3: To introduce pessimistic, optimistic and neutralistic views on population
CO4: To explain quantitative and qualitative aspects of human resources
CO5: To introduce the concepts of sustainable development, climate change and global warming

I. Concepts and Measures of Development

Need to study population in the context of development; Concepts of economic growth and economic development – definition and indicators; Limitations of per capita income as an indicator of development; Emphasis on equality, Lorenz curve and Gini coefficient.

Economic determinants of development, non-economic determinants of development, and role of institutional factors in development.

Approaches towards development: Growth oriented approach and basic minimum need approach; Human centred development – welfare approach, investment in human capital, Physical Quality of Life Index (PQLI), Human Development Index (HDI), Gender Development Index (GDI); Concepts and measures of money metric and multidimensional poverty, Human Poverty Index (HPI) and Multidimensional Poverty Index (MPI).

Concepts of social development, social capital and social change.

II. Theories and Strategies of Development

Theories of development: Big push theory, Rostow's stages of growth, Arthur Lewis's two-sector model Liebenstein's critical minimum effort theory, Harrod-Domar model, and Solow's growth model.

Strategies of development: Millennium Development Goals (MDGs), achievements with special reference to India; Concept of sustainable development, Sustainable Development Goals (SDGs); Development strategies through the different five-year plans in India; Recent development strategy (NITI Aayog) in India.

III. Population and Development linkages

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; and (iv) views of revisionists and need to study linkages between population change and development.

Demographic transition theory, age structure transition, demographic dividends and population ageing; effects of fertility and mortality declines, health improvementsand migration on economic growth. Divergent views regarding the relationship between population and development.

IV. Population and Resources

Natural resources: classification of natural resources, renewable and non-renewableresources, resources scarcity and resource depletion.
Capital resources: effect of demographic factors on savings and investments, technology and development; importance of technology to improve the productivityof physical assets.
Human resources - quantitative aspects: concepts labour force, economically activepopulation, 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 onfood, 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 socialconsequences.

V. Population and Environment

Ecosystem: Basic concepts, structure and functioning, energy and material flow, changes and challenges of ecosystem; simplification, eutrophication, pollution.
Philosophical dimensions of the new environmentalism: postmodernism, eco Marxism, deep ecology, social ecology and ecofeminism.
Sustainable development and environment: Role of environment in development – evolution, inclusion and progress; Brundtland Commission – Our Common Future; "5 *Ps*" that shape the *SDGs*: People, Planet, Prosperity, Peace, and Partnerships; UNGC Ten Principles; Linkages of SDGs with environment. Living planet index, Human foot print, IPAT model; environmental-Kuznetz curve;
Environmental challenges: Resource depletion and environment; pollution; poverty and environment; food, nutrition and environment; ecofeminism; solid waste; climate change and development; health and environmental challenges; occupational health.
UN conventions on environment and development: Major world commissions from 1972 to Rio+20 and so on; UNFCCC and challenges in making policies on environment; Environmental policies and programmes in India.

ESSENTIAL READINGS:

1. Birdsall Nancy, Kelley Allen, & Sinding Steven (2001). *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World,* Oxford: Oxford University Press. Chapters 2, 4 and 5.
2. Ray, Debraj (1998): *Development Economics.* Delhi: Oxford University Press. Chapters 3 & 4.

3. Todaro, Michael P. (1981): *Economic Development in the Third world.* New York: Longman. Chapter
4. UNDP (2022). *Human Development Report 2021-2022: Uncertain Times. Unsettled Lives: Shaping Our Future in a Transforming World.* UNDP: New York.
5. UN Environment (2019). *Global Environment Outlook – GEO-6: Healthy Planet, Healthy People.* Cambridge University Press.
6. World Commission on Environment and Development (1987). *Our Common Future*. London: Oxford University Press.

SUGGESTED READINGS:

1. Chary, S.N. & Vinod Vyasulu (eds). (2000). *Environmental Management: An Indian Perspective*. New Delhi: Macmillan India.
2. Coale A.J. and Hoover, E.M. (1958). *Population Growth and Economic Development in Low Income countries.* Princeton: Princeton University Press.
3. David Bloom, David Canning & Jaypee Sevilla, (2003): *The Demographic Dividend.* Sanata Monica: Rand Corporation. Chapter 2.
4. Irfan Habib, (2010), *Man and Environment: The Ecological History of India* (A Peoples History of India 36). New Delhi: Tulika Books.
5. Kapila, Ray and Uma Kapila (2001). *India's Economy in the Twenty First Century.* New Delhi: Academic Foundation. Chapters I to 5, 15, 16& 21.
6. Leibenstein, H. (1963). *Economic Backwardness and Economic Growth*. New York: John Wiley. Chapter 8.
7. 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.
8. Morton Lippmann, Beverly S. Cohen, Richard B. Schlesinger, (2003). *Environmental Health Science: Recognition. Evaluation. and Control of Chemical and Physical Health Hazards.* Oxford: Oxford University press.
9. Solow, R.M. (1956). A contribution to the theory of economic growth, *Quarterly Journal of Economics*, 70: 65-94.
10. United Nations Development Programme (1990). *Human Development Report, 1990.* Delhi: Oxford University Press. Chapter 1.

MSP-C15 **60 Hours**

POPULATION POLICIES AND PROGRAMME EVALUATION

Course Outcomes:

CO1: To have an understanding of population policy in pro-natalist and anti-natalist divide around the world.

CO2: To appreciate the role of United Nations and International population conferences, including ICPD, in evolving changes in designing and advocating population policies and programmes.

CO3: To critically evaluate the population policies and programmes of India since independence.

CO4: To understand the management and quality of care in health services and family planning programmes.

CO5: To learn the tools of evaluating family planning programmes and SWOT approach.

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; World Population Conferences, Declarations and Plan of Action.

Fertility influencing policies: pro-natalist policies, fertility control policies- direct and indirect. Policies and programmes for special groups: women and children.

Health influencing policies: historical perspective for policies and programmes in developing and developed countries.

India's health and family planning programmes: History of birth control movement, National Population Policies, National Health Policies, and National Health Mission.

B. POPULATION AND PROGRAMME MANAGEMENT

Strategic management approach, Targeting the people in need (Community Need Assessment); Client segmentation; and Unmet need approach.

Providing services; commercial distribution, community based distribution (CBD) systems and social marketing.

Quality of Care: Definition, Importance and Framework of quality of care in family planning.

C. EVALUATION OF PROGRAMME

Evaluation of programmes: objective, types, framework and methodological issues and data requirement. Role of family planning service statistics and surveys as sources of data in evaluation.

Management Information System (MIS); Role of HMIS in evaluation of the programmes.
Operation Research Techniques (ORT) in evaluation.

Economic evaluation of the programmes: Cost-benefit analysis, Cost-effective analysis, SWOT analysis.

Fertility impact of Family planning programme: Bongaarts' model for estimating fertility impact.

ESSENTIAL READINGS:

1. Government of India (2000), *National Population Policy- 2000*, Ministry of Health and Family Welfare: New Delhi.
2. Government of India (2017), *National Health Policy- 2017*, Ministry of Health and Family Welfare: New Delhi.
3. Srinivasan, K. (2017), *Population Concerns in India: Shifting trends, policies, and programs*, Sage Publications: New Delhi.
4. United Nations (1995): *Report of the International Conference on Population and Development*, Cairo, 5-13 Sept, 1994

SUGGESTED READINGS:

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; Gertler, 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. United Nations (1998): *National Population Policies*, Department of Economics and Social Affairs, New York.
5. Asia Development Bank (2006). *Impact Evaluation: Methodological and Operational Issues*. Economic Analysis and Operations Support Division. ADB, Manila.
6. Jain, A (ed.) *Do Population Policies Matter? Fertility and Politics in Egypt, India, Kenya and Mexico*, Population Council, New York
7. Visaria, L and R R Ved (2016): *India's family planning programme: Policies, practices and challenges*, Routledge, London.
8. James, K.S. and T.V. Sekher (eds.), (2023). *India Population Report*, Cambridge University Press, https://www.cambridge.org/core/books/india-population-, New Delhi.

MSP-C16 **45 Hours**

RESEARCH METHODOLOGY II

Course Outcomes:

CO1: To understand the theories underlying qualitative research
CO2: To familiarize the qualitative methods of data collection.
CO3: To understand qualitative data analysis using packages like Atlas Ti and Nvivo.
CO4: Develop skills for writing proposal and scientific articles.
CO5: Introducing students to field level settings and primary data collection.

QUALITATIVE RESEARCH METHODS

Philosophy of Research

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

Theory in Qualitative Research

Using the existing literature
Theories underlying the qualitative research
Approaches to qualitative research
Texts as data in qualitative research

Designing Qualitative Research

The qualitative research process
Research questions
Entering the field
Interviews, focus groups, key informants
Using narrative data
Collecting data beyond talk.

QUALITATIVE DATA ANALYSIS SKILLS

Data preparation
Developing codes
Making codebook and its process
Free listing and Pile sorting analysis using ANTHROPAK
In-depth Interviews, FGDs data analysis by N-Vivo/ATLAS-Ti
Group work - hands on data collection, data analysis and presentation

SCIENTIFIC WRITING AND ETHICS
Layout of research proposal and dissertation
Techniques of interpretation
Ethical considerations in data collection

FIELD VISITS
Visit to the field cites.
Conducting Key Informant Interviews and Focus Group Discussions at field level and writing up.

Essential Readings:

1. Hollis, M. (1994) *Philosophy of Social Science: An Introduction*. Cambridge, Cambridge University Press
2. Booth, W. C., Colomb, G. G., Colomb, and J. M., & Williams, J. M. (2003). *The Craft of Research.* University of Chicago press.
3. Hennink, M., Hutter, I. and Bailey, A. (2011). *Qualitative Research Methods.* Sage Publications, London.
4. Flick, Uwe (2014). *An Introduction to Qualitative Research*, SAGE, New Delhi
5. Bryman, Alan (2012). *Social Research Methods*, Oxford University Press
6. Schenshul, S.L, J.J. Schenshul and M.D. LeCompte (1999), *Essential EthnographicMethods*, Altamira Press, New York.

Suggested Readings:

1. MacIntyre, A. (1967) *A Short History of Ethics.* London.
2. Resnik, D.B. (2011). *What is ethics in research & why is it important.* National Institute of Environmental Health Sciences, 1-10.
3. Retrieved from https://www.niehs.nic.gov/research/resources/bioethics/whatis/index.cfm
4. 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.
5. Mukherjee, R. And P. N. Mukherjee (2000). *Methodology in social research: dilemmosand perspectives.* Sage Publication.
6. Sayer, Andrew. (1984). *Method in Social Science: A Realist Approach*, London: Hutchinson
7. Creswell, J. (2012). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.) Thousand Oaks, CA: Sage
8. Denzin. N. and Lincoln, Y. (2011). *The SAGE handbook of qualitative research* (4th ed.). Thousand Oaks, CA: Sage
9. Lee, T. W. (1999) *Using Qualitative Methods in Organization Research.* London: Sage.
10. Marshall, C. & Rossman, G. B.(2006). *Designing qualitative research* (4th ed.) Thousand Oaks, CA: Sage.
11. Miles, M.B., Huberman, A.M. & Saldana, J.(2014). *Qualitative data analysis: A methods sourcebook* – Third edition. Thousand Oaks, CA: Sage.
12. Patton M. Q.(2002). *Qualitative Research and Methods Evaluation*, Newbury Park: Sage.
13. Silverman. D.(2013) *Doing Qualitative Research*, London: Sage
14. Berg. B. L. & Lune, H. *Qualitative Research Methods for the Social Sciences*, 8th edition, Boston: Pearson, Allyn & Bacon. 201
15. Gastel, Barbara and Robert A. Day. *How to write and publish a scientific paper.*
16. Turabian, Kate L. *A manual for writers of research papers, theses and dissertation* Web reference: http://owl.english.purdue.edu

MSP-E3.1 **45 Hours**

CONCEPTS AND MEASURES OF GLOBAL 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 it varied features like cause ofdeath, population age structure and differential quality of life.

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

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

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

1. **Concept and introduction:** Concept of global health: importance to study global health, global variation in demographic, health and epidemiological transitions; linkages between globalization and health: linkages between global and local health; current challenges, emerging trends and priorities in global health; 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, age and gender? GBD 1990, 2010 and 2019 - changes and continuities.

3. **Infectious Diseases, Non-Communicable Diseases (NCDs) and Nutrition**: Persistence of infectious diseases in developed and low- and middle-income countries: new and re-emerging infectious diseases across globe; difficulty in prevention, treatment, and rehabilitation from infectious diseases. Current and growing challenge of NCDs in developed and low- and middle-income countries; NCD's epidemiology in developed and low- and middle-income countries. Double burden of malnutrition and diseases in low- and middle-income countries: food security of undernutrition; short-term and long-term impact of undernutrition; nutrition transition.

4. **Determinants of Health:** Factors responsible for variation in the global burden of disease - culture, race, ethnicity, education, socio-political establishment, economic development and economic inequality. Role of water, sanitation, indoor and outdoor air pollution, food security, migration, disaster (man-made, natural), conflicts and epidemics in explaining global health disparities.

5. **Health care delivery systems**: Introduction to health systems; components of health system; financial models of health care; service delivery models; governments role in delivering health care; measurement of health system performance in developed and developing countries; role of WHO, World Bank, etc. in setting global and national health

priorities.

Essential readings

1. Skolnik, R. (2008). Essentials of global health, Jones and Bartlett: Sudbury, MA.
2. Fried LP, Bentley ME, Buekens P, Burke DS, Frenk JJ, Klag MJ et al. (2010) Global Health is Public Health. *Lancet* 375, 535 – 7.
3. Huynen M, Martins P, Hilderink HBM. (2005). The Health Impacts of Globalisation: A Conceptual Framework. Globalization and Health 1:14. http://www.globalizationandhealth.com/content/1/1/14
4. 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.Coucil on Foreign Relations. (2014). The Emerging Global Health Crisis. Non-Communicable Diseases in Low- and Middle-Income Countries. Independent Task Force Report No. 72. https://www.cfr.org/sites/default/files/report_pdf/TFR72_NCDs.pdf
5. Fauci AS, Morens DM. (2012) The Perpetual Challenge of Infectious Diseases. N Engl J Med 366: 454 – 61.

Suggested readings

1. Hoffmann SJ. (2010). The Evolution, Etiology and Eventualities of the Global Health Security Regime. *Health Policy Plan* 25(6): 510-22. https://www.ncbi.nlm.nih.gov/pubmed/20732860
2. 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.
3. Dielman JL, Schneider MT, Haakenstad A, Singh L, Sadat N, Birger M, Reynolds A, Templin T, Hamavid H, Chapin A, Murray C. (2016) Development Assistance for Health: Past Trends, Associations, and the Future of International Financial Flows for Health. Lancet 387; 2536 – 44.
4. 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.
5. Mozaffarian D. (2017). Global Scourge of Cardiovascular Disease. Time for Health Care Systems Reform and Precision Population Health. Journal of the American College of Cardiology 70(1): 26 – 8.
6. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In Disease Control Priorities in Developing Countries (2nd Edition), pages 87-102, New York: Oxford University Press.
7. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
8. World Health Organization (2010). Key Components of a Well-Functioning Health System. http://www.who.int/healthsystems/publications/hss_key/en/
9. World Health Organization. (2017) Double Burden of Malnutrition. http://www.who.int/nutrition/double-burden-malnutrition/en/

MSP E3.2 **45 Hours**

POLITICAL DEMOGRAPHY

CO1. To provide basic and advanced concepts and methods of analysing political theory of popualtion change and its consquences with an inter-disciplinary perspective.
CO2. To familarize the students with changing political demography of India and its implications on policy interventions.

1 Population and Political Theory

Political Theory, Development and Population; Weiner's hypotheses; Shaping Future Children: Parental Rights and Societal Interest, Immigrants, Nations and Citizenship.

2. Population and Politics

Politics, Demography and History; Population and World Politics; Population and Power; Cultural identity, nationalism and population; Demography of political represnation.

3. Population Change and National and International Security

On Future Generations' Future Rights; Generations at War or Sustainable Social Policy in Ageing Societies, The Ethics of Refugee Policy.

4 Political Demography of India

A framework for the Study of Indian Political Demography; Politics of population growth in the context of Gender, Caste and Religion; Demographics of political representation; Voter Population of India and Its Socio-Demographic Chacracteristics; Political economy of population and health policy in India.

5 The Political Economy of Health

Virchow's philosophy; Politcal determinants of health; Governance and health; Political economy of global health financing; Austerity and health.

6. Conflicts, Demography and Health

Conflict Demography, Confict and Health

7. Future of Political Demography and its Impact on Policy

Politics of Population and Health Policies and methodological choices.

Essential Readings

1. Abernethy, V. D., & Hardin, G. (2018). *Population politics*. Routledge.
2. Clinton, R. L., & Clinton, R. L. (1973). *Population, Politics and Political Science*. Population and Politics. Lexington, Mass: Lexington Books.
3. Clinton, R. L., Flash, W. S., & Godwin, R. K. (Eds.). (1972). *Political Science in Population Studies*. Lexington, Mass., Lexington Books [1972].

4. Clinton, R. L., Godwin, R. K., & Godwin, R. J. (1972). *Research in the Politics of Population.* Lexington Books.
5. Demeny, P., & McNicoll, G. (2006). *The political demography of the world system, 2000-2050.* Population and Development Review, 32, 254-287.
6. Kligman, G. (1995). *Political Demography: The Banning of Abortion* in. Conceiving the new world order: The global politics of reproduction, 234.
7. Teitelbaum, M. S. (2005). Political demography. In Handbook of population (pp. 719-730). Springer, Boston, MA.
8. Teitelbaum, M. S. (2015). Political demography: Powerful trends under-attended by demographic science. Population studies, 69(sup1), S87-S95.

Indian Readings

1. Bhagat, R. B. (2022). *Population and the Political Imagination: Census, Register and Citizenship in India.* Taylor & Francis.
2. Bhagat, R. B. (2006). Census and caste enumeration: British legacy and contemporary practice in India. *Genus,* 119-134.
3. James, K. S., & Balachandran, A. (2021). *Demographic Politics in Asia's Super-Size Democracies: India, Bangladesh and Pakistan.* In Global Political Demography (pp. 141-166). Palgrave Macmillan, Cham.
4. James, K. S., & Goli, S. (2016). Demographic changes in India: Is the country prepared for the challenge. *Brown J. World Aff.,* 23, 169.
5. Rao, K. S. (2016). *Do we care?: India's health system.* Oxford University Press.
6. Srinivasan, K. (2017). Population concerns in India: shifting trends, policies, and programs. SAGE Publishing India.

MSP-E3.3 **45 Hours**

POPULATION, ENVIRONMENT AND SUSTAINABLEDEVELOPMENT

Course Outcomes:

CO1.	Understand sustainable development and its challenges.
CO2.	Learn quantitative and qualitative methods in environmentalhealth analysis
CO3.	Comprehend the role of the environment in development modelling

1. Sustainable development: Concepts

Sustainable development; Trends of global warming and climate change; Drivers of global warming and climate change; Impact of climate change and biological responses; Meaning and measurements of vulnerability, resilience and adaptive capacity; Calamities and measurements; challenges for environmental governance

2. Environmental challenges in India

Pollution and health- data sources, estimate; Urban environmental challenges; Tourism and environmental challenges; Indian standards; Role of state in pollution control and resources management; Indian environment policies and programme

Disaster: meaning, factors and significance; Types of disasters: natural and man-made; Causes and effects of disasters. Profiling of disaster in India; Community health during disaster (drinking water, food and nutrition, hygiene and sanitation), urban pollution (with case studies)

3. Practical session on-Training on environment and health

Population potential mapping; Satellite image interpretation; geospatial modeling to measure environmental impact on health; Analyzing environment using large scale data; Local area pollution analysis; Energy literacy training

Field visit: Qualitative methods to measure environmental impact; Community training on environment through IEC

Essential Readings:

1. The Economics of Climate Change: The Stern Review (2014) CambridgeUniversity Press
2. UN Climate reports https://www.un.org/en/climatechange/reports
3. Brundtland, G.H. (1987). *Our Common Future: The World Commission onEnvironment and Development*, Oxford, Oxford University Press.
4. Psychology and Climate Change (2018) Human Perceptions, Impacts, andResponses, 2018
5. Lillesand, Thomas, Kiefer, Ralph W., Chipman Jonathan (2015) *Remote Sensingand Image Interpretation*. 7th Edition. Wiley

Suggested readings:

1. Hardin, GarrettL(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. *Populationand Development Review, 18: 299-319.*

MSP E4.4 **45 Hours**

OCCUPATIONAL HEALTH

Course Outcomes:

CO1: To familiarize students with occupational health risks/ hazards and their demographic implications.

CO2: To train the students in basic concepts, theories, measurements and data sources of occupational health risks/hazards.

CO3: To acquaint students with various types of contemporary hazardous occupations throughout the world.

CO4: To develop in-depth understanding of intersectionality of occupation, health and demography in low and middle-income countries.

CO5: To develop critical thinking among students of social welfare policies and laws/ legislations/ acts for workers in India.

Introduction of Occupational Health and Demography:

Definition, basic concepts, the scope of occupational health and importance in demography; Difference between occupational health risks and hazards; Historical development of occupational health, the intersectionality of occupational health, socioeconomic characteristics, and demography; Pre and Post industrialization theories on occupational health risks and hazards; Decent work; Women's health and safety.

Morbidity and Mortality:

Health Well-being of Workers; Occupation–related Morbidity, Health Disorders, Different types of Disabilities, and Mortality; Mental Health.

Types and Measurements of Occupational Health Risks:

Occupational disciplines and related risks - Mechanical, Chemical, Biological, Physical, Psychological, Medical, Ergonomic, and Work organization hazards/risks (Hazards or stressors that cause stress (short- term effects) and strain (long-term effects)); Measurements of occupational health safety, risks and hazards; Health impact assessment, Mental health assessment scale, Musculoskeletal disorder scale, American Thoracic Society and the Division of Lung Diseases (ATS-DLD-78), Occupational Stress Index (OSI), Job Strain Model, etc.

Data Sources of Occupational Health:

International and National Data Sources of Occupational Health - Population Census, Services Statistics, Large - and Small-Scale Sample Surveys etc. Data limitations in the area of occupational health.

Legislation, Social and Welfare Policies:

Sustainable Development Goals - (Decent work), International Labour Organization (ILO) Declaration on Fundamental Principles and Rights at Work; International Labour Standards on Occupational Safety and Health, Wages and Working time; ILO - Occupational Safety and Health

Convention, Health and Safety Acts; The Occupational Safety, Health and Working Conditions Code, 2020 etc. Child Labour and Health

Occupational Health in India:

History of Occupational Health in India (types of occupations, work environment and working conditions); Health behavioral risks and hazards: Evolution of labour unions; and Contemporary occupational health challenges of workers in India. Social and Welfare legal provisions and acts in India; Hazardous Waste Management Rules – 2000, Constitutional Rights, Wage Regulations (Minimum Wage Act), Factory Act – 1948, Workmen Compensation Act – 1960, Employee Provident Act – 1952, Labour Welfare Measures, Retirement Benefits/National Pension Scheme – 2004, Social Welfare Schemes and Programmes.

ESSENTIAL READINGS:

1. Benjamin O. Alli, (2008), Fundamental Principles of Occupational Health and Safety, Second Edition, International Labour Office, Geneva: ILO, Pages:1 – 221
2. Government of India, National Policy on Safety, Health and Environment at Work Place, Ministry of Labour and Employment, https://labour.gov.in/policies/safety-health-and-environment-work-place.
3. Government of India, Ministry of Rural Development, (2015), Occupational Health & Safety, Environmental Issues and Decent Work-Module-8, New Delhi. Pages: 1 -32.
4. Occupational safety and health in public health emergencies: A manual for protecting health workers and responders: Geneva: World Health Organization and the International Labour Office. 2018. Licence : CC BY-NC-SA 3.0 IGO.
5. Dianne E. G. Dyck, 2020, Occupational Health & Safety: Theory, Strategy & Industry Practice, 4th Edition, ISBN/ISSN: 9780433502074.

SUGGESTED READINGS:

1. Government of India, Report of the Working Group on Occupational Safety and Health for the Twelfth Five Year Plan (2012 To 2017), Ministry of Labour And Employment, New Delhi, Pages 1- 145.
2. Hyde, Martin, Singh Chungkham, Holendro, (2017), Work and Health in India, Policy Press, ISBN:9781447335436, 1447335430
3. Page count:280
4. M. Timothy McAdams, Jeffrey J. Kerwin, Vanessa Olivo, Huseyin A. Goksel, (2011), National Assessment of the Occupational Safety and Health Workforce, 200-2000-08017, Task Order 18, Pages 1 - 246.
5. Gautam Bhan, Antara Rai Chowdhury, Rashee Mehra, (2021), State of occupational safety and health practices at workplace for domestic workers in COVID-19 and possibilities for action, International Labour Organization, Geneva, ISBN: 9789220350768 (Print). Pages 1 - 36.
6. Jacques Tamin, (2020), Occupational Health Ethics: From Theory to Practice, Springer Cham, Hardcover ISBN 978-3-030-47282-5, https://doi.org/10.1007/978-3-030-47283-2
7. International Labour Conference, (2003), Global Strategy on Occupational Safety and Health, International Labour Organization: ISBN 92-2-116287-7 (print version), Geneva, Pages – 1 – 20.
8. Global Strategy on Occupational Health for All: The Way to Health at Work (1994), WHO Collaborating Centres in Occupational Health, WHO/OCH/95.1, GENEVA, Pages: 1 -72.
9. World Health Organization (WHO) - Regional Office for the Eastern Mediterranean (2001), Occupational health: A manual for primary health care workers, Cairo, WHO-EM/OCH/85/E/L, pages – 1-168.

SEMESTER -IV

MSP-C17 **60 Hours**

SPATIAL DEMOGRAPHY AND APPLICATION OF GIS

Course Outcomes:

CO1: Understanding the concept of space and develop spatial dynamics indemographic 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 techniquesto 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):

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

ESSENTIAL READINGS:

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Wookbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on http://geodacenter.asu.edu/.
2. Bailey, T. and Gatrell, A. C, (19l95): 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, Willey-Blackwell.
5. Kurland K. S., Gorr W. L. (2007). GIS Tutorial for Health. Redlands, CA, ESRI Press.
6. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. New Delhi, Prentice Hall of India.

SUGGESTED READINGS:

1. 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.
2. 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.
3. 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).
4. Reibel, Michael, (2007). *Geographic Information Systems and Spatial Data Processing in Demography: A Review.* Population Research and Policy Review 26: 601-608.
5. Griffith, D. A. and Amehein (1997): Multivariate Statistical Analysis for Geographers. Englewood Cliffs, New Jersey, Prentice Hall.
6. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984) Elements of Cartography. New York, John Wiley and Sons.
7. Chang, K. (2008). Introduction to Geographic Information Systems. New Delhi, McGraw Hill Education.
8. Shaw, G. and Wheeler, D. (1994). Statistical Techniques in Geographical Analysis. Englewood Cliffs, New Jersey, Prentice Hall.
9. Soja, E. W. (1996). Third space: Journeys to Los Angeles and Other Real-and Imagined Places. Wiley-Blackwell.

10. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.

MSP C18 **60 Hours**

POPULATION AGING AND HEALTH TRANSITION

Course Outcomes:

CO1: To impart knowledge of concepts and theoretical framework relating to demography of ageing, and its societal interface.
CO2: To understand the health transition, its linkage with ageing transitions.CO3: To develop skills to analyze trends, determinants and consequences ofpopulation ageing.
CO4: To familiarize with aging data sets and its exploration.
CO5: To acquaint the students with ageing policies and programmes and its bearing onthe welfare of the elderly.

I Demography of Ageing:

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

II Life Course Perspectives and Social Dynamics of Ageing:

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.
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.

III Ageing and Health:

Ageing and Functional Health: Non-communicable diseases, Ageing and disabilities; trends and prevalence. Well-being and life satisfaction.
Ageing and mental health problems; cognition, memory loss, dementia and depression; Alzheimer's and Parkinson.
Ageing and health risk factors: nutrition, diet and food practices; health risk behaviour- tobacco, alcohol; physical activities;

IV Ageing Policies and Programmes:

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

ESSENTIAL READINGS:

1. Chakraborti, Rajagopal Dhar (2004), The Greying of India: Population Ageing in the Context of Asia, SAGE Publications, 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, New Delhi.
4. Govt. of India (1999). National Policy for Older Persons, Ministry of Social Justice and Empowerment, New Delhi.
5. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Ageing 2019: Highlights. UN, New York.

SUGGESTED READINGS:

1. World Health Organization (2015), WHO Report on Ageing and Health, Geneva, WHO.
2. United Nations (2001): Living Arrangements of Older Persons: Critical Issues and Policy Responses. Population Division, Department of Economic and Social Affairs, New York.
3. Sandra Gruescu, (2006), Population ageing and economic growth. Physica-Verlag.
4. Goli, S., B. Reddy, James, K. S. & Srinivasan, V. (2019). Economic independence and social security among India's elderly. Economic and Political Weekly. 54, 39, p. 32-41 10 p.
5. James, K.S and Goli S. (2017). Demographic Changes in India. Is the Country prepared for the Challenge? The Brown Journal of World Affairs, 23:169.
6. Berman, Lisa (2000) "Social Support, Social Networks, Social Cohesion and Health" Social Work in Health Care
7. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), Age-structural transitions: challenges for development. Paris: CIRCRED.
8. National Institute of Ageing (2007). Why population ageing matters? A global perspective, US National Institute of Health.
9. Asian Development Bank Institute (2019). Ageing Societies: Policies and Perspectives, ADB, Japan.

10. Bloom, D, T.V. Sekher and J. lee (2021). "Longitudinal Aging Study in India (LASI): new data resources for addressing aging in India", Nature Ageing, Vol. 1, Springer. https://rdcu.be/cCl6M

MSP E4.1 **45 Hours**

OPERATION RESEARCH IN REPRODUCTIVE HEALTH

Course Outcomes:

CO1: To familiarize the concept of operation and intervention research in reproductivehealth and related fields.

CO2: To differentiate the operation research from other social science research.

CO3: To train students to identify research problems, design and methodology inoperation research.

CO4: To familiarize the process of developing suitable indicators in keeping with theresearch design.

CO5: To develop a capacity to prepare proposal for operation research and itsimplementation.

1. Basic Concepts and Definition of OR
(a) What is Operations Research
(b) Focus, Objective and Characteristics of Operations Research
(c) Types and Examples of Operations Research
(d) Methods of Operations Research
(e) Implementation Research and Its Linkages with OR

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-Posttest Control Group Design
(b) Posttest –only Control Group Design
(c) Multiple Treatment Design

6. Design
(a) Experimental Design: Pretest-posttest control group design; Posttest-only control group design; Multiple treatment designs
(b) Quasi Experimental Deign: Non-equivalent control group; Time series design; Separate sample pretest-posttest design;
(c) Non-Experimental Design: Posttest-only design; Pretest-posttest design; Static-group comparison

7. Inferential Research Statistics Accordingly Operations Research design
(a) (X2, 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) International Perspectives: Research Ethics; Recognize Ethical Issues in Operation Research Need of Ethical Standards in Operational Research; History and Foundation of Research Ethics; Principles; Codes and Regulations: International Landscape; Ethics Review Committee: Members, Roles
Submission a Proposal for Ethical Clearance
(b) ICMR Guidelines: Background; ICMR Code; Statement of General Principles; General Ethical Issues
Responsible Conduct of Research (PCR); Ethical Review Procedures; Informed Consent Process; Vulnerability
(c) Case Studies

10. Utilization and Dissemination, and Process Documentation

11. Critiques to OR proposal

ESSENTIAL READINGS:

1. Blumenfeld, S. (1985). *Operations research methods: A general approach in primary health care*. Primary Health Care Operations Research, Center for Human Services.
2. Fisher, A. A., Foreit, J. R., Laing, J. E., Stoeckel, J. E., & Townsend, J. (2002). Designing HIV/AIDS intervention studies: An operations research handbook.
3. Foreit, J. R., & Frejka, T. (1998). Family planning operations research: a book of readings.

SUGGESTED READINGS:

1. Gallo, G. (2004). Operations research and ethics: Responsibility, sharing and cooperation. *European Journal of Operational Research*, *153*(2), 468-476.
2. Mathur, R., & Swaminathan, S. (2018). National ethical guidelines for biomedical & health research involving human participants, 2017: A commentary. *The Indian journal of medical research*, *148*(3), 279.
3. Oliver, P. (2010). *The student's guide to research ethics*. McGraw-Hill Education (UK).
4. Ormerod, R. J., & Ulrich, W. (2013). Operational research and ethics: A literature review. *European journal of operational research*, *228*(2), 291-307.
5. Sanmukhani, J., & Tripathi, C. B. (2011). Ethics in clinical research: The Indian perspective. *Indian journal of pharmaceutical sciences*, *73*(2), 125.

MSP E4.2 **45 Hours**

MONITORING AND EVALUATION IN POPULATION &HEALTH

Course Outcomes:

CO1: Familiarize the students with concepts and methods of monitoring andevaluation research.
CO2: To acquaint with various designs employed in monitoring and evaluation.
CO3: Develop skills on statistical approaches forimplementation programmes.
CO4: Orient students on health management informationsystem.

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; 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. Management Information System and Use of Technology: MIS – Monitoring information system; Role of programmers; HMIS system; Global Positioning System, Use of Machine learning and Artificial Intelligence, Use of spatial data

ESSENTIAL READINGS:

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. Rossi, Peter H.; Mark W. Lipsey and Howard E. Freeman (2004). Evaluation, A Systematic Approach. Seventh Edition. Sage Publications – New Delhi.
5. United nations development Group. The Theory of Change, UNDAF Companion Guideline.

SUGGESTED READINGS:

1. IFRC and RCS (2002). *Handbook for Monitoring and Evaluation.* International Federation of Red Cross and Red Crescent Societies –Geneva
2. McLean R. and Gargani J. (2019) Scaling Impact Innovations for the Public Good. Routledge, New York.
3. 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
4. OECD (2021). Applying Evaluation Criterion Thoughtfully, OECD Publishing, Paris. https://doi.org/10.1787/543e84ed-en.
5. 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.

MSP E4.3 **45 Hours**

Gender Theories in Demography and Development

Course Outcomes:

CO1: To provide an analysis of the location of women in processes of development and demographic transition and to understand the centrality of gender in each case through cutting-edge gender and feminist theories;

CO2: To examine theoretical and conceptual frameworks for the demographic and development analysis, including an understanding of gender divisions and inequalities and their interaction with other forms of inequality such as caste, class, race, and ethnicity and their spatiality;

CO3: To reflect upon the linkages between the economy, demography, and the gendered macro and micro processes of development; and

CO4: To provide a basis for research, practical action, and policy formulation, and for evaluating directions and strategies for social change by application of gender theories.

1. Section A

Gender Theories

i. Theoretical framework – Principal Theories of Patriarchy:

Traditionalist Theories of Patriarchy:

a. Religious,
b. Biological determinist,
c. Darwinian or Sociobiology: Evolutionary Sociobiological Theory.

New Economic Theories of Patriarchy:

a. Economic Theories of Patriarchy
b. Cultural or Constructive Social Biology View,
c. Working Hypothesis,
d. Maternalist or Matriarchal Theories,
e. Capitalist Patriarchy.

Indian Context:

a. Brahmanical Patriarchy,
b. Landholding-Patriarchy Hypothesis.

ii. Conceptual shift in the women and development discourse:

From 'Women in Development' (WID) to 'Gender in Development' (GID) and 'Gender and Development' (GAD).

iii. **Historical Perspective of Feminism:**

First Wave of Feminism, Second Wave of Feminism, Third Wave of Feminism, Fourth Wave of Feminism.

Introduction to Feminist Theories:

Gender-Reform Theories, Gender-Resistance Theories, Gender-Rebellion Theories, Liberal Feminism, Marxist Feminism, Social Feminism, Radical Feminism, Lesbian Feminism, Multiracial Feminism, Standpoint Feminism, Postmodern Feminism.

Classical and Neo-Classical Theories of human capital formation, institutions, and their feminist critique.

Feminist critique of the gender perspective in the Indian Planning: from welfare to 'empowerment and women's agency' approach.

2. **Section B**

Locating Gender in Development and Demographic Process

(Note: Worked out as Practical empirical exercises in the form of Classroom Term papers. Precisely use Gender Theories to construct "Theory of Change" in Socio-economic and Demographic measures)

i. Access and control over resources and assets; the cross-cutting issues of caste and class and space; and Spatial-temporal pattern.

ii. Social, Economic and Demographic Aspects and related measures:

a. Literacy/education

b. Women and Economy: Gendered Division of labour- mural and extra-mural

c. Gendered livelihoods and poverty; workforce trends and implications for emerging regional patterns; caste/class/region overlap

d. Gender biases in access and utilization of health including- gender differentials in nutrition and health; mortality differentials by sex, reproductive health and its consequences; and gender inequalities in healthcare utilization

e. Sex Ratio

f. Child Marriages

g. Gender and political participation: national, state and local; equal participation in policy and decision-making process; equal distribution of political power

h. Gender-based violence

i. Gender and mass media- language, image, and portrayal of women

j. Gender Development Indices; Government and bilateral policies/schemes; Gender budgeting; Gender-sensitive financing

k. Institutionalizing gender concerns and gender empowerment in policies and interventions

l. Gender and structural adjustment. National, and International programs, policies, and laws favouring the empowerment of women

m. Gendered Geographies: Space and Place

Essential Readings

1. Agarwal, B., (1994). *A Field of One's Own: Gender and Land Rights in South Asia.* Cambridge University Press: Cambridge.
2. Bhasin, K. (1993). *What is patriarchy?* Kali for Women Publishers, New Delhi.

3. Boserup, E. (1989). *Woman's Role in Economic Development*. Earthscan: London.
4. Engels, F (1884). *The Origin of the Family; Private Property and State*. International Publishers: New York.
5. Kabeer, N. (1994). *Reversed realities: Gender hierarchies in development thought*. Verso.
6. Lerner, G. (1986). *The creation of patriarchy*. Women and History; Vol. 1. Oxford University Press.
7. John, M. E. (Ed.). (2008). *Women's studies in India: A Reader*. Penguin Group.
8. Walby, S. (1990). *Theorizing Patriarchy*. Basil Blackwell: London.

Suggested Readings

1. John, M. E. (1996). Discrepant Dislocations: Feminism, Theory and Post-colonial Histories, Berkeley: University of California Press and Delhi: Oxford University Press.
2. John, M. E. (2014). Feminist Concepts in Time and Space: Perspectives from India, *Economic and Political Weekly*, 2014, vol. 49, no. 22, May 31st.
3. Kabeer, N. (1994). *Reversed realities: Gender hierarchies in development thought*. Verso.
4. Kapadia, K. (2002). Translocal modernities and transformations of gender and caste. *The violence of development: the politics of identity, gender and social inequalities in India*, 142-179.
5. Rege, S. (Ed.). (2003). *Sociology of gender: The challenge of feminist sociological thought*. SAGE Publications India.

Master of Arts/Science in Population Studies

Course No.	Course Name	Course Type	Credits	Hours	No. of Internal Exams	Weightage (%)	
						Internal Exam	Semester Exam
SEMESTER-I							
MSP F1	Social Science Concepts	F	NC	45	3	50	50
MSP C1	Basic Statistical Methods for Population Studies	C	4	60	3	40	60
MSP C2	Demography and History of Population	C	2	30	2	40	60
MSP C3	Age-sex Structure, Quality of Data and Population Dynamics	C	2	30	2	40	60
MSP C4	Nuptiality	C	2	30	2	40	60
MSP C5	Fertility	C	3	45	3	40	60
MSP E1	MSP E1.1: Healthcare System and Policies MSP E1.2: Biostatistics and Epidemiology MSP MSP E1.3: Family Demography	E	3	45	3	40	60
	Semester Credits		**16**	**285**			
SEMESTER-II							
MSP C6	Mortality, Morbidity and Public Health	C	4	60	3	40	60
MSP C7	Research Methodology I	C	2	30	2	40	60
MSP C8	Gender Equity and Reproductive Health	C	3	45	3	40	60
MSP C9	Migration and Urbanization	C	4	60	3	40	60
MSP C10	Statistical Methods and Computer Applications	C	2	30	2	50	50
MSP E2	MSP E2.1: Historical Demography MSP E2.2: Health Economics and Financing MSP E2.3: Urbanization, Space and Planning MSP E2.4: Gender, Health and Development	E	3	45	3	40	60
MSP V1	Viva-Voce-I	VI					
	Semester Credits		**20**	**300**			
SEMESTER-III							
MSP C11	Application of Statistical Packages in Large Scale data	C	4	60	3	50	50
MSP C12	Population Estimations and Projections	C	2	30	2	50	50
MSP C13	Demographic Estimation Techniques and Models	C	2	30	2	50	50
MSP C14	Population, Development and Environment	C	4	60	3	40	60
MSP C15	Population Policies and Programme Evaluation	C	4	60	3	40	60
MSP C16	Research Methodology II	C	3	45	3	50	50
MSP E3	MSP E3.1: Concepts and Measures of Global Health MSP E3.2: Political Demography MSP E3.3: Population, Environment and Sustainable Development MSP E3.4: Occupational Health	E	3	45	3	40	60
	Semester Credits		**22**	**330**			
SEMESTER-IV							
MSP C17	Spatial Demography and Application of GIS	C	4	60	3	50	50
MSP C18	Population Ageing and Health Transition	C	4	60	3	40	60
MSP E	MSP E4.1: Operations Research in Reproductive Health MSP E4.2: Monitoring and Evaluation in Population and Health MSP E4.3: Gender Theories in Demography and Development	E	3	45	3	40	60
MSP D	Dissertation	C	10				
MSP V2	Viva-Voce-II	C	2				
	Semester Credits		23	165			
	TOTAL CREDITS		**81**				

Notes:

Course type: F – Foundation course; C – Core course; E – Elective course; V – Viva voce; D – Dissertation.
NC: Non-credited foundation courses are not counted for calculating the final grade.
Core papers: Must for all students and cannot be changed.
Elective papers: One elective paper should be opted from a pair.

Internal Examination: Teachers are given the flexibility to decide mode of mode of internal examination from the following list: Written Test; Open Book Test; Written Home Assignment; Individual Thematic Presentation; Thematic Group Presentation; Group Discussion; Surprise Test; MCQ Test; Case Study; Situation Analysis (group activity or individual activity); Field Visit; Small Group Project & Internal Viva-Voce; Role Play / Story Telling; Literature Review / Book Review; Model Development/Simulation Exercises (Group Activity or Individual Activity); In-depth Viva; Quiz etc.

Dissertation: Weightage for evaluation of dissertation: Guide 0.25, Presentation & Defence 0.25; and Content 0.50.

Evaluation of Dissertation: The Director & Senior Professor appoints an evaluation committee for dissertation consisting of three members from among the faculty of IIPS. First, the committee members independently assess the 'oral presentation and defence' of the student and submit their grade to the Controller of Examinations. Second, the committee members independently evaluate the content of the 'final dissertation' submitted by the student and submit their grades to the Controller of Examinations. To arrive the final dissertation grade, the average of overall all grades of Guide, Presentation & Defence, and Content is considered.

Best Dissertation Award: The Director & Senior Professor appoints a committee consisting of three external experts for recommending the award of the best dissertation. The dissertations of top five ranks (based on the combined score of content, presentation and defence) are placed before the committee. The external members evaluate dissertations and submit their recommendation in a sealed cover to the Controller of Examinations.

Viva voce: Director & Senior Professor constitutes a committee comprising of one external examiner and three/four internal examiners for the viva-voce. The three/four internal examiners shall comprise of one senior professor (Chairperson), one/two faculty members and one programme co-ordinator. The committee members independently evaluate the performance of the students in the viva-voce and assign their grades. To arrive the final viva-voce grade, the average of the evaluation of the members is considered.

Grades Table

GRADE TABLE FOR EVALUATION OF ANSWER SHEET

The Grades, Grade Point and Descriptions are as given below

Final Grade	Grade Point	Grade Description
O Only	10	Outstanding
A Plus	9	Excellent
A Only	8	Very Good
B Plus	7	Good
B Only	6	Above average
C Only	5	Average
P Only	4	Pass
F3	3	Fail
F2	2	Fail
F1	1	Fail
NA/AB	0	Not Attempted / Absent

GRADE TABLE FOR SEMESTER GRADE CARD

The Grades, Grade Point and Descriptions are as given below

Final Grade	Grade Point	Grade Description
O Only	10	Outstanding
A Plus	9	Excellent
A Only	8	Very Good
B Plus	7	Good
B Only	6	Above average
C Only	5	Average
P Only	4	Pass
F Only	0	Fail
NA/AB	0	Not Attempted / Absent

ANNEXURE-III

To

Date: 28th July 2023

The Director,

IIPS Mumbai- 400088.

The committee duly constituted by the Director & Senior Professor to revise the syllabus of the **Master of Science in Biostatistics and Demography (MBD)** course. The committee under the chairpersonship of Prof. Abhishek Singh had several meetings and presented revise draft of syllabus before in the faculty meeting in order to revise the MBD syllabus.

The committee herewith submitting the final version of revised MBD syllabus after incorporating all the suggestions and comments received in the Academic Council meeting held on 5th July 2023.

Abhishek

(Prof. Abhishek Singh)

Chairperson

28/7/23

(Prof. Murali Dhar)

Member

(Dr. Dilip T R)

Member

Kaushalendra Kumar.

(Dr. Kaushalendra Kumar)

Member

(Dr. Guru Vasishtha)

Member

Guru

28/7/23

Paper Code	COURSE TITLE	No. of credits
	SEMESTER I	
MBD-F1	Basics of Human Biology	2*
MBD-F2	Social Science Concepts	2*
MBD-C1	Introduction to Demography and History of Population	3
MBD-C2	Basic Demographic Methods	3
MBD-C3	Methods in Biostatistics I	2
MBD-C4	Sample Survey Designs	2
MBD-E1	MBD E-1.1: Data Analysis with R and Python	3
	MBD E-1.2: Data Analysis with STATA	3
	Semester Credits	**13**
	SEMESTER II	
MBD-C5	Basic Concepts and Application of Epidemiology	3
MBD-C6	Infectious Disease Epidemiology	2
MBD-C7	Methods in Biostatistics II	2
MBD-C8	Healthcare Systems and Policies	2
MBD-C9	Demographic Theories and Nuptiality	2
MBD-C10	Advanced Sample Survey Designs and Related Concepts	2
MBD-E2	MBD E-2.1: Introduction to Longitudinal Data Analysis	3
	MBD E-2.2: Introduction to Spatial Statistics	3
MBD-E3	MBD E-3.1: Systematic Review and Application of Meta-Analysis	2
	MBD E-3.2: Large-scale Sample Surveys	2
MBD-V1	Viva-voce	2
	Semester Credits	**20**
	SEMESTER III	
MBD-C11	Research Methods in Epidemiology and Biostatistics	4
MBD-C12	Advanced Demographic Methods	3
MBD-F3	Introduction to Demographic Packages	2*
MBD-C13	Advanced Methods in Biostatistics	2
MBD-E4	MBD E-4.1: Concepts and Measures of Global Health	3
	MBD E-4.2: Big Data using Machine Learning	3
	MBD E-4.3: Health Economics and Financing	3
MBD-E5	MBD E-5.1: Population Ageing and Health Transition	3
	MBD E-5.2: Population, Environment and Sustainable Development	3
	MBD E-5.3: Gender, Health and Development	3
MBD-C14	Survival Analysis	3
	Semester Credits	**18**
	SEMESTER IV	
MBD-C15	Data Management and Analysis in SAS	3
MBD-C16	Demographic Models and Indirect Methods of Estimation	3
MBD-C17	Methods in Clinical Trials	3
MBD-E6	MBD E-6.1: Operations Research in Population and Health	3
	MBD E-6.2: Monitoring and Evaluation in Population and Health	3
	MBD E-6.3: Urbanization, Space and Planning	3
MBD-D	Dissertation	10$^{\$}$
MBD-V2	Viva-voce	2
	Semester Credits	**24**
	Total credits	**75**

*Credit not counted for calculating final grade.

$ Evaluation procedure for dissertation (weights): 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, 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

MBD-F1	Basics of Human Biology	30 Hours

Course Outcomes:
CO1: Aware of the basics of human biology.
CO2: Understand the human life cycle and its bearing on health and diseases.
CO3: Familiarity with anatomy and physiology of different organ systems of the human body.
CO4: Acquire basic knowledge about the pathophysiology of human organ systems.

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. Sembulingam K and Prema Sembulingam, 2019, Essentials of Medical Physiology, Jaypee Brothers Medical Publishers New Delhi.

Suggested Reading List

1. Horton Casey, 1994, Atlas of Anatomy, Marshall Cavendish Books, London
2. 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.
3. Keele, Neil et.al, 1991, Samson Wright's Applied Physiology, Oxford University Press, Delhi.

MBD-F2	Social Science Concepts	30 Hours

Course Outcomes:

CO1: To gain familiarity with basic social science concepts that has bearing on understanding population dynamics.
CO2: Imagine the varied axis of social reality, such as caste, tribe, gender, kinship and marriage, social mobility and religion in terms of its relevance in population studies.
CO3: Viewing population in space and time and read population geography in consideration of man-environment relationship, geographical factors and regional perspective.
CO4: Recognition of interplay between economic development and population changes in an evolving world order.
CO5: To understand the psychological concepts like perception, behaviour, emotion, personality, coping mechanism, communication and their bearing on Population Studies

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
   b) 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

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; Mapsscale, 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.

ECONOMICS

1. Introduction:

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

2. 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.

3. Basic Concepts in Macro Economics

Basic Concepts in National Income: Concept of GDP, NDP, GNP, NNP, NI, PCI, PPP, 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.

PSYCHOLOGY

1. Social Psychological Concepts:

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

2. Basics of Psychology:

Why Psychology, branches of psychology, methods of research, Psychological wellbeing acrossmajor stages of the life span. Role of psychology in population studies.

ESSENTIAL READINGS:

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
5. Winston, New York, (1949), Chapters No.1, 3,7,11,15,22,24,25,26.
6. Srinivas M.N**.,** *Social Change in Modern India,* University of California Press, Berkeley, (1966)
7. Sen, A. (2018). Collective Choice and Social Welfare: An Expanded Edition. United Kingdom: Harvard University Press.
8. Haralambos, Michael, *Sociology: Themes and Perspectives,* Oxford University Press, Delhi (1980).
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)Abler, R, Adams, J and Gould P., (1971): *Spatial Organization: The Geographer's view of the World,* Prentice Hall, New Jersey.
15. Johnston, R.J., (2004): *Geography and Geographers,* Oxford Unity Press.
16. Richard, Peet**.,** (1998): *Modern Geographic Thought,* Blackwall Publishers
17. Singh, R.L., (1971) *India: A Regional Geography,* National Geographical Society of India, Varanasi.
18. 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
19. Koutsoiannis A, 1979, Modern Microeconomics, London: Macmillan Press Ltd,
20. Lipsey and Chrystal, 2004, Economics, Oxford university Press, Part One, part two and part five
21. Dasgupta AK, Epochs of Economic Theory, OUP, Bombay, Chapters 2, 3, 4, 7 and 8
22. Kuppuswamy B**.,** *Social Change in India,* Konark Publication Pvt. Ltd. Delhi, (1972).
23. Muzumdar, Haridas , *The Grammar of Sociology: Man in Society*, Asia Publishing House, Mumbai (1966).
24. Johnson, Harry M, *Sociology: A Systematic Introduction,* Allied publishers, Bombay (1966).
25. Mc Gee, Reece , *Sociology: An Introduction* , Holt, Rinehard and Winston, New York (1980).
26. Magill, Frank N (ed.), *International Encyclopedia of Sociology,* Fitzroy Dearborn Publishers, London, (1995).
27. Francis John Monkhouse (1956) *Maps and Diagrams: Their Compilation and Construction*, University of Michigan.
28. JF Friedman (1966) *Regional Development Policy: A Case Study of Venezuela*, Cambridge, Massachusetts : MIT Press, 1966.
29. Samuelson, Paul A. and William D. Nordhaus., "Economics", New York: Tata McGraw Hill, part one, two and five
30. Datt R and Sundaram K.P.M, 2000**,** Indian economy, S. Chand & Company Ltd, Part II.
31. Government of India, Ministry of Finance, Economic Division, Economic Survey

Core Courses

MBD-C1	Introduction to Demography and History of Population	45 Hours

Course Outcomes:

CO1: Learn scope of demography and its relationship with other disciplines.
CO2: Understand the global, regional and national population trends.
CO3: Understand the nature of diversity in the size, distribution, composition, and basic characteristics of population across Indian states.
CO4: Know various sources of demographic data in India, and their limitations.
CO5: Appreciate the historical perspectives on population change.

Unit I: 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; registration of births and deaths act 1969

Unit II: Population History

Global population trends - Historical population trends, world population growth-a brief history, the power of doubling; global variation in population size and growth; past, present and future population trends across the world, continents, and major regions; history of population in India - trends and growth of India's population; concerns of population growth- before and after independence

Unit III: Sources of Demographic Data

Population census across the world; Census taking under British India; Indian census, details of different items on which Indian census collect data, publicationof census data/ reports; Vital registration system; Sample registration system (SRS), survey on causes of death; National Sample Survey Organization's surveys, details of different rounds collecting population and health data; Nationwide sample surveys - National Family Health Survey (NFHS), District Level Household and Facility Survey (DLHS), etc.

Unit IV: Population Theories

Malthus and Marx; optimum population; demographic transition theory

Essential Readings:

1. Bhende, A., (1996): *Principles of Population Studies* (Seventh Edition), Himalaya Publishing House, Bombay.
2. Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography,*Second Edition, USA.
3. John Weeks (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.
4. United Nations, (1973): The Determinants and Consequences of Population Trends, Vol. I, Population Studies, No. 50, Chapter VII, New York.

Suggested Reading List

1. Davis, Kingsley (1968). The Population of India and Pakistan, Russell and Russell, New York.
2. Bogue, D. (1969): *Principles of Demography*, John Wiley and Sons, New York.
3. Livi-Bacci, M. (1996): A Concise History of World Population (2nd edition), Oxford.

MBD-C2	Basic Demographic Methods	45 Hours

Course Outcomes:
CO1: Learn basic demographic concepts and measures of fertility, mortality and migration.
CO2: Learn synthetic formulation of survival experience (e.g. life table).
CO3: Understand the need for standardized comparison of demographic measures.
CO4: Learn computation and interpretation of levels and trends of fertility, mortality, and migration

Unit I: 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; cohort measures; birth interval analysis; reproduction measures

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

Unit II: 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; standardization: direct and indirect technique of standardization of rates and ratios; 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

Unit III: Migration
Concept and definition of mobility and migration: sources, quality and limitation of data; definition and concept of urban and urbanization

Types and streams of migration; internal migration - trend, patterns, determinants and consequences in developing countries with a special focus on India; international migration - trend, pattern and consequences

Degree of urbanization; 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 return migration;

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. Pathak, K.B. and F. Ram, (1998) Techniques of Demographic Analysis, Mumbai:Himalaya Publishing House, Chapter 4, Pp.108-153.
3. United Nations, (1974): *Methods of Measuring Internal Migration,* Manual VI, UN, New York.

Suggested Reading List

1. Preston, Samuel, Patrick Heuveline, and Michel Guillot: Demography – Measuring and Modeling Population Processes, Wiley-Blackwell, 2001.
2. Asha A. Bhende and Tara Kanitkar, (2003), *Principles of Population Studies,* Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
3. Hinde, Andrew (1998) *Demographic Methods.* London: Arnold.
4. John R. Weeks, (2005), *Population: An Introduction to Concepts and Issues,* Nineth Edition, Wadsworth Publishing Company, Belmont, California.

MBD-C3	Methods in Biostatistics I	30 Hours

Course Outcomes:
CO1: Learn the basic concepts of Biostatistics.
CO2: Understand types of data and summarizing data.
CO3: Understand basic concept of probability and sampling distributions.
CO4: Learn basic concepts of statistical inference.
CO5: Understand statistical methods.

Unit I: Introduction
Definition and objectives of biostatistics

Unit II: Types of data
Categorical data; numerical data; censored data

Unit III: Summarizing data
Tables and graphs; measures of central tendency; measures of dispersion and variability; measures of skewness and kurtosis

Unit IV: Probability concepts and distributions
Random variables; concept of probability; probability distributions; joint, marginal, conditional distributions

Unit V: Sampling distributions
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.

Unit V: Basic concepts of statistical inference
Using samples to understand populations; standard error; confidence intervals; hypothesis tests, p-value, and statistical power

Unit VI: Goodness of fit and contingency tables

Unit VII: Non-parametric methods

Unit VIII: Statistical methods
Correlation; linear regression; analysis of variance

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. Mood, A.M., Graybill, F.A., and Boes, D.C.: Introduction to the Theory of Statistics, Third edition. McGraw Hill.

Suggested Reading List

1. Zar, C Z: Biostatistical Analysis, 5th Edition, 2015
2. Bonita R, Beaglehole, R, Kjellstrom, T: Basic Epidemiology, 2nd Edition, 2006.

MBD-C4	Sample Survey Designs	30 Hours

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.

Unit I: Introduction and basic concepts

Introduction; need for sample surveys; sample survey versus complete enumeration; population, units and sampling units; sampling design; probability and non-probability sampling; sampling frame; bias and errors in sample surveys

Unit II: Simple random sampling

Description; method of selection; estimation of mean, total, and proportion; sampling variance of mean, total and proportion; determination of sample size

Unit III: Stratified random sampling

Description; estimation of mean, total, and proportions; sampling variance of mean, total, and proportions; allocation and selection of units; advantages of stratification

Unit IV: Systematic sampling

Description; method of selection; circular systematic sampling; advantages and disadvantages of systematic sampling; estimation of sampling variance

Unit V: Cluster sampling

Description; method of selection; estimation of parameters; estimation of sampling variance of parameters

Essential Reading List

1. Cochran, W.G. (1977). Sampling Technique, Third edition. New York: John Wiley& Sons.
2. Kish, L. (1995). Survey Sampling. New York: John Wiley and Sons, INC.
3. Roy, Tarun Kumar, Acharya, Rajib, and Roy, Arun Kumar (2016). Statistical Survey Design and Evaluating Impact. Delhi, India: Cambridge University Press.

Suggested Reading List

1. Lwanga, S.K. and Lemeshow, S. (1991). Sample size determination in healthstudies. Geneva: The World Health Organization.
2. Ladusingh, Laishram (2018). Survey Sampling Methods. Prentice Hall India.

MBD-C5	Basic Concepts and Application of Epidemiology	45 Hours

Course Outcomes:

CO1: Learn the basic concepts of different streams of Epidemiology, measuring the occurrence of disease, and disease risks.
CO2: Understand the study designs widely used in Epidemiology.
CO3: Learn the application of Epidemiology for evaluating health services.

Unit I: Introduction

Definition and objectives of epidemiology; epidemiology and clinical practice; the epidemiologic approach; infectious disease epidemiology, occupational epidemiology, disaster epidemiology

Unit II: 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

Unit III: Issues in epidemiology

Association; causation; causal inference; errors and bias; confounding; controlling confounding; interactions; generalizability

Unit IV: 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

Unit V: Application of epidemiology to identify the cause of disease

Cohort studies; case-control studies; nested case-control studies; comparing cohort and case-control studies; experimental studies

Unit VI: Application of epidemiology to evaluate health services

Essential Reading List

1. Gordis L: Epidemiology, ed. 3. Philadelphia, 2004.
2. Bonita R, Beaglehole R, Kjellstrom T: Basic Epidemiology, ed. 2. World Health Organization, 2006.
3. Dunn G, Everitt B: Clinical Biostatistics: An Introduction to Evidence-based Medicine. Edward Arnold, 1995.

Suggested Reading List

1. Park, K.**:** Park’s Textbook of Preventive and Social Medicine. **26**th Edition, M/S Banarsidas Bhanot Publishers, Jabalpur**, 2021.**
2. MacMahon B, Pugh T F: Epidemiology: Principles and Methods. Boston, Little Brown, 1970.

MBD-C6	Infectious Disease Epidemiology	30 Hours

Course Outcomes:
CO1: Learn terms and concepts of infectious disease epidemiology.
CO2: Learn concepts and methods related to modelling of infectious diseases.
CO3: Learn concepts, principles, and uses of surveillance of infectious diseases.
CO4: Familiarity with history and implications of infectious diseases.

Unit I: Introduction and basic concepts
Introduction; basic concepts; epidemiological triad; chain of transmission.

Unit II: Spread of infectious diseases and determinants
Epidemic, endemic and pandemic; disease outbreak; determinants of disease outbreak; herd immunity; incubation period

Unit III: Modelling infectious diseases
Transmission dynamics models; SI, SIS, SIR, and SICR models; Kermack- McKendrick threshold theorem; Kermack- McKendrick threshold theorem epidemiology; basic reproductive number (R_0); what determines R_0; effective reproductive number (R_t); eradication threshold; other considerations while vaccinating; estimating R_0.

Unit IV: Surveillance of infectious diseases
Surveillance of infectious diseases; guiding principles behind surveillance; uses of surveillance; integrated disease surveillance programme in India; outbreak investigation.

Unit V: History, implications and health care responses to a pandemic
Examples of COVID-19, SARS, etc.

Essential Reading List

1. Gordis L: Epidemiology, ed. 3. Philadelphia, 2004.
2. Park, K.: Park’s Textbook of Preventive and Social Medicine. 26th Edition, M/S Banarsidas Bhanot Publishers, Jabalpur, 2021.
3. Abubaker, Ibrahim, Helen R Stagg, Ted Cohen, and Laura C Rodrigues: Infectious Disease Epidemiology, Oxford University Press, 2016.

Suggested Reading List

1. Giesecke, Johan: Modern Infectious Disease Epidemiology 3rd Edition, CRC Press, 2017.
2. Kramer, Alexander, Mirjam Kretzschmar, and Klaus Krickeberg: Modern Infectious Disease Epidemiology – Concepts, Methods, Mathematical Models, and Public Health, Springer New York, 2012.
3. Centers for Disease Control and Prevention (CDC). Introduction to Public Health. In: Public Health 101 Series. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2014.

MBD-C7	Methods in Biostatistics II	30 Hours

Course Outcomes:

CO1: Understand multivariable regression models and related concepts.
CO2: Understand the use and interpretation of outputs of multivariable regression models.
CO3: Understand other multivariate techniques

Unit I: Multivariable regressions

Multiple regressions; partial correlation, relationship among simple, partial and multiple correlation coefficients; issues in multivariable regressions – multicollinearity, interaction, outliers; non-linearity; missing data; R^2 and adjusted R^2; omission of relevant variables and inclusion of irrelevant variables; multivariable regression with dummy explanatory variables; effect modifier

Unit II: Multivariable regression with categorical outcome variables

Binary logistic regression; conditional logistics regression; multinomial logistic regression; probit regression

Unit III: Multivariable regression with ordinal and count outcome variables

Ordinal logistic regression; poisson regression

Essential Reading List

1. Kennedy, Peter (2008). A Guide to Econometrics, 6th Edition. Wiley-Blackwell.
2. Agresti, Alan (2002). Categorical data analysis. New York: Wiley.
3. Cameron, A.C. and Trivedi, P.K. (1998). Regression analysis of count data. Cambridge University Press.

Suggested Reading List

1. Gujarati, DN and Sangeetha (2007). *Basic Econometrics* (Fourth Edition), TataMcGraw Hill, New Delhi.
2. Breslow, N.E. and Day, N.E. (1980). Statistical methods in cancer research. Vol I-the analysis of case-control studies. IARC Scientific Publication No. 32. Lyon: International Agency for Research on Cancer.
3. 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.

MBD-C8	Healthcare Systems and Policies	30 Hours

Course Outcomes:
CO1: Become aware about the basic concepts of health/health services/health care.
CO2: Understand health systems and services.
CO3: Understand health policy and its formulation.
CO4: Understand the regulations in the health sector.

Unit I: Basic Concepts

Concepts of health; public health; community health; preventive and curate health; one health; health promotion; health services; and primary, secondary and tertiary care; health data sources

Unit II: Health System

Goals; boundaries; functions; WHO's health system building blocks - service delivery, health workforce, health Information systems, access to essential medicines, financing and leadership/governance.

Unit III: Health Services

Basic models and functions of health services; international experiences; goals and elements in universal health care (UHC) approach.

Unit IV: Health care system in India

Public sector; private sector; voluntary sector; human resources for health; access to health care; utilization and expenditure on health services; UHC initiatives and challenges ahead; health workforce

Unit V: 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 VI: Health policymaking in India

Health planning in post-Independent India; national health policies; national health policy 2017; current national health programmes.

Unit VII: Regulation in the health sector

Need for regulations; mechanisms for regulations; 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.

Suggested Reading List

1. Government of India. 2017. National Health Policy-2017. New Delhi: Ministry of Health and Family Welfare, Government of India.
2. Balarajan, Yarlini, Selvaraj Selvaraj, and S. V. Subramanian. "Health care and equity in India." The Lancet 377, no. 9764 (2011): 505-515.
3. Gilson, Lucy, and World Health Organization. Health policy and system research: a methodology reader: the abridged version. World Health Organization, 2013.
4. 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.
5. Nandraj, S., Gupta, P., & Randhawa, S. (2021). Regulation of Health Care Delivery in India - A Landscape Study, Health Systems Transformation Platform, New Delhi.

MBD-C9	**Demographic Theories and Nuptiality**	**30 Hours**

Course Outcomes:
CO1: Learn fertility theories.
CO2: Learn framework of child survival.
CO3: Learn basic concepts of nuptiality.
CO4: Identify the different sources of data for nuptiality
CO5: Perform nuptiality analysis

Unit I: Fertility theories

Theory of social capillarity; theory of change and 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.

Unit II: Mosley & Chen framework of child survival

Unit III: Nuptiality

Introduction, Basic Concepts, Sources of Data and their limitations. Measures of Nuptiality from Registration data.
Analysis of Marital Status Data from Census.
Singulate Mean Age at Marriage (SMAM) - Synthetic Cohort and Decadal Synthetic Cohort Method.
Indices of Nuptiality (Coale's Indices)

Marriage Pattern in India and Selected Countries and related factors.

Marriage squeeze: Concepts and Implications, Concepts of Hypergamy and Hypogamy Gross and Net Nuptiality Tables.
Non-marriage
Multistate approach in Nuptiality analysis. Standard Age Pattern of Marriage – Coale's Model.

Divorce and Widowhood.

i. Definition and basic measures.
ii. Marriage Dissolution Tables and Remarriage Concept
iii. Mean Age at Widowhood/Divorce from Census Returns.

Definition and Measures of Remarriages of Widowed and Divorces

ESSENTIAL READINGS:

1. Siegel, Jacob S., and David A. Swanson (eds.), (2004) *The Methods andMaterials of Demography* (Second edition). San Diego: Elsevier Academic Press.
2. Newell, Colin (1988) *Methods and Models in Demography*. London: Frances Pinter.
3. Asha A. Bhende and Tara Kanitkar, (2003), *Principles of Population Studies,*
4. Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.

5. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis,Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.

SUGGESTED READINGS:

1. Coale Ansley J. and T. James Trussell (1978) *Technical Note: Finding the TwoParameters that Specify a Model Schedule of Marital Fertility. Population Index 44, 2* (1978), pp. 203-213.
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. 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. Rowland, Donald T. (2006), *Demographic Methods and* Concepts. New York: Oxford University Press.
5. 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: FertilityResearch, (All three chapters but selected pages).
6. Pollard, A.H., Yusuf, Farhat and Pollard, G.N. (1990) *Demographic Techniques* (third edition). Sydney: Pergamon Press.

MBD-C10	Advanced Sample Survey Designs and Related Concepts	30 Hours

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

Essential 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.

Suggested Reading List

1. Ladusingh, Laishram (2018). Survey Sampling Methods. Prentice Hall India.
2. Cochran, W.G. (1977). Sampling Technique, Third edition. New York: JohnWiley & Sons.

MBD-C11	Research Methods in Epidemiology and Biostatistics	60 Hours

Course Outcomes:
CO1: Become familiar with the scientific approaches for conducting research.
CO2: Understand qualitative and quantitative methods of data collection.
CO3: Understand qualitative data analysis using packages like Atlas Ti, Nvivo and Dedoose.
CO4: Enhanced skills for writing a proposal and scientific articles.
CO5: Gain experience of field level setting and primary data collection.

Unit I: Philosophy of Research

Unit II: Scientific Methods of Research
Definition of research, assumptions, operations and aims of scientific research; the research process - conceptual, empirical and analytical phases of research

Unit III: 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

Unit IV: Clinical agreement
Kappa statistics

Unit V: Research Ethics
Ethics of Research; history of ethical guidelines and general principlesinformed consent and human subject protection; ICMR ethical guidelines for biomedical research on human participants; biomedical research on human subjects -regulation, control and safeguards

Unit VI: Quantitative methods of data collection
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

Unit VII: Qualitative methods of data collection
Introduction to qualitative research; approaches in qualitative research; participatory rapid techniques – transect walk, social mapping; systematic techniques – free listing, pile sorting, Delphi techniques, projective techniques, mechanical devices (camera, tape recorder, mobile recording), mystery client technique; in-depth techniques – in-depth interviews, focus group discussion, key informant interview, case study, observation

Unit VIII: Data Collection and processing

Unit IX: Analysis of qualitative data using softwares

Nvivo; ATLAS Ti; Dedoose

Unit X: 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; STROBE checklist

Essential Reading List

1. Given, Lisa M: The SAGE Encyclopedia of Qualitative Research Methods, SAGE Publications Inc., 2008.
2. Dunn G, Everitt B: Clinical Biostatistics: An Introduction to Evidence-based Medicine. Edward Arnold, 1995.
3. Wolf, Christof, Dominique Joye, Tom W Smith, and Yang-chih Fu: The SAGE Handbook of Survey Methodology, SAGE Reference Los Angles, 2016.

Suggested Reading List

1. Schensul, Stephen L, Jean J Schensul, and Margaret D LeCompte: Essential Ethnographic Methods – Observations, Interviews, and Questionnaires, Altamira Press, Walnut Creek, 1999.
2. Indian Council of Medical Research (ICMR): National Ethical Guidelines for Biomedical and Health Research involving Human Participants, ICMR New Delhi, 2017.
3. Creswell, John W: Qualitative inquiry and research design: Choosing among five approaches- 2nd ed. Sage Publications, 2007.
4. United Nations: Household Sample Surveys in Developing and Transition Countries, Department of Economics and Social Affairs, United Nations New York, 2005.

MBD-C12	Advanced Demographic Methods	45 Hours

Course Outcomes:

CO1: Measure and analyze the age-sex structure of a population and its determinants and consequences.
CO2: Learn framework of child survival.
CO3: Learn stable population model
CO4: Learn methods used for evaluating and adjusting demographic data.
CO5: Learn methods used for population projections.

Unit I: Age and sex structure and its implications

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; socio-economic implications of age and sex structure

Unit II: Stable Population model

Stable population; conditions producing a stable population; equations characterizing a stable population; relation between intrinsic growth rate and NRR; effects of changes in fertility and mortality on age structure; momentum of population growth

Unit III: Evaluation and adjustment of demographic data

Types of errors - coverage and content errors; sources of errors; post-enumeration surveys, dual record system; techniques of evaluation of age data using Whipple’s index, Myer’s index, UN Joint score; smoothing of age data

Unit IV: 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 andmigration components; population projections of United Nations, World Bank and Expert Committees ofGovernment 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. Preston, S.H., Heuveline, P and Guillot, Michel (2001). Demography: measuring and modelling population processes. Oxford: Blackwell Publishers Ltd.
2. Shryock, H.S. and Siegel, J.S. (1976). The methods and materials of demography.California: Academic Press, Inc.
3. United Nations (1956). Manual III. Methods for population projections by age andsex. New York: United Nations.

Suggested Reading List

1. Moultrie, Tom et al. (2013). Tools of demographic estimation. Paris: IUSSP.
2. Srinivasan, K. (1997). Basic demographic techniques and applications. New Delhi:SAGE.

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

MBD-F3	**Introduction to Demographic Packages**	**30 Hours**

Course Outcomes:
CO1: Gain understanding of demographic packages.
CO2: Capable of estimating demographic outcomes using these packages.
CO3: Capable of projecting demographic and health parameters using these packages.

Unit I: Introduction of MORTPAK

File - new, open, close; save input and output; print worksheet; Edit - undo, select, cut, copy, and clear from worksheet, paste to worksheet; view; application; run; chart; window.

Unit II: MORTPAK modules and their application

BENHR; COMPAR; FERTCB; FERTPF; ICM; LIFTB; QFIVE; STABLE; WIDOW.

Unit III: Introduction and application of SPECTRUM

Introduction; DemProj; FamPlan; LiST; AIM; Goals; Resource Needs Module; TIME; Malaria; STI; NCD.

Essential Reading List

1. Futures Institute: SPECTRUM Manual: Spectrum System of Policy Models, Future Institute.
2. United Nations: MORTPAK for Windows. United Nations, 2013.

MBD-C13	Advanced Methods in Biostatistics	30 Hours

Course Outcomes:
CO1: Become aware about the advanced multivariate models.
CO2: Capable of estimating and interpreting advanced multivariate models.
CO3: Capable of estimating and interpreting multilevel models.
CO4: Learn other multivariate techniques

Unit I: Simultaneous equation models

Identification problem; methods of estimation - instrumental variable method and two-stage-least squares method; diagnostic checkingand model selection

Unit II: 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 generalized model; latent variable representation of a generalized linear model

Unit III: Multilevel modelling

A multilevel model for group effects; estimating group effects; random vs. fixed effects; random intercept model; random slope model; generalized linear random intercept model; random intercept logit model; random slope logit model

Unit IV: Other multivariate techniques

Factor analysis; discriminant analysis; cluster analysis; correspondence analysis

Essential Reading List:

1. Snijders, Tom A.B. and Bosker, Roel J., (1999): *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* Sage Publications.
2. McCullagh, P., & Nelder, J.A. (1989). *Generalized linear models.* CRC press.
3. Hair Jr, J.F., Black, W.C., Babin, B.J. and Anderson, Roph E. (2009) Multivariate data analysis 7th Edition. Pearson.

Suggested Reading List

1. Goldstein, H. 2003. Multilevel Statistical Models. Arnold. Some of the contents can be downloaded for from the following link, including updates and corrections: Multilevel Statistical Models (3rd Edition).
2. Gujarati, DN and Sangeetha (2007). Basic Econometrics (Fourth Edition), Tata McGraw Hill, New Delhi.
3. Dobson, AJ & Barnett, A. (2008). An Introduction to Generalized Linear Models. Chapman and Hall.
4. Backhaus, K., Erichson, B., Gensler, S., Weiber, R. and Weiber, T. (2021). Multivariate Analysis: an application-oriented introduction. Springer Gabler Wiesbaden.

MBD- C14	Survival Analysis	45 Hours

Course Outcomes:

CO1: Learn basic premises of survival analysis and its application.

CO2: Learn application of non-parametric methods for estimating survival functions and differentiation of survival curves.

CO3: Learn frequently used regression models of survival analysis.

Unit I: Introduction

Introduction to survival analysis; motivating the need; concepts and definitions; concept of censoring and type of censoring

Unit II: Functions of survival time

Survival function, probability density function, hazard function; relationship between the three types of function; survival curve; estimating medium survival time; estimation of these function in the absence and presence of censoring; application of these functions in survival analysis

Unit III: Survival distributions

Weibull distribution; exponential distribution; lognormal distribution; gamma distribution

Unit IV: 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

Unit V: Comparing survival curves

Generalized Wilcoxon (Breslow, Gehan); Logrank test

Unit VI: 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 hazardmodels in Epidemiology and Public Health; discrete-time survival models; regression models with time dependence; competing risks

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.

Suggested Reading List

1. *Armitage P, Berry G:* Statistical Methods in Medical Research, ed.4, Wiley Blackwell, 2001.
2. *Choe MK, Retherford RD:* Statistical Models for Causal Analysis, Wiley-Interscience, 1993.

MBD-C15	Data Management and Analysis in SAS	45 Hours

Course Outcomes:
CO1: Learn the functioning of the SAS statistical packages in handling data sets.
CO2: Learn data wrangling in SAS.
CO3: Learn data analysis in SAS.
CO4: Learn the survey data analysis module in SAS.

Unit I: Access and create data structures and generate reports and output

Create temporary and permanent SAS data sets; use a LIBNAME statement to assign a library reference name to a SAS library; access SAS data sets with the SET statement; INFILE Statement & PROC IMPORT to access non-SAS data sources; combine SAS data sets; use informats and formats to correctly read & display data; control observations and variables in a SAS data set by using the WHERE statement & DROP and KEEP statements; generate list reports using the PRINT procedure; generate reports using ODS statements.

Unit II: Manage data

Sort observations in a SAS data set; conditionally execute IF-THEN/ELSE statements; use assignment statements in the DATA to create new variables and assign a new constant value & an expression to a variable; Modify variable attributes using RENAME= options and LENGTH, LABEL and FORMAT statements in the DATA step; Accumulate sub-totals and totals using DATA step statements; use SAS functions to manipulate character data, numeric data, and SAS date values; use SAS functions to convert character data to numeric and vice versa; process data using DO LOOPS; restructure SAS data sets with PROC TRANSPOSE; create macro variables with the %LET statement; use macro variables within SAS programs.

Unit III: Estimation of measures of central tendency and dispersion

Unit IV: Analysis of variance and covariance

One sample tests; two-sample tests; one-way analysis of variance; two- and N- way analysis of variance; analysis of covariance

Unit V: Linear regression analysis and regression diagnostics

Unit VI: Regression models for binary, categorical and ordinal outcomes; conditional logistic regression model

Unit VII: Regression models for survival data analysis

Cox proportional hazard model; test for proportionality assumption; discrete-time survival models

Unit VIII: Event-count models

Poisson regression; generalized linear models

Unit IX: Survey data analysis

Estimation of mean and proportion; estimation of multivariable linear regression and binary and multinomial logistic regression models

Essential Reading List

1. Field, Andy and Miles, Jeremy (2010). *Discovering Statistics using SAS*. SAGE Publishing.
2. Cody R, Smith J (1997). *Applied Statistics & the SAS Programming Language, 4th Edition*. Prentice Hall.

MBD-C16	**Demographic Models and Indirect Methods of Estimation**	**45 Hours**

Course Outcomes:

CO1: Learn and appreciate the concept of demographic modelling of events, processes, and outcomes.

CO2: Familiarity with indirect estimation procedures of vital rates towards verifying its robustness with observed survey estimates.

CO3: Learn the limitation in available data and service statistics as regards its completeness, accuracy, and reliability.

Unit I: Concepts of demographic models

Concept of multiregional model; micro models, such as birth interval, waiting time (birth distribution etc, estimation of fecundability)

Unit II: Indirect methods for estimating fertility

Need 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]; own-children method of fertility estimation

Unit III: Indirect method of estimating mortality

Methods for estimating infant and child mortality: basic concepts, fundamental assumptions, and underlying principles to the technique proposed by Brass based on retrospective data on children ever-born andsurviving mothers classified by current age of mother; modifications proposedby Sullivan and subsequently by Trussell for Brass method; the United Nations revised and extended version of Trussell's method

Methods for estimating adult (including maternal mortality) and old–age mortality: Estimating adult mortality using successive census age- distributions; methods for estimating life expectancies at older ages; estimation of maternal mortality through sisterhood method

Unit IV: Assessing completeness of death registration

Methods for estimating death registration completeness for countries having limited and defective vital registration data: Overview of some selected methods of estimating completeness of death registration - 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. Pathak, K.B. and F. Ram (1998): *Techniques of Demographic Analysis*, Himalaya Publishing House, Second Edition, Mumbai.
3. 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).

Suggested Reading List

1. Moultrie, Tom et al. (2013). Tools of demographic estimation. Paris: IUSSP.
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.

MBD-C17	**Methods in Clinical Trials**	**45 Hours**

Course Outcomes:

CO1: Learn features and characteristics of clinical trials and its execution.

CO2: Learn varying designs, recruitment of clients, and various stages of clinical trials.

CO3: Learn methods for analyzing clinical trial data.

Unit I: Basic concepts of clinical trials

Basic concepts; definitions; historical perspectives

Unit II: Classification of trials by design and purpose

Phases of clinical trials, concept of randomization, process of randomization, types of blinding

Unit III: Clinical trial designs

Completely randomized design, randomizedblock designs and factorial designs; cross-over designs

Unit IV: Sample size determination

Sample size determination for qualitative and quantitative outcomes, sample size for cluster randomization, sample size for repeated trials

Unit V: Planning and conduct of clinical trials

Protocol development; multicentric trials; deviations from protocol; stopping rules; considerations of adverse effects and non-compliance

Unit VI: Ethical issues

Ethical issues in clinical research; ICMR guidelines on ethical issues in medical research

Unit VII: Data safety and monitoring concepts

Types of form for clinical trials - baseline assessment, evaluation form, flow sheet, layout and design, missing, range and logicalchecks, data transfer

Unit VIII: 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.

Suggested Reading List

1. Dean, A., Voss, M: Design and Analysis of Experiments.
2. Federer, W.T.: Experimental Designs- Theory and Methods. Oxford & IBH.
3. Das, M.N. and Giri, N.C.: Design and Analysis of Experiments. Wiley Eastern.

Elective Courses

MBD E-1.1	Data Analysis with R and Python	45 Hours

Course Outcomes:

CO1: Learn open source softwares R and Python for data analysis.
CO2: Learn exploratory data analysis with R and Python.
CO3: Learn use of R and Python programming for model development.

R

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

Python

Unit I: Introduction

Introduction to Python; advantages of python over other programming languages; Python packages for data science

Unit II: Importing dataset

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

Unit III: 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 IV: 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 V: 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. Wes McKinney, Python for Data Analysis, O'Reilly Media, Inc., 2017.
4. Samir Madhavan, Mastering Python for Data Science, Packt Publishing, 2015.

Suggested Reading List

1. Download and install R from https://cran.r-project.org/
2. Download RStudio from www.rstudio.com
3. Video Tutorials on Installing R on windows
4. Video Tutorials for Installing R on Mac

MBD E 1.2	Data Analysis with STATA	45 Hours

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.

MBD E-2.1	**Introduction to Longitudinal Data Analysis**	**45 Hours**

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 STATA/SAS

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.

MBD E-2.2	**Introduction to Spatial Statistics**	**45 Hours**

Course Outcomes:
CO1: Learn basic spatial concepts and cartography.
CO2: Learn basic spatial statistics.
CO3: Learn spatial regression models and their application.
CO4: Learn softwares used for estimating spatial statistics.
CO5: Learn application of spatial statistics using ArcGIS and Geoda.

Unit I: Introduction to spatial statistics

Unit II: 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

Unit III: Basic Spatial Statistics

Exploratory spatial data analysis (ESDA); Moran's I; local indicators of spatial association (LISA) – univariate and bivariate; kriging; spatial pattern analysis

Unit IV: Spatial Regression Models

Lag and error regressions; multilevel models; geographically weighted regression

Unit V: Introduction to Geospatial Software

Geographic Information System (GIS) **-** discrete data, point, and polygondata; raster and vector data; layouts preparation; geocoding and basics of digitization in ArcGIS; Geoda

Unit VI: Application of spatial statistics using ArcGIS and Geoda

Essential Reading list:

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Wookbook. 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. ESRI (1993): Understanding GIS. Redlands, USA

Suggested Reading list:

1. 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.
2. 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
3. Sparks Corey. (2013). *Spatial Analysis in R: Part 1*. Spatial Demography 1(1) 131-139
4. Sparks Corey. (2013). *Spatial Analysis in R: Part 2*. Spatial Demography 1(2) 219-226

MBD E-3.1	**Systematic Review and Application of Meta-Analysis**	**30 Hours**

Course Outcomes:
CO1: Learn and describe the process and the uses of systematic reviews and meta-analyses.
CO2: Learn skills required for performing basic systematic reviews and meta-analyses.

Unit I: Introducing the systematic reviews

Need for a systematic review, difference between a narrative and a systematic review. Producers and users of systematic reviews, systematic review for randomized control trials and observational studies, and main challenges in systematic reviews.

Unit II: Developing a protocol for a systematic review

Determining scope of a review, defining the research question, framing the question (PICO/PECO), deciding the type and scope of the question, defining specific inclusion and exclusion criteria, Introduction to the Cochrane Collaboration, examples of questions and inclusion/exclusion criteria from Cochrane.

Unit III: Developing an analytic framework for review

Searching strategy, identifying key sources and techniques for searching, using databases for searching articles, building a high-quality search strategy, documenting search conclusions, reference management

Unit IV: Meta-analysis

Why do a meta-analysis?, strengths and weaknesses compared to narrative literature reviews. General steps of a meta-analysis, Hypotheses and problems in research synthesis, Types of data and summary measures, Statistical methods for meta-analysis, effect sizes, standardised mean difference, cumulative meta-analysis, fixed effect model, random effect model and summary effects

Unit V: Biases in the systematic review and meta-analysis

Selection bias, information bias and analysis bias. Heterogeneity, minimising meta-bias, meta regression, and handling within study dependency.

Unit VI: Reporting guidelines and tools

PRISMA, MOOSE, Screening i.e. Rayaan, EPPI-Reviewer, Covidence, DistillerSR. Qualitative synthesis, Interpreting results and their presentation.

Essential Reading List

1. Egger, M., Smith, G. D., & Altman, D. (Eds.). (2008). Systematic reviews in health care: meta-analysis in context. John Wiley & Sons.
2. Higgins, J. P., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (Eds.). (2019). Cochrane handbook for systematic reviews of interventions. John Wiley & Sons. Online version available at https://training.cochrane.org/handbook/current
3. Borenstein, Michael, Larry V. Hedges, Julian PT Higgins, and Hannah R. Rothstein. Introduction to meta-analysis. John Wiley & Sons, 2021.

Suggested Reading List

1. Card, Noel A. Applied meta-analysis for social science research. Guilford Publications, 2015.
2. Macaskill, Petra, Constantine Gatsonis, Jonathan Deeks, Roger Harbord, and Yemisi Takwoingi. "Cochrane handbook for systematic reviews of diagnostic test accuracy." (2010).
3. Leandro, Gioacchino. Meta-analysis in medical research: The handbook for the understanding and practice of meta-analysis. John Wiley & Sons, 2005.

MBD E-3.2	Large-scale Sample Surveys	30 Hours

Course Outcomes:

CO1: Learn determination of sample size in a large-scale household survey and its allocation at the state and district levels.

CO2: Learn basic concepts of sampling frame and construction and maintenance of sampling frame.

CO3: Learn tools for monitoring the quality of data in large-scale household surveys.

CO4: Learn how to develop data collection software.

CO5: Learn estimation of sampling weight in large-scale household surveys.

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 household 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; 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

Essential Reading List

1. United Nations (2005): Household Sample Surveys in Developing and Transition Countries. www.unstats.un.org/unsd/hhsurveys/
2. CSPro Software. www.census.gov/data/software/cspro.Download.htm
3. Roy, T.K., Acharya R., Roy, A.K. (2016). Statistical survey design and evaluatingimpact, Cambridge University Press, New Delhi.

Suggested Reading List

1. Kish, Leslie, (1995): Survey Sampling, John Wiley and Sons, Inc. New York.
2. Lohr L. Sharaon., (1999): Sampling: Design and Analysis, Duxbury Press, London
3. Ladusingh, L. (2018). Survey Sampling Methods, PHI Learning, New Delhi

MBD E-4.1	**Concepts and Measures of Global Health**	**45 Hours**

Course Outcomes:
CO1: Learn basic concepts and importance of global health.
CO2: Learn the basic concepts and methods used for studying global burden of disease.
CO3: Learn determinants of health.
CO4: Learn functioning of health care delivery system.

1. **Concept and introduction**: Concept of global health; importance to study global health, global variation in demographic, health and epidemiological transitions; linkages between globalization and health; linkages between global and local health; current challenges, emerging trends and priorities in global health; 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, age and gender? GBD 1990, 2010 and 2019 - changes and continuities.
3. **Infectious Diseases, Non-Communicable Diseases (NCDs) and Nutrition**: Persistence of infectious diseases in developed and low- and middle-income countries; new and re-emerging infectious diseases across globe; difficulty in prevention, treatment, and rehabilitation from infectious diseases. Current and growing challenge of NCDs in developed and low- and middle-income countries; NCD's epidemiology in developed and low- and middle-income countries. Double burden of malnutrition and diseases in low- and middle-income countries; food security of undernutrition; short-term and long-term impact of undernutrition; nutrition transition.
4. **Determinants of Health**: Factors responsible for variation in the global burden of disease - culture, race, ethnicity, education, socio-political establishment, economic development and economic inequality. Role of water, sanitation, indoor and outdoor air pollution, food security, migration, disaster (man-made, natural), conflicts and epidemics in explaining global health disparities.
5. **Health care delivery systems**: Introduction to health systems; components of health system; financial models of health care; service delivery models; governments role in delivering health care; measurement of health system performance in developed and developing countries; role of WHO, World Bank, etc. in setting global and national health priorities.

Essential readings

1. Skolnik, R. (2008). Essentials of global health, Jones and Bartlett: Sudbury, MA.
2. 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.
3. Council on Foreign Relations. (2014). The Emerging Global Health Crisis. Non-Communicable Diseases in Low- and Middle-Income Countries. Independent Task Force Report No. 72. https://www.cfr.org/sites/default/files/report_pdf/TFR72_NCDs.pdf
4. World Health Organization. (2017) Double Burden of Malnutrition. http://www.who.int/nutrition/double-burden-malnutrition/en/

Suggested readings

1. Hoffmann SJ. (2010). The Evolution, Etiology and Eventualities of the Global Health Security Regime. Health Policy Plan 25(6): 510-22. https://www.ncbi.nlm.nih.gov/pubmed/20732860
2. 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.
3. Dielman JL, Schneider MT, Haakenstad A, Singh L, Sadat N, Birger M, Reynolds A, Templin T, Hamavid H, Chapin A, Murray C. (2016) Development Assistance for Health: Past Trends, Associations, and the Future of International Financial Flows for Health. Lancet 387; 2536 – 44.
4. 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.
5. Mozaffarian D. (2017). Global Scourge of Cardiovascular Disease. Time for Health Care Systems Reform and Precision Population Health. Journal of the American College of Cardiology 70(1): 26 – 8.
6. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In Disease Control Priorities in Developing Countries (2nd Edition), pages 87-102, New York: Oxford University Press.
7. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
8. World Health Organization (2010). Key Components of a Well-Functioning Health System. http://www.who.int/healthsystems/publications/hss_key/en/
9. Fried LP, Bentley ME, Buekens P, Burke DS, Frenk JJ, Klag MJ et al. (2010). Global Health is Public Health. Lancet 375, 535 – 7.

MBD E-4.2	**Big Data using Machine Learning**	**45 Hours**

MBD E-4.3	**Health Economics and Health Financing**	**45 Hours**

Course Outcomes:

CO1: 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.
CO3: To familiarize the means and measures of health financing.
CO4: To understand the determinants of health insurance and its coverage.
CO5: 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 Heath, 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

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 utilization: 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. 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

VII. 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 READINGs:

1. Rexford E. Snterre and Stephen P. Neun, Health Economics: Theories, Insights and Industry Studies, Thompson South – Western, 3rd Edition (614, San/Hea, 073226) Note: 4th 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 (2008), AGiide to Techniques and Their Implementation
4. Xu K (2005). Distribution of health payments and catastrophic expenditures Methodology World Health Organization.

SUGGESTED READINGs

1. 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.
2. Grossman (1982), On the concept of Health capital and Demand for Health, Journal of Political Economy, 80(2)

3. Macintyre S (1997). The Black Report and Beyond-What are the issues, Social Science, Medicine, 44(6):723-745
4. Mohanty, S. K., & Dwivedi, L. K. (2021). Addressing data and methodological limitations in estimating catastrophic health spending and impoverishment in India, 2004–18. International journal for equity in health, 20(1), 1-18.
5. Ringel etal (2005) The Elasticity of Demand for Health Care A Review of the Literature and Its Application to the Military Health System
6. Victoria Y Fan and William D. Savedoff (2014), “Health Financing transition: A conceptual framework and empirical evidences, Social Science Medicine, 105 (2014):112-121
7. Wagstaff A, P. Paci and E van Doorslaer (1991), On the measurement of inequalities in health, Social Science and Medicine 33(5), 545-557
8. 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

MBD E-5.1	Population Ageing and Health Transition	45 Hours

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.
CO4: Familiarize with aging data sets and its exploration.
CO5: Learn ageing policies and programmes and its bearing on the welfare of the elderly.

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.

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 Health Care 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.
6. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), *Age-structural transitions: challengesfor development*. Paris: CIRCRED.

MBD E-5.2	Population, Environment and Sustainable Development	45 Hours

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, CO2 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 Responses, 2018

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.*

MBD E-5.3	**Gender, Health and Development**	**45 Hours**

Course Outcomes:

CO1: To sensitise students on gendered perspectives in reading health and development outcome
CO2: To gain an understanding of theoretical and conceptual issues involving gender in examiningdevelopment at large
CO3: To acquaint students with varied gendered frameworks and relevant analytical tools towards genderedinspection
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 providers
Nutritional 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 health inequalities and health outcomes
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
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 domestic

violence 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 vulnerabilityalong 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 differentialimpact 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 developmentand 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 criticismby 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 RHApproach.

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*, OxfordUniversity, 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, anddemographic 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 practicalguide 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 PoliciesReconsidered:*

Health and Empowerment and Rights, Harvard University Press, Harvard.

8. Jeffery Patricia and R. Jeffery. 1997. *Population Gender and Politics: Demographic changein rural north India.* Cambridge University, Cambridge.
9. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, NewYork.
10. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social ScienceResearch*. Sage Publication, London.
11. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economicand Social Affairs (Dept. of), New York
12. World Health Organization. (1998). *Gender and Health. Technical paper* WHO/FRH/WHD/98. (Website: 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 Equityand 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

MBD E-6.1	**Operations Research in Population and Health**	**45 Hours**

Course Outcomes:

CO1: Learn the concept of operations and intervention research in reproductive health and related fields.
CO2: Differentiate the operation research from other social science research.
CO3: Identify research problems, design and methodology in operation research.
CO4: Capacity to prepare proposal for operation research and its implementation.

Unit I: Introduction

What is operations research; focus and objective of operations research; types and examples of operations research; role of researchers and managers; components of operations research proposal; critiques to operations research proposal

Unit II: Identification of problem and solution

Identification and definition; justification; alternative solution; indicators - outputs, outcomes and impacts

Unit III: Causality (Randomize Experimental Design)

Pretest-posttest control group design; Posttest –only control group design; multiple treatment design

Unit IV: Quasi/non-experimental design

Non-experimental control design; time series design; before and after design

Unit V: Inferential statistics in operations research

χ^2, t, and F tests; deciding sample size in case of different experimental design; linking different design and statistical tests

Unit VI: Study design exercises

Unit VII: Ethics in operations research

ICMR guidelines; international perspectives; case studies

Unit VIII: Utilization and dissemination, and process documentation

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.

MBD E-6.2	Monitoring and Evaluation in Population and Health	45 Hours

Course Outcomes:

CO1: Develop M & E framework and statistical analysis plan.
CO2: Demonstrate an understanding of the essential principles and design of program evaluation.
CO3: Learn statistical methods used in evaluation Program.
CO4: Understand Ethical issues in evaluation research.
CO5: Understand public interventions related to health and family welfare.

Unit I: Introduction to monitoring and evaluation

Basic concepts, difference between monitoring and evaluation; linkage between planning, monitoring and evaluation; importance of monitoring and evaluation

Unit 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

Unit III: Monitoring of policy implementation

Components of policy and programme, budget, staff, process of evaluation, developing tangible indicators for policymonitoring in terms of input, process, output, outcome, impact; result based inference

Unit 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

Unit 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 dependent cluster design, interrupted time series analysis.

Unit VI: Assuring the quality of evaluation design and methodology

Overview; defining the context; the evaluation purpose; focusing the evaluation; evaluationmethodology; mandatory requirements for programme; SWOT analysis of NHM, ICDS and National Livelihood Mission; social audit – meaning, objectives, advantage, case study of social audit

Unit VII: Statistical approaches for 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

Unit VIII: Management information system and use of technology
MIS – monitoring information system; role of programmers; HMIS system; global positioningsystem; Use of machine learning and artificial intelligence, use of spatial data

Essential 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. IFRC and RCS (2002). Handbook for Monitoring and Evaluation. International Federation of Red Cross and Red Crescent Societies –Geneva

Suggested Reading List:

1. McLean R. and Gargani J. (2019) Scaling Impact Innovations for the Public Good. Routledge, New York.
2. United nations development Group. The Theory of Change, UNDAF Campanion Guideline.
3. UNDP (2009). Handbook on planning, monitoring and evaluating for development results. United Nations Development Programme - New York
4. 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

MBD E-6.3	**Urbanization, Space and Planning**	**45 Hours**

Course Outcomes:

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

Unit 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

Unit 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.

Unit III: Urban and Regional Planning

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

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.

Concepts; history and origins of urban planning; pioneers ofurban 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, Bhubaneshwar); Smart Cities Mission; HRIDAY, AMRUT, PURA, RURBAN mission

Unit IV: Challenges in Urban planning

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housing and real estate, Slums and slum rehabilitation, Urban pollution, Solid waste management; Management of migrants; Case studies of rehabilitation programs (SRA)

Unit V: Remote Sensing, GIS and Urban and Regional Planning

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

Essential Readings:

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

Suggested Readings:

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: SettlementTransition in Asia*, University of Hawaii Press, Honolulu.
12. Nath, V. (1971) “Regional Development Policies”, Economic and PoliticalWeekly, 6(30- 32):1601-1608.
13. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic InformationSystems. Prentice Hall of India, New Delhi.
14. Nyerges, Timothy L. and, Jankowski Piotr (2010): Regional and Urban Gis: A DecisionSupport Approach, Rawat Publication, Jaipur.
15. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolutionof*

regionalplanning, Edward Arnold, London.

16. Kawashima, T and P. Korcelli, (1982), *Human Settlement Systems: Spatial Patternsand Trend*, IIASA, Luxemburg.
17. Knowles, R and J. Warling, (1983), *Economic and Social geography: MadeSimple*, Heinemann, London.
18. Sarin, M, (1982), *Urban Planning in the Third World: The Chandigarh Experience*, Manshell, London.
19. MMRDA (2016), Mumbai Metroplotan Regional Development Plan 2016-2036 MMRDA,Mumbai.

UNEP and others (2007), Livable Cities: The benefits of environmentalplanning, The CitiesAlliance, Washington. http://www.citiesalliance.org/idex.html.

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Master of Science in Biostatistics & Demography

Course Code	Name of the Course	Course type	Credits	No. of hours	No. of Internals*	Weightage (%)	
						Internal Exam	Semester Exam
	Semester-I						
MBD-F1	Basics of Human Biology	F	NC	45	3	50	50
MBD-F2	Social Science Concepts	F	NC	45	3	50	50
MBD-C1	Introduction to Demography and History of Population	C	3	45	3	40	60
MBD-C2	Basic Demographic Methods	C	3	45	3	40	60
MBD-C3	Methods in Biostatistics I	E	2	30	2	40	60
MBD-C4	Sample Survey Designs	E	2	30	2	40	60
MBD-E1	MBD E-1.1: Data Analysis with R and Python	E	3	45	3	50	50
	MBD E-1.2: Data Analysis with STATA			45	3	50	50
		Total	13				
	Semester-II						
MBD-C5	Basic Concepts and Application of Epidemiology	F	3	45	3	40	60
MBD-C6	Infectious Disease Epidemiology	C	2	30	2	40	60
MBD-C7	Methods in Biostatistics II	C	2	30	2	40	60
MBD-C8	Healthcare Systems and Policies	C	2	30	2	40	60
MBD-C9	Demographic Theories and Nuptiality	C	2	30	2	40	60
MBD-C10	Advanced Sample Survey Designs and Related Concepts	C	2	30	2	40	60
MBD-E2	MBD E-2.1: Introduction to Longitudinal Data Analysis MBD E-2.2: Introduction to Spatial Statistics	E	3	45	3	50	50
MBD-E3	MBD E-3.1: Systematic Review and Application of Meta-Analysis MBD E-3.2: Large-scale Sample Surveys	E	2	30	2	50	50
MBD-V1	Viva-voce	V1					
		Total	20				
	Semester-III						
MBD-F3	Introduction to Demographic Packages	F	NC	45	3	50	50
MBD-C11	Research Methods in Epidemiology and Biostatistics	C	4	45	3	40	60
MBD-C12	Advanced Demographic Methods	C	3	45	3	50	50
MBD-C13	Advanced Methods in Biostatistics	E	2	30	2	40	60
MBD-E4	MBD E-4.1: Concepts and Measures of Global Health MBD E-4.2: Big Data using Machine Learning MBD E-4.3: Health Economics and Financing	E	3	45	3	50	50
MBD-E5	MBD E-5.1: Population Ageing and Health Transition MBD E-5.2: Population, Environment and Sustainable Development MBD E-5.3: Gender, Health and Development	E	3	45	3	40	60
MBD-C14	Survival Analysis	C	3	45	3	50	50
		Total	18				
	Semester-IV						
MBD-C15	Data Management and Analysis in SAS	C	3	45	3	50	50
MBD-C16	Demographic Models and Indirect Methods of Estimation	C	3	45	3	50	50
MBD-C17	Methods in Clinical Trials	C	3	45	3	40	60
MBD-E6	MBD E-6.1: Operations Research in Population and Health MBD E-6.2: Monitoring and Evaluation in Population and Health MBD E-6.3: Urbanization, Space and Planning	E	3	45	3	50	50
MBD-D	Dissertation	D*	10				
MBD-V2	Viva-voce	V2	2				
		Total	24				
	Total Credits		75				

20/7/23

Notes:

Course type. F – Foundation course; C – Core course; E – Elective course; V – Viva voce; D – Dissertation.
NC: Non-credited foundation courses are not counted for calculating the final grade.
Core papers: Must for all students and cannot be changed.
Elective papers: One elective paper should be opted from a pair.

Internal Examination: Teachers are given the flexibility to decide mode of mode of internal examination from the following list: Written Test; Open Book Test; Written Home Assignment; Individual Thematic Presentation; Thematic Group Presentation; Group Discussion; Surprise Test; MCQ Test; Case Study; Situation Analysis (group activity or individual activity); Field Visit; Small Group Project & Internal Viva-Voce; Role Play / Story Telling; Literature Review / Book Review; Model Development/Simulation Exercises (Group Activity or Individual Activity); In-depth Viva; Quiz etc.

24/07/23

Abhishek
26/07/23

Dissertation: Weightage for evaluation of dissertation: Guide 0.25: Presentation & Defence 0.25: and Content 0.50.

Evaluation of Dissertation: The Director & Senior Professor appoints an evaluation committee for dissertation consisting of three members from among the faculty of IIPS. First, the committee members independently assess the 'oral presentation and defence' of the student and submit their grade to the Controller of Examinations. Second, the committee members independently evaluate the content of the 'final dissertation' submitted by the student and submit their grades to the Controller of Examinations. To arrive the final dissertation grade, the average of overall grades of Guide, Presentation & Defence, and Content is considered.

Best Dissertation Award: The Director & Senior Professor appoints a committee consisting of three external experts for recommending the award of the best dissertation. The dissertations of top five ranks (based on the combined score of content, presentation and defence) are placed before the committee. The external members evaluate dissertations and submit their recommendation in a sealed cover to the Controller of Examinations.

Viva voce: Director & Senior Professor constitutes a committee comprising of one external examiner and three/four internal examiners for the viva-voce. The three/four internal examiners shall comprise of one senior professor (Chairperson), one/two faculty members and one programme co-ordinator. The committee members independently evaluate the performance of the students in the viva-voce and assign their grades. To arrive the final viva-voce grade, the average of the evaluation of the members is considered.

Grades Table

GRADE TABLE FOR EVALUATION OF ANSWER SHEET

The Grades, Grade Point and Descriptions are as given below

Final Grade	Grade Point	Grade Description
O Only	10	Outstanding
A Plus	9	Excellent
A Only	8	Very Good
B Plus	7	Good
B Only	6	Above average
C Only	5	Average
P Only	4	Pass
F3	3	Fail
F2	2	Fail
F1	1	Fail
NA/AB	0	Not Attempted / Absent

GRADE TABLE FOR SEMESTER GRADE CARD

The Grades, Grade Point and Descriptions are as given below

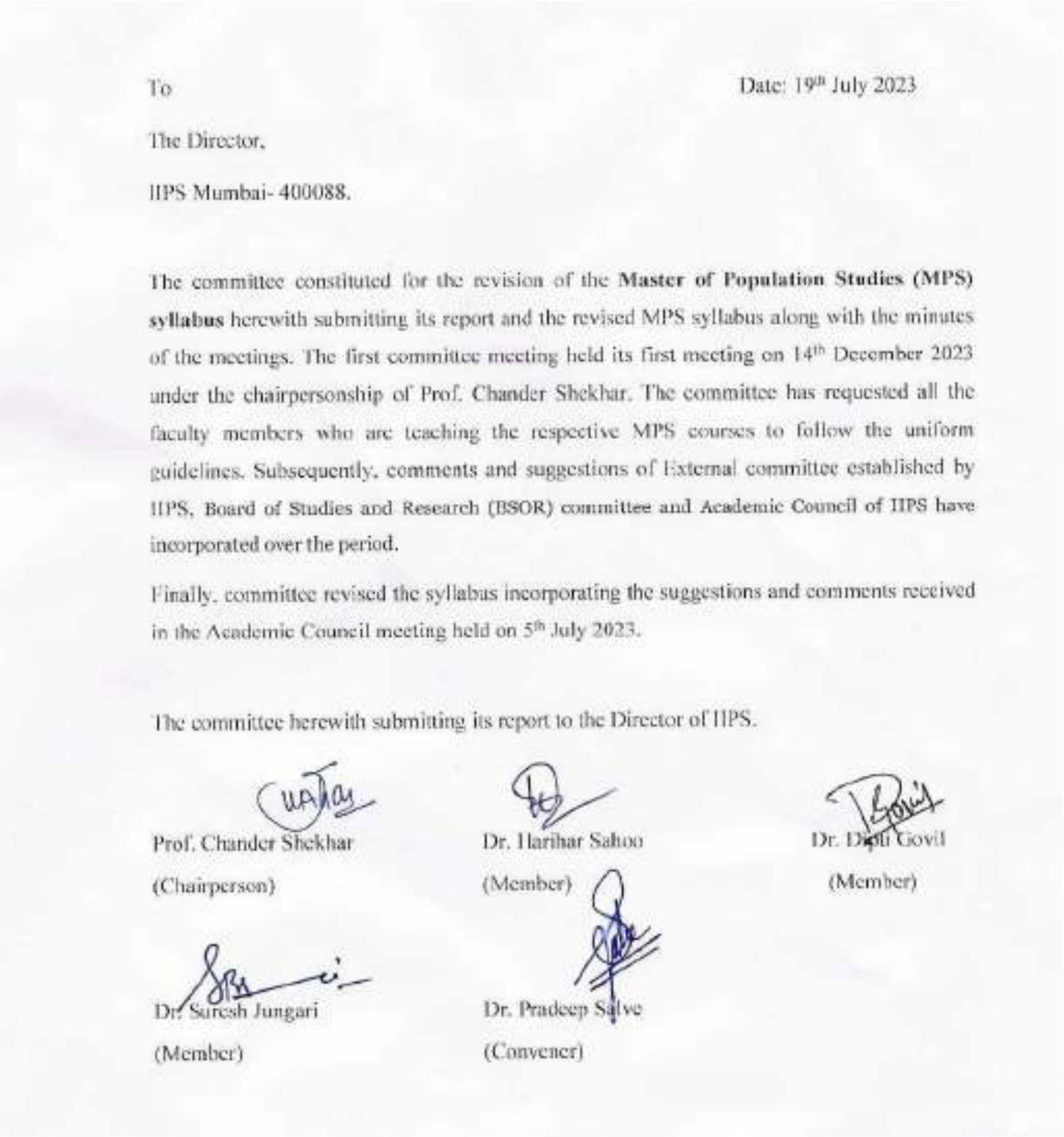
Final Grade	Grade Point	Grade Description
O Only	10	Outstanding
A Plus	9	Excellent
A Only	8	Very Good
B Plus	7	Good
B Only	6	Above average
C Only	5	Average
P Only	4	Pass
F Only	0	Fail
NA/AB	0	Not Attempted / Absent

20/7/23

24/07/23

Abhishek
24/07/23

ANNEXURE-IV



To

Date: 19th July 2023

The Director,

IIPS Mumbai- 400088.

The committee constituted for the revision of the **Master of Population Studies (MPS) syllabus** herewith submitting its report and the revised MPS syllabus along with the minutes of the meetings. The first committee meeting held its first meeting on 14th December 2023 under the chairpersonship of Prof. Chander Shekhar. The committee has requested all the faculty members who are teaching the respective MPS courses to follow the uniform guidelines. Subsequently, comments and suggestions of External committee established by IIPS, Board of Studies and Research (BSOR) committee and Academic Council of IIPS have incorporated over the period.

Finally, committee revised the syllabus incorporating the suggestions and comments received in the Academic Council meeting held on 5th July 2023.

The committee herewith submitting its report to the Director of IIPS.

Prof. Chander Shekhar
(Chairperson)

Dr. Harihar Sahoo
(Member)

Dr. Dipti Govil
(Member)

Dr. Suresh Jungari
(Member)

Dr. Pradeep Salve
(Convener)

Master of Population Studies (MPS)				
Semester I				
Code	**Type**	**TITLE**	**Credits**	**Hours**
MPS F1	Foundation	Basic Statistical Methods for Population Studies	NC	45
MPS F2	Foundation	Social Science Concepts	NC	45
MPS C1	Core	Demography and History of Population	2	30
MPS C2	Core	Age-sex structure, Quality of Data and Population Dynamics	2	30
MPS C3	Core	Nuptiality	2	30
MPS C4	Core	Fertility	3	45
MPS C5	Core	Mortality, Morbidity and Public Health	3	45
MPS C6	Core	Research Methodology	3	45
MPS C7	Core	Population Ageing and Health Transition	3	45
MPS E1	Elective	E1.1: Healthcare Systems and Policies E1.2: Biostatistics and Epidemiology	3	45
MPS E2	Elective	E2.1: Concepts and Measures of Global Health E2.2: Operations Research in Reproductive Health	3	45
VV-I	Viva-Voce Examination I		2	30
	Total		**26**	**390**
Semester II				
MPS C8	Core	Migration and Urbanization	3	45
MPS C9	Core	Population, Development and Environment	3	45
MPS C10	Core	Gender Equity and Reproductive Health	3	45
MPS C11	Core	Population Policies and Programme Evaluation	3	45
MPS C12	Core	Statistical Methods and Computer Applications	2	30
MPS C13	Core	Population Projections	2	30
MPS C14	Core	Demographic Estimation Techniques and Models	2	30
MPS E3	Elective	E3.1: Urbanization, Space and Planning E3.2: Occupational Health E3.3: Monitoring and Evaluation in Population and Health	3	45
MPS E4	Elective	E4.1: Health Economics and Financing E4.2: Spatial Demography and Application of GIS E4.3: Large-scale Sample Surveys	3	45
MPS C15	Term paper		4	60
VV-II	Viva-Voce Examination II		2	30
	Total		**30**	**450**
Grand Total			**56**	**840**

F1 **(45 Hours)**

BASIC STATISTICAL METHODS FOR POPULATION STUDIES

Course Outcomes:

CO1: Refresh on basic statistical methods and its application to population data.
CO2: Recognize the relevance of distribution in bivariate and multivariate tabulations.
CO3: Application of statistical distribution in diagnosing demographic outcome and indicators.
CO4: Develop an understanding of generalization based on principles of statistical 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. Generating simple frequencies. Graphical presentation of nominal, ordinal data, Logarithms: properties of logarithms, Ratios, Proportion and rates, growth rates (arithmetic, geometric and exponential), Interpolation and Extrapolation.

Data Manipulation – recoding creating new variables, sorting, filtering and selection of specific data.

Measures of Location: Mean (arithmetic, geometric, harmonic) Median, Mode; Its temporal andcross-sectional comparison; virtues and vices as a means of aggregation. Analyzing mean, (arithmetic, geometric, harmonic), median, mode.

Measures of dispersion: Range, Variance, Standard Deviation, coefficient of variation; use and interpretation in comparative reading of situation. Measures of Skewness and Kurtosis.

Techniques of analysing bivariate nominal and ordinal level data: Contingency table, oddsratios, relative risk. Measuring association and interpreting concordance and discordance

Probability concept and set theory: Introduction to the concept of probability, A-priory, and mathematical probability. Events: exhaustive, mutually exclusive events; Illustrating 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: Normal distribution and its properties, applications of normal distribution.

Concept of correlation and regression: Pearson correlation coefficient, and its properties; Spearman ranks correlation coefficient. Concept of linear regression, fitting of regression line tobi-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, comparingtwo 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 with and without interaction, Concept of unbiased estimates, Introduction to Multivariable Analysis. Multiple regression. Concept of Multiple and Partial correlation coefficients in regression analysis, Standardized regression coefficients, Regression with dummy variables. Logistic regression.

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, 4th 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.

SUGGESTED READINGS:

1. Lipshutz, Seymour., Schaum's Outline Theory and Problems of *Set Theory and Related Topics* Series, Mcgraw Hill.
2. Marcello Pagano and Kimberlee Gourneau (2000) "Principles of Biostatistics" Second Edition, Duxbury Thomson Learning, United States.
3. Prakasam, C.P., G. Rama Rao, and R.B. Upadhyay (1987): *Basic Mathematics in Population Studies*, Gemini Publishers, Mumbai.
4. Siegel J.J. and D.A. Swanson (Ed.), 2004. *The Methods and Materials of Demography*. Second Edition. Elaevier Academic Press.
5. Venkatachary, K (1994). *Elements of Mathematics for Demographers*. Monograph Series No.9. Regional Institute for Population Studies, University of Ghana. Legon.
6. Bhat N.R and M.R. Singh, 1993. *Applied Mathematics*. New Delhi: Tata McGraw – Hill Publishing Company Ltd.
7. Dillon, W.R. and Goldstein, M. (1984): *Multivariate Analysis*, John Willey and Sons, New York.
8. Douglas and Altman (2006): Practical Statistics for Medical Research, Chapman and Hall Publication, Washington, D.C.
9. Fisher, L.D and Van Belle, G. (1993) Biostatistics: A Methodology of the Health Sciences, New York, Wiley Intgescience,

MPS F2 **(45 Hours)**

SOCIAL SCIENCE CONCEPTS

Course Outcomes:

CO1: To gain familiarity with basic social science concepts that has bearing on understanding population dynamics.
CO2: Imagine the varied axis of social reality, such as caste, tribe, gender, kinship and marriage, social mobility and religion in terms of its relevance in population studies.
CO3: Viewing population in space and time and read population geography in consideration of man-environment relationship, geographical factors and regional perspective.
CO4: Recognition of interplay between economic development and population changes in an evolving world order.
CO5: To understand the psychological concepts like perception, behaviour, emotion,personality, coping mechanism, communication and their bearing on Population Studies

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
    b) 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

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; Mapsscale, 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.

ECONOMICS

1. **Introduction:**

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

2. **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.

3. **Basic Concepts in Macro Economics**

Basic Concepts in National Income: Concept of GDP, NDP, GNP, NNP, NI, PCI, PPP, 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.

PSYCHOLOGY

1. **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

2. **Basics of Psychology:**

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

ESSENTIAL READINGS:

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
5. Winston, New York, (1949), Chapters No.1, 3,7,11,15,22,24,25,26.
6. Srinivas M.N**.,** *Social Change in Modern India,* University of California Press, Berkeley, (1966)
7. Sen, A. (2018). Collective Choice and Social Welfare: An Expanded Edition. United Kingdom: Harvard University Press.
8. Haralambos, Michael, *Sociology: Themes and Perspectives,* Oxford University Press, Delhi (1980).
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)Abler, R, Adams, J and Gould P., (1971): *Spatial Organization: The Geographer's view of the World,* Prentice Hall, New Jersey.
15. Johnston, R.J., (2004): *Geography and Geographers,* Oxford Unity Press.
16. Richard, Peet**.,** (1998): *Modern Geographic Thought,* Blackwall Publishers
17. Singh, R.L., (1971) *India: A Regional Geography,* National Geographical Society of India, Varanasi.
18. 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
19. Koutsoiannis A, 1979, Modern Microeconomics, London: Macmillan Press Ltd,

20. Lipsey and Chrystal, 2004, Economics, Oxford university Press, Part One, part two and part five
21. Dasgupta AK, Epochs of Economic Theory, OUP, Bombay, Chapters 2, 3, 4, 7 and 8
22. Kuppuswamy B**.,** *Social Change in India,* Konark Publication Pvt. Ltd. Delhi, (1972).
23. Muzumdar, Haridas , *The Grammar of Sociology: Man in Society*, Asia Publishing House, Mumbai (1966).
24. Johnson, Harry M, *Sociology: A Systematic Introduction,* Allied publishers, Bombay (1966).
25. Mc Gee, Reece , *Sociology: An Introduction ,* Holt, Rinehard and Winston, New York (1980).
26. Magill, Frank N (ed.), *International Encyclopedia of Sociology,* Fitzroy Dearborn Publishers, London, (1995).
27. Francis John Monkhouse (1956) *Maps and Diagrams: Their Compilation and Construction*, University of Michigan.
28. JF Friedman (1966) *Regional Development Policy: A Case Study of Venezuela,* Cambridge, Massachusetts : MIT Press, 1966.
29. Samuelson, Paul A. and William D. Nordhaus., “Economics”, New York: Tata McGraw Hill, part one, two and five
30. Datt R and Sundaram K.P.M, 2000**,** Indian economy, S. Chand & Company Ltd, Part II.
31. Government of India, Ministry of Finance, Economic Division, Economic Survey

MPS C1 **(30 Hours)**

DEMOGRAPHY AND HISTORY OF POPUALTION

Course Outcomes:

CO1: Acquaint the students with the scope and relevance of the discipline ofpopulation studies.
CO2: Become aware of the global, regional and national population trends.
CO3: To understand the nature of diversity in the size, distribution, composition, and basic characteristics of population across Indian states.
CO4: To familiarize on various sources of demographic data in India, andtheir limitations.
CO5: To appreciate the historical perspectives on population change.

Introduction to Demography

Definition and Scope: Demography as a scientific discipline; Development of demography as a discipline. Multi-disciplinary nature of Demography, Linkage with other social science disciplines including statistics, mathematics, economics etc. Some basic demographic concepts. Balancing Equation and components of population change, Concept of doubling time. Malthusian concept of population growth and resources.

Sources of Demographic Data

Population census; Uses and limitations; Indian Censuses. Census taking under British India and later, details of different domain on which Indian census collect data, publication of census data/ reports. Vital registration system., Historical data – Parish Records, National Sample Survey, Sample Registration System, Demographic Health Surveys (DHS), Longitudinal ageing Survey in India, Other sample surveys. Strengths and weaknesses of various data sets

Population History

Historical trends in population situation in the world. Present population situation and past and future trends in the world, in developed and developing countries.

Demographic characteristics of first modern people. Socio-economic and demographic features of Indus Valley Civilisation, population change from medieval to Mughal times.

History of population in India: Population estimates in ancient time, population history during British rule, famine, plague, influenza and its impact on population, Trends and growth of India's population during pre-independence and post-independence period, major sources of data about the population in the past; major explanations of population change in the past; Contribution of fertility, mortality and migration to population change in the past.

ESSENTIAL READINGS:

1. Jacob S. Siegel and David a. Swanson (2004): *The Methods and Materials of Demography*, Second Edition, Chapters 1, 2, 3, 7, 8, 9,10, Elsevier Science, USA. https://books.google.co.in/books/about/The_Methods_and_Materials_of_Demography.html?id=-uPrAAAAMAAJ&redir_esc=y
2. John Weeks (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.
3. Dyson, Tim, A Population History of India: From the First Modern People to the Present Day (Oxford, 2018; online edn, Oxford Academic, 18 Oct. 2018), https://doi.org/10.1093/oso/9780198829058.001.0001, accessed 20 Mar. 2023.
4. Bhende, A., and Kanitkar, T. (1996): *Principles of Population Studies* (Seventh Edition), Himalaya Publishing House, Bombay.

SUGGESTED READINGS:

1. Warren S. Thompson, (1930), *Population Problems, New York; London: McGraw-Hill, [C1930]*
2. Bogue, D., (1969): *Principles of Demography*, John Wiley and Sons, New York.
3. United Nations, (1973): *The Determinants and Consequences of Population Trends*, Vol. I, Chapters 1, 2 and 8.
4. Census of India: http://www.censusindia.gov.in
5. United Nations. DESA. World Population Prospects 2022. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/wpp2022_summary_of_results.pdf
6. United Nations, (1998): Handbook on Civil Registration and Vital Statistics Systems, Management, Operation and Maintenance, New York.
7. United Nations (1958). Multilingual Demographic Dictionary, John Wiley & Sons Ltd., New York
8. International Institute for Population Sciences, Mumbai. www.iipsindia.ac.in

MPS C2 **(30 Hours)**

AGE-SEX STRUCTURE, QUALITY OF DATA AND POPULATION DYNAMICS

CO1: To familiarize the students with age-sex structure of the population
CO2: To develop capacity in measuring and analyzing the age-sex structure of a populationand its determinants and consequences.
CO3: To develop an understanding of demographic transition and demographic dividend.

Concepts and Measures of age and sex structure

Defining age and sex, sex ratio, sex ratio at birth, classification of age group and its importance, Measures of age structure; median age, percent distribution, dependency ratio, potential support ratio.

Age and sex pyramid of developed and developing countries, variations in age distribution, sex ratio and sex ratio at birth. Concept of age standardization, demographic transition theory and demographic dividend.

Dynamics of Age-Sex Structure of the World and India

Present levels and past trends in the sex and age structure of the population of the world, developed and developing countries and India.

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 role of low fertility and low mortality. Implication of migration on age sex structure.

Evaluation and Adjustment of Demographic Data:

Appraisal of quality of age-sex data:
Types and source of errors
Methods of data evaluation and error detection: direct (Post-enumeration surveys)and indirect methods
Appraisal of birth and death statistics by means of balancing equation
Dual system of records
Techniques of evaluation of age and sex data:
Measures of errors in age data (Graphical representations, Whipple's index, Myer'sindex, Age ratio, Sex ratio and UN Joint score
Evaluation of age data for young and old ages
Techniques of errors adjustment in age data and prorating
Quality checks incorporated in survey procedures to minimize errors
Possible errors and implications
Component of non-sampling errors
Mechanisms and protocols to minimize and correct errors

ESSENTIAL READINGS:

1. Jacob S. Siegel and David a. Swanson (2004): The Methods and Materials of Demography, Second Edition, Chapters 1, 2, 3, 7, 8, 9,10, Elsevier Science, USA. https://books.google.co.in/books/about/The_Methods_and_Materials_of_Demography.html?id=uPrA
2. John Weeks (2005): Population: An Introduction to Concepts and Issues, Wordsworth Learning. Singapore 9th edition.
3. Bhende, A., and Kanitkar, T. (1996): Principles of Population Studies (Seventh Edition), Himalaya Publishing House, Bombay.
4. Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel (2001) Demography: Measuring and Modeling Population Processes. Oxford: Blackwell Publishers.

SUGGESTED READINGS:

1. Warren S. Thompson, (1930), Population Problems, New York; London: McGraw-Hill, [C1930]
2. Bogue, D., (1969): Principles of Demography, John Wiley and Sons, New York.
3. United Nations, (1973): The Determinants and Consequences of Population Trends, Vol. I, Chapters 1, 2 and 8.
4. Census of India: http://www.censusindia.gov.in
5. United Nations. DESA. World Population Prospects 2022. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/wpp2022_sum mary_of_results.pdf
6. United Nations, (1998): Handbook on Civil Registration and Vital Statistics Systems, Management, Operation and Maintenance, New York.
7. Mukherjee S.B. 1976. 'The Age Distribution of the Indian Population: A Reconstruction for the state and territories, 1881-1961'. East-West Centre, University Press of Hawaii, Honolulu.
8. S Irudaya Rajan, K S James (2008). Third National Family Health Survey in India: Issues, Problems and Prospects, Economic & Political Weekly, November 29, 2008 33
9. K S James, S Irudaya Rajan (2004). Respondents and Quality of Survey Data. Economic and Political Weekly February 14, 2004

MSP-C3 **(30 Hours)**

NUPTIALITY

CO1: Familiarize students' basic concepts on nuptiality

CO2: Inculcate an understanding of various theories of family formation.

CO3: Identify the different sources of data for nuptiality

CO4: Perform nuptiality analysis

Nuptiality

Introduction, Basic Concepts, Sources of Data and their limitations. Measures of Nuptiality from Registration data.

Analysis of Marital Status Data from Census.

Singulate Mean Age at Marriage (SMAM) - Synthetic Cohort and Decadal Synthetic Cohort Method.

Indices of Nuptiality (Coale's Indices)

Marriage Pattern in India and Selected Countries and related factors.

Marriage squeeze: Concepts and Implications, Concepts of Hypergamy and HypogamyGross and Net Nuptiality Tables.
Non-marriage
Multistate approach in Nuptiality analysis. Standard Age Pattern of Marriage – Coale's Model.

Divorce and Widowhood.

a. Definition and basic measures.
b. Marriage Dissolution Tables and Remarriage Concept
c. Mean Age at Widowhood/Divorce from Census Returns.

Definition and Measures of Remarriages of Widowed and Divorces

ESSENTIAL READINGS:

1. Siegel, Jacob S., and David A. Swanson (eds.), (2004) *The Methods andMaterials of Demography* (Second edition). San Diego: Elsevier Academic Press.
2. Newell, Colin (1988) *Methods and Models in Demography.* London: Frances Pinter.
3. Asha A. Bhende and Tara Kanitkar, (2003), *Principles of Population Studies,*
4. Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
5. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis,Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.

SUGGESTED READINGS:

1. Coale Ansley J. and T. James Trussell (1978) *Technical Note: Finding the TwoParameters that Specify a Model Schedule of Marital Fertility. Population Index 44, 2* (1978), pp. 203-213.

Increase: a Self-Teaching Guide to Elementary Measures. Honolulu: East-West Population Institute, East-West Center.

3. Rowland, Donald T. (2006), *Demographic Methods and* Concepts. New York: Oxford University Press.
4. 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: FertilityResearch, (All three chapters but selected pages).
5. Pollard, A.H., Yusuf, Farhat and Pollard, G.N. (1990) *Demographic Techniques* (third edition). Sydney: Pergamon Press.

MSP-C4 **(45 Hours)**

FERTILITY

Course Outcomes:

CO1: Familiarize students' basic concepts on fertility
CO2: Recognize socio-cultural and economic factors influencing fertilitybehaviours.
CO3: Inculcate an understanding of various theories of reproduction andfamily formation.
CO4: Identify the different sources of data for fertility measurements
CO5: Perform fertility analysis

A. FERTILITY

Terms and Concepts

Importance of the fertility study in population dynamics; Basic terms and concepts used in the study of fertility, desired family size, fertility regulation

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.

Fertility Transition in Developed Countries

Historical fertility declines in European and Non-European Industrialized Countries and underlying factors; Below-replacement level fertility in developed countries and its implications.

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.

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's Framework of Fertility, Intergenerational Wealth Flow Theory, U. N. Threshold Hypothesis, Reproductive motivations and value of children theories. Second demographic transition

B. FERTILITY MEASURES AND MODELS

Introduction of Basic Concepts

Sources of Data for Fertility Analysis
Concept of Period and Cohort Approaches

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 of Fertility

- Children Ever Born
- Completed Fertility
- Parity Progression Ratios

Reproduction Measures
Concept of Maternity Function
Basic Idea of Tempo and Quantum Effects

Fertility Models

Age patterns of Fertility: Coale and Trussell Fertility Model: Estimating M and m
Bongaarts and Potters Aggregate Fertility Model and its applications

ESSENTIAL READINGS:

1. Preston, Samuel H., Heuveline, Patrick, and Guillot, Michel (2001) *Demography: Measuring and Modeling Population Processes.* Oxford: BlackwellPublishers.
2. Siegel, Jacob S., and David A. Swanson (eds.), (2004) *The Methods andMaterials of Demography* (Second edition). San Diego: Elsevier Academic Press.
3. Newell, Colin (1988) *Methods and Models in Demography.* London: Frances Pinter.
4. United Nations, (1973), *Determinants and Consequences of Population Trends,Vol. 1*, pages 96-104, UN, New York.
5. Bongaarts, J and Potter, R (1983) *Fertility, Biology and Behavior: An Analysisof the Proximate Determinants*. Academic Press, New York.
6. Asha A. Bhende and Tara Kanitkar, (2003), *Principles of Population Studies,* Sixteenth Revised Edition, Himalaya Publishing House, Mumbai.
7. Pathak, K.B. and F.Ram, (1998) Techniques of Demographic Analysis,Mumbai: Himalaya Publishing House, Chapter 4, Pp.108-153.

SUGGESTED READINGS:

1. David G. Mandelbaum, (1974), *Human Fertility in India: Social Components and Policy Perspectives,* University of California Press, Berkeley.
2. United Nations, (1973), *Determinants and Consequences of Population Trends,Vol. 1*, pages 96-104, UN, New York.
3. Coale Ansley J. and T. James Trussell (1978) *Technical Note: Finding the TwoParameters that Specify a Model Schedule of Marital Fertility. Population Index 44, 2* (1978), pp. 203-213.
4. Palmore, James A. and Gardner, Robert W. (1983) *Measuring Mortality, Fertility and Natural*

Institute, East-West Center.

5. Rowland, Donald T. (2006), *Demographic Methods and* Concepts. New York: Oxford University Press.
6. 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: FertilityResearch, (All three chapters but selected pages).
7. Pollard, A.H., Yusuf, Farhat and Pollard, G.N. (1990) *Demographic Techniques* (third edition). Sydney: Pergamon Press.
8. Sydney H. Contz, (1968) , *Population Theories and the Economic Interpretation,* Routledge, London.

MPS C5 **(45 Hours)**

MORTALITY, MORBIDITY AND PUBLIC HEALTH

Course Outcomes:

CO1: Become familiar with the basic definitions and concepts used, importance and the scope of mortality study and its bearing on fertility, and population health.
CO 2: Become aware of varied sources of health data (morbidity, mortality, disability), their merits/demerits, uses and significance as indicators; and their basic measures.
CO3: Explain synthetic formulation of survival experience (e.g., life table).
CO4: To convey the transitional and differential dynamics of early age life experiences.
CO5: To understand the linkages among epidemiology, mortality transition, and public health.

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. Global Mortality and Emerging Issues

***Introduction and basic measures*:**

Some basic measures: - crude death rate (CDR) and Age-Specific Death Rates (ASDRs)- their relative 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), MORTPAK4

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.

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 and XI (1990, 2019); 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, and burden of disease; 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. 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.

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. 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).
4. Ram, F. and K.B. Pathak (1998): Techniques of Demographic Analysis,2nd Ed, Himalaya Publishing house, Bombay (Chapters 2 & 3).
5. WHO (1992): International Statistical Classification of Diseases and related Health Problems, Tenth Revision, Vol. 1, Geneva.

SUGGESTED READINGS:

1. Omran, A. R. (1971): The epidemiologic transition: a theory of the epidemiology of population change, Milbank Memorial Fund Quarterly, Vol. XLIX, pp. 509-538.
2. 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).
3. Preston, S. H., Patrick Heuveline and Michel Guillot (2001): Demography: Measuring and Modeling Population Process, Blackwell Publishers, Oxford, UK (Chapters 2, 3 & 4).
4. 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

MPS C6 **(45 Hours)**

RESEARCH METHODOLOGY

Course Outcomes:

CO1: To understand the research design and scientific approaches to conduct of research in varied settings.
CO2: To familiarize the qualitative and quantitative methods of data collection.
CO3: To understand qualitative data analysis using packages like Atlas Ti and Nvivo.
CO4: Develop skills for writing proposal and scientific articles.
CO5: Introducing students to field level settings and primary data collection.

Scientific Methods of Research

Definition of Research, Assumptions, Operations and Aims of Scientific Research. Philosophy of Research, The Research Process: conceptual, Empirical and Analytical Phases of Research: Essentials Criterions of Scientific methods.

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.

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.

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.

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.

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.

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.

Research Methodology Lab-exercise: ANTHROPAC, Atlast Ti and Group Work

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 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 (4th Edition).
10. Kothari, CR (2020), Research Methodology - Methods And Technique, Generic, ASIN : B0BCPDGN66, 394 pages

MPS C7 **(45 Hours)**

POPULATION AGEING AND HEALTH TRANSITION

Course Outcome:

CO1: To impart knowledge of concepts and theoretical framework relating to demography of ageing, and its societal interface.
CO2: To understand the health transition, its linkage with ageing transitions.
CO3: To develop skills to analyze trends, determinants and consequences of population ageing.
CO4: To familiarize with aging data sets and its exploration.
CO5: To acquaint the students with ageing policies and programmes and its bearing on the welfare of the elderly.

I Demography of Ageing:

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.

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

II Life Course Perspectives and Social Dynamics of Ageing:

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.

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.

III Ageing and Health:

Ageing and Functional Health: Non-communicable diseases, Ageing and disabilities; trends and prevalence. Well-being and life satisfaction.

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

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

IV Ageing Policies and Programmes:

Social and Economic Support Policies and Programmes for the Elderly- Retirement, Pensions and

and programmes for elderly in India. National Programmes for Health Care of Elderly (NPHCE); National Policy for Senior Citizens.

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

ESSENTIAL READINGS:

1. Chakraborti, Rajagopal Dhar (2004), The Greying of India: Population Ageing in the Context of Asia, SAGE Publications, 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, New Delhi.
4. Govt. of India (1999). National Policy for Older Persons, Ministry of Social Justice and Empowerment, New Delhi.
5. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Ageing 2019: Highlights. UN, New York.

SUGGESTED READINGS:

1. World Health Organization (2015), WHO Report on Ageing and Health, Geneva, WHO.
2. United Nations (2001): Living Arrangements of Older Persons: Critical Issues and Policy Responses. Population Division, Department of Economic and Social Affairs, New York.
3. Sandra Gruescu, (2006), Population ageing and economic growth. Physica-Verlag.
4. Goli, S., B. Reddy, James, K. S. & Srinivasan, V. (2019). Economic independence and social security among India's elderly. Economic and Political Weekly. 54, 39, p. 32-41 10 p.
5. James, K.S and Goli S. (2017). Demographic Changes in India. Is the Country prepared for the Challenge? The Brown Journal of World Affairs, 23:169.
6. Berman, Lisa (2000) “Social Support, Social Networks, Social Cohesion and Health” Social Work in Health Care
7. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), Age-structural transitions: challenges for development. Paris: CIRCRED.
8. National Institute of Ageing (2007). Why population ageing matters? A global perspective, US National Institute of Health.
9. Asian Development Bank Institute (2019). Ageing Societies: Policies and Perspectives, ADB, Japan.

MPS E1.1 **(45 Hours)**

HEALTHCARE SYSTEM AND POLICIES

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 curate 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, utilization 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, Bhore Committee Report 1946, 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.

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

Field visits to public health facilities (Sub-Health Centre/Primary Health Centre/Community

ESSENTIAL READINGS:

1. Lassey M, Lassey W, and Jinks, M. (1997). Health Care Systems around the World: Characteristics, Issues and Reforms. Prentice-Hall, Inc.
2. Bodenheimer, Thomas S., Kevin Grumbach. *Understanding Health Policy*
3. Fort, Meredith, Mary Anne Mercer and Oscar Gish (Editors). *Sickness and Wealth: The Corporate Assault on Global Health*
4. Govt. of India (2017) - National Health Policy-2017, Ministry of Health and Family Welfare, New Delhi.
5. Peters, et.al (2002), Better Health System for India's poor: Findings, Analysis and Options: The World bank, New Delhi
6. Abel-Smith, Brian. An introduction to health: policy, planning and financing. Routledge, 2018. 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.

SUGGESTED READINGS

1. Bhore, J. (1946). Report of the health survey and development committee (Vol. 1-4). Manager of Publications.
2. Reddy, K.S. et.al (2011)" Towards achievement of universal health care in India by 2020: A Call of Action", www.thelancet.com
3. Banerjee, D. (1982), Poverty, class and Health Culture in India, Vol. 1 Parchi Prakashan, New Delhi.
4. Indian Council of Social Science Research and Indian Council of Medical Research (1981), Health for All by 2000 A. D., ICSSR, Delhi.
5. Madan, T.N. (1969), "Who Chooses Modern Medicine and Why", Economic and Political Weekly, pp. 1475-84.
6. K. Sujatha Rao, (2017), Do We Care: India's Health System, Oxford University Press, ISBN10 : 9780199469543, 478 pages

MPS E1.2 **(45 Hours)**

BIOSTATISTICS & EPIDEMIOLOGY

Course Outcomes:

CO1: To introduce the basic concepts of different streams of epidemiology, disease risks, and interventions as public health tools in population studies.

CO2: To introduce the study designs and methodology in cross-sectional, case-control, cohort, andexperimental data to analyse epidemiological patterns.

CO3: To understand the use of summary measures of disease burden over epidemiological data in populationscience.

CO4: To understand comparability of estimates obtained from various parametric and non-parametric models.

CO5: To appreciate the relevance of epidemiology in public policy making.

I. Basic concepts in Biostatistics

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

II. 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 significance

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

III. 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.

ESSENTIAL READINGS:

1. Gordis L: Epidemiology, ed. 5. Philadelphia, 2014. Elsevier Saunders; ISBN: 978-1-4557-3733-8
2. Bonita R, Beaglehole R, Kjellstrom T: Basic Epidemiology, ed. 2. World Health Organization, 2006.
3. Friedman L M, Furberg C D, DeMets D L: Fundamentals of Clinical Trials. Boston, PSG, 1982.
4. MacMahon B, Pugh T F: Epidemiology: Principles and Methods. Boston, Little Brown, 1970.
5. Altman D G: Practical Statistics for Medical Research, London: Chapman and Hall, 2006.
6. Bhore, J. (1946). Report of the health survey and development committee (Vol. 1-4). Manager of Publications.

SUGGESTED READINGS:

1. Lee E T: Statistical Methods for Survival Data Analysis, ed. 2. New York, JohnWiley & Sons.
2. Goldstein H: Multilevel Statistical Model. London, Institute of Education, 1999.
3. Everitt B S, Pickles A: Statistical Aspects of the Design and Analysis of ClinicalTrials, ed. 2. London, Imperial College Press.
4. Kutner MH, Nachtsheim CJ, Neter J, Li W: Applied Linear Statistical Models.5th edition, McGraw-Hill/Irwin, 2005.
5. Gelman A, Carlin JB, Stern HS, Rubin DB, Dunson DB, Vehtari A: BayesianData Analysis, 3rd ed. Chapman and Hall, 2013.

7. Groeneboom P: Nonparametric Estimation under Shape Constraints, CambridgeUniversity Press; 1 edition, 2014.
8. 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
9. Kestenbaum, Brya: Epidemiology and Biostatistics, Springe ,2009.

MPS E2.1: **(45 Hours)**

CONCEPTS AND MEASURES OF GLOBAL HEALTH

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; importance to study global health, global variation in demographic, health and epidemiological transitions; linkages between globalization and health; linkages between global and local health; current challenges, emerging trends and priorities in global health; 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, age and gender? GBD 1990, 2010 and 2019 - changes and continuities.
3. **Infectious Diseases, Non-Communicable Diseases (NCDs) and Nutrition**:
   Persistence of infectious diseases in developed and low- and middle-income countries; new and re-emerging infectious diseases across globe; difficulty in prevention, treatment, and rehabilitation from infectious diseases. Current and growing challenge of NCDs in developed and low- and middle-income countries; NCD's epidemiology in developed and low- and middle-income countries. Double burden of malnutrition and diseases in low- and middle-income countries; food security of undernutrition; short-term and long-term impact of undernutrition; nutrition transition.
4. **Determinants of Health**:
   Factors responsible for variation in the global burden of disease - culture, race, ethnicity, education, socio-political establishment, economic development and economic inequality. Role of water, sanitation, indoor and outdoor air pollution, food security, migration, disaster (man-made, natural), conflicts and epidemics in explaining global health disparities.
5. **Health care delivery systems**:
   Introduction to health systems; components of health system; financial models of health care; service delivery models; governments role in delivering health care; measurement of health system performance in developed and developing countries; role of WHO, World Bank, etc. in setting global and national health priorities.

Essential readings

1. Skolnik, R. (2008). Essentials of global health, Jones and Bartlett: Sudbury, MA.
2. Fried LP, Bentley ME, Buekens P, Burke DS, Frenk JJ, Klag MJ et al. (2010). Global Health is Public Health. *Lancet* 375, 535 – 7.
3. Huynen M, Martins P, Hilderink HBM. (2005). The Health Impacts of Globalisation: A Conceptual Framework. Globalization and Health 1:14. http://www.globalizationandhealth.com/content/1/1/14
4. 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.Council on Foreign Relations. (2014). The Emerging Global Health Crisis. Non-Communicable Diseases in Low- and Middle-Income Countries. Independent Task Force Report No. 72. https://www.cfr.org/sites/default/files/report_pdf/TFR72_NCDs.pdf
5. Fauci AS, Morens DM. (2012) The Perpetual Challenge of Infectious Diseases. N Engl J Med 366: 454 – 61.

Suggested readings

1. Hoffmann SJ. (2010). The Evolution, Etiology and Eventualities of the Global Health Security Regime. *Health Policy Plan* 25(6): 510-22. https://www.ncbi.nlm.nih.gov/pubmed/20732860
2. 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.
3. Dielman JL, Schneider MT, Haakenstad A, Singh L, Sadat N, Birger M, Reynolds A, Templin T, Hamavid H, Chapin A, Murray C. (2016) Development Assistance for Health: Past Trends, Associations, and the Future of International Financial Flows for Health. Lancet 387; 2536 – 44.
4. 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.
5. Mozaffarian D. (2017). Global Scourge of Cardiovascular Disease. Time for Health Care Systems Reform and Precision Population Health. Journal of the American College of Cardiology 70(1): 26 – 8.
6. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, In Disease Control Priorities in Developing Countries (2nd Edition), pages 87-102, New York: Oxford University Press.
7. Hsiao, W.C. (2003). What is a health system? Why should we care? Harvard School of Public Health Working Paper.
8. World Health Organization (2010). Key Components of a Well-Functioning Health System. http://www.who.int/healthsystems/publications/hss_key/en/
9. World Health Organization. (2017) Double Burden of Malnutrition. http://www.who.int/nutrition/double-burden-malnutrition/en/

MPS E2.2 **(45 Hours)**

OPERATIONS RESEARCH IN REPRODUCTIVE HEALTH

Course Outcomes:

CO1: To familiarize the concept of operation and intervention research in reproductive health and related fields.

CO2: To differentiate the operation research from other social science research.

CO3: To train students to identify research problems, design and methodology in operation research.

CO4: To familiarize the process of developing suitable indicators in keeping with the research design.

CO5: To develop a capacity to prepare proposal for operation research and its implementation.

1. Basic Concepts and Definition of OR
(a) What is Operations Research
(b) Focus, Objective and Characteristics of Operations Research
(c) Types and Examples of Operations Research
(d) Methods of Operations Research
(e) Implementation Research and Its Linkages with OR

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-Posttest Control Group Design
(b) Posttest –only Control Group Design
(c) Multiple Treatment Design

6. Design
(a) Experimental Design: Pretest-posttest control group design; Posttest-only control group design; Multiple treatment designs
(b) Quasi Experimental Deign: Non-equivalent control group; Time series design; Separate sample pretest-posttest design;

(c) Non-Experimental Design: Posttest-only design; Pretest-posttest design; Static-group comparison

7. Inferential Research Statistics Accordingly Operations Research design
   (a) (X2, 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) International Perspectives: Research Ethics; Recognize Ethical Issues in Operation Research Need of Ethical Standards in Operational Research; History and Foundation of Research Ethics; Principles; Codes and Regulations: International Landscape; Ethics Review Committee: Members, Roles
   Submission a Proposal for Ethical Clearance
   (b) ICMR Guidelines: Background; ICMR Code; Statement of General Principles; General Ethical Issues
   Responsible Conduct of Research (PCR); Ethical Review Procedures; Informed Consent Process; Vulnerability
   (c) Case Studies

10. Utilization and Dissemination, and Process Documentation

11. Critiques to OR proposal

ESSENTIAL READINGS:

1. Blumenfeld, S. (1985). *Operations research methods: A general approach in primary health care*. Primary Health Care Operations Research, Center for Human Services.
2. Fisher, A. A., Foreit, J. R., Laing, J. E., Stoeckel, J. E., & Townsend, J. (2002). Designing HIV/AIDS intervention studies: An operations research handbook.
3. Foreit, J. R., & Frejka, T. (1998). Family planning operations research: a book of readings.

SUGGESTED READINGS:

1. Gallo, G. (2004). Operations research and ethics: Responsibility, sharing and cooperation. *European Journal of Operational Research*, *153*(2), 468-476.
2. Mathur, R., & Swaminathan, S. (2018). National ethical guidelines for biomedical & health research involving human participants, 2017: A commentary. *The Indian journal of medical research*, *148*(3), 279.
3. Oliver, P. (2010). *The student's guide to research ethics*. McGraw-Hill Education (UK).
4. Ormerod, R. J., & Ulrich, W. (2013). Operational research and ethics: A literature review. *European journal of operational research*, *228*(2), 291-307.
5. Sanmukhani, J., & Tripathi, C. B. (2011). Ethics in clinical research: The Indian perspective. *Indian journal of pharmaceutical sciences*, *73*(2), 125.

MPS-C8 **(45 Hours)**

MIGRATION AND URBANIZATION

Course Outcomes:

CO1: To make the students understand the basic concepts, definitions, sources of data etc. on migration and urbanization.

CO2: To develop a critical understanding on the various theories/models concerning migration and urbanisation.

CO3: To equip students on the measurement and estimation of level, trend and pattern of migration and urbanization.

CO4: To understand the trend and pattern of spatial distribution and its linkage with migration and urbanization.

CO5: To develop a critical understanding on the emerging migration and urban issues, government policies and programmes in the context of development.

I. SPATIAL DISTRIBUTION

i. Pattern and factors affecting spatial distribution of population
ii. Selected measures of concentration of population: Measures of concentration of population-Density, percentage distribution and dissimilarity index

II. MIGRATION Introduction and Concepts

i Concept of mobility and migration, types of migration, censusdefinition of migrants and its limitations

Sources and quality of data : Census, NSSO, Migration surveys

Migration theories and models

i. Ravenstein's Laws of Migration
ii. Everett Lee's Theory of Migrationiii Mobility Field Theory
iii. Todaro's Model of Rural-Urban Migrationv New Economics of Labour Migration
iv. Transnationalism Theory of Migration

Internal Migration

i Patterns and characteristics in developing countries with a special focus on India.

ii Causes and consequences of internal migration: demographic, economic, social and politicalconsequences at the individual, household and community level

iii Policies related to internal migration

International migration

ii. Patterns and types of international migration: Historical and recent trends, Indian Diaspora andpeople of Indian origin.
iii. Causes and consequences of international migration: demographic, economic, social andpolitical consequences at the individual, household and community level
iv. Policies of international migration

Measures of Migration

i 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

i. Estimation of return migration
ii. Methods of estimating international migration

Migration and health

Migrants' rights and Social entitlements

III Urbanization Definition and Concepts

i. Definitional and conceptual problems and Data sources: Rural-Urban Fringe, Metropolis or Metropolitan Area, Conurbation, Metropolitan Region, Megalopolis, Metropolitan Hinterland, urban turnaround, sub-urbanization
ii. Definition of urban and other associated urban concepts in Indian census; Urban size class structure

Measures

i Degree and tempo of urbanization;
ii Urban population growth and its components;
iii Rank-Size rule and Primacy Index, Lorenz curve and Gini's concentration ratio

Theories

i. Kingsley Davis model of urbanization process
ii. Functional Classification of Urban Centres by Harrisiii The City-Region Relationship
iii. iv Theories and Models of urban planning, Concept of New Towns

Urbanization process

i Current urbanization process in developed and developing countries with special focus on India,
ii Major urbanization problems and policies

ESSENTIAL READINGS:

1. Cohen, Robin. (1996): Theories of Migration. The International Library of Studies on Migration

2. Eduardo Arriaga, (1975): “Selected Measures of Urbanization”, in Sydney Goldstein and DavidSly (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, (2019): *World Urbanization Prospects, The 2018 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. International organization for Migration (2021), World Migration Report 2022, IOM, Geneva.
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 LabourOffice, 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, NewYork, Chapter-V
8. Weeks, John R. (2015), Population: An Introduction to Concepts and Issues, CengageLearning
9. Haas, H. d., Castles, S., & Miller, M. J. (2020). The age of migration: international population movements in the modern world. Sixth edition. New York, The Guilford Press

MPS C9 **(45 Hours)**

POPULATION, DEVELOPMENT AND ENVIRONMENT

CO1: To acquaint students on key concepts, indicators and composite indices of development
CO2: To familiarize students on various theories of population and development
CO3: To introduce pessimistic, optimistic and neutralistic views on population
CO4: To explain quantitative and qualitative aspects of human resources
CO5: To introduce the concepts of sustainable development, climate change and global warming

I. Concepts and Measures of Development

i. Need to study population in the context of development; Concepts of economic growth and economic development – definition and indicators; Limitations of per capita income as an indicator of development; Emphasis on equality, Lorenz curve and Gini coefficient.
ii. Economic determinants of development, non-economic determinants of development, and role of institutional factors in development.
iii. *Approaches towards development:* Growth oriented approach and basic minimum need approach; Human centred development – welfare approach, investment in human capital, Physical Quality of Life Index (PQLI), Human Development Index (HDI), Gender Development Index (GDI); Concepts and measures of money metric and multidimensional poverty, Human Poverty Index (HPI) and Multidimensional Poverty Index (MPI).
iv. Concepts of social development, social capital and social change.

II. Theories and Strategies of Development

i. *Theories of development:* Big push theory, Rostow's stages of growth, Arthur Lewis's two-sector model Liebenstein's critical minimum effort theory, Harrod-Domar model, and Solow's growth model.
ii. *Strategies of development:* Millennium Development Goals (MDGs), achievements with special reference to India; Concept of sustainable development, Sustainable Development Goals (SDGs); Development strategies through the different five-year plans in India; Recent development strategy (NITI Aayog) in India.

III. Population and Development linkages

- *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; and (iv) views of revisionists and need to study linkages between population change and development.

- Demographic transition theory, age structure transition, demographic dividends and population growth. Divergent views regarding the relationship between population and development.

IV. Population and Resources

i. *Natural resources:* classification of natural resources, renewable and non-renewableresources, resources scarcity and resource depletion.
ii. *Capital resources:* effect of demographic factors on savings and investments, technology and development; importance of technology to improve the productivityof physical assets.
iii. *Human resources - quantitative aspects:* concepts labour force, economically activepopulation, 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.
iv. *Human resources – qualitative aspects:* factors influencing productivity of human beings need for investment in human capital, implications of population growth onfood, sanitation, housing, employment, education and health and social security to improve the quality of human resources.
v. Educational development, urbanization and exposure to mass media and their social consequences.

V. Population and Environment

i. *Ecosystem:* Basic concepts, structure and functioning, energy and material flow, changes and challenges of ecosystem; simplification, eutrophication, pollution.
ii. *Philosophical dimensions of the new environmentalism:* postmodernism, eco Marxism, deep ecology, social ecology and ecofeminism.
iii. *Sustainable development and environment:* Role of environment in development – evolution, inclusion and progress; Brundtland Commission – Our Common Future; "5 *Ps*" that shape the *SDGs*: People, Planet, Prosperity, Peace, and Partnerships; UNGC Ten Principles; Linkages of SDGs with environment. Living planet index, Human foot print, IPAT model; environmental-Kuznetz curve;
iv. *Environmental challenges:* Resource depletion and environment; pollution; poverty and environment; food, nutrition and environment; ecofeminism; solid waste; climate change and development; health and environmental challenges; occupational health.
v. *UN conventions on environment and development:* Major world commissions from 1972 to Rio+20 and so on; UNFCCC and challenges in making policies on environment; Environmental policies and programmes in India.

ESSENTIAL READINGS:

1. Birdsall Nancy, Kelley Allen, & Sinding Steven (2001). *Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World,* Oxford: Oxford University Press. Chapters 2, 4 and 5.
2. Ray, Debraj (1998): *Development Economics.* Delhi: Oxford University Press. Chapters 3 & 4.
3. Todaro, Michael P. (1981): *Economic Development in the Third world.* New York: Longman. Chapter 3.
4. UNDP (2022). *Human Development Report 2021-2022: Uncertain Times, Unsettled Lives:*

5. UN Environment (2019). G*lobal Environment Outlook – GEO-6: Healthy Planet, Healthy People*. Cambridge University Press.
6. World Commission on Environment and Development (1987). *Our Common Future.* London: Oxford University Press.

SUGGESTED READINGS:

1. Chary, S.N. & Vinod Vyasulu (eds). (2000). *Environmental Management: An Indian Perspective*. New Delhi: Macmillan India.
2. Coale A.J. and Hoover, E.M. (1958). *Population Growth and Economic Development in Low Income countries*. Princeton: Princeton University Press.
3. David Bloom, David Canning & Jaypee Sevilla, (2003): *The Demographic Dividend.* Sanata Monica: Rand Corporation. Chapter 2.
4. Irfan Habib, (2010), *Man and Environment: The Ecological History of India* (A Peoples History of India 36). New Delhi: Tulika Books.
5. Kapila, Ray and Uma Kapila (2001). *India's Economy in the Twenty First Century.*New Delhi: Academic Foundation. Chapters 1 to 5, 15, 16& 21.
6. Leibenstein, H. (1963). *Economic Backwardness and Economic Growth*. New York: John Wiley. Chapter 8.
7. 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.
8. Morton Lippmann, Beverly S. Cohen, Richard B. Schlesinger, (2003). *Environmental Health Science: Recognition, Evaluation, and Control of Chemical and Physical Health Hazards.* Oxford: Oxford University press.
9. Solow, R.M. (1956). A contribution to the theory of economic growth, *Quarterly Journal of Economics*, 70: 65-94.
10. United Nations Development Programme (1990). *Human Development Report, 1990.* Delhi: Oxford University Press. Chapter 1.

MSP-C10 **45 Hours**

GENDER AND REPRODUCTIVE HEALTH

Course Outcomes:

CO1: To sensitize students to basic gender concepts, gender equity, gender inequalities and gender differentials.

CO2: To explain to students about empowerment, feminist and gender theories.

CO3: To familiarize students with the reproductive health paradigm and right-based approach to reproduction and gender egalitarianism.

Learning objectives: This paper aims to teach students about gender issues related to population, development and reproductive health. The main goal is to build skills for students to understand and analyze evidence pertaining to the institutional context of gender and gender-based inequalities and linkages between population, development and health with gender. Further, it provides a non-clinical foundation in the main aspects of reproductive health: maternal care, obstetric health, gynaecological morbidities, RTI/ STI/HIV/AIDS, infertility, abortion, family planning, and adolescent and men.

I. Basic concepts and theories of gender

Definitions, Concepts and Terminologies: gender, third gender, unequal gender relations, gender equity, gender disparities, gender inequalities, gender mainstreaming, gender-sensitive planning and gender balance, Masculinity and femininity, importance of the study of gender issues in Population Studies.

II. Gender Inequalities and Linkages with Development

Sex ratio trends and patterns in India; Son Preference, Desired sex composition of children, child sex ratio, the sex ratio at birth and sex-selective abortion; Marriage, customs and practices, dowry and mohar system, age at marriage; Purdah system; female genital mutilation; land rights of women; education, skill development and gender; labour force participation, household activities and social reproduction; gender differentials in nutrition and health; access to health care; political representation, and female headship; valuation of women in the context of marriage, dowry and development; gender-based violence (GBV) and its implications on child, adult and elderly; media and gender.

III. **Autonomy, Empowerment and Status**

Concepts, definition and measurement; various indicators and frameworks; approaches: Functionalist, Marxist, Feminist, Behaviouralism; the process of empowerment; a paradigm shift in gender, development and empowerment: WID, WAD, GID, GAD, WED; policies and programmes related to empowerment.

IV. **Reproduction physiology, Rights and Ethical issues**

Evolution of ideas about reproductive health and rationale of RH approach, Components of RH

Customs and taboos related to menstruation & puberty, and pregnancy in different societies; Aspects of adolescent sexual and reproductive behaviours, the vulnerability of adolescent and their health needs. Role of reproductive health policies and programmes on health. Ethical values in RH services; information, liberty of choice.

V. Maternal, obstetric, gynaecological and contraceptive morbidity

Risk factors of maternal mortality and morbidity, Three delay model, Emergency obstetric care, Maternal near miss and obstetric fistula, Impact of cultural practices during pregnancy on women's health, Programmes, policies and strategies for safe motherhood. Behavioural and lifestyle factors of different reproductive morbidities, Issues related to RTIs/STIs, HIV infection, Issues related to menopause and socio-psychological health problems of menopausal women.

VI. Infertility and abortion

Methodological issues in measuring primary and secondary infertility; social, cultural, environmental and anatomical risk factors of infertility. Consequences of infertility on marital stability of couples, mental health and violence. Assisted Reproductive Technologies(ART) use and misuse; surrogacy; laws and acts regarding their use. Abortion data and its measurement, type of abortions, the association of abortion with untimed and unintended births, Unsafe abortion and its association with maternal death and infertility, Laws regarding abortion

ESSENTIAL READINGS:

1. Kamla Bhasin, Understanding Gender (1999): Kali for Women, India, 88 pages, 9788186706213 (ISBN10: 8186706216).
2. Rosemarie Tong, Tina Fernandes Botts (2018), Feminist Thought; A More Comprehensive Introduction, 5th edition, by Routledge, ISBN 9781138329522, 432 Pages
3. Andrea Parrot, Nina Cummings (2006), Forsaken Females: The Global Brutalization of Women, Rowman & Littlefield Publishers, ISBN-10 : 0742545792, 270 pages
4. Michael S. Kimmel, The Gendered Society (2000), Oxford University Press, USA, ISBN 9780195399028 (ISBN10: 0195399021), 472 pages.
5. Berer, M., (2000): Making Abortions Safe: A Matter of Good Public Health Policy and Practice, Bulletin, WHO, Vol. 78(5), pp. 590-592.
6. Starrs, A. (2015): A Lancet Commission on sexual and reproductive health and rights: going beyond the Sustainable Development Goals. The Lancet, Vol 386 September 19, 2015.

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. Chhabra P. Maternal near miss: an indicator for maternal health and maternal care. Indian J Community Med. 2014 Jul;39(3):132-7. doi: 10.4103/0970-0218.137145. PMID: 25136152; PMCID: PMC4134527
3. Zampas, C. (2013) Legal and ethical standards for protecting women's human rights and the practice of conscientious objection in reproductive healthcare settings. International Journal of Gynecology & Obstetrics 123(Suppl 3): S63-S65.
4. Macaluso, M., et al. (2010) A public health focus on infertility prevention, detection, and management. Fertility and Sterility 93(1):16.e1-10.

5. Basu, Alaka M., (1992): Culture, The Status of Women and Demographic Behaviour, Oxford University, New York.
6. Ellsberg Mary and Heise Lori L. (2005) Researching violence against women: A practical guide for researchers and activists. WHO and Path, Washington D.C.
7. Gita Sen, Adreinne Germain and Lincoln C. Chen, (Eds.), (1994): Population Policies
8. Rutstein SO, Shah IH. Infecundity, infertility, and childlessness in developing countries. DHS Comparative Reports No.9. Calverton, MD: ORC Macro and Geneva: World Health Organization, 2004
9. Pachauri, S. (Eds. 1999): Implementing a Reproductive Health Agenda in India: The Beginning, New Delhi; Population Council.
10. Rozee G.V. and Sayeed Unisa (Editors) (2016) Assisted Reproductive Technologies in the Global South and North: Issues, Challenges and Future, Rutledge, London

11 Michael A. Koenig, Shireen Jejeebhoy (2008) Reproductive Health in India: New Evidence , Rawat Publications.

12 The Women, Gender and Development Edition 2, (2011) by Nalini Visvanathan (Editor), Lynn Duggan (Editor), Nan Wiegersma (Editor), Laurie Nisonoff (Editor), et al ; ZED Books, London.

MPS C11 **(45 Hours)**

POPULATION POLICIES AND PROGRAMME MANAGEMENT

Course Outcomes:

CO1: To have an understanding of population policy in pro-natalist and anti-natalist divide around the world.

CO2: To appreciate the role of United Nations and International population conferences, including ICPD, in evolving changes in designing and advocating population policies and programmes.
CO3: To critically evaluate the population policies and programmes of India since independence.
CO4: To understand the management and quality of care in health services and family planning programmes.

CO5: To learn the tools of evaluating family planning programmes and SWOT approach.

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; World Population Conferences, Declarations and Plan of Action.Fertility influencing policies: pro-natalist policies, fertility control policies- direct and indirect.Policies and programmes for special groups: women and children.

Health influencing policies: historical perspective for policies and programmes in developing and developed countries.

India's health and family planning programmes: History of birth control movement, National Population Policies, National Health Policies, and National Health Mission.

B. POPULATION AND PROGRAMME MANAGEMENT

Strategic management approach, Targeting the people in need (Community Need Assessment); Client segmentation; and Unmet need approach.

Providing services; commercial distribution, community-based distribution (CBD) systems andsocial marketing.

Quality of Care: Definition, Importance and Framework of quality of care in family planning.

C. EVALUATION OF PROGRAMME

Evaluation of programmes: objective, types, framework and methodological issues and data

Management Information System (MIS); Role ofHMIS in evaluation of the programmes.

Operation Research Techniques (ORT) in evaluation.

Economic evaluation of the programmes: Cost-benefit analysis, Cost-effective analysis, SWOT analysis

Fertility impact of Family planning programme: Bongaarts' model for estimating fertility impact.

ESSENTIAL READINGS:

1. Government of India (2000), *National Population Policy- 2000*, Ministry of Health and Family Welfare: New Delhi.
2. Government of India (2017), *National Health Policy- 2017*, Ministry of Health and Family Welfare: New Delhi.
3. Srinivasan, K. (2017), *Population Concerns in India: Shifting trends, policies, and programs,* Sage Publications: New Delhi.
4. United Nations (1995): *Report of the International Conference on Population and Development*, Cairo, 5-13 Sept, 1994

SUGGESTED READINGS:

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. United Nations (1998): *National Population Policies,* Department of Economics and Social Affairs, New York.
5. Asia Development Bank (2006*). Impact Evaluation: Methodological and Operational Issues.* Economic Analysis and Operations Support Division. ADB, Manila.
6. Jain, A (ed.) *Do Population Policies Matter? Fertility and Politics in Egypt, India, Kenya and Mexico*, Population Council, New York
7. Visaria, L and R R Ved (2016): *India's family planning programme: Policies, practices and challenges,* Routledge, London.

MPS C12 **(30 Hours)**

STATISTICAL METHODS AND COMPUTER APPLICATIONS IN LARGE SCALE DATA

Course Outcome:

CO1: To have hands on experience on statistical packages like SPSS, STATA to facilitate handling of large-scale data sets.

CO2: To familiarize with the data management such as recoding, sorting, filtering, file merging and splitting using SPSS and STATA

CO3: To understand and learn the uses of univariate, bivariate and multivariate analysis using software packages

i. 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.

ii. Correlation and regression analysis – interpretation and regression diagnostic test.

iii. Multivariable 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.

iv. Introduction to STATA and R - generating, variables, commands and do file editor. Survey analysis – estimation of mean, proportion, design effect and probit analysis and standard non-parametric test.

v. 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.

ESSENTIAL READINGS:

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.,* 2nd Edition. Stata Press.
5. *Stata programming reference manual: Release 8.,* 2nd Edition. Stata Press.
6. *Stata survey data reference manual: Release 8.,* 2nd 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.

MPS C13 **(30 Hours)**

POPULATION PROJECTIONS

Course Outcomes:

CO1: To train the students in mathematical and component methods of population projections.

CO 2: To develop the skills to use different demographic packages of projection of population, households, urban-rural, education, and employment for programs andpolicymaking.

Population Estimates and Projections

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

Methods of interpolation and extrapolation: linear, exponential, polynomial, logistics, and Gompertz curves. Intercensal and post-censal estimates. Regression method of projection for behavioural event. ARIMA.

Cohort component method: basic methodology; projection of mortality, fertility, and migration components; population projections of United Nations and Office of the RegistrarGeneral of India. Use of SPECTRUM and its applications.

Methods of rural-urban and sub-national population projections: ratio method, apportionment (Water) method, urban-rural growth difference method, and concept ofraking.

Methods of related socio-economic projections: labour force, school-enrolment, and households.
Projection of Future Health Needs: Like ambulatory services, sanitary napkins, old age nest/home, health personnel, nursing staff (hospital and home-based), counselors etc. SPECTRUM software.

ESSENTIAL READINGS:

1. 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.
2. United Nations (1955). Manuals on methods of estimating populations: Manual II – Methods of Appraisal of Quality of Basic Data for Population Estimates. Department of Economics andSocial Affairs, New York. Chapter 1, 2, 3
3. United Nations, (1955): Methods of Appraisal of Quality of Basic Data for Population Estimates, Manual II. New York: United Nations. Chapter 1 & 3.
4. Pathak, K.B. and F. Ram (1998): *Techniques of Demographic Analysis*, Himalaya Publishing House, Second Edition, Mumbai.
5. 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.
6. Srinivasan, K. (1998), *Basic Demographic Techniques and Applications*. London: Sage Publications.

SUGGESTED READINGS:

1. 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.
2. Potter, R.G. and Kulkarni, P.M. (1977): Population Momentum: A Wider Definition, Population Studies Vol. 40 pp. 555-56.
3. Preston, Samuel H., and Subrata Lahiri (1991): "A Short-cut Method for Estimating Death Registration

4. Rele, J. R., (1987), “Fertility Levels and Trends in India, 1951-81”, *Population and Development Review* Vol. 13 (2). Academic Press, New York.
5. Mishra, B.D. (1981): An Introduction to the Study of Population, New Delhi: South Asian Publishers, Pvt. Ltd. New Delhi.
6. K. Srinivasan. Training Manual on Demographic Techniques. Census of India and UnitedNations Population Fund, India. Chapter 4, 10
7. Jeremiah P. Banda (2003). Non-sampling errors in surveys. UNITED NATIONS SECRETARIAT ESA/STAT/AC.93/7. Statistics Division 03 November 2003
8. Census of India (2011). Report on Post Enumeration Survey, 2011. Registrar General &Census Commissioner.
9. 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.
10. Potter, R.G. and Kulkarni, P.M. (1977): Population Momentum: A Wider Definition, Population Studies Vol. 40 pp. 555-56.

MPS C14 **(30 Hours)**

DEMOGRAPHIC ESTIMATION TECHNIQUES AND MODELS

Course Outcomes:

CO1: To familiarize students with the indirect techniques of estimating demographic components under the limited circumstance of data availability.

CO2: To familiarise students with demographic models to understand the population issues and evaluate the observed demographic rates and ratios.

Demographic Models

Concepts of Demographic Models:

Stationary, Stable and 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?)

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] Completeness of Death Registration by Lopez applications of MORTPAK in estimating age specific fertility rate (ASFR) and total fertility rate (TFR).

Indirect Method of Estimating Mortality:

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; applications of MORTPAK in estimating infant and child mortality.

(b) Modifications proposed by Sullivan and subsequently by Trussell over Brass method; and (c) the UN revised and extended version of Trussell's method.

Methods of Estimating Adult (including Maternal Mortality) and Old Age Mortality

(i) 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.

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 READINGS:

1. 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).
2. Preston, Samuel H. Patrick, Heuveline and Michel Guillot, 2003, *Demography: Measuring and Modeling Population Processes*, Blackwell Publishers, 2001 (First Indian Reprint 2003).
3. United Nations (1955). Manuals on methods of estimating populations: Manual III – Methodsof Population Projections by Age and Sex. Department of Economics and Social Affairs, NewYork. Chapter 2.
4. Navaneetham Kannan and George Groenewold, (1998): *The Projection of Populations: Data Appraisal, Basic*

SUGGESTED READINGS:

1. 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.
2. 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.
3. Rele, J. R., (1987), "Fertility Levels and Trends in India, 1951-81", *Population and Development Review* Vol. 13 (2). Academic Press, New York.
4. Srinivasan, K. (1998), *Basic Demographic Techniques and Applications*. London: Sage Publications.
5. Government of India (2019): *Population Projections for India and States, 2011-2036.* New Delhi: NCP, MoHFW.
6. Field, J.L. (1990) Past projections: How successful? In Population Projections: Trends, Methods and Uses, Liverpool, 12-14 sept. 1990. Occasional paper 38. Office of Population Censuses and Surveys, pp. 23-29.
7. Shaw, C. (2007). Fifty years of United Kingdom national population projections: how accurate have they been? Population Trends 128: 8-23. Available at www.ons.gov.uk/ons/rel/population-trends-rd/population-treends/no--128--summer-2007/fifty-years-of-united-kingdom-national-population-projections--how-accurate-have-they-been-.pdf
8. Moultrie, Tom, Rob Dorrington, Allan Hill, Kenneth Hill, Ian Timæus and Basia Zaba, (2013) Tools for
9. Demographic Estimation. International Union for the Scientific Study of Population (IUSSP)
10. Office of the Registrar General of India, Government of India (2020): Population Projections for India and States, 2011-2036. Report of the Technical Group on Population Projection. National Commission on Population and Ministry of Health & Family Welfare, Government of India. New Delhi

MPS E3.1 **(45 Hours)**

URBANIZATION, SPACE AND PLANNING

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 progammes 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

Definitions, concepts, purpose, types and levels; geography/demography and planning relationship.Region: concept and definition, types (formal, functionaland planning); Need for regional planning; Types of regional planning; Spatial structure of regions, Climate resilience,

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.

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, Gandhinar, Bhubaneshwar); Smart Cities Mission; HRIDAY, AMRUT, PURA,

IV. Challenges in Urban planning

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housing and real estate, Slums and slum rehabilitation; Urban pollution, Solid waste management; Management of migrants; Case studies of rehabilitation programs (SRA)

V. Remote Sensing, GIS and Urban and Regional Planning

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

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, Hyderbad.
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 READINGS:

1. Bhagat, R. B., Roy, Archana K. and Sahoo, Harihar. (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. Hall, P, (1992), *Urban and Regional Planning*, Third Editions, Routledge, London.
4. Harvey, D. (2012) *Rebel Cities: From the Right to the City to the Urban Revolution*, Verso, London
5. Leong, Goh C. and G.C. Morgan, (1982), *Human and Economic Geography,* Oxford University Press, Singapore.
6. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall of India, New Delhi.
7. Nyerges, Timothy L. and, Jankowski Piotr (2010): Regional and Urban Gis: A Decision Support Approach, Rawat Publication, Jaipur.
8. Kawashima, T and P. Korcelli, (1982), Human Settlement Systems: Spatial Patterns and Trend, IIASA, Luxemburg.
9. Sarin, M, (1982), Urban Planning in the Third World: The Chandigarh Experience, Manshell, London.
10. MMRDA (2016), Mumbai Metroplotan Regional Development Plan 2016-2036 MMRDA, Mumbai.
11. UNEP and others (2007), Livable Cities: The benefits of environmental planning, The Cities Alliance, Washington. http://www.citiesalliance.org/idex.html

MPS E.3.2 **(45 Hours)**

OCCUPATIONAL HEALTH

Course Outcomes:

CO1: To familiarize students with occupational health risks/ hazards and their demographic implications.

CO2: To train the students in basic concepts, theories, measurements and data sources of occupational health risks/hazards.

CO3: To acquaint students with various types of contemporary hazardous occupations throughout the world.

CO4: To develop in-depth understanding of intersectionality of occupation, health and demography in low and middle-income countries.

CO5: To develop critical thinking among students of social welfare policies and laws/ legislations/ acts for workers in India.

Teaching Strategy: Classroom teaching, seminars, case studies, group exercises and field visits.

I. Introduction of Occupational Health and Demography:

Definition, basic concepts, the scope of occupational health and importance in demography; Difference between occupational health risks and hazards; Historical development of occupational health, the intersectionality of occupational health, socioeconomic characteristics, and demography; Pre and Post industrialization theories on occupational health risks and hazards; Decent work; Women's health and safety.

II. Morbidity and Mortality:

Health Well-being of Workers; Occupation–related Morbidity, Health Disorders, Different types of Disabilities, and Mortality; Mental Health.

III. Types and Measurements of Occupational Health Risks:

Occupational disciplines and related risks - Mechanical, Chemical, Biological, Physical, Psychological, Medical, Ergonomic, and Work organization hazards/risks (Hazards or stressors that cause stress (short- term effects) and strain (long-term effects)); Measurements of occupational health safety, risks and hazards; Health impact assessment, Mental health assessment scale, Musculoskeletal disorder scale, American Thoracic Society and the Division of Lung Diseases (ATS-DLD-78), Occupational Stress Index (OSI), Job Strain Model, etc.

IV. Data Sources of Occupational Health:

International and National Data Sources of Occupational Health - Population Census, Services Statistics, Large - and Small-Scale Sample Surveys etc. Data limitations in the area of occupational health.

V. Legislation, Social and Welfare Policies:

Sustainable Development Goals - (Decent work), International Labour Organization (ILO) Declaration on Fundamental Principles and Rights at Work; International Labour Standards on Occupational Safety and Health, Wages and Working time; ILO - Occupational Safety and Health Convention, Health and Safety Acts; The Occupational Safety, Health and Working Conditions Code, 2020 etc. Child Labour and Health

VI. Occupational Health in India:

History of Occupational Health in India (types of occupations, work environment and working conditions); Health behavioral risks and hazards; Evolution of labour unions; and Contemporary occupational health challenges of workers in India. Social and Welfare legal provisions and acts in India; Hazardous Waste Management Rules – 2000, Constitutional Rights, Wage Regulations (Minimum Wage Act), Factory Act – 1948, Employees' State Insurance Act, 1948 (ESI Act), Workmen Compensation Act – 1960, Employee Provident Act – 1952, Labour Welfare Measures, Retirement Benefits/National Pension Scheme – 2004, Social Welfare Schemes and Programmes.

ESSENTIAL READINGS:

1. Benjamin O. Alli, (2008), Fundamental Principles of Occupational Health and Safety, Second Edition, International Labour Office, Geneva: ILO, Pages:1 – 221
2. Government of India, National Policy on Safety, Health and Environment at Work Place, Ministry of Labour and Employment, https://labour.gov.in/policies/safety-health-and-environment-work-place.
3. Government of India, Ministry of Rural Development, (2015), Occupational Health & Safety, Environmental Issues and Decent Work-Module-8, New Delhi. Pages: 1 -32.
4. Occupational safety and health in public health emergencies: A manual for protecting health workers and responders: Geneva: World Health Organization and the International Labour Office, 2018. Licence : CC BY-NC-SA 3.0 IGO.
5. Dianne E. G. Dyck, 2020, Occupational Health & Safety: Theory, Strategy & Industry Practice, 4th Edition, ISBN/ISSN: 9780433502074.

SUGGESTED READINGS:

1. Government of India, Report of the Working Group on Occupational Safety and Health for the Twelfth Five Year Plan (2012 To 2017), Ministry of Labour And Employment, New Delhi, Pages 1- 145.
2. Hyde, Martin, Singh Chungkham, Holendro, (2017), Work and Health in India, Policy Press, ISBN:9781447335436, 1447335430
3. Page count:280
4. M. Timothy McAdams, Jeffrey J. Kerwin, Vanessa Olivo, Huseyin A. Goksel, (2011), National Assessment of the Occupational Safety and Health Workforce, 200-2000-08017, Task Order 18, Pages 1 - 246.
5. Gautam Bhan, Antara Rai Chowdhury, Rashee Mehra, (2021), State of occupational safety and health practices at workplace for domestic workers in COVID-19 and possibilities for action, International Labour Organization, Geneva, ISBN: 9789220350768 (Print). Pages 1 - 36.
6. Jacques Tamin, (2020), Occupational Health Ethics: From Theory to Practice, Springer Cham, Hardcover ISBN 978-3-030-47282-5, https://doi.org/10.1007/978-3-030-47283-2
7. International Labour Conference, (2003), Global Strategy on Occupational Safety and Health, International Labour Organization: ISBN 92-2-116287-7 (print version), Geneva, Pages – 1 – 20.
8. Global Strategy on Occupational Health for All: The Way to Health at Work (1994), WHO Collaborating Centres in Occupational Health, WHO/OCH/95.1, GENEVA, Pages: 1 -72.
9. World Health Organization (WHO) - Regional Office for the Eastern Mediterranean (2001), Occupational health: A manual for primary health care workers, Cairo, WHO-EM/OCH/85/E/L, pages – 1-168.

MSP E3.3 **(45 Hours)**

MONITORING AND EVALUATION IN POPULATION &HEALTH

Course Outcomes:
CO1: Familiarize the students with concepts and methods of monitoring and evaluation research.
CO2: To acquaint with various designs employed in monitoring and evaluation.
CO3: Develop skills on statistical approaches for implementation programmes.
CO4: Orient students on health management information system.

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; 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. Management Information System and Use of Technology: MIS – Monitoring information system; Role of programmers; HMIS system; Global Positioning System, Use of Machine learning and Artificial Intelligence, Use of spatial data

ESSENTIAL READINGS:

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. Rossi, Peter H.; Mark W. Lipsey and Howard E. Freeman (2004). Evaluation, A Systematic Approach. Seventh Edition. Sage Publications – New Delhi.
5. United nations development Group. The Theory of Change, UNDAF Companion Guideline.

SUGGESTED READINGS:

1. IFRC and RCS (2002). *Handbook for Monitoring and Evaluation*. International Federation of Red Cross and Red Crescent Societies –Geneva
2. McLean R. and Gargani J. (2019) Scaling Impact Innovations for the Public Good. Routledge, New York.
3. 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
4. OECD (2021). Applying Evaluation Criterion Thoughtfully, OECD Publishing, Paris. https://doi.org/10.1787/543e84ed-en.
5. 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.

MPS E-4.1 **(45 Hours)**

HEALTH ECONOMICS AND FINANCING

Course Outcomes:

CO1: 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.
CO3: To familiarize the means and measures of health financing.
CO4: To understand the determinants of health insurance and its coverage.
CO5: 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 Heath, 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

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

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 utilization: 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. 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

VII. 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 READINGs:

1. Rexford E. Snterre and Stephen P. Neun, Health Economics: Theories, Insights and Industry Studies, Thompson South – Western, 3rd Edition (614, San/Hea, 073226) Note: 4th 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 (2008), AGiide to Techniques and Their Implementation
4. Xu K (2005). Distribution of health payments and catastrophic expenditures Methodology World Health Organization.

SUGGESTED READINGs

1. 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.
2. Grossman (1982), On the concept of Health capital and Demand for Health, Journal of Political Economy, 80(2)
3. Macintyre S (1997). The Black Report and Beyond-What are the issues, Social Science, Medicine, 44(6):723-745
4. Mohanty, S. K., & Dwivedi, L. K. (2021). Addressing data and methodological limitations in estimating catastrophic health spending and impoverishment in India, 2004–18. International journal for equity in health, 20(1), 1-18.
5. Ringel etal (2005) The Elasticity of Demand for Health Care A Review of the Literature and Its Application to the Military Health System
6. Victoria Y Fan and William D. Savedoff (2014), “Health Financing transition: A conceptual framework and empirical evidences, Social Science Medicine, 105 (2014):112-121
7. Wagstaff A, P. Paci and E van Doorslaer (1991), On the measurement of inequalities in health, Social Science and Medicine 33(5), 545-557
8. 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

MPS E.4.2 **(45 Hours)**

SPATIAL DEMOGRAPHY AND APPLICATION OF GIS

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 techniquesto 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):

i. Population distribution map of India using dot and sphere/circle, cubes, combined; Cartograms
ii. Density map by Choropleth and population density gradient by Isopleth;
iii. Fertility, mortality and natural growth of population by Polygraph.
iv. Measurement of population concentration by cumulative curve.
v. Migration flow by Carogram

Concept and application Models:

i. Spatial Lag and Error Regression Modeling;
ii. Multilevel modeling (hierarchical linear modeling);
iii. Geographically Weighted Regression;
iv. Spatial Pattern Analysis;
v. Urban and city level projection

ESSENTIAL READINGS:

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Wookbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on http://geodacenter.asu.edu/.
2. Bailey, T. and Gatrell, A. C. (19l95): 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, Willey-Blackwell.
5. Kurland K. S., Gorr W. L. (2007). GIS Tutorial for Health. Redlands, CA, ESRI Press.
6. Lo, C.P. and Yeung, A. K. W. (2002): Concepts and Techniques of Geographic Information Systems. New Delhi, Prentice Hall of India.

SUGGESTED READINGS:

1. 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.
2. 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.
3. 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).
4. Reibel, Michael, (2007). *Geographic Information Systems and Spatial Data Processing in Demography: A Review.* Population Research and Policy Review 26: 601-608.
5. Griffith, D. A. and Amehein (1997): Multivariate Statistical Analysis for Geographers. Englewood Cliffs, New Jersey, Prentice Hall.
6. Robinson, A. H. H., Sale R., Morrison J. and Muehrcke, P. C (1984) Elements of Cartography. New York, John Wiley and Sons.
7. Chang, K. (2008). Introduction to Geographic Information Systems. New Delhi, McGraw Hill Education.
8. Shaw, G. and Wheeler, D. (1994). Statistical Techniques in Geographical Analysis. Englewood Cliffs, New Jersey, Prentice Hall.
9. Soja, E. W. (1996). Third space: Journeys to Los Angeles and Other Real-and Imagined Places. Wiley-Blackwell.
10. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.

MPS E.4.3 **45 Hours**

LARGE-SCALE SAMPLE SURVEYS

Course Outcomes:

CO1: To decide sample size for large-scale and its allocation at the sates and districts level.

CO2: To select rural and urban Primary Sampling Unit (PSU) from sampling frame such as – Census, NSS, or other frame.

CO3: To implement stratified sampling for PSU selection.

CO4: To conduct household mapping and listing for household selection.

CO5: to device the mechanism or develop a tool to monitor the large-scale household survey.

CO6: To check he quality of household sample survey data to generate reliable estimate at the national, sub-national, global level.

CO7: To assess the cognitive process of survey response.

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.

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 household listing for preparation of frame for last stage sampling units; sample selection of PSUs and households.

Quality assurance procedures: Revisit of sub-samples; field check tables; non-response pattern; roles of supervisors, editors, field and nodal agencies; third party audit.

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.

Ethical considerations in large-scale sample surveys

Estimation of sampling weights

ESSENTIAL READINGS:

1. United Nations (2005): Household Sample Surveys in Developing and Transition Countries. www.unstats.un.org/unsd/hhsurveys/
2. CSPro Software. www.census.gov/data/software/cspro.Download.htm
3. Roy, T.K., Acharya R., Roy, A.K. (2016). Statistical survey design and evaluating impact, Cambridge University Press, New Delhi.

SUGGESTED READINGS:

1. Kish, Leslie, (1995): Survey Sampling, John Wiley and Sons, Inc. New York.
2. Lohr L. Sharaon., (1999): Sampling: Design and Analysis, Duxbury Press, London
3. Ladusingh, L. (2018). Survey Sampling Methods, PHI Learning, New Delhi

Master of Population Studies (MPS)

Code	TITLE	Type	Credits	Hours	No. of Internal Exams	Weightage (%)	
						Internal Exam	Semester Exam
	Semester I						
MPS F1	Basic Statistical Methods for Population Studies	F	NC	45	3	50	50
MPS F2	Social Science Concepts	F	NC	45	3	50	50
MPS C1	Demography and History of Population	C	2	30	2	40	60
MPS C2	Age-sex structure, Quality of Data & Population Dynamics	C	2	30	2	40	60
MPS C3	Nuptiality	C	2	30	2	40	60
MPS C4	Fertility	C	3	45	3	40	60
MPS C5	Mortality, Morbidity and Public Health	C	3	45	3	40	60
MPS C6	Research Methodology	C	3	45	3	50	50
MPS C7	Population Ageing and Health Transition	C	3	45	3	40	60
MPS E1	E1.1: Healthcare Systems and Policies E1.2. Biostatistics and Epidemiology	E	3	45	3	40	60
MPS E2	E2.1: Concepts and Measures of Global Health E2.2. Operations Research in Reproductive Health	E	3	45	3	40	60
VV-I	Viva-Voce Examination I	V	2	30			
	Semester credits		**26**	**390**			
	Semester II						
MPS C8	Migration and Urbanization	C	3	45	3	40	60
MPS C9	Population, Development and Environment	C	3	45	3	40	60
MPS C10	Gender Equity and Reproductive Health	C	3	45	3	40	60
MPS C11	Population Policies and Programme Evaluation	C	3	45	3	40	60
MPS C12	Statistical Methods and Computer Applications	C	2	30	2	50	50
MPS C13	Population Estimation and Projections	C	2	30	2	50	50
MPS C14	Demographic Estimation Techniques and Models	C	2	30	2	50	50
MPS E3	E3.1: Urbanization, Space and Planning E3.2. Occupational Health E3.3: Monitoring and Evaluation in Population & Health	E	3	45	3	40	60
MPS E4	E4.1: Health Economics and Financing E4.2: Spatial Demography and Application of GIS E4.3. Large-scale Sample Surveys	E	3	45	3	40	60
MPS C15	Term paper	T	4	60			
VV-II	Viva-Voce Examination II		2	30			
	Semester credits		30	**450**			
Grand Total			56	**840**			

Notes:

Course type: **F** – Foundation course; C – Core course; E – Elective course; V – Viva voce; T – Term Paper.
NC: Non-credited foundation courses are not counted for calculating the final grade.
Core papers: Must for all students and cannot be changed.
Elective papers: One elective paper should be opted from a pair.

Internal Examination: Teachers are given the flexibility to decide mode of mode of internal examination from the following list: Written Test; Open Book Test; Written Home Assignment; Individual Thematic Presentation; Thematic Group Presentation; Group Discussion; Surprise Test; MCQ Test; Case Study; Situation Analysis (group activity or individual activity); Field Visit; Small Group Project & Internal Viva-Voce; Role Play / Story Telling; Literature Review / Book Review; Model Development/Simulation Exercises (Group Activity or Individual Activity); In-depth Viva; Quiz; etc.

Term Paper: Weightage for evaluation of term paper: Guide: 0.25; Presentation & Defence 0.25; and Content: 0.50.

Evaluation of Term Paper: The Director & Senior Professor appoints an evaluation committee for term paper consisting of three members from among the faculty of IIPS. First, the committee members independently assess the 'oral presentation and defence' of the student and submit their grade to the Controller of Examinations. Second, the committee members independently evaluate the content of the 'final term paper' submitted by the student and submit their grades to the Controller of Examinations. The average of the evaluation is considered for the final grade of the term paper.

Best Term Paper Award: The Director & Sr. Professor appoints a committee consisting of three external experts for recommending the award of the best term paper. The term papers of top five ranks (based on the combined score of content, presentation and defence) are placed before the committee. The external members evaluate term paper and submit their recommendation in a sealed cover to the Controller of Examinations.

Viva voce: Director & Sr. Professor constitutes a committee comprising of one external examiner and three/four internal examiners for the viva-voce. The three/four internal examiners shall comprise of one senior professor (Chairperson), one/two faculty members and one programme co-ordinator. The committee members independently evaluate the performance of the students in the viva-voce and assign their grades. To arrive the final viva-voce grade, the average of the evaluation of the members is considered.

Evaluation of Term Paper: The Director & Senior Professor appoints an evaluation committee for ~~dissertation~~ TP consisting of three members from among the faculty of IIPS. First, the committee members independently assess the 'oral presentation and defence' of the student and submit their grade to the Controller of Examinations. Second, the committee members independently evaluate the content of the 'final dissertation' submitted by the student and submit their grades to the Controller of Examinations. To arrive the final term paper grade, the average of overall all grades of Guide, Presentation & Defence, and Content is considered.

Best Term Paper: The Director & Senior Professor appoints a committee consisting of three external experts for recommending the award of the best dissertation. The dissertations of top five ranks (based on the combined score of content, presentation and defence) are placed before the committee. The external members evaluate dissertations and submit their recommendation in a sealed cover to the Controller of Examinations.

Viva voce: Director & Sr. Professor constitutes a committee comprising of one external examiner and three/four internal examiners for the viva-voce. The three/four internal examiners shall comprise of one senior professor (Chairperson), one/two faculty members and one programme co-ordinator. The committee members independently evaluate the performance of the students in the viva-voce and assign their grades. To arrive the final viva-voce grade, the average of the evaluation of the members is considered.

Grades Table

GRADE TABLE FOR EVALUATION OF ANSWER SHEET

The Grades, Grade Point and Descriptions are as given below

Final Grade	Grade Point	Grade Description
O Only	10	Outstanding
A Plus	9	Excellent
A Only	8	Very Good
B Plus	7	Good
B Only	6	Above average
C Only	5	Average
P Only	4	Pass
F3	3	Fail
F2	2	Fail
F1	1	Fail
NA/Ab	0	Not Attempted / Absent

GRADE TABLE FOR SEMESTER GRADE CARD

The Grades, Grade Point and Descriptions are as given below

Final Grade	Grade Point	Grade Description
O Only	10	Outstanding
A Plus	9	Excellent
A Only	8	Very Good
B Plus	7	Good
B Only	6	Above average
C Only	5	Average
P Only	4	Pass
F Only	0	Fail
NA/Ab	0	Not Attempted / Absent

MINUTES OF THE MEETING OF THE ACADEMIC COUNCIL OF THE INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES HELD ON DECEMBER 13, 2023.

The meeting of the Academic Council was held under the chairpersonship of Prof S.K Singh, Director (Additional Charge) on December 13, 2023 at 10.30 AM at Seminar Hall ,IIPS-Mumbai. At the outset, the Chairperson extended warm welcome to all members and external experts to the meeting of Academic Council.
The list of members attended the meeting is given in Annexure I

Chairperson of Academic Council requested Prof. D.A.Nagdeve, Member-Secretary to proceed with the agenda.

Agenda Item No.1: **To confirm the Minutes of Academic Council Meeting held on July 05, 2023.**

The members confirmed and approved the minutes of the meeting of Academic Council held on July 05, 2023.

Agenda Item No.2: **Action taken on the Minutes of Academic Council Meeting held on July 05, 2023.**

Action taken were noted.

Agenda Item No.3: **To discuss & approve the admission criteria of Master of Science (M.Sc.) in Survey Research and Data Analytics.**

The Director (Additional charge) has constituted a committee for the admission criteria of Master of Science (M.Sc.) in Survey Research and Data Analytics.
Dr.Preeti Dhillon, member of the committee , made a presentation on the eligibility criteria. The committee has recommended to the follow the same admission procedure & fees structure like other master degree programme of the institute.
The members of Academic Council approved the approve the admission criteria of Master of Science (M.Sc.) in Survey Research and Data Analytics. **Annexure II**

Agenda Item No.4: **To approve the syllabus of Master of Science (M.Sc.) in Survey Research and Data Analytics.**

The Director & Sr. Professor constituted a committee for frame the syllabus of Master of Science (M.Sc.) in Survey Research and Data Analytics. Dr.Preeti Dhillon, Member Secretary of the committee , presented in detailed the syllabus of M.Sc. in Survey Research and Data Analytics course. Dr.Dhillion has displayed the semester wise credit distribution and also enlighten the elective papers ,field work & internship .
Chairperson has suggested to constitute a committee with course coordinator for the evaluation process of Internship /field work. The Placement cell must ensure the internship of students.
The members of Academic Council approved the syllabus for Master of Science (M.Sc.) in Survey Research and Data Analytics. w.e.f AY 2024-25. **Annexure III**

Agenda Item No.5: **To discuss and approve the revised admission eligibility criteria for Fulltime & Part time Ph.D Programme in line with UGC.**

The Director (Additional charge) has constituted a committee for revised the admission eligibility criteria for full-time & Part-time Ph.D programme in line with the UGC guideline.

Prof.Abhishek Singh, Member Secretary of the committee , made a presentation on the eligibility criteria. He has briefed about the recommendation of the committee & enlighten the new Ph.D eligibility criteria and admission procedure in line with the UGC regulation.To ensure the quality of Ph.D degree, he also added that the committee propose publication is essential for the award of Ph.D degree.

The member of AC has recommended the followings :-

- Ph.D admission will be in two stage process namely 1.Entrance Test /CBT (weightage 70%)2.Interview (weightage 30%). Part-time Ph.D admission procedure will be the same as regular Ph.D admission.
- Course work is mandatory for M.Phil degree holder and no course work exemption will be granted under any circumstances
- AC recommended to add one external member in the personal interview in Ph.D admission process from the academic year 2024-25 onwards.
- In case of superannuation or resignation of Guide, the advisory committee members will authorize to signature on half yearly progress report or any others documents required day to day basis.

The members of Academic Council approved the revised Ph.D guideline. **Annexture IV**

Agenda Item No.6: **To discuss & approve the admission procedure, fee & course structure of 4 years Bachelor course in Population Studies (Honours with Research) as per NEP-2020.**

Prof. Aparajita Chattopadhya, Chairperson of the NEP Committee has informed the AC that the committee has prepared the programme structure in the line with NEP-2020. The name of proposed courses shall be 1) Bachelor of Science in Population Sciences (Honours with research or Honours) (2) Bachelor of Science in Statistics(Honours with research or Honours) 3) Bachelor of Science in Population Health (Honours with research or Honours). The commencement of the courses is proposed from the Academic Year 2025-2026 through Central University Entrance Test(CUET) managed by the National Testing Agency.The committee also recommended to extend the course upto fifth year (Master degree) as per NEP-2020.

Dr. Srinivas Goli has made brief presentation on the proposed programme namely Bachelor of Science in Population Sciences .Dr. Kunal Kesari has presented Bachelor of Science in Population Health and Prof. Nandita Saikia has made brief presentation on the proposed programme namely Bachelor of Science in Statistics.
Assistant Registrar (Acad.), Member Secretary of the committee informed the AC that the committee has recommended the fee structure same as master degree programmed currently running at the Institute. At the time of recommendation, it was also mentioned that the committee has recommended the fee structure keeping in the mind with multiple entry, exit and re-entry points.
The members of Academic Council approved the proposed course structure & fees of the above the three programme. **Annexture V**

Agenda Item No.7: To discuss & approve the structure of the Master of Arts in Population Studies programme, offered through the distance learning.

The Director & Sr. Professor, has constituted a committee to prepare structure of course namely the Master of Arts in Population Studies offered through mode. Prof. T. V. Sekher, Chairperson of the Committee has presented the detailed recommendation of the committee. He has informed that the weightage of semester end examination and internal assessment should be 70%, 30% respectively. The AC recommended that in case of Term Paper only secondary data to be considered.

Chairperson has recommended to develop the modules as per the revised syllabus with immediate effects.

The member of Academic Council approved the same.

Agenda Item No. 8: Ph.D Re-registration of Mr.Kisan Dilip Algur.

Prof. D. A. Nagdeve, Ph.D coordinator informed that a committee with an external member review the progress of Mr.Kisan Dilip Algur & recommended to submit the thesis within one year.
The member of Academic Council approved the same.

Agenda Item No.9: Review the progress of internally and externally funded research projects of the Institute.
Internal Projects (Ongoing)

Sr. No.	Project Name	Co-ordinators	Start Date	Completion Date	Status
1	Longitudinal study of Maternal and Infant Nutrition in Maharashtra (LoSMINM)	Dr. L.K Dwivedi, Dr.Dilip T.R Dr. Sarang P, Dr. Preeti Dhillon Dr. R.S. Reshmi Dr.Suresh Jungari Mr.Anjani Kumar Mishra DHO of Raigarh District	Jan-21	Mar-24	Noted
2	Estimation of child mortality and Immunization coverage at district level in India. An application of small area estimation techniques	Dr. L.K. Dwivedi	April-21	Mar-24	Noted
3	Projection of Annual cancer incidence at district level by quienquennial age group and sex from 2021 to 2031 in Maharashtra	Dr.Murali Dhar, Dr Atul Budukh	Jan-22	Oct-24	Noted
4	Cost of treating Gastrointestinal cancer and the burden of treatment on patient's household	Dr Dilip T.R Dr. Shailesh Shrikhande & Dr Manish Bhandare.	Sep-21	March-24	Noted
5	Small estimates of Covid 19 disease in India: What we missed	Dr. Suryakant Yadav Dr. Dilip T.R	June-21	March-24	Noted
6	A study on marriage and dissolution pattern in India	Dr.D.A. Nagdeve, Dr.C. Shekhar, Dr.M. Alagarajan, Dr.H.Sahoo, Dr.Srinivas Goli,Dr.M R Pradhan	May - 22	Dec - 23	Noted
7	An assessment of Civil Registration System in India	Dr.Nandita Saikia, Dr.T R Dilip and Dr.Kaushalendra Kumar	Aug-22	Jan-24	Approve extension upto March 24.
8	Estimation mortality indicators for North Eastern Region of India based on recent survey data (NSSO and NFHS)	Dr.H. Lhungdim, Dr.Abhishek Singh, Dr.Dhananjay Bansod, Dr. Nandita Saikia, Dr.Kaushalendra Kumar, Dr.Suresh Jungari	Oct –22	March -24	Noted
9	A study of Migrants in Mumbai Urban	Dr.Sunil Sarode, Dr.Archana Roy, Dr.Suresh Jungari, Dr.Kunal Keshri	April-23	Sep -25	Noted

	agglomeration from within Maharashtra				
10	famTRANS - Families in Transition	Dr Srinivas Goli, Dr. T.V.Sekher, Sabu S. Padmadas(University of Southampton), Vegard Skirbekk(Columbia Aging Center) Ishita Chatterjee (UWA Business School)	April -23	Sept-24	Noted
11	Consequences of male Migration on left –behind women, children and elderly parents in Kerala and Middle Ganga Plain: Differentials and Determinants	Dr.Archana K Roy, Dr.Dipti Govil, Dr.Suryakant Yadav and Dr.KC Das	April-23	Sept-24	Noted
12	The Effect of Resettlement on Livelihood Rebuilding, Women Health and Demographic Behaviour: The Study of Indira Sagar Irrigation Project in Bhandara District of Maharashtra	Dr. D. A. Nagdeve	April-23	March-24	Noted

External Projects (Ongoing)

Sr. No.	Project Name	Coordinators	Start Date	Completion Date	Status
1	Global Youth Tobacco Survey-4	Dr.H.Lhungdim. Dr.R.Nagarajan Dr.Murali Dhar	Apr-18	Jun-23	Completed
2	State of India's children report - SOICR	Dr. S. Goli	Aug-22	Aug-23	Completed
3	Gender Equity and Health (GEH Project (2017-27)	Dr.Abhishek Singh Dr.Kaushalendra Kumar	Nov-18	Oct-27	Noted.
4	Study of Global Ageing and Adult Health (SAGE)- India, Wave-3, 2019-23	Dr.T.V. Sekher, Dr. Murali Dhar Dr.Archana K. Roy	Jun-19	Dec -23	Noted.
5	Exemplars in Maternal & New born Mortality Reduction in India.	Dr.Usha Ram, Dr.Manoj Alagarajan.	May-21	May-23	Approve extension upto March - 24
6	Integrating Ageing Research with Policy and Programmes in India	Dr.D Govil, Dr. H Sahoo	Aug-21	June-23	Approve extension upto March - 24.

7	Longitudinal Ageing Study in India (LASI) Main Wave 2 (2023-25)	Dr.T.V. Sekhar, Dr.Chander Shekhar, Dr.R. Nagarajan, Dr Aparajita Chattopadhyay, Dr. Dipti Govil Dr.Sarang Pedgaonkar	April-23	Dec-25	Noted. (Wave -II)
8	South Asia Centre for Labour Mobility and Migrants (SALAM) Funded by ILO, IOM And UN Women	Dr.R.B.Bhagat, Dr.K.C.Das Dr.Reshmi, R.S.	Oct- 21	Nov- 23	Completed.
9	National Family Health Survey-6	Dr.S.K. Singh, Dr.H. Lhungdim Dr.Abhishek Singh, Dr.Dhananjay Bansod, Dr.L.K Dwivedi, Dr.Harihar Sahoo Dr.Sarang Pedgaonkar, Dr Preeti Dhillon, Dr.Reshmi R.S.	Jan-23	Dec -25	Noted.
10	IFPRI-International Food Policy research institute (POSHAN) Project	Dr. S.K. Singh Dr.L.K Dwivedi, Dr.Sarang Pedgaonkar	Jun -23	May- 24	Noted.
11	Small area estimates of hypertension and Diabetes in India.	Dr Suryakant Yadav Dr Solveing A. Cunningham, Dr Waller Lance (Emory University), Dr Siddharta Mandal, Dr Dimple Kondal	Dec-22	July 24	Noted
12	The Harmonised Diagnostic Assessment of Dementia for the Longitudinal Aging Study in India (LASI- DAD Study) (2019-2025) in collaboration with University of Southern California and All India Institute of Medical Sciences.	Dr.T.V.Sekhar Dr. Sarang Pedgaonkar	Jan- 19	Aug 25	Noted.
13	R4D India (LASI-VIS Study)	Prof. S.K.Mohanty Dr. Sarang Pedgaonkar	Feb-21	June-23	Completed
14	Provision of Technical support for Implementation of STEP survey in Timor-Leste"	Prof. Udaya S Mishra	Feb-23	Nov-23	Noted.
15	Support for a survey on the availability and readiness of health	Prof. U.S. Mishra Dr. T.R. Dilip	Feb-23	Nov-23	

	facilities to provide non communicable disease-related care as a part of the STEPs Survey in Timor-Leste				Noted.
16	The impact of lifestyle habits and disaster on the health of the tribal population in eastern area	Prof. Nandita Saikia	Aug-22	July-24	Noted.
17	Global Adult Tobacco Survey-3	Dr.R. Nagarajan, Dr.Murali Dhar, Dr.Nandita Saikia, Dr.Dilip TR, Dr.Manas Pradhan, Dr. Pradeep Salve	Nov-21	June -25	Noted.
18	Young Wives: An exploratory study of married women below twenty and the socio- cultural determinants of their contraceptive behavior in low resource setting in India	Dr. S.K. Singh	March -23	Jan-24	Noted.

Agenda Item No.9: New Projects Proposal.

Internal New (Projects Proposal):

Sr. No.	Project Name	Coordinators	Status
1	Environment and health of older adults in India: An examination of population data with gridded pixel environment data	Prof. Aparajita Chattopadhyay Prof. TV Sekher	Approve
2	Occupational Mobility and Employment Pattern in India	Prof.Sanjay K Mohanty	Approve
3	Global burden of causes of death in seven regions of world with a focus on South Asia (India), East Asia, USA, UK and High-income countries.	Dr. Suryakant Yadav Prof. U.S. Mishra Dr. T.R. Dilip	Approve

External New (Projects Proposal):

Sr. No.	Project Name	Coordinators	Status
1	SANGLE: Study and Action on Hysterectomy: Evidence on	Dr. Dipti govil Dr. Archana Kujur	Approve

	Women's Health through the Life Course in India		
2	Transforming Healthcare Service Delivery at Pimpri Chichwad Muncipal Corporation	Prof. D.A.Nagdeve	Approve
3	Proposal Development for Reproductive Health in India Study	Dr. Chander Shekhar, Dr. Harihar Sahoo. Dr. Archana Kujur	Approve

Agenda Item No.9: To report the matters regarding current academic activities.

The following reported to the academic council.
1.The institute has already registered in the Academic Bank of Credit(ABC) and simultaneously published degree on digilocker.
2.The academic section has collected feedback namely feedback on Student Satisfactory Survey and feedback on curriculum for NAAC purpose.
3. Master degree students are eligible for fellowship during the Diwali vacation but not in the summer vacation.
4.The BoS has approve the followship for the student, those who will resume the programme after temporary withdraw from the programme as per the provision of examination manual. others terms and conditions will be the same as admission letter.
5.One Ph.D student has joined the University of Rostock, Germany under Dual Ph.D degree Programme.

Agenda Item No. 10 Any matter with the permission of Chair.

With the permission of the Chair, the following was discussed,

As per the recommendation of Prof. S.K Mohanty, Chairperson, Admission Committee,The member of the academic council agreed to drop the clause of fellowship for the candidates who have not cleared UGC-NET and also recommended to add 'any other fellowship' along with UGC-JRF (wherever applicable) in the upcoming admission bulletin.

The meeting came to an end with the vote of thanks to the chair.

(Prof. D.A.Nagdeve)
Member-Secretary
Academic Council

Prof. S.K. Singh
Director (Additional charge)
Chairperson, Academic Council

ANNEXURE – I

1	Prof. S.K Singh , Director (Additional Charge)	Chairperson	Attended
2	Mrs. Reena Singh, Chief Director (stats), MOHFW, GOI	Member	Absent
3	Dr. Sunil Vilasrao Gitte, Director, NIPHTR, Mumbai	Member	Absent
4	Dr. Dheeraj Shah, Director, NIHFW, Member (Nominated to Dr. Vijay Kumar Tiwari)	Member	Online Attended
5	Prof. D.A. Nagdeve, HoD, Dept. of Fertility & Social Demography	Member Secretary	Attended
6	Prof. Hemkhothang Lhungdim, HoD, Dept. of Public Health and Mortality Studies	Member	Attended
7	Prof. Kailash Chandra Das, HoD, Dept. of Migration & Urban Studies	Member	Attended
8	Prof. T.V. Sekher, HoD Dept. of Family & Generations,	Member	Attended
9	Prof. Chander Shekhar, Dept. of Fertility & Social Demography	Member	Attended
10	Prof. Sanjay Kumar Mohanty, HoD, Dept. of Population & Development	Member	Attended
11	Prof. R. Nagarajan, Dept. of Population & Development	Member	Attended
12	Prof. Abhishek Singh, Dept. of Public Health & Mortality Studies	Member	Attended
13	Prof. Murali Dhar, HoD, Dept. of Bio-Statistics and Epidemiology	Member	Attended
14	Prof. Archana Roy, Dept. of Migration & Urban Studies	Member	Absent
15	Prof. Dhananjay Bansod, Dept. of Public Health & Mortality Studies	Member	Absent
16	Prof. Aparajita Chattopadhyay, Dept. of Population & Development	Member	Attended
17	Prof. Laxmikant Dwivedi, Dept. of Survey Research & Data Analytics	Member	Absent
18	Prof. Nandita Saikia, Dept. of Public Health & Mortality Studies	Member	Attended
19	Prof. Udaya Shankar Mishra, Dept. of Bio-Statistics and Epidemiology	Member	Attended
20	Prof. S. Chandrasekhar, IGIDR, Mumbai	External Member	Attended
21	Prof. Anjali Radkar, GIPE, Pune	External Member	Absent
22	Prof. Asha Banu Soletti, TISS, Mumbai	External Member	Absent
23	Dr. Sukanya Rangamani, NCDIR, ICMR, Bengaluru	External Member	Attended
24	Dr. Sonal Sarode, Associate Professor	Member	Absent
25	Dr. Srinivas Goli, Associate Professor	Member	Attended
26	Dr. Archana Kujur, MA/MSc Co-ordinator	Member	Absent
27	Dr. Sarang P. Pedgaonkar, Assistant Professor	Member	Attended
28	Dr. Pradeep Salve, MPS Co-ordinator	Member	Attended
29	Dr. Guru Vasishtha MDO Co-ordinator	Member	Attended
30	Dr. Kunal Keshri, MA/MSc Co-ordinator	Member	Attended
31	Mr. Sudarshan Bhadra, Assistant Registrar (Academic)	Invitee	Attended

ANNEXURE-II

Report Submitted by the Committee to Frame Admission Criteria for M.Sc. in Survey Research and Data Analytics

Date: 22/12/2023

The committee met on 26/10/2023 and 1/11/2023 to propose the admission criteria for the new program of M.Sc. in Survey Research and Data Analytics from the academic year 2024-25. The admission criteria suggested by the committee members was presented in the Board of Studies (BOS) held on December, 1 2023. After incorporating the BOS suggestions, the Academic Council of IIPS approved (on 13.12.2023) the admission criteria as given below-

Eligibility for admission and selection procedure

Candidates with a Bachelor's degree from recognized universities in India or abroad in Statistics, Bio-statistics, Mathematics, Health Statistics, Applied Statistics, Applied Mathematics, Population Studies, Demography, Operation Research, Statistics and Computing, Data Science, Big Data and Analytics or BE/BTech/BCA in Computer Science/Data Science/Big Data and Analytics or BSc in IT with minimum of 55% marks or equivalent grade will be eligible for admission to the above programme. Reservation policies, minimum age and marks relaxation will be applied as per GoI norms.

Selection Criteria for the M.Sc. in Survey Research and Data Analytics

The selection will be made on the basis of online admission test. Admission procedure and fees structure will be same as for other master program of IIPS. Candidates awaiting results of qualifying examination latest by [DATE TO BE FIXED LATER] of the admission year can also apply for consideration.

L.K. Dwivedi

Prof. L. K. Dwivedi

Prof. U.S. Mishra

Preeti 22/12/23

Dr. Preeti Dhillon

Dr. Guru Vasishtha

ANNEXURE-III

M.Sc. on Survey Research and Data Analytics

Course Curriculum

Committee members:

Prof SK Singh (Chair Person)
Prof Laxmikant Dwivedi on leave
Prof US Mishra
Prof. Bino Paul, TISS, Mumbai
Prof Ramakrishnan, IIT Mumbai
Dr Preeti Dhillon Preeti
Dr Guru Vasishtha (invited)

Program Outcomes:

PO1: To create Survey Research Experts, Data Analysts, for the future, equipped with necessary skills and expertiseto address evolving population and health concerns.

PO2: To widen the relevance of the discipline of Survey Research and Data Analytics in the discipline of Population Health and Social Sciences.

PO3: Training students to encourage evidence-based policy making with an understanding of dynamics of data, healthcare informatics and program evaluation methods.

PO4: To inculcate an interdisciplinary approach in their professional pursuit/academic engagement.

PO5: Prepare students for an advanced career in research/academics with sufficient adaptive potential tocontribute in the national and international sphere.

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

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
	Semester Credits		**19**				
SEMESTER-IV							
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				
	Semester Credits		**21**				
	TOTAL CREDITS		**80**				

- *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

Preeti

MSD-F1 UNDERSTANDING DEMOGRAPHY

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.

MSD-F2 SOCIAL SCIENCES-A PRIMER

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. Blaugh, 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 Rn, 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 metrices, 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*, 4th 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",* 4th Edition, an International Thosuross 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.

MSD-C3 ACQUAINTING WITH DATA: SURVEYS AND SOURCES

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 intepenetrating 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 om 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/
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

MSD-C4	**SAMPLING METHODS-BASICS**

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 samplesurveys. 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**

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, Atlast 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/cspro.Download.htm
2. United Nations (2005): Household Sample Surveys in Developing and Transition Countries.
3. 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
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

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

MSD-C7	**Sampling Methods-Advance**

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

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/ CSPro 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.

MSD-C10	PREDICTIVE ANALYTICS: THEORY AND PRACTICE

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 Grolemund, 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.

MSD-E2.2 METHODS OF DECOMPOSITION

To be prepared

MSD-E3.1 HEALTH SYSTEMS AND POLICIES

Course Outcomes:

CO1: To develop capacity among students to analyze health systems from an international and comparativeperspectives.
CO2: To provide a historical orientation to the students on Indian-scenario; national health policy, health caredelivery system, national health programmes and health sector reforms.
CO3: To understand the need and relevance of health legislations as an instrument of protection and promotionof 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 curate 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, Yarlini, 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.

MSD-E3.2 URBANIZATION, SPACE AND PLANNING

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 progammes in India
CO5: Providing students a practical knowledge of Geographical Information Systems and its utility in regionaland 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, functionaland 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, Bhubaneshwar); Smart Cities Mission; HRIDAY, AMRUT, PURA, RURBAN mission

IV. Challenges in Urban planning

Recent urban policies and programmes; Urban redevelopment; Urban poverty, urban housingand 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, Hyderbad.
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: SettlementTransition 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 InformationSystems. Prentice Hall of India, New Delhi.
14. Nyerges, Timothy L. and, Jankowski Piotr (2010): Regional and Urban Gis: A DecisionSupport Approach, Rawat Publication, Jaipur.

15. Friedman, J and Clyde Weaver, (1979), *Territory and Function: The evolution of regionalplanning*, 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 Metroplotan 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/idex.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 interactionalism, 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**

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, 5**V**s, 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 leaning 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
4) Russell, Norvig, Artifificial 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

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 Campanion Guideline.

MSD-C14	ANALYSIS OF COMPLEX SURVEY AND ESTIMATION

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

Ojectives: 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 incontemporary world.

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

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

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

CO5: To recommend appropriate public health intervention in keeping with disease burden and evaluate healthsystem 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 healthissues, Bulletin of the World Health Organization 87(8): 608-613.
11. Gwatkin, D.R. (2000). Health inequalities and the health of the poor: what dowe 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 messagesfrom the Disease Control Priorities Project, Lancet 367(9517): 1193-1208.
13. Murray, C.J.L., Frenk, J. (2000). A framework for assessing the performance ofhealth systems, Bulletin of the World Health Organization 78(6): 717-731.
14. Mills, A., Rasheed, F., Tollman, S. (2006). Strengthening health systems, InDisease Control Priorities in Developing Countries (2nd Edition), pages 87-102, New York: Oxford University Press.

15. Hsiao, W.C. (2003). What is a health system? Why should we care? HarvardSchool 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, Lancet364(9449): 1984-1990.
18. Pallikadavath, S., Singh, A., Ogollah, R., Dean, T., Stones, W. (2013). Humanresource 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 healthworkforce, Human Resources for health 2(13): 1-12.
20. Willis-Stattuck, M. et al. (2008). Motivation and retention of health workers indeveloping countries: a systematic review, BMC Health Services Research 8: 1-8.
21. Brown, T.M., Cueto, M., Fee, E. (2006). The World Health Organization andthe 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 developmentassistance 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 itmatter? Health Human Rights 10(1): 65-80.

MSD-E4.2	**HEALTH ECONOMICS AND FINANCING**

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 Heath, 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 ad 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, 3rd Edition (614, San/Hea, 073226) Note: 4th 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

MSD-E4.3	DEMOGRAPHIC MODELS AND INDIRECT ESTIMATIONS

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.

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

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.

12. Keyfitz, Nathan (1977): Introduction to the Mathematics of Population with Revision, AddisonWesley Publishing Company, Inc., Massachusetts.

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.

17. 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.

18. Mishra, B.D. (1981). Introduction to Study of Population. South Asian Publishers. Chapters 4 & 7.

19. Mitra, S., 1984, “Estimating the Expectation of Life at Old Ages”, Population Studies, Vol. 38, pp. 313-319.

21. Pathak, K.B. and F. Ram (1998): Techniques of Demographic Analysis, Himalaya Publishing House, Second Edition, Mumbai.

22. Potter, R.G. and Kulkarni, P.M. (1977) : Population Momentum : A WiderDefination, Popluation Studies Vol. 40 pp. 555-56.

23. Preston, S.H., and A.J. Coale (1982): “Age structure, growth, attrition, and accession: A new synthesis, Population Index”, 48(2): 217-259.

24. Preston, S.H.; Himes, Christine and Mitchell, Eggers (1989): “Demographic Conditions Responsible for Population Aging”, Demography, 26 (4): 691-704.

25. Preston, Samuel H. Patrick, Heuveline and Michel Guillot, 2003, Demography: Measuring and Modeling Population Processes, Blackwell Publishers, 2001 (First Indian Reprint 2003).

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.

27. Rele, J. R. (1967): “Fertility Analysis Through extension of Stable Population Concepts”, Population Monograph Series No.2, University of Berkeley.

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.

MSD-E5.1	**Population Ageing and Generational Analysis**

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; populationageing 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 ofIndian 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.
6. Pool, Ian, Laura R. Wong and Eric Vilquin (ed) (2006), *Age-structural transitions: challengesfor development*. Paris: CIRCRED.

MSD-E5.2	Population, Environment and Sustainable Development

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, CO2 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

Responses, 2018

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.*

MSD-E5.3	GENDER, HEALTH AND DEVELOPMENT

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 examiningdevelopment at large

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

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 vulnerabilityalong 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 differentialimpact 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 developmentand 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 criticismby feminist; shift to Gender and Development (GAD), Gender Mainstreaming and the MillenniumDevelopment 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 RHApproach.

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 anddevelopment 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*, OxfordUniversity, 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 practicalguide for researchers and activists*. WHO and Path, Washington D.C.

6. Folbre, Nancy. (1992). Improper arts: Sex in classical political economy. *Population andDevelopment 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 changein rural north India.* Cambridge University, Cambridge.
9. Miller, Barbara, D.(ed) (1993) *Sex and Gender Hierarchies*, Cambridge University Press, NewYork.
10. Hess, B.B. and M.M. Ferree. (1987). *Analyzing Gender: A Handbook of Social ScienceResearch*. Sage Publication, London.
11. United Nation. 2001. *Population, Gender and Development: A Concise Report*. UN, Economicand Social Affairs (Dept. of), New York
12. World Health Organization. (1998). *Gender and Health. Technical paper* WHO/ FRH/WHD/98. (Website: 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 Equityand 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, NewDelhi.
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 UniversityPress, New York.
9. Harriet B. Presser, (1997): Demography, Feminism and the Science-policy Nexus, *Population andDevelopment 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

MSD-C16	**APPLIED MULTIVARIATE ANALYSIS**

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

MSD-C17 PROJECTIONS AND FORECASTING

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, **N**ature 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

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 techniquesto 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 Analysi); 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

1. Anselin, L. (2005). Exploring Spatial Data with GeoDa: A Wookbook. UC Santa Barbara, CA: Center for Spatially Integrated Social Science. available on http://geodacenter.asu.edu/.
2. Bailey, T. and Gatrell, A. C. (19l95): 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, Willey-Blackwell.
5. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World. Longman, Harlow.
6. Griffith, D. A. and Amehein (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.

MSD-E6.2	**BAYESIAN AND SMALL AREA ESTIMATION METHODS**

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

ANNEXURE-IV

Draft regulations for the award of PhD Degree, International Institute for Population Sciences, Mumbai, India, December 2023

S. No.	Content Item	As per UGC Regulations 2022
1.	Eligibility criteria for admission to the Ph.D. Programme	The following are eligible for the PhD programme at IIPS (1) Candidates who have completed A 1-year/2-semester master's degree programme after a 4-year/8-semester bachelor's degree programme or a 2-year/4-semester master's degree programme after a 3-year bachelor's degree programme or qualifications declared equivalent to the master's degree by the corresponding statutory regulatory body, with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of the educational institution. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the UGC from time to time. Provided that a candidate seeking admission after a 4-year/8-semester bachelor's degree programme should have a minimum of 75% marks in aggregate or its equivalent grade on a point scale wherever the grading system is followed. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section

		(EWS) and other categories of candidates as per the decision of the UGC from time to time. (2) Candidates who have completed the M.Phil. programme with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of educational institutions, shall be eligible for admission to the Ph.D. programme. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the UGC from time to time.
2.	Duration of the programme	(1) Ph.D. Programme shall be for a minimum duration of three (3) years, including course work, and a maximum duration of six (6) years from the date of admission to the Ph.D. programme. (2) A maximum of an additional two (2) years can be given through a process of re-registration as per the Statute/Ordinance of the Institute; provided, however, that the total period for completion of a Ph.D. programme should not exceed eight (8) years from the date of admission in the Ph.D. programme. Provided further that, female Ph.D. scholars and Persons with Disabilities (having more than 40% disability) may be allowed an additional relaxation of two (2) years; however, the total period for completion of a Ph.D. programme in such

		cases should not exceed ten (10) years from the date of admission in the Ph.D. programme. (3) Female Ph.D. scholars may be provided Maternity Leave/Child Care Leave for up to 240 days in the entire duration of the Ph.D. programme. (4) A sick leave to a maximum of 90 days in the entire duration of the Ph.D. programme may be provided to PhD scholars subject to sufficient documentary evidence/medical certificate from a competent authority Re-registration (academic extension without fellowship) guidelines: (1) PhD scholars, who are not able to complete their thesis within 6 years from the date of admission to the Ph.D. programme, will have to seek re-registration (academic extension without fellowship) for additional duration (maximum period of 2 years) preferably on or before the last date of regular duration. Female/differently-abled scholars will have to seek further extension, immediately after the lapse of first 2 years (maximum additional duration of 2 years). (2) If the PhD scholar did not request for re-registration within the stipulated time, his/her admission stands cancelled. (3) PhD scholar must submit his/her thesis within the stipulated time mentioned in the re-registration order by making an application and paying a re-registration fee of Rs 32,450 excluding other fees and clear all other dues/fees, if any, till the date of submission of final thesis.

		(4) Duration of the fellowships shall be as per the duration prescribed by the sponsor of the fellowships.
3.	Procedure for admission	(1) The admission shall be based on the criteria notified by the institute, keeping in view the guidelines/norms in this regard issued by the UGC and other statutory/regulatory bodies concerned, and taking into account the reservation policy of the Central/State Government from time to time. (2) Admission to the Ph.D. programme shall be made using the following methods: i. All candidates shall be admitted through an Entrance Test conducted by the Institute. The Entrance Test syllabus shall consist of 50% of research methodology, and 50% from Population Studies/Demography. ii. Candidates who have secured 50% marks in the entrance test are eligible to be called for the interview. iii. A relaxation of 5 % marks will be allowed in the entrance examination for the candidates belonging to SC/ST/OBC/differently-abled category/Economically Weaker Section (EWS), and other categories of candidates as per the decision of the UGC from time to time. iv. Institute may decide the number of eligible candidates to be called for an Interview based on the number of Ph.D. seats available. v. Provided that for the selection of candidates based on the entrance test conducted by the Institute, a weightage of 70 % for the entrance test and 30 % for the performance in the interview shall be given. vi. The interview panel shall include an academic expert from outside the Institute. (3) i. The Institute shall notify a prospectus well in advance on the institution's website specifying the number of seats for admission, subject/discipline-wise distribution of available

		seats, criteria for admission, the procedure for admission, and all other relevant information for the candidates. ii. The Institute shall adhere to the National/State-level reservation policy, as applicable. (4) The Institute shall maintain a list of Ph.D. supervisors (specifying the name of the supervisor, his or her designation, and the department/school/centre), along with the details of Ph.D. scholars (specifying the name of the registered Ph.D. scholar, the topic of his/her research and the date of admission) admitted under them on the website of the institution and update this list every academic year.
4.	Allocation of research supervisor	Eligibility criteria to be a Research Supervisor, Co-Supervisor, Number of Ph.D. scholars permissible per supervisor, etc. (1) Permanent faculty members working as Professor/Associate Professor of the Institute with a Ph.D., and at least five research publications in peer-reviewed or refereed journals and permanent faculty members working as Assistant Professors in the Institute with a Ph.D., and at least three research publications in peer-reviewed or refereed journals may be recognized as a Research Supervisor in the Institute. Such recognized research supervisors cannot supervise research scholars in other institutions, where they can only act as co-supervisors. Adjunct Faculty members shall not act as Research Supervisors and can only act as co-supervisors. (2) In case of interdisciplinary/multidisciplinary research work, if required, a Co-Supervisor from outside the Institute may be appointed.

		(3) An eligible Professor/Associate Professor/Assistant Professor can guide up to eight (8)/ six (6)/ four (4) Ph.D. scholars, respectively, at any given time (4) In case of relocation of a female Ph.D. scholar due to marriage or otherwise, the research data shall be allowed to be transferred to the Higher Educational Institution to which the scholar intends to relocate, provided all the other conditions in these Regulations are followed, and the research work does not pertain to a project sanctioned to the Institute/Supervisor by any funding agency. Such scholar shall, however, give due credit to the Institute and the supervisor for the part of research already undertaken. (5) Faculty members with less than three years of service before superannuation shall not be allowed to take new research scholars under their supervision. However, such faculty members can continue to supervise Ph.D. scholars who are already registered until superannuation and as a co-supervisor after superannuation, but not after attaining the age of 70 years.
5.	Admission of international students in the PhD programme	(1) Each supervisor can guide up to two international research scholars on a supernumerary basis over and above the permitted number of Ph.D. scholars as specified in clause 4.3 above. (2) The Institute may decide its own selection procedure for Ph.D. admission of international students keeping in view the guidelines/norms in this regard issued by statutory/regulatory bodies concerned from time to time.
6.	Total number of PhD scholars under a supervisor/co-supervisor	At any point, the total number of Ph.D. scholars under a faculty member, either as a supervisor or a co-supervisor, shall not exceed the number prescribed in clause 4.3 and clause 5.1.
7.	Course work	Credit requirements, number, duration, syllabus, minimum standards for completion, etc.

		(1) The Credit requirement for the Ph.D coursework is a minimum of 20 credits, including a "Research and Publication Ethics" course as notified by UGC vide D.O. No. F.1- 1/2018(Journal/CARE) in 2019 and a research methodology course. The Research Advisory Committee can also recommend UGC recognized online courses as part of the credit requirements for the Ph.D. programme. (2) All Ph.D. scholars, irrespective of discipline, shall be required to train in teaching /education /pedagogy/writing related to their chosen Ph.D. subject during their doctoral period. Ph.D. scholars may also be assigned 4-6 hours per week of teaching/research assistantship for conducting tutorial or laboratory work and evaluations. (3) A Ph.D. scholar must obtain a minimum of 55% marks or B+ in the course work to be eligible to continue in the programme and submit his or her thesis (4) Course work is mandatory and no course work exemption will be granted under any circumstances. All PhD scholars admitted from 2024 batch onwards will have to complete the course work in the first two semesters. Any scholar who fails to complete the course work with in first two semesters will have to leave the PhD programme. (5) Course work is also mandatory for PhD scholars with an M.Phil. degree. (5) Only regular and supplementary exams will be conducted for the students to clear the course work. There will not be any provision for improvement or special supplementary exams. (6) A PhD scholar must attend a minimum 75% of the total lectures during the coursework.

		(7) The results and grade sheet will only show Pass/fail.
8.	Research advisory committee and its functions	(1) There shall be a Research Advisory Committee as defined in the Statutes/Ordinances of the Institute concerned for each Ph.D. scholar. The Research Supervisor of the Ph.D. scholar concerned shall be the Convener of this committee, and this committee shall have the following responsibilities: i. To review the research proposal and finalize the topic of research. ii. To guide the Ph.D. scholar in developing the study design and methodology of research and identify the course(s) that he/she may have to do. iii. To periodically review and assist in the progress of the research work of the PhD scholar. (2) Each semester, a Ph.D. scholar shall appear before the Research Advisory Committee to make a presentation and submit a brief report on the progress of his/her work for evaluation and further guidance. The Research Advisory Committee shall submit its recommendations along with a copy of Ph.D. scholar's progress report to the Institute. A copy of such recommendations shall also be provided to the Ph.D. scholar. (3) In case the progress of the Ph.D. scholar is unsatisfactory, the Research Advisory Committee shall record the reasons for the same and suggest corrective measures. If the Ph.D. scholar fails to implement these corrective measures, the Research Advisory Committee may recommend, with specific reasons, the cancellation of the registration of the Ph.D. scholar from the Ph.D. programme.
9.	Evaluation and Assessment Methods, minimum standards/credits for award of the degree	(1) Upon satisfactory completion of course work and obtaining the marks/grade prescribed in clause (3) of Regulation 7 above, the Ph.D. scholar shall be required to undertake research work and produce a draft dissertation/thesis.

		(2) Before submitting the dissertation/thesis, the Ph.D. scholar shall make a presentation before the Research Advisory Committee, which shall also be open to all faculty members and other research scholars/students. (3) The Institute's library and information officer (LIO) shall check the draft PhD thesis with software applications for plagiarism in the research work. The research integrity shall be an integral part of all the research activities leading to the award of a Ph.D. degree at the Institute. (4) A Ph.D. scholar shall submit the thesis for evaluation, along with (a) an undertaking from the Ph.D. scholar that there is no plagiarism, (b) a certificate from the Institute's LIO and (c) a certificate from the Research Supervisor attesting to the originality of the thesis and that the thesis has not been submitted for the award of any other degree/diploma to any other Higher Educational Institution. (5) The Ph.D. thesis submitted by a Ph.D. scholar shall be evaluated by his/her Research Supervisor and at least two external examiners who are experts in the field and not in employment of the Institute. Such examiner(s) should be academics with a good record of scholarly publications in the field. Wherever possible, one of the external examiners should be chosen from outside India. The viva-voce board shall consist of the Research Supervisor and at least one of the two external examiners and may be conducted online. The viva-voce shall be open to the members of the Research Advisory Committee/faculty members/research scholars, and students. Institute may formulate appropriate rules/ordinances to effect the provisions of this Regulations. (6) A PhD scholar shall present two papers from his/her thesis in national/international conferences/seminars

		organized outside the Institute (presentations in Institute's organized conferences/seminars will not be considered) for being eligible for the viva-voce exam. (7) In addition to clause 9.6, a PhD scholar shall (a)publish one paper from his/her PhD thesis in reputed peer-reviewed national/international journals and (b) submit one paper from his/her PhD thesis for publication in reputed peer-reviewed national/international journals. (8) The viva-voce of the Ph.D. scholar to defend the thesis shall be conducted if both the external examiners recommend acceptance of the thesis after incorporating any corrections suggested by them. If one of the external examiners recommends rejection, the Institute shall send the thesis to an alternate external examiner from the approved panel of examiners, and the viva-voce examination shall be held only if the alternate examiner recommends acceptance of the thesis. If the alternate examiner does not recommend acceptance of the thesis, the thesis shall be rejected, and the Ph.D. scholar shall be declared ineligible for the award of a Ph.D. (9) The Institute concerned shall complete the entire process of evaluating a Ph. D. thesis, including the declaration of the viva-voce result, within a period of six (6) months from the date of submission of the thesis.
10.	PhD through part-time mode	(1) Ph.D. programmes through part-time mode will be permitted, provided all the conditions stipulated in these Regulations are fulfilled. (2) Candidates having a minimum of five (5) years of work experience post their highest academic degree shall be eligible to apply.

		(3) Course work is mandatory and no course work exemption will be granted under any circumstances. (4) The Institute shall obtain a "No Objection Certificate" through the candidate for a part-time Ph.D. programme from the appropriate authority in the organization where the candidate is employed, clearly stating that: i. The candidate is permitted to pursue studies on a part-time basis. ii. His/her official duties permit him/her to devote sufficient time for research. iii. He/she will be relieved from the duty to complete the course work (5) The Institute shall not conduct Ph.D. programmes through distance and/or online mode. (6) Admission procedure for PhD through part-time mode will be same as described in section 3.
11.	Issuing a provisional certificate	Prior to the actual award of the Ph.D. degree, the Institute shall issue a provisional certificate to the effect that the Ph.D. is being awarded in accordance with the provisions of these Regulations.
12.	Award of Ph.D. degrees prior to Notification of these Regulations	Award of degrees to candidates registered for the Ph.D. programme on or after July 11, 2009, till the date of Notification of these Regulations shall be governed by the provisions of the UGC (Minimum Standards and Procedure for Award of M.Phil./Ph.D. Degree) Regulations, 2009 or the UGC (Minimum Standards and Procedure for Award of M.Phil./Ph.D. Degrees) Regulations, 2016 as the case may be. Further, the award of degrees to candidates already registered and pursuing Ph.D. shall be governed by these Regulations or UGC (Minimum Standards and Procedure for Award of M.Phil./Ph.D. Degree) Regulations, 2016. Nothing in these Regulations shall impact the M.Phil. degree

		programmes commencing prior to the enactment of these Regulations.
13.	Depository with INFLIBNET	Following the successful completion of the evaluation process and before the announcement of the award of the Ph.D. degree(s), the Institute shall submit an electronic copy of the Ph.D. thesis to INFLIBNET, for hosting he same so as to make it accessible to all the Higher Educational Institutions and research institutions.

Referee's Evaluation Report on Ph.D. Thesis

Name of the Candidate:

Title of Thesis :

Name of Referee & Address :

SECTION A
(Referee's Overall Recommendation)

	Recommendation of the Referee	Mark (✔) in the appropriate box
(a)	The thesis be accepted in present form.	
(b)	The thesis be accepted after clarification of the minor points listed in my report, at the time of viva-voce.	
(c)	The thesis be accepted after minor modifications in the thesis, as suggested in my report. The thesis need not be referred to an external referee again.	
(d)	The thesis requires major revisions. The nature of the revisions are indicated in my report. It is recommended that the revised thesis be examined again by an external referee.	
(e)	The thesis is rejected.	

Section B (Referee's Detailed Comments) : Please provide the following as an attachment.

1. General comments on the thesis, including a critical survey and evaluation of the quality and quantity of the work reported in thesis.
2. Points which require clarification, and suggested amendments or revisions (if any).
3. Questions to be asked at the time of the viva voce.

Date: ____________________ Referee's Signature: ______________________

SECTION B
(Referee's Detailed Comments)

Name of the Candidate :

Referee's Name :

Detailed Comments :

Referee's Signature: ____________________

(Please provide your signature on each additional sheets)

(CONFIDENTIAL)

(To be sent in a separate pdf file)

Section C will only be shared with the Controller of Examinations as a guideline for recommending the thesis work of the student for the Institute's P.N. Mari Bhat award for best PhD Thesis.

Name of the Candidate:

Title of the Thesis:

Referee's name & address:

Evaluation for award of " P.N. Mari Bhat award for best Ph.D. Research"

Evaluation parameter	Evaluation scale (10-1)
Originality/Novelty	
Methodological rigor	
Quality of thesis presentation	
Management of citations and references/bibliography	
Any other	
Total Points	

Date:

Referee's Signature.

ANNEXURE-V

Structure of the UG Programme :Bachelor in Population Sciences (BSc)

Semesters	Discipline-Specific Courses- Core	Minor	Multi-disciplinary	Ability Enhancement Course (Languages)	Skill Enhancement Courses/Internship /Dissertation	Common Value-added courses	Total credits
I	Introduction to Population (4 Credits-L)	Economics (4 Credits-L)	Sociology and Anthropology (4 Credits-L)	Basic English and Hindi/any regional Language and Literature (4 Credits-L)	Basic and Advanced Computer Skills and MS Office learning (2 Credits-L)	Bharat Knowledge Systems (4 Credits-L)	22 Credits
II	Fertility, Nuptiality, and Mortality Basic Concepts (4 Credits-L)	Human Geography (4 Credits-L)	Political Science and Psychology (4 Credits-L)	Advanced English Communication and Writing (4 Credits- L and T)	Basic Mathematics and Statistics (2 Credits-L)	Yoga, Sports, and Wellbeing (2 Credits- L and P)	20 Credits
*Work-based vocational courses offered during the summer term or Internship (***Only if student exits of after the second semester)*							4 Credits
	Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 4 credits in work-based vocational courses offered during the summer term or Internship / Apprenticeship in addition to 6 credits from skill-based courses earned during the first and second semester.						46 Credits
Break							
III	Fertility and Nuptiality Theories and Measures (4 Credits-L)	Mortality and Public Health Theories and Measures (4 Credits-L)	Migration and Urbanisation Theories and Measures (4 Credits-L)	Advanced Statistics (4 Credits- L and T)	Basic Data Analyses and Software (Stata and SPSS) (2 Credits- L and P)	Disaster and Mitigation (2 Credits- L and T)	20 Credits
IV	Understanding Global Health (4 Credits-L)	Understanding Sustainable Development (4 Credits-L)	Advanced Understanding of Census and Demographic and Health Surveys (4 Credits-L)	Survey Research Design and Fieldwork (4 Credits- L and T)	Data Quality Assessment and Management (2 Credits- L and T)	Monitoring and Evaluations (2 Credits- L and T)	20 Credits
	Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provided they secure additional 4 credits in skill-based vocational courses offered during the first year or second-year summer term.						86 Credits

	Major and Minor						
V	Indirect Estimations of Demographic Measures (4 Credits-L)	Biostatistics and Epidemiology (4 Credits-L)	Understanding Social and Economic Inequality (4 Credits- L and T)	Gender and Society (4 Credits-L)	Demographic Softwares (Mortpack and Spectrum (2 Credits- L and P)	Health Care Systems in the World: Canada, US, Europe, and India cases (2 Credits-L)	20 Credits
VI	Research Methodology (Quantitative) (4 Credits-L)	Research Methodology (Qualitative) (4 Credits-L)	Advanced Qualitative Data Analyses using NVivo or Atlas Ti Software and Anthro-pack (4 Credits- L and P)	Advanced-Quantitative Data Analytics using Stata and SPSS (4 Credits-L and P)	Advanced-Quantitative Data Analytics Using SAS (2 Credits- L and P)	Advanced-Quantitative Data Analytics Using R (2 Credits- L and P)	20 Credits
	Students who want to undertake a 3-year UG programme will be awarded a UG Degree in the relevant Discipline /Subject upon securing 120 credits						120 Credits
Break							
VII Major Streams	**Development Studies**	Development Theories (4 Credits-L)	Population, Development, and Environment (4 Credits-L)	Gender and Development (4 Credits-L)	Health Care Economics and Financing (4 Credits-L)	**Minor Course:** Advanced Understanding of Projections and Software Population, Households, and Public Health Indicators (4 Credits-L and P)	20 Credits
	Family Studies	Introduction to Family Demography (4 Credits-L)	Family and Gender (4 Credits-L)	Family and Intergenerational Outcomes and Gender Dimensions (4 Credits-L)	Family and Health (4 Credits-L)		
	Population and Public Health	Advanced understanding of Public Health (4 Credits-L)	Health Policies and Systems (4 Credits-L)	Social Determinants of Health and Health Inequalities (4 Credits-L)	Health Care Resource Management and Financing (4 Credits-L)		
	Migration and Urbanisation	Migration and Development (4 Credits-L)	Urbanization and Development (4 Credits-L)	Migration and Urban Governance (4 Credits-L)	Mixed Migration (4 Credits-L)		
	Biostatistics and Epidemiology	Advanced Biostatistics (4 Credits-L)	Advanced Epidemiology (4 Credits-L)	Experimental Designs and Causal Inferences (4 Credits-L)	Small Area Estimation, Disease Modelling and Forecast (4 Credits-L)		
	Survey Research and Data Analytics	Mathematics and Computing (4 Credits-L)	Statistical Approaches and Predictive Analytics (4 Credits-L)	Programming for Data Analytics with Python and R (4 Credits-L)	Artificial Intelligence and Machine Learning Applications (4 Credits-L)		

VIII	(Major) Advanced Research Methodology (Quantitative) Advanced Research Methodology (Quantitative) (8 Credits- P)	Research Project (12 Credits)	OR	Select Any Three (If not opting for research dissertation) 1. Monitoring and Evaluations 2. Operation Research 3. Business Demography 4. Big Data Analytics 5. Spatial Demography 6. Remote sensing and Geoinformatics (12 Credits-L and T)	20 Credits
	Students will be awarded UG Degree (Honours) with Research in the relevant				168 Credits
IX	Internship (20 Credits)				20 Credits
X	Dissertation and Presentation (20 Credits)				20 Credits
	Total Credits				208 Credits

Course	Total Credits	Minimum Requirement	Colour code
Discipline-Specific Courses- Core	82	80	
Minor/ Minor Elective Courses	34	32	
Inter-disciplinary	10	09	
Ability Enhancement Course (Languages)	8	08	
Skill Enhancement Courses/Internship /Dissertation	10+4+12=26	09+04+12	
Common Value-added courses	8	06 to 08	
Research Masters Internship	20	20	
Research Masters Dissertation	20	20	
Total	208	200	

** L – Lecture, T- Tutorial and P – Practical

Structure of the UG Programme : Bachelor in Statistics (BSc)

Semesters	Discipline-Specific Courses- Core	Minor	Multi-disciplinary Course	Ability Enhancement Course (Languages)	Skill Enhancement Courses/Internship /Dissertation	Common Value-added courses	Total credits
I	Descriptive statistics (4 Credits-L3+T1)	Calculus and Algebra [4 Credits-L3+T1]	Sociology and Economics Concepts and Theories (4 Credits-L)	Basic English and Hindi/any regional language* (4 Credits-L)	Basic and Advanced Computer Skills and MS Office learning (2 Credits-P)	Environment and Society (2 Credits-L)	20 Credits
II	Probability Theory and Statistical Distributions (4 Credits-L3+T1)	Statistical Inferences [4 Credits-L3+T1]	Political Science and Psychology Concepts and Theories (4 Credits-L)	Advanced English Language (Communication and Writing) (4 Credits-T)	Basic Data Analyses and Software (Stata and SPSS) (2 Credits-P)	Yoga and Wellbeing (2 Credits-P)	20 Credits
Work-based vocational courses offered during the summer term or internship							4 Credits
	Students exiting the programme after securing 40 credits will be awarded UG Certificate in Statistics provided they secure 4 credits in work-based vocational courses offered during the summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during the first and second semester.						44 Credits
Break							
III	Sampling Distributions [4 Credits- L3+T1]	Indian official statistics, Socio-economic and Demographic Data (4 Credits- L3+T1)	Introduction to Population Studies (4 Credits-L3+T1)	Understanding Social and Economic Inequality (4 Credits-L)	Introduction to spatial statistics (2 Credits-P)	Big Data using Machine Learning (2 Credits-L)	20 Credits
IV	Sample survey Techniques [4 Credits- L3+T1]	Biostatistics and epidemiology [4 Credits- L3+T1]	Understanding Global Health (2 credit-L)	Understanding Sustainable Development (4 Credits-L)	Data Analysis with R and Python (2 Credits-P)	Health care systems and policies in India (4 Credits-L)	20 Credits

	Students exiting the programme after securing 80 credits will be awarded UG Diploma in statistics provided they secure additional 4 credits in skill-based vocational courses offered during the first year or second-year summer term.						84 Credits
V	Analysis of Variance and Design of Experiments (4 Credits- L3+T1)	Research Methodology (Quantitative) (4 Credits – L2+T2)	Demographic Methods (4 credit- L3+T1)	Gender and Society (4 Credits-L)	Lab/practical work (4 Credits-P)	Monitoring and Evaluation in Population and Health (2 Credits-L)	20 Credits
VI	Multivariate Analysis and Nonparametric Methods (4 credit- L3+T1)	Research Methodology (Qualitative and NVivo Software) (4 Credits- L2+T2)	Operation Research (4 credits- L3+T1)	Demographic Softwares (Mortpack and Spectrum (2 Credits-P)	Survey Research Design and Field Work (2 Credits-P)	Demographic Models and Indirect demographic models (2 Credits-L)	20 Credits
	Students who want to undertake a 3-year UG programme will be awarded a UG Degree in the statistics upon securing 120 credits						124 Credits
Break							
VII	Population Studies	Fertility and Nuptiality Theories and Measures (4 Credits- L3+T1)	Mortality and Public Health Theories and Measures (4 Credits- L3+T1)	Migration and Urbanisation Theories and Measures (4 Credits- L3+T1)	Population and Development (4 Credits- L3+T1)	Minor Common Course: Advanced Understanding of Projections and Software: *Population, Households, and Public Health Indicators* (4 Credits-L+P)	20 Credits

VIII	Minor Elective Courses: Any two 1. Gender and Development Theories 2. Introduction to Family and Gender Demography 3. Advanced understanding of Global Health 4. Migration and Development 5. Advanced Biostatistics (4*2= 8 Credits-L+T)	Research project (12 Credits) OR (any three, L) 1)Advanced monitoring and Evaluation course 2) Artificial intelligence and Machine Learning 3) Market Research 4) Bayesian analysis 5) Econometrics 3* 4 Credits= 12	20 Credits
Students will be awarded UG Degree with Honours statistics with Research in the relevant subject			164 Credits
IX	Internship (20 Credits)		20 Credits
X	Dissertation and Presentation (20 Credits)		20 Credits
	Total Credits		206 Credits

Course	Total Credits	Colour code
Discipline-Specific Courses- Core	72	🟪
Minor/ Minor Elective Courses	28	🟫
Inter-disciplinary	14	🟪
Ability Enhancement Course (Languages)	8	🟧
Skill Enhancement Courses/Internship /Dissertation	12+4+16=28	🟨
Common Value-added courses	10	🟦
Research Masters Internship	20	🟧
Research Masters Dissertation	20	🟧
Total	206	

** L – Lecture, T- Tutorial and P – Practical

Structure of the UG Programme in Population Health (BSc)

Semesters	Major	Minor	Multi-disciplinary	Ability Enhancement Course (Languages)	Skill Enhancement Courses/Internship /Dissertation	Common Value-added courses	Total credits
I	Introduction to Population Health (4 Credits--L3+T1)	Basics of Sociology and Anthropology (4 Credits--L3+T1)	Basics of Economics (4 Credits-L)	Basic English and Hindi/any regional language* (4 Credits-L3+T1)	Basic Statistics (2 Credits-P)	Bharatiya Knowledge Systems (4 Credits-L)	22 Credits
II	Principles of Epidemiology (4 Credits--L3+T1)	Basics of Geography and Psychology (4 Credits-L3+T1)	Basic Concepts of Biostatistics (4 Credits-L)	English Communication and Writing (4 Credits--L3+T1)	Basic Computer Skills and MS Office (2 Credits-P)	Yoga, Sports, and Wellbeing (2 Credits-P)	20 Credits
*Work-based vocational courses offered during the summer term or internship (***Only if student exits of after the second semester)*							4 Credits
	Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline /Subject provided they secure 4 credits in work-based vocational courses offered during the summer term or internship / Apprenticeship in addition to 6 credits from skill-based courses earned during the first and second semester.						46 Credits
Break							
III	Concepts and measures of Demography (4 Credits--L3+T1)	Public Health Theories and Measures (4 Credits--L3+T1)	Health Care systems (4 Credits-L)	Advanced Bio-Statistics (4 Credits-L2+T2)	Data Analyses and Software (Stata and SPSS) (2 Credits-P)	Disasters and Mitigation (2 Credits-L)	20 Credits
IV	Understanding Global Health (4 Credits--L3+T1)	Understanding Sustainable Development (4 Credits-L)	Understanding of Demographic and Health Surveys (4 Credits--L3+T1)	Health Survey Research: Sampling, Design and Fieldwork (4 Credits--L3+T1)	Data Quality Assessment (2 Credits-P)	Monitoring and Evaluation (2 Credits-L)	20 Credits
	Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline /Subject provided they secure additional 4 credits in skill-based vocational courses offered during the first year or second-year summer term.						86 Credits
	*Based on availability of teachers						

Semesters	Discipline-Specific Courses-Core	Minor	Multi-disciplinary	Ability Enhancement Course (Languages)	Skill Enhancement Courses/Internship /Dissertation	Common Value-added courses	Total credits
V	Quantitative Research Methods for Population Health (4 Credits- L3+T1)	Quantitative Data Analytics using Stata and SPSS (4 Credits-P)	Health Care management (4 Credits-L3+T1)	Gender, Society and health (4 Credits- L3+T1)	Sampling in health research (2 Credits-L)	Analytics Using R (2 Credits-P)	20 Credits
VI	Concepts of Urban Health (4 Credits- L3+T1)	Qualitative research Methods for Population Health (4 Credits- L3+T1)	Qualitative Data Analyses using NVivo or Atlas Ti Software and Anthro-pack (4 Credits-P)	Mental Health (4 Credits- L3+T1)	Quantitative Data Analytics Using SAS (2 Credits-P)	Health policies and programmes in India (2 Credits-L)	20 Credits
	Students who want to undertake a 3-year UG programme will be awarded a UG Degree in the relevant Discipline /Subject upon securing 120 credits						126 Credits
Break							
VII **Major Streams (Select any one)**	**Population health**	Child, Youth and adolescent Health (4 Credits- L3+T1)	Aging and health (4 Credits- L3+T1)	Reproductive and sexual health (4 Credits- L3+T1)	Migrants' health (4 Credits-T)	**Minor Course:** Advanced Understanding of Projections and Software: *Population, and Public Health Indicators* (4 Credits-P)	20 Credits
	Environmental Health	Climate and Health (4 Credits- L3+T1)	Research methods and Data analytics in environmental health (4 Credits- L3+T1)	Environmental Pollution and Health (4 Credits- L3+T1)	Occupational Health (4 Credits-L)		
	Data Science and health	GIS and Spatial analysis (4 Credits- L3+T1)	Machine Learning and Public Health (4 Credits- L3+T1)	Experimental Designs and Causal Inferences (4 Credits- L3+T1)	Small Area Estimation, Disease Modelling and Forecast (4 Credits- L3+T1)		
	Health Economics	Socioeconomic Inequalities (4 Credits- L3+T1)	Health Care Financing (4 Credits- L3+T1)	Health Inequalities (4 Credits- L3+T1)	Health Programme evaluation (4 Credits- L3+T1)		
VIII	**Minor Courses:** (any 2) 1. Indigenous health practices 2. Population and Family	**Research Project** (12 Credits) **OR** (any three)					

	Health 3. Health Intervention studies (4*2= 8 Credits-L)	1. Health Communication and Promotion (3 Credits – L2+T1) 2. Human Rights and Social Justice (3 Credits – L2+T1) 3. Operations Research for Health Care (3 Credits – L2+T1) 4. Health policies and Laws (global) (3 Credits – L2+T1) 3* 4 Credits= 12	20 Credits
	Students will be awarded UG Degree (Honours) with Research in the relevant		166 Credits
IX	Internship (20 Credits)		20 Credits
X	Dissertation and Presentation (20 Credits)		20 Credits
	Total Credits		206 Credits

Course	Total Credits	Colour code
Discipline-Specific Courses- Core	82	▨
Minor/ Minor Elective Courses	34	▨
Inter-disciplinary	10	▨
Ability Enhancement Course (Languages)	8	▨
Skill Enhancement Courses/Internship/Dissertation	10+4+12=26	▨
Common Value-added courses	8	▨
	166	(min requirement 160)
Research Masters Internship	20	▨
Research Masters Dissertation	20	▨
Total	208	

** L – Lecture, T- Tutorial and P – Practical

Proposed Fee Structure for Bachelor of Science in Population Science with Multiple Entry & Exit Points

Fees to be Paid at the Time of Admission	Amount (Rs.) to be paid at the time of Admission
1. Admission Fee (One Time)	550.00
2. Tuition Fee (per year)	8800.00
3. Computer Fee (per year)	2750.00
4. Examination Fee (per year)	1100.00
5. Provisional Certificate Fee(One Time)	110.00
6. Degree Certificate Fee (One Time)	220.00
7. Library Fee (per year)	880.00
8. Convocation Charges (One Time)	550.00
9. Medical Examination Fee (One Time)	220.00
10. Sport/Cultural Fee (per year)	1100.00
11. Thesis Submission Fee (One Time Only for 4th Year)	550.00
Refundable Fee	
1. Library Deposit (One Time)	2200.00
2. Mess Deposit (One Time)	4400.00

In order to ensure flexible structures as per NEP, the Undergraduate degree programme is developed with multiple entry and exit points and re-entry options, with appropriate award certifications. Accordingly, the fee structure has been prepared and submitted for further approval.

MINUTES OF THE MEETING OF THE ACADEMIC COUNCIL OF THE INTERNATIONAL INSTITUTE FOR POPULATION SCIENCES HELD ON MAY 14, 2024.

The meeting of the Academic Council was held on May 14, 2024 at 10.30 am in Seminar Hall, IIPS. The meeting was chaired by Prof D. A. Nagdeve , Director(Additional Charge), IIPS. At the outset, the Chairperson extended warm welcome to all members and external experts to the meeting of the Academic Council. **The list of members attended the meeting is given in Annexure I.**

Prof. D. A. Nagdeve, Chairperson of Academic Council requested Prof. H. Lhungdim, Member-Secretary to proceed with the agenda.

Agenda no.1: **To confirm the minutes of Academic Council Meeting held on December 13, 2023.**

The members of Academic Council confirmed the minutes of Academic Council held on December 13, 2023.

Agenda no 2: **Action taken on the Minutes of Academic Council Meeting held on December 13, 2023.**

Action taken report on the minutes of Academic council meeting held on December 13,2023 was noted by the members.

Agenda no 3: **To approve results of final year courses - Academic Year 2023-2024.**

The respective courses coordinators presented the results of the following courses for the Academic Year 2023-2024:

Sr. No.	Name of the Course	Qualified for Degree
I.	Master of Arts/Science in Population Studies (MA/MSc) -2023-2024	28
II.	Master of Science in Biostatistics & Demography (MBD) -2023-2024	29
III.	Master of Population Studies (MPS) - 2023-2024	48
IV.	Master of Arts (M.A) in Population Studies (Distance Education)-2023-24	20
V.	Diploma in Health Promotion Education (2023-2024)	24
VI.	Post Graduate Diploma in Community Health Care (2023-2024)	9
VII.	Post Graduate Diploma in Hospital Management (2023-2024)	4
VIII.	Doctor of Philosophy in Population Studies (2023-2024)	31
IX.	Doctor of Philosophy in Biostatistics & Epidemiology (2023-2024)	3
X.	Doctor of Philosophy in Biostatistics & Demography (2023-2024)	4

The Academic Council Approved the results for the Academic year 2023-2024.

Agenda no 4: **To approve Gold and Silver Medals for the final year courses - Academic Year 2023-2024.**

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The Academic Council Approved the Medals & Award for the Academic year 2023-24.

Agenda no 5: To discuss & recommend the internship policy for Post Graduate Programmes.

Prof. Nandita Saikia, Chairperson of the committee, made a presentation on Internship policy for PG programme. The member of the AC gave their views and opinions on the Internship guideline.

Chairperson has suggested to revised the proposal as per the recommendation and include some senior faculty in the committee as advisor.

The academic council approved the above recommendation.

Agenda no 6: **To discuss and consider proposal & execution plan on Joint Master Degree (M.Sc.) in Mixed Migration with University of Continuous Education Krems (UWK), Austria and University of Palermo (UNIPA), Italy..**

The AC was briefed by the Prof. K. C Das, Head -Department of Migration & Urban Studies regarding the background of the course and collaboration with University of Continuous Education Krems (UWK), Austria and University of Palermo (UNIPA), Italy.

Prof. Archana K. Roy , presented in detailed the syllabus of M.Sc. in Mixed Migration.

Chairperson has suggested to constitute a committee with external member to formulate the guideline & execution plan in line with UGC.

Agenda no 7: **To report and discuss about the progress of NEP-2020.**

Prof. Aparajita Chattopadhya, Chairperson of the Syllabus Committee (4 years UG course) has informed the AC that the different aspect of 4 years UG course in line with NEP-2020 and also informed about the progress of syllabus.

Dr. Srinivas Goli has made brief presentation on the revised programme structure namely Bachelor of Science in Population Sciences. Also emphasis the different level of entry & exit. Chairperson has suggested to develop the syllabus as it's already approved in EC. After deliberated discussion on infrastructure & additional faculty requirement, it was decided that the NEP implementation committee will review the execution plan of four year UG programme.

The AC approved the same.

Agenda no 8: **To discuss about the Ph.D. Re-registration.**

In view of the progress & recommendation of the BoS, The academic council did not approve the re-registration of Mr. Chandrashekhar and Ms. Ragini Mishra.

Agenda no 9: **To report about the Master of Population Studies (MPS) course.**

It was reported that the MPS course is discontinued for the academic year 2024-25. However, the Academic Council is recommended to review course in line with UGC by the NEP implementation committee.

Agenda no 10: **To discuss on the UGC Public notice regarding entrance test for admission to Ph.D. programme.**

In view of UGC notice dated 27th ,The academic council recommended to constitute a committee to formulate a detailed guideline for Ph.D programme.
In addition, it was recommended that from the academic session 2025-26, the NET score will be considered for admission to Ph.D. programme in place of entrance test conducted by IIPS. Therefore, the Institute will not conduct any entrance test for Ph.D.
The AC approved the same.

Agenda no 11: **Review the progress of internally and externally funded research projects of the Institute.**

Sr. No.	Project Name	Co-ordinators	Start Date	Completion Date	Status
1	Longitudinal study of Maternal and Infant Nutrition in Maharashtra (LoSMINM)	Dr. L.K Dwivedi, Dr.Dilip T.R Dr. Sarang P, Dr. Preeti Dhillion Dr. R.S. Reshmi. Dr.Suresh Jungari Mr.Anjani Kumar Mishra DHO of Raigarh District	Jan-21	Mar-24	Approved Extension Up to March 2025
2	Estimation of child mortality and immunization coverage at district level in India, An application of small area estimation techniques	Dr. L.K. Dwivedi	April-21	Mar-24	Approved Extension Up to March 2025
3	Projection of Annual cancer Incidence at district level by quienquennial age group and sex from 2021 to 2031 in Maharashtra	Dr.Murali Dhar, Dr.Atul Budukh.	Jan-22	Oct-24	Noted
4	Cost of treating Gastrointestinal cancer and the burden of treatment on patient's household	Dr. Dilip T.R. Dr. Shailesh Shrikhande & Dr. Manish Bhandare.	Sep-21	March-24	Noted

Sr. No.	Project Name	Co-ordinators	Start Date	Completion Date	Status
5	Small estimates of Covid 19 disease in India: What we missed	Dr. Suryakant Yadav Dr. Dilip T.R	June-21	March-24	Approved Extension Up to Nov 2024
6	A study on marriage and dissolution pattern in India	Dr.D.A. Nagdeve, Dr.C. Shekhar, Dr.M. Alagrajan, Dr.H.Sahoo, Dr.Srinivas Goli, Dr.M R Pradhan	May - 22	Dec - 23	Completed
7	An assessment of Civil Registration System in India	Dr.Nandita Saikia, Dr.T R Dilip and Dr.Kauslendra Kumar	Aug-22	March-24	Completed
8	Estimation mortality indicators for North Eastern Region of India based on recent survey data (NSSO and NFHS)	Dr.H. Lhungdim, Dr.Abhishek Singh, Dr.Dhananjay Bansod, Dr. Nandita Saikia, Dr.Kaushalendra Kumar, Dr.Suresh Jungari	Oct -22	March -24	Approved Extension Up to Aug 2024
9	A study of Migrants in Mumbai from different regions of Maharashtra	Dr.Sunil Sarode, Dr.Archana Roy, Dr.Suresh Jungari, Dr.Kunal Keshri	April-23	Sep -25	Noted
10	famTRANS – Families in Transition	Dr. Srinivas Goli, Dr. T.V.Sekher,	April -23	Sept-24	Approved Extension Up to May 2025
11	Consequences of male Migration on left – behind women, children and elderly parents in Kerala and Middle Ganga Plain: Differentials and Determinants	Dr.Archana K Roy, Dr.Dipti Govil, Dr.Suryakant Yadav and Dr.KC Das	Sept-23	May-25	Noted
12	The Effect of Resettlement on Livelihood Rebuilding, Women Health and Demographic Behaviour: The Study of Indira Sagar Irrigation Project in Bhandara District of Maharashtra	Dr. D. A. Nagdeve	April-23	March-24	Approved Extension Up to March 2025
13	Environment and health of older population in India: An examination of population data with gridded pixel environment data	Prof. Aparajita Chattopadhyay Prof. TV Sekher	April 2024 -	March -25	Noted

Sr. No.	Project Name	Co-ordinators	Start Date	Completion Date	Status
14	Occupational Mobility and Employment Pattern in India	Prof. Sanjay K Mohanty	April 2024-	March -25	Noted
15	Global burden of causes of death in seven regions of world with a focus on South Asia (India), East Asia, USA, UK and High-Income countries.	Dr. Suryakant Yadav Prof. U.S. Mishra Dr. T.R. Dilip	August 2023-	Dec -26	Noted

External Project

Sr. No.	Project Name	Coordinators	Start Date	Completion Date	Status
1	Gender Equity and Health (GEH Project (2017-27)	Dr.Abhishek Singh Dr.Kaushalendra Kumar	Nov-18	Oct-27	Noted
2	Study of Global Ageing and Adult Health (SAGE)- India, Wave-3, 2019-23	Dr.T.V. Sekher, Dr. Murali Dhar Dr.Archana K. Roy	Jun-19	Dec -23	Approved Extension Up to Aug 2024
3	Exemplars in Maternal & New born Mortality Reduction in India.	Dr.Usha Ram, Dr.Manoj Alagarajan,	May-21	March -24	Approved Extension Up to March 2025
4	Integrating Ageing Research with Policy and Programmes in India	Dr.D Govil, Dr. H Sahoo	Aug-21	March -24	Completed
5	Longitudinal Ageing Study in India (LASI) Wave 2 (2023-25)	Dr.T.V. Sekher, Dr.Chander Shekhar, Dr. Sanjay Kumar Mohanty, Dr.Aparajita Chattopadhyay, Dr.Srinivas Goli, Dr. Dipti Govil Dr.Sarang Pedgaonkar	April-23	Dec-25	Noted
6	National Family Health Survey-6	Dr.H. Lhungdim, Dr.Abhishek Singh, Dr.Dhananjay Bansod, Dr.LaxmiKant Dwivedi, Dr.Harihar Sahoo Dr.Sarang Pedgaonkar, Dr.Preeti Dhillon, Dr.Reshmi R. S.	Jan-23	Dec -25	Noted
7	IFPRI-International Food Policy research institute (POSHAN) Project	Dr.LaxmiKant Dwivedi, Dr.Sarang Pedgaonkar	Jun -23	May- 24	Noted

Sr. No.	Project Name	Coordinators	Start Date	Completion Date	Status
8	Small area estimates of hypertension and Diabetes in India	Dr Suryakant Yadav Dr Solveing A. Cunningham, Dr Waller Lance (Emory University), Dr Siddharta Mandal, Dr Dimple Kondal	Dec-22	July 24	Approved Extension Up to November 2024
9	The Harmonised Diagnostic Assessment of Dementia for the Longitudinal Aging Study in India (LASI- DAD Study) (2019-2025) in collaboration with University of Southern California and All India Institute of Medical Sciences.	Dr.T.V.Sekher Dr. Sarang Pedgaonkar	Jan- 19	Aug 25	Noted
10	Provision of Technical support for Implementation of STEP survey in Timor-Leste"	Dr. T.R. Dilip Prof. Udaya S Mishra	Feb-23	Nov- 23	Approved Extension Up to July 2024
11	Support for a survey on the availability and readiness of health facilities to provide non communicable disease-related care as a part of the STEPs Survey in Timor-Leste	Dr. T.R. Dilip Prof. U.S. Mishra	Feb-23	Nov-23	Approved Extension Up to July 2024
12	The impact of lifestyle habits and disaster on the health of the tribal population in eastern area	Prof. Nandita Saikia	Aug-22	July-24	Noted
13	Global Adult Tobacco Survey-3	Dr.R. Nagarajan, Dr.Murali Dhar, Dr.Nandita Saikia, Dr.Dilip TR, Dr.Manas Pradhan, Dr. Pradeep Salve	Nov-21	June -25	Noted
14	Young Wives: An exploratory study of married women below twenty and the socio- cultural determinants of their contraceptive behavior in low resource setting in India	Dr. S.K. Singh	March -23	March-24	Completed
15	SAHELI: Study and Action on Hysterectomy: Evidence on Women's Health through the Life Course in India	Dr. Dipti Govil Dr. Archana K. Roy	Aug 2023	Dec 2027	Noted
16	Transforming Healthcare Service Delivery at Pimpri Chichwad Muncipal Corporation	Prof. D.A.Nagdeve	Sep 2023	Oct 2027	Noted
17	Proposal Development for Reproductive Health in India Study	Dr. Chander Shekhar, Dr. Harihar Sahoo,	July 2023	Aug 2024	Noted

Agenda no 12: **New Project Proposals (Internal & External).**

Chairperson has suggested that before academic council meeting ,the details of new Internal project must be presented in the faculty & BoS meeting .The academic council recommended the following projects in the next faculty & BoS meeting.

Internal Project:

Sr. No.	Project Name	Coordinators	Duration
1	Assessment and projection of annual cancer incidence at district level by quinquennial age group and sex from 2021 to 2031 in Punjab, India	Dr. Murali Dhar Dr. Atul Budukh	18 months
2	Drought, Development and Daughters eficiencies: Study of unprecedented Demographic phenomena in Marathwada regions of Maharashtra	Dr.Pradeep S Salve Dr.Suresh Jungari	12 months

The following external project approve by AC.

External Project:

Sr.No.	Project Name	Coordinators
1	Mapping the risk factor and consequences of violence against women in India for the last two decades using large - scale data	Dr. Suresh Jungari Dr. Pradeep S Salve
2	The cognitive consequences of social frailty: a mixed methods study of precarity and resilience among aging populations in India and Sweden (ICMR-FORTE Study)	Rakhal Gaitonde Dr. T.V. Sekher, Dr. T.R. Dilip, Mala Ramanathan, Jissa V.T.
3	A Study of Early Marriages in Assam (ASEMA)	Dr.H. Lhungdim Dr.Nandita Saikia, Dr.Srinivas Goli,
4	Empirical Studies on the social Impact of Maan Ki Baat	Dr.Nandita Saikia
5	Evaluation of BBBP schemes in Haryana State (Govt. of Haryana)	Dr. T.V. Sekher, Dr. Srinivas Goli

Agenda no 13: **To report the matters regarding current academic activities.**

The academic council noted the reporting of matters for the academic year 2023-24.

Agenda no 14: **Any other matter with the permission of Chair.**

With the permission of chair, The following additional agendas were presented.

Additional Agenda : Regarding Examination Manual.

As per the recommendation of BoS, The following were approved by AC.

Amended: Rule 9 (m): For four & three credit papers, appearing in two internal assessment out of three internal assessment in each paper is compulsory for the students, failing which he/she will not eligible to write semester-end examination of that paper.

Inclusion Rule 24 (e): In case of Medial Emergency, Student may request for Online Viva-Voce. However, Medical certificate issued by the IIPS Authorised

Medical Attendant is essential for approval of the competent authority. Failing which request for online viva-voce will not be considered.

Inclusion: Rule 27 (d): Students appearing in re-examination & improvement examination, are not eligible for Gold & Silver Medal award w.e.f admission batch 2024-25.

Additional Agenda : **Regarding Provisional Certificate for the academic year 2023-24.**

In case, the convocation of the Institute is not held in the month of May'2024, The following documents will be issued to the students for their further studies & career purpose.
1.Consolidate Mark Sheets
2.Transcripts (If applicable for the course)
3.TC cum Migration Certificate (If applicable for the course)
4.Provitional Certificate

Additional Agenda : **Regarding Ph.D Admission**

It has been decided that before the Ph.D admission, Admission committee will circulate a notice to all faculty regarding the availability of Ph.D vacancy and subsequently willingness to take student against vacancy available for the respective academic year.

Additional Agenda: **Ph.D degree related issues.**

i. After completion of Ph.D Viva-Voce, The Institute will issue a notification from the academic year 2024-25. However, a separate letter to the Ph.D. supervisor will not be issued as and when required
ii. As per UGC norms, the successful defense of the Ph.D. viva voce is a mandatory requirement for completing the Ph.D. program. The Academic Council approves Ph.D. degrees only for candidates whose viva-voce has been successfully defended before the Academic Council meeting.

Additional Agenda: **Ph.D admission cancellation.**

After review the progress, Fees stat-us & timeline of Ph.D course, The admission of the following candidates were cancelled.

Sr. No.	Name of the Ph.D Students	Name of the Guide	Date of Registration
1	Mr. Nelson Franklin Soy	Prof. P. Arokiasamy	03-08-2017
2	Mr. Mausam Kumar Garg	Prof. R.B. Bhagat	02-04-2018

After review the timeline of Ph.D course, The admission of the following candidates will be extended subject to submission of progress report &fees.

Sr. No.	Name of the Ph.D Students	Name of the Guide	Date of Registration
1	Mr. Deepak Gopal	Prof. Murali Dhar	20-05-2018
2	Ms. Mahera Mumtaz	Prof. Sayeed Unisa	01-06-2020

Chairperson of Academic Council suggested to adhere the different timeline of Ph.D as per the existing rules. The Institute should not encourage unnecessary delay or postpone of different kind presentations/Examinations.

Additional Agenda: **Miscellaneous.**

I. The Chairperson explained to the council that the student election could not be held as per the instructions received from the MoHFW.
II. After externally funded research projects are completed, there is often a substantial amount of money remains in the accounts. Chairperson has suggested to discuss this matter in the faculty meeting for further discussion in consultation with sponsoring agency and F&A department.
III. Regarding the media exposure to the research findings of the Institute, the medial cell will look into this matter.

The meeting ended with vote of thanks to the Chair.

Prof. H. Lhungdim
Member-Secretary,
Academic Council, IIPS

Prof D. A. Nagdeve
Director (Additional Charge) &
Chairperson, Academic Council, IIPS

Annexure I

List of Members Attended

1. Prof. D.A. Nagdeve - Chairperson
2. Prof .Hemkhothang Lhungdim - Member-Secretary
3. Prof .Kailash Chandra Das - Member
4. Prof .Chander Shekhar - Member
5. Prof .Sanjay Kumar Mohanty - Member
6. Prof .R. Nagarajan - Member
7. Prof. Abhishek Singh - Member
8. Prof .Murali Dhar - Member
9. Prof .Archana Roy - Member
10. Prof .Dhananjay W. Bansod - Member
11. Prof .Aparajita Chattopadhyay - Member
12. Prof .Nandita Saikia - Member
13. Prof. S. Chandrasekhar - Member
14. Prof. Anjali Radkar - Member
15. Dr. Manoj Alagarajan - Member
16. Dr.Dipti Govil - Member
17. Dr. Manas R Pradhan - Member
18. Dr. Pradeep Salve - Member
19. Dr. Guru Vasishtha - Member
20. Dr. Kunal Keshri - Member
21. Shri Sudarshan Bhadra - Invitee
22. Dr. Mangesh Patil - Invitee
23. Dr. Shubhangi Baviskar - Invitee
24. Dr. Amol Ade - Invitee
25. Dr. Krishnaja N. P. - Invitee.