School of Public Health Sciences and Technology

Masters of Public Health

Course Curriculum (I year I Semester)

Course Structure

Sl. No	SUBJECT	L	T	P	C	Max. Marks		
						INT	EXT	Total
1.	FoundationsofPublicHealth	2	-	-	2	30	70	100
2.	PrinciplesofEpidemiology	2	-	-	2	30	70	100
3.	SocialDeterminantsofHealth	2	-	-	2	30	70	100
4.	HealthSystemsandPolicy	2	-	-	2	30	70	100
5.	ResearchMethodologyinPublic Health	2	-	-	2	30	70	100
6.	BasicsofBiostatistics	2	-	-	2	30	70	100
7.	PublicHealthAnthropology	1	-	-	1	30	70	100
8.	PopulationCohortsin Communities		-	2	1	30	70	100
9	Public Health Communications	1	-	-	1	30	70	100
10	Basics of Parasitology and Vector Biology	1	-	-	1	30	70	100
11	Community-BasedHealthSurveys Practical	-	-	2	1	30	70	100
12.	IndustrialExposure Practical	-	-	2	1	30	70	100
13.	CasestudiesDiscussions Practical	-	-	2	1	30	70	100

14.	Principles of Epidemiology Practical	-	-	2	1	30	70	100
15.	Research Methodology in Public Health Practical	-	-	2	1	30	70	100
16.	Basics of Biostatistics Practical	-	-	2	1	30	70	100
		15	**0**	**14**	**22**	**480**	**1120**	**1600**
Total Contact Hours			**29**					

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010101	I	Foundations of Public Health	2	2-0-0

COURSE OUTCOMES (COs)

CO1: Explain the core concepts, history, evolution, and principles of Public Health.
CO2: Describe disease causation, determinants of health, and levels of prevention.
CO3: Explain the components of health systems and public health functions.
CO4: Analyse global and Indian public health frameworks, agencies, and responsibilities.
CO5: Apply public health approaches to health promotion, disease prevention, and community health.

Module I: INTRODUCTION TO PUBLIC HEALTH (6 Hours)

- **Meaning & Scope of Public Health**
  - Definition and its evolution from sanitation to modern epidemiology.
  - Clinical medicine vs public health.
  - Preventive, promotive, curative, rehabilitative services.
- **Historical development of Public Health**
  - Ancient civilizations (Egypt, India, China).
  - John Snow and cholera.
  - Evolution of PH in 19th & 20th century.
  - Public Health in post-independence India.
- **Core Functions of Public Health**
  - Assessment, Policy Development, Assurance.
  - Essential Public Health Services (EPHS-10).
- **Determinants of Health**
  - Biological, behavioural, environmental, socioeconomic.
  - Risk factors vs protective factors.
- **Concept of Health & Disease**
  - WHO definition.

- Iceberg phenomenon.
- Spectrum of health.
- Web of causation.

Module II: PUBLIC HEALTH APPROACHES (6 Hours)

- **Levels of Prevention**
  - Primordial, primary, secondary, tertiary.
  - Prevention strategies for NCDs, infectious diseases.
  - Screening and early diagnosis.
- **Health Promotion**
  - Definition, strategies, and theories.
  - Ottawa Charter (1986): Five action areas, three strategies.
  - Behaviour Change Theories:
    - Health Belief Model
    - Social Cognitive Theory
    - Transtheoretical Model
- **Public Health Interventions**
  - Population-based vs high-risk approaches.
  - Examples: tobacco control, road safety, maternal health, vaccination.
- **Community Engagement**
  - Participatory approaches.
  - Social mobilization.
  - Role of community health workers.

Module III: PUBLIC HEALTH SYSTEMS (6 Hours)

- **Global Health Systems**
  - WHO structure and functions.
  - UNICEF, UNDP, World Bank, UNFPA — mandates & PH roles.
  - GHSA, IHR-2005, SDGs linkage to health.
- **Indian Health System**
  - MoHFW organizational structure.
  - National Health Mission (NHM), RMNCH+A.
  - National disease control programmes (NADCP, RNTCP, NVBDCP).
  - IDSP: surveillance and outbreak response.
- **Healthcare Delivery Models**
  - Public vs private systems.
  - Primary, secondary, tertiary care structure.
  - PPP models in India.
- **Public Health Workforce**
  - Roles: PH Nurses, Epidemiologists, Field workers, ASHA.
  - Multidisciplinary PH teams.

Module IV: EPIDEMIOLOGY & SURVEILLANCE BASICS (6 Hours)

- **Introduction to Surveillance**
  - Definition and types: passive, active, sentinel, syndromic.
  - Steps in surveillance cycle.
- **Major Surveillance Systems in India**
  - IDSP: reporting formats, weekly reporting, outbreak alerts.
  - NVBDCP (malaria, dengue).
  - NTEP (TB surveillance).
  - AFP & Measles surveillance.
- **Outbreak Preparedness & Response**
  - Early Warning Signals (EWS).
  - Case definitions.
  - Line listing, spot mapping.
- **Public Health Data Sources**
  - Census, NFHS, DLHS, NSSO.
  - Hospital records, vital statistics, HMIS.

Suggested Readings

1. K. Park — *Textbook of Preventive and Social Medicine*
2. Merson, Black & Mills — *Global Health*
3. Oxford Textbook of Global Public Health
4. WHO — *Public Health Surveillance Guidelines*
5. CDC — *Principles of Epidemiology*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH26010111	I	Principles of Epidemiology	2	2-0-0

COURSE OUTCOMES (COs)

CO1: Define epidemiology, scope, uses, and principles.
CO2: Describe measures of disease frequency and burden.
CO3: Explain and compare various epidemiological study designs.
CO4: Apply epidemiological methods in outbreak investigation.
CO5: Analyse causation, bias, validity, and interpretation of epidemiological findings.

Module I: INTRODUCTION TO EPIDEMIOLOGY (6 Hours)

1. Definition & Evolution of Epidemiology

- Meaning, aims, and objectives of epidemiology.
- Historical landmarks:
  - John Snow's cholera investigation
  - Smallpox eradication
  - Development of field epidemiology
- Scope of epidemiology in public health.

2. Concepts & Uses of Epidemiology

- Describing disease distribution.
- Identifying risk factors and determinants.
- Guiding health policy and programme planning.
- Evaluating interventions.

3. Natural History of Disease

- Pre-pathogenesis and pathogenesis phases.
- Levels of prevention (primordial → tertiary).
- Iceberg phenomenon.
- Epidemic, endemic, pandemic definitions.

4. Concepts of Host, Agent, Environment

- Epidemiological triad.
- Web of causation.
- Multifactorial causation of disease.

5. Measures of Disease Occurrence (Overview)

- Incidence, prevalence, mortality.
- Basic difference between rates, ratios, proportions.

Module II: MEASURES OF DISEASE FREQUENCY & BURDEN (6 Hours)

1. Measures of Morbidity

- **Incidence**: cumulative incidence, incidence density.
- **Prevalence**: point, period, lifetime prevalence.
- Relationship between incidence & prevalence.
- Applications of morbidity indicators.

2. Measures of Mortality

- Crude death rate.
- Cause-specific mortality rate.
- Infant mortality rate (IMR).
- Maternal mortality ratio (MMR).
- Standardized mortality ratio (SMR).
- Case fatality rate (CFR).

3. Measures of Burden of Disease

- Disability-Adjusted Life Years (DALYs).
- Years Lived with Disability (YLD).
- Years of Life Lost (YLL).
- Global Burden of Disease (WHO/IHME) concept.

4. Epidemiological Measures of Association (Basic Introduction)

- Relative risk (RR).
- Odds ratio (OR).
- Attributable risk (AR).
- Population Attributable Risk (PAR).

5. Interpretation & Public Health Importance

- Comparing indicators between populations.
- Age-adjustment and standardization concepts.

Module III: EPIDEMIOLOGICAL STUDY DESIGNS (6 Hours)

1. Descriptive Epidemiology

- Person, place, time distribution.
- Descriptive study designs:
  - Case reports
  - Case series
  - Ecological studies
  - Cross-sectional studies
- Uses of descriptive data.

2. Analytical Epidemiology

- **Case-Control Study**
  - Concept, design, selection of cases & controls.
  - Matching, bias, confounders.
  - Calculating Odds Ratio.
- **Cohort Study**
  - Prospective vs retrospective.
  - Exposure assessment, follow-up.
  - Measuring incidence in exposed vs unexposed.
  - Calculating Relative Risk (RR).

3. Experimental Epidemiology

- Randomized Controlled Trials (RCTs):
  - Types: parallel, crossover, factorial.
  - Blinding, randomization, control groups.
- Community trials.
- Quasi-experimental designs.

4. Screening in Epidemiology

- Purpose and importance.
- Sensitivity, specificity, PPV, NPV.
- ROC curves (concept only).
- Screening programme examples:
  - Newborn screening
  - Cervical cancer
  - Breast cancer

5. Validity & Reliability

- Internal vs external validity.
- Bias: selection, information, confounding.
- Methods to reduce bias.

Module IV: OUTBREAK INVESTIGATION & CAUSATION (6 Hours)

1. Epidemics & Types of Epidemic Curves

- Common source (point, continuous).
- Propagated outbreaks.
- Mixed epidemics.
- Interpretation of epidemic curves.

2. Steps in Outbreak Investigation (CDC Approach)

1. Confirm the outbreak
2. Verify diagnosis
3. Define and identify cases
4. Descriptive epidemiology (time, place, person)
5. Develop hypotheses
6. Test hypotheses (analytical studies)
7. Implement control measures
8. Communicate findings

3. Case Definitions & Line Listing

- Standard definitions (suspected, probable, confirmed).
- Constructing a line list.
- Spot map and cluster identification.

4. Modes of Transmission

- Direct: droplet, contact, vertical.
- Indirect: vector, vehicle, airborne.
- Infectivity, pathogenicity, virulence.

5. Association & Causation

- Types of associations: spurious, indirect, direct.
- Hill's Criteria for Causation:
    - Temporality
    - Strength
    - Dose-response
    - Consistency
    - Plausibility
    - Coherence
    - Experiment
    - Analogy

6. Public Health Response & Reporting Systems

- IDSP outbreak reporting.
- Rapid Response Teams (RRT).
- Early Warning Signals (EWS).

Suggested Readings

1. Rothman K. — *Modern Epidemiology*
2. CDC — *Field Epidemiology Manual*
3. Park K. — *Preventive and Social Medicine*
4. WHO — *Epidemiology for Public Health Practice*
5. Gordis L. — *Epidemiology*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010112	I	Social Determinants of Health	2	2-0-0

COURSE OUTCOMES (COs)

CO1: Explain the concept, models, and frameworks of Social Determinants of Health.
CO2: Analyse how socioeconomic, cultural, political, and environmental factors influence population health.
CO3: Identify pathways linking social disadvantage to diseases and inequities.
CO4: Examine SDH issues in India, including caste, gender, poverty, tribal health, and rural–urban disparities.
CO5: Propose evidence-based interventions to reduce health inequities.

Module I: INTRODUCTION TO SOCIAL DETERMINANTS OF HEALTH (6 Hours)

1. Concepts and Definitions

- Definition of Social Determinants of Health (SDH).
- Distinction between determinants, risk factors, structural determinants, and intermediary determinants.
- Social gradient in health: "health follows a social gradient."
- Equity vs equality; social justice.

2. Theoretical Models & Frameworks

- Dahlgren & Whitehead "Rainbow Model."
- WHO Commission on Social Determinants of Health (CSDH) Framework – structural & intermediary determinants.
- Eco-social model (Nancy Krieger).
- Life-course approach.

3. Pathways Linking Social Factors to Health

- Psychosocial pathways (stress, coping, social support).
- Material/structural pathways (housing, income, resources).
- Behavioural pathways (diet, physical activity, substance use).
- Epigenetics and early childhood influences.

4. Global Perspectives

- SDH priorities in LMICs and high-income countries.
- Role of global institutions in addressing SDH: WHO, UN, World Bank.

Module II: SOCIOECONOMIC DETERMINANTS OF HEALTH (6 Hours)

1. Economic Status & Income Inequality

- Poverty, absolute vs relative poverty.
- Income inequality indicators (Gini coefficient).
- Livelihood security and economic vulnerability.

2. Education & Health Literacy

- Influence of literacy on health behaviour and outcomes.
- Health literacy and access to care.
- Impact of education on reproductive health, maternal health, child health.

3. Occupation & Working Conditions

- Occupational hazards (chemical, physical, ergonomic, psychosocial).
- Informal sector workers and lack of social security.
- Child labour, women's labour participation.

4. Housing & Living Environment

- Crowding, sanitation, ventilation.
- Impact of slum environments on communicable and noncommunicable diseases.
- Access to clean water and safe food.

5. Social Class & Mobility

- Socioeconomic stratification.
- Intergenerational and intragenerational mobility.
- Social exclusion and marginalization.

Module III: CULTURAL, BEHAVIOURAL & ENVIRONMENTAL DETERMINANTS (6 Hours)

1. Cultural Determinants

- Influence of cultural beliefs, customs, and practices on health.
- Illness behaviour: help-seeking patterns.
- Cultural stigma around diseases (HIV, TB, mental health).
- Traditional healing systems in India.

2. Gender as a Determinant

- Gender norms and health behaviours.
- Maternal mortality and reproductive health disparities.

- Violence against women and its health consequences.
- Gender inequality index.

3. Caste, Race, Ethnicity, and Religion

- Caste-based discrimination and access to healthcare.
- Minority health disparities.
- Social exclusion and health disadvantage in tribal groups.

4. Behavioural Determinants

- Substance use (alcohol, tobacco).
- Diet, physical activity, obesity.
- High-risk sexual behaviour.
- Lifestyle transitions and urbanization.

5. Environmental Determinants

- Indoor and outdoor air pollution.
- Climate change and health (heat waves, vector-borne diseases).
- Water contamination, waste disposal.
- Environmental justice.

Module IV: SOCIAL DETERMINANTS OF HEALTH IN INDIA (6 Hours)

1. Indian Context of Inequities

- Rural–urban disparities in healthcare access and outcomes.
- Malnutrition and poverty among children (NFHS data).
- Maternal and child health inequalities.

2. Tribal and Vulnerable Populations

- Health status of Scheduled Tribes (ST).
- Barriers to access: geography, culture, poverty.
- Tribal nutrition crisis, malaria burden, maternal mortality.
- Case studies: Odisha, Chhattisgarh, Telangana tribal health indicators.

3. Social Policies Addressing SDH

- National Health Policy (2017): SDH elements.
- POSHAN Abhiyaan.
- Ayushman Bharat & Health and Wellness Centres.
- Education and sanitation schemes:
    - Mid-Day Meal
    - Swachh Bharat Mission

- Right to Education (RTE)

4. Urbanization & Migration

- Slum health issues.
- Migrant labourers: occupational risks, lack of social security, exclusion from services.
- Urban heat island effect.

5. Frameworks for Reducing Inequities

- Community participation and empowerment.
- Intersectoral coordination (health, education, labour, housing).
- Social protection strategies: PDS, pensions, insurance.

Suggested Readings

1. WHO — *Closing the Gap in a Generation*
2. Marmot M. — *The Health Gap*
3. Solar & Irwin — *WHO Framework on SDH*
4. Park K. — PSM (SDH Chapter)
5. CSDH Final Report — WHO
6. IHME Global Burden of Disease Reports

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010104	I	Health Systems and Policy	2	2-0-0

COURSE OUTCOMES (COs)

CO1: Explain the structure, components, and functions of health systems.
CO2: Analyse the organization of the Indian health system and major national health programmes.
CO3: Describe the principles of health policy, governance, and regulation.
CO4: Explain health financing mechanisms and challenges in achieving Universal Health Coverage (UHC).
CO5: Critically evaluate global health systems, reforms, and international policy frameworks.

Module I: OVERVIEW OF HEALTH SYSTEMS (6 Hours)

1. Concepts, Definitions & Functions of Health Systems

- What is a health system?
- Goals: improving health, responsiveness, and financial protection.
- Functions: service delivery, resource generation, financing, stewardship.
- WHO Health System Framework (6 building blocks).

2. Health System Models

- Beveridge Model (UK, NHS).
- Bismarck Model (Germany, France).
- National Health Insurance Model (Canada).
- Out-of-pocket model (many LMICs).
- Strengths and weaknesses of each model.

3. Service Delivery & Continuum of Care

- Primary, secondary, and tertiary care.
- Referral systems.
- Integrated care pathways.
- Quality assurance in health services.

4. Human Resources for Health (HRH)

- Types of health workforce: doctors, nurses, CHWs, AYUSH.
- Task shifting and skill mix.
- Challenges: shortages, migration, distribution imbalance.

5. Health Information Systems (HIS)

- Role of HIS in planning and evaluation.
- HMIS, DLHS, SRS, NFHS, IDSP.
- Electronic health records (EHRs).

Module II: INDIAN HEALTH SYSTEM & REFORMS (6 Hours)

1. Structure of Indian Health System

- Union, State, District: roles and responsibilities.
- MoHFW structure and departments.
- Public health vs medical care systems.

2. National Health Programmes

- Overview of major programmes:
    - RMNCH+A
    - National Tuberculosis Elimination Programme
    - NVBDCP (malaria, dengue)
    - NACP (HIV)
    - National Mental Health Programme
    - NPCDCS (NCD control)
    - RSBY/PM-JAY

3. National Health Mission (NHM)

- Objectives and strategies.
- NRHM & NUHM components.
- ASHA programme.
- Health and Wellness Centres (HWCs).

4. Health Infrastructure in India

- Sub-centres, PHCs, CHCs, District Hospitals.
- Ayushman Aarogya Mandirs.
- Challenges: quality, accessibility, infrastructure gaps.

5. Public–Private Partnerships (PPP)

- Outsourcing diagnostics, ambulance services.
- Insurance schemes.
- Advantages and limitations.

Module III: HEALTH POLICY, GOVERNANCE & REGULATION (6 Hours)

1. Health Policy Concepts

- What is health policy?
- Public policy cycle: agenda setting → formulation → implementation → evaluation.
- Stakeholders in health policy (government, NGOs, private sector, academia).

2. Major Indian Health Policies

- National Health Policy 1983, 2002, 2017 (key features).
- Policies affecting SDH (education, sanitation, nutrition).
- National Digital Health Mission (NDHM).

3. Health Governance & Regulation

- Regulation of healthcare providers, pharmaceuticals, hospitals.
- Clinical Establishments Act.
- Drug regulation: CDSCO, DCGI.
- Ethical and legal issues in health policy.

4. Social and Community Participation

- Village Health Sanitation & Nutrition Committees (VHSNC).
- Rogi Kalyan Samitis (RKS).
- Community-based monitoring.

5. Health Policy Analysis Tools

- Problem-tree analysis.
- Stakeholder analysis.
- SWOT analysis.
- Policy briefs.

Module IV: HEALTH FINANCING, UHC & GLOBAL HEALTH POLICY (6 Hours)

1. Health Financing Concepts

- Sources of financing: taxation, insurance, OOP payments, donations.
- Public vs private health expenditure.
- Catastrophic health expenditure.

2. Universal Health Coverage (UHC)

- WHO definition and core components.
- Service coverage, financial protection, quality.

- India’s pathway to UHC.

3. National & State Insurance Schemes

- Ayushman Bharat – PM-JAY.
- State schemes: Arogyasri (Telangana/AP), Karunya (Kerala).
- Insurance benefit packages.

4. Global Health Policy & International Cooperation

- Sustainable Development Goals (SDG-3).
- International Health Regulations (IHR 2005).
- WHO resolutions and conventions.
- GHSA, pandemic preparedness.

5. Comparative Health System Analysis

- How health systems differ across countries.
- Lessons for India from UK, Thailand (UHC), Sri Lanka, and Canada.

Suggested Readings

1. WHO — *Health Systems Framework*
2. K. Park — *Preventive and Social Medicine (Health System Chapters)*
3. Berman P. — *Health Economics for Developing Countries*
4. National Health Policy 2017 – MoHFW
5. Rao K. et al. — *India Health Report*
6. WHO — *Universal Health Coverage Compendium*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010105	I	Research Methodology in Public Health	2	2-0-0

COURSE OUTCOMES (COs)

CO1: Explain fundamental concepts, types, and approaches in research.
CO2: Formulate research problems, objectives, hypotheses, and conceptual frameworks.
CO3: Describe sampling techniques and sample size calculation.
CO4: Develop data collection tools and understand measurement, scaling, and validity.
CO5: Describe research ethics, protocol writing, and dissemination of findings.

Module I: BASICS OF RESEARCH (6 Hours)

1. Introduction to Research

- Definition and purpose of research.
- Research in public health vs clinical research vs operational research.
- Characteristics of good research.

2. Types of Research

- Basic vs applied research.
- Quantitative vs qualitative research.
- Observational vs experimental studies.
- Exploratory, descriptive, explanatory research.

3. Research Problem Identification

- Sources of research problems: literature gaps, policy gaps, epidemiological data.
- Refining a broad topic into a researchable question.
- SMART research objectives.

4. Research Questions & Hypothesis Formulation

- Characteristics of good research questions (FINER criteria).
- Null and alternative hypotheses.
- Directional vs non-directional hypotheses.

5. Literature Review & Conceptual Frameworks

- Types of literature: primary, secondary, tertiary.
- Searching literature: PubMed, Google Scholar, Scopus.
- PRISMA concept (overview).
- Developing conceptual and theoretical frameworks.

Module II: SAMPLING TECHNIQUES AND SAMPLE SIZE (6 Hours)

1. Basics of Sampling

- Population vs sample.
- Sampling unit, sampling frame, sampling error.
- Representativeness and validity of samples.

2. Probability Sampling Methods

- Simple random sampling.
- Systematic sampling.
- Stratified random sampling.
- Cluster sampling and multistage sampling.
- PPS (Probability Proportionate to Size).

3. Non-Probability Sampling Methods

- Convenience sampling.
- Purposive sampling.
- Snowball sampling.
- Quota sampling.

4. Sample Size Calculation

- Determinants: precision, confidence level, power.
- Sample size formula for:
    - Proportion
    - Mean comparison
    - Case-control and cohort studies
- Adjustments for design effect and non-response.

5. Errors in Sampling

- Sampling error vs nonsampling error.
- How to reduce sampling errors.

Module III: DATA COLLECTION METHODS, MEASUREMENT & QUALITY (6 Hours)

1. Data Types & Sources

- Primary vs secondary data.
- Qualitative vs quantitative data.
- Sources: surveys, censuses, HMIS, IDSP, NFHS.

2. Data Collection Tools

- Questionnaires and interview schedules.
- Observation checklists.
- Focus group discussions (FGDs).
- Key informant interviews (KIIs).

3. Measurement Scales

- Nominal, ordinal, interval, ratio.
- Choosing the correct measurement scale for variables.

4. Validity & Reliability

- Types of validity: content, face, construct, criterion.
- Types of reliability: test–retest, inter-rater, internal consistency (Cronbach's alpha).

5. Data Quality Assurance

- Pilot testing and pretesting tools.
- Training of data collectors.
- Monitoring and supervision.
- Dealing with missing data.

Module IV: RESEARCH ETHICS, PROTOCOL WRITING & REPORTING (6 Hours)

1. Research Ethics

- Principles: autonomy, beneficence, non-maleficence, justice.
- Informed consent processes.
- Privacy, confidentiality, data protection.
- Vulnerable populations (children, pregnant women, mentally ill).
- Role of Institutional Ethics Committees (IEC).

2. Components of a Research Protocol

- Title, background, rationale.
- Objectives and hypotheses.
- Methodology: design, sampling, tools, data analysis plan.
- Timeline and budget.

- Ethical considerations.

3. Data Management & Analysis Plan

- Coding, data entry, validation.
- Basic structure of analysis: univariate, bivariate, multivariate.
- Selection of appropriate statistical tests (link to Biostatistics).

4. Report Writing & Dissemination

- IMRAD format (Introduction, Methods, Results, Discussion).
- Referencing styles: APA, Vancouver.
- Preparing policy briefs.
- Presenting findings: posters, conferences, community meetings.

5. Evidence-Based Public Health

- Concepts of evidence hierarchy.
- Systematic reviews and meta-analysis (overview).
- Translating research to policy.

Suggested Readings

1. Kothari C.R. — *Research Methodology: Methods and Techniques*
2. Creswell J. — *Research Design*
3. Green & Thorogood — *Qualitative Methods for Health Research*
4. WHO — *Ethics in Public Health Research*
5. UNICEF/WHO — *Health Research Methods Slides & Manuals*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010113	I	Basics of Biostatistics	2	2-0-0

COURSE OUTCOMES (COs)

CO1: Understand basic statistical concepts, terminology, and types of data.
CO2: Summarize and present data using descriptive statistics and graphical methods.
CO3: Apply probability concepts and commonly used probability distributions.
CO4: Perform hypothesis testing, interpret p-values and confidence intervals.
CO5: Understand correlation, regression, and basic statistical inference relevant to public health.

Module I: INTRODUCTION TO BIOSTATISTICS (6 Hours)

1. Meaning & Importance of Biostatistics

- Definition, role, and applications of statistics in public health.
- Uses in epidemiology, demography, clinical trials, programme monitoring.
- Data-driven decision-making in public health.

2. Basic Statistical Terminology

- Population vs sample.
- Variable: definition and types (qualitative, quantitative).
- Continuous vs discrete variables.
- Dependent and independent variables.

3. Types & Sources of Data

- Primary vs secondary data.
- Cross-sectional, longitudinal, retrospective data.
- Sources: surveys (NFHS, NSSO), records, vital statistics, HMIS.

4. Scales of Measurement

- Nominal, ordinal, interval, ratio.
- Choosing correct statistical tools based on scale.

5. Data Tabulation & Presentation

- Frequency distributions.
- Methods of tabulation.
- Principles of table construction.

Module II: DESCRIPTIVE STATISTICS & DATA VISUALIZATION (6 Hours)

1. Measures of Central Tendency

- Mean, median, mode.
- Uses and limitations.
- When to use each measure.

2. Measures of Dispersion

- Range, interquartile range.
- Variance, standard deviation.
- Coefficient of variation (CV).

3. Position Measures

- Percentiles and quartiles.
- Applications in growth charts, BMI percentiles.

4. Data Visualization Techniques

- Bar charts, histograms, line diagrams.
- Box and whisker plots.
- Pie charts, scatter plots.
- Choosing appropriate charts for data type.

5. Normal Distribution & Z-Scores (Introduction)

- Characteristics of normal distribution curve.
- Standard scores and their interpretation.

Module III: PROBABILITY & PROBABILITY DISTRIBUTIONS (6 Hours)

1. Basics of Probability

- Definition and concepts.
- Types: theoretical, experimental, subjective.
- Addition and multiplication rules.
- Conditional probability.

2. Random Variables

- Discrete and continuous random variables.
- Expectation and variance.

3. Binomial Distribution

- Characteristics and assumptions.
- Real-life public health applications:
    - vaccine success
    - probability of malaria positivity
    - sampling scenarios

4. Poisson Distribution

- Rare event distribution.
- Use in modelling:
    - medical errors
    - rare outbreaks
    - accidents

5. Normal Distribution (Detailed)

- Standard normal curve.
- Applications: blood pressure, height/weight, test scores.
- Z-tables and probability calculations (conceptual).

Module IV: INFERENTIAL STATISTICS, HYPOTHESIS TESTING & CORRELATION (6 Hours)

1. Concept of Statistical Inference

- Sampling distributions.
- Standard error (SE).
- Central Limit Theorem (CLT).

2. Hypothesis Testing

- Null (H0) and alternative (H1) hypotheses.
- Type I and Type II errors.
- Power of a test.
- p-value interpretation.
- Confidence intervals (CI).

3. Parametric Tests

- Z-test (mean, proportion).
- t-test:
    - One-sample
    - Independent samples
    - Paired
- ANOVA (concept only).

4. Non-Parametric Tests

- Chi-square test (goodness of fit, independence).
- Mann–Whitney U test (concept).
- Kruskal–Wallis test (concept).

5. Correlation & Regression

- Pearson correlation (r): interpretation of strength and direction.
- Spearman's rank correlation.
- Simple linear regression:
    - regression line
    - slope interpretation
- Applications in epidemiology and public health.

6. Introduction to Statistical Software (Conceptual Only)

- SPSS, R, Stata, Excel for data analysis.
- Importing data, basic summaries.

Suggested Readings

1. Rosner B. — *Fundamentals of Biostatistics*
2. Gupta S.C. & Kapoor — *Fundamentals of Mathematical Statistics*
3. Wayne D. — *Biostatistics: A Foundation for Analysis in Health Sciences*
4. Pagano & Gauvreau — *Principles of Biostatistics*
5. WHO — *Health Statistics Guide*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010114	I	Public Health Anthropology	1	1-0-0

COURSE OUTCOMES (COs)

CO1: Explain basic anthropological concepts and their relevance to public health.
CO2: Analyse how culture influences health behaviour, illness perception, care-seeking, and healing systems.
CO3: Identify the role of social structure, kinship, caste, and gender in shaping health outcomes.
CO4: Evaluate cultural barriers to healthcare access and public health interventions.
CO5: Apply anthropological insights in designing culturally appropriate public health programmes.

Module I: INTRODUCTION TO PUBLIC HEALTH ANTHROPOLOGY (3 Hours)

1. Introduction to Anthropology

- Definition, branches of anthropology (cultural, social, biological, linguistic).
- Relationship between anthropology and public health.
- Importance of cultural context in health interventions.

2. Concepts & Theories in Medical Anthropology

- Cultural relativism vs ethnocentrism.
- Health, illness, sickness: differences in meanings.
- Theories of illness causation:
    - Naturalistic systems
    - Personalistic systems
    - Supernatural systems
- Lay perceptions of disease.

3. Methods in Medical Anthropology

- Ethnography: definition and use in public health.
- Participant observation.
- Qualitative methods: in-depth interviews, FGDs.
- Case studies from global and Indian settings.

Module II: CULTURE, HEALTH BEHAVIOUR & ILLNESS PERCEPTION (3 Hours)

1. Culture & Health Behaviour

- How culture shapes behaviour related to diet, hygiene, sexuality, reproduction.
- Cultural norms on body image, physical activity.
- Influence of myths, beliefs, rituals on health practices.

2. Illness Behaviour& Help-Seeking

- Cultural influences on recognizing symptoms.
- Delay in seeking care.
- Pathways to care: self-care → traditional healers → formal health system.
- Case examples: mental health, TB, maternal care.

3. Stigma & Health

- Social stigma: causes and consequences.
- Diseases associated with stigma: HIV/AIDS, TB, leprosy, mental illnesses.
- Gendered stigma and discrimination.
- Impact of stigma on access to health services.

Module III: SOCIAL STRUCTURE, COMMUNITY & HEALTH SYSTEMS (3 Hours)

1. Social Structure & Determinants of Health

- Caste and social stratification.
- Family and kinship systems: nuclear, joint, extended families.
- Role of kinship in caregiving and chronic disease support.

2. Gender & Power Relations

- Gender roles and expectations in health behaviours.
- Maternal health, reproductive rights, gender-based violence.
- Barriers faced by women and LGBTQ+ individuals.

3. Traditional & Indigenous Health Systems

- Indigenous healing practices in India (Ayurveda, Siddha, Unani, tribal healing).
- Role of traditional birth attendants (Dais).
- Integration of traditional systems with modern health care.

4. Culture & Health Programmes

- How cultural mismatch affects programme uptake.
- Need for culturally sensitive communication.
- Case Studies:
    - Polio resistance in some communities
    - Vaccine hesitancy due to religious beliefs
    - Maternal health practices among tribal groups

Suggested Readings

1. Helman C. — *Culture, Health and Illness*
2. Baer, Singer & Susser — *Medical Anthropology and the World System*
3. Mark Nichter — *Anthropology and International Health*
4. Kleinman A. — *Patients and Healers in the Context of Culture*
5. Singer & Erickson — *A Companion to Medical Anthropology*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010107C	I	Population Cohorts in Communities	1	1-0-0

COURSE OUTCOMES (COs)

CO1: Explain the concept and purpose of population cohorts in public health research.
CO2: Describe cohort design, recruitment strategies, and follow-up mechanisms in communities.
CO3: Understand measurement tools, indicators, and data collection methods for cohort studies.
CO4: Analyse the role of community cohort studies in disease surveillance and health policy.
CO5: Identify challenges and ethical issues involved in establishing and maintaining population cohorts.

Module I: INTRODUCTION TO POPULATION COHORTS (3 Hours)

1. Meaning & Types of Cohorts

- Definition of cohort.
- Birth cohorts, disease cohorts, occupational cohorts, community cohorts.
- Static vs dynamic cohorts.
- Examples: Framingham Heart Study, Demographic Surveillance Sites (DSS), INDEPTH Network.

2. Design & Methodology of Cohort Studies

- Prospective, retrospective, and ambidirectional designs.
- Cohort selection and recruitment methods.
- Follow-up strategies: active vs passive follow-up.
- Calculating incidence rates in cohorts.

3. Role of Community-Based Cohorts in Public Health

- Monitoring disease trends (NCDs, infectious diseases).
- Studying social determinants of health across life-course.
- Evaluating effectiveness of health interventions.

Module II: COMMUNITY-BASED DATA COLLECTION & LONGITUDINAL FOLLOW-UP (3 Hours)

1. Data Collection Tools for Cohort Studies

- Baseline survey design.
- Repeated measurement tools (anthropometry, biomarkers).

- Use of digital technologies: mobile apps, cloud-based systems.

2. Indicators in Cohort Studies

- Exposure assessment (risk factors).
- Outcome measurement: health events, mortality, morbidity.
- Behavioural and environmental indicators.

3. Ensuring Cohort Retention & Quality

- Methods to reduce loss to follow-up.
- Engaging communities: volunteers, local leaders, CHWs.
- Maintaining data quality: validation, standardization, calibration.

Module III: ETHICS, CHALLENGES & APPLICATIONS (3 Hours)

1. Ethical Issues in Cohort Research

- Informed consent for long-term follow-up.
- Privacy and confidentiality.
- Working with sensitive groups (tribals, migrants, minors).

2. Operational Challenges

- Migration, mobility, urban slums.
- Funding limitations for long-term studies.
- Staff training and supervision.

3. Applications in Policy & Programmes

- Evidence for noncommunicable disease control.
- Maternal and child health cohorts.
- Using cohort findings for UHC, SDGs, and public health planning.

Suggested Readings

1. Rothman K. — *Modern Epidemiology*
2. WHO — *Health Research Toolkit*
3. INDEPTH Network publications
4. Framingham Heart Study reports
5. UNICEF Longitudinal Cohort Manuals

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010107D	I	Public Health Communications	1	1-0-0

COURSE OUTCOMES (COs)

CO1: Explain fundamental concepts and theories of communication in the context of public health.
CO2: Design effective public health messages tailored to diverse populations.
CO3: Apply behaviour change theories to communication strategies.
CO4: Use media, digital tools, IEC/BCC techniques for health promotion.
CO5: Evaluate communication campaigns and address misinformation.

Module I: FOUNDATIONS OF PUBLIC HEALTH COMMUNICATION (3 Hours)

1. Concepts & Functions of Communication

- Definition of communication and public health communication.
- Components: sender, message, medium, receiver, feedback.
- Barriers to effective communication.

2. Theories & Models of Health Communication

- Health Belief Model (HBM).
- Theory of Planned Behaviour (TPB).
- Social Cognitive Theory.
- Diffusion of Innovations.
- KAP Model (Knowledge → Attitude → Practice).

3. Behaviour Change Communication (BCC)

- Definition, principles, and strategies.
- Designing BCC interventions for communities.
- Case examples: sanitation, maternal health, HIV campaigns.

Module II: MEDIA, IEC MATERIALS & DIGITAL COMMUNICATION (3 Hours)

1. Information, Education, and Communication (IEC)

- Types of IEC materials: pamphlets, posters, flipcharts, videos.
- Principles of IEC development: clarity, simplicity, cultural appropriateness.

2. Digital Health Communication

- Use of social media platforms: WhatsApp, Facebook, YouTube.
- Mobile-based messaging and mHealth interventions.
- Telemedicine and tele-counselling.

3. Risk Communication & Crisis Communication

- Communicating during outbreaks (COVID-19, dengue, H1N1).
- Managing infodemics and combating misinformation.
- WHO guidelines for emergency communication.

Module III: PUBLIC HEALTH CAMPAIGNS & COMMUNITY ENGAGEMENT (3 Hours)

1. Designing Public Health Campaigns

- Steps: situational analysis, audience segmentation, message development, media selection.
- Formative research and pre-testing messages.
- Multi-channel approaches.

2. Community Participation in Communication

- Involving ASHAs, peer educators, local leaders.
- Culturally sensitive messages.
- Role of NGOs and community-based organizations.

3. Monitoring & Evaluation

- Process evaluation: reach, frequency, exposure.
- Outcome evaluation: behaviour change indicators.
- Tools: surveys, FGD, feedback forms, digital analytics.

Suggested Readings

1. Schiavo R. — *Health Communication: From Theory to Practice*
2. WHO — *Communicating Risk in Public Health Emergencies*
3. CDC — *Gateway to Health Communication*
4. UNICEF — *Communication for Development (C4D)*
5. Indian MOHFW IEC/BCC Module

Practicals

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH26010108	I	Community Based Health Surveys	1	0-0-2

OBJECTIVES

1. To train students in planning, conducting, and reporting community health surveys.
2. To develop competencies in questionnaire design, sampling, data collection, and field interviewing.
3. To understand ethical procedures during community interaction.
4. To apply public health tools for household-level data collection.
5. To compile, analyse, and present community survey findings.

WEEKLY PRACTICAL MODULES (2 Hours per session)

Week 1: Introduction & Tools Development

- Types of public health surveys.
- Designing household questionnaires: demographic, sanitation, morbidity.
- Drafting observation checklists.

Week 2: Sampling & Field Preparation

- Mapping the survey area.
- Line listing and house-numbering.
- Selecting households: SRS/systematic sampling.
- Informed consent preparation.

Week 3: Interview Techniques

- Rapport building.
- Asking sensitive questions.
- Recording responses without bias.

Week 4: Field Data Collection (I)

- Household demographic data.
- Socioeconomic indicators.
- Health-service utilization.

Week 5: Field Data Collection (II)

- Morbidity & risk factor survey.
- Environmental assessment: water, sanitation, waste disposal.
- Observation checklist recording.

Week 6: Data Entry & Cleaning

- Creating data templates in Excel/SPSS.
- Coding responses.
- Identifying errors & missing data.

Week 7: Basic Analysis

- Descriptive statistics: frequency tables, percentages.
- Preparing graphs & tables.

Week 8: Report Preparation & Presentation

- Writing a community survey report: Introduction → Methods → Findings → Discussion.
- Presenting findings to classmates/faculty.

SUGGESTED READINGS

1. WHO – *Household Survey Guidelines*
2. NFHS/DHS Survey Tools
3. MOHFW – *Community Survey Formats*
4. CDC – *Community Assessment Tools*

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010109	I	Industrial Exposure	1	0-0-2

OBJECTIVES

1. To expose students to workplace environments and occupational health risks.
2. To study environmental, ergonomic, chemical, and physical hazards.
3. To understand safety protocols and industrial health regulations.
4. To assess worker health, welfare, and occupational disease risks.

WEEKLY PRACTICAL MODULES

Week 1 – Introduction to Industrial Health

- Concepts of industrial hygiene.
- Types of industries: manufacturing, mining, chemical, food processing.

Week 2 – Walkthrough Survey Planning

- Studying layout, operations, workflow.
- Preparing checklists for hazard identification.

Week 3 – Physical Hazard Assessment

- Noise level measurement.
- Light intensity assessment.
- Heat stress.

Week 4 – Chemical & Biological Hazards

- Exposure to solvents, dusts, fumes.
- Safe handling and storage.
- Chemical accident preparedness.

Week 5 – Ergonomic Assessment

- Repetitive strain injuries.
- Postural analysis.
- Musculoskeletal risk assessment.

Week 6 – Occupational Disease Surveillance

- Respiratory diseases, dermatitis, hearing loss.
- Accident recording.
- First aid and emergency response.

Week 7 – Worker Health & Safety

- PPE usage.
- Fire safety systems.
- Compliance with the Factories Act.

Week 8 – Industrial Visit Report Submission

- Preparing detailed visit report with photographs, findings, recommendations.

Suggested readings:

1. Park's PSM – Occupational Health
2. ILO Occupational Safety Guidelines
3. Indian Factories Act Manual
4. NIOSH/OSHA Toolkits

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010115	I	Case Studies Discussions	1	0-0-2

OBJECTIVES

1. To analyse real-life public health case situations.
2. To build problem-solving and decision-making skills.
3. To understand outbreak investigation, programme evaluation, and policy issues.
4. To apply epidemiological reasoning to public health cases.

WEEKLY CASE DISCUSSION MODULES

Week 1 – Introduction to Case Analysis

- Structure of a public health case.
- Using evidence for decision-making.

Week 2 – Dengue Outbreak Case

- Identifying index cases.
- Epi curve interpretation.
- Vector surveillance gaps.

Week 3 – Foodborne Outbreak (Wedding/Hostel)

- Case definition creation.
- Attack rate calculation.
- Source identification.

Week 4 – Maternal Death Review Case

- Verbal autopsy.
- Delays model (Delay 1, 2, 3).
- Recommendations.

Week 5 – NCD Case: Diabetes Cluster

- Risk factor mapping.
- Screening challenges.
- Lifestyle analysis.

Week 6 – Environmental Health Case (Water Contamination)

- Water testing data interpretation.
- Mapping contamination pathways.

Week 7 – Health Programme Failure Case

- Immunization dropout case.
- Supply chain analysis.
- Behavioural barriers.

Week 8 – Group Presentation & Report Submission

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010111P	I	Principles of Epidemiology-Practical	1	0-0-2

OBJECTIVES

- To train students in basic epidemiological calculations.
- To perform outbreak investigation exercises.
- To construct and interpret epidemiological graphs and tables.

WEEKLY EXERCISES

Week 1

- Incidence, prevalence calculations.
- Frequency tables.

Week 2

- Mortality indicators (IMR, MMR, CDR).

Week 3

- Attack rate, secondary attack rate.

Week 4

- Epidemic curve construction & interpretation.

Week 5

- Case-control data → Odds Ratio calculation.

Week 6

- Cohort data → Relative Risk calculation.

Week 7

- Screening test evaluation (Sensitivity, Specificity, PPV, NPV).

Week 8

- Outbreak investigation simulation & report.

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010105P	I	Research Methodology in Public Health -Practical	1	0-0-2

WEEKLY MODULES

Week 1 – Formulating research questions

Week 2 – Writing objectives & hypotheses

Week 3 – Designing tools (questionnaire, interview guide)

Week 4 – Validity & reliability testing

Week 5 – Sampling methods demonstration

Week 6 – Pilot testing tools

Week 7 – Constructing data entry formats

Week 8 – Research protocol preparation & presentation

Subject Code	Semester	SubjectTitle	Credit	(L-T-P)
MPH 26010113P	I	Basics of Biostatistics-Practical	1	0-0-2

WEEKWISE EXERCISES

Week 1
- Data entry, coding, tabulation.

Week 2
- Mean, median, mode.

Week 3
- Standard deviation, variance.

Week 4
- Graphs: histogram, line chart, pie chart.

Week 5
- Probability exercises.

Week 6
- t-test, chi-square test (manual calculation).

Week 7
- Correlation exercises.

Week 8SPSS/R demonstration & final assignment.