



MALLA REDDY VISHWAVIDYAPEETH

(Deemed to be University)

Suraram X Roads, Jeedimetla, Hyderabad 500055

**School of Public Health, Emerging Healthcare & Technology
(SPHEHT)**

**COURSE STRUCTURE
&
SYLLABUS DOCUMENT**

**Master of Public Health
Year 2025–27 Batch**

Semester-wise Curriculum Structure (Scheme of Instruction)

SEMESTER – I							
S. No.	Category	Course Code	Name of the Subject	L	T	P	Credits
1	MC	MPH26010101	Foundations of Public Health	2	0	0	2
2	MC	MPH26010104	Health Systems and Policy	2	0	0	2
3	MC	MPH26010105	Research Methodology in Public Health	2	0	0	2
4	PL	MPH26010105P	Research Methodology in Public Health Practical	0	0	2	1
5	EL	MPH26010107C	Population Cohorts in Communities	0	0	2	1
6	EL	MPH26010107D	Public Health Communications	1	0	0	1
7	PL	MPH26010108	Community-Based Health Surveys Practical	0	0	2	1
8	PL	MPH26010109	Industrial Exposure Practical	0	0	2	1
9	VAC	MPH26010110	Basics of Parasitology and Vector Biology	1	0	0	1
10	MC	MPH26010111	Principles of Epidemiology	2	0	0	2
11	PL	MPH26010111P	Principles of Epidemiology Practical	0	0	2	1
12	MC	MPH26010112	Social Determinants of Health	2	0	0	2
13	MC	MPH26010113	Basics of Biostatistics	2	0	0	2
14	PL	MPH26010113P	Basics of Biostatistics Practical	0	0	2	1
15	MI	MPH26010114	Public Health Anthropology	1	0	0	1
16	PL	MPH26010115	Case studies Discussions Practical	0	0	2	1
Total				15	0	14	22
Total Contact Hours				29			

SEMESTER – II							
S. No.	Category	Course Code	Name of the Subject	L	T	P	Credits
1	MC	MPH26010211	Maternal and Child Health	4	0	0	4
2	MC	MPH26010212	Biostatistics -II	4	1	0	5
3	MC	MPH26010212P	Biostatistics -II Practical	0	0	2	1
4	MC	MPH26010213	Research Methodology in Public Health - II	4	1	0	5
5	MC	MPH26010213P	Research Methodology in Public Health – II Practical	0	0	2	1

SEMESTER – II							
6	AEC	MPH26010214	Demography and Population Health	4	0	0	4
7	MC	MPH26010215	Public Health Field Practicum	0	0	6	3
Total				16	2	10	23
Total Contact Hours				28			

SEMESTER – III							
S. No.	Category	Course Code	Name of the Subject	L	T	P	Credits
1			Epidemiological Methods and Study Designs	2	2	0	4
2			Environmental and Occupational Health	3	1	0	4
3			Communicable and Noncommunicable Diseases	2	1	0	3
4			Behavioral Health Theories and Practices	2	1	0	3
5			Healthcare Delivery Systems	2	2	0	4
6			Data Analytics using MS-Excel and R Programming (Practical)	0	0	2	1
7			Health Economics and Financing	2	0	0	2
			AI in Healthcare: Foundation	1	0	0	1
Total				14	7	2	22
Total Contact Hours				23			

SEMESTER – IV							
S. No.	Category	Course Code	Name of the Subject	L	T	P	Credits
			Healthcare Informatics	2	1	0	3
			Public Health Governance, Law, and Bioethics	2	1	0	3
			Health Programs in India	3	0	0	3
			Capstone Project / Thesis	0	0	20	10
Total				7	2	20	19
Total Contact Hours				29			

Course codes follow the pattern PHM (e.g., PHM101 = Master of Public Health, Semester I, Course 1). L-T-P denote weekly Lecture-Tutorial-Practical hours; C denotes credits.

- **Practicals:** Subjects with the course code suffix ‘P’ are practicals. A Practical (experiential learning) subject of 2 hours per week for 15 weeks equals 1 Credit.
- **Summer Internships:** A total of 240 hours (30 hours per week for 8 weeks) of full-time summer internship (experiential learning) equals 8 credits; represented as 16 hours per week for 15 weeks (16*15 = 240)

- **Research Project / Dissertation** is allocated a total of 360 hours (= 30 hours per Credit * 12 Credits). The total allocated hours include periods of full-time efforts for data collection, data analysis, and thesis writing. If a student opts for a specialisation, then they must choose a research project/dissertation topic that aligns with their area of specialisation.
- Students completing all eight semesters and securing 160 credits shall be awarded the “Bachelor of Public Health (Honours with Research).”

SEMESTER I

Foundations of Public Health

Category: Major Core (MC) | L-T-P: 2-2-0 | **Credits:** 4

Course Objectives

- Explain core public health concepts, scope, and functions, integrating foundational epidemiology with modern digital and data-driven population health tracking.
- Examine the historical milestones of global and Indian public health, mapping how systematic interventions and technological advancements have shaped health delivery systems.
- Analyze individual and population-level health determinants, health inequities, and vulnerabilities using contemporary data indicators and systemic frameworks.
- Distinguish public health approaches from clinical care, emphasizing preventive strategies, health promotion, and community-level interventions.
- Apply public health ethics, governance principles, data privacy, and equity frameworks to real-world health practice and policy formulation.

Course Outcomes: On completion, students will be able to:

- CO1: Explain core public health concepts, scope, functions, and the role of modern health systems in population well-being
- CO2: Describe the evolution and key milestones in global and Indian public health, tracing progress from early sanitary revolutions to contemporary national health missions.
- CO3: Analyze determinants of health at individual and population levels, recognizing social gradients and environmental impacts.
- CO4: Distinguish public health approaches from clinical care by evaluating population-level prevention and health promotion strategies.
- CO5: Relate public health ethics, equity, human rights, and accountability to real-world professional practice.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: History and Evolution of Public Health

- Ancient sanitation systems and early community health practices
- Germ theory, sanitary revolution, and classical epidemiology

- Growth of organized public health and health departments
- Global milestones: Alma-Ata, Ottawa Charter, SDGs, UHC
- Evolution of public health in India (Bhore Committee to NHM)
- Practical/Hands-on Session: Mapping historical epidemiological shifts and public health milestones through data visualization and case studies

Unit 2: Concepts and Functions of Public Health

- Definitions: health, public health, population health, community health
- Essential public health services and core functions (assessment, policy, assurance)
- Levels of prevention: primordial, primary, secondary, tertiary
- Health promotion, disease prevention, and protection strategies
- Role of multidisciplinary public health teams
- Practical/Case Demo Session: Designing a multi-level prevention framework for a modern public health issue

Unit 3: Public Health Systems and Approaches

- Health system building blocks and service delivery models
- Primary health care principles and community-based care
- Public–private partnerships and role of NGOs/CSOs
- Health programs and campaigns (national and global examples)
- Systems thinking and inter-sectoral coordination for health
- Practical/Tutorial Session: Critical appraisal of public-private health delivery models and national campaign tracking

Unit 4: Determinants of Health

- Social, economic, cultural, environmental, and political determinants
- Health inequities, social gradients, and vulnerable groups
- Life-course approach and critical stages for interventions
- Urbanization, migration, and globalization impacts on health
- Frameworks for addressing determinants in policy and practice
- Practical/Interactive Session: Policy analysis exercise addressing health disparities and social gradients across diverse populations

Unit 5: Public Health Ethics and Equity

- Principles of public health ethics (beneficence, justice, autonomy)
- Ethical dilemmas in screening, surveillance, and resource allocation
- Community participation, informed consent, and trust building
- Human rights, health equity, and social justice perspectives
- Professional codes, accountability, and responsible conduct
- Practical/Capstone Presentation: Group formulation, ethical scenario analysis, and capstone pitch addressing a real-world public health challenge

Suggested Readings

- Schneider, M. J. *Introduction to Public Health*. Jones & Bartlett Learning.
- Turnock, B. J. *Public Health: What It Is and How It Works*. Jones & Bartlett Learning.
- Detels, R., et al. *Oxford Textbook of Public Health*. Oxford University Press.

Health Systems and Policy

Category: Major Core (MC) | L-T-P: 2-0-0 | **Credits:** 2

Course Objectives

- Describe core health system components, goals, and WHO building blocks to understand global and national healthcare architectures.
- Analyze health policy formulation, the policy cycle, and stakeholder influence mapping to navigate complex healthcare governance.
- Compare diverse national and global health system models (Beveridge, Bismarck, NHI, LMIC vs. HIC) and service delivery mechanisms.
- Evaluate health financing structures, resource allocation, out-of-pocket expenditures, and financial protection strategies.
- Develop actionable strategies and policy interventions for health system strengthening, Universal Health Coverage (UHC), and digital health integration (e.g., Ayushman Bharat, ABDM).

Course Outcomes: On completion, students will be able to:

- CO1: Describe health system components and functions.
- CO2: Analyze health policy formulation and implementation.
- CO3: Compare national and global health systems.
- CO4: Evaluate financing mechanisms and resource allocation.
- CO5: Develop strategies for health system strengthening.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Overview of Health Systems

- Definition, goals, and components of a health system
- WHO Health System Building Blocks
- Comparison of global health system models: Beveridge, Bismarck, National Health Insurance (NHI), Out-of-pocket
- LMIC vs HIC health systems: key differences, challenges

- Practical/Hands-on Session: Comparative mapping and architectural analysis of international healthcare delivery models

Unit II: Health Policy – Formulation and Implementation

- Definition, need, and scope of health policy
- Health Policy Cycle: agenda setting, formulation, implementation, evaluation
- Key stakeholders: Government, NGOs, private sector, international agencies
- Basics of stakeholder influence and power mapping
- Practical/Case Demo Session: Stakeholder analysis and power-mapping workshop based on real-world health reform case studies

Unit III: Health Financing and Service Delivery

- Health financing mechanisms: public, private, social insurance
- Out-of-pocket expenditure and financial protection
- Service delivery levels: primary, secondary, tertiary care
- Indian context: PHC, CHC, District Hospitals, HWC, Ayushman Bharat
- Practical/Tutorial Session: Financial risk protection assessment and public healthcare tier utilization analysis

Unit IV: Governance and Policy Analysis

- Governance in health: concepts and importance
- National health governance: MoHFW, State Health Departments, NHM
- Global governance: WHO, UN agencies
- Introduction to policy analysis frameworks
- Practical/Interactive Session: Critical policy critique using structured health policy analysis frameworks

Unit V: Current Issues and Health System Reforms

- Universal Health Coverage (UHC)
- National Health Mission (NHM)
- Ayushman Bharat: HWC & PM-JAY
- Innovations & Digital Health: ABDM, telemedicine, CoWIN
- Public–Private Partnerships (PPP) in Indian health system
- Practical/Capstone Presentation: Group policy brief and presentation proposing a strategic health system reform or digital health intervention

Suggested Readings

- World Health Organization. *Everybody's Business: Strengthening Health Systems*.
- Kutzin, J. *Health Financing Revisited*.
- Government of India. *National Health Policy 2017*.

Research Methodology in Public Health

Category: Major Core (MC) | L-T-P: 2-0-0 | Credits: 2

Course Objectives

- Formulate robust public health research questions, hypotheses, and objectives using quantitative, qualitative, or mixed-methods approaches.
- Design appropriate experimental, quasi-experimental, and observational public health studies while accounting for validity and sample size.
- Develop structured data collection tools, protocols, and quality control frameworks for field research.
- Apply core ethical principles, institutional ethics committee processes, and protective measures for vulnerable populations.
- Write comprehensive research proposals, scientific reports, and knowledge translation strategies.

Course Outcomes: On completion, students will be able to:

- CO1: Formulate research questions and objectives.
- CO2: Design appropriate public health studies.
- CO3: Develop data collection tools and protocols.
- CO4: Apply ethical principles in research.
- CO5: Write research proposals and reports.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Research Fundamentals

- Types of research: basic, applied, action research
- Quantitative, qualitative, mixed methods approaches
- Formulating research questions, hypotheses, objectives
- Literature review and gap identification
- Conceptual and theoretical frameworks
- Practical/Hands-on Session: Literature mapping and hypothesis formulation exercise using structured gap-identification frameworks

Unit II: Study Design Development

- Experimental, quasi-experimental designs
- Observational study designs selection
- Sampling techniques and sample size calculation
- Validity, reliability, generalizability concerns

- Research protocol structure and components
- Practical/Case Demo Session: Sample size estimation and study design selection workshop for public health scenarios

Unit III: Data Collection Methods

- Structured questionnaires and interviews
- Focus group discussions and observation
- Secondary data sources and records
- Quality control and data management
- Fieldwork planning and logistics
- Practical/Tutorial Session: Designing survey instruments and planning data quality control protocols

Unit IV: Research Ethics

- Ethical principles: autonomy, beneficence, justice
- Informed consent and confidentiality
- Institutional ethics committee processes
- Vulnerable populations protection
- Research misconduct and integrity
- Practical/Interactive Session: Institutional Review Board (IRB) application review and ethical dilemma role-play

Unit V: Proposal Writing and Dissemination

- Research proposal components and structure
- Budgeting, timeline, and resource planning
- Grant writing basics and funding sources
- Scientific writing: abstracts, papers, reports
- Dissemination strategies and knowledge translation
- Practical/Capstone Presentation: Group proposal pitch, budget justification presentation, and grant application review

Suggested Readings

- Creswell, J. W. *Research Design: Qualitative, Quantitative, and Mixed Methods*.
- World Health Organization. *Research for Universal Health Coverage*.
- NHMRC. *National Statement on Ethical Conduct in Research*.
- Greenhalgh, T. *How to Read a Paper*.
- Indian Council of Medical Research Guidelines.

Research Methodology in Public Health (Practicals)

Category: Major Core (MC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Develop structured data collection instruments, interview guides, and observation checklists for public health research.
- Conduct pilot testing, reliability and validity assessments, and pretesting of research tools in field settings.
- Perform qualitative data analysis, thematic content coding, and triangulation using modern software tools.
- Write comprehensive research protocols following standard IMRAD structures.
- Prepare complete Institutional Review Board (IRB) submissions, risk-benefit assessments, and ethical compliance documentation.

Course Outcomes: On completion, students will be able to:

- CO1: Develop data collection instruments.
- CO2: Conduct pilot testing validation.
- CO3: Perform qualitative data analysis.
- CO4: Write complete research protocols.
- CO5: Prepare IRB submissions.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Tool Development

- Questionnaire design principles
- Interview guide construction
- Focus group discussion protocols
- Observation checklist creation
- Cognitive interviewing pretesting
- Practical/Hands-on Session: Designing and refining structured survey instruments and cognitive pretesting templates

Unit II: Field Testing

- Pilot study implementation
- Reliability validity assessment
- Content validity expert review
- Test-retest reliability calculation
- Informed consent form testing
- Practical/Case Demo Session: Evaluating pilot study data and calculating test-retest reliability scores

Unit III: Qualitative Analysis

- Thematic content analysis
- Coding framework development

- NVivo software introduction
- Triangulation methods application
- Quote selection interpretation
- Practical/Tutorial Session: Building a coding framework and executing thematic analysis using qualitative software tools

Unit IV: Protocol Writing

- IMRAD structure practice
- Background literature synthesis
- Methods detailed specification
- Timeline Gantt chart creation
- Budget justification preparation
- Practical/Interactive Session: Drafting detailed methods sections and developing project Gantt charts

Unit V: Ethics Submission

- IRB application completion
- Risk-benefit assessment
- Vulnerable population plans
- Data security confidentiality
- Protocol revision response
- Practical/Capstone Presentation: Compiling a complete IRB application package and simulating an ethics committee defense

Suggested Readings

- World Health Organization. *Operational Research Guidelines*.
- CONSORT and STROBE reporting guidelines.
- Indian Council of Medical Research (ICMR) Ethical Guidelines.
- Specialized qualitative research methods texts.
- Grant proposal writing manuals.

Population Cohorts in Communities

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Identify community cohort characteristics, prospective and retrospective designs, and baseline assembly strategies.
- Apply cohort study methods, community mapping, and sampling frames within field settings to ensure population representativeness.
- Analyze population health trends longitudinally using incidence rates, risk factor patterns, and Kaplan-Meier survival analysis curves.
- Engage communities effectively in cohort research, ethical participation, specimen collection, and result dissemination.
- Interpret cohort data for public health action, birth cohort evaluations, and long-term program maintenance.

Course Outcomes: On completion, students will be able to:

- CO1: Identify community cohort characteristics.
- CO2: Apply cohort study methods in field settings.
- CO3: Analyze population health trends longitudinally.
- CO4: Engage communities in cohort research.
- CO5: Interpret cohort data for public health action.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Cohort Study Principles

- Prospective and retrospective cohort designs
- Cohort assembly and baseline characterization
- Follow-up strategies and retention methods
- Loss to follow-up minimization techniques
- Time-to-event analysis basics
- Practical/Hands-on Session: Designing baseline tracking tools and retention protocol frameworks for prospective cohorts

Unit II: Community Cohort Selection

- Community mapping and eligibility criteria
- Sampling frames for population cohorts
- Representativeness and generalizability
- Ethical community engagement processes
- Baseline data collection protocols
- Practical/Case Demo Session: Community mapping and sampling frame selection workshop for field studies

Unit III: Data Collection in Cohorts

- Repeated measures and longitudinal tracking
- Biological specimen collection and storage
- Questionnaire standardization across waves
- Digital tools for cohort data management
- Quality assurance in field operations
- Practical/Tutorial Session: Setting up digital data management systems and quality assurance checklists for longitudinal tracking

Unit IV: Community-Based Analysis

- Incidence rate calculation in cohorts
- Risk factor identification patterns

- Survival analysis Kaplan-Meier curves
- Nested case-control efficiency
- Community feedback result dissemination
- Practical/Interactive Session: Calculating incidence rates and plotting Kaplan-Meier survival curves using cohort datasets

Unit V: Applications and Challenges

- Birth cohorts and life-course epidemiology
- Occupational cohorts exposure assessment
- Community intervention cohort evaluations
- Data linkage with health records
- Sustainability long-term cohort maintenance
- Practical/Capstone Presentation: Designing a long-term cohort maintenance and data-linkage strategy presentation

Suggested Readings

- Rothman, K. J. *Modern Epidemiology*. Wolters Kluwer.
- World Health Organization. *Longitudinal Studies Guidelines*.
- National cohort study protocols and field manuals.
- Community-based participatory research texts.
- Field epidemiology manuals.

Public Health Communications

Category: Skill Enhancement Course (SEC) | L-T-P: 1-0-0 | Credits: 1

Course Objectives

- Apply core communication theories, concepts, and process elements to public health contexts.
- Design effective health messages, educational materials, and IEC tools using structured interpersonal and mass media approaches.
- Utilize mass media, digital communication channels, and traditional tools to drive health campaigns.
- Conduct risk and crisis communication strategies to address public health emergencies and community concerns.
- Evaluate communication campaign effectiveness, behavior change communication (BCC) principles, and overcome communication barriers.

Course Outcomes: On completion, students will be able to:

- CO1: Apply communication theories to public health.
- CO2: Design effective health messages and materials.
- CO3: Utilize mass media and digital communication strategies.
- CO4: Conduct risk and crisis communication.
- CO5: Evaluate communication campaign effectiveness.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Introduction to Health Communication (3 Hours)

- Definition, concept, and significance
- Elements and process of communication
- Types and channels of communication
- Practical/Hands-on Session: Mapping communication channels for targeted community health outreach

Unit II: Models of Communication (3 Hours)

- Lasswell's Model, Shannon–Weaver Model, Berlo's SMCR Model
- Health Education, Models of Health Education
- Alma-Ata declaration principles in education
- Practical/Case Demo Session: Applying communication models to design public health educational frameworks

Unit III: Health Education and Communication Methods (3 Hours)

- Interpersonal, group, and mass media approaches
- Use of IEC materials and audio-visual aids
- Traditional and modern communication tools
- Practical/Tutorial Session: Creating audio-visual aids and IEC materials for local health campaigns

Unit IV: Behaviour Change Communication (BCC) (3 Hours)

- Concept and principles of BCC
- IEC vs BCC vs SBCC (Social and Behaviour Change Communication)
- Behavior change theories (overview)
- Practical/Interactive Session: Designing a behavioral change communication matrix for a public health priority

Unit V: Barriers and Communication Planning (3 Hours)

- Barriers to effective communication
- Strategies to overcome barriers
- Basics of designing and evaluating a communication plan
- Practical/Capstone Presentation: Pitching a comprehensive health communication and campaign evaluation plan

Suggested Readings

- Rice, R. E., & Atkin, C. K. *Public Communication Campaigns*. SAGE Publications.
- Centers for Disease Control and Prevention (CDC). *Health Communication Basics*.

- World Health Organization. *Communication for Health*.

Community-Based Health Surveys Practical

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Design comprehensive community health surveys, covering objective and indicator selection, cluster sampling designs, and sample size power calculations.
- Conduct field data collection, household mapping, interviewer-administered techniques, anthropometric and clinical measurements, and validation checks.
- Analyze survey data appropriately using data cleaning, weighting, descriptive statistics, and multivariate adjustment techniques in software like SPSS or EpiInfo.
- Report findings effectively to communities through feedback sessions, policy briefs, and infographic dashboards.
- Evaluate survey quality, coverage, outlier detection, and document lessons learned for future public health assessments.

Course Outcomes: On completion, students will be able to:

- CO1: Design community health surveys.
- CO2: Conduct field data collection.
- CO3: Analyze survey data appropriately.
- CO4: Report findings to communities.
- CO5: Evaluate survey quality and coverage.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Survey Planning

- Objectives and indicator selection
- Sampling design: cluster and household
- Sample size and power calculations
- Questionnaire development and adaptation
- Team training and logistics planning
- Practical/Hands-on Session: Designing survey sampling frames and questionnaire adaptation workshops

Unit II: Field Implementation

- Household listing and mapping
- Informed consent procedures

- Interviewer-administered techniques
- Anthropometry and blood pressure measurement
- Data recording and validation checks
- Practical/Case Demo Session: Field simulation for household mapping and biometric data collection protocols

Unit III: Data Management

- Data entry and cleaning processes
- Missing data handling strategies
- Weighting and complex survey analysis
- Descriptive statistics generation
- Quality control and outlier detection
- Practical/Tutorial Session: Setting up data entry masks, cleaning raw survey datasets, and handling missing values

Unit IV: Analysis Methods

- Prevalence and proportion calculations
- Trend analysis across subgroups
- Risk factor associations testing
- Multivariate adjustment techniques
- Software use basics (SPSS, Epi Info)
- Practical/Interactive Session: Running cross-tabulations, risk factor associations, and multivariate models using SPSS/Epi Info

Unit V: Reporting Dissemination

- Community feedback sessions
- Policy brief preparation
- Infographic dashboard creation
- Scientific presentation writing
- Lessons learned documentation
- Practical/Capstone Presentation: Creating and pitching community feedback dashboards and policy briefs

Suggested Readings

- World Health Organization. *STEPwise Survey Manual*.
- Centers for Disease Control and Prevention (CDC). *Community Health Assessment*.
- National Family Health Survey (NFHS) India survey methodology.
- Standard sampling survey manuals and field survey toolkits.

Industrial Exposure Practical

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Assess occupational health risks, factory layouts, process flows, and workforce demographic shifts during site visits.
- Observe industrial hygiene practices, chemical exposure routes, physical/biological hazards, and ergonomic strains.
- Identify worker health programs, pre-employment medical examinations, and occupational disease screening mechanisms.
- Analyze workplace safety systems, engineering/administrative controls, incident reporting, and safety compliance gaps.
- Recommend public health interventions, exposure assessment summaries, risk prioritization matrices, and worker training strategies.

Course Outcomes: On completion, students will be able to:

- CO1: Assess occupational health risks.
- CO2: Observe industrial hygiene practices.
- CO3: Identify worker health programs.
- CO4: Analyze workplace safety systems.
- CO5: Recommend public health interventions.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Industry Orientation

- Factory layout process flows
- Workforce demographics shifts
- Hazard identification walkthrough
- PPE usage observation compliance
- Safety signage emergency protocols
- Practical/Hands-on Session: Industrial walkthrough simulation and PPE compliance checklist auditing

Unit 2: Occupational Hazards

- Chemical exposure routes monitoring
- Physical hazards noise vibration
- Biological risks healthcare industry
- Ergonomic strain assessment
- Psychosocial work stress factors
- Practical/Case Demo Session: Ergonomic strain evaluation and noise level mapping exercises

Unit 3: Control Measures

- Engineering controls ventilation

- Administrative controls rotation
- Substitution safer alternatives
- Health surveillance programs
- Incident reporting investigation
- Practical/Tutorial Session: Designing hierarchy-of-control solutions for industrial hazard scenarios

Unit 4: Health Services

- Pre-employment medical exams
- Periodic health checkups
- Occupational disease screening
- First aid emergency response
- Rehabilitation return-to-work
- Practical/Interactive Session: Occupational health surveillance planning and return-to-work case evaluation

Unit 5: Reporting Recommendations

- Exposure assessment summary
- Risk prioritization matrix
- Intervention cost-benefit
- Policy compliance gaps
- Worker training needs
- Practical/Capstone Presentation: Compiling and pitching an industrial health audit report and risk prioritization matrix

Suggested Readings

- World Health Organization. *Occupational Health Guidelines*.
- International Labour Organization (ILO). *Occupational Safety Conventions*.
- *Factories Act India Regulations*.
- Industrial hygiene manuals and NIOSH exposure guidelines.

Basics of Parasitology and Vector Biology

Category: Skill Enhancement Course (SEC) | L-T-P: 1-0-0 | Credits: 1

Course Objectives

- Classify major human protozoan and helminth parasites, analyzing their identification and pathology.
- Describe vector biology, mosquito species, vectorial capacity, and transmission dynamics.
- Identify control strategies for parasitic diseases, including indoor residual spraying, long-lasting insecticide nets, and larval source management.

- Analyze parasite life cycles, epidemiological patterns, basic reproduction numbers (R_0), and zoonotic cycles.
- Apply integrated vector management (IVM) principles, surveillance systems, and mass drug administration impacts.

Course Outcomes: On completion, students will be able to:

- CO1: Classify major human parasites.
- CO2: Describe vector biology and transmission.
- CO3: Identify control strategies for parasitic diseases.
- CO4: Analyze parasite life cycles and epidemiology.
- CO5: Apply integrated vector management principles.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Protozoan Parasites

- Plasmodium life cycle malaria transmission
- Entamoeba histolytica amoebiasis pathology
- Leishmania species visceral cutaneous forms
- Trypanosoma cruzi gambiense transmission
- Giardia lamblia waterborne transmission
- Practical/Hands-on Session: Microscopy identification and life-cycle mapping of protozoan blood and intestinal parasites

Unit 2: Helminth Parasites

- Ascaris lumbricoides soil-transmitted helminth
- Hookworm Necator Strongylus anemia effects
- Schistosoma species water contact transmission
- Filarial worms elephantiasis pathology
- Taenia solium cysticercosis neurocysticercosis
- Practical/Case Demo Session: Stool sample diagnostics and helminth egg morphology evaluation

Unit 3: Vector Biology Basics

- Anopheles Aedes Culex mosquito biology
- Vectorial capacity and entomological inoculation
- Vector-parasite-host interactions
- Breeding sites identification control
- Insecticide resistance mechanisms
- Practical/Tutorial Session: Vector breeding site mapping and insecticide resistance testing analysis

Unit 4: Transmission Dynamics

- R_0 basic reproduction number concepts
- Reservoir hosts and zoonotic cycles
- Seasonal transmission patterns
- Mass drug administration impacts
- Vector control intervention effects
- Practical/Interactive Session: Modeling vector-borne transmission patterns and R_0 estimation exercises

Unit 5: Control Strategies

- Indoor residual spraying IRS techniques
- Long-lasting insecticide nets LLINs
- Larval source management methods
- Integrated vector management IVM
- Surveillance monitoring systems
- Practical/Capstone Presentation: Designing a comprehensive Integrated Vector Management (IVM) program for a vector-borne disease outbreak

Suggested Readings

- Centers for Disease Control and Prevention (CDC). *DPDx Parasites*.
- World Health Organization. *Vector Control Guidelines*.
- Park, K. *Textbook of Preventive Medicine*.
- Standard parasitology texts and national vector-borne disease program manuals.

Principles of Epidemiology

Category: Major Core (MC) | L-T-P: 2-0-0 | Credits: 4

Course Objectives

- Define key epidemiological terms, concepts, health/disease paradigms, and population distribution patterns.
- Compute and interpret basic measures of disease frequency, incidence, prevalence, attack rates, and case fatality ratios.
- Describe main epidemiologic study designs (cross-sectional, case-control, cohort, and RCTs) and their field applications.
- Identify sources of bias, confounding, error, and screening test properties (sensitivity, specificity) in epidemiological research.
- Apply basic epidemiologic reasoning, descriptive analysis, and outbreak investigation protocols to public health problems.

Course Outcomes: On completion, students will be able to:

- CO1: Define key epidemiological terms and concepts.
- CO2: Compute and interpret basic measures of disease frequency.
- CO3: Describe main epidemiologic study designs and their applications.

- CO4: Identify sources of bias, confounding, and error.
- CO5: Apply basic epidemiologic reasoning to public health problems.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Introduction and Measures of Disease

- Definition, aims, and uses of epidemiology
- Concepts of health, disease, epidemic, endemic, pandemic
- Incidence, prevalence, attack rate, and case fatality rate
- Person–place–time distribution and interpretation
- Data sources: registries, surveys, records, surveillance
- Practical/Hands-on Session: Computing disease frequency measures and plotting person-place-time distributions

Unit 2: Measures of Association and Impact

- Risk, rate, and odds concepts
- Relative risk, odds ratio, risk difference basics
- Attributable risk and population-attributable fraction (qualitative understanding)
- Validity, reliability, accuracy, and precision in measurements
- Simple interpretation of epidemiological findings for policy
- Practical/Case Demo Session: Calculating relative risk and odds ratios using epidemiological contingency tables

Unit 3: Descriptive Epidemiology and Outbreaks

- Descriptive epidemiology: person, place, time analysis
- Epidemic curve types and interpretation
- Steps in outbreak investigation (overview)
- Case definition, line listing, and hypothesis generation
- Communication of findings to stakeholders
- Practical/Tutorial Session: Constructing epidemic curves and building line listings for simulated outbreak scenarios

Unit 4: Basic Study Designs

- Overview of observational vs experimental studies
- Cross-sectional studies: uses, strengths, limitations
- Case-control studies: selection of cases/controls, recall bias issues
- Cohort studies: prospective vs retrospective, loss to follow-up
- Simple overview of randomized controlled trials
- Practical/Interactive Session: Critically appraising published observational and experimental study designs

Unit 5: Errors, Bias, and Causation

- Types of bias: selection, information, confounding (basic examples)
- Random error, sample size concepts (non-technical)
- Screening test properties: sensitivity, specificity, predictive values
- Criteria for causation (e.g., temporality, strength of association)
- Role of epidemiology in health policy and programs
- Practical/Capstone Presentation: Evaluating screening test validity and analyzing bias/causation in public health research briefs

Suggested Readings

- Friis, R. H., & Sellers, T. A. *Epidemiology for Public Health Practice*. Jones & Bartlett Learning.
- Gordis, L. *Epidemiology*. Elsevier.
- Centers for Disease Control and Prevention (CDC). *Principles of Epidemiology in Public Health Practice*.
- Bonita, R., Beaglehole, R., & Kjellström, T. *Basic Epidemiology*. World Health Organization.
- Relevant national on disease surveillance and investigation.

Principles of Epidemiology (Practical)

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Calculate and interpret epidemiological measures, incidence, prevalence, and confidence intervals using spreadsheet tools.
- Construct and analyze epidemic curves, spot maps, cluster analyses, and age-sex pyramids.
- Perform basic outbreak investigations, line listing, hypothesis testing, and relative risk calculations.
- Use epidemiological software tools efficiently (Epi Info, EpiData, OpenEpi, Excel pivot tables, and R Commander).
- Present epidemiological findings effectively through summary reports, chart selection, press releases, and group presentations.

Course Outcomes: On completion, students will be able to:

- CO1: Calculate interpret epi measures.
- CO2: Construct analyze epidemic curves.
- CO3: Perform basic outbreak investigations.
- CO4: Use epi software tools.
- CO5: Present epi findings effectively.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Epi Measures Computation

- Incidence prevalence calculations
- Attack rates case-fatality ratios
- Person-time at risk estimation
- Confidence intervals proportions
- Spreadsheet software applications
- Practical/Hands-on Session: Computing rates, proportions, and confidence intervals in Excel

Unit 2: Descriptive Analysis

- Spot maps cluster analysis
- Epidemic curve construction
- Age-sex pyramids interpretation
- Time trend line graphs
- Descriptive tables formatting
- Practical/Case Demo Session: Generating demographic pyramids and spatial spot maps using surveillance data

Unit 3: Outbreak Simulation

- Line listing case definition
- Hypothesis generation testing
- Case-control analysis practice
- Relative risk calculation
- Control measures evaluation
- Practical/Tutorial Session: Simulating a field outbreak investigation and analyzing risk ratios

Unit 4: Software Applications

- Epi Info questionnaire design
- EpiData data entry validation
- OpenEpi online calculators
- Excel pivot tables graphs
- Basic R Commander epi functions
- Practical/Interactive Session: Designing data entry masks and executing statistical queries using Epi Info and OpenEpi

Unit 5: Report Presentation

- Epi summary report structure

- Visual aids chart selection
- Stakeholder communication
- Press release preparation
- Group presentation skills
- Practical/Capstone Presentation: Compiling an outbreak investigation report and delivering a stakeholder briefing

Suggested Readings

- Centers for Disease Control and Prevention (CDC). *Epi Info Training Manuals*.
- OpenEpi software tutorials.
- Field Epidemiology Training Program (FETP) .
- Practical epidemiology workbooks and national surveillance guidelines.

Social Determinants of Health

Category: Major Core (MC) | L-T-P: 2-0-0 | Credits: 2

Course Objectives

- Explain major social, structural, and economic determinants of health across populations.
- Describe biological and social pathways linking living conditions, income, education, and social support to health outcomes.
- Analyze health inequities, social gradients, and disparities using equity, human rights, and social justice frameworks.
- Identify community-level strategies, cultural influences, health-seeking behaviors, and behavior change models to address social determinants.
- Integrate social determinants perspectives and behavior change theories into comprehensive public health planning and policy formulation.

Course Outcomes: On completion, students will be able to:

- CO1: Explain major social and structural determinants of health.
- CO2: Describe pathways linking social conditions to health outcomes.
- CO3: Analyze health inequities using equity and rights frameworks.
- CO4: Identify community-level strategies to address social determinants.
- CO5: Integrate social determinants perspective into public health planning.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Introduction to Social Determinants of Health

- Concept and scope of SDH
- Key determinants: income, education, occupation, social support
- Social gradient and structural determinants
- WHO Commission on SDH framework
- Practical/Hands-on Session: Mapping social gradients and structural inequities using public health datasets

Unit II: Health Inequities and Social Justice

- Health equity, equality, and disparities
- Determinants of inequity: gender, caste, class, region
- Social justice and human rights in public health
- Policy implications and SDH interventions
- Practical/Case Demo Session: Policy analysis workshop addressing intersectional health disparities

Unit III: Culture, Society, and Health Behaviour

- Role of culture, beliefs, and values
- Influence of gender norms & religion
- Stigma, discrimination, and health-seeking behaviour
- Social networks and community influences
- Practical/Tutorial Session: Evaluating cultural barriers and stigma in health-seeking behavior case studies

Unit IV: Behaviour Change Communication

- Meaning and Definition of BCC
- Goal and Importance of BCC
- Principles of BCC
- Behaviour Change Communication (BCC) and health promotion
- Practical/Interactive Session: Designing a target-specific Behavior Change Communication plan

Unit V: Behavioural Theories in Public Health

- Health Belief Model (HBM)
- Theory of Planned Behaviour (TPB)
- Transtheoretical Model (Stages of Change)
- Social Cognitive Theory
- Applications in public health behaviour change
- Practical/Capstone Presentation: Applying health behavior theories to design a community intervention proposal

Suggested Readings

- Marmot, M., & Wilkinson, R. *Social Determinants of Health*. Oxford University Press.

- Glanz, K., Rimer, B. K., & Viswanath, K. *Health Behavior and Health Education: Theory, Research, and Practice*. Jossey-Bass.
- World Health Organization. Reports on Social Determinants of Health.
- Parker, R. *Health, Culture, and Society*.

Basics of Biostatistics

Category: Major Core (MC) | L-T-P: 2-0-0 | Credits: 2

Course Objectives

- Describe basic statistical concepts, data types, and scales of measurement used in public health research.
- Summarize, organize, and present health data using frequency distributions, graphical presentations, and summary statistics.
- Apply basic probability rules, normal, binomial, and Poisson distributions to solve simple health problems.
- Perform and interpret common statistical tests (t-tests, chi-square, correlation, regression) at an introductory level.
- Critically read, evaluate, and interpret statistical results and potential misuses in public health literature.

Course Outcomes: On completion, students will be able to:

- CO1: Describe basic statistical concepts used in public health.
- CO2: Summarize and present health data using appropriate measures.
- CO3: Apply basic probability and distributions in simple problems.
- CO4: Perform and interpret common statistical tests at introductory level.
- CO5: Critically read and interpret statistical results in literature.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Data and Descriptive Statistics

- Types of data: qualitative, quantitative, discrete, continuous
- Scales of measurement: nominal, ordinal, interval, ratio
- Frequency distributions and graphical presentations
- Measures of central tendency: mean, median, mode
- Measures of dispersion: range, variance, standard deviation
- Practical/Hands-on Session: Calculating descriptive statistics and generating graphical summaries using statistical software

Unit 2: Probability and Distributions

- Basic concepts of probability and simple rules
- Normal distribution and its properties (conceptual)
- Binomial and Poisson distributions (simple overview)
- Standard scores (z-scores) and interpretation
- Sampling distributions and standard error (conceptual)
- Practical/Case Demo Session: Applying normal distribution properties and z-score standardization to health data

Unit 3: Sampling and Estimation

- Population vs sample; sampling frames and
- Probability and non-probability sampling techniques
- Concept of confidence intervals and margins of error
- Introduction to parameter estimation (mean, proportion)
- Sample size considerations (qualitative understanding)
- Practical/Tutorial Session: Estimating confidence intervals and determining sample size requirements

Unit 4: Hypothesis Testing

- Null and alternative hypotheses, type I and II errors
- p-values, significance levels, and confidence levels
- t-test (independent and paired) for means (conceptual use)
- Chi-square test for association between categorical variables
- Interpretation of statistical outputs in health studies
- Practical/Interactive Session: Executing independent t-tests and chi-square tests for categorical health variables

Unit 5: Correlation, Regression, and Presentation

- Correlation: direction and strength (Pearson, Spearman basic ideas)
- Simple linear regression (concept and interpretation, not computation heavy)
- Basics of logistic regression interpretation (odds ratios)
- Data presentation in tables, graphs, and abstracts
- Common misuses of statistics in health literature
- Practical/Capstone Presentation: Critiquing statistical models and presenting regression outputs in scientific formats

Suggested Readings

- Mahajan, B. K. *Methods in Biostatistics for Medical Students*. Jaypee Brothers Medical Publishers.
- Pagano, M., & Gauvreau, K. *Principles of Biostatistics*. Cengage Learning.
- Rosner, B. *Fundamentals of Biostatistics*. Cengage Learning.
- National handbooks and on health statistics and data analysis.

Basics of Biostatistics (Practical)

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Perform descriptive statistics, data cleaning, outlier detection, and frequency distributions using Excel and SPSS.
- Apply probability distributions, z-score standardizations, and confidence interval estimations practically.
- Conduct basic hypothesis tests, including one-sample, independent, paired t-tests, and chi-square tests.
- Use statistical software proficiently to run correlation analyses and simple linear regression models.
- Report statistical results in scientific formats, APA style tables, and professional PowerPoint presentations.

Course Outcomes: On completion, students will be able to:

- CO1: Perform descriptive statistics.
- CO2: Conduct basic hypothesis tests.
- CO3: Create interpret graphs tables.
- CO4: Use statistical software proficiently.
- CO5: Report results in scientific format.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Data Entry Analysis

- Data cleaning outlier detection
- Descriptive statistics generation
- Frequency distributions histograms
- Measures of central tendency dispersion
- Excel SPSS data manipulation
- Practical/Hands-on Session: Data cleaning and descriptive statistics generation in SPSS and Excel

Unit 2: Probability Distributions

- Normal distribution properties
- Z-score standardization practice
- Binomial probability calculations
- Sampling distribution simulation
- Confidence interval estimation

- Practical/Case Demo Session: Simulating sampling distributions and calculating confidence intervals

Unit 3: Hypothesis Testing

- One-sample t-test application
- Independent t-test comparison
- Paired t-test before-after
- Chi-square test contingency tables
- P-value interpretation errors
- Practical/Tutorial Session: Running paired t-tests and chi-square contingency table analyses in statistical software

Unit 4: Correlation Regression

- Pearson Spearman correlation
- Simple linear regression model
- Coefficient interpretation prediction
- Scatterplot residual analysis
- Regression assumptions checking
- Practical/Interactive Session: Fitting simple linear regression models and checking residual assumptions

Unit 5: Presentation Reporting

- Table formatting APA style
- Graph design principles
- Statistical reporting conventions
- Abstract results section writing
- PowerPoint scientific presentation
- Practical/Capstone Presentation: Formatting APA-style result tables and delivering a statistical data presentation

Suggested Readings

- SPSS and Epi Info training tutorials.
- World Health Organization. *Biostatistics for Health Workers*.
- Practical statistics workbooks and online statistical calculator guides.
- National health statistics manuals.

Public Health Anthropology

Category: Skill Enhancement Course (SEC) | L-T-P: 1-0-0 | Credits: 1

Course Objectives

- Explain core anthropological concepts, medical anthropology sub-disciplines, and health belief systems.

- Analyze cultural influences on health behaviors, illness experiences, explanatory models, and transcultural health issues.
- Apply ethnographic methods, participant observation, in-depth interviewing, and ethical considerations in fieldwork.
- Address culture in public health program design through cultural humility, community diagnosis, and tailored interventions.
- Interpret health disparities through a critical cultural lens, examining the political economy of health, medicalization, and global health.

Course Outcomes: On completion, students will be able to:

- CO1: Explain anthropological concepts in health context.
- CO2: Analyze cultural influences on health behaviors.
- CO3: Apply ethnographic methods in public health.
- CO4: Address culture in health program design.
- CO5: Interpret health disparities through cultural lens.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Anthropological Foundations

- Culture concepts and health belief systems
- Medical anthropology sub-disciplines
- Ethnomedicine and pluralistic health systems
- Biocultural approach to health and disease
- Social suffering and structural violence
- Practical/Hands-on Session: Mapping pluralistic health systems and medical pluralism frameworks

Unit 2: Culture and Health Behaviors

- Illness experience and explanatory models
- Cultural constructions of body and disease
- Ritual, religion, and healing practices
- Gender, kinship, and health roles
- Migration and transcultural health issues
- Practical/Case Demo Session: Constructing patient illness narratives and explanatory models

Unit 3: Ethnographic Methods

- Participant observation techniques
- In-depth interviewing and life histories
- Rapid ethnographic assessment protocols

- Cultural domain analysis methods
- Ethical considerations in fieldwork
- Practical/Tutorial Session: Designing rapid ethnographic assessment tools and interview guides

Unit 4: Culture in Public Health Programs

- Cultural competence vs cultural humility
- Community diagnosis and participatory methods
- Tailoring interventions to cultural contexts
- Health communication across cultures
- Evaluating cultural appropriateness
- Practical/Interactive Session: Evaluating cultural appropriateness in public health campaign materials

Unit 5: Critical Health Anthropology

- Political economy of health and inequality
- Medicalization and pharmaceuticalization
- Global health and cultural imperialism
- Indigenous health systems preservation
- Anthropological critique of public health
- Practical/Capstone Presentation: Delivering a critical anthropological analysis of a global health intervention

Suggested Readings

- Singer, M., & Baer, H. *Introducing Medical Anthropology*. Routledge.
- Kleinman, A. *The Illness Narratives*. Basic Books.
- Farmer, P. *Pathologies of Power*. University of California Press.
- Nichter, M. *Global Health*. Duke University Press.
- World Health Organization. *Anthropology and Public Health*.

Case Studies Discussions

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Analyze real public health cases spanning epidemic investigations, program implementations, and systems crises.
- Apply theoretical knowledge practically to solve complex field challenges.
- Develop critical thinking skills through systematic evaluation of health determinants, policies, and ethics.
- Formulate evidence-based recommendations and actionable strategies for public health interventions.

- Improve group discussion and presentation skills through collaborative case analysis and stakeholder communication.

Course Outcomes: On completion, students will be able to:

- CO1: Analyze real public health cases.
- CO2: Apply theoretical knowledge practically.
- CO3: Develop critical thinking skills.
- CO4: Formulate evidence-based recommendations.
- CO5: Improve group discussion presentation skills.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Epidemic Investigations

- Cholera outbreak response analysis
- COVID-19 contact tracing evaluation
- Vaccine hesitancy case studies
- Foodborne illness source tracing
- Vector-borne outbreak control
- Practical/Hands-on Session: Simulated cholera outbreak investigation and contact tracing analysis

Unit 2: Program Implementation

- Immunization campaign challenges
- Maternal health program scale-up
- Nutrition intervention evaluation
- TB DOTS implementation barriers
- Sanitation behavior change cases
- Practical/Case Demo Session: Evaluating bottlenecks in national immunization and TB DOTS programs

Unit 3: Health Systems

- Hospital overload crisis management
- Rural health facility strengthening
- Public-private partnership models
- Health financing reform impacts
- Digital health implementation
- Practical/Tutorial Session: Managing hospital surge capacity and health financing reform case simulations

Unit 4: Social Determinants

- Urban slum health interventions
- Tribal health access barriers
- Migration health impacts
- Gender-based health disparities
- Climate change health effects
- Practical/Interactive Session: Addressing health access barriers in tribal and urban slum case scenarios

Unit 5: Policy Ethical Issues

- Resource allocation dilemmas
- Quarantine enforcement ethics
- Corruption procurement scandals
- Policy implementation failures
- Equity-focused decision making
- Practical/Capstone Presentation: Debating public health resource allocation dilemmas and policy ethics cases

Suggested Readings

- Centers for Disease Control and Prevention (CDC). *Case Studies in Applied Epidemiology*.
- World Health Organization. *Public Health Case Studies*.
- National health program reviews.
- Harvard Public Health Case Collection.
- Field epidemiology training cases.

SEMESTER II

Maternal & Child Health

Category: Major Core (MC) | L-T-P: 4-0-0 | Credits: 4

Course Objectives

- Describe key indicators, determinants, and intergenerational perspectives of maternal, neonatal, child, and adolescent health.
- Explain major causes of maternal and child morbidity, mortality, and near-miss events across care continuums.
- Summarize core components of MCH programs, safe motherhood strategies, and integrated management of childhood illnesses.
- Plan basic community-level MCH promotion activities, frontline worker linkages, and nutritional interventions.
- Apply rights-based, life-course, and digital health approaches to emerging and cross-cutting MCH issues.

Course Outcomes: On completion, students will be able to:

- CO1: Describe key indicators and determinants of maternal, neonatal, and child health.
- CO2: Explain major causes of maternal and child morbidity and mortality.
- CO3: Summarize core components of MCH programs and interventions.
- CO4: Plan basic community-level MCH promotion activities.
- CO5: Apply rights-based and life-course approaches to MCH issues.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Overview and Indicators

- Scope and importance of maternal, neonatal, child, and adolescent health
- Key indicators: MMR, IMR, NMR, U5MR, TFR, contraceptive prevalence
- Global and national goals/targets for MCH
- Determinants of MCH outcomes (biological, social, health system)
- Life-course and intergenerational perspectives on MCH

Practical/Hands-on Session: Analyzing national MCH indicator trends and demographic health survey data

Unit 2: Maternal Health

- Components of quality antenatal, intranatal, and postnatal care
- Major causes of maternal mortality and near-miss events
- Safe motherhood strategies, EmOC, and referral systems
- Maternal nutrition, anemia, and micronutrient supplementation
- Maternal mental health, gender-based violence, and rights issues

- Practical/Case Demo Session: Evaluating maternal audit reports and referral pathways for obstetric emergencies

Unit 3: Newborn and Child Health

- Major causes of neonatal and under-five mortality
- Essential newborn care and home-based care concepts
- Integrated Management of Childhood Illness (IMCI) principles
- Routine immunization schedule and newer vaccines (conceptual)
- Child nutrition: breastfeeding, complementary feeding, growth monitoring
- Practical/Tutorial Session: Simulating IMCI case management and growth monitoring curve interpretation

Unit 4: Programs, Policies, and Service Delivery

- Overview of national and global MCH initiatives
- Continuum of care: community–facility–referral linkages
- Role of ASHAs/CHWs, ANMs, nurses, and other frontline workers
- Quality of care and respectful maternity care concepts
- Monitoring, evaluation, and key indicators for MCH programs
- Practical/Interactive Session: Mapping community-facility referral networks and frontline worker responsibilities

Unit 5: Emerging and Cross-cutting Issues

- Adolescent sexual and reproductive health, including safe transitions
- MCH in emergencies, displacement, and disaster situations
- HIV, TB, and other comorbidities affecting MCH
- Digital health and mHealth tools for MCH services and monitoring
- Equity, ethics, and rights-based approaches to MCH programming
- Practical/Capstone Presentation: Pitching an mHealth intervention proposal for tracking high-risk pregnancies in resource-limited settings

Suggested Readings

- World Health Organization. Guidelines on Maternal, Newborn, Child, and Adolescent Health.
- Ministry of Health and Family Welfare, Government of India. national MCH guidelines and program manuals.

Biostatistics – II

Category: Major Core (MC) | L-T-P: 4-1-0 | Credits: 5

Course Objectives

- Apply advanced statistical tests, including one-way ANOVA and non-parametric alternatives, for comparing multiple group means.
- Build and interpret multiple linear regression and binary logistic regression models for multivariable health data analysis.
- Analyze categorical data using contingency table stratifications and specialized regression links.
- Describe survival analysis concepts, Kaplan-Meier curves, log-rank tests, and Cox proportional hazards models. Critically interpret advanced statistical methods, reporting standards, and study designs in biomedical literature.

Course Outcomes: On completion, students will be able to:

- CO1: Apply advanced statistical tests in health research.
- CO2: Build and interpret linear and logistic regression models.
- CO3: Analyze categorical data using appropriate methods.
- CO4: Describe survival analysis concepts and interpret basic outputs.
- CO5: Critically interpret statistical methods and results in literature.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Advanced Hypothesis Testing

- One-way ANOVA for comparing multiple group means
- Post-hoc tests and multiple comparison issues (conceptual)
- Non-parametric tests: Mann–Whitney, Wilcoxon, Kruskal–Wallis basics
- Assumption checking (normality, homogeneity of variances) at concept level
- Choosing appropriate tests based on data type and distribution
- Practical/Hands-on Session: Selecting and executing appropriate parametric and non-parametric tests for multi-group comparisons

Unit 2: Multiple Linear Regression

- Concept of multivariable modeling and adjustment for confounders
- Interpretation of coefficients, confidence intervals, and p-values
- Goodness-of-fit measures
- Collinearity, interaction terms, and model building strategies (overview)
- Presentation and interpretation of regression tables and graphs
- Practical/Case Demo Session: Evaluating confounding and building adjusted linear regression models

Unit 3: Logistic Regression and Categorical Data

- Binary logistic regression: odds, odds ratios, and logit function
- Model interpretation with categorical and continuous predictors
- Assessing model fit and predictive performance (conceptual)
- Intro to multinomial and ordinal logistic regression (non-technical)
- Use of contingency tables with stratification and simple modeling links
- Practical/Tutorial Session: Interpreting odds ratios and logit outputs from binary logistic regression runs

Unit 4: Survival Analysis

- Time-to-event data concepts and right censoring
- Kaplan–Meier survival curves: construction and interpretation
- Log-rank test for comparing survival distributions
- Intuitive understanding of Cox proportional hazards model
- Common applications in treatment outcomes and cohort studies

- Practical/Interactive Session: Plotting Kaplan-Meier survival curves and interpreting log-rank test results

Unit 5: Practical Interpretation and Reporting

- Reading and critiquing statistical methods in journal articles
- Basics of sample size calculations for common study designs
- Handling missing data at an introductory level (complete case, simple imputation)
- Reporting standards and checklists (CONSORT, STROBE – conceptual)
- Presenting statistical results clearly in tables, graphs, and text
- Practical/Capstone Presentation: Critiquing a published journal article's statistical methodology and presentation style

Suggested Readings

- Rosner, B. Fundamentals of Biostatistics. Cengage Learning.
- Pagano, M., & Gauvreau, K. Principles of Biostatistics. Cengage Learning.
- Altman, D. G. Practical Statistics for Medical Research. Chapman & Hall/CRC.

Biostatistics – II (Practical)

Category: Skill Enhancement Course (SEC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Use statistical software to import, clean, transform, and manage complex health datasets for reproducibility.
- Perform one-way ANOVA, group comparisons, and graphical data displays using software tools.
- Fit multivariable linear and binary logistic regression models and interpret output coefficients and odds ratios.
- Apply basic survival analysis techniques, Kaplan-Meier curves, and log-rank tests using analytical software.
- Prepare comprehensive statistical reports, mini-project documentation, and data visualizations.

Course Outcomes: On completion, students will be able to:

- CO1: Use statistical software for multivariable analyses.
- CO2: Perform ANOVA and regression analyses on health datasets.
- CO3: Conduct logistic regression and interpret model outputs.
- CO4: Apply basic survival analysis using software tools.
- CO5: Prepare clear statistical reports and visualizations.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Software Setup and Data Handling

- Importing data from common formats (spreadsheets, CSV)

- Data labeling, recoding, and creation of derived variables
- Handling missing data with simple approaches
- Data transformation and checking distributions
- Saving and organizing syntax/logs for reproducibility
- Practical/Hands-on Session: Data recoding, missing value management, and script organization practice

Unit 2: Group Comparisons and ANOVA

- One-way ANOVA in software, with simple interpretation
- Post-hoc comparisons between multiple groups (conceptual)
- Non-parametric alternatives where assumptions fail
- Graphical display of group differences (box plots, error bars)
- Writing concise interpretations for reports
- Practical/Case Demo Session: Generating box plots and running ANOVA analyses with software

Unit 3: Linear and Logistic Regression

- Running multiple linear regression models on sample health data
- Checking assumptions briefly (residual plots, multicollinearity flags)
- Fitting binary logistic regression: outcome coding and predictors
- Interpreting odds ratios, CIs, and p-values from outputs
- Creating publication-style regression tables

Unit 4: Survival Analysis with Software

- Setting up time and event variables for survival analysis
- Generating Kaplan–Meier curves for different groups
- Conducting log-rank tests and interpreting results
- Exporting survival plots and tables for reports
- Introductory look at Cox model output interpretation
- Practical/Interactive Session: Executing log-rank tests and exporting Kaplan-Meier survival graphics

Unit 5: Reporting, Review, and Mini-Project

- Developing a brief analysis plan for a mini-project
- Executing analyses and documenting all steps
- Preparing a short written report (methods, results, key tables/figures)
- Peer feedback and discussion on analysis choices
- Reflection on strengths, limitations, and next steps for learning
- Practical/Capstone Presentation: Presenting mini-project statistical findings and defending analytical choices

Suggested Readings

- Software user manuals and tutorials (SPSS, R, or Stata).
- Applied biostatistics computing workbooks.

Research Methodology in Public Health II

Category: Major Core (MC) | L-T-P: 4-1-0 | Credits: 5

Course Objectives

- Provide students with a comprehensive understanding of qualitative research principles, phenomenological approaches, and data collection methods.
- Develop skills in participatory research techniques (PRA methods) and qualitative thematic data analysis for community-based studies.
- Equip students with knowledge of evidence synthesis methods, scoping/systematic reviews, and PRISMA search guidelines.
- Enhance critical appraisal abilities, research proposal development, and Institutional Ethics Committee (IEC) compliance procedures.
- Build competencies in scientific writing (IMRAD format), referencing tools (Zotero/Mendeley), publication ethics, and research dissemination.

Course Outcomes: On completion, students will be able to:

- CO1: Apply qualitative research approaches and methods to design and conduct public health studies.
- CO2: Utilize participatory research tools and perform qualitative data analysis, including thematic analysis, in real-world settings.
- CO3: Conduct evidence synthesis by identifying appropriate review types and applying systematic search and screening strategies.
- CO4: Critically evaluate research studies and develop ethically sound research proposals suitable for submission to Institutional Ethics Committees.
- CO5: Produce scientifically sound manuscripts and effectively communicate research findings through publications, presentations, and policy-oriented outputs.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit 1: Qualitative Research Methods

- Introduction to Qualitative Research
- Qualitative research approaches: Phenomenology, Grounded Theory, Ethnography, Participatory action research, Case Study
- Qualitative data collection methods: In-Depth Interviews (IDI), Focus Group Discussions (FGD), Key Informant Interviews (KII)
- Practical/Hands-on Session: Designing qualitative interview guides and conducting mock IDIs and FGDs

Unit 2: Participatory Methods and Qualitative Data Analysis

Participatory Research Methods:

Space / Spatial PRA Methods: Social Map, Transect Walk, Resource Map, Mobility Map

Time / Temporal PRA Methods: Time Line, Trend Analysis, Seasonal Calendar / Seasonal Analysis

Relation PRA Methods: Cause & Effect Diagram, Venn Diagram

Sampling techniques in qualitative research

Qualitative data management and thematic analysis

Practical/Case Demo Session: Constructing social/resource maps and executing thematic coding exercises

Unit 3: Evidence Synthesis in Public Health

Types of reviews: narrative review, mini review, rapid review, scoping review, systematic review, and systematic review & meta-analysis (SR&MA)

Databases and systematic search strategies for public health research

Basics of systematic reviews and PRISMA guidelines

Unit 4: Research Quality Assessment, Proposal Development, and Ethics

- Critical appraisal of research studies
- Research Proposal Development
- Research Ethics and Regulatory Processes:
- Ethical principles in public health research
- Institutional Ethics Committee (IEC)
- Informed consent and Participant Information Sheet (PIS)
- Practical/Interactive Session: Drafting participant information sheets and conducting critical appraisal critiques

Unit 5: Scientific Writing and Research Dissemination

Scientific Writing in Public Health: Structure of a scientific paper (IMRAD format); writing abstract, results, discussion, and conclusion

Referencing and Publication Process: Reference styles (APA, Vancouver); reference management tools (Zotero/Mendeley); journal selection, peer-review process, and publication ethics

Suggested Readings

- Creswell, J. W., & Creswell, J. D. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. SAGE Publications.
- Kothari, C. R., & Garg, G. Research Methodology: Methods and Techniques. New Age International.
- Bowling, A. Research Methods in Public Health. Open University Press.

Research Methodology in Public Health II - Practical

Category: Major Core (MC) | L-T-P: 0-0-2 | Credits: 1

Course Objectives

- Identify relevant public health research problems and formulate research questions and objectives.
- Conduct focused literature searches and summarize evidence from published research articles.
- Select suitable research designs, sampling techniques, and basic sample size estimation approaches.
- Develop and pre-test data collection tools while applying ethical principles, informed consent, and confidentiality.

Course Outcomes: On completion, students will be able to:

- CO1: Demonstrate understanding of research principles, ethics, informed consent, confidentiality, and research integrity through practical exercises.

- CO2: Formulate research problems, objectives, questions, hypotheses, and select appropriate research designs, sampling methods, and basic sample size estimates.
- CO3: Develop data collection tools and apply basic quantitative and qualitative data collection, management, and analysis techniques.
- CO4: Prepare a simple public health research proposal, organize and present findings, and develop a scientific report.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Research Problem Identification and Literature Review

- Identification of public health research problems from community observations and published reports
- Formulation of a problem statement, research questions, and preliminary objectives
- Search for relevant literature using scholarly databases and academic search engines
- Preparation of a literature matrix summarizing objectives, methods, findings, and research gaps
- Practical/Hands-on Session (3 Hours): Research problem statement, objectives, literature search, and literature matrix

Unit II: Research Design, Sampling, and Sample Size

- Formulation of research objectives and hypotheses, where appropriate
- Selection of quantitative, qualitative, mixed-method, descriptive, and analytical research designs
- Demonstration of probability and non-probability sampling techniques
- Basic sample size estimation exercises and preparation of a sampling plan
- Practical/Case Demo Session (6 Hours): Research design worksheet, sampling exercises, and sample size estimation

Unit III: Data Collection Tools and Research Ethics

- Development of a structured questionnaire based on research objectives
- Question types, measurement scales, pre-testing, and revision of data collection tools
- Preparation of a Participant Information Sheet and informed consent form
- Confidentiality, secure data handling, research integrity, plagiarism, and the role of an Institutional Ethics Committee
- Practical/Tutorial Session (6 Hours): Questionnaire development and pre-testing; preparation of research ethics documentation

Unit IV: Data Management, Analysis, and Presentation

- Development of a data dictionary and coding scheme

- Data entry, identification of missing values, duplicate records, and inconsistencies, and data cleaning
- Calculation and interpretation of frequencies, percentages, mean, median, and range as appropriate
- Preparation of tables, charts, and graphs; introductory organization of qualitative interview responses
- Practical/Interactive Session (6 Hours): Spreadsheet-based data management, basic descriptive analysis, and visualization

Unit V: Mini Research Proposal and Project Presentation

- Preparation of a mini proposal including title, background, rationale, objectives, methods, sampling, data collection, and ethical considerations
- Scientific writing, citation, referencing, and plagiarism awareness
- Preparation of a concise research report, interpretation of findings, and discussion of limitations
- Oral presentation and peer review of the mini research project
- Practical/Capstone Session (9 Hours): Proposal development (3 hours), mini-project analysis and report writing (3 hours), and presentation and feedback (3 hours)

Suggested Readings

- Kothari, C. R., & Garg, G. Research Methodology: Methods and Techniques (4th edition). New Age International Publishers.
- Crosby, R. A., Salazar, L. F., & DiClemente, R. J. Research Methods in Public Health. Jones & Bartlett Learning.

Demography and Population Studies

Category: Major Core (MC) | L-T-P: 4-0-0 | Credits: 4

Course Objectives

- Define demographic scope, concepts, historical cycles, and population data sources (Census, SRS, NFHS, DLHS, NSS).
- Analyze population composition, structure, growth models, demographic transition stages, and the demographic dividend.
- Evaluate fertility measures, reproductive behavior patterns, proximate determinants, and changing fertility scenarios in India.
- Examine mortality indicators, life tables, health transitions, and the epidemiological impact of major epidemics.
- Assess migration dynamics, urbanization impacts, population aging, and the evolution of India's population policies and programs.

Course Outcomes: On completion, students will be able to:

- CO1: Define demographic scope, concepts, and utilize data sources for policy making.

- CO2: Analyze population composition, growth structures, and demographic transition dynamics.
- CO3: Calculate and evaluate fertility measures and proximate determinants.
- CO4: Interpret mortality measures, construct life tables, and analyze health transitions.
- CO5: Appraise migration patterns, population aging, and national population policy frameworks.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

UNIT I: Introduction to Demography and Data Sources

- Definition and scope of demography
- Demographic Cycle, Birth and Death Rates
- Basic demographic measures and concepts, Demographic Trends in India
- Family size, Literacy and Education, Life Expectancy
- Sources of data in demography: Census of India, Sample Registration System (SRS), National Family Health Survey (NFHS), District Level Health Surveys (DLHS), National Sample Survey (NSS), Other surveys
- Nature and use of demographic data for policy making: Delimitation of constituencies, Manpower planning
- Practical/Hands-on Session: Exploring NFHS and Census data repositories for policy indicators

UNIT II: Population Composition, Structure and Growth

- Composition and structure of population: Sex ratio, Age dependency ratio, Population pyramid
- Growth of population: Rate of population growth, Natural increase
- Population growth models: Linear growth, Geometric growth, Exponential growth
- Demographic Transition and Demographic Dividend
- Dwindling sex ratio in India: Implications for society, Gender Equity, Gender Equality, Demographic Profile of India
- Population Explosion, Population Stabilization, Calculations: Composition, structure and growth of population
- Practical/Case Demo Session: Constructing population pyramids and calculating exponential growth projections

UNIT III: Fertility and Reproductive Behaviour

- Fertility measures: Concepts, calculations and scenarios, Crude Birth Rate (CBR), General Fertility Rate (GFR), Age Specific Fertility Rate (ASFR), Total Fertility Rate (TFR), Gross Reproduction Rate (GRR), Net Reproductive Rate (NRR), Child–Women Ratio
- Fertility Trends, Proximate determinants of fertility: Percentage of women in union, Percentage of women breastfeeding, Contraceptive prevalence rate, Abortion rate
- Changing fertility scenario in India, Fertility and religion in India, Calculation of fertility rates

- Practical/Tutorial Session: Computing TFR, GFR, and analyzing proximate fertility determinants

UNIT IV: Mortality, Life Tables and Health Transition

- Mortality measures: Concepts, calculations and scenarios, Crude Death Rate (CDR), Age Specific Death Rate (ASDR), Cause Specific Death Rate
- Infant and child mortality measures, Maternal Mortality Rate / Ratio
- Changing mortality scenario in India, Impact of HIV/AIDS on demographic profile
- Life tables: Definition and uses, Construction of life tables
- Practical/Interactive Session: Calculating mortality rates and constructing abbreviated life tables

UNIT V: Migration, Population Projection, Ageing and Population Policy

- Migration and health: Definition of migration, Measurement of migration, Immigration rate, Emigration (out-migration) rate, Net Migration Rate
- Migration selectivity: Demographic, Educational, Economic; Causes of migration: Push and pull factors
- Migration and rapid urbanization: Impact on health and environment
- Population projection: Projection of population size, Different methods of projection
- Ageing of population: Is it an issue in India?
- India's population policy: Evolution of population policies in India, National Population Policy (NPP)
- Population policy links with: National Health Policy (NHP), National Rural Health Mission (NRHM), Population programme in India: History of different approaches, Linkages with politics
- Practical/Capstone Presentation: Evaluating migration impact case studies and analyzing national population policy frameworks

Suggested Readings

- Standard demographic textbooks and official reports (Census of India, SRS, NFHS).
- United Nations manuals on methods of estimating population.

Demography and Population Studies

Category: Ability Enhancement Courses (AEC) | L-T-P: 0-0-6 | Credits: 3

Course Objectives

- Identify relevant public health research problems and formulate research questions and objectives.
- Conduct focused literature searches and summarize evidence from published research articles.
- Select suitable research designs, sampling techniques, and basic sample size estimation approaches.
- Develop and pre-test data collection tools while applying ethical principles, informed consent, and confidentiality.
- Organize, code, clean, analyze, and present basic quantitative and qualitative research data.

- Prepare a mini public health research proposal and communicate findings through a concise report and presentation.

Course Outcomes: On completion, students will be able to:

- CO1: Demonstrate understanding of research principles, ethics, informed consent, confidentiality, and research integrity through practical exercises.
- CO2: Formulate research problems, objectives, questions, hypotheses, and select appropriate research designs, sampling methods, and basic sample size estimates.
- CO3: Develop data collection tools and apply basic quantitative and qualitative data collection, management, and analysis techniques.
- CO4: Prepare a simple public health research proposal, organize and present findings, and develop a scientific report.

Graduate Attributes Addressed

GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA5 (Effective Communication), GA7 (Ethical Reasoning & Professional Integrity), GA9 (Entrepreneurship & Innovation Mindset), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Research Problem Identification and Literature Review

- Identification of public health research problems from community observations and published reports
- Formulation of a problem statement, research questions, and preliminary objectives
- Search for relevant literature using scholarly databases and academic search engines
- Preparation of a literature matrix summarizing objectives, methods, findings, and research gaps
- Practical Session (3 hours): Research problem statement, objectives, literature search, and literature matrix

Unit II: Research Design, Sampling, and Sample Size

- Formulation of research objectives and hypotheses, where appropriate
- Selection of quantitative, qualitative, mixed-method, descriptive, and analytical research designs
- Demonstration of probability and non-probability sampling techniques
- Basic sample size estimation exercises and preparation of a sampling plan
- Practical Session (6 hours): Research design worksheet, sampling exercises, and sample size estimation

Unit III: Data Collection Tools and Research Ethics

- Development of a structured questionnaire based on research objectives
- Question types, measurement scales, pre-testing, and revision of data collection tools
- Preparation of a Participant Information Sheet and informed consent form

- Confidentiality, secure data handling, research integrity, plagiarism, and the role of an Institutional Ethics Committee
- Practical Session (6 hours): Questionnaire development and pre-testing; preparation of research ethics documentation

Unit IV: Data Management, Analysis, and Presentation

- Development of a data dictionary and coding scheme
- Data entry, identification of missing values, duplicate records, and inconsistencies, and data cleaning
- Calculation and interpretation of frequencies, percentages, mean, median, and range as appropriate
- Preparation of tables, charts, and graphs; introductory organization of qualitative interview responses
- Practical Session (6 hours): Spreadsheet-based data management, basic descriptive analysis, and visualization

Unit V: Mini Research Proposal and Project Presentation

- Preparation of a mini proposal including title, background, rationale, objectives, methods, sampling, data collection, and ethical considerations
- Scientific writing, citation, referencing, and plagiarism awareness
- Preparation of a concise research report, interpretation of findings, and discussion of limitations
- Oral presentation and peer review of the mini research project
- Practical/Capstone Session (9 hours): Proposal development (3 hours), mini-project analysis and report writing (3 hours), and presentation and feedback (3 hours)

Recommended Readings

- Kothari, C. R., & Garg, G. *Research Methodology: Methods and Techniques* (4th edition). New Age International Publishers.
- Crosby, R. A., Salazar, L. F., & DiClemente, R. J. *Research Methods in Public Health*. Jones & Bartlett Learning.
- Park, K. *Park's Textbook of Preventive and Social Medicine* (28th edition, 2025). Banarsidas Bhanot Publishers.

SEMESTER III

Epidemiological Methods and Study Designs

Category: Major Core (MC) | **L-T-P:** 2-2-0 | **Credits:** 4

Course Objectives

- Develop advanced competencies in evaluating and selecting appropriate epidemiological study designs for complex public health research.
- Analyze measures of disease occurrence and association while differentiating between statistical association and causal inference.
- Evaluate threats to study validity—including selection/information bias, confounding, and effect measure modification—and apply techniques for mitigation.
- Apply survival analysis, multivariate adjustment methods, and epidemiological perspectives to communicable and non-communicable disease prevention through field exposure.

Course Outcomes: On completion, students will be able to:

- **CO1:** Evaluate the strengths and limitations of various epidemiological study designs and select the most appropriate design for a research project.
- **CO2:** Evaluate and interpret measures of disease occurrence and association, and differentiate between association and causation.
- **CO3:** Identify and evaluate threats to validity of a research study (bias, confounding, and interaction/effect measure modification) and apply strategies to avoid, analyze, and report them.
- **CO4:** Apply epidemiological perspectives to communicable and noncommunicable diseases and synthesize field-level public health surveillance data.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA4 (Practical & Health Assessment Skills / Research Aptitude), GA8 (Social Responsibility & Global Citizenship), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Advanced Study Designs, Association, and Causal Inference

- Systematic review of observational and experimental epidemiological study designs and decision frameworks for design selection
- Evaluation, calculation, and interpretation of advanced measures of disease occurrence, risk, and rate ratio metrics
- Concepts of association vs. causation, causal models, and Hill's criteria for causal inference
- Study design protocols, sampling strategies, and data collection frameworks in population-based research

Unit II: Threats to Study Validity — Bias, Confounding, and Interaction

- Threats to Validity I: Selection bias, information bias, recall bias, misclassification, and methods to minimize observational errors
- Threats to Validity II: Identification, mechanisms, and control of confounding at the design and analysis stages
- Threats to Validity III: Interaction, effect measure modification, additive vs. multiplicative interaction models
- Reporting standards (STROBE/CONSORT guidelines) for presenting validity threats and analytical adjustments

Unit III: Analytical Methods, Stratification, and Survival Analysis

- Stratification, direct/indirect standardization, and adjustment techniques
- Introduction to multivariate analysis, logistic regression, and linear regression principles in epidemiology
- Fundamentals of survival analysis: time-to-event data, life tables, Kaplan-Meier curves, and introduction to Cox proportional hazards models
- Practical computer lab exercises in secondary data analysis and epidemiologic problem-solving

Unit IV: Applied Epidemiology of Disease and Field Practice

- Epidemiological perspectives, transmission dynamics, outbreak control, and surveillance of communicable diseases
- Epidemiological transition, risk factor profiling, and prevention strategies for non-communicable diseases (NCDs)
- Experiential field visit to local health centers, disease surveillance, or community field research sites
- Field observations, primary data gathering, experiential learning synthesis, and field study reporting

Suggested Readings

- Szklo, M., & Nieto, F.J. *Epidemiology Beyond the Basics*. 4th ed., Jones & Bartlett Learning.
- Celentano, D.D., Szklo, M., & Farag, Y. *Gordis Epidemiology*. 7th ed., Elsevier.
- Lash, T.L., VanderWeele, T.J., Haneuse, S., & Rothman, K.J. *Modern Epidemiology*. 4th ed., Wolters Kluwer.

Environmental and Occupational Health

Category: Major Core (MC) | **L-T-P:** 3-1-0 | **Credits:** 4

Course Objectives

- Explain the foundational concepts, principles, and determinants of environmental and occupational health.
- Analyze physical, chemical, biological, radiological, and workplace hazards, environmental pollution, and climate change impacts on human health.
- Apply environmental sanitation, waste management, vector control, and workplace safety practices for disease prevention.
- Evaluate occupational health surveillance systems, risk assessment methods, hazard control hierarchies, ergonomics, and workplace safety regulations.

Course Outcomes: On completion, students will be able to:

- **CO1:** Explain the concepts, principles, determinants, and significance of environmental and occupational health, including their role in protecting public health.
- **CO2:** Analyze environmental hazards, pollution, climate change, and workplace hazards to assess their impact on human health.
- **CO3:** Apply environmental health protection measures, occupational safety practices, and disease prevention strategies to promote healthy living and safe workplaces.
- **CO4:** Evaluate occupational health management systems, workplace risk assessment, hazard control measures, ergonomics, and health promotion strategies to improve occupational health and safety.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA7 (Ethical Reasoning & Professional Integrity), GA8 (Social Responsibility, Sustainability & Global Citizenship), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Foundations of Environmental Health and Environmental Hazards

- Definition, concepts, scope, importance, environment–human health relationship, and determinants of environmental health
- Physical, chemical, biological, radiological, and psychosocial environmental hazards
- Environmental pollution sources, routes of exposure, and adverse health effects
- Radiation hazards, climate change dynamics, and environmental health risk assessment

Unit II: Environmental Health Protection and Sanitation Management

- Environmental sanitation principles, safe drinking water supply, and water quality standards
- Solid waste management, electronic waste (e-waste), and hazardous waste handling
- Biomedical waste management guidelines and municipal sewage disposal systems
- Vector control strategies, pest management, and environmental protection measures

Unit III: Foundations of Occupational Health, Diseases, and Workplace Safety

- Concepts, principles, and scope of occupational health across formal and informal work settings
- Workplace hazards and the impact of occupation on worker health
- Overview of occupational diseases, work-related illnesses, and occupational toxicities
- Work-related injury prevention, essential workplace safety practices, and accident control

Unit IV: Occupational Health Management, Ergonomics, and Risk Assessment

- Occupational health surveillance and workplace health risk assessment methodologies
- Hierarchy of hazard control measures (engineering, administrative, and personal controls)
- Ergonomics, workplace design, and Personal Protective Equipment (PPE) standards
- Workplace health promotion, occupational safety legislation, and health management systems

Suggested Readings

- Levy, B.S., Wegman, D.H., Baron, S.L., & Sokas, R.K. *Occupational and Environmental Health: Recognizing and Preventing Disease and Injury*. Oxford University Press.
- Park, K. *Park's Textbook of Preventive and Social Medicine*. Banarsidas Bhanot.
- Friis, R.H. *Essentials of Environmental Health*. Jones & Bartlett Learning.

Communicable and Noncommunicable Diseases

Category: Major Core (MC) | **L-T-P:** 2-1-0 | **Credits:** 3

Course Objectives

- Explain the epidemiological transition, disease transmission dynamics, and epidemiology of communicable diseases.
- Describe the epidemiology, prevention, and control of major communicable diseases of public health importance.
- Explain the epidemiology, risk factors, prevention, and control of major noncommunicable diseases.
- Apply disease prevention principles and evaluate national and global policies, programmes, and strategies for disease control.
- Analyze public health case studies and apply evidence-based approaches to disease prevention and control in diverse population settings.

Course Outcomes: On completion, students will be able to:

- **CO1:** Explain the epidemiological transition, disease transmission dynamics, and the epidemiology of communicable diseases.
- **CO2:** Describe the epidemiology, prevention, and control of major communicable diseases of public health importance.
- **CO3:** Explain the epidemiology, risk factors, prevention, and control of major noncommunicable diseases.
- **CO4:** Apply principles of disease prevention and evaluate national and global policies, programmes, and strategies for communicable and noncommunicable disease control.
- **CO5:** Analyze public health case studies and apply evidence-based approaches to disease prevention and control in diverse population settings.

Graduate Attributes Addressed: GA1: Disciplinary & Interdisciplinary Knowledge, GA2: Critical Thinking & Problem Solving, GA3: Analytical Reasoning & Research Skills, GA5: Effective Communication, GA7: Reflective Thinking & Field Application, GA8: Social

Unit I: The Epidemiological Transition and Disease Burden

- Shifts in disease patterns: historical transition from infectious to chronic diseases
- The "Double Burden" of disease and epidemiological transition in India
- Demographic transition, urbanization, lifestyle changes, and health system impacts

Unit II: Dynamics of Disease Transmission

- Elements of the chain of infection: reservoir, mode of transmission, and susceptible host
- Epidemiological parameters: Basic Reproduction Number (R_0) and Effective Reproduction Number (R_t)
- Herd immunity thresholds, serial intervals, and transmission modeling fundamentals

Unit III: Introduction to Communicable Diseases

- General concepts, classification, and public health impact of infectious diseases
- Surveillance mechanisms, notification guidelines, and epidemic potential
- Global health security and international frameworks for infectious disease containment

Unit IV: Major Infectious Diseases (I)

- Epidemiology, clinical features, and transmission of Tuberculosis; National Tuberculosis Elimination Programme (NTEP)
- Malaria: vector dynamics, epidemiology, diagnostic methods, and National Vector Borne Disease Control Programme
- Leprosy: clinical classification, epidemiology, and elimination strategies under NLEP

Unit V: Major Infectious Diseases (II)

- HIV/AIDS: global and national burden, modes of transmission, screening, and NACO/NACP strategies
- Viral Hepatitis (A, B, C, D, E): transmission routes, prevention, and National Viral Hepatitis Control Program (NVHCP)
- Harm reduction strategies, stigma mitigation, and continuum of care models

Unit VI: Vaccine-Preventable Diseases and Digital Immunization

- Childhood and adult vaccine-preventable diseases (measles, polio, diphtheria, pertussis, tetanus, rubella)
- Universal Immunization Programme (UIP) and targeted intensification via Mission Indradhanush
- Digital health applications in supply chains and beneficiary tracking: eVIN and the U-WIN platform

Unit VII: One Health and Zoonoses

- Cross-species transmission and the animal-human-environment interface

- Epidemiology, surveillance, and outbreak containment for emerging zoonoses: Nipah virus, Rabies, and Avian Influenza
- Implementation framework of the National One Health Mission and multisectoral coordination

Unit VIII: Introduction to Noncommunicable Diseases

- Overview, definitions, and rising trends in noncommunicable disease (NCD) morbidity and mortality
- Modifiable behavioral risk factors (tobacco, alcohol, unhealthy diet, physical inactivity) and metabolic markers
- Primary, secondary, and tertiary levels of prevention applied to chronic conditions

Unit IX: Cardiovascular and Chronic Respiratory Diseases

- Epidemiology, pathology, and management of Hypertension and Coronary Heart Disease
- Cerebrovascular accidents (Stroke): risk factors, emergency response, and post-stroke rehabilitation
- Chronic Obstructive Pulmonary Disease (COPD) and Asthma: indoor/outdoor environmental exposure and clinical burden

Unit X: Diabetes Mellitus and Obesity

- Diabetes Mellitus (Type 1 and Type 2): diagnostic criteria, glycemic control, and systemic micro/macrovacular complications
- Epidemiology of overweight and obesity, body mass index (BMI) cut-offs for Asian populations, and metabolic syndrome
- Community-based screening, lifestyle interventions, and lifestyle medicine frameworks

Unit XI: Oncology (Cancer Epidemiology)

- Cancer epidemiology: global and Indian cancer incidence, prevalence, and mortality patterns
- Site-specific priority cancers: oral, breast, and cervical cancers
- Cancer screening methodologies, early detection protocols, and palliative care integration

Unit XII: Mental Health and Noncommunicable Diseases

- Public health burden of common and severe mental disorders; bidirectional link between chronic illness and mental health
- National Mental Health Programme (NMHP) and integration of mental healthcare into primary health centers and NCD clinics
- Digital mental health solutions: architecture and delivery of the Tele-MANAS initiative

Unit XIII: National and Global Disease Control Policies and Frameworks

- National Programme for Prevention & Control of Non-Communicable Diseases (NP-NCD)

- Ayushman Arogya Mandir (Health and Wellness Centres) and primary care service packages
- WHO global action plans, NCD Best Buys, and Sustainable Development Goal targets (SDG 3.3 and 3.4)

Unit XIV: Case Studies and Public Health Applications

- Applied case analyses of real-world outbreak responses, cluster investigations, and chronic care programs
- Evidence-based synthesis: designing targeted interventions for vulnerable and underserved populations
- Evaluating implementation challenges and health system bottlenecks in disease control

Unit XV: Practical Experiential Learning and Field Visits

- Field visits to public healthcare facilities, NCD screening clinics, or disease surveillance
- Observation of service delivery pathways, registries, cold chain infrastructure, and patient counseling
- Compilation and presentation of field assessment reports

Suggested Readings

- Park, K. *Park's Textbook of Preventive and Social Medicine*. 28th ed. Banarsidas Bhanot Publishers, 2025.
- Blaser, M. J., Cohen, J. I., & Holland, S. M. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 10th ed. Elsevier.
- Narain, J. P., & Kumar, R. *Textbook of Chronic Noncommunicable Diseases: The Health Challenge of 21st Century*. 1st ed. Jaypee Brothers Medical Publishers.

Behavioral Health Theories and Practices

Category: Major Core (MC) | **L-T-P:** 2-1-0 | **Credits:** 3

Course Objectives

- Introduce the fundamental concepts, history, scope, and biopsychosocial frameworks of behavioral health sciences in public health.
- Examine the biological, psychological, sociocultural, and structural determinants shaping human health behaviors and health equity.
- Apply individual, interpersonal, and ecological theories and models of behavior change to design effective public health interventions.
- Analyze methods of health communication, community engagement, needs assessment, and behavioral research for population-level health promotion.
- Evaluate ethical dilemmas, professional standards, emerging digital technologies, and contemporary innovations in behavioral health practice.

Course Outcomes:

- CO1: Explain the fundamental concepts, principles and scope of behavioral health sciences in public health.
- CO2: Describe the biological, psychological, social, cultural and environmental determinants influencing health behaviour.
- CO3: Apply behavioural science theories and models to understand health behaviours and design behaviour change interventions.
- CO4: Interpret the role of health communication, community engagement and behavioural research in promoting population health.
- CO5: Evaluate ethical issues, emerging technologies and contemporary approaches in behavioural health practice.

Graduate Attributes Addressed: GA1: Disciplinary & Interdisciplinary Knowledge, GA2: Critical Thinking & Problem Solving, GA3: Analytical Reasoning & Research Skills, GA5: Effective Communication & Health Promotion, GA6: Professional Ethics, Equity & Cultural Sensitivity, GA8: Social Responsibility, Community Engagement & Global Citizenship, GA10: Lifelong Learning & Self-Directed Growth

Unit I: Introduction to Behavioral Health Sciences

- Definition, scope, and importance of behavioral health sciences
- Public health and behavioral health: concepts and relationship
- Evolution and interdisciplinary nature of behavioral health sciences
- Biopsychosocial model of health
- Role of behavioral health sciences in disease prevention, health promotion, and population health

Unit II: Foundations of Behavioral Sciences

- Behaviourism: Classical and Operant Conditioning
- Social Learning Theory
- Cognitive theories of behaviour
- Developmental perspectives (Piaget, Vygotsky, and Erikson)
- Humanistic perspectives (Maslow and Rogers)

Unit III: Determinants of Health Behaviour

- Biological and psychological determinants
- Social and cultural determinants
- Family, peer, and community influences
- Environmental, commercial, and political determinants
- Health equity and social determinants of health

Unit IV: Health Behaviour Theories and Models

- Health Belief Model (HBM)
- Theory of Reasoned Action (TRA)
- Theory of Planned Behaviour (TPB)
- Social Cognitive Theory (SCT)

- Transtheoretical Model (TTM)

Unit V: Ecological and Community-Based Models

- Social Ecological Model
- Diffusion of Innovations Theory
- Community Organization Model
- PRECEDE-PROCEED Model
- Behaviour Change Wheel (COM-B framework)

Unit VI: Behaviour Change and Health Promotion

- Principles of behaviour change
- Health communication
- Information, Education, and Communication (IEC)
- Behaviour Change Communication (BCC) and Social and Behaviour Change Communication (SBCC)
- Social marketing and behavioural economics

Unit VII: Behavioural Assessment and Research

- Behavioural assessment and needs assessment
- Knowledge, Attitude, and Practice (KAP) studies
- Behavioural surveillance and health indicators
- Qualitative and quantitative methods in behavioural research
- Monitoring and evaluation of behaviour change interventions

Unit VIII: Community Engagement and Behavioural Interventions

- Community participation and empowerment
- Community mobilization
- Stakeholder engagement and multisectoral collaboration
- Behavioural counselling and supportive interventions
- Designing community-based behaviour change programmes

Unit IX: Ethics and Professional Issues in Behavioral Health

- Ethical principles in behavioural health practice and research
- Confidentiality and informed consent
- Cultural competence and working with diverse populations
- Professional responsibilities in behavioural health practice
- Legal and ethical issues in public health interventions

Unit X: Emerging Trends in Behavioral Health Sciences

- Digital health and mobile health interventions
- Telehealth and tele-counselling
- Artificial intelligence in behavioural health
- Wellness, resilience, and positive mental health
- Future directions in behavioural health sciences

Suggested Readings

- Glanz, K., Rimer, B. K., & Viswanath, K. *Health Behavior: Theory, Research, and Practice*. Jossey-Bass/Wiley.
- Coreil, J. *Social and Behavioral Foundations of Public Health*. SAGE Publications.
- Larsen, K. *Health Promotion in Health Care – Vital Theories and Research*. Routledge.

Healthcare Delivery Systems

Category: Major Core (MC) | **L-T-P:** 2-2-0 | **Credits:** 4

Course Objectives

- Introduce the fundamental concepts, evolution, and major health committees that have shaped healthcare delivery globally and in India.
- Explain the tiered structure of healthcare delivery (Primary, Secondary, Tertiary) and the organizational framework of Indian healthcare facilities.
- Analyze the roles of the healthcare workforce, health system governance structures, and major initiatives like the National Health Mission.
- Evaluate the quality of healthcare services and apply theoretical knowledge through case studies and field-based observations.

Course Outcomes: On completion, students will be able to:

- CO1: Explain the structure, organization, and components of healthcare delivery systems in India and globally.
- CO2: Describe the different levels of healthcare delivery and the organization of healthcare services in India.
- CO3: Explain the roles of the healthcare workforce, health system governance, and the National Health Mission in healthcare delivery.
- CO4: Apply knowledge of healthcare delivery systems to analyze healthcare services through case studies and field-based observations of healthcare facilities.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA8 (Social Responsibility, Sustainability & Global Citizenship), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Introduction and Evolution of Healthcare Systems

- Concept, objectives, and principles of healthcare delivery
- Evolution of Global and Indian healthcare systems; public and private healthcare sectors
- Major Indian Health Committees: Bhore Committee (1946), Mudaliar Committee (1962), Chadha Committee (1963), Mukherjee Committee (1965), Jungalwalla Committee (1967), Kartar Singh Committee (1973), Shrivastav Committee (1975), and Bajaj Committee (1986)

Unit II: Levels and Organization of Healthcare Delivery

- Levels of Healthcare Delivery: Primary, Secondary, and Tertiary healthcare; Referral system principles
- Organization of frontline Healthcare Services in India: Sub-Centre, Health & Wellness Centre (HWC), and Primary Health Centre (PHC)
- Organization of referral facilities: Community Health Centre (CHC), District Hospital, and Medical College Hospital

Unit III: Health Workforce, Governance, and National Health Mission

- Healthcare Workforce: Healthcare professionals and frontline workers (ASHAs, ANMs, AWWs), and their respective roles and responsibilities
- Health System Governance: Ministry of Health and Family Welfare, State Health Departments, and Local Health Authorities
- National Health Mission: Strategic frameworks of the National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM)

Unit IV: Quality of Care and Field Applications

- Quality of Healthcare Services: Accessibility, availability, equity, quality, patient safety, and healthcare facility accreditation
- Case Studies and Public Health Applications: Analyzing healthcare services and delivery challenges
- Field Visit to Healthcare Facilities: Observational visits to local health infrastructure (Sub-Centre, Health & Wellness Centre, and Primary Health Centre)

Suggested Readings

- Park, K. *Park's Textbook of Preventive and Social Medicine*. 28th ed., Banarsidas Bhanot Publishers.
- World Health Organization. *Health Systems: Improving Performance*. WHO Publications.
- Turnock, B.J. *Essentials of Public Health*. 4th ed., Jones & Bartlett Learning.

Data Analytics using MS-Excel and R Programming

Category: Skill Enhancement Course (SEC) | **L-T-P:** 0-0-2 | **Credits:** 1

Course Objectives

- Perform data validation, lookup operations, and logical formula structures using MS-Excel.
- Create data summaries, Pivot Tables, and visual charts in MS-Excel for exploratory health and business data analysis.
- Import, clean, transform, and manipulate structured datasets in R using core functions, dplyr, and ggplot2.
- Apply inferential statistical tests, predictive regression models, and end-to-end automated analytics using MS-Excel and R.

Course Outcomes: On completion, students will be able to:

- **CO1:** Perform data entry, data validation, lookup operations, and logical formula structures using MS-Excel.
- **CO2:** Create data summaries, Pivot Tables, and visual charts in MS-Excel for exploratory health and business data analysis.
- **CO3:** Import, clean, transform, and manipulate structured datasets in R using core functions and dplyr.
- **CO4:** Construct advanced visual analytics and publication-ready graphs using R's ggplot2 and base graphics packages.
- **CO5:** Apply inferential statistical tests, regression models, and automated analytics using MS-Excel and R to derive insights from real-world datasets.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA4 (Practical & Health Assessment Skills / Research Aptitude), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: MS-Excel Fundamentals, Data Validation, and Lookup Operations

- Arithmetic operations, formatting, cell references, filtering, grouping, and data validation rules in MS-Excel
- Practical/Tutorial Session: Implementing formulas, logical operators (IF, AND, OR), nested structures, and conditional formatting
- Data searching routines, VLOOKUP/XLOOKUP functionalities, and index-match principles
- Practical/Tutorial Session: Connecting external data sources, querying raw health datasets, and setting up automated lookup tables

Unit II: Data Aggregation, Visual Analytics, and Macros in MS-Excel

- Data aggregation principles, Pivot Table architecture, calculated fields, and multi-dimensional summaries
- Practical/Tutorial Session: Building interactive Pivot Charts, slicers, and visual dashboards for exploratory data analysis
- Data analysis tools, descriptive statistics utilities, and Analysis ToolPak applications
- Practical/Tutorial Session: Introduction to spreadsheet automation, macro recording, and macro-enabled analytical workflows

Unit III: R Environment, Data Manipulation, and Visualizations with ggplot2

- Overview of RStudio environment, R syntax, data types (numeric, character, factor), data structures (vectors, matrices, data frames), and package management
- Practical/Tutorial Session: Importing/exporting datasets across formats (CSV, Excel), missing value handling, and data cleaning routines
- Data frame manipulation, subsetting, filtering, mutating, and transformation using the dplyr package
- Practical/Tutorial Session: Generating descriptive statistics, graphical exploratory analysis, and publication-ready visual analytics using Base R and ggplot2

Unit IV: Inferential Statistics, Predictive Modeling, and Integrated Analytics

- Inferential statistics in R: Hypothesis testing principles, two-sample t-tests, and Analysis of Variance (ANOVA)

- Practical/Tutorial Session: Executing parametric statistical tests, interpreting model outputs, and evaluating statistical significance
- Predictive modeling in R: Correlation analysis, Simple/Multiple Linear Regression, and Binary Logistic Regression
- Integrated Project Practical: End-to-end dataset analysis, predictive modeling, automated reporting, and visual project presentations using MS-Excel and R

Suggested Readings

- Harvey, G. *Excel 2016 All-in-One For Dummies*. John Wiley & Sons.
- Walkenbach, J. *Microsoft Excel 2016 Bible: The Comprehensive Tutorial Resource*. Wiley Publishers.
- Wickham, H., Çetinkaya-Rundel, M., & Golemund, G. *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. 2nd ed., O'Reilly Media.

Health Economics and Financing

Category: Major Core (MC) | **L-T-P:** 2-0-0 | **Credits:** 2

Course Objectives

- Introduce foundational economic concepts, micro- and macroeconomic principles, and the scope and importance of health economics in public health.
- Analyze healthcare cost components, catastrophic health expenditures, and the overall economic burden of disease on households and health systems.
- Apply standard economic evaluation techniques, including cost-effectiveness, cost-benefit, and cost-utility analyses, to support evidence-based healthcare resource allocation.
- Examine diverse health financing models, financial risk protection mechanisms, health insurance schemes (such as Ayushman Bharat–PM-JAY), and Public–Private Partnerships (PPPs).
- Evaluate National Health Accounts, domestic and global health financing policies, and real-world case studies to assess progress toward Universal Health Coverage (UHC).

Course Outcomes: On completion, students will be able to:

- **CO1:** Explain the basic concepts, principles, and terminology of health economics, including the economic burden of disease
- **CO2:** Describe healthcare financing mechanisms and apply economic evaluation methods in healthcare.
- **CO3:** Explain health insurance systems, public–private partnerships, and national and global health financing initiatives.
- **CO4:** Apply principles of health economics and financing to analyze public health programmes and real-world case studies.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA4 (Practical & Health Assessment Skills / Research Aptitude), GA8 (Social Responsibility & Global Citizenship), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Introduction to Health Economics

- Basic economic concepts, terminology, and market principles in healthcare

- Microeconomics and macroeconomics foundations relevant to health systems
- Definition, scope, multidisciplinary nature, and importance of health economics

Unit II: Healthcare Costs and Economic Burden of Disease

- Classification of healthcare costs: direct medical, direct non-medical, indirect, and intangible costs
- Out-of-pocket expenditure (OOPE) dynamics and distress healthcare financing
- Catastrophic health expenditure, medical impoverishment, and measuring the economic burden of disease

Unit III: Economic Evaluation in Healthcare

- Principles and taxonomy of health economic evaluation methodologies
- Cost analysis and Cost-Minimization Analysis (CMA)
- Cost-Effectiveness Analysis (CEA) and Incremental Cost-Effectiveness Ratios (ICER)
- Cost-Benefit Analysis (CBA) and monetary valuation of health outcomes
- Cost-Utility Analysis (CUA): Quality-Adjusted Life Years (QALYs) and Disability-Adjusted Life Years (DALYs)

Unit IV: Introduction to Health Financing

- Core concepts, goals, and functions of health financing systems (revenue collection, pooling, purchasing)
- Sources of health financing: tax-based financing, social insurance, private health insurance, and external/donor funding
- Strategic purchasing versus passive purchasing of healthcare services

Unit V: Health Insurance and Financial Risk Protection

- Risk pooling principles, adverse selection, moral hazard, and financial risk protection
- Roadmap toward Universal Health Coverage (UHC) and equity in service coverage
- Flagship health protection schemes: Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) design, implementation, and impact

Unit VI: Health Systems Financing and Resource Allocation

- Trends and patterns in public and total health expenditures
- Framework and methodology of National Health Accounts (NHA) and System of Health Accounts (SHA)
- Priority setting, cost-containment strategies, and budget allocation in healthcare systems

Unit VII: Public–Private Partnership (PPP) in Healthcare

- Conceptual rationale, frameworks, and operational models of PPP in the health sector
- Potential advantages, performance incentives, and systemic challenges of PPP contracts
- Role of private sector engagement in primary healthcare and specialized hospital services delivery

Unit VIII: National and Global Health Financing Initiatives

- Indian health financing landscape: National Health Policy mandates and fiscal devolution
- The World Health Organization (WHO) health systems financing framework
- Health financing pathways to achieve Sustainable Development Goal 3 (SDG 3.8 targets)

Unit IX: Case Studies and Applications in Health Economics and Financing

- Applied case analyses of national health financing reforms and universal coverage models
- Critical appraisal of published economic evaluations and health technology assessment (HTA) reports
- Economic analysis of specific public health disease control programs and real-world policy scenarios

Suggested Readings

- Park, K. *Park's Textbook of Preventive and Social Medicine*. 28th ed. Banarsidas Bhanot Publishers, 2025.
- Bhattacharya, J., Hyde, T., & Tu, P. *Health Economics*. 3rd ed. Red Globe Press (Macmillan), 2022.
- Drummond, M. F., Sculpher, M. J., Claxton, K., Stoddart, G. L., & Torrance, G. W. *Methods for the Economic Evaluation of Health Care Programmes*. 4th ed. Oxford University Press, 2015.

AI in Healthcare: Foundation

Category: Foundation | **Mode:** Lecture and hands-on demos (12 h) plus activities and assessment (4 h) | **Credits:** 1

Course Objectives

- Introduce core AI concepts and explain how they are applied across the healthcare system.
- Identify major healthcare use cases of AI and critically evaluate AI tools using basic performance measures.
- Apply ethical, legal, and regulatory principles to AI use in healthcare.
- Facilitate the responsible use of no-code AI tools to propose realistic healthcare solutions.

Course Outcomes: On completion, students will be able to:

- CO1: Explain core AI concepts (machine learning, deep learning, NLP, generative AI) and how they are applied across the healthcare system, in plain language.
- CO2: Identify and describe major healthcare use cases of AI, such as diagnostics and imaging, clinical decision support, drug discovery, public health surveillance, and hospital operations.
- CO3: Critically evaluate an AI tool's claims by interpreting basic performance measures (accuracy, sensitivity, specificity, false positives/negatives) and recognising bias, data-quality problems and limitations.

- CO4: Apply ethical, legal and regulatory principles (privacy, consent, fairness, accountability, transparency) to AI use in healthcare.
- CO5: Use no-code AI tools responsibly and propose a realistic AI solution for a healthcare problem in their own discipline.

Graduate Attributes Addressed: Disciplinary and interdisciplinary knowledge, Critical thinking and problem solving, Digital and technological literacy, Ethics, professionalism and social responsibility, Communication and teamwork, Innovation and entrepreneurship, Lifelong learning

Unit I: Introduction to AI and Health Data

- What AI is and isn't; AI vs ML vs deep learning; how machines "learn" from data (no maths).
- Types of health data (EHR, imaging, genomics, wearables); data quality and "garbage in, garbage out".
- Activity: train a simple image classifier using Teachable Machine.

Unit II: AI Applications in Healthcare

- Medical imaging (radiology, pathology, ophthalmology); clinical decision support and risk prediction.
- NLP for clinical notes; generative AI and chatbots; drug discovery; public health and epidemic surveillance; hospital operations and telemedicine.
- Activity: case demos and group discussion.

Unit III: Evaluating AI: Does It Actually Work?

- Reading performance metrics in plain terms; sensitivity vs specificity with clinical examples; overfitting.
- Validation and clinical trials of AI; bias and generalisability across populations; explainability.
- Activity: critique a published AI tool's claim.

Unit IV: Ethics, Law and Governance

- Patient privacy and consent (HIPAA/GDPR/India's DPDP Act at awareness level).
- Algorithmic bias and health equity; accountability when AI errs; regulation of AI as a medical device; human-in-the-loop principles.
- Activity: ethical dilemma role-play.

Unit V: Using AI Responsibly and Capstone

- Prompting generative AI for clinical and academic work; hallucinations and verification; future trends.
- Final group presentation proposing an AI solution to a healthcare problem.

Prerequisites

- None. No coding or mathematics beyond basic statistics is needed.
- Hands-on work uses no-code tools (e.g., ChatGPT/Claude, Teachable Machine, Orange Data Mining, Google Colab notebooks run as pre-built demos, public AI-demo sites for imaging and symptom checkers).

Teaching Methods

- Interactive lectures, live demonstrations, case-based learning, group discussions, role-play and short guided no-code exercises.

Recommended Readings

Key Textbooks & Reference Books

1. **Topol, E.** (2019). *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. Basic Books.
2. **Bohr, A., & Memarzadeh, K.** (Eds.). (2020). *Artificial Intelligence in Healthcare*. Academic Press.
3. **Agrawal, A., Gans, J., & Goldfarb, A.** (2018). *Prediction Machines: The Simple Economics of Artificial Intelligence*. Harvard Business Review Press.

Regulatory Reports & Ethical Guidelines

1. **World Health Organization.** (2021). *Ethics and governance of artificial intelligence for health: WHO guidance*. Geneva: World Health Organization.
2. **Ministry of Law and Justice, Government of India.** (2023). *The Digital Personal Data Protection Act, 2023 (DPDP Act)*. Gazette of India.
3. **U.S. Food and Drug Administration (FDA).** (2021). *Artificial Intelligence/Machine Learning (AI/ML)-Based Software as a Medical Device (SaMD) Action Plan*.

Online Interactive & No-Code Resources

1. **Google Teachable Machine:**
<https://teachablemachine.withgoogle.com/>
2. **Orange Data Mining (Visual Programming & Interactive Workflows):**
<https://orangedatamining.com/>
3. **WHO / ITU Focus Group on Artificial Intelligence for Health (FG-AI4H) Resources:** <https://www.who.int/initiatives/cih>

SEMESTER IV

Healthcare Informatics

Category: Skill Enhancement Course (SEC) | **L-T-P:** 2-1-0 | **Credits:** 3

Course Objectives

- Explain concepts, structural components, data standards, and applications of biomedical and public health informatics.
- Apply health information systems, electronic health records (EHR), interoperability protocols, and digital health technologies to healthcare delivery.
- Analyze health data, clinical decision support systems, artificial intelligence models, and public health surveillance platforms.
- Evaluate ethical, legal, cybersecurity, data privacy, and governance frameworks governing health informatics implementations.

Course Outcomes: On completion, students will be able to:

- **CO1:** Explain the concepts, components, standards and applications of healthcare informatics within healthcare and public health systems.
- **CO2:** Apply health information systems, electronic health records, interoperability standards and digital health technologies for healthcare delivery and public health decision-making.
- **CO3:** Analyze health data using informatics principles to support surveillance, quality improvement, healthcare management and evidence-based practice.
- **CO4:** Evaluate ethical, legal, privacy, security and governance issues related to health information systems and digital health.
- **CO5:** Design informatics-enabled solutions to improve healthcare quality, patient safety and population health.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA3 (Digital & Technological Literacy), GA4 (Practical & Health Assessment Skills / Research Aptitude), GA7 (Ethical Reasoning & Professional Integrity), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Foundations of Healthcare Informatics, Information Systems, and EHR Standards

- Definition, scope, evolution, and role of biomedical, clinical, and public health informatics in digital healthcare transformation
- Healthcare Data Ecosystem: Components of Health Information Systems (HIS), Hospital Information Systems, Laboratory (LIS), Radiology (RIS), and Pharmacy (PIS) workflows
- Electronic Health Record (EHR), Electronic Medical Record (EMR), and Personal Health Record (PHR) architectures

- Healthcare data interoperability standards: HL7, FHIR, SNOMED CT, ICD, and LOINC terminologies

Unit II: Digital Health Technologies, Health Data Analytics, and Clinical Decision Support

- Digital Health Technologies: Telemedicine, telehealth, mHealth apps, wearable technology, Internet of Medical Things (IoMT), remote patient monitoring, digital therapeutics, and patient portals
- Health Data Analytics: Health databases, data quality assurance, data cleaning, descriptive/predictive analytics, executive dashboards, and visualization tools
- Population health analytics and metrics for tracking healthcare quality indicators
- Clinical Decision Support Systems (CDSS): Decision concepts, AI-assisted clinical tools, Computerized Physician Order Entry (CPOE), alerts, and medication safety integration

Unit III: Public Health Informatics, Artificial Intelligence, and Emerging Technologies

- Public Health Informatics: Disease surveillance systems, immunization registries, outbreak management, GIS mapping, health registries, One Health informatics, and digital epidemiology
- Applications of Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) in clinical and public health informatics
- Big Data architectures, cloud computing, blockchain for health data exchange, and generative AI applications
- Precision medicine informatics and emerging technological trends in healthcare systems

Unit IV: Privacy, Security, Digital Health Governance, and Implementation Evaluation

- Health Information Security and Ethics: Confidentiality, cybersecurity threats, informed consent, ethical AI principles, and WHO ethical guidelines
- Data Privacy Legislation: Regulatory compliance under the Indian Digital Personal Data Protection (DPDP) Act and international health data protection norms
- Digital Health Policies: Strategic execution of Ayushman Bharat Digital Mission (ABDM), National Digital Health Mission, and WHO Global Digital Health Strategy
- Implementation, Evaluation, and Future Directions: Change management, usability, system performance indicators, precision public health, digital twins, smart hospitals, and learning health systems

Suggested Readings

- Shortliffe, E.H., & Cimino, J. *Biomedical Informatics*. Springer.
- Magnuson, J.A., & Fu, P. *Public Health Informatics and Information Systems*. Springer.

Public Health Governance, Law and Bioethics

Category: Value Added Courses(VAC) | **L-T-P:** 2-1-0 | **Credits:** 3

Course Objectives

- Explain concepts of public health law, constitutional guarantees, governance structures, and international right-to-health covenants.
- Analyze statutory frameworks regulating food safety, pharmaceuticals, intellectual property rights, and access to essential medicines.
- Examine medical jurisprudence, patient rights, informed consent, medical negligence, and health regulations for vulnerable groups.
- Evaluate core bioethical principles, clinical trial regulations, and ethical issues in end-of-life care, organ donation, and health research.

Course Outcomes: On completion, students will be able to:

- **CO1:** Explain the legal frameworks, constitutional guarantees, and international covenants governing public health in India and globally.
- **CO2:** Analyze the interrelationship between law, public health policy, socio-environmental determinants, and governance structures.
- **CO3:** Evaluate ethical principles, regulatory frameworks, and bioethical concerns in medical practice, clinical research, and public health delivery.
- **CO4:** Apply health legislation and statutory safeguards to address epidemic control, food safety, reproductive rights, vulnerable populations, and legal epidemiology.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA7 (Ethical Reasoning & Professional Integrity), GA8 (Social Responsibility & Global Citizenship), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Foundations of Health Law, Human Rights, and Public Health Governance

- Concepts and principles of public health law, constitutional mandates, and legal epidemiology
- International right-to-health covenants and declarations: UDHR, ICESCR, WHO frameworks, and the Declaration of Helsinki
- Public health governance structures: Roles, functions, and oversight of the Ministry of Health and Family Welfare (MoHFW) and Directorate General of Health Services (DGHS)
- National and state public health policies, programs, and social health protection/insurance schemes (NHM, NUHM, JSY, RSBY)
- Statutory safeguards and criminal health offenses related to public safety and epidemic control under the IPC and CrPC

Unit II: Regulation of Food Safety, Pharmaceuticals, and Intellectual Property

- Right to food, food security principles, and statutory regulation under the Food Safety and Standards Act (FSSA), 2006
- Pharmaceutical and medical technology regulation: Drugs & Cosmetics Act, Medical Devices Rules, and ICMR research guidelines
- Intellectual Property Rights (IPR) in healthcare: TRIPS agreement, patent regimes, and compulsory licensing mechanisms

- Trade policies, drug pricing control, and strategies for ensuring global and national access to essential medicines

Unit III: Medical Jurisprudence, Patient Rights, and Healthcare Legislation

- Legal foundations of the doctor-patient relationship, informed consent, patient autonomy, and medical confidentiality
- Medical negligence, standard of care, professional misconduct, and applications of the Consumer Protection Act in healthcare
- Governance of medical education and clinical practice under the National Medical Commission (NMC) Act, 2019, and anti-quackery enforcement
- Disability rights in healthcare, reproductive rights, and legal protections for vulnerable and marginalized populations

Unit IV: Bioethics, Clinical Research, and Public Health Practice Ethics

- Core bioethical standards and foundational guidelines: Belmont Report and ICMR Ethical Guidelines for Biomedical Research
- Research ethics: Clinical trial regulations, human participant protections, informed consent processes, and Institutional Ethics Committee (IEC) review
- Legal and bioethical perspectives on euthanasia, end-of-life care, advance directives, and living wills
- Regulatory and bioethical frameworks governing organ transplantation, stem cell research, and legal protections under HIV/AIDS prevention and control legislation

Suggested Readings

- Park, K. *Park's Textbook of Preventive and Social Medicine*. Banarsidas Bhanot Publishers.
- Moitra, S., Chatterjee, C., & Debnath, D. *A Compendium on Health Laws*. New Era Law Publication.
- Herring, J. *Medical Law and Ethics*. Oxford University Press.

Health Programs in India

Category: Major Core (MC) | **L-T-P:** 3-0-0 | **Credits:** 3

Course Objectives

- Explain the concepts, evolution, committee recommendations, and policy foundations of health planning and programs in India.
- Describe the organizational structure, components, and target strategies of major National Health Missions, RMNCH+A, and nutrition initiatives.
- Analyze public health strategies, clinical spectrums, and elimination goals of national communicable and non-communicable disease control programs.
- Evaluate national health protection initiatives, program monitoring/evaluation metrics, and field-level public health applications.

Course Outcomes: On completion, students will be able to:

- **CO1:** Explain the evolution, organization, and objectives of health programmes in India.
- **CO2:** Describe the structure, components, implementation, and scope of major national health programmes.
- **CO3:** Explain the role of national health missions, health policies, and programme monitoring in improving population health.
- **CO4:** Apply knowledge of national health programmes to analyze public health services through case studies and field-based observations.

Graduate Attributes Addressed: GA1 (Disciplinary & Interdisciplinary Knowledge), GA2 (Critical Thinking & Problem Solving), GA4 (Practical & Health Assessment Skills / Research Aptitude), GA8 (Social Responsibility & Global Citizenship), GA10 (Lifelong Learning & Self-Directed Growth)

Unit I: Foundations of Health Planning, Health Policies, and National Health Mission

- Introduction to health programs in India: Concepts, key objectives, and historical evolution
- Health planning committees in India: Bhore, Mudaliar, Kartar Singh, Srivastava, and Bajaj Committee recommendations
- Policy frameworks: National Health Policy, NITI Aayog strategic initiatives, and alignment with Sustainable Development Goals (SDGs)
- National Health Mission (NHM): Architecture, strategic objectives, and key components of National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM)
- Health infrastructure transformation: Health & Wellness Centres (HWCs) and Ayushman Arogya Mandir

Unit II: Maternal, Child, Adolescent Health, Nutrition, and Communicable Disease Control Programmes

- Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A) strategic framework
- National immunization and nutrition initiatives: Universal Immunization Programme (UIP), POSHAN Abhiyaan, and Anaemia Mukta Bharat
- Priority infectious disease elimination programs: National Tuberculosis Elimination Programme (NTEP) and National AIDS Control Programme (NACP)
- Vector-borne, chronic, and viral disease programs: National Vector Borne Disease Control Programme (NVBDCP), National Leprosy Eradication Programme (NLEP), and National Viral Hepatitis Control Programme (NVHCP)

Unit III: Non-Communicable Disease Programmes, Mental Health, and Health Protection Initiatives

- Chronic disease control: National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD)

- Specialized national programs: National Mental Health Programme (NMHP), National Programme for Health Care of the Elderly (NPHCE), and National Programme for Palliative Care (NPPC)
- Financial risk protection: Ayushman Bharat–Pradhan Mantri Jan Arogya Yojana (PM-JAY)
- Digital health and specialized public health initiatives: Ayushman Bharat Digital Mission (ABDM), National Blood Programme, and National Organ Transplant Programme (NOTP)

Unit IV: Programme Implementation, Monitoring, Case Studies, and Field Applications

- Programme planning, implementation frameworks, supervision mechanisms, and reporting structures
- Public health indicators, program performance tracking, monitoring metrics, and evaluation tools
- Public health case studies: Applied analysis of national health program delivery and operational challenges
- Field exposure visits to a Primary Health Centre (PHC), Urban Health Centre, or District Health Office
- Field report synthesis: Documenting program implementation, ground-level service delivery, and health system integration

Suggested Readings

- Park, K. *Park's Textbook of Preventive and Social Medicine*. 28th ed., Banarsidas Bhanot Publishers.
- Kishore, J. *National Health Programs of India*. 13th ed., Century Publications.

Capstone Project / Thesis

Category: Research Project / Dissertation (RP) | **L-T-P:** 0-0-20 | **Credits:** 10

Course Objectives

1. Develop students' ability to identify and formulate a relevant public health research problem.
2. Enable students to review scientific literature and identify research gaps.
3. Develop competency in selecting appropriate research designs, sampling methods, data collection tools, and analytical approaches.
4. Ensure ethical conduct of research, including confidentiality, informed consent, and responsible data management.
5. Develop practical skills in data collection, analysis, interpretation, and presentation of public health findings.
6. Enable students to prepare a structured thesis or capstone report and communicate evidence-based recommendations.

Course Outcomes (COs)

- CO1: Formulate a focused public health research question based on a critical review of relevant literature.
- CO2: Develop an appropriate research protocol using suitable study designs, sampling strategies, data collection methods, and analytical techniques.
- CO3: Apply ethical principles and appropriate procedures for research approvals, informed consent, confidentiality, and data management.
- CO4: Conduct or complete an approved public health research project and analyse and interpret the findings using appropriate methods.
- CO5: Prepare a scientifically structured thesis or capstone report with evidence-based conclusions and recommendations.
- CO6: Present, defend, and communicate research findings effectively to academic and public health audiences.

Capstone Project / Thesis Guidelines

A. Selection of Research Topic

Students should select a topic relevant to public health practice, research, policy, or programme implementation. Possible areas include:

- Epidemiology of communicable and noncommunicable diseases.
- Environmental and occupational health.
- Health systems, healthcare quality, and health administration.
- Health policy, health economics, and health financing.
- Maternal, child, adolescent, and reproductive health.
- Health promotion and behavioural sciences.
- Digital health, health informatics, and emerging technologies.
- Global health, health equity, and social determinants of health.
- Health programme evaluation and implementation research.

The topic must be feasible within the allotted academic period and approved by the assigned faculty supervisor and the relevant academic authority.

B. Research Protocol Development

Each student must prepare a research protocol containing:

1. Title of the study.
2. Introduction and background.
3. Statement of the research problem.
4. Rationale and significance of the study.
5. Review of relevant literature.
6. Research question and, where appropriate, hypothesis.
7. Aim and specific objectives.
8. Research methodology, including study design and setting.
9. Study population, eligibility criteria, sample size, and sampling technique.
10. Data collection tools and operational definitions.
11. Data management and statistical analysis plan.
12. Ethical considerations and proposed approvals.

13. Expected outcomes and public health implications.
14. Timeline and references.

C. Ethical Approval and Research Conduct

- Obtain the required institutional ethics committee approval before commencing research involving human participants or identifiable human data, as applicable.
- Obtain permissions from hospitals, communities, organizations, or other study sites where required.
- Secure informed consent or assent, as applicable.
- Maintain confidentiality, anonymity where feasible, and secure data storage.
- Do not fabricate, falsify, or manipulate data.
- Disclose conflicts of interest and use appropriate citation practices.
- Follow applicable institutional policies and ethical guidelines throughout the project.

D. Data Collection and Analysis

Students must conduct the approved study in accordance with the protocol. Depending on the research design, activities may include:

- Primary data collection through surveys, interviews, observations, or assessments.
- Secondary data analysis using authorized datasets.
- Qualitative data transcription, coding, and thematic analysis.
- Quantitative data cleaning, descriptive analysis, and appropriate statistical testing.
- Evaluation of health programmes, policies, or interventions.
- Interpretation of findings in relation to existing literature and public health practice.

Students must maintain appropriate documentation of data collection, analysis, and any approved changes to the research protocol.

E. Thesis / Capstone Report Structure

The final submission should ordinarily contain:

1. Title page.
2. Certificate or declaration, as prescribed by the university.
3. Acknowledgements.
4. Abstract.
5. Table of contents.
6. List of tables, figures, and abbreviations, where applicable.
7. Introduction and background.
8. Review of literature.
9. Aim and objectives.
10. Methodology.
11. Results or findings.
12. Discussion.
13. Strengths and limitations.
14. Conclusions and recommendations.
15. Public health implications.
16. References.

17. Appendices, including approved tools and participant information documents where applicable.

The university's prescribed thesis format, referencing style, and similarity-check requirements must be followed.

Proposed Course Outline and Practical Work

The following stages can be used to monitor student progress throughout the capstone project.

Stage 1: Research problem identification and literature review

- Identify a public health problem.
- Conduct a structured literature search.
- Develop the research question and rationale.

Stage 2: Protocol development

- Define aims and objectives.
- Select the research design and methodology.
- Develop data collection tools and an analysis plan.

Stage 3: Proposal presentation and approval

- Present the research proposal.
- Incorporate supervisor and review committee feedback.
- Obtain required permissions and ethical approvals.

Stage 4: Data collection and project implementation

- Conduct the approved study.
- Maintain research documentation.
- Ensure data quality and ethical compliance.

Stage 5: Data analysis and interpretation

- Analyse quantitative or qualitative data using appropriate methods.
- Prepare tables, figures, or thematic summaries.
- Interpret findings against the research objectives.

Stage 6: Thesis writing and final defence

- Prepare the complete thesis or capstone report.
- Submit the final document.
- Present and defend the findings before the designated evaluation panel.

5. Supervision and Monitoring Guidelines

- Each student should be assigned a faculty supervisor.

- The supervisor should approve the topic, guide protocol development, and monitor progress.
- Students should submit periodic progress reports.
- Supervisor meetings and milestones should be documented.
- Any substantial change in objectives, methodology, or study population should receive the necessary approval.
- The final thesis should be evaluated for research quality, methodological appropriateness, ethical compliance, originality, and clarity of presentation.