



GUJARAT TECHNOLOGICAL UNIVERSITY
Integrated Master of Science (Biotechnology)

Semester: 8

Subject Name: Public Health and Epidemiology

Subject Code: 1380409

Prerequisite: Students should have a basic understanding of microbiology, biostatistics, and healthcare systems. Familiarity with epidemiological methods, disease surveillance, and public health policies is beneficial.

Rationale: This course provides comprehensive knowledge of public health, epidemiological methods, and global health challenges. It covers disease surveillance, outbreak investigation, healthcare policies, and data-driven decision-making in public health.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
4	0	0	3	70	30	0	0	100

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Unit 1: Introduction to Public Health and Epidemiology <ul style="list-style-type: none"> • Definition and Scope of Public Health • Epidemiology and Its Role in Public Health • Determinants of Health and Disease Prevention • Global Health Policies and Organizations (WHO, CDC, ICMR) • Emerging Public Health Challenges (COVID-19, AMR, Climate Change) 	12	20
2	Unit 2: Epidemiological Study Designs and Disease Surveillance <ul style="list-style-type: none"> • Types of Epidemiological Studies (Case-Control, Cohort, RCT) • Disease Surveillance Systems and Outbreak Investigation • Statistical Tools for Public Health Data Analysis • Reproductive Number (R0), Incidence, and Prevalence Calculation • AI and Big Data in Epidemiology 	12	20
3	Unit 3: Public Health Interventions and Policy Development <ul style="list-style-type: none"> • Vaccination Strategies and Immunization Programs • Health Economics and Cost-Effectiveness Analysis • Nutrition and Lifestyle Interventions in Public Health • Disaster Preparedness and Bioterrorism Threats 	12	20



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	<ul style="list-style-type: none">• Case Studies: Eradication of Smallpox, Polio, and HIV Prevention Strategies		
4	Unit 4: Communicable and Non-Communicable Diseases (NCDs) <ul style="list-style-type: none">• Epidemiology of Infectious Diseases (TB, Malaria, HIV, COVID-19)• Public Health Burden of NCDs (Diabetes, Cardiovascular Diseases, Cancer)• Role of Genetics and Lifestyle in Disease Development• National and International Disease Control Programs• AI-Driven Predictive Models for Disease Management	12	20
5	Unit 5: Future of Public Health and Epidemiology <ul style="list-style-type: none">• Emerging Technologies in Public Health Surveillance• AI and Machine Learning in Predictive Epidemiology• Role of Blockchain in Health Data Security• Policy Recommendations for Strengthening Global Public Health Systems• Future Trends: Personalized Public Health, Precision Epidemiology	12	20

Reference Books:

1. Epidemiology: Beyond the Basics – Moyses Szklo, Javier Nieto
2. Public Health: What It Is and How It Works – Bernard J. Turnock
3. Modern Epidemiology – Kenneth J. Rothman
4. Principles of Epidemiology in Public Health Practice – CDC Guidelines
